

In the Matter of

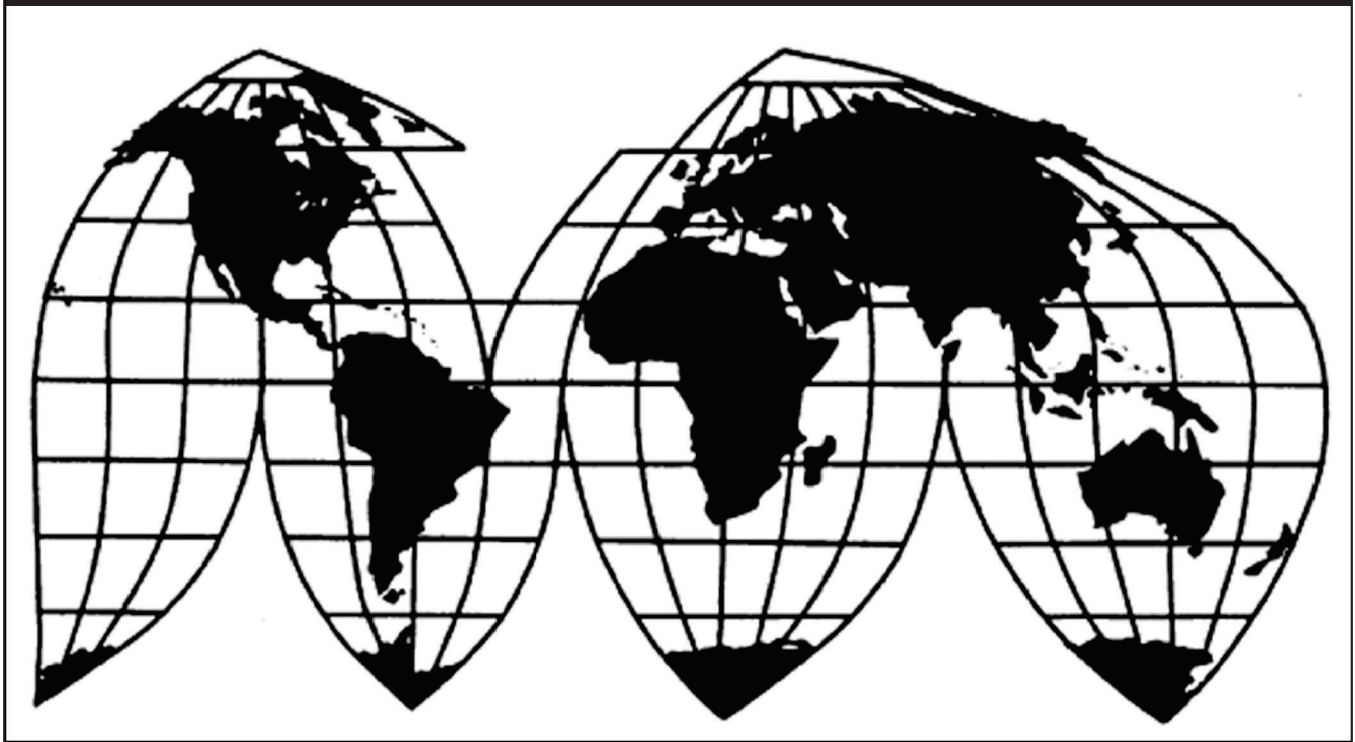
**CERTAIN ROBOTIC VACUUM CLEANING
DEVICES AND COMPONENTS THEREOF
SUCH AS SPARE PARTS**

Investigation No. 337-TA-1057

Publication 4979

September 2019

U.S. International Trade Commission



Washington, DC 20436

U.S. International Trade Commission

COMMISSIONERS

David Johanson, Chairman
Irving Williamson, Commissioner
Meredith Broadbent, Commissioner
Rhonda Schmidlein, Commissioner
Jason Kearns, Commissioner

Address all communications to
Secretary to the Commission
United States International Trade Commission
Washington, DC 20436

U.S. International Trade Commission

Washington, DC 20436
www.usitc.gov

In the Matter of

CERTAIN ROBOTIC VACUUM CLEANING DEVICES AND COMPONENTS THEREOF SUCH AS SPARE PARTS

Investigation No. 337-TA-1057



**UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.**

In the Matter of

**CERTAIN ROBOTIC VACUUM
CLEANING DEVICES AND
COMPONENTS THEREOF SUCH AS
SPARE PARTS**

**Investigation No. 337-TA-1057
(Consolidated Advisory Opinion and
Enforcement Proceeding)**

**NOTICE OF THE COMMISSION'S DETERMINATION NOT TO
REVIEW AN INITIAL DETERMINATION TERMINATING
THE ENFORCEMENT PROCEEDING; TERMINATION
OF THE ENFORCEMENT PROCEEDING**

AGENCY: U.S. International Trade Commission.

ACTION: Notice.

SUMMARY: Notice is hereby given that the U.S. International Trade Commission ("the Commission") has determined not to review an initial determination ("ID") (Order No. 53) issued by the presiding administrative law judge ("ALJ") that terminates the enforcement proceeding. The investigation is terminated.

FOR FURTHER INFORMATION CONTACT: Robert Needham, Office of the General Counsel, U.S. International Trade Commission, 500 E Street, SW., Washington, D.C. 20436, telephone (202) 708-5468. Copies of non-confidential documents filed in connection with this investigation are or will be available for inspection during official business hours (8:45 a.m. to 5:15 p.m.) in the Office of the Secretary, U.S. International Trade Commission, 500 E Street, SW., Washington, D.C. 20436, telephone (202) 205-2000. General information concerning the Commission may also be obtained by accessing its Internet server (<https://www.usitc.gov>). The public record for this investigation may be viewed on the Commission's electronic docket (EDIS) at <https://edis.usitc.gov>. Hearing-impaired persons are advised that information on this matter can be obtained by contacting the Commission's TDD terminal on (202) 205-1810.

SUPPLEMENTARY INFORMATION: The Commission instituted an investigation on May 23, 2017, based on a complaint filed by iRobot Corporation of Bedford, Massachusetts ("iRobot"). 82 FR 23593-94. The complaint, as supplemented, alleged violations of section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. 1337, in the importation into the United States, the sale for importation, and the sale within the United States after importation of certain robotic vacuum cleaning devices and components thereof that infringe certain claims of, *inter alia*, U.S. Patent No. 9,038,233 ("the '233

patent”). *Id.* The Commission’s notice of investigation named as respondents, *inter alia*, Shenzhen Silver Star Intelligent Technology Co., Ltd., of Shenzhen, China (“Silver Star”), and bObsweep USA, of Henderson, Nevada, and bObsweep Inc., of Toronto, Canada (together, “bObsweep”). *Id.* at 23593. The Office of Unfair Import Investigations did not participate in the investigation. *Id.*

On November 30, 2018, the Commission found, *inter alia*, that Silver Star and bObsweep violated section 337 with respect to the ’233 patent, and issued a limited exclusion order (“LEO”) against, *inter alia*, Silver Star and bObsweep, with respect to certain claims of the ’233 patent. 83 FR 63186-87 (Dec. 7, 2018).

On January 30, 2019, Silver Star filed a request for an advisory opinion that eight of its new products do not violate the LEO. On March 21, 2019, the Commission instituted an advisory opinion proceeding, and named as parties iRobot, Silver Star, and the Office of Unfair Import Investigations (“OUII”). 84 FR 10531 (Mar. 21, 2019).

On February 21, 2019, iRobot filed an enforcement complaint against bObsweep. On April 1, 2019, the Commission instituted a formal enforcement proceeding, and named as parties iRobot, bObsweep, and OUII. 84 FR 12289 (Apr. 1, 2019). The Commission consolidated the formal enforcement proceeding with the advisory opinion proceeding described above.

On April 12, 2019, iRobot and Silver Star filed a joint motion to terminate the advisory opinion proceeding based on a settlement agreement. The Commission terminated the advisory opinion proceeding on May 15, 2019.

On May 7, 2019, iRobot and bObsweep filed a joint motion to terminate the enforcement proceeding based on a settlement agreement. On May 15, 2019, OUII filed a response arguing that the Commission should grant the motion.

On May 20, 2019, the ALJ issued the subject ID, granting the motion and terminating the enforcement proceeding based on a settlement agreement. The ALJ found that the motion complied with Rule 210.21(b) and that there is no evidence that termination by settlement has any adverse effect on the public interest. No petitions for review of the ID were filed.

The Commission has determined not to review the subject ID. The investigation is terminated.

The authority for the Commission’s determination is contained in section 337 of the Tariff Act of 1930, as amended (19 U.S.C. 1337), and in part 210 of the Commission’s Rules of Practice and Procedure (19 CFR part 210).

By order of the Commission.

A handwritten signature in black ink, appearing to read 'Lisa R. Barton', written in a cursive style.

Lisa R. Barton
Secretary to the Commission

Issued: June 4, 2019

**CERTAIN ROBOTIC VACUUM CLEANING
DEVICES AND COMPONENTS THEREOF SUCH
AS SPARE PARTS**

**Inv. No. 337-TA-1057
(Enforcement)**

CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **NOTICE** has been served by hand upon the Commission Investigative Attorney, **Todd Taylor, Esq.**, and the following parties as indicated, on **June 5, 2019**.



Lisa R. Barton, Secretary
U.S. International Trade Commission
500 E Street, SW, Room 112
Washington, DC 20436

On Behalf of Complainant iRobot Corporation:

Stephen Marshall
FISH & RICHARDSON P.C.
1000 Maine Ave. SW
Suite 1000
Washington, DC 20024

- Via Hand Delivery
- Via Express Delivery
- Via First Class Mail
- Other: _____

On Behalf of Respondents bObsweep USA and bObsweep Inc.:

Kecia J. Reynolds
PILLSBURY WINTHROP SHAW PITTMAN LLP
1200 Seventeenth St. NW
Washington, DC 20036

- Via Hand Delivery
- Via Express Delivery
- Via First Class Mail
- Other: _____

UNITED STATES INTERNATIONAL TRADE COMMISSION

Washington, D.C.

In the Matter of

**CERTAIN ROBOTIC VACUUM
CLEANING DEVICES AND
COMPONENTS THEREOF SUCH AS
SPARE PARTS**

**Inv. No. 337-TA-1057
(Consolidated Advisory Opinion
and Enforcement Proceeding)**

**ORDER NO. 53: INITIAL DETERMINATION GRANTING COMPLAINANT
IROBOT CORPORATION'S MOTION TO TERMINATE
ENFORCEMENT ACTION BASED ON SETTLEMENT
AGREEMENT**

(May 20, 2019)

On May 7, 2019, complainant iRobot Corp. ("iRobot") moved (1057-064) pursuant to 19 C.F.R. § 210.21(b) to terminate the remaining enforcement portion of the consolidated proceeding based on settlement agreement between iRobot and respondents bObsweep, Inc. and bObsweep USA ("bObsweep"). iRobot's motion was filed in both confidential and public versions which attached confidential and public versions of the settlement agreement, respectively. (EDIS Doc. Nos. 675276, 675282.) The motion represents, "bObsweep does not oppose this motion. Staff has indicated that they may file a response after review of the motion papers." (Mot. at 1.) On May 17, 2019, the Commission Investigative Staff filed a statement in support of the motion. (EDIS Doc. No. 676273.)

Commission Rule 210.21(b) provides, in relevant part:

An investigation before the Commission may be terminated as to one or more respondents pursuant to section 337(c) of the Tariff Act of 1930 on the basis of a licensing or other settlement agreement. The motion for termination by settlement shall contain copies of the licensing or other settlement agreements, any supplemental

agreements, any documents referenced in the motion or attached agreements, and a statement that there are no other agreements, written or oral, express or implied between the parties concerning the subject matter of the investigation. If the licensing or other settlement agreement contains confidential business information within the meaning of § 201.6(a) of this chapter, a copy of the agreement with such information deleted shall accompany the motion. On motion for good cause shown, the administrative law judge may limit the service of the agreements to the settling parties and the Commission investigative attorney.

19 C.F.R. § 210.21(b)(1).

While Commission Rule 210.75 pertains to formal enforcement proceedings, it does not provide explicit direction concerning the termination of those proceedings. Nonetheless, Commission Rules 210.21(a) and (b) have been cited and used towards Commission determinations terminating formal enforcement proceedings. *See, e.g., Certain Network Devices, Related Software and Components Thereof (I)*, Inv. No. 337-TA-944 (Enforcement Proceeding), Comm'n Notice (Sep. 17, 2018).

The pending motion for termination complies with the Commission Rules. In particular, iRobot has provided confidential and public versions of its settlement agreement, attached hereto as Exhibits A and B, respectively. Moreover, iRobot states: “[t]here are no other agreements, written or oral, express or implied, between iRobot and bObsweep concerning the subject matter of this Investigation.” (Mot. at 1.) In addition, I find there are no extraordinary circumstances that warrant denying the motion.

With respect to the public interest, the Commission Rules provide that when considering a motion to terminate based upon a settlement agreement, the Administrative Law Judge “shall consider and make appropriate findings in the initial determination regarding the effect of the proposed settlement on the public health and welfare, competitive conditions in the U.S. economy,

Public Version

the production of like or directly competitive articles in the United States, and U.S. consumers.”
19 C.F.R. § 210.50(b)(2). After a review of the settlement agreement, I find no evidence indicating that terminating this investigation would be contrary to the public interest.

Accordingly, it is my initial determination that Motion No. 1057-064 is granted. This consolidated proceeding is terminated as to the remaining enforcement portion and is therefore terminated in its entirety. This Initial Determination is hereby certified to the Commission.

Pursuant to 19 C.F.R. § 210.42(h), this initial determination shall become the determination of the Commission thirty (30) days after the date of service of the initial determination, unless a party files a petition for review of the initial determination within five (5) business days after service of the initial determination pursuant to 19 C.F.R. § 210.43(a), or the Commission, pursuant to 19 C.F.R. § 210.44, orders on its own motion a review of the initial determination or certain issues herein. Any issue or argument not raised in a petition for review, or response thereto, will be deemed to have been abandoned and may be disregarded by the Commission in reviewing the initial determination pursuant to 19 C.F.R. §§ 210.43(b) and (c).

SO ORDERED.



Cameron Elliot
Administrative Law Judge

EXHIBIT A
**(omitted from public
version)**

EXHIBIT B

SETTLEMENT AGREEMENT

This Settlement Agreement (“**Agreement**”) is entered into between iRobot Corporation, a corporation organized and existing under the laws of Delaware, with its principal place of business at 8 Crosby Drive, Bedford, Massachusetts 01730 (“**iRobot**”) and bObsweep, Inc., a Canadian corporation, with its principal place of business located at 1121 Bay Street, Suite 709, Toronto, ON M5S3L9, Canada, and bObsweep USA, a corporation organized under the laws of the State of Nevada, with its principal place of business located at 7 Sunset Way, No. 180-190, Henderson, Nevada 89014 (“**bObsweep, Inc.**” and “**bObsweep USA**” collectively referred to as “**bObsweep**”) as of the date iRobot counter-signs the agreement (the “**Effective Date**”), as defined below. As used herein, “**Party**” refers to either iRobot or bObsweep and “**Parties**” refers to iRobot and bObsweep, collectively.

WHEREAS, iRobot brought suit against a number of parties, including bObsweep, in *Certain Robotic Vacuum Cleaning Devices and Components Thereof Such as Spare Parts*, Inv. No. 337-TA-1057 (Int’l Trade Comm’n), filed April 18, 2017 (the “**ITC Action**”) and *iRobot Corp. v. bObsweep, et al.*, Case No. 1:17-cv-10651 (D. Mass.) (the “**iRobot District Court Action**”), and iRobot additionally filed an ITC enforcement action against bObsweep in *Certain Robotic Vacuum Cleaning Devices and Components Thereof Such as Spare Parts*, Inv. No. 337-TA-3366, filed Feb. 21, 2019 (the “**Enforcement Action**”);

WHEREAS, iRobot desires [REDACTED]

WHEREAS, bObsweep further desires to [REDACTED]

[REDACTED] resolve certain disputes related thereto, including all claims alleged in the ITC Action, the iRobot District Court Action, and the Enforcement Action, in relation to the accused robotic vacuum devices sold under the bObsweep brand as set forth below;

WHEREAS, bObsweep denies liability and disputes, among other allegations, iRobot’s allegation of infringement and validity of all asserted patents in the ITC Action, the iRobot District Court Action, and the Enforcement Action; and

WHEREAS, the Parties now desire to enter into this Agreement providing for a disposition of the claims set forth in the ITC Action, the iRobot District Court Action, and the Enforcement Action [REDACTED]

NOW, THEREFORE, in consideration of the covenants, representations, and warranties contained herein and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties, intending to be legally bound, hereby agree as follows:

1. DEFINITIONS

1.1 “**Affiliate(s)**” shall mean any other Person (defined below) directly or indirectly controlling a Party, controlled by a Party or under common control with a Party, currently or in the future. For purposes of this definition, “control” in this Section 1.1 means direct or indirect (*e.g.*, through any number of successive tiers) ownership of: (a) more than fifty percent (50%) of the outstanding shares having the right to vote for the election of directors or other managing authority of the subject entity; or (b) in the case of a Person that does not have outstanding shares (*e.g.*, a partnership, joint venture or unincorporated association), more than fifty percent (50%) of the ownership interests having the right to make decisions for the subject entity.

1.2 “**Average Selling Price**” means the average amount of currency (in US Dollars) [REDACTED]

1.3 “**bObsweep Patents**” shall mean all U.S. robotic vacuum patents and patent applications that are, during the term of this Agreement, assigned to, owned by, or controlled by bObsweep, or for which bObsweep has a right to assert a claim of infringement or to grant licenses. [REDACTED]

1.4 “**Business Day**” shall mean any day other than a Saturday, a Sunday or a day on which banks in New York, U.S.A., are authorized or obligated by law or executive order to close.

1.5 “**iRobot Licensed Patents**” shall mean all U.S. robotic vacuum patents and patent applications that are, during the term of this Agreement, assigned to, owned by, or controlled by iRobot, or for which iRobot has a right to assert a claim of infringement or to grant licenses, including, without limitation, the patents asserted in the ITC Action and the iRobot District Court Action. [REDACTED]

1.6 “**Effective Date**” shall mean the date upon which iRobot counter-signs the Agreement.

1.7 **“bObsweep Customers”** shall mean U.S. customers that have purchased, distributed and/or sold a bObsweep Product, as defined herein, including without limitation, distributors, retailers, resellers, and end users, subject to the time limitations defined herein.

1.8 **“bObsweep Products”** shall mean robotic vacuum devices designed, developed, manufactured by and/or manufactured for bObsweep or for bObsweep Customers under the bObsweep brand name in the United States including, but not limited to the [REDACTED] robotic vacuum devices during the Term.

1.9 **“Third Party bObsweep Products”** shall mean robotic vacuum devices designed, developed, and/or manufactured for bObsweep for importation and/or sale by Third Parties.

1.10 **“bObsweep Distributor”** shall mean all third parties that: (1) import, sell, resell, and/or distribute bObsweep Products and Third Party bObsweep Products, and (2) bObsweep collects sales, revenue, or other consideration from, or, alternatively, has a contractual relationship with for the aforementioned activities. [REDACTED]

1.11 **“iRobot Customers”** shall mean U.S. customers that have purchased, distributed and/or sold an iRobot Product, as defined herein, including without limitation, distributors, retailers, resellers, and end users, subject to the time limitations defined herein.

1.12 **“iRobot Products”** shall mean all robotic vacuum devices designed, developed, manufactured by and/or manufactured for iRobot, including, but not limited to, the Roomba 500, 600, 700, 800, 900, and e/i series robotic vacuum devices. For the avoidance of doubt, this includes all versions of these robotic vacuum devices and any new models or variations thereof.

1.13 [REDACTED]

1.14 **“Person”** as used herein shall mean an individual, trust, corporation, partnership, joint venture, limited liability company, association, unincorporated organization or other legal or governmental entity.

1.15 **“Term”** shall be until [REDACTED]

1.16 **“Third Party”** shall mean any Person other than the Parties to the Agreement or an Affiliate of a Party to this Agreement.

1.17 **“License Territory”** shall mean the United States of America.

2. LICENSES, COVENANTS, AND RELEASES

2.1 **License by iRobot.** Subject to iRobot's counter-signature of the Agreement [REDACTED] (and unless this Agreement is terminated as permitted in Section 5), iRobot hereby grants to bObsweep and its Affiliates a non-exclusive and non-transferable license, without right to sub-license, to the iRobot Licensed Patents from the Effective Date until [REDACTED]

2.2 **Covenant by iRobot.** Subject to iRobot's counter-signature of the Agreement [REDACTED] (and unless this Agreement is terminated as permitted in Section 5), iRobot, on behalf of itself and its Affiliates, successors, and assigns, hereby covenants that during the Term of this Agreement [REDACTED]

2.3 **Covenant by bObsweep.** Subject to iRobot's counter-signature of the Agreement and unless this Agreement is terminated as permitted in Section 5, bObsweep, on behalf of itself and its Affiliates, officers, directors, employees, successors, and assigns, hereby covenants [REDACTED] during the Term of this Agreement.

2.4 **Release by bObsweep.** Subject to iRobot's counter-signature of the Agreement and unless this Agreement is terminated as permitted in Section 5, bObsweep hereby fully, finally, and forever releases, discharges, and acquits iRobot, its Affiliates, its officers, directors, employees, successors, and assigns from any and all known or unknown claims arising out of, based upon, attributable to, or in connection with the ITC Action, Enforcement Action, and the iRobot District Court Action with respect to the bObsweep Patents and the bObsweep Products. This release includes, but is not limited to any and all known claims for damages, costs, and/or attorney fees arising out of, as a result of, or related to the allegations in the ITC Action, Enforcement Action, and iRobot District Court Action in relation to the bObsweep Products.

For the avoidance of doubt, the foregoing does not include: (1) any claims with respect to breach of this Agreement, (2) the design, development, manufacture, use, sale, or offer for sale of iRobot

Products [REDACTED]

2.5 **Release by iRobot.** Subject to iRobot's counter-signature of the Agreement [REDACTED] (and unless this Agreement is terminated as permitted in Section 5), iRobot hereby fully, finally, and forever releases, discharges, and acquits bObsweep and its Affiliates, its officers, directors, employees, successors, and assigns from any and all known or unknown claims arising out of, based upon, attributable to, or in connection with the ITC Action, Enforcement Action, and the iRobot District Court Action. This release includes, but is not limited to, any and all known and unknown claims for damages, costs, and/or attorney fees arising out of, as a result of, or related to the allegations in the ITC Action, Enforcement Action, and iRobot District Court Action.

For the avoidance of doubt, the foregoing does not include: [REDACTED]

(3) any claims with respect to breach of this Agreement, (4) [REDACTED]

2.6 **General Release.** The Parties, having specific intent to release potential claims described in the foregoing Sections 2.4 and 2.5, whether known or unknown, do hereby acknowledge and expressly waive any rights they may have under the provisions of California Civil Code Section 1542 (or any similar law in another jurisdiction) which provides: "A general release does not extend to claims which the creditor does not know or suspect to exist in his favor at the time of executing the release, which if known by him must have materially affected his settlement with the debtor."

3. **IMPORTATION** [REDACTED]

3.1 [REDACTED] bObsweep, on behalf of itself and its Affiliates, bObsweep Distributors, successors, assigns, hereby agrees [REDACTED]

[REDACTED]

3.2 [REDACTED]

(a) Unless this Agreement is terminated as permitted in Section 5, [REDACTED]

[REDACTED]

[REDACTED]

3.3 (a) Importation, [REDACTED] Reporting and Audit.

(i) *Obligation to Maintain Records:* [REDACTED]

[REDACTED]

(ii) [REDACTED] **Reporting:** Beginning after the Effective Date, as applicable based on the Term, [REDACTED]

[REDACTED] These records shall include, but are not limited to, [REDACTED]

(iii) **Audit Procedures:** bObsweep further agrees that it will, upon request by iRobot, during the Term and upon good cause (e.g., a discrepancy in the reporting), allow a certified accountant appointed by iRobot access to its premises during business hours and audit the aforementioned records of [REDACTED]

3.4 **Payment.** [REDACTED]

3.5 **Initial Obligations.** Any reporting or payment obligations that would have already come due under this Section 3 by the Effective Date of this Agreement will instead be due within thirty (30) calendar days after the Effective Date (e.g., 30 calendar days after iRobot executes the Agreement). [REDACTED]

4. **CONSIDERATION**

4.1 **The Payment.** [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

5. Termination.

5.1 Termination for Breach. If a Party (the “Defaulting Party”) is in breach of this Agreement because it has failed to substantially perform any of its obligations under this Agreement, the other party (the “Aggrieved Party”) may give written notice to the Defaulting Party specifying the respects in which the Defaulting Party has so failed to perform its obligations and state that the Aggrieved Party intends to terminate this Agreement in the event of continued default. In the event that any default so specified is not remedied within ten (10) business days after the receipt of such written notice, the Aggrieved Party may forthwith terminate this Agreement, including voiding the license, covenant, and releases set forth in Section 2, by giving written notice of termination to the Defaulting Party. Such termination shall be effective five (5) business days after the date of the receipt of such notice of termination. Illustrative examples of a Party’s failure to substantially perform its obligations under this Agreement that shall constitute material breach of this Agreement include, but are not limited to:

- (a) [REDACTED]
- (b) [REDACTED]
- [REDACTED]; or
- (c) Breach by bObsweep or iRobot of the confidentiality provisions of this Agreement.

The Parties agree that a breach by the Defaulting Party to this Agreement shall cause irreparable harm to the Aggrieved Party which may not be adequately compensated by money damages. Accordingly, in the event of a breach by a Defaulting Party, the Aggrieved Party shall be entitled to seek the remedies of specific performance, injunction, or other preliminary or equitable relief, without having to prove irreparable harm or actual damages. The foregoing right shall be in addition to such other rights or remedies as may be available to the Aggrieved Party for such breach, including the recovery of money damages.

Failure of the Aggrieved Party to so terminate this Agreement shall be without prejudice to the rights of the Aggrieved Party to terminate for a later breach, and any termination or failure to

terminate hereunder shall be without prejudice to any other rights the Aggrieved Party may have under this Agreement.

5.2 **Termination under Other Conditions.** A Party hereto may also terminate, at its option, this Agreement at any time under the following conditions:

- (a) The filing by the other Party of a petition in bankruptcy or insolvency;
- (b) The filing by the other Party of patent infringement litigation or an administrative or a judicial challenge to patent validity in the United States against the other Party [REDACTED] (for the avoidance of doubt, litigation claims filed by one Party concerning marketing and advertising shall not provide a basis for the other Party to terminate this Agreement), except with respect to non-robotic vacuum patents and patent applications and [REDACTED] or
- (c) Any adjudication that the other Party is bankrupt or insolvent.

A Party may only terminate the Agreement under the above-listed circumstances ten (10) business days after receipt by the other Party of written notice specifying the reason for termination.

Following the Effective Date and for a period of 30 days, and conditioned upon [REDACTED]
[REDACTED] iRobot additionally reserves the right to rescind this Agreement in the event that [REDACTED]

5.3 **Dismissals and Release** [REDACTED] Within forty-five days of the Effective Date (and subject to termination in Section 5), the parties to the Agreement agree to execute and file necessary documents to withdraw or terminate all pending legal challenges and legal proceedings in the form set forth in Exhibits B – D, or in any other form as the court or the International Trade Commission (ITC) may require to effectuate such withdrawals or terminations:

- (a) The Parties agree to file a joint petition for rescission/modification of the ITC Limited Exclusion Order and Cease-and-Desist Orders (Investigation Number 337-TA-1057), as against bObsweep, pursuant to Exhibit B.
- (b) iRobot agrees to file a motion to terminate the Enforcement Action, pursuant to Exhibit C.
- (c) iRobot shall dismiss claims in the iRobot District Court Action as against bObsweep, pursuant to Exhibit D, or in such other form as required for approval by each court to effectuate the dismissals.
- (d) iRobot agrees to cooperate with bObsweep and US Customs and Border Protection [REDACTED]
[REDACTED]

Should more time be required to effectuate the withdrawal or dismissal of certain actions [REDACTED]
[REDACTED] iRobot and bObsweep agree to stay all discovery in the Enforcement Action until May 16, 2019.

The Parties understand that this Agreement [REDACTED] Any dismissals, withdrawals, and accompanying documentation, as set forth in Exhibits B – D, are intended to dismiss, vacate, or withdraw products and entities with respect to bObsweep, Third Party bObsweep Products, and/or bObsweep Products only.

5.4 **Timeline.** For the avoidance of doubt, the relevant timelines for the appropriate dismissals are:

Event	Date
Date iRobot counter-signs Agreement	Effective Date, defined herein
[REDACTED]	30 calendar days after Effective Date
[REDACTED]	6 months after Effective Date
[REDACTED]	12 months after Effective Date
[REDACTED]	30 calendar days after Effective Date
iRobot files papers for dismissal and/or stay (if applicable) of District Court Action, ITC Action, and Enforcement Action	45 calendar days after Effective Date
Term ends	[REDACTED]
Records to be held	[REDACTED]

6. REPRESENTATIONS AND WARRANTIES

6.1 **Mutual Representations.** Each Party hereby represents, warrants, and covenants that:

- (a) It has, and throughout the term of this Agreement will have, the full right, power, authority and competence to enter into and perform its obligations under this Agreement;
- (b) This Agreement has been duly executed by such Party;
- (c) This Agreement constitutes a legal, valid, and binding obligation of such Party, enforceable against it in accordance with its terms;
- (d) The execution and delivery of this Agreement and the performance of such Party’s obligations hereunder (i) do not conflict with or violate such Party’s corporate charter or bylaws or any requirement of applicable laws or regulations, and (ii) do not and shall not conflict with, violate, breach, constitute a default, or require any consent under any agreement, contract, commitment, or obligation by which it is bound;
- (e) All necessary consents, approvals and authorizations of all authorities and other Persons and entities required to be obtained by such Party in connection with the execution, delivery and performance of this Agreement have been obtained;

- (f) Each of the persons signing this Agreement is duly authorized, with full authority to bind the respective Party and no signature of any other person or entity is necessary to bind the respective Party; and
- (g) It has not relied on any matter, statement, representation of any adverse party or counsel, or term not expressly contained in this Agreement.

7. CONFIDENTIALITY

7.1 Designation of this Agreement as Confidential Information. The terms of this Agreement shall be considered and treated as confidential information and the Parties agree that the Parties will not disclose, directly or indirectly, any information regarding this Agreement or the claims or allegations settled to any Third Party, other than their attorneys, accountants, tax preparers, financial advisors, or unless otherwise required by law or judicial process, or in the defense of their rights or interests, provided, however, that either Party may publicly disclose that they have entered into this Agreement and name the Parties thereto. Such disclosure must specifically exclude disclosure of any of the terms and/or conditions of this Agreement.

7.2 Disclosure. Any Party may disclose the existence and terms and/or conditions of this Agreement to (i) any court or governmental entity of competent jurisdiction requiring such disclosure, including without limitation the Securities and Exchange Commission, to the extent disclosure is required; (ii) in response to a valid subpoena or as otherwise may be required in a litigation; provided however, that the Party producing a copy of this Agreement shall exercise its best efforts to produce it subject to a protective order under an "Outside Attorneys' Eyes Only" or higher confidentiality designation; and (iii) to a counterparty in connection with a potential merger, acquisition, financing, stock offering, or related transaction, with confidentiality obligations no less restrictive than those in this Agreement.

7.3 Materiality. The confidentiality provisions of this Agreement are material terms of this Agreement, and any breach of these provisions will constitute a breach of this Agreement. The failure of any Party to enforce at any time any of the provisions governing the confidentiality of the terms of this Agreement or to require at any time performance by any of the Parties of any such provisions shall in no way be construed as a waiver of such provision or relinquishment of the right thereafter to enforce such provision.

8. ASSIGNMENT

8.1 Assignment. Except as expressly permitted in this Section, no Party may assign (by contract, operation of law, or otherwise) its rights under this Agreement without the prior written consent of the other Party and any attempt to assign without such permission will be void.

8.2 Permitted Assignment by iRobot. Notwithstanding the provisions of Section 8.1, iRobot may assign its rights under this Agreement, in whole or in part, without bObsweep's prior written consent provided that the assignment is subject to all of the terms and conditions of this Agreement and shall be binding on any purchasers, transferees, or assigns thereof.

9. **MISCELLANEOUS**

9.1 **Entire Agreement, Amendment, Modification and Waiver.** This Agreement constitutes and contains the entire agreement between iRobot and bObsweep, and supersedes any and all prior negotiations, conversations, correspondence, understandings, emails, and letters, respecting the subject matter hereof. This Agreement cannot be modified or amended in any respect orally or by the conduct of the Parties. This Agreement may be amended or modified or one or more provisions hereof waived only by a written instrument signed by all of the Parties. No delay or omission by any Party in exercising any right shall be construed as a waiver of such right, nor shall any single or partial exercise thereof preclude any further exercise thereof or the exercise of any other right. No waiver of any right under this Agreement shall be construed to be a previous or subsequent waiver of such right, nor shall it constitute the waiver of any performance other than the actual performance specifically waived.

9.2 **No Relationship Intended.** Nothing in this Agreement is intended or shall be deemed to constitute a partnership, agency, or joint venture relationship between iRobot and bObsweep. Neither iRobot nor bObsweep shall incur any debts or make any commitments for the other. There is no fiduciary duty or special relationship of any kind between iRobot and bObsweep. Each Party expressly disclaims any reliance on any act, word, or deed of the other Party in entering into this Agreement.

9.3 **Governing Law.** This Agreement shall be construed, and the relationship between the Parties determined, in accordance with the laws of the State of Delaware, notwithstanding any choice-of-law principle that might dictate a different governing law. This Agreement and its terms shall be valid and enforceable throughout the world. The parties specifically agree and acknowledge that by agreeing to have Delaware law govern this Agreement they are doing so for purposes of this Agreement only and that the parties have not agreed that Delaware courts would be the proper venue for resolving any disputes between the parties.

9.4 **Forum Selection.** The Parties agree that all actions and proceedings arising out of or relating directly or indirectly to this Agreement, or any ancillary agreement or any other related obligations shall be litigated solely and exclusively in the state or federal courts of Delaware in the United States, and that such courts are convenient forums for the purpose of any such actions or proceedings. Each Party hereby submits to the personal jurisdiction of such courts for purposes of any such actions or proceedings. Further, each Party agrees that any personal service of process may be made by registered or certified mail to the notice address as set forth in Section 9.7 hereof, and that the notice addresses may be changed from time to time as provided therein.

9.5 **Severability and Headings.** If one or more provisions of this Agreement are held to be invalid or unenforceable under applicable law, such provision shall be excluded from this Agreement and the balance of this Agreement shall be interpreted as if such provision were so excluded. In the event a part or provision of this Agreement is held to be invalid or unenforceable or in conflict with law for any reason, the Parties shall replace any invalid part or provision with a valid provision which most closely approximates the intent and economic effect of the invalid provision. The headings to this Agreement are for convenience only and are to be of no force or effect in construing and interpreting the provisions of this Agreement.

9.6 **Counterparts; Signatures.** This Agreement may be executed in counterparts, each of which shall be deemed an original, but all of which, when taken together, shall constitute one and the same instrument. This Agreement may be executed and delivered by facsimile or other means of electronic delivery and upon such delivery the signature will be deemed to have the same effect as if the original signature had been delivered to the other Party or Parties.

9.7 **Notices and Acceptance.** Any notice required or permitted under this Agreement shall be given in writing and shall be sent via overnight carrier, email, or via facsimile and certified United States mail (return receipt requested), to the addresses below:

For iRobot

[REDACTED]

[REDACTED]

For bObsweep

[REDACTED]

Any Party may give written notice of a change of address or recipient name and, after notice of such change has been received, any notice or request shall thereafter be given to such Party as above provided at such changed address and/or recipient name.

9.8 **Interpretation.** The language of this Agreement has been approved by counsel for each Party, and no Party (nor their respective counsel) shall be deemed to be the draftsman of this Agreement. Thus, any rule of construction to the effect that ambiguities are to be resolved against the drafting Party will not be applied in the interpretation of this Agreement. The words “include” and “including” and variations thereof, will not be deemed to be terms of limitation in this Agreement, but rather will be deemed to be followed by the words “without limitation.”

9.9 **Force Majeure.** No Party shall be liable for any failure to fulfill its obligations hereunder due to causes beyond its reasonable control, including but not limited to acts of omissions of government or military authority, acts of God, shortages of materials, transpiration delays, earthquakes, fires, floods, labor disturbances, riots, or wars.

9.10 **Attorney Fees, Costs, and Expenses.** Each Party shall bear its own attorney’s fees, costs, and expenses in relation to the Actions, and the negotiation and documentation of this Agreement.

9.11 **Further Assurances.** The Parties agree to cooperate fully to take all additional actions that may be reasonably necessary or appropriate to give full force and effect to the terms of this Agreement.

9.12 **No Hypothetical Negotiation.** The Parties acknowledge that the terms of this Agreement did not result from the legal framework of a hypothetical negotiation.

9.13 **Survival.** The provisions of Sections 1, 6, and 9 will survive any termination of this Agreement.

[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK]

IN WITNESS WHEREOF, this Agreement has been duly executed by the Parties as of the Effective Date as follows:

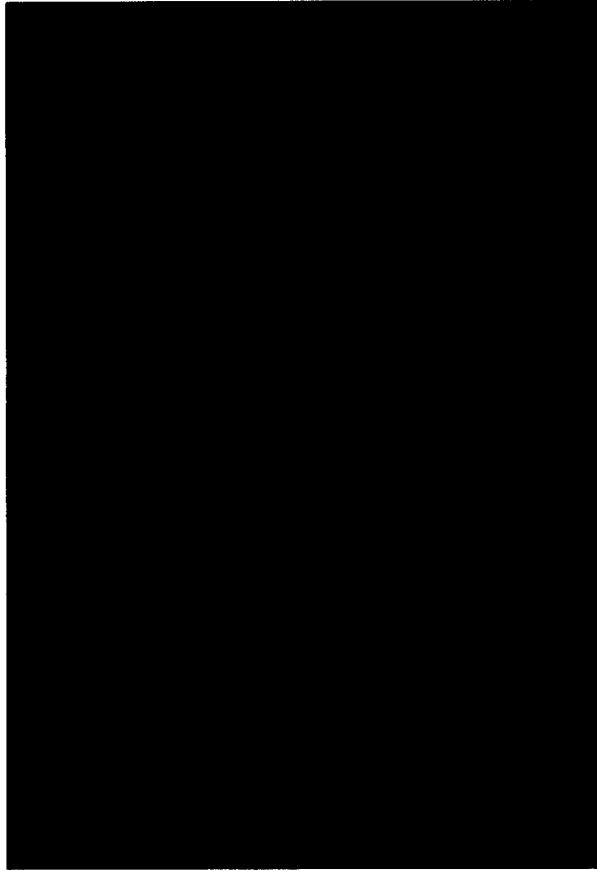


EXHIBIT A

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

EXHIBIT B

[ITC ACTION]

**UNITED STATES INTERNATIONAL TRADE COMMISSION
WASHINGTON, D.C.**

In the Matter of

**CERTAIN ROBOTIC VACUUM
CLEANING DEVICES AND
COMPONENTS THEREOF SUCH AS
SPARE PARTS**

Investigation No. 337-TA-1057

**JOINT PETITION FOR MODIFICATION OF LIMITED EXCLUSION
ORDER AND RESCISSION OF CEASE AND DESIST ORDERS BASED ON
SETTLEMENT AGREEMENTS**

Pursuant to 19 U.S.C. § 1337(k) and 19 C.F.R. § 210.76(a), Complainant iRobot Corporation (“Complainant” or “iRobot”) and Respondents bObsweep, Inc. and bObsweep USA LLC (collectively, “Respondents” or “bObsweep”) jointly petition for modification of the Limited Exclusion Order (“LEO”) and rescission of the Cease and Desist Orders (“CDOs”) (together the “Remedial Orders”) issued on November 30, 2018, pursuant to the Commission’s Final Determination Finding a Violation of Section 337 (hereinafter, the “Joint Petition”). This Petition is limited only to the Remedial Orders as directed against bObsweep, and does not impact the LEO as directed to Respondent Shenzhen Silver Star Intelligent Technology Co., Ltd.

I. INTRODUCTION

This Joint Petition is being filed because iRobot and bObsweep have entered into a confidential Settlement Agreement (the “Agreement”) that resolves all past and current disputes

between the parties, is fully effective, and has been executed by authorized representatives of iRobot and bObsweep. A confidential version of the Agreement is attached hereto as Exhibit A.¹ Modification of the LEO and rescission of the CDOs is appropriate and in the public interest pursuant to a license to, among other patents, U.S. Patent No. 9,038,233 (“the ’233 patent”). (Ex. A at Sections 1.5, 2.1, and 5.3).

Modification and rescission are warranted on the basis of changed conditions of fact and law because the specific conduct prohibited in the Remedial Orders as to bObsweep has become authorized or licensed by way of the Agreement. In addition, as set forth below, the public interest and Commission precedent support modification and rescission of remedial orders based on settlements and license agreements.

II. FACTUAL BACKGROUND

On November 30, 2018, the Commission issued its Notice of the Commission’s Final Determination Finding a Violation of Section 337; Issuance of a Limited Exclusion Order and Cease and Desist Orders; Termination of the Investigation (the “Final Determination”) finding a violation of 19 U.S.C. § 1337 by, among others, bObsweep with respect to claims 1, 10, 11, 14, 15 and 16 of the ’233 patent. The Commission then issued a LEO and CDOs directed to bObsweep and others with respect to the ’233 patent.

III. ARGUMENT

Commission Rule 210.76(a)(1) provides that: “Whenever any person believes that changed conditions of fact or law, or the public interest, require that an exclusion order, cease and desist order, or consent order be modified or set aside, in whole or in part, such person may” file with the Commission a petition requesting such relief.

¹ Pursuant to Commission Rule 210.4, a redacted public version of the Agreement is being filed with the public version of this Joint Petition.

The Agreement changes the circumstances upon which the Remedial Orders were issued. By executing the Agreement, iRobot and bObsweep have eliminated all the factual and legal disputes between them. Specifically, iRobot has granted bObsweep a license to the '233 patent, among other patents (Ex. A at Sections 1.5 and 2.1) and the parties agreed to jointly seek modification and rescission of the Remedial Orders as to bObsweep. (Ex. A at Section 5.3). The resolution of the parties' disputes in the Agreement warrants modification and rescission, and also is in the public interest. *See, e.g., Certain Marine Sonar Imaging Systems, Products Containing the Same, and Components Thereof*, Inv. No. 337-TA-926, Comm'n Notice (June 21, 2016); *Certain Sortation Systems, Parts Thereof, and Products Containing Same*, Inv. No. 337-TA-460, Order Rescinding Limited Exclusion Order at 2 (March 3, 2005) (ruling that rescission petition based on a settlement agreement satisfies the requirements of Rule 210.76(a)); *Certain Integrated Circuits, Processes for Making Same, and Products Containing Same*, Inv. No. 337-TA-450, Notice of Rescission of Limited Exclusion Order and Vacatur of Order No. 5 (April 23, 2003).

The public interest is served by modifying the LEO and rescinding the CDOs as to bObsweep. Settlement is in the public interest. Also, issuance of a modification of the LEO eases the burden of enforcement by U.S. Customs and Border Protection and rescission of the CDOs avoids additional expense, risk, and business disruption to iRobot and bObsweep.

Although the Office of Unfair Import Investigations ("OUII") was not a party to the underlying violation phase of the investigation, OUII is a party to the advisory phase of the investigation. Therefore, OUII was contacted for its position on this Joint Petition for Modification and Rescission. OUII indicated that it will [not oppose / take a position on] the Joint Petition for Rescission [after reviewing the papers].

EXHIBIT C

MOTION TO TERMINATE ENFORCEMENT ACTION BASED ON SETTLEMENT AGREEMENT

Pursuant to Commission Rule 210.21(b), Complainant iRobot Corp. (“iRobot”) respectfully requests termination of the enforcement proceedings based on a Settlement agreement and withdrawal of the complaint in its entirety against Respondents bObsweep, Inc. and bObsweep USA (“bObsweep”). iRobot and bObsweep have settled all disputes in the underlying investigation and in the enforcement proceeding.

Commission Rule 210.21(b) provides that “[a]n investigation before the Commission may be terminated as to one or more respondents pursuant to section 337(c) of the Tariff Act of 1930 on the basis of a licensing or other settlement agreement.” There is a settlement agreement between iRobot and bObsweep concerning the subject matter of the investigation, which pursuant to Commission Rule 210.21(b), is attached to this motion. (*See Confidential Exhibit 1*). There are no other agreements, written or oral, express or implied, between iRobot and bObsweep concerning the subject matter of this Investigation.

Commission policy and the public interest generally favor settlements, which preserve resources for both the Commission and the parties, and termination based on settlement agreement is routinely granted. *See, e.g., Certain Consumer Elec., Including Mobile Phones and Tablets*, Inv. No. 337-TA-839, Order No. 35, 2013 WL 453756 at *2 (Feb. 4, 2013) (“termination of litigation under these circumstances [settlement] as an alternative method of dispute resolution is generally in the public interest and will conserve public and private resources”); *Certain Portable Commc’n. Devices*, Inv. No. 337- TA-827, Order No. 15, 2012 WL 1979229 (May 31, 2012) (unreviewed) (terminating investigation based on settlement agreement).

iRobot therefore respectfully moves for termination of the enforcement investigation with respect to bObsweep on the basis of the agreement it has entered into with bObsweep.

EXHIBIT D

[DISTRICT COURT ACTION]

MOTION FOR DISMISSAL WITH PREJUDICE

Plaintiff iRobot Corporation, pursuant to Fed. R. Civ. P. 41(a)(1), hereby moves to dismiss WITH PREJUDICE all claims by iRobot against bObsweep, Inc. and bObsweep USA, with each Party to bear its own costs, expenses, and attorney's fees.

CERTAIN ROBOTIC VACUUM CLEANING DEVICES AND COMPONENTS THEREOF SUCH AS SPARE PARTS

**337-TA-1057
(Consolidated Advisory
Opinion and Enforcement
Proceeding)**

PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **INITIAL DETERMINATION ORDER NO. 53** has been served upon the Commission Investigative Attorney, Todd P. Taylor, Esq., and the following Parties as indicated **MAY 20 2019**.



Lisa R. Barton, Secretary
U.S. International Trade Commission
500 E Street SW, Room 112A
Washington, DC 20436

FOR COMPLAINANT IROBOT CORPORATION	
Stephen A. Marshall, Esq. FISH & RICHARDSON, P.C. 1000 Maine Avenue SW Washington, DC 20024	() Via Hand Delivery (<input checked="" type="checkbox"/>) Express Delivery () Via First Class Mail () Other: _____
FOR RESPONDENTS BOBSWEEP INC. & BOBSWEEP USA	
Kecia J. Reynolds, Esq. PILLSBURY WINTHROP SHAW PITTMAN, LLP. 1200 Seventeenth Street NW Washington, DC 20036	() Via Hand Delivery (<input checked="" type="checkbox"/>) Express Delivery () Via First Class Mail () Other: _____

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.

In the Matter of

**CERTAIN ROBOTIC VACUUM
CLEANING DEVICES AND
COMPONENTS THEREOF SUCH AS
SPARE PARTS**

**Investigation No. 337-TA-1057
(Rescission Proceeding)**

**NOTICE OF COMMISSION DETERMINATION TO INSTITUTE A
RESCISSION PROCEEDING; RESCISSION OF THE REMEDIAL ORDERS;
TERMINATION OF THE PROCEEDING**

AGENCY: U.S. International Trade Commission.

ACTION: Notice.

SUMMARY: Notice is hereby given that the U.S. International Trade Commission has determined to institute a rescission proceeding, to rescind a November 30, 2018 limited exclusion order and four cease-and-desist orders (“the remedial orders”), and to terminate the rescission proceeding.

FOR FURTHER INFORMATION CONTACT: Robert Needham, Office of the General Counsel, U.S. International Trade Commission, 500 E Street, SW., Washington, D.C. 20436, telephone (202) 708-5468. Copies of non-confidential documents filed in connection with this investigation are or will be available for inspection during official business hours (8:45 a.m. to 5:15 p.m.) in the Office of the Secretary, U.S. International Trade Commission, 500 E Street, SW., Washington, D.C. 20436, telephone (202) 205-2000. General information concerning the Commission may also be obtained by accessing its Internet server (<https://www.usitc.gov>). The public record for this investigation may be viewed on the Commission's electronic docket (EDIS) at <https://edis.usitc.gov>. Hearing-impaired persons are advised that information on this matter can be obtained by contacting the Commission's TDD terminal on (202) 205-1810.

SUPPLEMENTARY INFORMATION: The Commission instituted an investigation on May 23, 2017, based on a complaint filed by iRobot Corporation of Bedford, Massachusetts (“iRobot”). 82 FR 23593-94. The complaint, as supplemented, alleged violations of section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. 1337, in the importation into the United States, the sale for importation, and the sale within the United States after importation of certain robotic vacuum cleaning devices and components thereof that infringe certain claims of, *inter alia*, U.S. Patent No. 9,038,233 (“the ’233 patent”). *Id.* The Commission’s notice of investigation named as respondents, *inter alia*,

Shenzhen Silver Star Intelligent Technology Co., Ltd., of Shenzhen, China (“Silver Star”), and bObsweep USA, of Henderson, Nevada, and bObsweep Inc., of Toronto, Canada (together, “bObsweep”). *Id.* at 23593. The Office of Unfair Import Investigations did not participate in the investigation. *Id.*

On November 30, 2018, the Commission found, *inter alia*, that Silver Star and bObsweep violated section 337 with respect to the ’233 patent, and issued the remedial orders.

On May 7, 2019, iRobot, bObsweep, and Silver Star filed a joint petition for rescission of the limited exclusion order and the cease and desist orders that issued on November 30, 2018. The parties state that they have entered into settlement agreements that resolve all disputes among the parties regarding the subject matter of the investigation. No response to the petition was filed.

Having considered the petition, the Commission has determined to institute a rescission proceeding and to rescind the remedial orders. The rescission proceeding is hereby terminated.

The authority for the Commission’s determination is contained in section 337 of the Tariff Act of 1930, as amended (19 U.S.C. 1337), and in part 210 of the Commission’s Rules of Practice and Procedure (19 CFR part 210).

By order of the Commission.



Lisa R. Barton
Secretary to the Commission

Issued: June 4, 2019

**CERTAIN ROBOTIC VACUUM CLEANING
DEVICES AND COMPONENTS THEREOF SUCH
AS SPARE PARTS**

**Inv. No. 337-TA-1057
(Rescission Proceeding)**

CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **NOTICE** has been served by hand upon the Commission Investigative Attorney, **Todd Taylor, Esq.**, and the following parties as indicated, on **June 5, 2019**.



Lisa R. Barton, Secretary
U.S. International Trade Commission
500 E Street, SW, Room 112
Washington, DC 20436

On Behalf of Complainant iRobot Corporation:

Stephen Marshall
FISH & RICHARDSON P.C.
1000 Maine Ave. SW
Suite 1000
Washington, DC 20024

- Via Hand Delivery
- Via Express Delivery
- Via First Class Mail
- Other: _____

On Behalf of Respondents bObsweep USA and bObsweep Inc.:

Kecia J. Reynolds
PILLSBURY WINTHROP SHAW PITTMAN LLP
1200 Seventeenth St. NW
Washington, DC 20036

- Via Hand Delivery
- Via Express Delivery
- Via First Class Mail
- Other: _____

On Behalf of Respondent Shenzhen Silver Star Intelligent Technology Co., Ltd.:

Gary M. Hnath
MAYER BROWN LLP
1999 K Street, N.W.
Washington, D.C. 20006

- Via Hand Delivery
- Via Express Delivery
- Via First Class Mail
- Other: _____

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, DC

In the Matter of

**CERTAIN ROBOTIC VACUUM
CLEANING DEVICES AND
COMPONENTS THEREOF SUCH AS
SPARE PARTS**

Investigation No. 337-TA-1057

**NOTICE OF THE COMMISSION'S FINAL DETERMINATION FINDING A
VIOLATION OF SECTION 337; ISSUANCE OF A LIMITED EXCLUSION ORDER
AND CEASE AND DESIST ORDERS; TERMINATION OF THE INVESTIGATION**

AGENCY: U.S. International Trade Commission.

ACTION: Notice.

SUMMARY: Notice is hereby given that the U.S. International Trade Commission has found a violation of section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. 1337, in this investigation. The Commission has issued a limited exclusion order prohibiting the unlicensed entry of certain vacuum cleaning devices and components thereof, such as spare parts, that infringe certain claims of U.S. Patent No. 9,038,233. The Commission has also issued cease and desist orders prohibiting the sale and distribution within the United States of articles that infringe certain claims of that patent against Hoover, Inc. of Glenwillow, Ohio; Royal Appliance Manufacturing Co., Inc. d/b/a TTI Floor Care North America, Inc. of Glenwillow, Ohio; bObsweep, Inc. of Toronto, Canada; and bObsweep USA of Henderson, Nevada. The investigation is terminated.

FOR FURTHER INFORMATION CONTACT: Lucy Grace D. Noyola, Office of the General Counsel, U.S. International Trade Commission, 500 E Street, SW, Washington, DC 20436, telephone 202-205-3438. Copies of non-confidential documents filed in connection with this investigation are or will be available for inspection during official business hours (8:45 a.m. to 5:15 p.m.) in the Office of the Secretary, U.S. International Trade Commission, 500 E Street, SW, Washington, DC 20436, telephone 202-205-2000. General information concerning the Commission may also be obtained by accessing its Internet server (<https://www.usitc.gov>). The public record for this investigation may be viewed on the Commission's electronic docket (EDIS) at <https://edis.usitc.gov>. Hearing-impaired persons are advised that information on this matter can be obtained by contacting the Commission's TDD terminal on 202-205-1810.

SUPPLEMENTARY INFORMATION: The Commission instituted this investigation under section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. 1337, on May 23, 2017, based on a complaint filed by iRobot Corporation of Bedford, Massachusetts (“iRobot”). 82 FR 23592 (May 23, 2017). The complaint alleges a violation of section 337 based upon the importation into the United States, the sale for importation, and the sale within the United States after importation of certain vacuum cleaning devices and components thereof, such as spare parts, by reason of infringement of certain claims of U.S. Patent Nos. 6,809,490 (“the ’490 patent”), 7,155,308 (“the ’308 patent”), 8,474,090 (“the ’090 patent”), 8,600,553 (“the ’553 patent”), 9,038,233 (“the ’233 patent”), and 9,486,924 (“the ’924 patent”). The Notice of Investigation names as respondents Bissell Homecare, Inc. of Grand Rapids, Michigan (“Bissell”); Hoover, Inc. of Glenwillow, Ohio and Royal Appliance Manufacturing Co., Inc. d/b/a TTI Floor Care North America, Inc. of Glenwillow, Ohio (collectively, “Hoover”); bObsweep, Inc. of Toronto, Canada and bObsweep USA of Henderson, Nevada (collectively, “bObsweep”); The Black & Decker Corporation of Towson, Maryland and Black & Decker (U.S.) Inc. of Towson, Maryland (collectively, “Black & Decker”); Shenzhen ZhiYi Technology Co., Ltd., d/b/a iLife of Shenzhen, China (“iLife”); Matsutec Enterprises Co., Ltd. of Taipei City, Taiwan (“Matsutec”); Suzhou Real Power Electric Appliance Co., Ltd. of Suzhou, China (“Suzhou”); and Shenzhen Silver Star Intelligent Technology Co., Ltd. of Shenzhen, China (“SSSIT”). The Office of Unfair Import Investigations is not a party in this investigation.

The investigation has been terminated with respect to respondents Suzhou, Black & Decker, Bissell, and Matsutec. Notice (Oct. 18, 2017) (determining not to review Order No. 23 (Sept. 26, 2017)); Notice (Jan. 31, 2018) (determining not to review Order No. 31 (Jan. 9, 2018)); Notice (Feb. 16, 2018) (determining not to review Order No. 34 (Jan. 25, 2018)). The investigation has also been terminated with respect to the ’924 and the ’308 patents. Notice (Jan. 16, 2018) (determining not to review Order No. 29 (Dec. 14, 2017)); Notice (Mar. 15, 2018) (determining not to review Order No. 40 (Feb. 21, 2018)).

On June 25, 2018, the presiding administrative law judge (“ALJ”) issued a final initial determination (“ID”), finding a violation of section 337 with respect to the ’553 and ’233 patents and no violation with respect to the ’490 and ’090 patents. Specifically, with respect to the ’553 patent, the ID found that: (1) iLife directly infringes claims 1 and 4, but not claims 11, 12, 13, and 22; (2) iLife has not induced or contributed to infringement of the patent; (3) iRobot has satisfied the technical prong of the domestic industry requirement; (4) claim 1, but not claims 11 and 12, is invalid for anticipation; and (5) claims 4, 12, 13, and 22 are not invalid for obviousness. With respect to the ’490 patent, the ID found that: (1) iLife and bObsweep directly infringe claim 42, but not claims 1 and 12, and Hoover directly infringes claim 42; (2) iLife, Hoover, bObsweep, and SSSIT have not induced or contributed to infringement of the patent; (3) iRobot has satisfied the technical prong of the domestic industry requirement; (4) claim 1, but not claim 12, is invalid for anticipation; (5) claims 12 and 42 are invalid for obviousness; and (6) claims 1 and 42 are not invalid for indefiniteness. With respect to the ’090 patent, the ID found that: (1) iLife, Hoover, SSSIT, and bObsweep directly infringe claims 1, 2, 3, 5, 7, and 10, but not claim 17; (2) iLife, Hoover, bObsweep, and SSSIT have not induced or contributed to infringement of the patent; (3) iRobot has satisfied the technical prong of the domestic industry requirement; (4) claims 1, 5, 7, 10, and 17 are not invalid for anticipation; and (5) claims 1, 2, 3, 4, 5, 7, 10, and 17 are invalid for obviousness in view of certain prior art combinations, but not

others. With respect to the '233 patent, the ID found that: (1) iLife and bObsweep directly infringe claims 1, 10, 11, 14, 15, and 16 and Hoover directly infringes the same claims with respect to the Hoover Quest 1000 products, but not the Hoover Rogue/Y1 and Hoover Y2 products; (2) iLife, Hoover, bObsweep, and SSSIT have not induced or contributed to infringement of the patent; (3) iRobot has satisfied the technical prong of the domestic industry requirement; and (4) claims 1, 10, 11, 14, 15, and 16 of the '233 patent are not invalid for anticipation, obviousness, nor lack of written description. The ID found that iRobot has satisfied the economic prong of the domestic industry requirement under 19 U.S.C. § 1337(a)(3)(C) with respect to all asserted patents.

The ALJ also issued a Recommended Determination on Remedy and Bond ("RD"), recommending, if the Commission finds a section 337 violation, the issuance of (1) a limited exclusion order against certain robotic vacuum cleaning devices and components thereof that are imported, sold for importation, and/or sold after importation by Hoover, bObsweep, SSSIT, and iLife, (2) cease and desist orders against Hoover and iLife, and (3) imposition of a bond of 18.89 percent of the entered value for iLife products, 48.65 percent for bObsweep products, and 41.35 percent for Hoover products that are imported during the period of Presidential review.

On July 9, 2018, iRobot and Respondents each filed a petition for review challenging various findings in the final ID. On July 17, 2018, iRobot and Respondents each filed responses to the petitions for review.

On July 16, 2018, the Commission determined that iRobot satisfied the economic prong of the domestic industry requirement under 19 U.S.C. 1337(a)(3)(B). Notice (July 16, 2018) (determining to affirm with modifications Order No. 39 (Feb. 13, 2018)).

On July 25, 2018, iRobot filed post-RD statements on the public interest under Commission Rule 210.50(a)(4). The Commission did not receive any post-RD public interest comments from any respondent pursuant to Commission Rule 210.50(a)(4). The Commission did not receive comments from the public in response to the Commission notice issued on July 10, 2018 soliciting public interest comments. 83 FR 31977 (July 10, 2018).

On September 12, 2018, the Commission determined to review in part the final ID. 83 FR 47188 (Sept. 18, 2018). Specifically, the Commission determined to review the ID's findings on: (1) induced and contributory infringement with respect to the '553, '490, '090, and '233 patents; (2) anticipation with respect to the asserted claims of the '553 patent; (3) obviousness with respect to the asserted claims of the '553 patent; (4) direct infringement of the '090 patent by iLife, Hoover, bObsweep, and SSSIT; (5) anticipation with respect to the asserted claims of the '090 patent; (6) obviousness with respect to the asserted claims of the '090 patent; (7) anticipation with respect to the asserted claims of the '233 patent; and (8) consideration of U.S. Patent No. 6,594,844 as prior art under 35 U.S.C. 102(a) and 35 U.S.C. 103 with respect to the '233 patent. The Commission also requested briefing from the parties on certain issues under review and briefing from the parties, interested government agencies, and interested persons on the issues of remedy, the public interest, and bonding.

On September 19, 2018, iRobot filed an unopposed motion to terminate the investigation as to iLife based on a settlement agreement and, because the '553 patent is asserted against iLife only, all claims asserted under the '553 patent for mootness. On October 2, 2018, the Commission determined to grant that motion. Notice (Oct. 2, 2018). Thus, the respondents remaining in this investigation are Hoover, bObsweep, and SSSIT, and the remaining asserted patents are the '490, '090, and '233 patents.

On September 24, 2018, iRobot and the remaining respondents filed initial written submissions addressing the Commission's questions and the issues of remedy, the public interest, and bonding. On October 1, 2018, the parties filed response briefs. No comments were received from the public.

Having examined the record of this investigation, including the ID and the parties' submissions, the Commission has determined to affirm, on modified grounds, the ID's finding of a violation as to the '233 patent and no violation as to the '490 and '090 patents. Specifically, the Commission has determined that Hoover, bObsweep, and SSSIT have not induced or contributed to infringement of the '490, '090, and '233 patents. With respect to the '090 patent, the Commission has determined that the Hoover, SSSIT, and bObsweep bObi products meet all limitations of claims 1, 2, 3, 5, 7, 10, and 17, and that the asserted claims are invalid for obviousness, but not invalid for anticipation. With respect to the '233 patent, the Commission has determined that claims 1, 10, 11, 14, 15, and 16 are not invalid for anticipation nor obviousness. The Commission has determined to adopt all findings and conclusions in the final ID that are not inconsistent with the Commission's opinion issued herewith.

The Commission has determined the appropriate remedy is a limited exclusion order prohibiting Hoover, bObsweep, and SSSIT from importing certain vacuum cleaning devices and components thereof, such as spare parts, that infringe one or more of claims 1, 10, 11, 14, 15, and 16 of the '233 patent, as well as cease and desist orders against Hoover and bObsweep prohibiting them from, *inter alia*, selling or distributing within the United States such products. The Commission has determined the public interest factors enumerated in section 337(d)(1) and (f)(1) do not preclude issuance of the limited exclusion order or cease and desist orders.

The Commission has also determined to set a bond in the following percentages of the entered value of the respondents' infringing products during the period of Presidential review (19 U.S.C. 1337(j)): 48.65 percent for products that are manufactured by or on behalf of bObsweep; 41.35 percent for products that are manufactured by or on behalf of Hoover; and zero percent (no bond) for products that are manufactured by SSSIT on behalf of entities other than Hoover and bObsweep, as well as products that are manufactured on behalf of SSSIT. The Commission's orders and opinion were delivered to the President and to the United States Trade Representative on the day of their issuance.

The authority for the Commission's determination is contained in section 337 of the Tariff Act of 1930, as amended (19 U.S.C. 1337), and in part 210 of the Commission's Rules of Practice and Procedure (19 CFR part 210).

By order of the Commission.

A handwritten signature in black ink, appearing to read 'Lisa R. Barton', written in a cursive style.

Lisa R. Barton
Secretary to the Commission

Issued: November 30, 2018

PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **NOTICE** has been served upon the following parties as indicated, on **November 30, 2018**.



Lisa R. Barton, Secretary
U.S. International Trade Commission
500 E Street, SW, Room 112
Washington, DC 20436

On Behalf of Complainant iRobot Corporation:

Stephen A. Marshall
FISH & RICHARDSON P.C.
1000 Maine Ave SW
Suite 1000
Washington, DC 20024

- Via Hand Delivery
- Via Express Delivery
- Via First Class Mail
- Other: _____

**On Behalf of Respondents Shenzhen Silver Star Intelligent
Technology Co., Ltd., Hoover Inc., Royal Appliance
Manufacturing Co. Inc. d/b/a TTI Floor Care, bObsweep, Inc.
and bObsweep, USA:**

Kecia J. Reynolds
PILLSBURY WINTHROP SHAW PITTMAN LLP
1200 Seventeenth Street NW
Washington, DC 20036

- Via Hand Delivery
- Via Express Delivery
- Via First Class Mail
- Other: _____

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, DC

In the Matter of

**CERTAIN ROBOTIC VACUUM
CLEANING DEVICES AND
COMPONENTS THEREOF SUCH AS
SPARE PARTS**

Investigation No. 337-TA-1057

LIMITED EXCLUSION ORDER

The Commission has determined that there is a violation of section 337 of the Tariff Act of 1930, as amended (19 U.S.C. § 1337), in the unlawful importation, sale for importation, or sale after importation by Hoover, Inc. of Glenwillow, Ohio and Royal Appliance Manufacturing Co., Inc. d/b/a TTI Floor Care North America, Inc. of Glenwillow, Ohio (collectively, “Hoover”); bObsweep, Inc. of Toronto, Canada and bObsweep USA of Henderson, Nevada (collectively, “bObsweep”); and Shenzhen Silver Star Intelligent Technology Co., Ltd. of Shenzhen, China (“SSSIT”) (all collectively, “Respondents”) of certain vacuum cleaning devices and components thereof, such as spare parts, covered by one or more of claims 1, 10, 11, 14, 15, and 16 of U.S. Patent No. 9,038,233 (“the ’233 patent”).

Having reviewed the record in this investigation, including the written submissions of the parties, the Commission has made its determination on the issues of remedy, the public interest, and bonding. The Commission has determined that the appropriate form of relief is a limited exclusion order prohibiting the unlicensed entry of certain covered vacuum cleaning devices and components thereof, such as spare parts, manufactured by or on behalf of, or imported by or on behalf of, Respondents or any of their affiliated companies, parents, subsidiaries, or other related business entities, or their successors or assigns.

The Commission has also determined that the public interest factors enumerated in 19 U.S.C. § 1337(d)(1) do not preclude the issuance of the limited exclusion order.

The Commission has further determined to set a bond during the period of Presidential review in the following percentages of the entered value of the covered products: 48.65 percent for products that are manufactured by or on behalf of bObsweep; 41.35 percent for products that are manufactured by or on behalf of Hoover; and zero percent (no bond) for products that are manufactured by SSSIT on behalf of entities other than Hoover and bObsweep, as well as products that are manufactured on behalf of SSSIT.

Accordingly, the Commission hereby **ORDERS** that:

1. Certain vacuum cleaning devices and components thereof, such as spare parts, that infringe one or more of claims 1, 10, 11, 14, 15, and 16 of the '233 patent and that are manufactured by or on behalf of, or are imported by or on behalf of Respondents or any of their affiliated companies, parents, subsidiaries, or other related business entities, or their successors or assigns ("covered products"), are excluded from entry for consumption into the United States, entry for consumption from a foreign trade zone, or withdrawal from a warehouse for consumption, for the remaining term of the patent, except under license of the patent owner or as provided by law.

2. The provisions of this Order shall not apply to certain vacuum cleaning devices and components thereof, such as spare parts, found to be non-infringing as detailed in the Administrative Law Judge's final initial determination dated June 25, 2018, at pages 297-307, or the following SSSIT products: RolliCute, RolliTerra, LASEREYE, RV003A, Xshai, F1, T2104, T2015, T2107, and T2109.

3. Notwithstanding paragraph 1 of this Order, the covered products are entitled to entry into the United States for consumption, entry for consumption from a foreign-trade zone, or withdrawal from a warehouse for consumption under bond in the amount of 48.65 percent of the entered value of products that are manufactured by or on behalf of bObsweep, 41.35 percent of the entered value of products that are manufactured by or on behalf of Hoover, and zero percent of the entered value (no bond) for products that are manufactured by SSSIT on behalf of entities other than Hoover and bObsweep, as well as products that are manufactured on behalf of SSSIT, pursuant to subsection (j) of section 337 (19 U.S.C. § 1337(j)) and the Presidential Memorandum for the United States Trade Representative of July 21, 2005 (70 *Fed. Reg.* 43,251), from the day after this Order is received by the United States Trade Representative until such time as the United States Trade Representative notifies the Commission that this Order is approved or disapproved but, in any event, not later than sixty days after the date of receipt of this Order. All entries of covered products made pursuant to this paragraph are to be reported to U.S. Customs and Border Protection (“CBP”), in advance of the date of the entry, pursuant to procedures CBP establishes.

4. At the discretion of CBP and pursuant to procedures it establishes, persons seeking to import vacuum cleaning devices and components thereof, such as spare parts, that are potentially subject to this Order may be required to certify that they are familiar with the terms of this Order, that they have made appropriate inquiry, and thereupon state that, to the best of their knowledge and belief, the products being imported are not excluded from entry under paragraph 1 of this Order. At its discretion, CBP may require persons who have provided the certification described in this paragraph to furnish such records or analyses as are necessary to substantiate the certification.

5. In accordance with 19 U.S.C. § 1337(l), the provisions of this Order shall not apply to covered products that are imported by or for the use of the United States, or imported for and to be used for, the United States with the authorization or consent of the Government.

6. The Commission may modify this Order in accordance with the procedures described in section 210.76 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.76).

7. The Secretary shall serve copies of this Order upon each party of record in this investigation and upon CBP.

8. Notice of this Order shall be published in the *Federal Register*.

By order of the Commission.

A handwritten signature in black ink, appearing to read "Lisa R. Barton".

Lisa R. Barton
Secretary to the Commission

Issued: November 30, 2018

PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **LIMITED EXCLUSION ORDER** has been served upon the following parties as indicated, on **November 30, 2018**.



Lisa R. Barton, Secretary
U.S. International Trade Commission
500 E Street, SW, Room 112
Washington, DC 20436

On Behalf of Complainant iRobot Corporation:

Stephen A. Marshall
FISH & RICHARDSON P.C.
1000 Maine Ave SW
Suite 1000
Washington, DC 20024

- Via Hand Delivery
- Via Express Delivery
- Via First Class Mail
- Other: _____

**On Behalf of Respondents Shenzhen Silver Star Intelligent
Technology Co., Ltd., Hoover Inc., Royal Appliance
Manufacturing Co. Inc. d/b/a TTI Floor Care, bObsweep, Inc.
and bObsweep, USA:**

Kecia J. Reynolds
PILLSBURY WINTHROP SHAW PITTMAN LLP
1200 Seventeenth Street NW
Washington, DC 20036

- Via Hand Delivery
- Via Express Delivery
- Via First Class Mail
- Other: _____

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, DC

In the Matter of

**CERTAIN ROBOTIC VACUUM
CLEANING DEVICES AND
COMPONENTS THEREOF SUCH AS
SPARE PARTS**

Investigation No. 337-TA-1057

CEASE AND DESIST ORDER

IT IS HEREBY ORDERED THAT bObsweep USA of Henderson, Nevada cease and desist from conducting any of the following activities in the United States: importing, selling, marketing, advertising, distributing, transferring (except for exportation), and soliciting U.S. agents or distributors for vacuum cleaning devices and components thereof, such as spare parts, that are covered by one or more of claims 1, 10, 11, 14, 15, and 16 of U.S. Patent No. 9,038,233 (“the ‘233 patent”) in violation of section 337 of the Tariff Act of 1930, as amended (19 U.S.C. § 1337).

I.
Definitions

As used in this Order:

(A) “Commission” shall mean the United States International Trade Commission.

(B) “Complainant” shall mean iRobot Corporation of 8 Crosby Drive, Bedford,

Massachusetts 01730.

(C) “Respondent” shall mean bObsweep USA of 7 Sunset Way, Unit 190, Henderson, Nevada 89014.

(D) “Person” shall mean an individual, or any non-governmental partnership, firm, association, corporation, or other legal or business entity other than Respondent or its majority-owned or controlled subsidiaries, successors, or assigns.

(E) “United States” shall mean the fifty States, the District of Columbia, and Puerto Rico.

(F) The terms “import” and “importation” refer to importation for entry for consumption under the Customs laws of the United States.

(G) The term “covered products” shall mean vacuum cleaning devices and components thereof, such as spare parts, that are covered by one or more of claims 1, 10, 11, 14, 15, and 16 of the '233 patent. “Covered products” shall not include certain vacuum cleaning devices and components thereof, such as spare parts, found to be non-infringing as detailed in the Administrative Law Judge’s final initial determination dated June 25, 2018, at pages 297-307, or the following Shenzhen Silver Star Intelligent Technology Co., Ltd. products: RolliCute, RolliTerra, LASEREYE, RV003A, Xshai, F1, T2104, T2015, T2107, and T2109.

II. Applicability

The provisions of this Cease and Desist Order shall apply to Respondent and to any of its principals, stockholders, officers, directors, employees, agents, distributors, controlled (whether by stock ownership or otherwise) and majority-owned business entities, successors, and assigns, and to each of them, insofar as they are engaging in conduct prohibited by section III, *infra*, for, with, or otherwise on behalf of Respondent.

III. Conduct Prohibited

The following conduct of Respondent in the United States is prohibited by this Order. For the remaining term of the '233 patent, Respondent shall not:

- (A) import or sell for importation into the United States covered products;
- (B) market, distribute, sell, or otherwise transfer (except for exportation) in the United States imported covered products;
- (C) advertise imported covered products;
- (D) solicit U.S. agents or distributors for imported covered products; or
- (E) aid or abet other entities in the importation, sale for importation, sale after importation, transfer, or distribution of covered products.

IV. Conduct Permitted

Notwithstanding any other provision of this Order, specific conduct otherwise prohibited by the terms of this Order shall be permitted if, in a written instrument, the owner of the '233 patent licenses or authorizes such specific conduct or such specific conduct is related to the importation or sale of covered products by or for the United States.

V. Reporting

For purposes of this requirement, the reporting periods shall commence on January 1 of each year and shall end on the subsequent December 31. The first report required under this section shall cover the period from the date of issuance of this Order through December 31, 2018. This reporting requirement shall continue in force until such time as Respondent has truthfully reported, in two consecutive timely filed reports, that they have no inventory of covered products in the United States.

Within thirty (30) days of the last day of the reporting period, Respondent shall report to the Commission (a) the quantity in units and the value in dollars of covered products that it has (i) imported and/or (ii) sold in the United States after importation during the reporting period,

and (b) the quantity in units and value in dollars of reported covered products that remain in inventory in the United States at the end of the reporting period.

When filing written submissions, Respondent must file the original document electronically on or before the deadlines stated above and submit eight (8) true paper copies to the Office of the Secretary by noon the next day pursuant to section 210.4(f) of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.4(f)). Submissions should refer to the investigation number ("Inv. No. 337-TA-1057") in a prominent place on the cover pages and/or the first page. (See Handbook for Electronic Filing Procedures, http://www.usitc.gov/secretary/fed_reg_notices/rules/handbook_on_electronic_filing.pdf). Persons with questions regarding filing should contact the Secretary (202-205-2000). If Respondent desires to submit a document to the Commission in confidence, it must file the original and a public version of the original with the Office of the Secretary and must serve a copy of the confidential version on Complainant's counsel.¹

Any failure to make the required report or the filing of any false or inaccurate report shall constitute a violation of this Order, and the submission of a false or inaccurate report may be referred to the U.S. Department of Justice as a possible criminal violation of 18 U.S.C. § 1001.

VI. Recordkeeping and Inspection

(A) For the purpose of securing compliance with this Order, Respondent shall retain any and all records relating to the sale, offer for sale, marketing, or distribution in the United States of covered products, made and received in the usual and ordinary course of business,

¹ Complainant must file a letter with the Secretary identifying the attorney to receive reports and bond information associated with this Order. The designated attorney must be on the protective order entered in the investigation.

whether in detail or in summary form, for a period of three (3) years from the close of the fiscal year to which they pertain.

(B) For the purposes of determining or securing compliance with this Order and for no other purpose, subject to any privilege recognized by the federal courts of the United States, and upon reasonable written notice by the Commission or its staff, duly authorized representatives of the Commission shall be permitted access and the right to inspect and copy, in Respondent's principal offices during office hours, and in the presence of counsel or other representatives if Respondent so chooses, all books, ledgers, accounts, correspondence, memoranda, and other records and documents, in detail and in summary form, that must be retained under subparagraph VI(A) of this Order.

VII. Service of Cease and Desist Order

Respondent is ordered and directed to:

(A) Serve, within fifteen days after the effective date of this Order, a copy of this Order upon each of its respective officers, directors, managing agents, agents, and employees who have any responsibility for the importation, marketing, distribution, or sale of imported covered products in the United States;

(B) Serve, within fifteen days after the succession of any persons referred to in subparagraph VII(A) of this Order, a copy of the Order upon each successor; and

(C) Maintain such records as will show the name, title, and address of each person upon whom the Order has been served, as described in subparagraphs VII(A) and VII(B) of this Order, together with the date on which service was made.

The obligations set forth in subparagraphs VII(B) and VII(C) shall remain in effect until the expiration date of the '233 patent.

VIII.
Confidentiality

Any request for confidential treatment of information obtained by the Commission pursuant to Section V and VI of this Order should be made in accordance with section 201.6 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 201.6). For all reports for which confidential treatment is sought, Respondent must provide a public version of such report with confidential information redacted.

IX.
Enforcement

Violation of this Order may result in any of the actions specified in section 210.75 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.75), including an action for civil penalties under section 337(f) of the Tariff Act of 1930 (19 U.S.C. § 1337(f)), as well as any other action that the Commission deems appropriate. In determining whether Respondent is in violation of this Order, the Commission may infer facts adverse to Respondent if it fails to provide adequate or timely information.

X.
Modification

The Commission may amend this Order on its own motion or in accordance with the procedure described in section 210.76 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.76).

XI.
Bonding

The conduct prohibited by section III of this Order may be continued during the sixty (60) day period in which this Order is under review by the United States Trade Representative, as delegated by the President (70 Fed. Reg. 43,251 (Jul. 21, 2005)), subject to Respondent posting of a bond in the amount of 48.65 percent of the entered value of the covered products.

This bond provision does not apply to conduct that is otherwise permitted by Section IV of this Order. Covered products imported on or after the date of issuance of this Order are subject to the entry bond as set forth in the exclusion order issued by the Commission, and are not subject to this bond provision.

The bond is to be posted in accordance with the procedures established by the Commission for the posting of bonds by Complainant in connection with the issuance of temporary exclusion orders. (*See* 19 C.F.R. § 210.68). The bond and any accompanying documentation are to be provided to and approved by the Commission prior to the commencement of conduct that is otherwise prohibited by Section III of this Order. Upon the Secretary's acceptance of the bond, (a) the Secretary will serve an acceptance letter on all parties, and (b) Respondent must serve a copy of the bond and any accompanying documentation on Complainant's counsel.²

The bond is to be forfeited in the event that the United States Trade Representative approves this Order (or does not disapprove it within the review period), unless (i) the U.S. Court of Appeals for the Federal Circuit, in a final judgment, reverses any Commission final determination and order as to Respondent on appeal or (ii) Respondent exports or destroys the products subject to this bond and provides certification to that effect that is satisfactory to the Commission.

The bond is to be released in the event the United States Trade Representative disapproves this Order and no subsequent order is issued by the Commission and approved (or not disapproved) by the United States Trade Representative, upon service on Respondent of an

² See note 1 above.

order issued by the Commission based upon application therefore made by Respondent to the Commission.

By order of the Commission.

A handwritten signature in black ink, appearing to read "Lisa R. Barton". The signature is stylized and cursive.

Lisa R. Barton
Secretary to the Commission

Issued: November 30, 2018

PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **CEASE AND DESIST ORDER** has been served upon the following parties as indicated, on **November 30, 2018**.



Lisa R. Barton, Secretary
U.S. International Trade Commission
500 E Street, SW, Room 112
Washington, DC 20436

On Behalf of Complainant iRobot Corporation:

Stephen A. Marshall
FISH & RICHARDSON P.C.
1000 Maine Ave SW
Suite 1000
Washington, DC 20024

- Via Hand Delivery
 Via Express Delivery
 Via First Class Mail
 Other: _____

**On Behalf of Respondents Shenzhen Silver Star Intelligent
Technology Co., Ltd., Hoover Inc., Royal Appliance
Manufacturing Co. Inc. d/b/a TTI Floor Care, bObsweep, Inc,
and bObsweep, USA:**

Kecia J. Reynolds
PILLSBURY WINTHROP SHAW PITTMAN LLP
1200 Seventeenth Street NW
Washington, DC 20036

- Via Hand Delivery
 Via Express Delivery
 Via First Class Mail
 Other: _____

**UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, DC**

In the Matter of

**CERTAIN ROBOTIC VACUUM
CLEANING DEVICES AND
COMPONENTS THEREOF SUCH AS
SPARE PARTS**

Investigation No. 337-TA-1057

CEASE AND DESIST ORDER

IT IS HEREBY ORDERED THAT bObsweep, Inc. of Toronto, Canada cease and desist from conducting any of the following activities in the United States: importing, selling, marketing, advertising, distributing, transferring (except for exportation), and soliciting U.S. agents or distributors for vacuum cleaning devices and components thereof, such as spare parts, that are covered by one or more of claims 1, 10, 11, 14, 15, and 16 of U.S. Patent No. 9,038,233 (“the ’233 patent”) in violation of section 337 of the Tariff Act of 1930, as amended (19 U.S.C. § 1337).

**I.
Definitions**

As used in this Order:

- (A) “Commission” shall mean the United States International Trade Commission.
- (B) “Complainant” shall mean iRobot Corporation of 8 Crosby Drive, Bedford, Massachusetts 01730.
- (C) “Respondent” shall mean bObsweep, Inc. of 1121 Bay Street, Suite 709, Toronto, Ontario M5S3L9, Canada.

(D) “Person” shall mean an individual, or any non-governmental partnership, firm, association, corporation, or other legal or business entity other than Respondent or its majority-owned or controlled subsidiaries, successors, or assigns.

(E) “United States” shall mean the fifty States, the District of Columbia, and Puerto Rico.

(F) The terms “import” and “importation” refer to importation for entry for consumption under the Customs laws of the United States.

(G) The term “covered products” shall mean vacuum cleaning devices and components thereof, such as spare parts, that are covered by one or more of claims 1, 10, 11, 14, 15, and 16 of the '233 patent. “Covered products” shall not include certain vacuum cleaning devices and components thereof, such as spare parts, found to be non-infringing as detailed in the Administrative Law Judge’s final initial determination dated June 25, 2018, at pages 297-307, or the following Shenzhen Silver Star Intelligent Technology Co., Ltd. products: RolliCute, RolliTerra, LASEREYE, RV003A, Xshai, F1, T2104, T2015, T2107, and T2109.

II. Applicability

The provisions of this Cease and Desist Order shall apply to Respondent and to any of its principals, stockholders, officers, directors, employees, agents, distributors, controlled (whether by stock ownership or otherwise) and majority-owned business entities, successors, and assigns, and to each of them, insofar as they are engaging in conduct prohibited by section III. *infra*, for, with, or otherwise on behalf of Respondent.

III. Conduct Prohibited

The following conduct of Respondent in the United States is prohibited by this Order. For the remaining term of the '233 patent, Respondent shall not:

- (A) import or sell for importation into the United States covered products;
- (B) market, distribute, sell, or otherwise transfer (except for exportation) in the United States imported covered products;
- (C) advertise imported covered products;
- (D) solicit U.S. agents or distributors for imported covered products; or
- (E) aid or abet other entities in the importation, sale for importation, sale after importation, transfer, or distribution of covered products.

IV. Conduct Permitted

Notwithstanding any other provision of this Order, specific conduct otherwise prohibited by the terms of this Order shall be permitted if, in a written instrument, the owner of the '233 patent licenses or authorizes such specific conduct or such specific conduct is related to the importation or sale of covered products by or for the United States.

V. Reporting

For purposes of this requirement, the reporting periods shall commence on January 1 of each year and shall end on the subsequent December 31. The first report required under this section shall cover the period from the date of issuance of this Order through December 31, 2018. This reporting requirement shall continue in force until such time as Respondent has truthfully reported, in two consecutive timely filed reports, that they have no inventory of covered products in the United States.

Within thirty (30) days of the last day of the reporting period, Respondent shall report to the Commission (a) the quantity in units and the value in dollars of covered products that it has (i) imported and/or (ii) sold in the United States after importation during the reporting period,

and (b) the quantity in units and value in dollars of reported covered products that remain in inventory in the United States at the end of the reporting period.

When filing written submissions, Respondent must file the original document electronically on or before the deadlines stated above and submit eight (8) true paper copies to the Office of the Secretary by noon the next day pursuant to section 210.4(f) of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.4(f)). Submissions should refer to the investigation number ("Inv. No. 337-TA-1057") in a prominent place on the cover pages and/or the first page. (*See Handbook for Electronic Filing Procedures*, http://www.usitc.gov/secretary/fed_reg_notices/rules/handbook_on_electronic_filing.pdf). Persons with questions regarding filing should contact the Secretary (202-205-2000). If Respondent desires to submit a document to the Commission in confidence, it must file the original and a public version of the original with the Office of the Secretary and must serve a copy of the confidential version on Complainant's counsel.¹

Any failure to make the required report or the filing of any false or inaccurate report shall constitute a violation of this Order, and the submission of a false or inaccurate report may be referred to the U.S. Department of Justice as a possible criminal violation of 18 U.S.C. § 1001.

VI. Recordkeeping and Inspection

(A) For the purpose of securing compliance with this Order, Respondent shall retain any and all records relating to the sale, offer for sale, marketing, or distribution in the United States of covered products, made and received in the usual and ordinary course of business.

¹ Complainant must file a letter with the Secretary identifying the attorney to receive reports and bond information associated with this Order. The designated attorney must be on the protective order entered in the investigation.

whether in detail or in summary form, for a period of three (3) years from the close of the fiscal year to which they pertain.

(B) For the purposes of determining or securing compliance with this Order and for no other purpose, subject to any privilege recognized by the federal courts of the United States, and upon reasonable written notice by the Commission or its staff, duly authorized representatives of the Commission shall be permitted access and the right to inspect and copy, in Respondent's principal offices during office hours, and in the presence of counsel or other representatives if Respondent so chooses, all books, ledgers, accounts, correspondence, memoranda, and other records and documents, in detail and in summary form, that must be retained under subparagraph VI(A) of this Order.

VII. Service of Cease and Desist Order

Respondent is ordered and directed to:

(A) Serve, within fifteen days after the effective date of this Order, a copy of this Order upon each of its respective officers, directors, managing agents, agents, and employees who have any responsibility for the importation, marketing, distribution, or sale of imported covered products in the United States;

(B) Serve, within fifteen days after the succession of any persons referred to in subparagraph VII(A) of this Order, a copy of the Order upon each successor; and

(C) Maintain such records as will show the name, title, and address of each person upon whom the Order has been served, as described in subparagraphs VII(A) and VII(B) of this Order, together with the date on which service was made.

The obligations set forth in subparagraphs VII(B) and VII(C) shall remain in effect until the expiration date of the '233 patent.

**VIII.
Confidentiality**

Any request for confidential treatment of information obtained by the Commission pursuant to Section V and VI of this Order should be made in accordance with section 201.6 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 201.6). For all reports for which confidential treatment is sought, Respondent must provide a public version of such report with confidential information redacted.

**IX.
Enforcement**

Violation of this Order may result in any of the actions specified in section 210.75 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.75), including an action for civil penalties under section 337(f) of the Tariff Act of 1930 (19 U.S.C. § 1337(f)), as well as any other action that the Commission deems appropriate. In determining whether Respondent is in violation of this Order, the Commission may infer facts adverse to Respondent if it fails to provide adequate or timely information.

**X.
Modification**

The Commission may amend this Order on its own motion or in accordance with the procedure described in section 210.76 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.76).

**XI.
Bonding**

The conduct prohibited by section III of this Order may be continued during the sixty (60) day period in which this Order is under review by the United States Trade Representative, as delegated by the President (70 Fed. Reg. 43,251 (Jul. 21, 2005)), subject to Respondent posting of a bond in the amount of 48.65 percent of the entered value of the covered products.

This bond provision does not apply to conduct that is otherwise permitted by Section IV of this Order. Covered products imported on or after the date of issuance of this Order are subject to the entry bond as set forth in the exclusion order issued by the Commission, and are not subject to this bond provision.

The bond is to be posted in accordance with the procedures established by the Commission for the posting of bonds by Complainant in connection with the issuance of temporary exclusion orders. (*See* 19 C.F.R. § 210.68). The bond and any accompanying documentation are to be provided to and approved by the Commission prior to the commencement of conduct that is otherwise prohibited by Section III of this Order. Upon the Secretary's acceptance of the bond, (a) the Secretary will serve an acceptance letter on all parties, and (b) Respondent must serve a copy of the bond and any accompanying documentation on Complainant's counsel.²

The bond is to be forfeited in the event that the United States Trade Representative approves this Order (or does not disapprove it within the review period), unless (i) the U.S. Court of Appeals for the Federal Circuit, in a final judgment, reverses any Commission final determination and order as to Respondent on appeal or (ii) Respondent exports or destroys the products subject to this bond and provides certification to that effect that is satisfactory to the Commission.

The bond is to be released in the event the United States Trade Representative disapproves this Order and no subsequent order is issued by the Commission and approved (or not disapproved) by the United States Trade Representative, upon service on Respondent of an

² *See* note 1 above.

order issued by the Commission based upon application therefore made by Respondent to the Commission.

By order of the Commission.

A handwritten signature in black ink, appearing to read 'Lisa R. Barton', written in a cursive style.

Lisa R. Barton
Secretary to the Commission

Issued: November 30, 2018

PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **CEASE AND DESIST ORDER** has been served upon the following parties as indicated, on **November 30, 2018**.



Lisa R. Barton, Secretary
U.S. International Trade Commission
500 E Street, SW, Room 112
Washington, DC 20436

On Behalf of Complainant iRobot Corporation:

Stephen A. Marshall
FISH & RICHARDSON P.C.
1000 Maine Ave SW
Suite 1000
Washington, DC 20024

- Via Hand Delivery
- Via Express Delivery
- Via First Class Mail
- Other: _____

**On Behalf of Respondents Shenzhen Silver Star Intelligent
Technology Co., Ltd., Hoover Inc., Royal Appliance
Manufacturing Co. Inc. d/b/a TTI Floor Care, bObsweep, Inc.
and bObsweep, USA:**

Kecia J. Reynolds
PILLSBURY WINTHROP SHAW PITTMAN LLP
1200 Seventeenth Street NW
Washington, DC 20036

- Via Hand Delivery
- Via Express Delivery
- Via First Class Mail
- Other: _____

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, DC

In the Matter of

**CERTAIN ROBOTIC VACUUM
CLEANING DEVICES AND
COMPONENTS THEREOF SUCH AS
SPARE PARTS**

Investigation No. 337-TA-1057

CEASE AND DESIST ORDER

IT IS HEREBY ORDERED THAT Hoover, Inc. of Glenwillow, Ohio cease and desist from conducting any of the following activities in the United States: importing, selling, marketing, advertising, distributing, transferring (except for exportation), and soliciting U.S. agents or distributors for vacuum cleaning devices and components thereof, such as spare parts, that are covered by one or more of claims 1, 10, 11, 14, 15, and 16 of U.S. Patent No. 9,038,233 (“the ’233 patent”) in violation of section 337 of the Tariff Act of 1930, as amended (19 U.S.C. § 1337).

I.
Definitions

As used in this Order:

- (A) “Commission” shall mean the United States International Trade Commission.
- (B) “Complainant” shall mean iRobot Corporation of 8 Crosby Drive, Bedford, Massachusetts 01730.
- (C) “Respondent” shall mean Hoover, Inc. of 7005 Cochran Road, Glenwillow, Ohio 44139.

(D) “Person” shall mean an individual, or any non-governmental partnership, firm, association, corporation, or other legal or business entity other than Respondent or its majority-owned or controlled subsidiaries, successors, or assigns.

(E) “United States” shall mean the fifty States, the District of Columbia, and Puerto Rico.

(F) The terms “import” and “importation” refer to importation for entry for consumption under the Customs laws of the United States.

(G) The term “covered products” shall mean vacuum cleaning devices and components thereof, such as spare parts, that are covered by one or more of claims 1, 10, 11, 14, 15, and 16 of the ’233 patent. “Covered products” shall not include certain vacuum cleaning devices and components thereof, such as spare parts, found to be non-infringing as detailed in the Administrative Law Judge’s final initial determination dated June 25, 2018, at pages 297-307, or the following Shenzhen Silver Star Intelligent Technology Co., Ltd. products: RolliCute, RolliTerra, LASEREYE, RV003A, Xshai, F1, T2104, T2015, T2107, and T2109.

II. Applicability

The provisions of this Cease and Desist Order shall apply to Respondent and to any of its principals, stockholders, officers, directors, employees, agents, distributors, controlled (whether by stock ownership or otherwise) and majority-owned business entities, successors, and assigns, and to each of them, insofar as they are engaging in conduct prohibited by section III, *infra*, for, with, or otherwise on behalf of Respondent.

III. Conduct Prohibited

The following conduct of Respondent in the United States is prohibited by this Order. For the remaining term of the ’233 patent, Respondent shall not:

- (A) import or sell for importation into the United States covered products;
- (B) market, distribute, sell, or otherwise transfer (except for exportation) in the United States imported covered products;
- (C) advertise imported covered products;
- (D) solicit U.S. agents or distributors for imported covered products; or
- (E) aid or abet other entities in the importation, sale for importation, sale after importation, transfer, or distribution of covered products.

IV. Conduct Permitted

Notwithstanding any other provision of this Order, specific conduct otherwise prohibited by the terms of this Order shall be permitted if, in a written instrument, the owner of the '233 patent licenses or authorizes such specific conduct or such specific conduct is related to the importation or sale of covered products by or for the United States.

V. Reporting

For purposes of this requirement, the reporting periods shall commence on January 1 of each year and shall end on the subsequent December 31. The first report required under this section shall cover the period from the date of issuance of this Order through December 31, 2018. This reporting requirement shall continue in force until such time as Respondent has truthfully reported, in two consecutive timely filed reports, that they have no inventory of covered products in the United States.

Within thirty (30) days of the last day of the reporting period, Respondent shall report to the Commission (a) the quantity in units and the value in dollars of covered products that it has (i) imported and/or (ii) sold in the United States after importation during the reporting period,

and (b) the quantity in units and value in dollars of reported covered products that remain in inventory in the United States at the end of the reporting period.

When filing written submissions, Respondent must file the original document electronically on or before the deadlines stated above and submit eight (8) true paper copies to the Office of the Secretary by noon the next day pursuant to section 210.4(f) of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.4(f)). Submissions should refer to the investigation number ("Inv. No. 337-TA-1057") in a prominent place on the cover pages and/or the first page. (*See Handbook for Electronic Filing Procedures*, http://www.usitc.gov/secretary/fed_reg_notices/rules/handbook_on_electronic_filing.pdf). Persons with questions regarding filing should contact the Secretary (202-205-2000). If Respondent desires to submit a document to the Commission in confidence, it must file the original and a public version of the original with the Office of the Secretary and must serve a copy of the confidential version on Complainant's counsel.¹

Any failure to make the required report or the filing of any false or inaccurate report shall constitute a violation of this Order, and the submission of a false or inaccurate report may be referred to the U.S. Department of Justice as a possible criminal violation of 18 U.S.C. § 1001.

VI. Recordkeeping and Inspection

(A) For the purpose of securing compliance with this Order, Respondent shall retain any and all records relating to the sale, offer for sale, marketing, or distribution in the United States of covered products, made and received in the usual and ordinary course of business,

¹ Complainant must file a letter with the Secretary identifying the attorney to receive reports and bond information associated with this Order. The designated attorney must be on the protective order entered in the investigation.

whether in detail or in summary form, for a period of three (3) years from the close of the fiscal year to which they pertain.

(B) For the purposes of determining or securing compliance with this Order and for no other purpose, subject to any privilege recognized by the federal courts of the United States, and upon reasonable written notice by the Commission or its staff, duly authorized representatives of the Commission shall be permitted access and the right to inspect and copy, in Respondent's principal offices during office hours, and in the presence of counsel or other representatives if Respondent so chooses, all books, ledgers, accounts, correspondence, memoranda, and other records and documents, in detail and in summary form, that must be retained under subparagraph VI(A) of this Order.

VII. Service of Cease and Desist Order

Respondent is ordered and directed to:

(A) Serve, within fifteen days after the effective date of this Order, a copy of this Order upon each of its respective officers, directors, managing agents, agents, and employees who have any responsibility for the importation, marketing, distribution, or sale of imported covered products in the United States;

(B) Serve, within fifteen days after the succession of any persons referred to in subparagraph VII(A) of this Order, a copy of the Order upon each successor; and

(C) Maintain such records as will show the name, title, and address of each person upon whom the Order has been served, as described in subparagraphs VII(A) and VII(B) of this Order, together with the date on which service was made.

The obligations set forth in subparagraphs VII(B) and VII(C) shall remain in effect until the expiration date of the '233 patent.

VIII.
Confidentiality

Any request for confidential treatment of information obtained by the Commission pursuant to Section V and VI of this Order should be made in accordance with section 201.6 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 201.6). For all reports for which confidential treatment is sought, Respondent must provide a public version of such report with confidential information redacted.

IX.
Enforcement

Violation of this Order may result in any of the actions specified in section 210.75 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.75), including an action for civil penalties under section 337(f) of the Tariff Act of 1930 (19 U.S.C. § 1337(f)), as well as any other action that the Commission deems appropriate. In determining whether Respondent is in violation of this Order, the Commission may infer facts adverse to Respondent if it fails to provide adequate or timely information.

X.
Modification

The Commission may amend this Order on its own motion or in accordance with the procedure described in section 210.76 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.76).

XI.
Bonding

The conduct prohibited by section III of this Order may be continued during the sixty (60) day period in which this Order is under review by the United States Trade Representative, as delegated by the President (70 Fed. Reg. 43,251 (Jul. 21, 2005)), subject to Respondent posting of a bond in the amount of 41.35 percent of the entered value of the covered products.

This bond provision does not apply to conduct that is otherwise permitted by Section IV of this Order. Covered products imported on or after the date of issuance of this Order are subject to the entry bond as set forth in the exclusion order issued by the Commission, and are not subject to this bond provision.

The bond is to be posted in accordance with the procedures established by the Commission for the posting of bonds by Complainant in connection with the issuance of temporary exclusion orders. (*See* 19 C.F.R. § 210.68). The bond and any accompanying documentation are to be provided to and approved by the Commission prior to the commencement of conduct that is otherwise prohibited by Section III of this Order. Upon the Secretary's acceptance of the bond, (a) the Secretary will serve an acceptance letter on all parties, and (b) Respondent must serve a copy of the bond and any accompanying documentation on Complainant's counsel.²

The bond is to be forfeited in the event that the United States Trade Representative approves this Order (or does not disapprove it within the review period), unless (i) the U.S. Court of Appeals for the Federal Circuit, in a final judgment, reverses any Commission final determination and order as to Respondent on appeal or (ii) Respondent exports or destroys the products subject to this bond and provides certification to that effect that is satisfactory to the Commission.

The bond is to be released in the event the United States Trade Representative disapproves this Order and no subsequent order is issued by the Commission and approved (or not disapproved) by the United States Trade Representative, upon service on Respondent of an

² *See* note 1 above.

order issued by the Commission based upon application therefore made by Respondent to the Commission.

By order of the Commission.

Lisa R. Barton
Secretary to the Commission

Issued: November 30, 2018

PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **CORRECTED CEASE AND DESIST ORDER** has been served upon the following parties as indicated, on **December 17, 2018**.



Lisa R. Barton, Secretary
U.S. International Trade Commission
500 E Street, SW, Room 112
Washington, DC 20436

On Behalf of Complainant iRobot Corporation:

Stephen A. Marshall
FISH & RICHARDSON P.C.
1000 Maine Ave SW
Suite 1000
Washington, DC 20024

- Via Hand Delivery
- Via Express Delivery
- Via First Class Mail
- Other: _____

**On Behalf of Respondents Shenzhen Silver Star Intelligent
Technology Co., Ltd., Hoover Inc., Royal Appliance
Manufacturing Co. Inc. d/b/a TTI Floor Care, bObsweep, Inc.
and bObsweep, USA:**

Kecia J. Reynolds
PILLSBURY WINTHROP SHAW PITTMAN LLP
1200 Seventeenth Street NW
Washington, DC 20036

- Via Hand Delivery
- Via Express Delivery
- Via First Class Mail
- Other: _____

**UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, DC**

In the Matter of

**CERTAIN ROBOTIC VACUUM
CLEANING DEVICES AND
COMPONENTS THEREOF SUCH AS
SPARE PARTS**

Investigation No. 337-TA-1057

CEASE AND DESIST ORDER

IT IS HEREBY ORDERED THAT Royal Appliance Manufacturing Co. Inc., d/b/a TTI Floor Care North America of Glenwillow, Ohio cease and desist from conducting any of the following activities in the United States: importing, selling, marketing, advertising, distributing, transferring (except for exportation), and soliciting U.S. agents or distributors for vacuum cleaning devices and components thereof, such as spare parts, that are covered by one or more of claims 1, 10, 11, 14, 15, and 16 of U.S. Patent No. 9,038,233 (“the ’233 patent”) in violation of section 337 of the Tariff Act of 1930, as amended (19 U.S.C. § 1337).

**I.
Definitions**

As used in this Order:

- (A) “Commission” shall mean the United States International Trade Commission.
- (B) “Complainant” shall mean iRobot Corporation of 8 Crosby Drive, Bedford, Massachusetts 01730.
- (C) “Respondent” shall mean Royal Appliance Manufacturing Co. Inc., d/b/a TTI Floor Care North America, Inc. of 7005 Cochran Road, Glenwillow, Ohio 44139.

(D) “Person” shall mean an individual, or any non-governmental partnership, firm, association, corporation, or other legal or business entity other than Respondent or its majority-owned or controlled subsidiaries, successors, or assigns.

(E) “United States” shall mean the fifty States, the District of Columbia, and Puerto Rico.

(F) The terms “import” and “importation” refer to importation for entry for consumption under the Customs laws of the United States.

(G) The term “covered products” shall mean vacuum cleaning devices and components thereof, such as spare parts, that are covered by one or more of claims 1, 10, 11, 14, 15, and 16 of the '233 patent. “Covered products” shall not include certain vacuum cleaning devices and components thereof, such as spare parts, found to be non-infringing as detailed in the Administrative Law Judge’s final initial determination dated June 25, 2018, at pages 297-307, or the following Shenzhen Silver Star Intelligent Technology Co., Ltd. products: RolliCute, RolliTerra, LASEREYE, RV003A, Xshai, F1, T2104, T2015, T2107, and T2109.

II. Applicability

The provisions of this Cease and Desist Order shall apply to Respondent and to any of its principals, stockholders, officers, directors, employees, agents, distributors, controlled (whether by stock ownership or otherwise) and majority-owned business entities, successors, and assigns, and to each of them, insofar as they are engaging in conduct prohibited by section III, *infra*, for, with, or otherwise on behalf of Respondent.

III. Conduct Prohibited

The following conduct of Respondent in the United States is prohibited by this Order. For the remaining term of the '233 patent, Respondent shall not:

- (A) import or sell for importation into the United States covered products;
- (B) market, distribute, sell, or otherwise transfer (except for exportation) in the United States imported covered products;
- (C) advertise imported covered products;
- (D) solicit U.S. agents or distributors for imported covered products; or
- (E) aid or abet other entities in the importation, sale for importation, sale after importation, transfer, or distribution of covered products.

IV. Conduct Permitted

Notwithstanding any other provision of this Order, specific conduct otherwise prohibited by the terms of this Order shall be permitted if, in a written instrument, the owner of the '233 patent licenses or authorizes such specific conduct or such specific conduct is related to the importation or sale of covered products by or for the United States.

V. Reporting

For purposes of this requirement, the reporting periods shall commence on January 1 of each year and shall end on the subsequent December 31. The first report required under this section shall cover the period from the date of issuance of this Order through December 31, 2018. This reporting requirement shall continue in force until such time as Respondent has truthfully reported, in two consecutive timely filed reports, that they have no inventory of covered products in the United States.

Within thirty (30) days of the last day of the reporting period, Respondent shall report to the Commission (a) the quantity in units and the value in dollars of covered products that it has (i) imported and/or (ii) sold in the United States after importation during the reporting period,

and (b) the quantity in units and value in dollars of reported covered products that remain in inventory in the United States at the end of the reporting period.

When filing written submissions, Respondent must file the original document electronically on or before the deadlines stated above and submit eight (8) true paper copies to the Office of the Secretary by noon the next day pursuant to section 210.4(f) of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.4(f)). Submissions should refer to the investigation number ("Inv. No. 337-TA-1057") in a prominent place on the cover pages and/or the first page. (See Handbook for Electronic Filing Procedures, http://www.usitc.gov/secretary/fed_reg_notices/rules/handbook_on_electronic_filing.pdf). Persons with questions regarding filing should contact the Secretary (202-205-2000). If Respondent desires to submit a document to the Commission in confidence, it must file the original and a public version of the original with the Office of the Secretary and must serve a copy of the confidential version on Complainant's counsel.¹

Any failure to make the required report or the filing of any false or inaccurate report shall constitute a violation of this Order, and the submission of a false or inaccurate report may be referred to the U.S. Department of Justice as a possible criminal violation of 18 U.S.C. § 1001.

VI. Recordkeeping and Inspection

(A) For the purpose of securing compliance with this Order, Respondent shall retain any and all records relating to the sale, offer for sale, marketing, or distribution in the United States of covered products, made and received in the usual and ordinary course of business,

¹ Complainant must file a letter with the Secretary identifying the attorney to receive reports and bond information associated with this Order. The designated attorney must be on the protective order entered in the investigation.

whether in detail or in summary form, for a period of three (3) years from the close of the fiscal year to which they pertain.

(B) For the purposes of determining or securing compliance with this Order and for no other purpose, subject to any privilege recognized by the federal courts of the United States, and upon reasonable written notice by the Commission or its staff, duly authorized representatives of the Commission shall be permitted access and the right to inspect and copy, in Respondent's principal offices during office hours, and in the presence of counsel or other representatives if Respondent so chooses, all books, ledgers, accounts, correspondence, memoranda, and other records and documents, in detail and in summary form, that must be retained under subparagraph VI(A) of this Order.

VII. Service of Cease and Desist Order

Respondent is ordered and directed to:

(A) Serve, within fifteen days after the effective date of this Order, a copy of this Order upon each of its respective officers, directors, managing agents, agents, and employees who have any responsibility for the importation, marketing, distribution, or sale of imported covered products in the United States;

(B) Serve, within fifteen days after the succession of any persons referred to in subparagraph VII(A) of this Order, a copy of the Order upon each successor; and

(C) Maintain such records as will show the name, title, and address of each person upon whom the Order has been served, as described in subparagraphs VII(A) and VII(B) of this Order, together with the date on which service was made.

The obligations set forth in subparagraphs VII(B) and VII(C) shall remain in effect until the expiration date of the '233 patent.

**VIII.
Confidentiality**

Any request for confidential treatment of information obtained by the Commission pursuant to Section V and VI of this Order should be made in accordance with section 201.6 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 201.6). For all reports for which confidential treatment is sought, Respondent must provide a public version of such report with confidential information redacted.

**IX.
Enforcement**

Violation of this Order may result in any of the actions specified in section 210.75 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.75), including an action for civil penalties under section 337(f) of the Tariff Act of 1930 (19 U.S.C. § 1337(f)), as well as any other action that the Commission deems appropriate. In determining whether Respondent is in violation of this Order, the Commission may infer facts adverse to Respondent if it fails to provide adequate or timely information.

**X.
Modification**

The Commission may amend this Order on its own motion or in accordance with the procedure described in section 210.76 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.76).

**XI.
Bonding**

The conduct prohibited by section III of this Order may be continued during the sixty (60) day period in which this Order is under review by the United States Trade Representative, as delegated by the President (70 Fed. Reg. 43,251 (Jul. 21, 2005)), subject to Respondent posting of a bond in the amount of 41.35 percent of the entered value of the covered products.

This bond provision does not apply to conduct that is otherwise permitted by Section IV of this Order. Covered products imported on or after the date of issuance of this Order are subject to the entry bond as set forth in the exclusion order issued by the Commission, and are not subject to this bond provision.

The bond is to be posted in accordance with the procedures established by the Commission for the posting of bonds by Complainant in connection with the issuance of temporary exclusion orders. (*See* 19 C.F.R. § 210.68). The bond and any accompanying documentation are to be provided to and approved by the Commission prior to the commencement of conduct that is otherwise prohibited by Section III of this Order. Upon the Secretary's acceptance of the bond, (a) the Secretary will serve an acceptance letter on all parties, and (b) Respondent must serve a copy of the bond and any accompanying documentation on Complainant's counsel.²

The bond is to be forfeited in the event that the United States Trade Representative approves this Order (or does not disapprove it within the review period), unless (i) the U.S. Court of Appeals for the Federal Circuit, in a final judgment, reverses any Commission final determination and order as to Respondent on appeal or (ii) Respondent exports or destroys the products subject to this bond and provides certification to that effect that is satisfactory to the Commission.

The bond is to be released in the event the United States Trade Representative disapproves this Order and no subsequent order is issued by the Commission and approved (or not disapproved) by the United States Trade Representative, upon service on Respondent of an

² *See* note 1 above.

order issued by the Commission based upon application therefore made by Respondent to the Commission.

By order of the Commission.

A handwritten signature in black ink, appearing to read "Lisa R. Barton". The signature is stylized and cursive.

Lisa R. Barton
Secretary to the Commission

Issued: November 30, 2018

PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **CEASE AND DESIST ORDER** has been served upon the following parties as indicated, on **November 30, 2018**.



Lisa R. Barton, Secretary
U.S. International Trade Commission
500 E Street, SW, Room 112
Washington, DC 20436

On Behalf of Complainant iRobot Corporation:

Stephen A. Marshall
FISH & RICHARDSON P.C.
1000 Maine Ave SW
Suite 1000
Washington, DC 20024

- Via Hand Delivery
- Via Express Delivery
- Via First Class Mail
- Other: _____

**On Behalf of Respondents Shenzhen Silver Star Intelligent
Technology Co., Ltd., Hoover Inc., Royal Appliance
Manufacturing Co. Inc. d/b/a TTI Floor Care, bObsweep, Inc.
and bObsweep, USA:**

Kecia J. Reynolds
PILLSBURY WINTHROP SHAW PITTMAN LLP
1200 Seventeenth Street NW
Washington, DC 20036

- Via Hand Delivery
- Via Express Delivery
- Via First Class Mail
- Other: _____

PUBLIC VERSION

**UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, DC**

In the Matter of

**CERTAIN ROBOTIC VACUUM
CLEANING DEVICES AND
COMPONENTS THEREOF SUCH AS
SPARE PARTS**

Investigation No. 337-TA-1057

COMMISSION OPINION

On June 25, 2018, the presiding administrative law judge (“ALJ”) issued a final initial determination (“ID”), finding, *inter alia*, a violation of section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. § 1337, with respect to U.S. Patent No. 9,038,233 (“the ’233 patent”) and no violation with respect to U.S. Patent Nos. 6,809,490 (“the ’490 patent”) and 8,474,090 (“the ’090 patent”). On September 12, 2018, the Commission determined to review in part the ID and requested briefing on certain issues under review and on the issues of remedy, the public interest, and bonding. 83 Fed. Reg. 47188 (Sept. 18, 2018).

Having considered the record of this investigation, including the ID and the parties’ submissions, the Commission has determined to affirm, with modifications, the ID’s finding of a section 337 violation and to issue a limited exclusion order and cease and desist orders.

I. BACKGROUND

A. Procedural History

The Commission instituted this investigation under section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. § 1337, on May 23, 2017, based on a complaint filed by iRobot Corporation of Bedford, Massachusetts (“iRobot”). 82 Fed. Reg. 23592 (May 23, 2017). The

PUBLIC VERSION

complaint alleges a violation of section 337 based upon the importation into the United States, the sale for importation, and the sale within the United States after importation of certain vacuum cleaning devices and components thereof such as spare parts by reason of infringement of certain claims of the '490, '090, and '233 patents, as well as U.S. Patent Nos. 7,155,308 ("the '308 patent"), 9,486,924 ("the '924 patent"), and 8,600,553 ("the '553 patent"). The complaint, as amended, names as respondents Bissell Homecare, Inc. of Grand Rapids, Michigan ("Bissell"); Hoover, Inc. of Glenwillow, Ohio and Royal Appliance Manufacturing Co., Inc. d/b/a TTI Floor Care North America, Inc. of Glenwillow, Ohio (collectively, "Hoover"); bObsweep, Inc. of Toronto, Canada and bObsweep USA of Henderson, Nevada (collectively, "bObsweep"); The Black & Decker Corporation of Towson, Maryland and Black & Decker (U.S.) Inc. of Towson, Maryland (collectively, "Black & Decker"); Shenzhen ZhiYi Technology Co., Ltd., d/b/a iLife of Shenzhen, China ("iLife"); Matsutek Enterprises Co., Ltd. of Taipei City, Taiwan ("Matsutek"); Suzhou Real Power Electric Appliance Co., Ltd. of Suzhou, China ("Suzhou"); and Shenzhen Silver Star Intelligent Technology Co., Ltd. of Shenzhen, China ("SSSIT"). The Office of Unfair Import Investigations is not a party in this investigation.

On September 25, 2017, the ALJ held a technology tutorial and a *Markman* hearing. On November 9, 2017, the ALJ issued Order No. 27, construing certain terms of the asserted patents.

On December 14, 2017, the ALJ issued an ID (Order No. 29), granting summary determination of noninfringement of the '924 patent based on the ALJ's construction of one of

PUBLIC VERSION

the patent claim terms. The Commission determined not to review that ID. Notice (Jan. 16, 2018).¹

The Commission terminated respondents Suzhou, Black & Decker, Bissell, and Matsutek, as well as the '308 patent, from the investigation. Notice (Oct. 18, 2017) (determining not to review Order No. 23 (Sept. 26, 2017)); Notice (Jan. 31, 2018) (determining not to review Order No. 31 (Jan. 9, 2018)); Notice (Feb. 16, 2018) (determining not to review Order No. 34 (Jan. 25, 2018)); Notice (Mar. 15, 2018) (determining not to review Order No. 40 (Feb. 21, 2018)).

On March 9-14, 2018, the ALJ conducted an evidentiary hearing. Before and after the hearing, the ALJ received briefing from the parties.²

On June 25, 2018, the ALJ issued a final ID, finding a violation of section 337 with respect to the '553 and '233 patents and no violation with respect to the '490 and '090 patents.

Specifically:

- With respect to the '553 patent, the ALJ found that: (1) iLife directly infringes claims 1 and 4, but not claims 11, 12, 13, and 22; (2) iLife has not induced or contributed to infringement of the patent; (3) iRobot has satisfied the technical prong of the domestic industry requirement; (4) claim 1, but not claims 11 and 12, is invalid for anticipation; and (5) claims 4, 12, 13, and 22 are not invalid for obviousness.

¹ iRobot petitioned the U.S. Court of Appeals for the Federal Circuit for review of the Commission's grant of summary determination of noninfringement of the '924 patent and the underlying claim construction order. *See iRobot Corp. v. Int'l Trade Comm'n*, No. 18-1690 (filed Mar. 13, 2018). That appeal is currently pending.

² Complainant iRobot's Pre-Hearing Statement; Respondents' Pretrial Brief ("RPB"); Complainant iRobot Corporation Inc.'s Initial Post-Hearing Brief ("CIB"); Respondents' Post-Hearing Brief ("RIB"); Complainant iRobot Corporation's Responsive Post-Hearing Brief; Respondents' Responsive Post-Hearing Brief; Complainant iRobot Corporation's Reply Post-Hearing Brief ("CRPB"); Respondents' Reply Post-Hearing Brief.

PUBLIC VERSION

- With respect to the '490 patent, the ALJ found that: (1) iLife and bObsweep directly infringe claim 42, but not claims 1 and 12, and Hoover directly infringes claim 42; (2) iLife, Hoover, bObsweep, and SSSIT have not induced or contributed to infringement of the patent; (3) iRobot has satisfied the technical prong of the domestic industry requirement; (4) claim 1, but not claim 12, is invalid for anticipation; (5) claims 12 and 42 are invalid for obviousness; and (6) claims 1 and 42 are not invalid for indefiniteness.
- With respect to the '090 patent, the ALJ found that: (1) iLife, Hoover, SSSIT, and bObsweep directly infringe claims 1, 2, 3, 5, 7, and 10, but not claim 17; (2) iLife, Hoover, bObsweep, and SSSIT have not induced or contributed to infringement of the patent; (3) iRobot has satisfied the technical prong of the domestic industry requirement; (4) claims 1, 5, 7, 10, and 17 are not invalid for anticipation; and (5) claims 1, 2, 3, 4, 5, 7, 10, and 17 are invalid for obviousness in view of certain prior art combinations, but not others.
- With respect to the '233 patent, the ALJ found that: (1) iLife and bObsweep directly infringe claims 1, 10, 11, 14, 15, and 16 and Hoover directly infringes the same claims with respect to the Hoover Quest 1000 products, but not the Hoover Rogue/Y1 and Hoover Y2 products; (2) iLife, Hoover, bObsweep, and SSSIT have not induced or contributed to infringement of the patent; (3) iRobot has satisfied the technical prong of the domestic industry requirement; and (4) claims 1, 10, 11, 14, 15, and 16 are not invalid for anticipation, obviousness, or lack of written description.
- The ALJ found that iRobot has satisfied the economic prong of the domestic industry requirement under 19 U.S.C. § 1337(a)(3)(C) with respect to the '553, '490, '090, and '233 patents.

The ALJ also issued a Recommended Determination on Remedy and Bond ("RD"), recommending, if the Commission finds a section 337 violation, the issuance of (1) a limited exclusion order against certain robotic vacuum cleaning devices and components thereof that are imported, sold for importation, and/or sold after importation by Hoover, bObsweep, SSSIT, and iLife; (2) cease and desist orders against Hoover and iLife; and (3) imposition of a bond of 18.89 percent for iLife products, 48.65 percent for bObsweep products, and 41.35 percent for Hoover products that are imported during the period of Presidential review.

PUBLIC VERSION

On July 9, 2018, iRobot filed a petition for review challenging various findings in the final ID.³ Specifically, iRobot petitioned for review of the ID's findings on: (1) indirect infringement with respect to the '553, '490, '090, and '233 patents; (2) anticipation with respect to claim 1 of the '553 patent; (3) obviousness with respect to claim 42 of the '490 patent; and (4) obviousness with respect to claims 1, 2, 3, 4, 5, 7, 10, and 17 of the '090 patent. iRobot also contingently petitioned for review of the ALJ's findings on anticipation with respect to certain limitations of claims 1, 5, 7, 10, and 17 of the '090 patent in the event the Commission determines to review the ID's findings on anticipation with respect to that patent on other grounds.

Also on July 9, 2018, iLife, Hoover, bObsweep, and SSSIT filed a petition for review challenging various findings in the final ID.⁴ Specifically, iLife, Hoover, bObsweep, and SSSIT petitioned for review of the ID's findings on: (1) anticipation with respect to claims 11, 12, and 13 of the '553 patent; (2) obviousness with respect to claims 4 and 22 of the '553 patent; (3) direct infringement of the asserted '490 patent claims with respect to Hoover; (4) indefiniteness with respect to claims 1, 12, and 42 of the '490 patent; (5) anticipation with respect to claims 1, 5, 7, 10, and 17 of the '090 patent; (6) obviousness with respect to claims 1, 2, 3, 4, 5, 7, 10, and 17 of the '090 patent; (7) infringement of the asserted '233 patent claims with respect to a certain component; (8) anticipation, obviousness, and indefiniteness with respect to claims 1, 10, 11, 14, 15, and 16 of the '233 patent; and (9) the economic prong of the

³ Complainant's Petition for Review of Initial Determination on Violation of Section 337 ("CPet.").

⁴ Respondents' Petition for Review of the Final Initial Determination with Respect to Certain Findings and Determinations ("RPet.").

PUBLIC VERSION

domestic industry requirement with respect to the '553, '490, '090, and '233 patents. iLife, Hoover, bObsweep, and SSSIT also contingently petitioned for review of the ALJ's findings on: (1) anticipation with respect to claim 12 of the '490 patent in the event the Commission reviews the ID's finding that claim 12 is invalid for obviousness; (2) infringement of the '090 patent and the technical prong of the domestic industry requirement with respect to that patent in the event that the Commission reviews the ALJ's construction of the claim term "attached" or "chassis" required by the asserted claims of the '090 patent; and (3) infringement of the '233 patent in the event that the Commission reviews the ALJ's construction of the claim term "the gap being configured to prevent occlusion of the cliff detector beam" required by the asserted claims of the '233 patent.

On July 16, 2018, the Commission determined that iRobot satisfied the economic prong of the domestic industry requirement under 19 U.S.C. § 1337(a)(3)(B). Notice (July 16, 2018) (determining to affirm with modifications Order No. 39 (Feb. 13, 2018)).

On July 17, 2018, iRobot, and iLife, Hoover, bObsweep, and SSSIT, filed responses to the petitions for review.⁵

On July 25, 2018, iRobot filed post-RD statements on the public interest under Commission Rule 210.50(a)(4). The Commission did not receive post-RD public interest comments from any respondent pursuant to Commission Rule 210.50(a)(4). The Commission did not receive comments from the public in response to the Commission notice issued on July 10, 2018. 83 Fed. Reg. 31977 (July 10, 2018).

⁵ Respondents' Response to Complainant's Petition for Review of the Final Initial Determination ("RResp."); Complainant's Response to Respondents' Petition for Review of the Final Initial Determination with Respect to Certain Findings and Determinations ("CResp.").

PUBLIC VERSION

On September 12, 2018, the Commission determined to review in part the final ID. 83 Fed. Reg. 47188 (Sept. 18, 2018). Specifically, the Commission determined to review the ID's findings on: (1) induced and contributory infringement with respect to the asserted claims of the '553, '490, '090, and '233 patents; (2) anticipation with respect to the asserted claims of the '553 patent; (3) obviousness with respect to the asserted claims of the '553 patent; (4) direct infringement of the asserted claims of the '090 patent by iLife, Hoover, bObsweep, and SSSIT; (5) anticipation with respect to the asserted claims of the '090 patent; (6) obviousness with respect to the asserted claims of the '090 patent; (7) anticipation with respect to the asserted claims of the '233 patent; and (8) regarding whether the asserted '233 patent claims are invalid for obviousness, consideration of U.S. Patent No. 6,594,844 as prior art under 35 U.S.C. § 102(a) and § 103. The Commission also requested briefing from the parties on certain issues under review and briefing from the parties, interested government agencies, and interested persons on the issues of remedy, the public interest, and bonding.

On September 19, 2018, iRobot filed an unopposed motion to terminate the investigation as to iLife based on a settlement agreement and, because the '553 patent is asserted against iLife only, all claims asserted under the '553 patent for mootness. On October 2, 2018, the Commission determined to grant that motion. Notice (Oct. 2, 2018). Thus, the remaining respondents in this investigation are Hoover, bObsweep, and SSSIT (collectively, "Respondents"), and the remaining asserted patents are the '490, '090, and '233 patents (collectively, the "asserted patents").

On September 24, 2018, iRobot and Respondents filed initial written submissions addressing the Commission's questions and the issues of remedy, the public interest, and

PUBLIC VERSION

bonding.⁶ On October 1, 2018, the parties filed response briefs.⁷ No comments were received from the public.

B. The Patents at Issue

The asserted patents relate to the structure and control systems for robotic vacuum cleaners. The following patent claims are at issue in this investigation:

Patent	Infringement Claims	Domestic Industry Claims
'490 patent	12, 42	8, 42
'090 patent	1, 2, 3, 7, 10, 17	1, 2, 3, 4, 10, 17
'233 patent	1, 10, 11, 14, 15, 16	1, 9, 15

ID at 5.

1. The '490 Patent

The '490 patent is entitled “Method and System for Multi-Mode Coverage for an Autonomous Robot” and issued on October 26, 2004. JX-1. The application for the '490 patent was filed on June 12, 2002, and claims priority to a provisional application filed on June 12, 2001. *Id.* The '490 patent generally describes a control system for a mobile robot that includes different types of movement “modes,” such as random bounce, obstacle following, and spot coverage. *Id.*, Abstract.

The following claims of the '490 patent are at issue in this investigation:

⁶ Complainant’s Response to Request for Written Submissions Regarding Issues Under Review (“CBr.”); Respondents’ Response to the Commission’s September 12, 2018 Notice and Request for Written Submissions (“RBr.”).

⁷ Complainant iRobot Corporation’s Response to Respondents’ Written Submissions in Response to the Commission’s September 12, 2018 and Request for Written Submissions (“CReply”); Respondents’ Reply to Complainant’s Response to Request for Written Submissions Regarding Issues Under Review (“RReply”).

PUBLIC VERSION

1. A mobile robot comprising:

- (a) means for moving the robot over a surface;
- (b) an obstacle detection sensor;
- (c) and a control system operatively connected to said obstacle detection sensor and said means for moving;
- (d) said control system configured to operate the robot in a plurality of operational modes and to select from among the plurality of modes in real time in response to signals generated by the obstacle detection sensor, said plurality of operational modes comprising: a spot-coverage mode whereby the robot operates in an isolated area, an obstacle following mode whereby said robot travels adjacent to an obstacle, and a bounce mode whereby the robot travels substantially in a direction away from an obstacle after encountering the obstacle, and wherein, when in the obstacle following mode, the robot travels adjacent to an obstacle for a distance at least twice the work width of the robot.

7. A mobile robot according to claim 1, whereby said obstacle detection sensor comprises a tactile sensor.

8. A mobile robot according to claim 7, whereby said obstacle detection sensor further comprises an IR sensor.

12. The mobile robot according to claim 1, further comprising a means for manually selecting an operational mode.

42. A mobile robot comprising:

- (a) means for moving the robot over a surface;
- (b) an obstacle detection sensor;
- (c) a cliff sensor; and
- (d) a control system operatively connected to said obstacle detection sensor, said cliff sensor, and said means for moving;
- (e) said control system configured to operate the robot in a plurality of operational modes, said plurality of operational modes comprising: a spot-coverage mode whereby the robot operates in an isolated area, an obstacle following mode whereby said robot travels adjacent to an obstacle for a distance at least twice the work width of the robot, and a bounce mode whereby the robot travels substantially in a direction away from an obstacle after encountering the obstacle.

PUBLIC VERSION

*Id.*⁸

2. The '090 Patent

The '090 patent is entitled "Autonomous Floor-Cleaning Robot" and issued on July 2, 2013. JX-3. The application for the '090 patent was filed on August 29, 2008, and claims priority as a continuation application to an application filed on December 16, 2002, now U.S. Patent No. 6,883,201. *Id.* The '090 patent generally describes the structure of a floor cleaning robot with sensors, means for movement, rotating brushes, and a removable bin for receiving dust and other particulates. *Id.*, Abstract.

The following claims of the '090 patent are at issue in this investigation:

1. A floor cleaning robot comprising:

a housing and a chassis;

wheels and at least one motor to drive the wheels disposed at least partially within the housing and configured to move the floor cleaning robot across a floor, each of the wheels being attached to the chassis via a respective arm having a distal end and a proximal end;

a control module disposed within the housing and directing movement of the floor cleaning robot across the floor;

at least one sensor for detecting an obstacle and communicating obstacle information to the control module so that the control module can cause the floor cleaning robot to react to the obstacle;

a removable bin disposed at least partially within the housing and configured to receive particulates; and

a first rotating member configured to direct particulates toward the bin,

⁸ Claims 1 and 7 are not asserted for infringement or the domestic industry requirement, but are implicated by asserted claims 8 and 12. There are no specific claim terms at issue on review.

PUBLIC VERSION

wherein one of the wheels is rotatably attached to the distal end of each arm, and the proximal end of each arm is pivotably attached to the chassis,

wherein each wheel is biased to an extended position away from the robot chassis by a spring extending between the arm and the robot chassis, and

wherein, during cleaning, the weight of the floor cleaning robot overcomes a force from the spring biasing the wheels to an extended position.

2. The floor cleaning robot of claim 1, further comprising *a second rotating member configured to cooperate with the first rotating member to direct particulates toward the bin.*
3. The floor cleaning robot of claim 2, wherein *the first rotating member contacts the floor and agitates particulates and directs the particulates toward the second rotating member.*
4. The floor cleaning robot of claim 3, wherein *the second rotating member is positioned to receive particulates from the first rotating member and direct the particulates toward the removable bin.*
5. The floor cleaning robot of claim 1, further comprising an air moving system disposed at least partially within the housing and configured to ingest particulates and direct particulates toward the removable bin.
7. The floor cleaning robot of claim 5, wherein air moved by the air moving system passes through a filter before exiting the housing.
10. A floor cleaning robot comprising:
 - a housing and a chassis;
 - a first wheel and a first arm for attaching the first wheel to the chassis, the first arm having a proximal end pivotably attached to the chassis and a distal end to which the first wheel is rotatably mounted;*
 - a first resilient member connecting the first arm to the chassis and biasing the distal end of the first arm and the first wheel to an extended position;*
 - a second wheel and a second arm for attaching the second wheel to the chassis, the second arm having a proximal end pivotably attached to the chassis and a distal end to which the second wheel is rotatably mounted;*
 - a second resilient member connecting the second arm to the chassis and biasing the distal end of the second arm and the second wheel to an extended position;*

PUBLIC VERSION

at least one motor disposed at least partially within the housing and configured to drive the first and second wheels to move the floor cleaning robot across a floor;

a control module disposed within the housing and directing movement of the floor cleaning robot across the floor;

at least one sensor for detecting an obstacle and communicating obstacle information to the control module so that the control module can cause the floor cleaning robot to react to the obstacle;

a removable bin disposed at least partially within the housing and configured to receive particulates;

a rotating brush configured to agitate particulates and direct particulates toward the removable bin;

wherein, during cleaning, the weight of the floor cleaning robot overcomes a force from the first and second resilient members that biases the wheels to an extended position.

17. A method for directing particulates from a floor into a bin, the method comprising:

driving wheels to move a cleaning robot across a floor, *the wheels being attached to a chassis of the cleaning robot by a pivoting arm and being biased to an extended position by a spring extending between the arm and the chassis;*

allowing the weight of the cleaning robot to overcome the spring force biasing the wheels to an extended position when the cleaning robot is positioned for use;

sensing obstacles;

causing the cleaning robot to avoid the sensed obstacles;

agitating particulates from the floor and directing the particulates toward a removable bin of the cleaning robot;

generating a negative pressure to direct agitated particulates toward the removable bin; and

holding particulates in the removable bin.

PUBLIC VERSION

Id. (emphasis added to terms at issue on review).⁹

3. The '233 Patent

The '233 patent is entitled "Autonomous Floor-Cleaning Robot" and issued on May 26, 2015. JX-5. The application for the '233 patent was filed on December 14, 2012, and, similar to the '090 patent, claims priority as a continuation application to an application filed on December 16, 2002, now U.S. Patent No. 6,883,201. *Id.* The '233 patent generally describes the structure of a floor cleaning robot with sensors, means for movement, rotating brushes, and a removable bin for receiving dust and other particulates. *Id.*, Abstract.

The following claims of the '233 patent are at issue in this investigation:

1. A self-propelled floor-cleaning robot comprising

a housing defining a housing perimeter;

a powered primary brush assembly disposed within the housing perimeter and positioned to engage a floor surface, the primary brush assembly being configured to rotate about an axis generally parallel to the floor surface;

a cliff detector carried by the housing and configured to direct a beam toward the floor surface and to respond to a falling edge of the floor surface; and

a powered side brush extending beyond the housing perimeter and positioned to brush floor surface debris from beyond the housing perimeter, the side brush being configured to rotate about an axis generally perpendicular to the floor surface and to rotate in a direction to direct debris toward the robot along a projected direction of movement of the powered primary brush assembly, the side brush having bundles of bristles and being positioned such that the bundles of bristles pass between the cliff detector and the floor surface during a rotation of the side brush around the axis, the bundles of bristles being separated by a gap, the gap

⁹ Claim 5 is not asserted for infringement or the domestic industry requirement, but is implicated by asserted claim 7.

PUBLIC VERSION

being configured to prevent occlusion of the cliff detector beam during at least part of the rotation of the side brush around the axis;

a particulate receptacle positioned to receive and collect particulates brushed from the floor surface by the primary brush assembly and the powered side brush;

an obstacle detector responsive to obstacles encountered by the robot; and

a control circuit in electrical communication with a motor drive and configured to control the motor drive to maneuver the robot about detected obstacles across the floor surface during a floor-cleaning operation.

9. The floor cleaning robot of claim 1, further comprising at least one friction pad secured to the underside of the housing and positioned to engage the floor surface and inhibit robot motion when a forward wheel of the robot travels beyond a falling edge of the floor surface.

10. The floor cleaning robot of claim 1, wherein *the obstacle detector comprises a displaceable bumper disposed at the housing perimeter, and a bumper displacement sensor responsive to displacement of the bumper with respect to the housing.*

11. The floor cleaning robot of claim 1, wherein the control circuit is configured to move the robot in a wall-following mode to maneuver the robot along a wall in a direction that places the side brush against the wall.

14. The floor cleaning robot of claim 1, wherein *a portion of the bundles of bristles of the powered side brush passes between a portion of a drive wheel of the robot and the cleaning surface during the rotation of the side brush around the axis.*

15. A self-propelled floor-cleaning robot comprising:

wheels operably connected to a motor drive to propel the robot across the floor surface;

a controller in electrical communication with the motor drive and configured to control the motor drive to autonomously maneuver the robot about detected obstacles encountered on the floor surface during a floor-cleaning operation;

a housing defining a housing perimeter;

a cleaning head disposed within the housing perimeter and positioned to engage a floor surface;

PUBLIC VERSION

a cliff detector carried by the housing and configured to direct a beam toward the floor surface and to respond to a falling edge of the floor surface; and

a powered rotating side brush extending beyond the housing perimeter and positioned to brush floor surface debris from beyond the housing perimeter toward a projected path of the cleaning head, the powered rotating side brush rotating in a direction that brushes debris toward the robot ahead of a rotating axis of the brush along the projected path of the cleaning head, the side brush having bundles of bristles and being positioned such that the bundles of bristles pass between the cliff detector and the floor surface during a rotation of the side brush around the axis, the bundles of bristles being separated by a gap, the gap being configured to prevent occlusion of the cliff detector beam during at least a portion of a rotation of the side brush around the axis;

the controller being configured to move the robot in a wall-following mode to maneuver the robot along a wall in a direction that places the powered rotating side brush adjacent the wall.

16. The floor cleaning robot of claim 15, wherein the cleaning head comprises a powered primary brush assembly disposed within the housing perimeter and positioned to engage the floor surface.

Id. (emphasis added to terms at issue on review).

II. STANDARD ON REVIEW

Once the Commission determines to review an initial determination, its review is conducted de novo. *Certain Polyethylene Terephthalate Yarn and Products Containing Same*, Inv. No. 337-TA-457, USITC Pub. No. 3550 (Oct. 2002), Comm'n Op. at 9 (June 18, 2002). Upon review, "the Commission has 'all the powers which it would have in making the initial determination,' except where the issues are limited on notice or by rule." *Certain Flash Memory Circuits and Products Containing Same*, Inv. No. 337-TA-382, USITC Pub. No. 3046 (July 1997), Comm'n Op. at 14 (June 26, 1997) (quoting *Certain Acid-Washed Denim Garments and Accessories*, Inv. No. 337-TA-324, USITC Pub. No. 2576 (Nov. 1992), Comm'n Op. at 5 (Aug. 28, 1992)). Commission practice in this regard is consistent with the Administrative Procedure Act. See 5 U.S.C. § 557(b).

PUBLIC VERSION

Upon review, “the Commission may affirm, reverse, modify, set aside or remand for further proceedings, in whole or in part, the initial determination of the administrative law judge.” 19 C.F.R. § 210.45(c). “The Commission may also make any findings or conclusions that in its judgment are proper based on the record in the proceeding.” *Id.* This rule reflects the fact that the Commission is not an appellate court, but is the body responsible for making the final agency decision.

III. DISCUSSION

A. Issues Under Review

1. Indirect Infringement

The ID finds that Respondents did not induce or contribute to infringement of the asserted patents.¹⁰ ID at 137-42, 220-21, 307-08. Specifically, with respect to Hoover and bObsweep, the ID finds that both respondents induce their customers to use their products in the United States through sales, instruction manuals, and customer support, and that their provision of replacement parts can contribute to the infringement of the asserted claims. *Id.* The ID finds, however, that neither respondent had the requisite knowledge of either the asserted patents or their infringement. *Id.* With respect to SSSIT, the ID finds no evidence that it has a relationship with end users of the accused SSSIT product in the United States or that iRobot made any specific argument concerning the SSSIT product. *Id.*

iRobot petitions for review of the ID’s findings on indirect infringement. CPet. at 9-14. For all asserted patents, iRobot contends that the knowledge requirement is satisfied based on the

¹⁰ The ID finds that iRobot’s inducement and contributory infringement theories apply to all asserted patent claims for every accused product. *See* ID at 137, 220, 307-08.

PUBLIC VERSION

filing of iRobot's complaint, which included detailed claim charts demonstrating infringement on a limitation-by-limitation basis. *Id.* at 9-12. In addition, iRobot argues that Hoover and bObsweep had knowledge of the asserted patents and of infringement of those patents before the filing of iRobot's complaint. *Id.* at 13-14. Specifically, with respect to Hoover, iRobot argues that an email shows that [REDACTED] [REDACTED]. *Id.* at 14. With respect to bObsweep, iRobot argues that certain emails from [REDACTED] [REDACTED]. *Id.* With respect to SSSIT, iRobot specifically refers to that respondent only in a footnote to its arguments with respect to Hoover. *Id.* at 14 n.7.

Respondents contend that iRobot's argument that knowledge of the patent can be inferred from the filing of the complaint should be deemed abandoned or withdrawn because it was not properly raised before the ALJ and was raised for the first time in its petition for review. RResp. at 2-4. Respondents argue that the ID properly finds that the evidence did not establish any respondent's knowledge of the asserted patents or knowledge of patent infringement. *Id.* at 4-6. With respect to Hoover, Respondents argue that the email cited by iRobot neither identifies any of the asserted patents nor acknowledges infringement of the asserted patents. *Id.* at 5-6. With respect to bObsweep, Respondents argue that the emails cited by iRobot does not identify the asserted patents and generally describes avoiding others' intellectual property. *Id.* at 6.

Section 271 of the Patent Act governs induced infringement and contributory infringement. Section 271(b) provides that "[w]hoever actively induces infringement of a patent shall be liable as an infringer." 35 U.S.C. § 271(b). Section 271(c) provides that "[w]hoever offers to sell or sells within the United States or imports into the United States a component of a

PUBLIC VERSION

patented machine, manufacture, combination or composition, or a material or apparatus for use in practicing a patented process, constituting a material part of the invention, knowing the same to be especially made or especially adapted for use in an infringement of such patent, and not a staple article or commodity of commerce suitable for substantial noninfringing use, shall be liable as a contributory infringer.” 35 U.S.C. § 271(c). Contributory infringement and induced infringement require both “knowledge of the patent in suit and knowledge of patent infringement.” *Commil USA, LLC v. Cisco Sys., Inc.*, 135 S. Ct. 1920, 1926-27 (2015).

The Commission has recognized that knowledge of the patent and knowledge of patent infringement are two separate requirements for induced and contributory infringement. See *Certain Beverage Brewing Capsules, Components Thereof, and Products Containing the Same* (“*Certain Beverage Brewing Capsules*”), Inv. No. 337-TA-929, Comm’n Op. at 18-19 (Apr. 5, 2016). The Commission has found that “service of a section 337 complaint can be adequate to provide knowledge of the asserted patents.” *Certain Television Sets, Television Receivers, Television Tuners, and Components Thereof*, Inv. No. 337-TA-910, Comm’n Op. at 41 (Oct. 30, 2015) (finding contributory infringement); *Certain Beverage Brewing Capsules*, Inv. No. 337-TA-929, Comm’n Op. at 17-19 (finding inducement and contributory infringement).

The Commission finds that iRobot waived its argument that the filing of the complaint suffices to show the requisite knowledge for induced and contributory infringement. iRobot did not present this argument in its initial post-hearing brief and argued for the first time in its post-hearing reply brief that Hoover and bObsweep had knowledge of the patents at issue at least as early as the filing of the complaint in this investigation. See CIB at 103-08; CRPB at 43. Moreover, at no time before its petition for review did iRobot make any argument based on the filing of the complaint regarding the requisite knowledge of patent infringement, which is a

PUBLIC VERSION

separate requirement from knowledge of the patents, for both induced infringement and contributory infringement.

The Commission thus adopts the ID's findings on indirect infringement, including the findings that, based on the evidence presented to the ALJ, iRobot failed to satisfy its burden to prove that Hoover and bObsweep had knowledge of the asserted patents and their infringement before the filing of the complaint and that iRobot has not made the necessary showing for either induced infringement or contributory infringement by SSSIT. *See* ID at 137-42, 220-21, 307-08. Regarding the emails cited by iRobot, the Commission agrees with the ID that they do not satisfy the knowledge requirement because they do not identify any of the asserted patents nor discuss infringement of the asserted patents.

Accordingly, the Commission affirms, with the supplemental reasoning provided above, the ID's findings of no induced infringement and no contributory infringement of the asserted patents.¹¹

2. The '090 Patent

a) Direct Infringement

The ID finds that the Hoover, SSSIT, and bObsweep bObi products meet all limitations of claims 1, 2, 3, 5, 7, 10, and 17 of the '090 patent and that Hoover, SSSIT, and bObsweep directly infringe apparatus claims 1, 2, 3, 5, 7, and 10, but not method claim 17. ID at 190-220.

¹¹ The Commission notes that, contrary to its contention, iRobot has not proven every element of its contributory infringement claim. Specifically, although iRobot presented arguments to the ALJ on whether Hoover and bObsweep import a component "constituting a material part of the invention" or whether the imported component is "not a staple article or commodity of commerce suitable for substantial noninfringing use," the ID does not reach those issues. *See* ID at 137-42, 220-21, 307-08. Thus, these factual issues have not been adjudicated by the Commission.

PUBLIC VERSION

As relevant on review, the ID finds that the accused products meet the following limitations requiring a wheel arm pivotably attached to a chassis:

- “wherein one of the wheels is rotatably attached to the distal end of each arm, and the proximal end of each arm is pivotably attached to the chassis” required by claims 1, 2, 5, and 7;
- “a first wheel and a first arm for attaching the first wheel to the chassis, the first arm having a proximal end pivotably attached to the chassis and a distal end to which the first wheel is rotatably mounted” and “a second wheel and a second arm for attaching the second wheel to the chassis, the second arm having a proximal end pivotably attached to the chassis and a distal end to which the second wheel is rotatably mounted” required by claim 10; and
- “wheels being attached to a chassis of the cleaning robot by a pivoting arm” required by claim 17.

Id. at 196-99, 206-08, 216-18. The ID finds that the structure of the accused products is not in dispute: each wheel is rotatably attached to a wheel arm at one end and the opposite end of the arm is rotatably attached to a plastic “cover,” “module,” or “plate,” which is fixed to a larger frame that is readily identifiable as a chassis. *Id.* at 184-85, 198-99, 208, 218. The ID finds that the wheel module cover or plate meets the limitations requiring a wheel arm pivotably attached to the chassis because the plain and ordinary meaning of the term “attached” allows for direct or indirect attachment. *Id.* at 185, 198-99, 208, 218. The ID finds that the intrinsic evidence of the ’090 patent does not suggest otherwise; for example, many claim limitations recite being “attached” to one another, but the specification depicts them as separated by several intervening parts with no single embodiment showing the wheel as directly attached to the chassis. *Id.* at 185, 198-99, 208, 218. The ID finds that a person of ordinary skill in the art would not find it practical to consider the wheel arm as not attached to the chassis in the accused products; otherwise, the accused products would not operate correctly. *Id.* at 186, 198-99, 208, 218.

The ALJ previously adopted the parties’ agreed-upon construction for the term “chassis”:
“the frame of the floor cleaning robot to which components are attached or integrated.” *See*

PUBLIC VERSION

Order No. 27, at 10; ID at 172. The ID finds that, based on its structure and function, the wheel module cover or plate can be considered a “chassis” as construed by the ALJ. ID at 186-88, 197-99, 207-08, 217-18. The ID credits testimony from both experts showing that the chassis can be segmented into components and that the wheel module covers or plates of the accused products are part of the chassis because their purpose is to attach and integrate the wheel, wheel arm, and motor with the robot. *See id.*

For similar reasons, the ID finds that the accused products meet the following limitations requiring a spring extending between the arm and the chassis (or a resilient member connecting the arm and the chassis):

- “wherein each wheel is biased to an extended position away from the robot chassis by a spring extending between the arm and the robot chassis” required by claims 1, 2, 5, and 7;
- “a first resilient member connecting the first arm to the chassis and biasing the distal end of the first arm and the first wheel to an extended position” and “a second resilient member connecting the second arm to the chassis and biasing the distal end of the second arm and the second wheel to an extended position” required by claim 10;
- “wheels being attached to a chassis of the cleaning robot by a pivoting arm and being biased to an extended position by a spring extending between the arm and the chassis” required by claim 17.

Id. at 199-201, 209-10, 219-20.

Respondents contingently petition for review of the ID’s findings on infringement of the ’090 patent with respect to the limitations identified above in the event that the Commission reviews the construction of the term “attached” or “chassis.” RPet. at 26. Respondents argue that the accused products do not have wheel arms attached to the chassis as required by the asserted claims of the ’090 patent because the wheel arms in the accused products are attached to wheel module covers or plates, which are not the chassis but distinct pieces attached to the chassis, and indirect attachment cannot meet the limitation. *Id.* at 27. Respondents argue that

PUBLIC VERSION

the wheel module covers or plates are made of different materials and serve different purposes than the chassis and that iRobot's own documents concerning the asserted domestic industry products "confirm" that a chassis and wheel module are considered separate components. *Id.* Respondents also argue that the accused products do not have a spring connecting to the chassis or extending between the arm and the chassis, as required by the patent claims, because the spring in the accused products is contained in a detachable wheel module. *Id.* at 27-28.

iRobot argues that the ID's infringement findings should not be disturbed. CResp. at 22. iRobot argues that the ID correctly finds that the plastic piece to which the wheel arms and the springs in the accused products attach meets the "chassis" limitation. *Id.* at 22-23. iRobot argues that Respondent's position is based on an incorrect claim construction argument that contradicts the intrinsic record of the '090 patent, the parties' agreed-upon construction of "chassis," and testimony of Respondents' invalidity expert. *Id.* at 22-24. iRobot argues that, even if the plastic piece to which the wheel arm and spring attach is not a "chassis," the limitation is still met by indirect attachment to the chassis and Respondents present no argument that the ID's finding on indirect attachment is erroneous. *Id.* at 25-26.

With respect to the "chassis" term, the Commission adopts the construction proposed by the parties and adopted by the ALJ: "frame of the floor cleaning robot to which components are attached or integrated." *See* Order No. 27, at 10; ID at 172. This construction was agreed-upon with no further limitations. Thus, under this construction, the Commission rejects Respondents' argument that the wheel module covers or plates are components, and not the chassis, and thus cannot satisfy the "chassis" term. *See* RPet. at 27. The construction of "chassis" does not require that the chassis comprise a unitary piece or single material nor serve a single purpose. Also, contrary to Respondents' argument, iRobot's description of the asserted domestic industry

PUBLIC VERSION

products are irrelevant to whether the accused products meet the “chassis” limitation. Moreover, as the ID discusses, expert testimony from both parties demonstrate that a chassis may be made of multiple pieces and that the wheel module covers or plates of the accused products are part of the chassis because their purpose is to attach and integrate the wheel, wheel arm, and motor with the robot. *See* ID at 186-88, 197-99, 207-08, 217-18; CX-220C (Papanikolopoulos DWS) at Q/A 447, 499, 550.

With respect to the “attached” term, the Commission adopts the ID’s finding that the plain and ordinary meaning of the term allows for direct or indirect attachment. *See, e.g.*, ID at 185. The claims do not expressly require that the wheel arms and springs be directly attached to the chassis. On the contrary, the claims’ use of the term “attached” suggests that the wheel arms and springs may be indirectly attached to the chassis. Specifically, claims 1, 10, and 17 require wheels “attached” to the chassis and additionally require various intervening components between the wheels and the chassis, thus strongly implying that the term “attached” allows for indirect attachment. For example, claim 1 recites “each of the wheels being attached to the chassis via a respective arm” and “wherein each wheel is biased to an extended position away from the robot chassis by a spring extending between the arm and the robot chassis.” JX-3, claim 1. Because the “respective arm” and “spring” are connecting components between the wheels and the chassis, the wheels and the chassis are indirectly attached.

Other claim language also implies indirect attachment. For example, claim 1 requires that the wheel be “rotatably attached” to the wheel arm and that the other end of the wheel arm be “pivotably attached” to the chassis. *Id.* Direct attachment here would not allow for the required rotation or pivoting. As expert testimony shows, a person of ordinary skill in the art

PUBLIC VERSION

would create the attachment with pins or bearings to allow the wheel to rotate and the arm to pivot. *See, e.g.*, CX-220C at Q/A 457-458, 508-509, 560-561.

The specification also describes embodiments in which components are indirectly attached. For example, one embodiment includes wheels that are indirectly attached to the chassis. *See* JX-3, 5:62-6:15 (“Each clevis-shaped arm member **42A_{CM}**, **42B_{CM}** is pivotally mounted to the chassis **21** One end of a tension spring **42B_{TS}** (the tension spring for the right wheel subassembly **42A** is not illustrated, but is identical to the tension spring **42B_{TS}** of the left wheel subassembly **42A**) is attached to the aft portion of the clevis-shaped arm member **42B_{CM}** and the other end of the tension spring **42B_{TS}** is attached to the chassis **21** forward of the respective wheel **42A_w**, **42B_w**.”), Figs. 3A, 3B, 3C.

The evidence shows, and the parties do not dispute that, the accused products include wheel arms that are pivotably attached to the wheel module covers or plates, as well as springs attached to the wheel module covers or plates, and that the wheel module covers or plates are attached to the chassis. *See* ID at 198-201, 207-10, 217-20; CX-220C at Q/A 457-458, 508-509, 560-561. Thus, the Commission finds that the accused products meet the limitations requiring a wheel arm pivotably attached to a chassis and the limitations requiring a spring extending between the arm and the chassis (or a resilient member connecting the arm and the chassis).

Accordingly, the Commission affirms, with the supplemental reasoning provided above, the ID’s construction of the “attached” and “chassis” terms, as well as the ID’s findings that the Hoover, SSSIT, and bObsweep bObi products meet all limitations of claims 1, 2, 3, 5, 7, 10, and 17 of the ’090 patent and that Hoover, SSSIT, and bObsweep directly infringe the apparatus claims 1, 2, 3, 5, 7, and 10, but not method claim 17.

PUBLIC VERSION

b) Anticipation

The ID finds that claims 1, 5, 7, 10, and 17 of the '090 patent are not invalid as anticipated by U.S. Patent No. 5,995,884 (RX-80) ("Allen"). ID at 232-52. The ID finds that Allen does not disclose the limitation "a removable bin disposed at least partially within the housing and configured to receive particulates" required by claims 1, 5, 7, and 10. *Id.* at 232-51. Specifically, the ID finds that Allen's disclosures of a removable bag and "equivalent configurations" does not expressly or inherently disclose "a removable bin" as required by the claims. *See id.* at 241-42, 251. The ID similarly finds that Allen does not disclose the limitation "a removable bin" required by claim 17. *Id.* at 251-52. The ID does, however, find that Allen discloses all other limitations required by the asserted claims, including the limitation "a control module disposed within the housing and directing movement of the floor cleaning robot across the floor" required by claims 1, 5, 7, and 10 and "causing the cleaning robot to avoid the sensed obstacles" required by claim 17 (collectively, the "control module" limitations). *Id.* at 232-52.

Respondents petition for review of the ID's findings on anticipation with respect to the "removable bin" limitations of claims 1, 5, 7, 10, and 17. RPet. at 29-30. Respondents argue that Allen discloses the required limitations because Allen discloses a removable "bag" that is disposed at least partially within the housing and configured to receive particulates and a bag is equivalent to a bin. *Id.* at 30. Respondents argue that the ID errs in finding that Allen does not disclose the "removable bin" limitations where iRobot did not dispute the issue. *Id.*

iRobot argues that the ID correctly finds that Allen discloses a removable "bag," but not a removable "bin." CResp. at 27-28. iRobot argues that Respondents' contention as to the interchangeability of bins and bags is irrelevant to an anticipation analysis and further undermines Respondents' position that Allen inherently discloses a removable bin. *Id.* at 28.

PUBLIC VERSION

Allen discloses and depicts a removable bag for receiving particulates. *See* RX-80 at 14:45-51 (“dirt collection reservoir **69** lined with a trapping bag **70**”); *id.* 14:54-57 (“As is common in such systems, an air stream is drawn by fan **68** in through intake opening **65**, then forced out through exhaust vent **72** via dirt collection reservoir **69** and associated gas-permeable trapping bag **70**.”); *id.* 47:59-62 (“replacement of vacuum-cleaner bag **70**”). Allen also states: “Vacuum cleaning systems of this type are well-known, and a variety of equivalent configurations will readily suggest themselves to persons of ordinary skill in the art.” *Id.* 14:57-60. The Commission adopts the ID’s finding that Allen does not explicitly or inherently disclose the “removable bin” limitations for the reasons stated in the ID. *See* ID at 241-42, 251-52.

iRobot contingently petitions for review of the ID’s findings on anticipation with respect to the “control module” limitations required by claims 1, 5, 7, 10, and 17 in the event the Commission determines to review the ID’s findings on anticipation on other grounds. CPet. at 25-28. iRobot argues that the robot in Allen lacks the required control module, Allen does not disclose a robot with every limitation “arranged as in the claims,” and the ID errs in relying on a control module from a robot that Allen discloses but disparages in a background section. *Id.* at 26-27. iRobot argues the ID improperly “cuts across embodiments to piece together the control module limitation.” *Id.* at 26.

Respondents argue that the ID correctly finds that Allen discloses the “control module” limitations in its discussion of the prior art. RResp. at 16-17. Respondents argue that iRobot contends for the first time in its petition for review that the prior art robot disclosed in Allen cannot be incorporated into Allen’s disclosed embodiment and that iRobot did not rebut Respondents’ anticipation arguments when the issue was before the ALJ. *Id.* at 17-18. Respondents argue that, in any event, a reference anticipates a claim where all elements of the

PUBLIC VERSION

invention are disclosed, not only when a particular embodiment within a reference discloses each element. *Id.* at 18-20.

The Commission takes no position on the “control module” limitations with respect to anticipation.

Accordingly, the Commission affirms the ID’s findings that claims 1, 5, 7, 10, and 17 of the ’090 patent are not invalid for anticipation.

c) Obviousness

(1) Combinations Involving Allen

The ID finds that claims 1, 2, 3, 4, 5, 7, 10, and 17 of the ’090 patent are not invalid for obviousness in view of Allen alone or combined with the knowledge of one of ordinary skill in the art or combined with U.S. Patent No. 5,341,540 (RX-89) (“Soupert”). ID at 252-78. Specifically, the ID finds that Respondents’ obviousness arguments did not address Allen’s failure to disclose the “removable bin” limitations and that Respondents failed to provide a motivation to use well-known pivoting suspension arms described in Allen with the robot disclosed in Allen to satisfy the limitations “wherein one of the wheels is rotatably attached to the distal end of each arm, and the proximal end of each arm is pivotably attached to the chassis,” “wherein each wheel is biased to an extended position away from the robot chassis by a spring extending between the arm and the robot chassis,” and “wherein, during cleaning, the weight of the floor cleaning robot overcomes a force from the spring biasing the wheels to an extended position” required by claims 1, 2, 3, 4, 5, and 7. *Id.* at 252-58. The ID also finds that claim 1 is effectively representative of claims 10 and 17 and thus finds that Respondents also have not shown that claims 10 and 17 are obvious in view of combinations involving Allen. *Id.* at 276. The ID does, however, find that the “control module” limitations required by claim 1 would have been an obvious modification to the control system disclosed in Allen and that

PUBLIC VERSION

modifying Allen with the two counter-rotating brushes disclosed in Soupert renders the limitations of claims 2, 3, and 4 obvious. *Id.* at 253-56, 270-75.

Respondents petition for review of the ID's findings on non-obviousness, arguing that Allen alone renders claims 1, 2, 3, 4, 5, 7, 10, and 17 obvious. RPet. at 31-32. Respondents contend that they argued that a removable bin was obvious based on Allen alone in their pre-hearing brief and that they did not present such arguments in their post-hearing briefs because iRobot admitted that the limitation was present in Allen. *Id.* Respondents argue that expert testimony establishes that it would have been obvious to a person of ordinary skill in the art to use a bin instead of the bag expressly disclosed in Allen and that choosing one over the other was a design choice. *Id.*

iRobot argues that Respondents fail to provide a reason why a person of ordinary skill in the art would replace the disposable bag in Allen with a removable bin. CResp. at 29-30. iRobot also argues that there is no record evidence that it admitted or conceded to the "removable bin" limitations and that, in any event, Respondents bear the burden of proving invalidity by clear and convincing evidence. *Id.* at 30.

iRobot also petitions for review of the ID's findings on obviousness in view of combinations involving Allen. *See* CPet. at 28-34. iRobot argues that (1) a person of ordinary skill in the art would not replace Allen's off-robot control module with an on-robot control module that was disparaged by Allen and that would change Allen's principle of operation and (2) the ID does not provide a reasoned explanation for why a person of ordinary skill in the art would combine Allen and Soupert. *See id.*

Respondents argue that the ID's findings on obviousness are well-reasoned and proper. RResp. at 20. Respondents argue that iRobot failed to raise any arguments relating to Allen's

PUBLIC VERSION

“principle of operation” in its pre-hearing or post-hearing briefs and thus abandoned this argument. *Id.* at 22. Respondents argue that “Allen’s teachings as a whole provide motivation and reason for a POSITA to replace Allen’s off-board control module with an onboard control module” and their expert testified that “a POSITA in 2002 would have seen an obvious benefit in putting all of the control functionality onboard Allen’s robot, both to avoid the complications of communicating back and forth with an off-board computer, and because by then onboard processing would have been much cheaper than it was at the time of Allen.” *Id.* at 21, 23-24. Respondents argue that using an onboard control module with the Allen robot would not change its principle of operation because Allen’s robot will drive around and clean floors regardless of whether its movements are directed from onboard or off-board. *Id.* at 24.

To assist with its review, the Commission requested responses from the parties to the following question:

Describe the principle of operation of U.S. Patent No. 5,995,884 (“Allen”) and discuss whether modifying Allen with a “control module” as required by the asserted claims of the ’090 patent would change that principle of operation.

83 Fed. Reg. at 47189.

Respondents argue that Allen’s principle of operation is to “autonomously drive[] around a room and clean[] up dirt from the floor in a home or office environment.” RBr. at 8.

Respondents argue that modifying Allen with a well-known onboard control system will not impair the operation of Allen because Allen will still function in its intended manner, Allen’s cost concerns do not teach away from using an onboard control module, and Allen and various prior art references using an onboard control module are from the same field of endeavor. *Id.* at 2, 8-13.

iRobot argues that Allen’s principle of operation is the “division of computation labor between a sophisticated off-vehicle host computer for generating directional commands and an

PUBLIC VERSION

unsophisticated processor on the vehicle for executing those commands” and that the purpose of this principle of operation is to “minimize costs and take advantage of the processing power, resources, and storage of a host computer.” CBr. at 7. iRobot argues that relocating the control module from the off-vehicle host computer to the mobile vehicle fundamentally undermines Allen’s principle of operation and that a person of ordinary skill would be discouraged from making this modification because it would reverse the advantages provided by Allen. *Id.* at 7-9. iRobot argues that Respondents improperly limit Allen’s principle of operation to its objective and ignores how Allen achieves that objective. CReply at 5.

“Obviousness is a question of law based on underlying factual findings, including what a reference teaches, the existence of a reason to combine references, and whether the prior art teaches away from the claimed invention.” *In re Urbanski*, 809 F.3d 1237, 1241 (Fed. Cir. 2016) (internal citations omitted). In determining obviousness, “a court must ask whether the improvement is more than the predictable use of prior art elements according to their established functions.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 417 (2007). “A reference may be read for all that it teaches, including uses beyond its primary purpose.” *In re Mouttet*, 686 F.3d 1322, 1331 (Fed. Cir. 2012). The obviousness determination may also consider whether a proposed modification would change a reference’s “principle of operation.” *See id.* at 1332.

With respect to the “removable bin” limitations, as discussed above, Allen discloses a removable “bag,” but not a “removable bin” as required by the asserted claims. In its analysis of whether Allen alone anticipates claim 1 and discloses the “removable bin” limitation, the ID states that “I am inclined to believe that it would have been an obvious modification.” ID at 242. For support, the ID cites expert testimony on the issue of obviousness, stating:

PUBLIC VERSION

Q214. If bins were better, why does Allen only expressly disclose a bag?

Answer: Bins aren't always better, though I think they would be in the context of a robot like Allen. But *more fundamentally, a person of ordinary skill in the art would recognize that both bins and bags were reasonable choices, and that either could be easily used. In other words, as of December 2002 the choice between a bin and a bag was a design choice that was well with [sic] the realm of a person of ordinary skill. Choosing a bag instead of a bin was an implementation detail, and Allen probably didn't think about it much – as you can tell from the statement in Allen that “equivalent configurations” could be used.*

RX-2082C (Messner DWS) at Q/A 214 (emphasis added) (cited by ID at 242). This expert testimony establishes that substituting the removable bin in Allen with a removable bag was nothing more than the “predictable use of prior art elements according to their established functions” or the “simple substitution of one known element for another.” *KSR*, 550 U.S. at 417. Thus, the Commission finds that Respondents have shown that a person of ordinary skill in the art would have found it obvious to replace the removable bin in Allen with a removable bag.

With respect to the limitations “wherein one of the wheels is rotatably attached to the distal end of each arm, and the proximal end of each arm is pivotably attached to the chassis,” “wherein each wheel is biased to an extended position away from the robot chassis by a spring extending between the arm and the robot chassis,” and “wherein, during cleaning, the weight of the floor cleaning robot overcomes a force from the spring biasing the wheels to an extended position” required by claims 1, 2, 3, 4, 5, and 7 and similar limitations required by claims 10 and 17, the ID found that Allen discloses these limitations. ID at 242-50, 257-58. Moreover, the evidence shows that a skilled person would have been motivated to use the prior art suspension system disclosed in Allen with the robot in Allen. *See KSR*, 550 U.S. at 417 (“[I]f a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.”). Allen describes a “suspension system” that is

PUBLIC VERSION

“similar to those widely used in inexpensive remote-control toy cars” and, further, Respondents’ expert explained that persons of ordinary skill in the art often used parts from remote control cars “for the drive mechanism, chassis and suspension so we can devote our time to the actual robotic features being added.” *See* RX-80, 13:17-28; ID at 245-47; RX-2082C at Q/A 174-175.

With respect to the limitation “control module disposed within the housing and directing movement of the floor cleaning robot across the floor” required by claims 1, 2, 3, 4, 5, and 7 and similar limitations required by claims 10 and 17, Respondents assert that Allen’s description of the prior art discloses this limitation and that the combination of that prior art and the invention disclosed in Allen renders the claims obvious. *See* RIB at 69-70; ID at 253.

Allen describes an invention relating to the “use of an AGV [automatic guided vehicle] as a computer peripheral device in a home or office environment already equipped with a computer.” RX-80, 1:7-10. As background, Allen describes the prior art as follows:

Most AGV systems described in the prior art use an onboard computer for control and guidance. . . . As the AGV traverses the area, ultrasonic sensors detect the presence or absence of an obstacle within each grid square. The onboard computer system stores this information and uses it to guide the vehicle through the environment. A principal limitation of this system . . . is the high cost and/or limited capabilities of the onboard computer. If the vehicle includes an inexpensive computer, its storage, processing, and user-interface capabilities are necessarily limited. If the vehicle includes a computer system with plentiful storage and CPU resources, the cost of the system is increased beyond the reach of many consumers.

Id. 1:23-39; *see also id.* 2:24-29. Allen discloses an invention using a remote host computer for guidance and control operations such that the “overarching object and advantage of the present invention is the construction and deployment of an automatic self-running cleaning system which is inexpensive enough, convenient enough, effective enough, and fun enough to find widespread acceptance among consumers.” *Id.* 3:3-7; *see also id.* 10:1-17 (requiring a “control program installed on the host PC which schedules, coordinates, plans, and controls the action of the

PUBLIC VERSION

vehicle” that “implements all of the high-level control and navigation algorithms traditionally associated with AGVs”). Allen states: “The principal distinction between this invention and other AGVs described in the prior art is that it is constructed and delivered to the end-user in the manner of a computer peripheral. This device is designed and constructed for the specific purpose of being attached to a personal computer already owned and operated by the end-user (e.g. an Apple Macintosh System, or an Intel-based computer running a version of Windows).” *Id.* 9:50-57 (emphasis added).

The inquiry as to whether a modification would change a reference’s “principle of operation” often turns on how the “principle of operation” is defined. Here, the principal difference between the invention disclosed in Allen and the prior art disclosed in Allen is the location of the control module that controls and guides the cleaning robot; Allen’s invention uses a remote host computer for control and guidance of an autonomous cleaning system, whereas the disclosed prior art system used an onboard computer for guidance and control. *See, e.g., id.* 1:23-39, 9:50-10:35. Allen repeatedly describes its invention as using a computer peripheral to remotely control and guide the robot for the purpose of providing a low-cost vacuum cleaning system by using a personal computer already owned by the user. *See, e.g., id.* 1:23-39, 9:50-10:35. In this respect, this case is similar to *Plas-Pak Industries, Inc. v. Sulzer Mixpac AG*, in which the Federal Circuit defined a prior art reference’s principle of operation based on the reference’s description of the invention. *See* 600 F. App’x 755, 758 (Fed. Cir. 2015) (cited by CBr. at 3, 7) (finding that reference “is expressly directed to [the] very manner in which the backflow of the mixture is prevented” and “is rife with statements defining the invention as adding stop valves to prevent backflow” (internal quotation marks omitted)). However, *Plas-Pak* was a non-precedential decision and thus is not controlling. In two precedential decisions,

PUBLIC VERSION

In re Umbarger and Mouttet, the Federal Circuit found a reference's description of the invention's contribution to the art and differences with the prior art that do not affect the operability of the invention to be non-dispositive on the question of principle of operation. *See* 407 F.2d 425, 430-31 & n.3 (C.C.P.A. 1969) (cited at RBr. at 7) (finding modified reference would operate on the same principle of operation as before despite omission of reference's stated contribution to the art and reference's description of prior art as "impractical or prohibitively expensive for several reasons"); 686 F.3d at 1332, 1334 (cited at RBr. at 7-10) (finding that difference in circuitry used by two references did not affect overall principle of operation, as well as finding an absence of evidence suggesting that combination would be unlikely to work, even where primary reference recognized a "fundamental difference between circuit types, and even suggest[ed] that electrical circuits are inferior to optical circuitry for certain purposes" (internal quotation marks omitted)). Further, this case differs from *Plak-Pak* in that (1) the manner in which the host computer in *Allen* controls and guides the robot to autonomously clean a home or office is not "unique in its implementation" and (2) there is no evidence that replacing the host computer in *Allen* with an onboard computer would alter the computer from controlling and guiding the robot nor would prevent the robot from operating to autonomously clean a home or office. *See* 600 F. App'x at 758-59.

The Commission rejects the principles of operation proposed by iRobot and Respondents. iRobot's proposed principle of operation—the division of computation labor between a sophisticated off-vehicle host computer for generating directional commands and an unsophisticated processor on the vehicle for executing those commands—states no operation for the asserted principle. The purpose of iRobot's proposed principle may be to provide a low-cost vacuuming system or take advantage of already-available resources, but neither purpose is an

PUBLIC VERSION

operation.¹² Conversely, Respondents' proposed principle of operation—autonomously cleaning a home or office—states an operation without a principle.¹³

The Commission finds that the principle of operation of the robot in Allen is using a computer to control and guide the robot to autonomously clean a home or office. The Commission also finds that replacing the host computer in Allen with an onboard computer would not be contrary to Allen's principle of operation. There is no evidence that the difference in location of the computer controlling and guiding the robot would affect the operability of the robot. *See Mouttet*, 686 F.3d at 1332 (“But this difference [in the type of circuitry] does not affect the operability of Mouttet’s broadly claimed device—a programmable arithmetic processor.”); *Umbarger*, 407 F.2d at 430-31 (“[T]he modified apparatus is clearly obvious in view of the prior art and the retained circuit [] of Horsch will operate therein on the same principles as before to indicate engine speed as a function of applied pulse frequency.”). Nor has iRobot shown that the control program and wireless connection used by the host computer in Allen to control and guide the robot is unique to its implementation, as compared to an onboard computer. *See Mouttet*, 686 F.3d at 1332 (“Nothing in the programming and processing of junction states in Falk . . . is unique to its optical implementation, and [the applicant] has not shown otherwise”). Although iRobot can point to differences between Allen’s

¹² iRobot subsequently argues that “[a]lthough the Allen device will autonomously traverse a room to clean up dirt, Allen’s principle of operation is defined by the architecture that results in such functionality.” CReply at 5.

¹³ Respondents subsequently propose an alternative principle of operation: “an autonomous robot including a control system which controls and directs the movement of the robot for driving around a room and cleaning up dirt from the floor in a home or office environment.” RReply at 5.

PUBLIC VERSION

invention and the prior art and benefits that Allen describes in using a host computer, those differences and benefits do not render the proposed combination inoperable or unlikely to work.

For similar reasons, the Commission finds that Allen does not disparage or otherwise teach away from the use of an onboard control module. Allen's disclosures regarding a low-cost solution "does not criticize, discredit, or otherwise discourage investigation into" the claimed invention. *See Galderma Labs., L.P. v. Tolmar, Inc.*, 737 F.3d 731, 739 (Fed. Cir. 2013); *Mouttet*, 686 F.3d at 1334; *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994) ("A known or obvious composition does not become patentable simply because it has been described as somewhat inferior to some other product for the same use."). Moreover, Allen's concerns about cost do not pertain to the technological feasibility of the combination. As the Federal Circuit has explained: "[T]he fact that the two disclosed apparatus [sic] would not be combined by businessmen for economic reasons is not the same as saying that it could not be done because skilled persons in the art felt that there was some technological incompatibility that prevented their combination. Only the latter fact is telling on the issue of nonobviousness." *Orthopedic Equip. Co. v. United States*, 702 F.2d 1005, 1013 (Fed. Cir. 1983) (cited by RBr. at 12).

With respect to claims 2, 3, and 4 of the '090 patent, the Commission adopts the ID's findings of obviousness in view of Allen combined with Soupert for the reasons stated in the ID. *See ID at 270-75*. Although Respondents argue that these claims are obvious in view of Allen alone, Respondents do not present any arguments that Allen alone discloses the limitations recited in these claims. *See RPet. at 31-32*.

Thus, the Commission finds that Allen combined with the knowledge of one of ordinary skill in the art discloses or teaches all of the limitations of claims 1, 5, 7, 10, and 17 of the '090

PUBLIC VERSION

patent and that Allen combined with Soupert discloses or teaches all of the limitations of claims 2, 3, and 4 of that patent.

(2) Combinations Involving Haegermarck and Kirkpatrick

The ID finds that claims 1, 5, 7, 10, and 17 of the '090 patent are invalid for obviousness in view of international patent application WO 02/067744 (RX-82) ("Haegermarck") and U.S. Patent No. 6,481,515 (RX-83) ("Kirkpatrick") and that claims 2, 3, and 4 are invalid for obviousness in view of Haegermarck, Kirkpatrick, and U.S. Patent No. 500,974 (RX-90) ("Tangenberg"). ID at 252-78. Specifically, the ID finds that Haegermarck discloses certain limitations required by the asserted claims and that Kirkpatrick discloses various other limitations relating to the suspension system, including "one of the wheels is rotatably attached to the distal end of each arm, and the proximal end of each arm is pivotably attached to the chassis," required by claims 1, 2, 3, 4, 5, and 7. *Id.* at 258-76. The ID finds that Haegermarck and Kirkpatrick are in the same field of endeavor and thus analogous art such that one of ordinary skill in the art would consider one to improve the other. *Id.* at 261-62. The ID finds that a person of ordinary skill in the art would have been motivated to improve Haegermarck with the suspension system disclosed in Kirkpatrick because Kirkpatrick addresses a "skating out" problem not contemplated by Haegermarck. *Id.* at 263. The ID finds that modifying Haegermarck and Kirkpatrick with the rotating brush disclosed in Tangenberg renders the limitations of claims 2, 3, and 4 obvious. *Id.* at 270-275. The ID also finds that claim 1 is effectively representative of claims 10 and 17 and thus finds that Respondents also have shown that claims 10 and 17 are obvious in view of Haegermarck and Kirkpatrick. *See id.* at 276.

In its petition for review, iRobot argues that a person of ordinary skill in the art would not be motivated to combine Haegermarck and Kirkpatrick because such a combination would require substantial reconstruction and redesign of these references, as well as a change in the

PUBLIC VERSION

basic principles under which the references were designed to operate. CPet. at 35-39. iRobot also argues that the ID errs in failing to address whether Haegermarck discloses certain limitations that are disclosed by Kirkpatrick. *Id.* at 39-41.

Respondents argue that the ID correctly finds the asserted claims obvious in view of combinations involving Haegermarck and Kirkpatrick. RResp. at 27. Respondents argue that the ID provides a reason to combine Haegermarck and Kirkpatrick, that Haegermarck and expert testimony further support the ID's findings of obviousness, and that the combination of Haegermarck and Kirkpatrick would not have required substantial reconstruction or changed Haegermarck's principle of operation. *Id.* at 30-35. Respondents also argue that whether Haegermarck discloses rotatable and pivotable attachments to a wheel arm as required by the claims is irrelevant because Kirkpatrick discloses these limitations. *Id.* at 35-36.

Haegermarck discloses an autonomous cleaning apparatus with drive wheels, each of which are supported by a "drive wheel support (16) which is arranged to be pressed towards a floor surface by means of a spring-like device." RX-82, Abstract. The purpose of the invention in Haegermarck is to "achieve a simple and efficient, self-adjusting wheel supporting arrangement for a cleaning apparatus, preferably a robot vacuum cleaner, wherein the vacuum cleaner easily climbs over or otherwise avoids objects and obstacles it may encounter during its operation." *Id.* 2:5-8. Haegermarck describes the wheel support arrangement as follows:

The drive wheel support **16**, is arranged to allow drive wheel support **16** movement in a vertical direction within the housing, shown in a first embodiment provided with a first upwardly directed part **20** with a fastening means for an upper and a lower slide bearing **21** surrounding a vertical slide rail **22** fixed at the upper and lower wall part **23** and **24** of the housing. The slide rail **22** serves as a means for guiding the vertical movement of the wheel support arrangement, allowing the wheel to remain in contact with [the] floor surface should the surface be uneven or bumpy or should the robot vacuum clean[e]r encounter obstructions or objects. Other guide means may also be employed to guide the vertical movement of the wheel support arrangement.

PUBLIC VERSION

Id. 4:21-30 (emphasis added).

Kirkpatrick discloses an autonomous mobile surface treating apparatus with a drive mechanism mounted to a chassis by a suspension. RX-83, Abstract. In particular, Kirkpatrick discloses the following preferred wheel suspension system:

Each wheel **38** is driven by motor-gearbox **36** that is pivotably mounted to chassis **34** using a pivot pin **52**. Upward rotation of motor-gearbox **36** in direction A, e.g., when autonomous mobile surface treating apparatus **10** is pushed down toward the floor or other surface **24**, is resisted by a resilient element **54** interposed between motor-gearbox **36** and chassis **34**.

Id. 9:37-43, Fig. 7. Kirkpatrick states the prior art “poses an underfoot hazard by virtue of having freely rotating wheels that would cause the robot to act like a roller skate, [*i.e.*], ‘skate-out’, if stepped upon.” *Id.* 2:4-7. Kirkpatrick discloses that its suspension system “reduces the risk of the autonomous mobile surface treating apparatus ‘skating-out’ if . . . stepped upon.” *Id.* 3:43-50.

The Commission adopts the ID’s findings on obviousness in view of combinations involving Haegermarck and Kirkpatrick. *See* ID at 252-76. The Commission further finds combining Kirkpatrick with the suspension system disclosed in Haegermarck would have been straightforward to a person of ordinary skill in the art and would have had a reasonable expectation of success because pivot arm suspensions were well-known and the suspension systems are interchangeable. *See* RX-2082C (Messner DWS) at Q/A 330-331. In addition, whereas Haegermarck uses a guide rail or track, it teaches that “[o]ther guide means may also be employed to guide the vertical movement of the wheel support arrangement.” RX-82, 4:28-30. Expert testimony demonstrates that Haegermarck may be modified to use the pivot arm in Kirkpatrick to guide the wheels up and down. RX-2082C at Q/A 329-331; Hr’g Tr. (Messner) at 375:4-736:1; *see also* RX-83, 9:37-43, Fig. 7A. There is no evidence that such a modification

PUBLIC VERSION

would prevent the robot from working, guiding the vertical movement of the wheels, or reducing the risk of “skate-out.” Thus, the Commission rejects iRobot’s argument that the combination of Kirkpatrick and Haegermarck would have changed either reference’s “principle of operation” or resulted in a substantial reconstruction so as to preclude a finding of obviousness.

iRobot also takes issue with the absence of a finding in the ID as to whether Haegermarck discloses the limitations requiring the wheels to be rotatably attached to the distal end of each arm and the proximal end of each arm to be pivotably attached to the chassis. CPet. at 39-41. The ID does not make such a finding, nor is one necessary, because the ID relies on Kirkpatrick for disclosure of the limitations identified by iRobot and combinations involving Haegermarck and Kirkpatrick to find the asserted claims obvious. *See* ID at 252, 258-70, 276. iRobot identifies no legal error in solely relying on Kirkpatrick for disclosure of these limitations to find obviousness.

Thus, the Commission finds that the combination of Haegermarck and Kirkpatrick discloses or teaches all of the limitations of claims 1, 5, 7, 10, and 17 of the ’090 patent and that the combination of Haegermarck, Kirkpatrick, and Tangenberg discloses or teaches all of the limitations of claims 2, 3, and 4 of that patent.

(3) Objective Indicia of Non-Obviousness

The ID also makes findings on the objective indicia of non-obviousness. The ID finds that iRobot’s evidence on copying, commercial success, and praise is minimally connected to the patented and novel features of the ’090 patent claims. ID at 276-77. The ID finds that the secondary considerations have “nominal weight for the claims of the ’090 patent” and do not overturn his finding that the asserted claims would have been obvious. *Id.* at 278.

PUBLIC VERSION

The Commission adopts the ID's findings on objective indicia of non-obviousness and finds that there are no objective indicia that would overcome the findings of *prima facie* obviousness. *See id.* at 277-78.

Accordingly, the Commission reverses the ID's finding that the asserted claims of the '090 patent are not invalid for obviousness in view of combinations involving Allen and affirms, with the modified reasoning provided above, the ID's finding that the asserted claims of the '090 patent are invalid for obviousness in view of combinations involving Haegermarck and Kirkpatrick.

3. The '233 Patent

a) Anticipation

The ID finds that claims 1, 10, 11, 14, 15, and 16 of the '233 patent are not invalid as anticipated by U.S. Patent No. 6,594,844 (RX-95) ("Jones-844"). ID at 316-30. Specifically, the ID finds Jones-844 discloses all limitations of the asserted claims except for the following limitations:

- "powered side brush . . . having bundles of bristles and being positioned such that the bundles of bristles pass between the cliff detector and the floor surface during a rotation of the side brush around the axis, the bundles of bristles being separated by a gap, the gap being configured to prevent occlusion of the cliff detector beam during at least part of the rotation of the side brush around the axis" recited by claims 1;
- "obstacle detector compris[ing] a displaceable bumper disposed at the housing perimeter, and a bumper displacement sensor responsive to displacement of the bumper with respect to the housing" recited by claim 10;
- "a portion of the bundles of bristles of the powered side brush passes between a portion of a drive wheel of the robot and the cleaning surface during the rotation of the side brush around the axis" recited by claim 14; and
- "powered rotating side brush . . . having bundles of bristles and being positioned such that the bundles of bristles pass between the cliff detector and the floor surface during a rotation of the side brush around the axis, the bundles of bristles being separated by a gap, the gap being configured to prevent occlusion of the

PUBLIC VERSION

cliff detector beam during at least a portion of a rotation of the side brush around the axis” recited by claim 15.

Id. The ID finds that Jones-844 does not contain a written description of a brush having bundles of bristles and, instead, includes figures showing structures with “arc segments” that do not look like bristles. *Id.* at 321-22, 329. The ID finds that Jones-844 does not disclose bundles of bristles that “pass between the cliff detector and the floor surface during a rotation of the side brush around the axis, the bundles of bristles being separated by a gap, the gap being configured to prevent occlusion of the cliff detector beam during at least a portion of a rotation of the side brush around the axis” because there is no disclosure on the relationship between the cliff sensor and the structures Respondents allege are bundles of bristles. *Id.* at 323, 329. The ID finds that Jones-844 contains no disclosure regarding a displaceable bumper and that the statements describing contact with an obstacle or bumping into an object do not disclose the limitation as required by the claims. *Id.* at 324-26. The ID similarly finds no disclosure of a side brush passing between a portion of a wheel and the floor surface. *Id.* at 327.

Respondents petition for review of the ID’s findings on anticipation with respect to the above-identified limitations. RPet. at 36-41, 43-47. Respondents argue that the ID ignores evidence, including iRobot’s drawings, iRobot’s engineer’s testimony, and the testimony of both parties’ experts, showing that a person of ordinary skill would understand the drawings in Jones-844 to disclose the side brushes required by the asserted claims. *Id.* at 36-39. Respondents argue that, because Jones-844 discloses other powered features, a person of ordinary skill would reasonably understand that the side brushes would also be powered. *Id.* at 39-40. Respondents argue that the ID errs in finding no disclosure on the relationship between the cliff sensor and the bundles of bristles and that Figure 24 of Jones-844 discloses a side brush that passes through the area under a cliff detector and that has gaps that prevent occlusion of the cliff detector beam. *Id.*

PUBLIC VERSION

at 40-41. Respondents also argue that the ID ignores evidence showing that Jones-844 discloses a displaceable bumper as required by claim 10 and “a portion of the bundles of bristles of the powered side brush passes between a portion of a drive wheel of the robot and the cleaning surface during the rotation of the side brush around the axis” as required by claim 14. *Id.* at 43-47.

iRobot argues that Jones-844 does not anticipate the asserted claims of the '233 patent. CResp. at 30-38. iRobot argues that Jones-844 does not disclose a side brush with bundles of bristles, a powered side brush, or gaps between the bundles of bristles configured to prevent occlusion of the cliff sensors as required by claims 1 and 15. *Id.* at 30-37. iRobot argues that Jones-844 does not disclose a displaceable bumper as required by claim 10 and instead disparages tactile sensors as inefficient. *Id.* at 37-38. iRobot argues that Jones-844 does not disclose bundles of bristles that pass between the drive wheel and floor during rotation of the brush as required by claim 14 and that Respondents rely on a figure that does not even show wheels. *Id.* at 38.

The Commission finds that Respondents have not shown by clear and convincing evidence that the side brush in Jones-844 discloses “bundles of bristles” as required by the asserted claims. As the ID finds, Jones-844 contains no disclosure, in text or by drawings, of a side brush having bundles of bristles. *See ID* at 321-22. As shown below (along with enlarged images), Figure 24 of Jones-844 provides a bottom view of an embodiment, and Figure 25 provides a side view of that embodiment. RX-95, 4:30-35, 8:63-67, Figs. 24, 25.

PUBLIC VERSION

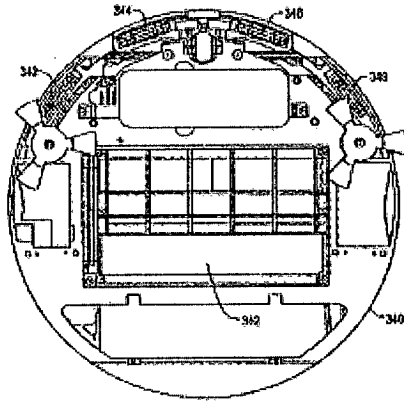


FIG. 24

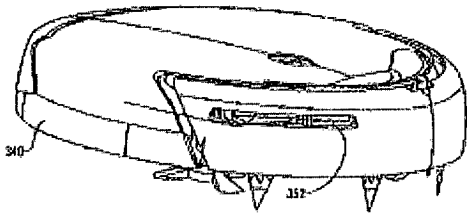
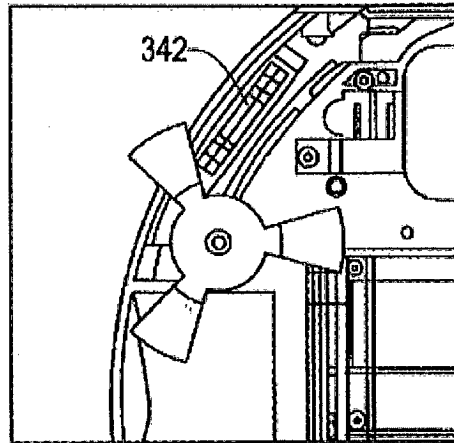
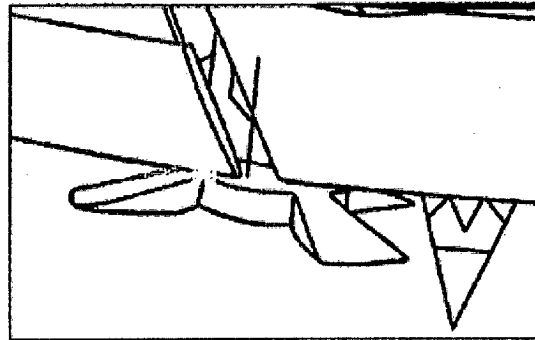


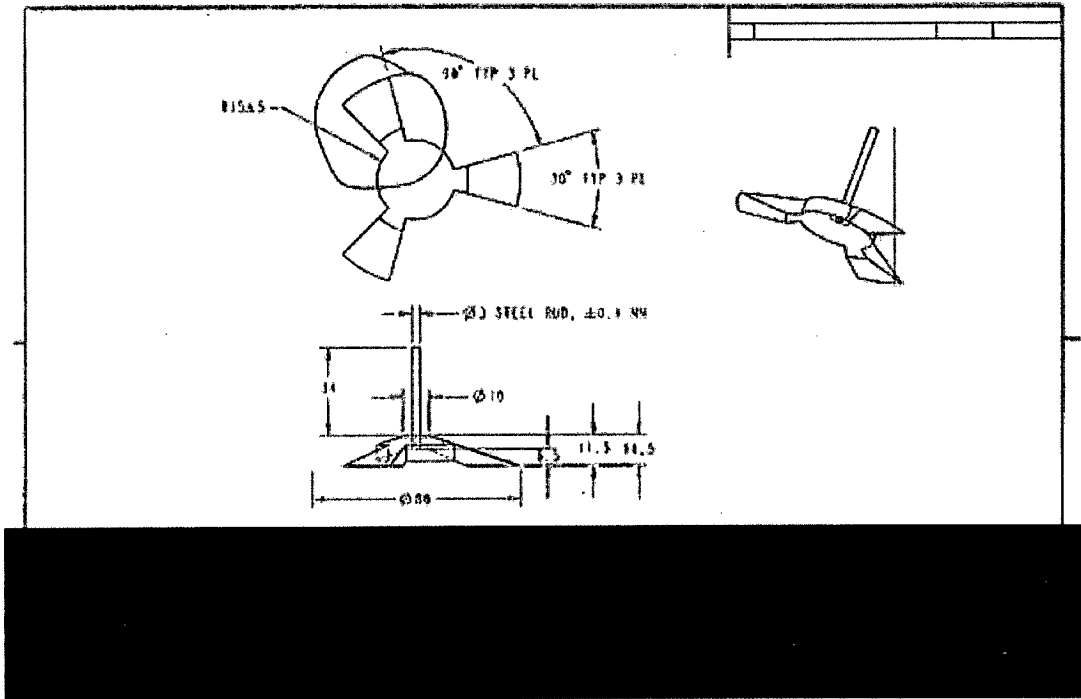
FIG. 25



These figures do not show side brushes having bundles of bristles, and iRobot's expert explained that the figures show side brushes with rubber arms rather than bristles. *See Hr'g Tr. (Papanikolopoulos) at 793:9-794:1, 835:21-836:12.*

Respondents disagree, arguing that a person of ordinary skill would understand the figures to depict brushes with bristles based on iRobot's own internal drawings and its engineer's testimony. *See RPet. at 37-38.* An iRobot drawing titled "Side Brush" includes structures similar to those in Figures 24 and 25 of Jones-844 and a note stating [REDACTED]

[REDACTED] *See RX-1290C.003.*



An iRobot engineer testified that the note refers to the brush having bristles, despite the drawing depicting an entirely solid object. See RX-2042C (Nugent Dep.) at 90:15-91:12. However, that testimony is specific to the iRobot drawing, and does not describe the figures in Jones-844 nor drawings as generally used in the art. See *id.* Indeed, as shown below, another figure in the '233 patent uses a very different drawing to depict a bundle of bristles 78 as part of the side brush assembly 70. See JX-5, Fig. 2A, 8:39-43.

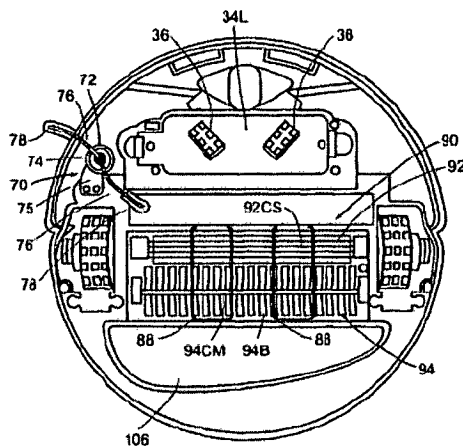


FIG. 2A

PUBLIC VERSION

Respondents also argue that iRobot's expert admitted that the brushes in Figures 24 and 25 have bristles. *See* RPet. at 38-39. However, there is nothing in the expert's testimony to support such an assertion. *See* Hr'g Tr. (Papanikolopoulos) at 787:22-788:13, 795:2-13.

With respect to the limitation that the side brush is "powered," Respondents argue that "[i]t is undisputed, and the ID finds, that Jones-844 discloses a self-propelled cleaning robot that drives around a room (ID at 316), follows walls by using infrared wall-detectors (ID at 323), and use[s] a powered main brush (ID at 317)" and that "a person of ordinary skill would reasonably understand that in a powered vacuum robot with a powered main brush the side brushes would also be powered, even if it is hypothetically possible that the side brushes could have been passive and ineffective." RPet. at 39-40. Jones-844 contains no disclosure of a powered side brush. That the side brush could be powered or passive indicates possibilities, not disclosed options. *Compare Cont'l Can Co. USA, Inc. v. Monsanto Co.*, 948 F.2d 1264, 1269 (Fed. Cir. 1991) ("Inherency . . . may not be established by probabilities or possibilities." (quoting *In re Oelrich*, 666 F.2d 578, 581 (C.C.P.A. 1981))) with *Upsher-Smith Labs. v. Pamlab, L.L.C.*, 412 F.3d 1319, 1321-22 (Fed. Cir. 2005) (finding anticipation where a "European Application's 'optional inclusion' of antioxidants teaches vitamin supplement compositions that both do and do not contain antioxidants"). For example, iRobot's expert testified that commercially available systems at the time used passive brushes to agitate dirt and debris. *See* Hr'g Tr. (Papanikolopoulos) at 790:11-14, 836:22-837:12.

Nor does Jones-844 disclose the limitation requiring that the bundle of bristles "pass between the cliff detector and the floor surface during a rotation of the side brush around the axis, the bundles of bristles being separated by a gap, the gap being configured to prevent occlusion of the cliff detector beam during at least a portion of a rotation of the side brush around

PUBLIC VERSION

the axis.” Figures 24 and 25 of Jones-844 depict side brushes that rotate and have a central axis and three arms separated by gaps and extending over cliff sensors 342 and 348. *See id.* at 790:6-8, 785:5-836:1-3; RX-95, Figs. 24, 25. However, what cannot be discerned from the figures (shown above) is whether the gaps are configured such that they do not block, either partially or totally, the cliff detector beam during at least a portion of the brushes’ rotation. Jones-844 provides no information on the side brushes, their dimensions, or the spread of the cliff sensor beam to make this determination.

Jones-844 also does not disclose the limitation “obstacle detector comprises a displaceable bumper disposed at the housing perimeter, and a bumper displacement sensor responsive to displacement of the bumper with respect to the housing” required by claim 10. Jones-844 describes a “random bounce mode” in which “the processing circuitry of the robot causes it to move in a straight line until the robot comes into contact with an obstacle; the robot then turns away from the obstacle and heads in a random direction.” RX-95, 1:23-27; *see also id.* 5:9-13; RX-2082 (Messner DWS) at Q/A 531. Jones-844 also depicts a robot with a “wall detector subsystem 352” on what “looks like a bumper and a cut-out.” RX-95, 8:63-67, Fig. 25; Hr’g Tr. (Papanikolopoulos) at 831:1-14. However, these descriptions disclose neither a bumper that is displaceable nor a sensor that responds to displacement of the bumper. Respondents’ expert testimony to the contrary is conclusory and not supported by Jones-844. *See* RX-2082C at Q/A 531. In addition, Respondents’ reliance on the bumper of the original Roomba design and prior art reference Haegermarck goes beyond the disclosures of Jones-844. *See* RPet. at 44-45; *Advanced Display Sys., Inc. v. Kent State Univ.*, 212 F.3d 1272, 1282 (Fed. Cir. 2000) (“[I]nvalidity by anticipation requires that the four corners of a single, prior art document describe every element of the claimed invention, either expressly or inherently, such that a

PUBLIC VERSION

person of ordinary skill in the art could practice the invention without undue experimentation.”).

Further, such evidence does not establish that a person of ordinary skill in the art would understand Jones-844 to disclose the required limitation.

Jones-844 also does not disclose the limitation “a portion of the bundles of bristles of the powered side brush passes between a portion of a drive wheel of the robot and the cleaning surface during the rotation of the side brush around the axis” required by claim 14. Although Figure 24 does not depict any wheels, it does depict cavities for wheels that are necessary for the robot to travel and clean a floor. However, Jones-844 provides no information on the side brushes or the dimensions of any wheels or side brush arms to determine whether a side brush passes between a drive wheel and the cleaning surface.

Accordingly, the Commission affirms, with the supplemental reasoning provided above, the ID’s finding that the asserted claims of the ’233 patent are not invalid for anticipation.

b) Obviousness

The ID finds that Respondents have not shown claims 1, 10, 11, 14, 15, and 16 of the ’233 are invalid for obviousness in view of various asserted prior art combinations. ID at 330-50. With respect to Jones-844 combined with Tangenberg, the ID finds that Jones-844 is disqualified from use in an obviousness theory under § 103(c) because: (1) Jones-844 is prior art under § 102(e) and (2) Jones-844 and the ’233 patent were owned by iRobot at the time the claimed invention of the ’233 patent was “made.” *Id.* at 330. Specifically, during the evidentiary hearing, the ALJ granted a motion by iRobot to preclude Respondents from introducing argument or evidence that Jones-844 is prior art under § 102(a) because Respondents

PUBLIC VERSION

failed to present the argument in their pre-hearing brief.¹⁴ Hr'g Tr. 344:18-345:13. The ID also finds that claims 1, 11, 14, 15, and 16 of the '233 patent are not invalid for obviousness in view of international patent application WO 00/38026 (RX-81) ("Bisset") and Tangenberg and that claim 10 is not invalid for obviousness in view of Bisset combined with Tangenberg and a 1999 book entitled *Mobile Robots* (RX-84). ID at 330-50. The ID also makes findings on the objective indicia of non-obviousness. The ID finds that iRobot's evidence on copying, commercial success, and praise is minimally connected to the patented and novel features of the '233 patent claims. *Id.* at 349-50. The ID finds that the secondary considerations have "nominal weight for the claims of the '233 patent." *Id.* at 350.

Respondents petition for review of the ID's findings on obviousness in view of Jones-844.¹⁵ RPet. at 41-47. Respondents argue that Jones-844 renders the asserted claims of the '233 patent invalid as obvious and that the ID errs by dismissing Respondents' obviousness theories based on Jones-844. *Id.* Specifically, Respondents argue that Jones-844 is also prior art under § 102(a) and that the ALJ improperly refused to consider that argument where no rule required Respondents to state the statutory basis for an asserted prior art reference and Respondents had consistently and repeatedly given iRobot notice that they intended to rely on Jones-844 for obviousness. *Id.* at 41-43.

¹⁴ See Complainant's Motion to Preclude Respondents from Introducing Argument or Evidence that Jones-844 Is Prior Art Under § 102(a) and for a Shortened Time to Respond to the Motion ("Jones-844 Motion").

¹⁵ Respondents also petition for review of the ID's findings on obviousness in view of combinations involving Bisset. RPet. at 47-59. The Commission determined not to review those findings. 83 Fed. Reg. at 47189.

PUBLIC VERSION

iRobot argues that the ID correctly finds that Respondents waived their obviousness arguments based on Jones-844, and their argument that Jones-844 is prior art under § 102(a) by failing to identify Jones-844 as prior art under § 102(a) in their pre-hearing brief. CResp. at 38-42. iRobot argues that: (1) a § 102(e) prior art reference may not be used to preclude patentability under § 103; (2) Respondents' invalidity contentions, expert report, and pre-hearing brief had identified Jones-844 as prior art under § 102(e) only; and (3) Respondents asserted Jones-884 as prior art under § 102(a) merely three days before the evidentiary hearing began. *Id.* at 40-42. iRobot argues that it was unduly prejudiced by Respondents' untimely disclosure of their invalidity theory because, in reliance of their contentions of Jones-844 as prior art under § 102(e), it chose not to conduct the discovery necessary to establish an earlier priority date. *Id.* at 40-41.

Section 102 of the pre-AIA Patent Act provides:

A person shall be entitled to a patent unless —

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for patent, or

...

(e) the invention was described in — (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for the purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language

35 U.S.C. § 102(a), (e). Under § 103, “[s]ubject matter developed by another person, which qualifies as prior art only under one or more of subsections (e), (f), and (g) of section 102, shall

PUBLIC VERSION

not preclude patentability under this section where the subject matter and the claimed invention were, at the time the claimed invention was made, owned by the same person or subject to an obligation of assignment to the same person.” *Id.* § 103(c)(1). Thus, prior art under § 102(e), like Jones-844, cannot be used to render a claimed invention obvious where that prior art is commonly owned with the claimed invention at the time the invention was made. No party disputes that Jones-844 and the claimed invention of the ’233 patent were both owned by iRobot at the time the claimed invention of the ’233 patent was made.

The ALJ’s Ground Rules require that respondents identify in their invalidity contentions each item of prior art that allegedly anticipates each asserted claim and the “priority date of each item of prior art identified.” Order No. 2, Rule 7.5.1. With respect to pre-hearing briefs, the ALJ’s Ground Rules state:

The pre-hearing brief shall set forth with particularity the party’s contentions with respect to each issue in the investigation and shall include pinpoint citations to any supporting authority and relevant exhibits, including witness statements. To meet the requisite level of particularity, the pre-hearing brief must provide the other parties fair notice of each issue and argument the party wishes to advance at the hearing or in post-hearing briefing and any evidence the party intends to rely on in support thereof. Any contentions not set forth with the level of particularity required herein shall be deemed abandoned or withdrawn, except for contentions of which a party is not aware and could not have been aware in the exercise of reasonable diligence at the time of filing the pre-hearing brief.

Id., Rule 11.2. Contrary to Respondents’ arguments, the ALJ’s Ground Rules required Respondents’ pre-hearing brief to set forth its argument that Jones-844 is prior art and to provide citations to any supporting authority. A finding of waiver is appropriate where a party fails to present an argument in its pre-hearing brief in accordance with the ALJ’s ground rules. *See Ajinomoto Co. v. Int’l Trade Comm’n*, 597 F.3d 1267, 1277 (Fed. Cir. 2010) (affirming waiver finding where party had not asserted an alternative priority date in its pre-trial brief as required

PUBLIC VERSION

by the ALJ's ground rules); *Certain Air Mattress Systems, Components Thereof, and Methods of Using the Same*, Inv. No. 337-TA-971, Comm'n Op. at 21 (June 20, 2017).

Respondents failed to comply with the ALJ's Ground Rules by not identifying Jones-844 as a prior art reference under § 102(a) as required in their invalidity contentions. Respondents also waived their argument that Jones-844 is prior art under § 102(a) by not raising the argument in their pre-hearing brief. Respondents' invalidity contentions asserted Jones-844 as prior art under § 102(e) only, identifying the filing date of Jones-844 as its priority date. *See* Jones-844 Motion, Ex. 1, Respondents' Disclosure of Invalidity Contentions, Ex. E, Invalidity Chart of U.S. Patent No. 9,038,233. Respondents' pre-hearing brief was consistent with their invalidity contentions and did not include any argument that Jones-844 is prior art under § 102(a). *See* RPB at 68. Moreover, when questioned directly on this issue by the ALJ, Respondents acknowledged that their pre-hearing brief contained no argument that Jones-844 is § 102(a) prior art. *See* Hr'g Tr. at 344:24-345:3. Respondents' petition does not identify any pre-hearing disclosures identifying Jones as § 102(a) prior art, and, according to iRobot, the first time Respondents provided notice of this argument was in an email to iRobot just days before the evidentiary hearing began. *See* RPet. at 41-42; CResp. at 39-41.

In view of the record here, the Commission finds that Respondents properly asserted Jones-844 as prior art under § 102(e) only. As a result, Respondents are precluded from arguing that the asserted claims are invalid for obviousness in view of Jones-844. *See* 35 U.S.C. § 103(c)(1).

Accordingly, the Commission affirms, with the supplemental reasoning provided above, the ALJ's ruling precluding argument that Jones-844 is prior art under § 102(a) and the ID's

PUBLIC VERSION

finding disqualifying Jones-844 as prior art under § 103(c). The Commission thus affirms the ID's finding that the asserted claims of the '233 patent are not invalid for obviousness.

The Commission's findings thus result in a violation determination based on infringement of the asserted claims of the '223 patent by Hoover, bObsweep, and SSSIT.

B. Remedy, the Public Interest, and Bonding

1. Limited Exclusion Order

The ALJ issued a Recommended Determination on Remedy and Bond, recommending, in the event the Commission finds a section 337 violation, the issuance of a limited exclusion order against certain robotic vacuum cleaning devices and components thereof that are imported, sold for importation, and/or sold after importation by Hoover, bObsweep, and SSSIT. RD at 4. The RD finds that the limited exclusion order should include a certification provision and expressly exclude from the scope of the order products listed in Exhibit B of the Joint Stipulation Between iRobot and Shenzhen Silver Star Intelligent Technology Co., Ltd. Regarding Sales and Importation ("Joint Stipulation").¹⁶ *Id.* at 3-4.

iRobot contends that the Commission should issue a limited exclusion order that prohibits the entry of certain robotic vacuum cleaning devices and components thereof that are manufactured or imported by Hoover, bObsweep, and SSSIT. CBr. at 9-10 & Ex. 1. iRobot provides a proposed limited exclusion order that carves out products listed in the Joint Stipulation. *Id.*, Ex. 1 n.1. iRobot argues that the carve-out provision should not include products or product combinations identified by Respondents as "bObsweep Bob 2.0" and "bObsweep bObi 2.0," or the use of Y1 and Y2 side brushes as replacement parts on bObsweep

¹⁶ See EDIS Doc. No. 638886, ¶ 5 & Ex. B (Mar. 14, 2018).

PUBLIC VERSION

products, because none of these products or combinations were adjudicated during the investigation. CReply at 11-13. iRobot argues that Respondents' request to carve out certain products or combinations is an improper attempt to import design-arounds without proper proceedings and that, in any event, Respondents' arguments that the non-adjudicated products are non-infringing are incorrect. *Id.* at 1, 12-14. iRobot argues that a certification provision covering SSSIT's SB2 side brush and non-infringing articles is, respectively, inappropriate and unnecessary. *Id.* at 15. If the Commission were to adopt a certification provision, iRobot provides a modified version of Respondents' proposed language limited to the products that the parties stipulated are not accused in the investigation or products expressly found not to infringe valid asserted claims. *Id.* at 15-16. iRobot also argues that a carve-out provision allowing importation of parts for service and repair should not be included because (1) Respondents did not request it during the proceedings before the ALJ, despite requesting five specific carve-outs, and (2) Respondents provide no evidence or argument on the need for a service and repair carve-out. *Id.* at 16-17. If the Commission determines to include such a provision, iRobot argues that it should be limited to replacement parts for repairs, and not include replacement vacuums. *Id.* at 17-18. iRobot also provides dates on which the asserted patents expire, HTSUS numbers that may cover the importation of the accused products, and a list of known importers of the subject articles. CBr. at 10.

Respondents argue that an exclusion order should be narrowly tailored to include provisions that: (1) expressly carve out those products listed in the Joint Stipulation; (2) expressly carve out products that the ID finds are non-infringing, including SSSIT's BD2, SB2, SB3, Y1 and Y2 designs, the Hoover Rogue 950, the Hoover Rogue 970, the bObsweep Bob 2.0, and bObsweep bObi 2.0 products; and (3) permit the importation of replacements parts,

PUBLIC VERSION

including SSSIT's Y1 and Y2 side brushes that are used in products the ID finds are non-infringing and can be used in the accused Hoover and bObsweep products, as well as SSSIT's SB2 and SB3 side brushes that Respondents argue iRobot failed to prove infringement under the doctrine of equivalents.¹⁷ RBr. at 14-22. Respondents argue that any finding as to the Y1 and Y2 designs apply equally to all SSSIT products with the same Y1 and Y2 design, regardless of the retailer or brand of the product. RReply at 9. As an alternative to express carve-out provisions for the stipulated and non-infringing products, Respondents request a certification provision that allows Respondents to identify products that have been stipulated to be outside the scope of the order or found to be non-infringing. RBr. at 16.

Having found a section 337 violation based on infringement of the '233 patent, the Commission has determined to issue a limited exclusion order prohibiting Hoover, bObsweep, and SSSIT from importing certain vacuum cleaning devices and components thereof, such as spare parts, that infringe one or more of claims 1, 10, 11, 14, 15, and 16 of the '233 patent. Consistent with Commission practice, the limited exclusion order includes a certification provision. *See Certain Access Control Systems and Components Thereof*, Inv. No. 337-TA-1016, Comm'n Op. at 35 (Aug. 21, 2018). Certification provisions aid U.S. Customs and Border Protection ("CBP") in enforcing Commission orders but "do not mandate that CBP accept certification as proof that the articles in question are not covered" by the limited exclusion order. *Id.* The limited exclusion order also includes a provision exempting the products that the parties

¹⁷ As discussed below, the ID does not make any findings as to whether the SSSIT SB2 and SB3 side brushes infringe the asserted patent claims.

PUBLIC VERSION

stipulated are not subject to any remedial order issued in this investigation and that the Commission has adjudicated as non-infringing.¹⁸

Respondents contend that the products found to be non-infringing include the following products: SSSIT's BD2, SB2, SB3, Y1 and Y2 designs; Hoover Rogue 950; Hoover Rogue 970; bObsweep Bob 2.0; and bObsweep bObi 2.0. *See* RBr. at 15. However, of these products, the ID adjudicated the Hoover Y1/Rogue and Y2 products only and found them to be non-infringing.¹⁹ *See* ID at 307. Regarding the other products identified by Respondents, the ID does not adjudicate them, and the record does not contain a basis to warrant their exemption at this time. In particular:

¹⁸ The Joint Stipulation states that the following products will “not be subject to any . . . remedial order”: RolliCute, RolliTerra, LASEREYE, RV003A, Xshai, F1, T2104, T2015, T2107, and T2109. *See* Joint Stipulation, ¶ 5 & Ex. B. Pursuant to the parties' stipulation, the Commission finds that these products are not subject to the remedial orders issued in this investigation.

¹⁹ iRobot does not dispute that the Hoover Y1/Rogue and Y2 products and SSSIT's Y1 and Y2 products are the same. *See* CReply at 11-16. SSSIT manufactures products for Hoover, and the Y1 is SSSIT's designation for the Hoover Rogue products, whereas the ID refers to the Y2 as both a Hoover and SSSIT product. ID at 9-10, 198 n.17, 298-307. It appears undisputed that the only material difference between the Y1 and Y2 products is that the Y2 product has a side brush with shorter bristles than the brush on the Y1 product. *See id.* at 300-01, 307; RBr. at 16.

PUBLIC VERSION

- The ID does not identify the SSSIT BD2 as an accused product with respect to the '233 patent, the only patent for which the Commission finds a section 337 violation, and makes no finding as to whether the SSSIT BD2 product meets the limitations of the asserted claims of the '233 patent.^{20, 21} *See id.* at 281-82, 302-07.
- The ID finds that the SB2 brush is not adjudicated.²² *Id.* at 299.
- The ID contains no reference to the SSSIT SB3 product.²³
- The ID does not make any findings concerning the SSSIT Y1 and Y2 “designs” nor the use of the side brushes in the Hoover Y1/Rogue and Y2 products with any other product. As discussed below, the record does not support applying the ID’s noninfringement findings regarding the Hoover Y1/Rogue and Y2 products to any SSSIT, bObsweep, or other Hoover product with a Y1 or Y2 side brush.
- The ID contains no reference to the bObsweep Bob 2.0 and bObsweep bObi 2.0 products.²⁴

Thus, the Commission cannot find at this time that the aforementioned products are exempted from the limited exclusion order because they have not been adjudicated in this investigation. As

²⁰ As discussed *supra* at 19-24, the Commission affirms, with modification, the ID’s finding that the accused SSSIT BD2 product infringes the '090 patent. However, the Commission finds that patent invalid for obviousness and thus finds no section 337 violation with respect to the '090 patent. *See supra* at 41.

²¹ iRobot argues that any carve-out provision should be limited to products that the parties stipulated are not accused in this investigation or products expressly found by the Commission to be non-infringing, but, in its proposed carve-out provision, iRobot does not strike the SSSIT BD2 product. *See* CReply at 11-12, 15-16. The Commission finds that iRobot’s failure to remove the SSSIT BD2 product from its proposed carve-out provision was inadvertent.

²² The SB2 is a rubber-arm brush variant used with the Hoover Y1/Rogue and Y2 products. ID at 298. The ID states that iRobot does not argue literal infringement by the Hoover Y2 product equipped with the SB2 brush and finds that iRobot waived its argument regarding infringement under the doctrine of equivalents by not raising the argument in its pre-hearing brief. *See id.* at 299.

²³ Respondents describe the SB3 as a side brush replacement part and as an alternative name for the Y2 side brush. *See* RBr. at 16. Respondents also note that the SB3 side brush was not accused in the investigation despite being identified as an imported product. *See id.* at 20.

²⁴ Respondents’ petition contains no description of the bObsweep Bob 2.0 and bObsweep bObi 2.0 products.

PUBLIC VERSION

discussed below, there are procedures available to the parties to determine whether these products are covered by the limited exclusion order.

With respect to an exemption for the service and repair of products imported before the effective date of an exclusion order, the Commission has granted such exemptions when unopposed,²⁵ in view of the public interest,²⁶ or upon some showing of a need for service and

²⁵ See *Certain Sleep-Disordered Breathing Treatment Systems and Components Thereof*, Inv. No. 337-TA-890, Comm'n Op. at 46-47 (Jan. 16, 2015); *Certain Digital Video Receivers and Hardware and Software Components Thereof*, Inv. No. 337-TA-1001, Comm'n Op. at 37-39 (Dec. 6, 2017); *Certain Electronic Digital Media Devices and Components Thereof*, Inv. No. 337-TA-796, Comm'n Op. at 121-22 (Sept. 6, 2013) (granting exemption for two years where complainant did not object to exemption limited to two years).

²⁶ See *Certain Automated Teller Machines, ATM Modules, Components Thereof, and Products Containing the Same*, Inv. No. 337-TA-972, Comm'n Op. at 26-27 (June 12, 2017) (exempting importation of replacement parts for service and repair of ATMs imported before date of remedial orders “in view of the interests of U.S. consumers” where numerous customers submitted letters citing harm without exemption); *Certain Digital Models, Digital Data, and Treatment Plans for Use in Making Incremental Dental Positioning Adjustment Appliances, the Appliances Made Therefrom, and Methods of Making the Same*, Inv. No. 337-TA-833, USITC Pub. No. 4555 (Nov. 2017), Comm'n Op. at 151-52 (Apr. 9, 2014) (“The potential effects of the orders on U.S. consumers (and possibly public health and welfare), however, warrant an exemption for activities related to treatment of patients who have already begun treatment with ClearCorrect’s aligners.”); *Certain Electronic Devices, Including Wireless Communication Devices, Portable Music and Data Processing Devices, and Tablet Computers*, Inv. No. 337-TA-794, Comm'n Op. at 114-15 (July 5, 2013) (granting two-year exception for replacement handsets that was unopposed and “justified to protect U.S. consumers who have purchased infringing goods”); *Certain Personal Data and Mobile Communications Devices and Related Software*, Inv. No. 337-TA-710, USITC Pub. No. 4331 (June 2012), Comm'n Op. at 72-73 (Dec. 29, 2011) (providing exemption for replacement handsets based on customer contracts and consideration of effect of exclusion on U.S. consumers); *Certain Liquid Crystal Display Modules, Products Containing the Same, and Methods Using the Same* (“*Certain LCD Modules*”), Inv. No. 337-TA-634, USITC Pub. No. 4187 (Dec. 2010), Comm'n Op. at 8 (Nov. 24, 2009) (“[T]he public interest weighs in favor of an exemption to allow importation of service and replacement parts”); *Certain Systems for Detecting and Removing Viruses or Worms, Components Thereof, and Products Containing Same*, Inv. No. 337-TA-510, Comm'n Op. at 6-7 (Aug. 23, 2005) (noting that provisions allowing current customers to receive maintenance and repair services allay any public interest concerns); *Certain Automated Mechanical Transmission Systems for Medium-Duty and Heavy-Duty Trucks and Components Thereof*, Inv. No. 337-TA-

(continued on next page)

PUBLIC VERSION

repair.²⁷ Here, iRobot opposes an exemption for service or repair, Respondents have made no showing or argument as to why such an exemption is necessary, and there is no record evidence, much less argument, of harm to U.S. consumers or adverse effect on other public interest factors to warrant an exemption. *See* CReply at 16-17; RBr. at 16-20. As noted below, Respondents state that there are no health, safety, or welfare concerns relating to the accused articles and that the only impact to U.S. consumers is higher prices during the holiday season. *See* RBr. at 25-26.

Respondents' only arguments in support of such an exemption are that the Y1 and Y2 side brushes used on the Hoover products—the combination of which the ID finds to be non-infringing—can be used on any of the SSSIT products, including the accused Hoover and bObsweep products, and that the ID's reasoning for finding no infringement of the Hoover products with the Y1 and Y2 brushes “applies equally” to the bObsweep products with the Y1 and Y2 design. *Id.* at 16-20. These are noninfringement arguments regarding product designs or combinations that were not before the ALJ and that Respondents improperly raise for the first time in the context of remedy. Further, the infringement analysis turns, in part, on the

(continued)

503, USITC Pub. No. 3934 (Aug. 2007), Comm'n Op. at 4-6 (May 9, 2005) (including exception for replacement parts in view of the record and the public interest to ensure the “continuous safe operation of transmissions” installed on medium-duty and heavy-duty trucks).

²⁷ *See Certain Network Devices, Related Software and Components Thereof*, Inv. No. 337-TA-944, Revised Comm'n Op. at 53-54 (Apr. 19, 2017) (granting warranty and repair exemption for products already sold to customers “for which [respondent] is obligated to provide warranty, repair services, or software update services”); *Certain Multiple Mode Outdoor Grills and Parts Thereof*, Inv. No. 337-TA-895, Comm'n Op. at 57-58 (Feb. 20, 2015) (“Respondents cite the need for customers to be able to purchase replacement parts to keep their grills in safe operable condition.”); *Certain Magnetic Data Storage Tapes and Cartridge Containing the Same*, Inv. No. 337-TA-1012, Comm'n Op. at 126-27 (Apr. 2, 2018) (exempting replacement cartridges “which Sony certifies are necessary for replacement under its warranty agreements” and where respondents' public interest submissions described their warranty obligations).

PUBLIC VERSION

relationship between the gaps separating the bundles of bristles in the side brush and the cliff detector beam. *See* ID at 304-07. There is no record evidence to suggest that the ID's findings regarding the Hoover Y1/Rogue and Y2 products apply to all Hoover and bObsweep products with the Y1 and Y2 side brush. Respondents also rely on photographs of the bObsweep Bob 2.0 and bObi 2.0 products that are not record evidence and, as noted above, these products are not referenced in the ID. *See* RBr. at 20; CReply at 14.

Because Respondents do not provide a justification to exempt service, repair, and replacement parts, the Commission has determined not to include such an exemption in the limited exclusion order. To the extent that Respondents wish to import specific replacement parts, product combinations, or products that have not been adjudicated by the Commission, Respondents may seek an advisory opinion or file a petition for a modification proceeding from the Commission, or a Part 177 ruling from CBP, regarding whether an article is subject to the exclusion order. *See* 19 C.F.R. §§ 210.76, 210.79; 19 C.F.R. Part 177.

Accordingly, the Commission has determined to issue a limited exclusion order prohibiting Hoover, bObsweep, and SSSIT from importing certain vacuum cleaning devices and components thereof, such as spare parts, that infringe one or more of claims 1, 10, 11, 14, 15, and 16 of the '233 patent. The limited exclusion order includes a provision exempting the products that the parties have stipulated are not subject to any remedial order issued in this investigation and that have been adjudicated as non-infringing, but does not include an exemption for service, repair, or replacement parts.

2. Cease and Desist Orders

The RD recommends the issuance of a cease and desist order against Hoover, but not against bObsweep. RD at 7-9. The RD finds the evidence demonstrates that Hoover maintained in the United States a commercially significant inventory of [REDACTED] units of the accused products,

PUBLIC VERSION

which is equal to approximately [REDACTED] of inventory. *Id.* at 8-9. The RD finds that the record lacks evidence to support iRobot's assertion that bObsweep maintained in the United States an inventory of [REDACTED] units of the accused products, which is equal to approximately [REDACTED] of inventory, and that the inventory is commercially significant. *Id.* at 7-8. The RD notes that iRobot does not seek a cease and desist order against SSSIT and thus does not make a recommendation as to whether such an order should issue against SSSIT. *Id.* at 9.

iRobot contends that the Commission should issue cease and desist orders against Hoover and bObsweep. CBr. at 11-14 & Ex. 3, 4. iRobot argues that Hoover and bObsweep each maintains commercially significant inventory in the United States. *Id.* at 11-14. With respect to bObsweep, iRobot argues that the ID errs in finding that a spreadsheet showing bObsweep's "Master Inventory" and "Stock" was just "a sales and customer table without information on inventory." *Id.* at 11-12. iRobot states that, although the spreadsheet was discussed in deposition testimony admitted into the record, cited in its pre- and post-hearing briefs, and considered by the ALJ, the spreadsheet inadvertently had not been moved into evidence. *Id.* at 12-13 n.1. iRobot argues that the inventory listed on that spreadsheet belongs to bObsweep, not bObsweep's retailers. *Id.* at 13-14.

Respondents argue that cease and desist orders should not be issued against any respondent. RBr. at 22. With respect to SSSIT, Respondents argue that iRobot did not allege that SSSIT has a domestic inventory. *Id.* With respect to bObsweep, Respondents argue that there is no record evidence that bObsweep has domestic inventory, that reopening the record to add an exhibit is improper and prejudicial, and that bObsweep products are transferred to retailers in the United States and thus are not owned by bObsweep. *Id.* at 22-23; RReply at 9-12. With respect to Hoover, Respondents argue that a commercially significant inventory cannot be

PUBLIC VERSION

based on non-infringing products and that iRobot has not shown how to adjust its calculations of Hoover's inventory to reflect only those articles that are found to be infringing. RBr. at 23.

Section 337(f)(1) provides that in addition to, or in lieu of, the issuance of an exclusion order, the Commission may issue a cease and desist order as a remedy for a violation of section 337. 19 U.S.C. § 1337(f)(1). Cease and desist orders are generally issued when, with respect to the imported infringing products, the respondents maintain commercially significant inventories in the United States or have significant domestic operations that could undercut the remedy provided by an exclusion order.²⁸ *See, e.g., Certain Protective Cases and Components Thereof*, Inv. No. 337-TA-780, USITC Pub. No. 4405 (July 2013), Comm'n Op. at 28 (Nov. 19, 2012) (citing *Certain Laser Bar Code Scanners and Scan Engines, Components Thereof, and Products Containing Same*, Inv. No. 337-TA-551, Comm'n Op. at 22 (June 14, 2007)); *Certain Agricultural Tractors, Lawn Tractors, Riding Lawnmowers, and Components Thereof*, Inv. No. 337-TA-486, USITC Pub. No. 3625 (Aug. 2003), Comm'n Op. at 17 (July 14, 2003). A complainant seeking a cease and desist order must demonstrate, based on the record, that this remedy is necessary to address the violation found in the investigation so as to not undercut the relief provided by the exclusion order. *Certain Integrated Repeaters, Switches, Transceivers, and Products Containing Same*, Inv. No. 337-TA-435, USITC Pub. No. 3547 (Oct. 2002), Comm'n Op. at 27 (Aug. 16, 2002) (“[C]omplainants bear the burden of proving that respondent

²⁸ When the presence of infringing domestic inventory is asserted as the basis for a cease and desist order under section 337(f)(1), Commissioner Schmidlein does not adopt the view that the inventory needs to be “commercially significant” in order to issue a cease and desist order. *See, e.g., Certain Table Saws Incorporating Active Injury Mitigation Technology and Components Thereof*, Inv. No. 337-TA-965, Comm'n Op. at 6-7, n.2 (Feb. 1, 2017). In Commissioner Schmidlein's view, the presence of some infringing domestic inventory, regardless of the commercial significance, provides a basis to issue a cease and desist order. *See id.*

PUBLIC VERSION

has such an inventory. Because complainants failed to sustain their burden, we have determined not to issue a cease and desist order.”); *see also* H.R. Rep. No. 100-40, at 160 (1987) (“When the Commission determines that both remedies [*i.e.*, an exclusion order and cease and desist order] are necessary, it should be without legal question that the Commission has authority to order such relief.”).

The Commission finds that iRobot has shown that Hoover maintains a commercially significant inventory of infringing imported product to warrant the issuance of a cease and desist order against Hoover. The Commission determined not to review the ID’s finding that the Hoover Quest 1000 products meet all limitations of the asserted claims of the ’233 patent and that the Hoover Rogue/Y1 and Hoover Y2 products do not. 83 Fed. Reg. at 47189; ID at 293-307. Thus, considering the inventory of the infringing products only, expert testimony shows that Hoover maintained [REDACTED] units of the Hoover Quest 1000 products, which is equal to approximately [REDACTED] of inventory and thus commercially significant. *See* CX-219C (Vander Veen WS) at Q/A 132; CX-1117C (Hoover interrogatory responses) at 23-24 & App. E.

With respect to bObsweep, its CEO testified that bObsweep maintains inventory of the accused products in the United States.²⁹ *See* CX-247C (M. Afrouzi Dep.) at 238:6-8.

Respondents’ argument that the bObsweep products are transferred to retailers in the United States and are held by bObsweep’s retailers is not supported by the cited evidence. The witness statement of iRobot’s expert, Dr. Vander Veen, upon which bObsweep relies, relates to bObsweep’s inventory as a percentage of bObsweep’s annual sales, not ownership of the

²⁹ On the issue of inventory in the United States, the RD and the parties refer to the bObsweep domestic and foreign entities collectively. *See, e.g.*, RD at 7-8; CBr. at 11-14; RBr. at 22-23.

PUBLIC VERSION

inventory. *See* RBr. at 23; CX-219C at Q/A 136-137. Respondents' reliance on Dr. Vander Veen's hearing testimony for the assertion that retailers, as opposed to bObsweep, held inventory of bObsweep products is also misplaced. *See* RReply at 11; Hr'g Tr. (Vander Veen) at 228:4-14.

Contrary to the RD, the Commission finds that bObsweep maintains commercially significant inventory in the United States. The RD states that RX-2021C, is just a "sales and customer table without information on inventory."³⁰ RD at 7-8. However, the RD's statement regarding RX-2021C does not align with the information in RX-2021C. Whereas the RD describes RX-2021C as a "sales and customer table without information on inventory" (RD at 8), RX-2021C is titled as "Master Inventory" and provides the number of units in stock in the United States for various products (*see* RX-2021C). In addition, fact and expert witnesses appear to have relied on RX-2021C to show bObsweep's domestic inventory. *See* CX-247C at 238:6-25, 261:1-265:2; CX-219C at Q/A 136 (including CDX-2022C). In light of the evidence, the Commission finds that bObsweep maintains commercially significant inventory in the United States. Specifically, bObsweep's CEO and expert testified that bObsweep maintains domestic inventory of the infringing products and that the inventory is commercially significant. *See* CX-

³⁰ iRobot states that RX-2021C is an Excel spreadsheet that was produced in native format with the Bates stamp bOb_ITC_00581313 and that was inadvertently not moved into evidence. *See* CBr. at 12-13 n.1, 14 n.3. iRobot argues that the Commission should nonetheless consider RX-2021C, which is attached to iRobot's initial submission to the Commission, because it was discussed in both admitted deposition testimony and trial testimony and considered by the ALJ. *Id.* at 12-13 n.1, 14 n.3, Ex. 2 (also referred to as "RX-2021C"). Although RX-2021C (Bates stamp bOb_ITC_00581313) was not officially admitted into evidence before the ALJ, the exhibit was produced by bObsweep in discovery, discussed by fact and expert witnesses in their deposition and hearing testimony, briefed by the parties before the ALJ, and considered by the ALJ in the RD. Given these circumstances concerning this exhibit in the proceedings before the ALJ and the fact that this exhibit was properly filed with the Secretary (*see* 19 C.F.R. § 210.38(a)), the Commission finds that the exhibit is part of the record in this investigation, and thus it is appropriate to consider it in the remedy determination.

PUBLIC VERSION

247C at 238:6-25, 261:1-265:2; CX-219C at Q/A 134-137. Exhibit RX-2021C, which is a spreadsheet of bObsweep's inventory, provides further support. *See* RX-2021C.

Accordingly, the Commission has determined to issue cease and desist orders against Hoover and bObsweep.³¹ As discussed above with respect to the limited exclusion order, the cease and desist orders include a provision exempting the products that the parties have stipulated are not subject to any remedial order issued in this investigation and that have been adjudicated as non-infringing. Also, as discussed above, the circumstances here do not warrant an exemption for service, repair, or replacement parts.

3. The Public Interest

Sections 337(d) and (f) of the Tariff Act of 1930, as amended, direct the Commission to consider certain public interest factors before issuing a remedy. These public interest factors include the effect of any remedial order on the “public health and welfare, competitive conditions in the United States economy, the production of like or directly competitive articles in the United States, and United States consumers.” 19 U.S.C. § 1337(d), (f).

The Commission did not instruct the ALJ to issue a recommended determination concerning the public interest in this investigation. *See* 19 C.F.R. § 210.50(b)(1).

iRobot argues that the statutory public interest factors do not militate against issuing an exclusion order and cease and desist orders. CBr. at 14-18. iRobot argues that the proposed

³¹ Commissioner Schmidlein supports issuance of the cease and desist orders in this investigation due to the presence of some infringing domestic inventory, regardless of the commercial significance. She does not rely on RX-2021C, which was not entered into evidence before the ALJ, in reaching her decision that a cease and desist order should issue against bObsweep. Rather, she finds that the evidence in the record establishes that bObsweep maintains infringing domestic inventory without having to consider RX-2021C.

PUBLIC VERSION

remedial orders will have no adverse effect on U.S. consumers and that the public interest in protecting valid and enforceable rights outweighs any potential adverse impact on U.S. consumers. *Id.* at 15-16. Specifically, iRobot argues that the proposed remedial orders will have no adverse effect on the public health and welfare in the United States because robot vacuum cleaners are typically used in residential settings to supplement regular cleaning and are not used for any specific use that would implicate such factors and that alternative vacuum cleaning systems and suppliers are available for the provision of healthcare or public safety, *e.g.*, in a hospital. *Id.* at 16. iRobot further argues that the proposed remedial orders will have no adverse effect on the production of like or directly competitive articles in the United States, that iRobot and competitors, such as Dyson and Samsung, should have the ability to expand their manufacturing capacity sufficiently to replace the volume of articles that will be subject to the recommend remedial orders, and that consumers have the option of turning to traditional (non-robotic) vacuum cleaners. *Id.* at 17. iRobot argues that it will have no difficulty replacing the volume of Respondents' excluded products, that it contracts with third parties to manufacture its robots, and that the number of Hoover and bObsweep units sold annually in the United States (approximately [REDACTED] units) is barely [REDACTED] percent of iRobot's global production (nearly [REDACTED] units). CReply at 22. iRobot also argues that the proposed remedial orders will have no adverse effect on competitive conditions in the U.S. economy and that traditional vacuum cleaners will continue to be available to those customers who desire such devices. CBr. at 17-18. iRobot argues that Respondents' contention that the accused articles are "luxury" items whose supply will be restricted and prices adversely impacted in the height of the holiday season is unsupported by the record. CReply at 21, 23.

PUBLIC VERSION

Respondents argue that the accused articles are robotic vacuum cleaners used in homes and office environments. RBr. at 25. Respondents state that there are no health, safety, or welfare concerns relating to a remedial order for the accused articles because the articles are luxury consumer electronic items. *Id.* Respondents state that, if the accused articles are excluded, then other entities, such as SharkNinja, Samsung, and Dyson, manufacture and/or sell similar competing articles. *Id.* at 26. Respondents argue that iRobot has not established its manufacturing timeline or capacity, that iRobot has only [REDACTED] for manufacturing, and that it is unclear if iRobot is capable of replacing the volume of articles subject to exclusion. *Id.* Respondents argue that exclusion of the accused article would immediately impact U.S. consumers because the exclusion order would issue at the height of the holiday season and that restriction of supply of the accused articles will adversely impact the sales price for robotic vacuum cleaners. *Id.*; RReply at 12.

The Commission did not receive any post-RD public interest comments from the public.

There is no evidence in the record that the proposed limited exclusion order and cease and desist orders would have an adverse impact on the public health and welfare, competitive conditions in the United States economy, the production of like or directly competitive articles in the United States, or United States consumers. The accused articles are residential automatic vacuum cleaners and the record indicates that the remedial orders raise no public health or welfare issues. iRobot has shown that it has the production capacity to replace the accused articles if they are excluded from entry. *See* CPX-33C (showing U.S. and global sales revenue); CPX-29C (showing number of units of domestic industry product sold). Respondents also acknowledge that other entities manufacture or sell similarly competing articles. *See* RBr. at 26. Further, Respondents do not provide any evidence to support their contention that U.S.

PUBLIC VERSION

consumers will be impacted during the height of the holiday season due to restricted supply and higher prices. *See id.*; RReply at 12. Moreover, such concerns have not been shown to militate against a remedy here.

Accordingly, the Commission finds that the statutory public interest factors do not preclude issuance of the remedial orders.

4. Bonding

If the Commission enters an exclusion order, a respondent may continue to import and sell its products during the 60-day period of Presidential review under a bond in an amount determined by the Commission to be “sufficient to protect the complainant from any injury.” 19 U.S.C. § 1337(j)(3); *see also* 19 C.F.R. § 210.50(a)(3). When reliable price information is available in the record, the Commission has often set the bond in an amount that would eliminate the price differential between the domestic product and the imported, infringing product. *See Certain Microsphere Adhesives, Process for Making Same, and Products Containing Same, Including Self-Stick Repositionable Notes*, Inv. No. 337-TA-366, USITC Pub. No. 2949 (Jan. 1996), Comm’n Op. at 24 (Jan. 16, 1996). The Commission also has used a reasonable royalty rate to set the bond amount where a reasonable royalty rate can be ascertained from the evidence in the record. *See, e.g., Certain Audio Digital-to-Analog Converters and Products Containing Same (“Certain Audio Digital-to-Analog Converters”)*, Inv. No. 337-TA-499, Comm’n Op. at 25 (Mar. 3, 2005). Where the record establishes that the calculation of a price differential is impractical or there is insufficient evidence in the record to determine a reasonable royalty, the Commission has imposed a 100 percent bond. *See, e.g., Certain LCD Modules*, Inv. No. 337-TA-634, Comm’n Op. at 6-7. The complainant bears the burden of establishing the need for a bond. *See Certain Rubber Antidegradants, Components Thereof, and Products Containing*

PUBLIC VERSION

Same, Inv. No. 337-TA-533, USITC Pub. No. 3975 (Apr. 2008), Comm'n Op. at 40 (July 24, 2006).

The RD recommends that, based on evidence of the price differentials between the domestic industry products and the imported, infringing products, the following bond amounts should be imposed against covered products that are imported during the period of Presidential review: 48.65 percent for bObsweep products and 41.35 percent for Hoover products. RD at 13. The RD finds that iRobot's weighted sales average approach is reasonable, compared to imposing a 100 percent bond such as when there is insufficient evidence in the record to determine a price differential or a reasonable royalty. *Id.* at 12. The RD finds that iRobot's product comparisons are supported by bObsweep's and Hoover's corporate testimony. *Id.* at 12-13. The RD also concludes that, contrary to Respondents' argument, a complainant is not required to show any specific injury to its alleged domestic industry due to a lack of a bond during the period of Presidential review. *Id.* at 12.

iRobot argues that the Commission should impose the bonds recommended by the RD. CBr. at 18. iRobot argues that the bObsweep products compete broadly with all the asserted domestic industry Roomba products and that a bond rate of 48.65 percent is appropriate based on the difference in average price of all the asserted domestic industry products (██████████) and the bObsweep products (██████████). *Id.* at 19. iRobot argues that the Hoover products compete most closely with the asserted domestic industry product Roomba 900 series and that a bond rate of 41.35 percent is appropriate based on the difference in average price of the Roomba 900 series (██████████) and the Hoover products (██████████). *Id.* iRobot argues that expert testimony and Hoover's internal documents demonstrate that the Roomba 900 series and the Hoover products offer similar high-end features. *Id.* at 19-20. iRobot argues that bond rates based on a weighted

PUBLIC VERSION

average price comparison is appropriate in view of Commission precedent and the impracticality or difficulty of otherwise determining a price differential. *Id.* at 20-21; CReply at 19-20. iRobot argues that an “apples-to-apples” comparison as proposed by Respondents is not possible because the accused products are not identical. CReply at 19. iRobot also argues that it need not show injury to obtain a bond. *Id.* at 20-21.

Respondents argue that the Commission should not require a bond because iRobot has not shown that it will be injured during the 60-day period of Presidential review. RBr. at 24. Respondents argue that “iRobot’s price comparison is not a proper apples-to-apples comparison” because iRobot improperly compared prices of product groups having different features and prices instead of comparing a single domestic industry product with a single accused article. *Id.* at 24-25. Respondents argue that iRobot provides no justification for its product comparisons and further that the bObsweep products are most comparable to the Roomba 600-series products. RReply at 13-14. Respondents argue that the Commission should set a bond rate at zero percent. RBr. at 24-25; RReply at 14.

The cases that Respondents cite for setting a bond rate of zero percent are inapposite in view of the record here, which includes pricing information. *See Certain Acid-Washed Denim Garments and Accessories*, Inv. No. 337-TA-324, USITC Pub. No. 2576 (Nov. 1992), Comm’n Op. at 27-28 (Aug. 28, 1992) (setting bond rate based on royalty rate charged to licensees where no party submitted price data for bond purposes); *Certain Reclosable Plastic Bags and Tubing* (“*Certain Reclosable Plastic Bags*”), Inv. No. 337-TA-266, USITC Pub. No. 2171 (Mar. 1989), Comm’n Op. at 5-6 (Mar. 1, 1989) (determining bond “based on calculation of an average of the amounts by which infringing imports undersell complainant’s products” as opposed to complainant’s proposed bond corresponding to a single respondent). The Commission finds that

PUBLIC VERSION

iRobot's approach of calculating a bond rate based on the difference in average price of certain asserted domestic industry products and the infringing articles is reasonable and supported by the evidence.

Specifically, with respect to bObsweep, iRobot's expert testified that he compared the bObsweep products to all of the domestic industry products, based on testimony by bObsweep's CEO that the bObsweep products have features no iRobot product has. *See* CX-219C (Vander Veen WS) at Q/A 159-160; CX-247C (M. Afrouzi Dep.) at 255:5-258:4; RD at 12.³² Further, Respondents cite no evidence for their contention that the bObsweep products are most comparable to the Roomba 600-series products. *See* RReply at 14.

With respect to Hoover, iRobot reasonably compared all Hoover products to the iRobot 900 series. The evidence shows that the Hoover products are most comparable to the iRobot 900 series. *See* CX-219C at Q/A 156; Hr'g Tr. (Vander Veen) at 229:17-231:13; CX-410C (Zimmerman Dep.) at 93:3-10.

iRobot has made a sufficient showing for its proposed bond rates. The prices at which Hoover and bObsweep undersell the accused articles reflect the injury to iRobot during the Presidential review period and iRobot's calculations based on weighted sales prices are amounts sufficient to protect the iRobot from any injury. *See Certain Audio Digital-to-Analog Converters*, Inv. No. 337-TA-499, Comm'n Op. at 24-25; *Certain Reclosable Plastic Bags*, Inv. No. 337-TA-266, Comm'n Op. at 5-6.

³² Dr. Vander Veen's witness statement appears to incorrectly cite CX-242C instead of CX-247C. *See* CX-219C at Q/A 160.

PUBLIC VERSION

With respect to SSSIT, the RD finds that “iRobot does not discuss a bond amount for respondent SSSIT.” RD at 10 (citing CIB at 123-25). Similarly, in its briefing before the Commission, iRobot offers no evidence or argument for a bond for SSSIT during the period of Presidential review. *See* CBr. at 14-16. On this record, therefore, the Commission finds that no bond is required for products that are manufactured by SSSIT on behalf of entities other than Hoover and bObsweep, as well as products that are manufactured on behalf of SSSIT, that are imported during the Presidential review period. Infringing products manufactured by SSSIT on behalf of Hoover and bObsweep will be subject to bond.

Accordingly, the Commission has determined to set a bond in the following percentages of the entered value of the respondents’ infringing products during the period of Presidential review: 48.65 percent for products that are manufactured by or on behalf of bObsweep; 41.35 percent for products that are manufactured by or on behalf of Hoover; and zero percent (no bond) for products that are manufactured by SSSIT on behalf of entities other than Hoover and bObsweep, as well as products that are manufactured on behalf of SSSIT. All imports of such products during the period of Presidential review are to be reported to CBP, in advance of the date of the entry, pursuant to procedures CBP establishes.

IV. CONCLUSION

The Commission has determined to affirm, on modified grounds, the ID’s finding of a section 337 violation and to issue a limited exclusion order and cease and desist orders prohibiting Hoover, bObsweep, and SSSIT from, *inter alia*, importing and selling or distributing within the United States certain vacuum cleaning devices and components thereof, such as spare parts, that infringe one or more of claims 1, 10, 11, 14, 15, and 16 of the ’233 patent. The

PUBLIC VERSION

Commission adopts all findings and conclusions in the ID that are not inconsistent with this opinion.

By order of the Commission.

A handwritten signature in black ink, appearing to read "Lisa R. Barton".

Lisa R. Barton
Secretary to the Commission

Issued: February 1, 2019

PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **Opinion, Commission** has been served upon the following parties as indicated, on **February 1, 2019**.



Lisa R. Barton, Secretary
U.S. International Trade Commission
500 E Street, SW, Room 112
Washington, DC 20436

On Behalf of Complainant iRobot Corporation:

Stephen A. Marshall
FISH & RICHARDSON P.C.
1000 Maine Ave SW
Suite 1000
Washington, DC 20024

- Via Hand Delivery
 Via Express Delivery
 Via First Class Mail
 Other: _____

**On Behalf of Respondents Shenzhen Silver Star Intelligent
Technology Co., Ltd., Hoover Inc., Royal Appliance
Manufacturing Co. Inc. d/b/a TTI Floor Care, bObsweep, Inc.
and bObsweep, USA:**

Kecia J. Reynolds
PILLSBURY WINTHROP SHAW PITTMAN LLP
1200 Seventeenth Street NW
Washington, DC 20036

- Via Hand Delivery
 Via Express Delivery
 Via First Class Mail
 Other: _____

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, DC

In the Matter of

**CERTAIN ROBOTIC VACUUM
CLEANING DEVICES AND
COMPONENTS THEREOF SUCH AS
SPARE PARTS**

Investigation No. 337-TA-1057

**NOTICE OF COMMISSION DETERMINATION TO REVIEW
A FINAL INITIAL DETERMINATION IN PART;
SCHEDULE FOR FILING WRITTEN SUBMISSIONS ON THE ISSUES
UNDER REVIEW AND ON REMEDY, THE PUBLIC INTEREST, AND BONDING;
EXTENSION OF THE TARGET DATE**

AGENCY: U.S. International Trade Commission.

ACTION: Notice.

SUMMARY: Notice is hereby given that the U.S. International Trade Commission has determined to review-in-part the presiding administrative law judge's final initial determination, finding a violation of section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. § 1337, with respect to U.S. Patent Nos. 8,600,553 and 9,038,233 and no violation with respect to U.S. Patent Nos. 6,809,490 and 8,474,090. The Commission has also determined to extend the target date for completion of the above-captioned investigation until November 20, 2018. The Commission requests certain briefing from the parties on the issues under review, as indicated in this notice. The Commission also requests briefing from the parties and interested persons on the issues of remedy, the public interest, and bonding.

FOR FURTHER INFORMATION CONTACT: Lucy Grace D. Noyola, Office of the General Counsel, U.S. International Trade Commission, 500 E Street, SW, Washington, DC 20436, telephone 202-205-3438. Copies of non-confidential documents filed in connection with this investigation are or will be available for inspection during official business hours (8:45 a.m. to 5:15 p.m.) in the Office of the Secretary, U.S. International Trade Commission, 500 E Street, SW, Washington, DC 20436, telephone 202-205-2000. General information concerning the Commission may also be obtained by accessing its Internet server (<https://www.usitc.gov>). The public record for this investigation may be viewed on the Commission's electronic docket (EDIS) at <https://edis.usitc.gov>. Hearing-impaired persons are advised that information on this matter can be obtained by contacting the Commission's TDD terminal on 202-205-1810.

SUPPLEMENTARY INFORMATION: The Commission instituted this investigation under section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. § 1337, on May 23, 2017, based on a complaint filed by iRobot Corporation of Bedford, Massachusetts (“iRobot”). 82 FR 23592 (May 23, 2017). The complaint alleges a violation of section 337 by reason of infringement of certain claims of U.S. Patent Nos. 6,809,490 (“the ’490 patent”); 7,155,308 (“the ’308 patent”); 8,474,090 (“the ’090 patent”); 8,600,553 (“the ’553 patent”); 9,038,233 (“the ’233 patent”); and 9,486,924 (“the ’924 patent”). The complaint names as respondents Bissell Homecare, Inc. of Grand Rapids, Michigan (“Bissell”); Hoover, Inc. of Glenwillow, Ohio and Royal Appliance Manufacturing Co., Inc. d/b/a TTI Floor Care North America, Inc. of Glenwillow, Ohio (collectively, “Hoover”); bObsweep, Inc. of Toronto, Canada and bObsweep USA of Henderson, Nevada (collectively, “bObsweep”); The Black & Decker Corporation of Towson, Maryland and Black & Decker (U.S.) Inc. of Towson, Maryland (collectively, “Black & Decker”); Shenzhen ZhiYi Technology Co., Ltd., d/b/a iLife of Shenzhen, China (“iLife”); Matsutec Enterprises Co., Ltd. of Taipei City, Taiwan (“Matsutec”); Suzhou Real Power Electric Appliance Co., Ltd. of Suzhou, China (“Suzhou”); and Shenzhen Silver Star Intelligent Technology Co., Ltd. of Shenzhen, China (“SSSIT”). The Office of Unfair Import Investigations is not a party in this investigation.

The investigation has been terminated with respect to respondents Suzhou, Black & Decker, Bissell, and Matsutec. Notice (Oct. 18, 2017) (determining not to review Order No. 23 (Sept. 26, 2017)); Notice (Jan. 31, 2018) (determining not to review Order No. 31 (Jan. 9, 2018)); Notice (Feb. 16, 2018) (determining not to review Order No. 34 (Jan. 25, 2018)). The ’924 and the ’308 patents are also no longer part of the investigation. Notice (Jan. 16, 2018) (determining not to review Order No. 29 (Dec. 14, 2017)); Notice (Mar. 15, 2018) (determining not to review Order No. 40 (Feb. 21, 2018)).

On July 16, 2018, the Commission determined that iRobot satisfied the economic prong of the domestic industry requirement under 19 U.S.C. § 1337(a)(3)(B). Notice (July 16, 2018) (determining to affirm with modifications Order No. 39 (Feb. 13, 2018)).

On June 25, 2018, the presiding administrative law judge (“ALJ”) issued a final initial determination (“ID”), finding a violation of section 337 with respect to the ’553 and ’233 patents and no violation with respect to the ’490 and ’090 patents. Specifically, with respect to the ’553 patent, the ALJ found that: (1) iLife directly infringes claim 42, but not claims 1, 12, 13, and 22; (2) iLife has not induced or contributed to infringement of the patent; (3) iRobot has satisfied the technical prong of the domestic industry requirement; (4) claim 1, but not claims 11 and 12, is invalid for anticipation; and (5) claims 4, 12, 13, and 22 are not invalid for obviousness. With respect to the ’490 patent, the ALJ found that: (1) iLife and bObsweep directly infringe claim 42, but not claims 1 and 12, and Hoover directly infringes claim 42; (2) iLife, Hoover, bObsweep, and SSSIT have not induced or contributed to infringement of the patent; (3) iRobot has satisfied the technical prong of the domestic industry requirement; (4) claim 1, but not claim 12, is invalid for anticipation; (5) claims 12 and 42 are invalid for obviousness; and (6) claims 1 and 42 are not invalid for indefiniteness. With respect to the ’090 patent, the ALJ found that: (1) iLife, Hoover, SSSIT and bObsweep directly infringe claims 1, 2, 3, 5, 7, 10, and 17; (2) iLife, Hoover, bObsweep, and SSSIT have not induced or contributed to infringement of the patent; (3) iRobot has satisfied the technical prong of the domestic industry requirement;

(4) claims 1, 5, 7, 10, and 17 are not invalid for anticipation; and (5) claims 1, 2, 3, 4, 5, 7, 10, and 17 are invalid for obviousness in view of certain prior art combinations, but not others. With respect to the '233 patent, the ALJ found that: (1) iLife and bObsweep directly infringe claims 1, 10, 11, 14, 15, and 16 and Hoover directly infringes the same claims with respect to the Hoover Quest 1000 products, but not the Hoover Rogue/Y1 and Hoover Y2 products; (2) iLife, Hoover, bObsweep, and SSSIT have not induced or contributed to infringement of the patent; (3) iRobot has satisfied the technical prong of the domestic industry requirement; and (4) claims 1, 10, 11, 14, 15, and 16 of the '233 patent are not invalid for anticipation, obviousness, nor lack of written description.

The ALJ also issued a Recommended Determination on Remedy and Bond ("RD"), recommending, if the Commission finds a section 337 violation, the issuance of (1) a limited exclusion order against certain robotic vacuum cleaning devices and components thereof that are imported, sold for importation, and/or sold after importation by Hoover, bObsweep, SSSIT, and iLife, (2) cease and desist orders against Hoover and iLife, and (3) imposition of a bond of 18.89 percent for iLife products, 48.65 percent for bObsweep products, and 41.35 percent for Hoover products that are imported during the period of Presidential review.

On July 25, 2018, iRobot filed post-RD statements on the public interest under Commission Rule 210.50(a)(4). The Commission did not receive any post-RD public interest comments from Respondents pursuant to Commission Rule 210.50(a)(4). The Commission did not receive comments from the public in response to the Commission notice issued on July 10, 2018. 83 FR 31977 (July 10, 2018).

On July 9, 2018, iRobot and Respondents each filed a petition for review challenging various findings in the final ID. On July 17, 2018, iRobot and Respondents each filed responses to the other party's petition for review.

Having examined the record of this investigation, including the final ID, the Commission has determined to review in part the ALJ's determination of a section 337 violation. Specifically, the Commission has determined to review the ALJ's findings on: (1) induced and contributory infringement with respect to the '553, '490, '090, and '233 patents; (2) anticipation with respect to the asserted claims of the '553 patent; (3) obviousness with respect to the asserted claims of the '553 patent; (4) direct infringement of the '090 patent by Respondents; (5) anticipation with respect to the asserted claims of the '090 patent; (6) obviousness with respect to the asserted claims of the '090 patent; (7) anticipation with respect to the asserted claims of the '233 patent; and (8) consideration of U.S. Patent No. 6,594,844 as prior art under 35 U.S.C. § 102(a) and concerning obviousness under 35 U.S.C. § 103.

The Commission has determined not to review the remaining issues decided in the final ID.

The Commission has also determined to extend the target date for completion of the investigation until November 20, 2018.

In connection with its review, the Commission requests responses to the following questions. The parties are requested to brief their positions with reference to the applicable law and the existing evidentiary record.

1. Before the ALJ, did Respondents assert invalidity of claims 1 and 12 of the '553 patent under 35 U.S.C. § 102(b) based on a theory that the invention was “described in a printed publication” or that the invention was “in public use”? *See* ID at 57.
2. What is the theory under section 102(b) (*i.e.*, “described in a printed publication” or “in public use”) addressed by the final ID to find claim 1 of the '553 patent invalid as anticipated by Suckmaster and to find claim 12 not invalid as anticipated by Suckmaster? *See* ID at 57-70.
3. Assuming Respondents argued before the ALJ invalidity of claim 12 of the '553 patent based on “public use” under section 102(b):
 - a. Does there need to be a showing that the Suckmaster robot was used in public to practice the steps of claim 12 to find anticipation of that claim based on a public use theory?
 - b. Does the record evidence show that the Suckmaster robot performed the steps of claim 12 during the Atlanta Hobby Robot Club Vacuum Contest?
4. Describe the principle of operation of U.S. Patent No. 5,995,884 (“Allen”) and discuss whether modifying Allen with a “control module” as required by the asserted claims of the '090 patent would change that principle of operation.

In connection with the final disposition of this investigation, the Commission may (1) issue an order that could result in the exclusion of the subject articles from entry into the United States, and/or (2) issue a cease and desist order that could result in the respondents Hoover and iLife being required to cease and desist from engaging in unfair acts in the importation and sale of such articles. Accordingly, the Commission is interested in receiving written submissions that address the form of remedy, if any, that should be ordered. If a party seeks exclusion of an article from entry into the United States for purposes other than entry for consumption, the party should so indicate and provide information establishing that activities involving other types of entry either are adversely affecting it or likely to do so. For background, see *Certain Devices for Connecting Computers via Telephone Lines*, Inv. No. 337-TA-360, USITC Pub. No. 2843 (Dec. 1994), Comm'n Opinion.

If the Commission contemplates some form of remedy, it must consider the effects of that remedy upon the public interest. The factors the Commission will consider include the effect that an exclusion order and/or cease and desist order would have on (1) the public health and welfare, (2) competitive conditions in the U.S. economy, (3) U.S. production of articles that are like or directly competitive with those that are subject to investigation, and (4) U.S. consumers. The Commission is therefore interested in receiving written submissions that address the aforementioned public interest factors in the context of this investigation.

If the Commission orders some form of remedy, the U.S. Trade Representative, as delegated by the President, has 60 days to approve or disapprove the Commission's action. *See* Presidential Memorandum of July 21, 2005, 70 FR 43251 (July 26, 2005). During this period, the subject articles would be entitled to enter the United States under bond, in an amount determined by the Commission and prescribed by the Secretary of the Treasury. The Commission is therefore

interested in receiving submissions concerning the amount of the bond that should be imposed if a remedy is ordered.

WRITTEN SUBMISSIONS: The parties to the investigation are requested to file written submissions on all of the issues identified in this notice. Parties to the investigation, interested government agencies, and any other interested parties are encouraged to file written submissions on the issues of remedy, the public interest, and bonding. Such submissions should address the recommended determination by the ALJ on remedy and bonding. Complainant is also requested to submit proposed remedial orders for the Commission's consideration. Complainant is also requested to state the date that the asserted patents expire and the HTSUS numbers under which the accused products are imported, and provide identification information for all known importers of the subject articles. Initial written submissions and proposed remedial orders must be filed no later than close of business on **Monday, September 24, 2018**. Reply submissions must be filed no later than the close of business on **Monday, October 1, 2018**. No further submissions on these issues will be permitted unless otherwise ordered by the Commission. Persons filing written submissions must file the original document electronically on or before the deadlines stated above and submit 8 true paper copies to the Office of the Secretary by noon the next day pursuant to section 210.4(f) of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.4(f)). Submissions should refer to the investigation number (Inv. No. 337-TA-1057) in a prominent place on the cover page and/or the first page. (See Handbook for Electronic Filing Procedures, https://www.usitc.gov/secretary/documents/handbook_on_filing_procedures.pdf). Persons with questions regarding filing should contact the Secretary at (202) 205-2000.

Any person desiring to submit a document to the Commission in confidence must request confidential treatment. All such requests should be directed to the Secretary to the Commission and must include a full statement of the reasons why the Commission should grant such treatment. *See* 19 C.F.R. § 201.6. Documents for which confidential treatment by the Commission is properly sought will be treated accordingly. All information, including confidential business information and documents for which confidential treatment is properly sought, submitted to the Commission for purposes of this investigation may be disclosed to and used: (i) by the Commission, its employees and Offices, and contract personnel (a) for developing or maintaining the records of this or a related proceeding, or (b) in internal investigations, audits, reviews, and evaluations relating to the programs, personnel, and operations of the Commission including under 5 U.S.C. Appendix 3; or (ii) by U.S. government employees and contract personnel,^[1] solely for cybersecurity purposes. All nonconfidential written submissions will be available for public inspection at the Office of the Secretary and on EDIS.

The authority for the Commission's determination is contained in section 337 of the Tariff Act of 1930, as amended (19 U.S.C. § 1337), and in Part 210 of the Commission's Rules of Practice and Procedure (19 C.F.R. part 210).

^[1] All contract personnel will sign appropriate nondisclosure agreements.

By order of the Commission.

A handwritten signature in black ink, appearing to read 'Lisa R. Barton', written in a cursive style.

Lisa R. Barton
Secretary to the Commission

Issued: September 12, 2018

PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **NOTICE** has been served upon the following parties as indicated, on September 12, 2018.



Lisa R. Barton, Secretary
U.S. International Trade Commission
500 E Street, SW, Room 112
Washington, DC 20436

On Behalf of Complainant iRobot Corporation:

Stephen A. Marshall
FISH & RICHARDSON P.C.
1000 Maine Ave SW
Suite 1000
Washington, DC 20024

- Via Hand Delivery
 Via Express Delivery
 Via First Class Mail
 Other: _____

**On Behalf of Respondents Shenzhen Silver Star Intelligent
Technology Co., Ltd., Hoover Inc., Royal Appliance
Manufacturing Co. Inc. d/b/a TTI Floor Care, bObsweep, Inc.
and bObsweep, USA:**

Kecia J. Reynolds
PILLSBURY WINTHROP SHAW PITTMAN LLP
1200 Seventeenth Street NW
Washington, DC 20036

- Via Hand Delivery
 Via Express Delivery
 Via First Class Mail
 Other: _____

**On Behalf of Respondents Shenzhen ZhiYi Technology Co.,
Ltd. d/b/a iLife:**

Nicholas A. Brown
GREENBERG TRAUERIG, LLP
4 Embarcadero Center, Suite 3100
San Francisco, CA 94111

- Via Hand Delivery
 Via Express Delivery
 Via First Class Mail
 Other: _____

UNITED STATES INTERNATIONAL TRADE COMMISSION

Washington, D.C.

In the Matter of

**CERTAIN ROBOTIC VACUUM CLEANING
DEVICES AND COMPONENTS THEREOF SUCH
AS SPARE PARTS**

Inv. No. 337-TA-1057

INITIAL DETERMINATION ON VIOLATION OF SECTION 337

Administrative Law Judge Thomas B. Pender

(June 25, 2018)

Pursuant to the Notice of Investigation and Rule 210.42(a) of the Rules of Practice and Procedure of the United States International Trade Commission, this is my Initial Determination in the matter of *Certain Robotic Vacuum Cleaning Devices and Components Thereof Such as Spare Parts*, Investigation No. 337-TA-1057.

TABLE OF CONTENTS

	Page
I. INTRODUCTION.....	1
A. Procedural Background.....	1
B. The Parties	4
C. The Asserted Patents and Claims.....	5
D. Products at Issue	7
1. Domestic Industry Products.....	7
2. Accused Products.....	8
II. STANDARDS OF LAW.....	10
A. Claim Construction	10
B. Infringement.....	13
1. Direct Infringement.....	13
2. Indirect Infringement	14
a. Induced Infringement.....	14
b. Contributory Infringement.....	15
C. Domestic Industry.....	15
1. Technical Prong	16
2. Economic Prong.....	17
D. Invalidity.....	18
1. 35 U.S.C. § 102.....	18
2. 35 U.S.C. § 103.....	19
3. 35 U.S.C. § 112.....	21
III. JURISDICTION AND IMPORTATION.....	23
A. Importation and <i>In Rem</i> Jurisdiction.....	23
B. Subject Matter Jurisdiction	23
C. Personal Jurisdiction.....	24
IV. U.S. PATENT NO. 8,600,553	24
A. Level of Ordinary Skill in the Art.....	24
B. Claims-at-Issue	25
C. Claim Construction.....	26

Public Version

D.	Infringement.....	35
1.	Direct Infringement by the iLife Products	35
a.	Undisputed Claim Limitations	35
b.	Disputed Claim Limitations Concerning “Presence of an Obstacle/Object”	39
c.	Disputed Claim Limitations Concerning “Heading Setting”	42
d.	Disputed Method Claims	48
2.	Indirect Infringement by iLife	50
E.	Domestic Industry - Technical Prong	55
F.	Validity	57
1.	Alleged Prior Art.....	58
2.	35 U.S.C. § 102.....	64
a.	Claim 1	64
b.	Claim 11	70
c.	Claim 12.....	76
3.	35 U.S.C. § 103.....	77
a.	Claim 4.....	77
b.	Claim 12.....	81
c.	Claim 13.....	84
d.	Claim 22.....	85
e.	Secondary Considerations.....	87
V.	U.S. PATENT NO. 6,809,490	92
A.	Level of Ordinary Skill in the Art.....	92
B.	Claims-at-Issue	93
C.	Claim Construction	94
D.	Infringement.....	105
1.	Direct Infringement by the iLife Products	106
a.	Undisputed Claim Limitations	106
b.	Disputed Claim Limitations Concerning “Twice the Work Width”	108

Public Version

c.	Disputed Claim Limitations Concerning “Configured to Operate the Robot”	115
d.	Disputed Claim Limitation Concerning “Select From Among the Plurality of Modes”	117
2.	Direct Infringement by the Hoover Products.....	118
a.	Undisputed Claim Limitations	118
b.	Disputed Claim Limitation Concerning “Twice the Work Width”	120
c.	Disputed Claim Limitation Concerning “Configured to Operate the Robot”	122
d.	Disputed Claim Limitations Concerning “Obstacle Following Mode”	123
3.	Direct Infringement by the bObsweep Products	129
a.	Undisputed Claim Limitations	129
b.	Disputed Claim Limitations Concerning “Twice the Work Width”	131
c.	Disputed Claim Limitations Concerning “Configured to Operate the Robot”	135
d.	Disputed Claim Limitation Concerning “Select From Among the Plurality of Modes”	136
4.	Indirect Infringement	137
E.	Domestic Industry – Technical Prong.....	142
F.	Validity	146
1.	Alleged Prior Art.....	146
2.	35 U.S.C. § 102.....	147
a.	Claim 1	148
b.	Claim 12.....	149
3.	35 U.S.C. § 103.....	156
a.	Claim 12.....	156
b.	Claim 42.....	158
c.	Secondary Considerations.....	163

Public Version

4.	35 U.S.C. § 112.....	165
VI.	U.S. PATENT NO. 8,474,090	168
A.	Level of Ordinary Skill in the Art.....	168
B.	Claims-at-Issue	169
C.	Claim Construction	172
D.	Infringement.....	172
1.	Direct Infringement by the iLife Products	173
a.	Undisputed Claim Limitations.....	173
b.	Disputed Claim Limitations Concerning an Arm Attached to Chassis	178
c.	Disputed Claim Limitations Concerning a Spring and a Chassis	188
2.	Direct Infringement by the Hoover Products.....	190
a.	Undisputed Claim Limitations.....	190
b.	Disputed Claim Limitations Concerning an Arm Attached to Chassis	196
c.	Disputed Claim Limitations Concerning a Spring and a Chassis	199
3.	Direct Infringement by the SSSIT Product.....	201
a.	Undisputed Claim Limitations.....	201
b.	Disputed Claim Limitations Concerning an Arm Attached to Chassis	206
c.	Disputed Claim Limitations Concerning a Spring and a Chassis	209
4.	Direct Infringement by the bObi Products.....	210
a.	Undisputed Claim Limitations.....	211
b.	Disputed Claim Limitations Concerning an Arm Attached to Chassis	216
c.	Disputed Claim Limitations Concerning a Spring and a Chassis	219
5.	Indirect Infringement	220
E.	Domestic Industry - Technical Prong	221

Public Version

a.	Undisputed Claim Limitations.....	221
b.	Disputed Claim Limitations Concerning an Arm Attached to Chassis	226
c.	Disputed Claim Limitations Concerning a Spring and a Chassis	229
F.	Validity	230
1.	Alleged Prior Art.....	230
2.	35 U.S.C. § 102.....	232
a.	Claim 1.....	232
b.	Claim 5.....	251
c.	Claim 7.....	251
d.	Claim 10.....	251
e.	Claim 17.....	251
3.	35 U.S.C. § 103.....	252
a.	Claim 1.....	252
b.	Claim 2.....	270
c.	Claim 3.....	273
d.	Claim 4.....	274
e.	Claim 5.....	275
f.	Claim 7.....	275
g.	Claim 10.....	276
h.	Claim 17.....	276
i.	Secondary Considerations.....	276
VII.	U.S. PATENT NO. 9,038,233	278
A.	Level of Ordinary Skill in the Art.....	278
B.	Claims-at-Issue	278
C.	Claim Construction	281
D.	Infringement.....	281
1.	Direct Infringement by the A6 Series	282

Public Version

2.	Direct Infringement by the bObsweep Products.....	287
3.	Direct Infringement by the Hoover Products.....	293
a.	Undisputed Claim Limitations.....	293
b.	Disputed Claim Limitations Concerning “Gap Being Configured to Prevent Occlusion”	297
4.	Indirect Infringement	307
E.	Domestic Industry - Technical Prong	308
F.	Validity	313
1.	Alleged Prior Art.....	313
2.	35 U.S.C. § 102.....	316
a.	Claim 1	316
b.	Claim 10.....	324
c.	Claim 11.....	326
d.	Claim 14.....	326
e.	Claim 15.....	327
f.	Claim 16.....	329
3.	35 U.S.C. § 103.....	330
a.	Claim 1	330
b.	Claim 10.....	342
c.	Claim 11.....	345
d.	Claim 14.....	345
e.	Claim 15.....	346
f.	Claim 16.....	348
g.	Secondary Considerations.....	349
4.	35 U.S.C. § 112.....	350
VIII.	DOMESTIC INDUSTRY - ECONOMIC PRONG	353
A.	Relevant Law	353
B.	iRobot’s Position.....	355
C.	Respondents’ Position.....	361

Public Version

D. Analysis.....363

IX. CONCLUSIONS OF LAW 370

X. INITIAL DETERMINATION AND ORDER 372

Public Version

TABLE OF ABBREVIATIONS

CDX	Complainant's Demonstrative Exhibit
CIB	Complainant's Initial Post-Hearing Brief
CPB	Complainant's Pre-Hearing Brief
CPX	Complainant's Physical Exhibit
CRPB	Complainant's Reply Post-Hearing Brief
CRSB	Complainant's Responsive Post-Hearing Brief
CX	Complainant's Exhibit
Dep. Tr.	Deposition Transcript
Hr'g Tr.	Hearing Transcript
JX	Joint Exhibit
RDX	Respondents' Demonstrative Exhibit
RIB	Respondents' Initial Post-Hearing Brief
RPB	Respondents' Pre-Hearing Brief
RPX	Respondents' Physical Exhibit
RRPB	Respondents' Reply Post-Hearing Brief
RRSB	Respondents' Responsive Post-Hearing Brief
RX	Respondents' Exhibit

Public Version

I. INTRODUCTION

A. Procedural Background

Complainant iRobot Corporation (“iRobot” or “Complainant”) filed the complaint underlying this Investigation on April 18, 2017. The complaint alleged respondents Bissell Homecare, Inc.; Hoover, Inc.; Royal Appliance Manufacturing Co., Inc. d/b/a TTI Floor Care North America, Inc.; bObsweep, Inc.; bObsweep USA; The Black & Decker Corporation; Black & Decker (U.S.) Inc.; Shenzhen Zhiyi Technology Co., Ltd., d/b/a iLife; Matsutek Enterprises Co., Ltd.; Suzhou Real Power Electric Appliance Co., Ltd.; and Shenzhen Silver Star Intelligent Technology Co., Ltd. import certain products that infringe one or more claims of U.S. Patent Nos. 6,809,490 (the “’490 patent”), 7,155,308 (the “’308 patent”), 8,474,090 (the “’090 patent”), 8,600,553 (the “’553 patent”), 9,038,233 (the “’233 patent”), and 9,486,924 (the “’924 patent”).

By publication of a notice in the Federal Register on May 23, 2017, the U.S. International Trade Commission ordered that:

Pursuant to subsection (b) of section 337 of the Tariff Act of 1930, as amended, an investigation be instituted to determine whether there is a violation of subsection (a)(1)(B) of section 337 in the importation into the United States, the sale for importation, or the sale within the United States after importation of certain vacuum cleaning devices and components thereof such as spare parts by reason of infringement of one or more of claims 1–3, 7, 12, and 42 of the ’490 patent; claims 1–3, 7, 11, 12, 17, 19, 20, 28, and 34 of the ’308 patent; claims 1–3, 7, 8, 10, 11, 14, 15, and 17–19 of the ’090 patent; claims 1, 2, 4, 8, 11, 12, 21, 22, and 25 of the ’553 patent; claims 1, 10, 11, and 14–16 of the ’233 patent; and claims 1, 2, 8, 9, 12, and 13 of the ’924 patent, and whether an industry in the United States exists as required by subsection (a)(2) of section 337;

82 F.R. 23593 (May 23, 2017). I set a target date of October 25, 2018 for completion of this investigation and set the evidentiary hearing for March 9, 2018. (Order No. 10.) On July 13, 2017, I issued the procedural schedule (Order No. 11), which was amended at subsequent points throughout the investigation (*see* Order Nos. 14, 20, 25, 30, 33).

Public Version

In accordance with the procedural schedule, on September 25, 2017, I held a technology tutorial and Markman hearing. On November 9, 2017, I issued Order No. 27, construing certain terms of the asserted patents. One of those terms, “instructions,” from the ’924 patent, was construed to mean “software program or machine executable code.” (Order No. 27 at 55.) This construction prompted those respondents accused of infringing the ’924 patent to file an unopposed motion for summary determination of no-infringement of the ’924 patent. I granted that motion on December 14, 2017 with an initial determination which terminated the ’924 patent from the investigation. (Order No. 29.) iRobot, disagreeing with the claim construction of “instructions,” and thus, the basis for Order No. 29, petitioned the Commission for review on December 21, 2017. The Commission determined not to review Order No. 29, and thus, the construction of “instructions” and the termination of the ’924 patent from the investigation, on January 16, 2018. (EDIS Doc. No. 633925.)

Additionally, on February 15, 2018, iRobot moved to terminate the ’308 patent in its entirety from the investigation along with several asserted claims from three other patents. I granted iRobot’s motion on February 21, 2018 with Order No. 40. The Commission determined not to review Order No. 40 on March 15, 2018. (EDIS Doc. No. 639103.)

Thus, the remaining asserted patents in this investigation are the ’553 patent, ’490 patent, ’090 patent, and ’233 patent (hereafter, the “asserted patents”).

With respect to those respondents named in the Notice of Investigation, several were terminated from the investigation prior to the evidentiary hearing. On September 14, 2017, iRobot moved to terminate respondent Suzhou Real Power Electric Appliance Co. on the basis of settlement agreement, which I granted on September 26, 2017 with Order No. 23. The Commission determined not to review Order No. 23 on October 18, 2017. (EDIS Doc. No.

Public Version

626057.) On December 21, 2017, iRobot moved to terminate respondents The Black & Decker Corporation and Black and Decker (U.S.) Inc. on the basis of settlement agreement, which I granted on January 9, 2018 with Order No. 31. The Commission determined not to review Order No. 31 on January 31, 2018. (EDIS Doc. No. 635271.) On January 16, 2018, iRobot moved to terminate respondents Matsutec Enterprises Co., Ltd. and Bissell Homecare, Inc. on the basis of settlement agreement, which I granted on January 25, 2018 with Order No. 34. The Commission determined not to review Order No. 34 on February 16, 2018. (EDIS Doc. No. 636741.)

Thus, the remaining respondents in this investigation are: Hoover, Inc. and Royal Appliance Manufacturing Co. Inc. d/b/a TTI Floor Care North America, Inc. (“Hoover”); bObsweep, Inc. and bObsweep USA (“bObsweep”); Shenzhen Silver Star Intelligent Technology Co. (“Silver Star” or “SSSIT”); and Shenzhen Zhiyi Technology Co. Ltd. d/b/a iLife (“Shenzhen Zhiyi” or “iLife”) (collectively, “Respondents”).

Finally, on January 8, 2018, iRobot moved for summary determination that it satisfies the economic prong of domestic industry. I granted iRobot’s motion on February 13, 2018 with Order No. 39, which no party petitioned for review of. By its own initiative, the Commission determined to review Order No. 39 on March 15, 2018 (EDIS Doc. No. 639112), but has yet to complete that review.

I then conducted an evidentiary hearing between March 9 and March 14, 2018.

As of the date of this initial determination, the following motions remain pending: Complainant’s Unopposed Motion to Correct the Responsive Post-Hearing Brief (Mot. Dkt. No. 1057-058); Respondents’ Unopposed Motion to Correct Respondents Post-Hearing Brief (Mot. Dkt. No. 1057-059); and Respondents’ Unopposed Motion for Leave to File Corrected Reply Post-Hearing Brief (Mot. Dkt. No. 1057-060). For the good cause explained, each of these three

Public Version

motions (Mot. Dkt. Nos. 1057-0058, -059, -060) is GRANTED and the corrected versions of their respective briefs have been considered.

B. The Parties

Complainant iRobot Corporation is organized under the laws of Delaware with its principal place of business in Bedford, Massachusetts. (CIB at 9 (citing CX-0222C at Q1, 10).) iRobot claims it “employs hundreds of persons in the U.S., including more than 400 persons dedicated to the research, development, testing, quality control, and customer care of its robotic cleaning devices.” (*Id.* (citing CX-0222C at Q6).)

According to iRobot, respondents Hoover, Inc. and Royal Appliance Manufacturing Co. Inc. d/b/a TTI Floor Care North America Inc. “are organized under the laws of Delaware and Ohio, respectively, and both have their principal place of business in Glenwillow, Ohio.” (*Id.* (citing CX-1115).) Respondent bObsweep, Inc. is “a Canadian corporation with its principal place of business in Toronto, Canada” while bObsweep USA is “a Nevada corporation with its principal place of business in Henderson, Nevada.” (*Id.* (citing RX-0004 at ¶¶ 3.10, 3.13).) Respondent Shenzhen Silver Star Intelligent Technology Co., Ltd: is “a Chinese corporation with its principal place of business in Shenzhen, People’s Republic of China” who “manufactures robotic vacuums for Hoover and bObsweep and sells them for importation into the U.S.” (*Id.* (citing RX-0008 at ¶ 3.32).) Respondent Shenzhen Zhiyi Technology Co. Ltd. d/b/a iLife is another “Chinese corporation with its principal place of business in Shenzhen, People’s Republic of China.” (*Id.* at 9-10 (citing RX-0010 at ¶ 3.23).) According to iRobot, “iLife sells various robotic vacuums.” (*Id.* at 10 (citing CX-0016; CX-0017).)

Public Version

C. The Asserted Patents and Claims

The asserted patents¹ relate to the structure and control systems for robotic vacuum cleaners. The following patents and claims remain at issue in this investigation:

Patent Number	Infringement Claims	Domestic Industry Claims
'553 patent	4, 12, 22	1, 10
'490 patent	12, 42	8, 42
'090 patent	1, 2, 3, 7, 10, 17	1, 2, 3, 4, 10, 17
'233 patent	1, 10, 11, 14, 15, 16	1, 9, 15

(See CIB at 8-9.)

The '553 patent is entitled, "Coverage Robot Mobility." (JX-0004.) It was filed on June 5, 2007, and claims priority, *inter alia*, as a continuation application of an application filed on December 4, 2006, now U.S. Patent No. 7,441,298. (*Id.*) The '553 patent issued on December 3, 2013. The '553 patent generally describes an autonomous robot drive system where obstacle presence and collision are sensed to alter the movement behavior of the robot. (*See id.* at Abstract.) In just one example, the robot can detect the presence of an obstacle in its path and slow down, and then further alter the direction of its movement if actual contact occurs. (*See, e.g., id.* at 3:24-40.) iRobot contends it owns the '553 patent (CIB at 12 (citing JX-0010)) and Respondents do not dispute ownership (*see generally* RIB; RRSB; RRPB).

The '490 patent is entitled, "Method and System for Multi-Mode Coverage for an Autonomous Robot." (JX-0001.) It was filed on June 12, 2002, and claims priority to a provisional application filed on June 12, 2001. (*Id.*) The '490 patent issued on October 26,

¹ The effective date of the asserted patents pre-dates the America Invents Act ("AIA") enacted by Congress on September 16, 2011.

Public Version

2004. The '490 patent generally describes a control system for a mobile robot that includes different types of movement “modes,” such as random bounce, obstacle following, and spot coverage. (*See id.* at Abstract.) The control system can cause the robot to enter into the different modes in order to increase, for example, amount of floor space covered for cleaning purposes. (*See, e.g., id.* at 1:16-22, 5:29-36.) iRobot contends it owns the '490 patent (CIB at 12 (citing JX-0007) and Respondents do not dispute ownership (*see generally* RIB; RRSB; RRPB).

The '090 patent is entitled, “Autonomous Floor-Cleaning Robot.” (JX-0003.) It was filed on August 29, 2008, and claims priority, *inter alia*, as a continuation application to an application filed on December 16, 2002, now U.S. Patent No. 6,883,201. (*Id.*) The '090 patent issued on July 2, 2013. The '090 patent generally describes the structure of a floor cleaning robot with sensors, means for movement, rotating brushes, and a removable bin for receiving dust and other particulates. (*See id.* at Abstract.) More specifically, there are two rotating brushes which cooperate with each other to direct particulates toward the removable bin (*i.e.*, “dual-stage”) (*see e.g., id.* at 1:20-31) where wheels are placed at the ends of armatures biased towards the ground (*see, e.g., id.* at 4:49-64). iRobot contends it owns the '090 patent (CIB at 12 (citing JX-0011)) and Respondents do not dispute ownership (*see generally* RIB; RRSB; RRPB).

The '233 patent is entitled, “Autonomous Floor-Cleaning Robot.” (JX-0005.) It was filed on December 14, 2012, and claims priority, *inter alia*, as a continuation application to an application filed on December 16, 2002, now U.S. Patent No. 6,883,201—the same as the '090 patent. (*Id.*) The '233 patent issued on May 26, 2015. The '233 patent generally describes, as does the '090 patent, the structure of a floor cleaning robot with sensors, means for movement, rotating brushes, and a removable bin for receiving dust and other particulates. (*See id.* at Abstract.) More specifically, there are two rotating brushes which cooperate with each other to

Public Version

direct particulates toward the removable bin (*i.e.*, “dual-stage”) (*see e.g., id.* at 1:20-31) where one of those brushes (*e.g.*, a side brush) is positioned so as to pass through a cliff sensor beam (*see, e.g., id.* at 8:55-9:2). iRobot contends it owns the ’233 patent (CIB at 12 (citing JX-0009)) and Respondents do not dispute ownership (*see generally* RIB; RRSB; RRPB).

D. Products at Issue

1. Domestic Industry Products

All of the products iRobot asserts practice the asserted patents are mobile robots intended to clean floors. iRobot’s initial post-hearing brief does not explicitly identify which of its products practice which asserted patent for purposes of domestic industry. (*See* CIB at 10-11; *see, e.g.,* CIB at 26 (stating “Each of the DI Products practices claims 1 and 10 of the ’553 patent” without defining “DI Products”).) Rather, iRobot presents a table matching certain series of Roomba products with a representative model from that series:

Products at Issue	Representative Product
iRobot Roomba 600 Series (R614020, R618020, R620020, R620400, R62511, R630020, R639000, R645020, R65099, R650020, R655020, R660020, R665020, R66900)	Roomba 650
iRobot Roomba 800 Series (R805020, R860020, R870020, R877020, R879000, R880020, R889000)	Roomba 860
iRobot Roomba 900 Series (R960020, R960020E, R980020, R989020)	Roomba 980

(CIB at 10-11.) Neither of iRobot’s pre-hearing brief or opening post-hearing brief actually explains which of the 650, 860, or 980 are alleged to practice which patents. I understand from iRobot’s expert testimony, however, that all three series of Roomba products (600, 800, and 900) are alleged to practice each and every patent claim identified for technical domestic industry.

Public Version

(See CX-0221C at Q15; CX-0220C at Q10.) Thus, I refer to the collectively listed 600, 800, and 900 Series products as the “iRobot Products” or “Domestic Industry Products.”

2. Accused Products

All of Respondents’ products accused of infringement are mobile robots intended to clean floors. iRobot provides the following table identifying these models and then also a representative model from within each group:

Products at Issue	Representative Product
iLife V3s, V3s Pro, V5s, V5s Pro	V5s
iLife A4, A4s, A6	A6
iLife X751, X781	X751
bObsweep bObi Classic, bObi Pet	bObi Classic
bObsweep Bob Standard, Bob PetHair, Bob PetHair Plus, Junior	Bob PetHair
Hoover Quest 1000 (Model Nos. BH71000, BH71000C, BH71000CDI); Hoover Rogue 950 (Model No. BH70950); Hoover Rogue 970 (Model No. BH70970); SSSIT Y2	Quest 1000
SSSIT BD1, BD2	BD1

(CIB at 10-11.) iRobot notes that the parties stipulated to the representativeness of the identified models, with the exception of the BD1 for the SSSIT product. (*Id.* at 10, n. 3.) Nevertheless, iRobot contends the BD1 is representative of the BD2 (*id.* (citing CX-0220C at Q84; CX-0221C at Q78)); and Respondents do not appear to dispute this BD1/BD2 contention in any of their post-hearing briefing (*see generally* RIB; RRSB; RRPB).

I do find, however, that the table supplied by iRobot is not accurate. For example, the joint stipulation upon which the table is based states that the X751 and Quest 1000 products are not *completely* representative of all those models listed to their left:

The Parties stipulate that for the purposes of addressing infringement issues in this Investigation, the iLife X751 product is representative of the

Public Version

iLife X781 product, except that the X751 product lacks a central brush and that the X781 product contains a central brush.

....

The Parties stipulate that for the purposes of addressing infringement issues in this Investigation: for the '490 and '090 Patents, the Hoover Quest 1000 is representative of the Hoover Rogue 950, Hoover Rogue 970, and Silver Star Y2, with the exception of the spot coverage mode limitation of the '490 patent; and for the '233 Patent, the Hoover Quest 1000 is representative of the Hoover Rogue 950, Hoover Rogue 970, and Silver Star Y2, with the exception of the powered side brush limitation.

(Stipulation Regarding Accused Products (EDIS Doc. No. 638887) at ¶¶ 5, 8.) The joint stipulation also states that every product within a group is representative of all models within the group:

The Parties stipulate that for purposes of this Stipulation, when a product is listed as “representative” of other products, this means that there are no relevant differences between that product and the product(s) it represents. It also means that the products in a particular representative group are representative of the other products in that group.

(*Id.* at ¶ 9.)

It is important to note, that despite listing the BD1 as an SSSIT “product at issue” this table, iRobot withdrew all allegations against that product. (*See* CIB at 8-9, n.2.) With that said the following table shows the accused products and the abbreviations that will be used to refer to the accused products throughout this Initial Determination:

Products at Issue	Abbreviation	Abbreviation
iLife V3s, V3s Pro, V5s, V5s Pro	V5s products	iLife Products
iLife A4, A4s, A6	A6 products	
iLife X751, X781	X751 products	
bObsweep bObi Classic, bObi Pet	bObi products	bObsweep Products
bObsweep Bob Standard, Bob PetHair, Bob PetHair Plus, Junior	Bob products	

Public Version

Hoover Quest 1000 (Model Nos. BH71000, BH71000C, BH71000CDI); Hoover Rogue 950 (Model No. BH70950); Hoover Rogue 970 (Model No. BH70970); SSSIT Y2	Hoover Products	
SSSIT BD2	BD2 product	SSSIT Product

II. STANDARDS OF LAW

A. Claim Construction

“The construction of claims is simply a way of elaborating the normally terse claim language in order to understand and explain, but not to change, the scope of the claims.”

Embrex, Inc. v. Serv. Eng'g Corp., 216 F.3d 1343, 1347 (Fed. Cir. 2000).

Claim construction focuses on the intrinsic evidence, which consists of the claims themselves, the specification, and the prosecution history. *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1314 (Fed. Cir. 2005) (*en banc*); *see also Markman v. Westview Instr., Inc.*, 52 F.3d 967, 979 (Fed. Cir. 1995) (*en banc*). As the Federal Circuit in *Phillips* explained, courts must analyze each of these components to determine the “ordinary and customary meaning of a claim term” as understood by a person of ordinary skill in art at the time of the invention. 415 F.3d at 1313.

“Such intrinsic evidence is the most significant source of the legally operative meaning of disputed claim language.” *Bell Atl. Network Servs., Inc. v. Covad Commc'ns Grp., Inc.*, 262 F.3d 1258, 1267 (Fed. Cir. 2001).

“It is a ‘bedrock principle’ of patent law that ‘the claims of a patent define the invention to which the patentee is entitled the right to exclude.’” *Phillips*, 415 F.3d at 1312 (quoting *Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1115 (Fed. Cir. 2004)). “Quite apart from the written description and the prosecution history, the claims themselves provide substantial guidance as to the meaning of particular claims terms.”

Public Version

Id. at 1314; *see also Interactive Gift Express, Inc. v. Compuserve Inc.*, 256 F.3d 1323, 1331 (Fed. Cir. 2001) (“In construing claims, the analytical focus must begin and remain centered on the language of the claims themselves, for it is that language that the patentee chose to use to ‘particularly point [] out and distinctly claim [] the subject matter which the patentee regards as his invention.’”). The context in which a term is used in an asserted claim can be “highly instructive.” *Phillips*, 415 F.3d at 1314. Additionally, other claims in the same patent, asserted or unasserted, may also provide guidance as to the meaning of a claim term. *Id.* “Courts do not rewrite claims; instead, we give effect to the terms chosen by the patentee.” *K-2 Corp. v. Salomon S.A.*, 191 F.3d 1356, 1364 (Fed. Cir. 1999).

“[T]he specification ‘is always highly relevant to the claim construction analysis. Usually it is dispositive; it is the single best guide to the meaning of a disputed term.’” *Phillips*, 415 F.3d at 1315 (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)). “[T]he specification may reveal a special definition given to a claim term by the patentee that differs from the meaning it would otherwise possess. In such cases, the inventor’s lexicography governs.” *Id.* at 1316. “In other cases, the specification may reveal an intentional disclaimer, or disavowal, of claim scope by the inventor.” *Id.* As a general rule, however, the particular examples or embodiments discussed in the specification are not to be read into the claims as limitations. *Id.* at 1323. In the end, “[t]he construction that stays true to the claim language and most naturally aligns with the patent’s description of the invention will be ... the correct construction.” *Id.* at 1316 (quoting *Renishaw PLC v. Marposs Societa' per Azioni*, 158 F.3d 1243, 1250 (Fed. Cir. 1998)).

In addition to the claims and the specification, the prosecution history should be examined, if in evidence. *Id.* at 1317; *see also Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d

Public Version

898, 913 (Fed. Cir. 2004). The prosecution history can “often inform the meaning of the claim language by demonstrating how the inventor understood the invention and whether the inventor limited the invention in the course of prosecution, making the claim scope narrower than it would otherwise be.” *Phillips*, 415 F.3d at 1317; *see also Chimie v. PPG Indus. Inc.*, 402 F.3d 1371, 1384 (Fed. Cir. 2005) (“The purpose of consulting the prosecution history in construing a claim is to exclude any interpretation that was disclaimed during prosecution.”).

When the intrinsic evidence does not establish the meaning of a claim, then extrinsic evidence (*i.e.*, all evidence external to the patent and the prosecution history, including dictionaries, inventor testimony, expert testimony, and learned treatises) may be considered. *Phillips*, 415 F.3d at 1317. Extrinsic evidence is generally viewed as less reliable than the patent itself and its prosecution history in determining how to define claim terms. *Id.* “The court may receive extrinsic evidence to educate itself about the invention and the relevant technology, but the court may not use extrinsic evidence to arrive at a claim construction that is clearly at odds with the construction mandated by the intrinsic evidence.” *Elkay Mfg. Co. v. Ebco Mfg. Co.*, 192 F.3d 973, 977 (Fed. Cir. 1999).

The construction of a claim term is generally guided by its ordinary meaning. However, courts may deviate from the ordinary meaning when: (1) “the intrinsic evidence shows that the patentee distinguished that term from prior art on the basis of a particular embodiment, expressly disclaimed subject matter, or described a particular embodiment as important to the invention;” or (2) “the patentee acted as his own lexicographer and clearly set forth a definition of the disputed claim term in either the specification or prosecution history.” *Edwards Lifesciences LLC v. Cook Inc.*, 582 F.3d 1322, 1329 (Fed. Cir. 2009); *see also GE Lighting Sols., LLC v. AgiLight, Inc.*, 750 F.3d 1304, 1309 (Fed. Cir. 2014) (“the specification and prosecution history

Public Version

only compel departure from the plain meaning in two instances: lexicography and disavowal.”); *Omega Eng'g, Inc. v. Raytek Corp.*, 334 F.3d 1314, 1324 (Fed. Cir. 2003) (“[W]here the patentee has unequivocally disavowed a certain meaning to obtain his patent, the doctrine of prosecution disclaimer attaches and narrows the ordinary meaning of the claim congruent with the scope of the surrender.”); *Rheox, Inc. v. Entact, Inc.*, 276 F.3d 1319, 1325 (Fed. Cir. 2002) (“The prosecution history limits the interpretation of claim terms so as to exclude any interpretation that was disclaimed during prosecution.”). Nevertheless, there is a “heavy presumption that a claim term carries its ordinary and customary meaning.” *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir. 2002) (citations omitted). The standard for deviating from the plain and ordinary meaning is “exacting” and requires “a clear and unmistakable disclaimer.” *Thorner v. Sony Computer Entm't Am. LLC*, 669 F.3d 1362, 1366-67 (Fed. Cir. 2012); *see Epistar Corp. v. Int'l Trade Comm'n*, 566 F.3d 1321, 1334 (Fed. Cir. 2009) (requiring “expressions of manifest exclusion or restriction, representing a clear disavowal of claim scope” to deviate from the ordinary meaning) (citation omitted).

B. Infringement

“An infringement analysis entails two steps. The first step is determining the meaning and scope of the patent claims asserted to be infringed. The second step is comparing the properly construed claims to the device accused of infringing.” *Markman*, 52 F.3d at 976.

1. Direct Infringement

A complainant must prove either literal infringement or infringement under the doctrine of equivalents. Infringement must be proven by a preponderance of the evidence. *SmithKline Diagnostics, Inc. v. Helena Labs. Corp.*, 859 F.2d 878, 889 (Fed. Cir. 1988). A preponderance of the evidence standard “requires proving that infringement was more likely than not to have

Public Version

occurred.” *Warner-Lambert Co. v. Teva Pharm. USA, Inc.*, 418 F.3d 1326, 1341 n.15 (Fed. Cir. 2005).

Literal infringement, a form of direct infringement, is a question of fact. *Finisar Corp. v. DirecTV Group, Inc.*, 523 F.3d 1323, 1332 (Fed. Cir. 2008). “To establish literal infringement, every limitation set forth in a claim must be found in an accused product, exactly.” *Microsoft Corp. v. GeoTag, Inc.*, 817 F.3d 1305, 1313 (Fed. Cir. 2016) (quoting *Southwall Techs., Inc. v. Cardinal IG Co.*, 54 F.3d 1570, 1575 (Fed. Cir. 1995)). If any claim limitation is absent, there is no literal infringement of that claim as a matter of law. *Bayer AG v. Elan Pharm. Research Corp.*, 212 F.3d 1241, 1247 (Fed. Cir. 2000).

2. Indirect Infringement

Section 271 of the Patent Act defines both direct infringement and the two categories of indirect infringement, active inducement of infringement and contributory infringement. 35 U.S.C. § 271 (2010). For indirect infringement violations under Section 337, the direct infringement element may occur after importation, so long as all the other elements of indirect infringement are met at the time of importation. *See Certain Vision-Based Driver Assistance System Cameras and Components Thereof*, Inv. No. 337-TA-907, Comm’n Op. at 19 (Dec. 1, 2015) (citing *Suprema, Inc. v. Int’l Trade Comm’n*, 796 F.3d 1338, 1348 (Fed. Cir. 2015)).

a. Induced Infringement

Section 271(b) of the Patent Act prohibits inducement: “[w]hoever actively induces infringement of a patent shall be liable as an infringer.” 35 U.S.C. § 271(b). *See DSU Med. Corp. v. JMS Co.*, 471 F.3d 1293, 1305 (Fed. Cir. 2006) (*en banc*) (“To establish liability under section 271(b), a patent holder must prove that once the defendants knew of the patent, they actively and knowingly aided and abetted another’s direct infringement.”) (citations omitted). “The mere knowledge of possible infringement by others does not amount to inducement;

Public Version

specific intent and action to induce infringement must be proven.” *Id.* (citations omitted). A defendant’s belief regarding patent validity is not a defense to a claim of induced infringement. *Commil USA, LLC v. Cisco Sys., Inc.*, 135 S. Ct. 1920, 1928 (2015).

b. Contributory Infringement

Section 271(c) of the Patent Act prohibits contributory infringement. *See* 35 U.S.C. § 271(c). “Under 35 U.S.C. § 271(c), a party who sells a component with knowledge that the component is especially designed for use in a patented invention, and is not a staple article of commerce suitable for substantial noninfringing use, is liable as a contributory infringer.” *Wordtech Sys., Inc. v. Integrated Networks Solutions, Inc.*, 609 F.3d 1308, 1316 (Fed. Cir. 2010).

Contributory infringement is premised upon a finding that: (1) Respondents sell, offer to sell, or import into the United States a component of a product; (2) the component has no substantial non-infringing use; (3) the component constitutes a material part of the claimed invention; (4) Respondents were aware of the patent and know that the product may be covered by a claim of the patent; and (5) the use of the component in the product directly infringes the claim. *See Certain Gaming & Entm’t Consoles, Related Software, & Components Thereof*, Inv. No. 337-TA-752, Final Initial Remand Determination at 8 (Mar. 22, 2013).

It is well settled that “[a]bsent direct infringement of the patent claims, there can be neither contributory infringement ... nor inducement of infringement.” *Met-Coil Sys. Corp. v. Korners Unltd., Inc.*, 803 F.2d 684, 687 (Fed. Cir. 1986) (citations omitted).

C. Domestic Industry

In an investigation based on a claim of patent infringement, Section 337 requires that an industry in the United States, relating to the articles protected by the patent, exist or be in the process of being established. 19 U.S.C. § 1337(a)(2). Under Commission precedent, the domestic industry requirement has been divided into (i) an “economic prong” (which requires

Public Version

certain activities with respect to the protected articles) and (ii) a “technical prong” (which requires that the activities relate to the asserted patent). *Certain Video Game Systems and Controllers*, Inv. No. 337-TA-743, Comm’n Op. at 6-7 (April 14, 2011) (“*Video Games*”).

1. Technical Prong

The technical prong of the domestic industry requirement is satisfied when the complainant in a patent-based section 337 investigation establishes that it is practicing or exploiting the patents at issue. *See* 19 U.S.C. §1337 (a)(2),(3); *Certain Microsphere Adhesives, Process for Making Same and Prods. Containing Same, Including Self-Stick Repositionable Notes*, Inv. No. 337-TA-366, Comm’n Op. at 8 (U.S.I.T.C. Jan. 16, 1996). “In order to satisfy the technical prong of the domestic industry requirement, it is sufficient to show that the domestic industry practices any claim of that patent, not necessarily an asserted claim of that patent.” *Certain Ammonium Octamolybdate Isomers*, Inv. No. 337-TA-477, Comm’n Op. at 55 (U.S.I.T.C. Aug. 28, 2003).

The test for claim coverage for the purposes of the technical prong of the domestic industry requirement is the same as that for infringement. *See Certain Doxorubicin and Preparations Containing Same*, Inv. No. 337-TA-300, Initial Determination at 109 (U.S.I.T.C. May 21, 1990), *aff’d*, Views of the Commission at 22 (U.S.I.T.C. Oct. 31, 1990); *Alloc, Inc. v. Int’l Trade Comm’n*, 342 F.3d 1361, 1375 (Fed. Cir. 2003). “First, the claims of the patent are construed. Second, the complainant’s article or process is examined to determine whether it falls within the scope of the claims.” *Certain Doxorubicin and Preparations Containing Same*, Inv. No. 337-TA-300, Initial Determination at 109. To prevail, the patentee must establish by a preponderance of the evidence that the domestic product practices one or more claims of the patent. The technical prong of the domestic industry can be satisfied either literally or under the doctrine of equivalents. *Certain Dynamic Sequential Gradient Devices and Component Parts*

Public Version

Thereof, Inv. No. 337-TA-335, Initial Determination at 44, Pub. No. 2575 (U.S.I.T.C. May 15, 1992).

2. Economic Prong

The “economic prong” of the domestic industry requirement is satisfied when there exists in the United States in connection with products practicing at least one claim of the patent at issue: (A) significant investment in plant and equipment; (B) significant employment of labor or capital; or (C) substantial investment in its exploitation, including engineering, research and development, and licensing. 19 U.S.C. § 1337(a)(3). Establishment of the “economic prong” is not dependent on any “minimum monetary expenditure” and there is no need for complainant “to define the industry itself in absolute mathematical terms.” *Certain Stringed Musical Instruments and Components Thereof*, Inv. No. 337-TA-586, Comm’n Op. at 25-26 (May 16, 2008) (“*Stringed Instruments*”). However, a complainant must substantiate the significance of its activities with respect to the articles protected by the patent. *Certain Printing and Imaging Devices and Components Thereof*, Inv. No. 337-TA-690, Comm’n Op. at 30 (February 17, 2011) (“*Imaging Devices*”). Further, a complainant can show that its activities are significant by showing how those activities are important to the articles protected by the patent in the context of the company’s operations, the marketplace, or the industry in question. *Id.* at 27-28. That significance, however, must be shown in a quantitative context. *Lelo Inc. v. Int’l Trade Comm’n*, 786 F.3d 879, 886 (Fed. Cir. 2015). The Federal Circuit noted that when the ITC first addressed this requirement, it found the word “‘significant’ denoted ‘an assessment of the *relative* importance of the domestic activities.’” *Id.* at 883-4 (internal citation omitted) (emphasis added).

The Commission “has long recognized that the ‘its’ in the phrase ‘investment in its exploitation’ in subparagraph (C) refers to the asserted patent or other intellectual-property right being asserted. That conclusion is supported by the clear text of the statute.” *Certain Integrated*

Public Version

Circuit Chips and Products Containing the Same, Inv. No. 337-TA-859, Comm'n Op. at 36 (Aug. 11, 2014) (“*Circuit Chips*”). This connection between the investment and the patent is known as the “nexus” requirement. *Id.* at 38. “To the extent that the patented technology arises from endeavors in the United States, such a nexus would ordinarily exist.” *Id.* at 39. “‘Exploitation’ is a generally broad term that encompasses activities such as efforts to improve, develop, or otherwise take advantage of the asserted patent.” *Id.*

D. Invalidity

1. 35 U.S.C. § 102

Pursuant to 35 U.S.C. § 102, a patent claim is invalid as anticipated if:

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant;

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States;

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent;”

(g)(2) before such person’s invention thereof, the invention was made in this country by another inventor who had not abandoned, suppressed, or concealed it.

35 U.S.C. § 102 (2008). “A patent is invalid for anticipation if a single prior art reference discloses each and every limitation of the claimed invention. Moreover, a prior art reference may anticipate without disclosing a feature of the claimed invention if that missing characteristic is necessarily present, or inherent, in the single anticipating reference.” *Schering Corp. v. Geneva Pharm., Inc.*, 339 F.3d 1373, 1377 (Fed. Cir. 2003) (citations omitted).

Public Version

2. 35 U.S.C. § 103

Section 103 of the Patent Act states:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

35 U.S.C. § 103(a) (2008). “Obviousness is a question of law based on underlying questions of fact.” *Scanner Techs. Corp. v. ICOS Vision Sys. Corp. N.V.*, 528 F.3d 1365, 1379 (Fed. Cir. 2008). The underlying factual determinations include: “(1) the scope and content of the prior art, (2) the level of ordinary skill in the art, (3) the differences between the claimed invention and the prior art, and (4) objective indicia of non-obviousness.” *Id.* (citing *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17-18 (1966)). These factual determinations are often referred to as the “Graham factors.”

The critical inquiry in determining the differences between the claimed invention and the prior art is whether there is a reason to combine the prior art references. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418-21 (2007). In *KSR*, the Supreme Court rejected the Federal Circuit’s rigid application of the teaching-suggestion-motivation test. While the Court stated that “it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does,” it described a more flexible analysis:

Often, it will be necessary for a court to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue As our precedents make clear, however, the analysis need not seek out precise teachings directed to

Public Version

the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.

Id. at 418. Since *KSR*, the Federal Circuit has announced that, where a patent challenger contends that a patent is invalid for obviousness based on a combination of prior art references, “the burden falls on the patent challenger to show by clear and convincing evidence that a person of ordinary skill in the art would have had reason to attempt to make the composition or device . . . and would have had a reasonable expectation of success in doing so.” *PharmaStem Therapeutics, Inc. v. ViaCell, Inc.*, 491 F.3d 1342, 1360 (Fed. Cir. 2007); *see KSR*, 550 U.S. at 399 (“The proper question was whether a pedal designer of ordinary skill in the art, facing the wide range of needs created by developments in the field, would have seen an obvious benefit to upgrading Asano with a sensor.”).

In addition to demonstrating that a reason exists to combine prior art references, the challenger must demonstrate that the combination of prior art references discloses all of the limitations of the claims. *Hearing Components, Inc. v. Shure Inc.*, 600 F.3d 1357, 1373-4 (Fed. Cir. 2010) (abrogated on other grounds by *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S.Ct. 2120 (2014)) (upholding finding of non-obviousness based on the fact that there was substantial evidence that the asserted combination of references failed to disclose a claim limitation); *Velander v. Garner*, 348 F.3d 1359, 1363 (Fed. Cir. 2003) (explaining that a requirement for a finding of obviousness is that “all the elements of an invention are found in a combination of prior art references”).

“A reference qualifies as prior art for a determination under § 103 when it is analogous to the claimed invention.” *Innovention Toys, LLC v. MGA Entm’t, Inc.*, 637 F.3d 1314, 1321 (Fed. Cir. 2011) (citing *In re Clay*, 966 F.2d 656, 658 (Fed. Cir. 1992)). “Two separate tests define the scope of analogous prior art: (1) whether the art is from the same field of endeavor, regardless of

Public Version

the problem addressed and, (2) if the reference is not within the field of the inventor's endeavor, whether the reference still is reasonably pertinent to the particular problem with which the inventor is involved.” *In re Bigio*, 381 F.3d 1320, 1325 (Fed. Cir. 2004) (citing *In re Deminski*, 796 F.2d 436, 442 (Fed. Cir. 1986)). One way of evaluating whether a reference is reasonably pertinent is to consider if, “logically [it] would have commended itself to an inventor's attention in considering his problem.” *K-TEC, Inc. v. Vita-Mix Corp.*, 696 F.3d 1364, 1375 (Fed. Cir. 2012) (citing *Innovention*, 637 F.3d at 1321)). The requirement for prior art to be analogous is “meant to defend against hindsight.” *In re Khan*, 441 F.3d 977, 986-987 (Fed. Cir. 2006).

An obviousness determination should also include a consideration of “secondary considerations” such as “commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented.” *Graham*, 338 U.S. at 17-18. “For [such] objective evidence to be accorded substantial weight, its proponent must establish a nexus between the evidence and the merits of the claimed invention.” *In re GPAC Inc.*, 57 F.3d 1573, 1580 (Fed. Cir. 1995); see *Merck & Cie v. Gnosis S.P.A.*, 808 F.3d 829, 837 (Fed. Cir. 2015). “Where the offered secondary consideration actually results from something other than what is both claimed and novel in the claim, there is no nexus to the merits of the claimed invention.” *In re Huai-Hung Kao*, 639 F.3d 1057, 1068 (Fed. Cir. 2011).

3. 35 U.S.C. § 112

Pursuant to 35 U.S.C. § 112, a patent claim is invalid for lack of written description if the patent’s specification fails to “reasonably convey[] to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date.” *Ariad Pharm., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (*en banc*). “[T]he test requires an objective inquiry

Public Version

into the four corners of the specification from the perspective of a person of ordinary skilled in the art,” *id.*, and “the level of detail required to satisfy the written description requirement varies depending on the nature and scope of the claims and on the complexity and predictability of the relevant technology,” *id.* (citing *Capon v. Eshar*, 418 F.3d 1349, 1357-58 (Fed. Cir. 2005)).

Additionally, under 35 U.S.C. § 112, a patent claim is invalid for indefiniteness if “its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention.” *Nautilus*, 134 S. Ct. at 2124. Indefiniteness can result from a single claim covering both an apparatus and a method of use of that apparatus, as “a manufacturer or seller of the claimed apparatus would not know from the claim whether it might also be liable for contributory infringement because a buyer or user of the apparatus later performs the claimed method using the apparatus.” *IPXL Holdings v. Amazon.com*, 430 F.3d 1377, 1384 (Fed. Cir. 2005); *see UltimatePointer, L.L.C. v. Nintendo Co.*, 816 F.3d 816, 826 (Fed. Cir. 2016) (holding these types of claims may make it “unclear whether infringement . . . occurs when one creates an infringing system, or whether infringement occurs when the user actually uses the system in an infringing manner”) (citation omitted). “[A]pparatus claims are not necessarily indefinite for using functional language,” however, as in, for example, means-plus-function formatted claims. *MasterMine Software, Inc. v. Microsoft Corp.*, 874 F.3d 1307, 1313 (Fed. Cir. 2017) (citing *Microprocessor Enhancement Corp. v. Tex. Instruments Inc.*, 520 F.3d 1367, 1375 (Fed. Cir. 2008)). Another example may be when the claim merely recites “that the system ‘possesses the recited structure which is capable of performing the recited functions.’” *Id.* at 1315-16 (quoting *Microprocessor Enhancement Corp.*, 520 F.3d at 1375).

III. JURISDICTION AND IMPORTATION

In order to have the power to decide a case, a court or agency must have both subject matter jurisdiction and jurisdiction over either the parties or the property involved. 19 U.S.C. § 1337; *Certain Steel Rod Treating Apparatus and Components Thereof*, Inv. No. 337-TA-97, Commission Memorandum Opinion, 215 U.S.P.Q. 229, 231 (U.S.I.T.C. 1981). Respondents do not dispute the Commission has subject matter jurisdiction over this investigation as well as personal jurisdiction.

A. Importation and *In Rem* Jurisdiction

iRobot states “[t]he Commission has in rem jurisdiction over the accused products. Respondents have each stipulated that the importation requirement of Section 337 is satisfied in this Investigation with respect to the Accused Products.” (CIB at 11-12.) For support, iRobot points to four separate stipulations entered into between iRobot and each respondent. (*Id.* at 12, n.4 (referring to EDIS Doc. Nos. 634937, 638884, 638886, 638885).) Indeed, Respondents do not dispute importation in their briefing. (*See* RRSB.) Upon review of the stipulations, I find each of the Respondents has satisfied the importation requirement and the Commission has *in rem* jurisdiction over the Accused Products. *See Sealed Air Corp. v. Int’l Trade Comm’n*, 645 F.2d 976, 985 (C.C.P.A. 1981).

B. Subject Matter Jurisdiction

Section 337 confers subject matter jurisdiction on the International Trade Commission to investigate, and if appropriate, to provide a remedy for, unfair acts and unfair methods of competition in the importation, the sale for importation, or the sale after importation of articles into the United States. *See* 19 U.S.C. §§ 1337(a)(1)(B),(a)(2).

iRobot alleges a violation of Section 337 in the importation and sale of robotic vacuum cleaning devices and components thereof. iRobot alleges the accused devices directly and

Public Version

indirectly infringe the asserted patents. iRobot has alleged sufficient facts that, if proven, would demonstrate that Respondents import articles that directly infringe iRobot's patents. *See Certain Elec. Devices with Image Processing Sys., Components Thereof, & Assoc. Software*, Inv. No. 337-TA-724, Comm'n Op., 2012 WL 3246515, at *7 (U.S.I.T.C. Dec. 21, 2011) (citing *Amgen, Inc. v. Int'l Trade Comm'n*, 902 F.2d 1532, 1536 (Fed. Cir. 1990)); *see also Suprema*, 796 F.3d at 1352-53 (“[T]he Commission’s interpretation that the phrase ‘articles that infringe’ covers goods that were used by an importer to directly infringe post-importation as a result of the seller’s inducement is reasonable.”).

Accordingly, I find the Commission has subject matter jurisdiction over this Investigation under Section 337 of the Tariff Act of 1930. *Amgen, Inc.*, 902 F.2d at 1536.

C. Personal Jurisdiction

Respondents have fully participated in this Investigation by, among other things, responding to the complaint and fully participating in discovery, the claim construction process, and filing and responding to motions for summary determination. Respondents have participated in the evidentiary hearing, filed pre-hearing briefs, and post-hearing briefs. Accordingly, I find, and Respondents do not dispute (*see generally* RRSB), that Respondents have submitted to the jurisdiction of the Commission. *Certain Lithium Metal Oxide Cathode Mats., et al.*, Inv. No. 337-TA-951, Initial Determination at 10-11 (Feb. 29, 2016); *Certain Miniature Hacksaws*, Inv. No. 337-TA-237, Pub. No. 1948, Initial Determination at 4, 1986 WL 379287 (U.S.I.T.C. Oct. 15, 1986) (not reviewed by Commission in relevant part).

IV. U.S. PATENT NO. 8,600,553

A. Level of Ordinary Skill in the Art

In Order No. 27 I found a person of ordinary skill in the art for each of the asserted patents at the time of the invention would be an individual with a bachelor’s degree in physics,

Public Version

electrical engineering, mechanical engineering, computer science, or a related discipline, and has at least three years of experience in the design and implementation of robots and embedded systems, or some other equivalent combination of education and experience. (Order No. 27 at 9.)

B. Claims-at-Issue

The following claims of the '553 patent are at-issue in this investigation, either through allegations of infringement or technical prong domestic industry:

1. An autonomous coverage robot comprising:

a drive system configured to maneuver the robot according to a heading setting and a speed setting;

a bump sensor responsive to a collision of the robot with an obstacle in a forward direction; and

a proximity sensor responsive to a potential obstacle forward of the robot;

wherein the drive system is configured to reduce the speed setting in response to a signal from the proximity sensor indicating detection of a potential obstacle, while continuing to advance the robot according to the heading setting;

wherein the drive system is configured to increase the speed setting if the drive system does not receive a subsequent signal indicating the presence of an obstacle while continuing to advance according to the heading setting and the reduced speed setting; and

wherein the drive system is configured to alter the heading setting in response to a signal received from the bump sensor indicating contact with an obstacle.

4. The robot of claim 1 wherein the proximity sensor comprises at least one infrared emitter and receive pair.

Public Version

10. The robot of claim 1 wherein the drive system is configured to increase the speed setting if the drive system does not receive the subsequent signal from the bump sensor indicating the presence of an obstacle within an elapsed time after the speed setting is reduced.

11. A method of navigating an autonomous coverage robot with respect to an object on a floor, the method comprising the robot:

autonomously traversing the floor in a cleaning mode at a cleaning speed;

upon sensing a proximity of the object forward of the robot, reducing the cleaning speed to a reduced speed while continuing towards the object;

in response to not sensing the presence of the object while advancing at the reduced speed, increasing the speed setting; and

in response to sensing contact with the object, turning with respect to the object and cleaning next to the object.

12. The method of claim 11 wherein the robot follows a perimeter of the object while cleaning next to the object.

13. The method of claim 11 wherein the robot maintains a substantially constant following distance from the object while cleaning next to the object in response to the contact with the object.

22. The method of claim 13 wherein the cleaning speed of the robot is about 300 mm/sec.

(CIB at 8.)²

C. Claim Construction

As part of the Markman process, the following terms of the '553 patent were construed, either as-agreed between the parties or determined by Order No. 27:

² While claims 11 and 13 are not asserted for infringement or domestic industry, they are implicated by asserted claims 12 and 22.

Public Version

Claim Term	Construction
nor-linear (claim 21)	non-linear
speed setting (claims 1, 11, 25)	a data value representing a particular speed
heading setting (claims 1, 25)	a data value representing a particular direction
while continuing towards the object (claim 11)	while not stopping towards the object

(See Order No. 27 at 11, 55.)

Both iRobot and Respondents identify remaining claim construction issues for this initial determination—the proper construction of “not receive a subsequent signal indicating the presence of an obstacle” as found in claim 1 and “in response to not sensing the presence of the object” as found in claim 11. (CIB at 15; RIB at 32.) I present those terms and my understanding of the parties’ proposed constructions below:

Claim Term	iRobot’s Construction	Respondents’ Construction
not receive a subsequent signal indicating the presence of an obstacle (claim 1)	“subsequent signal” may, but does not need to, come from bump sensor	“subsequent signal” must come from bump sensor
in response to not sensing the presence of the object (claim 11)	“sensing the presence of the object” may, but does not need to, be based on bump sensor	“sensing the presence of the object” must be based on bump sensor

iRobot’s Position

In its opening brief, iRobot argues “there is no reasonable way to arrive at Respondents’ construction.” (CIB at 15.) iRobot contends the claim language is “agnostic as to the origin of the signal—plainly reciting a ‘subsequent signal’” (*id.* (citing Hr’g Tr. at 493:21-494:1)) and is

Public Version

purposefully drafted that way (*id.*). iRobot views other limitations in the claim, which specifically identify the origin of their signals, as support for its interpretation of the claim term. (*Id.* (referring to “a signal from the proximity sensor” and “a signal received from the bump sensor”).) iRobot views support as coming from dependent claims 10 and 11 as well under principles of claim differentiation. (*Id.* at 15-16 (referring to claim language “subsequent signal from the bump sensor indicating the presence of an obstacle,” “not sensing the presence of an object,” and “sensing contact with the object”).) iRobot reasons, “where no particular signal is specified, as in element 1[E], either signal satisfies the limitation.” (*Id.* at 15 (citing *Phillips*, 415 at 1314.)

iRobot continues to point out that the proximity sensor is disclosed in the specification as detecting not only “potential obstacles” but also just “obstacles.” (*Id.* at 16 (citing to ’553 patent at 3:29-30, 11:20-21).) iRobot argues that prosecution history remarks from the patentee differentiate between a “signal from the bump sensor” and “subsequent signal indicating the presence of an object.” (*Id.* at 17 (referring to JX-0016 at 7788-7789).)

In its responsive brief, iRobot argues that Respondents’ own expert agrees that no sensor is specified and if one was, it would be the proximity sensor not the bump sensor. (CRSB at 30-31 (citing Hr’g Tr. at 255:12-265:5).) iRobot continues “[n]either the specification nor the prosecution history of the ’553 patent contains any disclaimer of claim scope related to this limitation.” iRobot concludes that a single figure from the specification which refers to a bump sensor before speeding up, Figure 9B precisely, cannot detract “from what is plain claim language.” (*Id.* at 32 (citing *Phillips*, 415 F.3d at 1323).)

Finally, in its reply brief, iRobot claims Respondents “shift their focus to further read an ‘elapsed time or distance’ limitation into the claim.” (CRPB at 10.) iRobot complains this

Public Version

“temporal limitation” has no support in the claim language of claim 1 but can be found in dependent claim 10. (*Id.*) Thus, according to iRobot, “Respondents ignore the claim construction maxim that ‘the presence of a dependent claim that adds a particular limitation gives rise to a presumption that the limitation in question is not present in the independent claim.’” (*Id.* at 11 (citing *Phillips*, 415 F.3d at 1315).)

Respondents’ Position

In their opening brief, Respondents argue a main focus of the ’553 patent is that the robot slows down when it approaches objects and speeds back up when no collision occurs. (RIB at 32 (referring to ’553 patent at 9:4-5, Abstract, Fig. 9B).) Respondents urge that the patentee distinguished prior art (the “Kanda” reference) during prosecution which did not increase a speed setting “if the drive system does not receive a signal from the bump sensor within an elapsed time after the speed setting is reduced.” (*Id.* at 33 (citing JX-0016 at 2844-45).) Respondents explain “[i]n other words, the applicants argued that because Kanda speeds back up based on clearing an object instead of *not* receiving a signal from the bump sensor, the claims should be allowed.” (*Id.*) Respondents also view Figure 9B from the ’553 patent as support for their construction because it shows:

[A] decision tree for the purported invention and, in the decision tree, after the robot slows down the control system continually monitors whether there is “contact with obstacle” for a “time period/distance elapsed” and if that time period or distance expires only then does the robot speed up. In this way, the decision to speed up is based exclusively on the elapsing of a time period or distance associated with the bump sensor.

(*Id.*) Respondents conclude with “[t]o the extent the plain meaning does not require the bump sensor to initiate the speeding up decision (as discussed in the non-infringement section below), the prosecution history certainly does.” (*Id.* (citing *Springs Window Fashions LP v. Novo Indus., L.P.*, 323 F.3d 989, 994 (Fed. Cir. 2003)).)

Public Version

In their responsive brief, Respondents acknowledge that “[t]he primary issue with respect to infringement turns on claim construction.” (RRSB at 3.) Respondents then claim there is ambiguity in the negative-phrasing of the claim limitations –“not receive a subsequent signal”/“not sensing the presence.” (*See id.* at 5-7.) Respondents reason that this ambiguity is only resolved by an interpretation where the subsequent signal comes from the bump sensor, “because it is a signal that indicates the presence of an obstacle, not a potential obstacle.” (*Id.* at 7.) Respondents believe “this is consistent with the next limitation in both claims 1 and 11, which says what happens when a bump-sensor signal *is* received (the robot turns).” (*Id.* at 7-8 (emphasis added).) Respondents then point back to the prosecution history remarks made with respect to the Kanda reference (*id.* at 8) and then point to the language of the claims to support the idea that “proximity sensor signals detect *potential obstacles*; bump sensor signals detect the *presence of obstacles*” (*id.* at 9 (emphasis in original)). Overall, Respondents describe their proposed construction as “requir[ing] gentle touch, which means that the reduced speed operation is performed for a given time or distance.” (*Id.* at 12.)

Analysis

This claim construction dispute can be summarized as whether the recited “presence of an obstacle” can only be sensed or detected by a bump sensor, as opposed to some other sensor, such as a proximity sensor. I find the latter interpretation to be more persuasive given the intrinsic evidence.

Under a plain and ordinary meaning, both proximity and bump sensors can “indicate the presence of an obstacle.” The proximity sensor detects the presence of an obstacle at a distance, whereas the bump sensor detects the presence of an obstacle after physical contact with the robot. (*See, e.g.,* ’553 patent at 3:24-40.) The ’553 patent specification does not dispel this

Public Version

interpretation as it only uses the term “presence” once, in an unrelated context. (*See id.* at 10:38.)

The ’553 patent claims, however, reflect a deliberate choice by the patentee to allow either signal. For example, claim 1 recites “a bump sensor [is] responsive to *a collision* of the robot *with an obstacle*” and “a signal received from the bump sensor indicat[es] *contact with an obstacle*.” (*Id.* at cl. 1 (emphasis added).) Claim 1 further recites “a proximity sensor [is] responsive to a *potential obstacle*.” (*Id.* (emphasis added).) Many claims which depend from claim 1 specifically call out when it is a bump sensor signal or proximity sensor signal that triggers a behavior:

reduce the speed setting in response to a signal from the proximity sensor

(*id.* at cl. 1);

alter the heading setting in response to a signal received from the bump sensor

(*id.* at cl. 1);

alter the heading setting in response to the signals received from the bump sensor and the proximity sensor

(*id.* at cls. 2, 3);

alter the torque setting in response to a signal received from the bump sensor

(*id.* at cl. 8);

increases the torque setting in response to a signal received from the bump sensor

(*id.* at cl. 9);

increases the torque setting in response to a signal received from the bump sensor

Public Version

(*id.* at cl. 9). Claim 11 is similar. It recites “upon sensing a *proximity of the object* forward of the robot, reducing the cleaning speed” and “in response to sensing *contact with the object*, turning with respect to the object.” (*Id.* at cl. 11 (emphasis added).)

Thus, it stands to reason that the patentee understood how to limit a particular signal as coming from a bump sensor or proximity sensor, but deliberately chose not to when reciting “a subsequent signal indicating the presence of an obstacle” in claim 1 and “sensing the presence of the object” in claim 11. *Phillips*, 415 F.3d at 1314 (“The context in which a term is used in the asserted claim can be highly instructive.”)

Dependent claim 10 is also instructive. This is the only other time “presence” appears outside of claims 1 and 11. Claim 10, which depends from claim 1, recites “increase the speed setting if the drive system does not receive the subsequent signal *from the bump sensor* indicating the presence of an obstacle.” (*Id.* at cl. 10 (emphasis added).) I agree with iRobot that the only way to read this limitation consistently with claim 1, and to not render “from the bump sensor” superfluous, is to *not* limit claim 1’s “indicating the presence of an obstacle” to a bump sensor. Indeed, it seems perfectly fair to read claim 10 as setting more conditions upon, and thereby narrowing, how the robot increases its speed setting.

A critical premise in Respondents’ briefing is the idea that “proximity sensor signals detect *potential obstacles*; bump sensor signals detect *the presence of obstacles*.” (RRSB at 9; see RRSB at 7, 10.) No intrinsic evidence supports this connection, however, especially not as clearly as Respondents argue. As discussed above, the specification only mentions “presence” once in an unrelated context and the claims use it sparingly. The only connection that is clear is that bump sensors detected contacted obstacles and proximity sensors detect obstacles at a distance. (See RRSB at 9-10 (discussing ’553 patent at 3:29-37, 11:20-21; Hr’g Tr. at 120:4-7).)

Public Version

Respondents also place great weight in the decision flowchart of Figure 9B of the '553 patent to support their interpretation that "if the product does not sense a collision, it will speed up." (RIB at 32; *see* RRSB at 3-6.) I agree that in the decision flowchart of Figure 9B, the robot will increase its speed setting (having previously decreased its speed) when the bump sensor does not send a signal and a time and/or distance limit has been reached. I do not agree, however, that claims 1 and 11 should be limited to this Figure in the face of their plain language. *See Phillips*, 415 F.3d at 1323. For example, it may very well be that Figure 9B illustrates an embodiment that corresponds to dependent claim 10 (which explicitly uses the bump sensor to indicate the presence of an obstacle) and not the broader independent claim 1.

Finally, while both parties point to the same moment in the prosecution history as having significance (CIB at 16-17 (citing JX-0016 at 7788-89); RIB at 33 (citing JX-0016.2844-45),³ they draw opposite meanings from it. The patentee's remarks to the examiner read:

The office action seems to acknowledge that the cited references (alone or in proper combination) did not describe or make obvious a mobile robot configured to increase the speed setting if the drive system does not receive a signal from the bump sensor within an elapsed time after the speed setting is reduced [citing page 6 of office action]. Applicants respectfully submit a further assertion that the cited references did not describe or make obvious "wherein the drive system is configured to increase the speed setting if the drive system does not receive a subsequent signal indicating the presence of an obstacle while continuing to advance according to the heading setting and the reduced speed setting," as recited in amended claim 1, or the "robot . . . in response to not sensing the presence of an object while advancing at the reduced speed, increasing the speed setting," as recited in amended claim 10. Accordingly, Applicants respectfully request reconsideration and allowance of claims 1-7 and 10-17 over the pending § 13 rejection.

³ The version of JX-0016 I have been provided, by iRobot at least, does not use this number scheme. Based on their quoted language however, I treat Respondents as referring to the same pages as iRobot.

Public Version

(JX-0016 at 7788-7789.) I view this excerpt, in light of the preceding office action and further preceding claim amendment, as showing clearly that “presence of an obstacle” is meant to be broader than signals from a bump sensor, as iRobot alleges.

To wit, in an early amendment to the claims, new claim 24 recited an increase in speed in response to an absence of bump sensor signals specifically:

The robot of claim 1 wherein the drive system is configured to increase the speed setting if the drive system does not receive a signal from the bump sensor within an elapsed time after the speed setting is reduced.

(JX-0016 at 6427.) The following office action explained:

Claim 24, is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

(*Id.* at 7627 (page 6 of the Office Action).)

Thereafter, the patentee amended the claims again and gave the following remark (as provided above):

The office action seems to acknowledge that the cited references (alone or in proper combination) did not describe or make obvious a mobile robot configured to increase the speed setting if the drive system does not receive a signal from the bump sensor within an elapsed time after the speed setting is reduced [citing page 6 of office action]. Applicants respectfully submit a further assertion that the cited references did not describe or make obvious “wherein the drive system is configured to increase the speed setting if the drive system does not receive a subsequent signal indicating the presence of an obstacle while continuing to advance according to the heading setting and the reduced speed setting,” as recited in amended claim 1.

(*Id.* at 7788-7789.) Clearly, the Applicant used the examiner’s statement of allowability to support, not limit, an arguably broader limitation. (*Id.* (characterizing it as “further assertion”).)

This is the opposite of an explicit disclaimer of scope, as Respondents argue.

Public Version

In sum, I find the plain and ordinary meaning of the terms control here. “Indicating the presence of an obstacle” (claim 1) and “sensing the presence of the object” (claim 11) do not refer exclusively to signals coming from the bump sensor, in light of the intrinsic record.

D. Infringement

According to iRobot’s post-hearing briefing, the following products are accused of infringing the following claims of the ’553 patent:

Product	Claims
iLife Products	1, 4, 11, 12, 13, 22

1. Direct Infringement by the iLife Products

For the reasons explained below, I find iRobot has shown by a preponderance of the evidence that the iLife Products meet the limitations of apparatus claims 1 and 4 and iLife therefore directly infringe those claims. I further find the iLife Products meet the limitations of method claims 11, 12, 13, and 22, but I do not find iRobot has shown that iLife performs the recited steps for direct infringement.

a. Undisputed Claim Limitations

As reflected in the parties’ post-hearing briefing, most of the ’553 patent asserted claim limitations in the iLife Products are not in dispute. (*See, e.g.*, RRSB at 3-16.) These undisputed limitations, along with my findings, are summarized below.

Independent claim 1 is not listed as an asserted claim by iRobot, but it is effectively asserted through dependent claim 4. Claim 1 requires, “[a]n autonomous coverage robot.” (’553 patent at cl. 1.) I find credible and unrebutted testimony demonstrates the iLife Products are robots which operate in an autonomous manner and move so as to cover a floor’s surface for

Public Version

cleaning. (See CIB at 17 (citing CX-0221C at Q87, 012, 118, 152, 194, 235; RX-2088C at Q30).) The limitation is met.

Claim 1 further requires, “a bump sensor responsive to a collision of the robot with an obstacle in a forward direction.” (’553 patent at cl. 1.) I find credible and unrebutted testimony demonstrates the iLife Products have a bump sensor which is depressed when physical contact occurs in the forward direction. (See CIB at 19-20 (citing CX-0221C at Q92, 107, 122, 160, 201, 241; RX-2088C at Q42, 53).) The limitation is met.

Claim 1 further requires, “a proximity sensor responsive to a potential obstacle forward of the robot.” (’553 patent at cl. 1.) I find credible and unrebutted testimony demonstrates the iLife Products use infrared emitter-detector pairs to detect objects near but not yet contacting the robot. (See CIB at 20 (citing CX-0221C at Q89-90, 104-105, 119-120, 161, 202, 242; RX-2088C at Q42).) The limitation is met.

Dependent claim 4 requires, “The robot of claim 1 wherein the proximity sensor comprises at least one infrared emitter and receive pair.” (’553 patent at cl. 4.) As mentioned above, I find credible and unrebutted testimony demonstrates the iLife Products use infrared emitter-detector pairs to detect objects near but not yet contacting the robot. (See CIB at 22 (citing CX-0221C at Q89, 104, 116, 175-176, 216-217, 256-257; CX-1125C at ROG No. 76).) The limitation is met.

Independent claim 11 is not listed as an asserted claim by iRobot, but it is effectively asserted through dependent claim 12. Claim 11 requires, “A method of navigating an autonomous coverage robot with respect to an object on a floor.” (’553 patent at cl. 11.) As mentioned above, I find credible and unrebutted testimony demonstrates the iLife Products are robots which operate in an autonomous manner and move so as to cover a floor’s surface for

Public Version

cleaning. (See CIB at 23 (citing CX-0221C at Q179, 220, 260).) I also find the iLife Products employ navigation techniques when encountering obstacles located on the floor. (See, e.g., Hr’g Tr. at 115:10-119:3.)⁴ The limitation is met.

Claim 11 further requires, “autonomously traversing the floor in a cleaning mode at a cleaning speed.” (’553 patent at cl. 11.) I find credible and unrebutted testimony demonstrates the iLife Products autonomously move themselves over the floor and, in some circumstances, at set cleaning speeds between 15-18 m/min. (See CIB at 23-24 (citing CX-0221C at Q94-100, 109-15, 124-130, 180, 221, 261).) The limitation is met.

Claim 11 further requires, “upon sensing a proximity of the object forward of the robot, reducing the cleaning speed to a reduced speed while continuing towards the object.” (’553 patent at cl. 11.) As mentioned above, I find credible and unrebutted testimony demonstrates the iLife Products will slow down when an obstacle at a distance from the robot is detected or sensed. (See CIB at 24; see also CIB at 20 (citing CX-0221C at Q162-165, 203-206, 243-246; RX-2088C at Q17, 42, 53; CX-0305C at 30:5-31:21, 43:25-44:3; 51:21-23).) The limitation is met.

Claim 11 further requires, “in response to sensing contact with the object, turning with respect to the object and cleaning next to the object.” (’553 patent at cl. 11.) I find credible and unrebutted testimony demonstrates the iLife Products can operate in “edge-cleaning” or “obstacle-following” modes which involve moving alongside and tracking an object’s perimeter

⁴ While it is not disputed that this method claim, and those that depend from it, are performed, *i.e.*, directly infringed, by the iLife Products; it is disputed whether iRobot has properly shown that Respondents perform, *i.e.*, directly infringe, this method claim as discussed below.

Public Version

during cleaning. (See CIB at 24 (citing CX-0221C at Q97-98, 102-103, 127-128, 183-184, 224-225, 264-265; Hr'g Tr. at 502:2-4).) The limitation is met.

Dependent claim 12 requires, “[t]he method of claim 11 wherein the robot follows a perimeter of the object while cleaning next to the object.” (’553 patent at cl. 12.) As mentioned above, I find credible and un rebutted testimony demonstrates the iLife Products can operate in “edge-cleaning” or “obstacle-following” modes which involve moving alongside and tracking an object’s perimeter during cleaning. (See CIB at 24 (citing CX-0221C at Q97-98, 102-103, 127-128, 183-185, 224-226, 264-266; CX-0305C at 24:4-25:5, 62:5-14; 73:4-15; CX-0278C at 87:16-23, 107:4-6).) The limitation is met.

Dependent claim 13 is not listed as an asserted claim by iRobot, but it is effectively asserted through dependent claim 22. Claim 13 requires, “[t]he method of claim 11 wherein the robot maintains a substantially constant following distance from the object while cleaning next to the object in response to the contact with the object.” (’553 patent at cl. 13.) As mentioned in the previous two paragraphs, I find credible and un rebutted testimony demonstrates the iLife Products can operate in “edge-cleaning” or “obstacle-following” modes which involve moving alongside and tracking an object’s perimeter during cleaning. I also find credible and sufficient testimony that the products “attempt to maintain a distance of 10 and 20 mm from the obstacles the clean beside.” (CIB at 25 (citing CX-0221C at Q97-98, 102-103, 107-108, 187, 228, 268; CX-0278C at 87:16-23, 107:12-14; CX-0305C at 50:25-51:8, 62:5-14, 73:4-15).) The limitation is met.

Dependent claim 22 requires “[t]he method of claim 13 wherein the cleaning speed of the robot is about 300 mm/sec.” (’553 patent at cl. 22.) As mentioned above, I find credible and un rebutted testimony demonstrates the iLife Products are set at cleaning speeds between 15-18

Public Version

m/min. I further find credible and un rebutted testimony that this range qualifies as “about 300 mm/sec.” (See CIB at 25 (citing CX-0221C at Q189, 230, 270; CX-0305C at 34:10-23, 51:24-52:10, 66:10-16, 73:4-15).) The limitation is met.

b. Disputed Claim Limitations Concerning “Presence of an Obstacle/Object”

In addition to those limitations listed above, claim 1 requires, “wherein the drive system is configured to increase the speed setting if the drive system does not receive a subsequent signal indicating the presence of an obstacle while continuing to advance according to the heading setting and the reduced speed setting.” (’553 patent at cl. 1.) Claim 11 similarly requires, “in response to not sensing the presence of the object while advancing at the reduced speed, increasing the speed setting.” (’553 patent at cl. 11.) Respondents dispute that these limitations are met by the iLife Products.

iRobot’s Position

In its opening brief, iRobot describes Respondents’ non-infringement position as “an apparent attempt to carve out a construction for design around” by “add[ing] in the requirement that the robot increase its speed only after not receiving a subsequent signal from the bump sensor.” (CIB at 3.) As discussed above, iRobot argues “[t]he relevant claim language is agnostic as to which sensor the ‘subsequent signal’ must come from whereas other limitations recite a specific signal source.” (*Id.* at 4.) iRobot notes that “even if Respondents’ limiting view is correct, the iLife Products—the only products accused under the ’553 patent—increase speed only if the bump sensor has not been triggered and thus this limitation is satisfied regardless.” (*Id.* (citing Hr’g Tr. at 496:11-499:2, 495:5-18, 435:3-436:18).) Additionally, iRobot states “[a]s iLife’s representative testified, the robots speed back up when an obstacle that caused the robot to slow is no longer present.” (*Id.* at 21 (citing CX-0305C at 30:5-31:21, 43:25-44:3, 51:21-23).)

Public Version

iRobot also points to video evidence of this behavior (*id.* (citing CPX-1932; CPX-1931; CPX-1930)) and the “[]” contains the relevant instructions (*id.* at 22 (citing CPX-0002C at 0211-0212, 0026, 1296-1297)). “Critically,” iRobot argues, “iLife’s experts admitted that the iLife Products will not increase their speed if they receive a subsequent signal from their proximity sensor *or* from their bump sensor.” (*Id.* at 21-22 (citing Hr’g Tr. at 496:11-499:2, 495:5-18, 435:3-436:18).) Generally, iRobot points to its expert’s testimony to show these limitations are met in both claim 1 and claim 11. (*See id.* at 21 (citing CX-0221C at Q166-172, 207-213, 247-253), 24 (citing CX-0221C at Q182, 223, 263).)

Respondents’ Position

Overall, Respondents dispute these limitations are met because “unlike iRobot’s products and unlike what is described in the Figure 9B of the ’090 [sic] patent, the accused products speed up immediately when they do not sense an obstacle.” (RRSB at 3.) Similarly, Respondents acknowledge:

There is no dispute that the iLife products slow down when they sense an obstacle with their infrared proximity sensors, and turn away when they sense an obstacle with their contact sensors. Nor is there any dispute that the iLife products immediately speed back up if their sensors show that the obstacle has disappeared.

(*Id.* at 3-4.) Respondents then discuss how the iRobot Products use a “light touch” behavior which “is what allows the Roomba to drive through fleeting objects such as a couch skirt.” (*Id.* at 4 (referring to Hr’g Tr. at 113:20-114:17).) Respondents contend “[t]he accused products do not have this behavior because they do not slow down for ‘a given amount of time.’” (*Id.* (citing RX-2088C at Q57).) Respondents admit “[i]f, alternatively, the claims are satisfied merely by slowing down and then speeding up again immediately if the obstacle is not sensed, then respondents do not dispute infringement because that behavior was known (*e.g.*, as shown in by the Suckmaster robot).” (*Id.*) Respondents note “Mr. Crockett confirmed that the ‘only

Public Version

condition' under which the accused products will decide to speed up from a slowed down mode of operation is 'when the obstacle sensor output goes below the threshold;'" where the particular output is from the accused proximity sensor, and not the bump sensor, "which initially caused the robot to slow down. (*Id.* at 11 (citing RX-2087C at Q17, 19).)

Respondents conclude:

In the disputed limitation, Respondents propose that the claims require that the accused products slow down for a given time or distance while waiting to see if they receive a bump-sensor signal. The accused products do not do this. Instead, as the demonstration showed, they slow down until the proximity sensors do not detect an object, or until the robot collides with something. That is not the claimed technology.

iRobot also tries to twist the Respondents' proposed construction to make an infringement argument under it. Particularly, iRobot argues that the accused products "check whether the bump sensor has been triggered." (iRobot PHB at p.13.) This bumper check, however, is irrelevant. As explained, Respondents' proposed construction means that the claims require gentle touch, which means that the reduced speed operation is performed for a given time or distance.

(*Id.* at 12.)

Analysis

As I found in the above claim construction section, the indication or detection of the "presence" of an obstacle is not limited to signals coming from the bump sensor. Under this construction, Respondents do not dispute infringement. (*See* RRSB at 4.) Respondents state:

There is no dispute that the iLife products slow down when they sense an obstacle with their infrared proximity sensors, and turn away when they sense an obstacle with their contact sensors. Nor is there any dispute that the iLife products immediately speed back up if their sensors show that the obstacle has disappeared.

(*Id.* at 3-4.) I further find credible and unrebutted testimony that the iLife Products "will not increase their speed if they receive a subsequent signal from their proximity sensor *or* from their bump sensor." (CIB at 21-22 (citing Hr'g Tr. at 496:11-499:2, 495:5-18, 435:3-436:18).) I also

Public Version

find sufficient evidence that the products will “speed back up when an obstacle that caused the robot to slow is no longer present.” (CIB at 21 (citing CX-0305C at 30:5-31:21, 43:25-44:3, 51:21-23), 22 (citing CPX-0002C at 0211, 0026, 1296-1297); CPX-1930; *see* RRSB at 11 (citing RX-2087C at Q17, 19), 12 (“they slow down until the proximity sensors do not detect an object, or until the robot collides with something”).) Thus, I find the limitations in claims 1 and 11 are met.

c. Disputed Claim Limitations Concerning “Heading Setting”

In addition to those limitations listed above, claim 1 recites several limitations which involve a “heading setting:” “a drive system configured to maneuver the robot according to a heading setting and a speed setting,” “wherein the drive system is configured to reduce the speed setting in response to a signal from the proximity sensor indicating detection of a potential obstacle, while continuing to advance the robot according to the heading setting,” and “wherein the drive system is configured to alter the heading setting in response to a signal received from the bump sensor indicating contact with an obstacle.” (’553 patent at cl. 1.) Respondents dispute that these “heading setting” limitations are met by the iLife Products.

iRobot’s Position

In its opening brief, iRobot characterizes Respondents’ as “seek[ing] to re-construe the ALJ’s construction of heading setting by adding the requirement that the data value as construed by the ALJ must be ‘retained in memory.’” (CIB at 4 (citing Hr’g Tr. at 127:24-132:11).) iRobot contends “an absolute heading is not required” and “[t]he iLife Products execute turns using a relative angle and then move straight according to that heading.” (*Id.*) iRobot cites testimony from Respondents’ expert to support the concept “if a robot travels in a straight line

Public Version

after completing a turn, the robot 'is proceeding according to a heading setting.'" (*Id.* (citing Hr'g Tr. at 250:6-14).)

More specifically and with respect to a "speed setting," iRobot explains "[t]he iLife Products have two motorized wheels, and each wheel connects to its own motor." (*Id.* at 18 (citing CX-0285C; CX-0665C; CX-1766C).) iRobot represents that "iLife's expert does not dispute that these motorized wheels allow the robot to maneuver" and can navigate a room by themselves. (*Id.* (citing RX-2088C at Q30).) Further, iRobot contends "[t]he iLife Products also move according to a speed setting as required by the claim" having normal and slow cleaning speeds ranging between 5-18 m/min. (*Id.* (citing C-0305C at 34:10-23, 51:24-52:1066:10-16, 73:4-15).) iRobot further contends that, in some models, [

] which represents the robot's

speed. (*Id.* (citing CPX-0002C at 0194, 0211, 009, 0026).) iRobot explains that for other models, [

] corresponds to the robot's speed.

(*Id.* (citing CPX-0002C at 774-776, 1274, 1296-1297; RX-2087C at Q19; Hr'g Tr. at 481:12-482:4).)

Regarding "heading setting," iRobot argues "[w]hen moving away from contacted objects, the robots adjust their heading by a certain angle" and an angle value is used to determine how much to turn. (*Id.* at 18-19 (citing Hr'g Tr. at 480:22-481:3; 482:5-11; *see also* RX-2087C at Q20).) iRobot states succinctly, [

] (*Id.* at 19 (citing RX-2087C at Q20).) iRobot claims the

[] (*Id.* (citing CPX-0002C at 249-251, 0067-0069, 0774-0776, 0202-0204, 0017-0018, 0020, 1283-1297).)

Public Version

iRobot also explains “the iLife Products ‘have proximity sensors’ that cause the robots to ‘slow down’ if they ‘tentatively sense an object’” which is executed by [

] (*Id.* at 20 (citing RX-2088C at Q42, 53; RX-2087C at Q17; CPX-0002C at 0211, 0020-0026, 1296-1297).) iRobot claims that when the iLife Products were demonstrated at the hearing, they advanced straight according to their heading setting when they slow down. (*Id.* at 20-21 (citing Hr’g Tr. at 115:10-119:3).) iRobot continues with “iLife’s expert testified that the robot’s two wheel speeds are set to be the same when the robot slows . . . which he further testified causes the robot to travel in a straight path.” (*Id.* at 21 (citing RX-2088C at Q42, 45; Hr’g Tr. at 482:20-24, 484:9-15).) If contact with an obstacle is made, iRobot argues a heading setting is altered. (*Id.* at 22.) For support, iRobot points to the demonstration at the evidentiary hearing where the robot made contact with a table leg and then made a “‘very sharp right hand turn.’” (*Id.* (citing Hr’g Tr. at 115:10-119:3).) iRobot argues this behavior comes from the [

]thereby altering its heading setting.” (*Id.* (citing CPX-0002C at 0200-0203, 0009-0034, 1284-1289).) Generally, iRobot points to its expert’s testimony to show these limitations are met in claim 1. (*See id.* at 18 (citing CX-0221C at Q153-159, 195-199, 237-239), 20 (citing CX-0221C at Q162-165, 203-206, 243-246), 22 (citing CX-0221C at Q173, 214-215, 254-255).)

In its reply brief, iRobot questions the timing of Respondents’ argument that a value in iLife’s source code is never altered. (*See* CRPB at 13.) iRobot claims this “is at odds with Respondents’ position in their Pre-Hearing Brief, where they indicated that the ‘value signifying the amount of rotation’ identified by iRobot for this limitation satisfies ‘one part of the claim relate[d] to turning—‘configured to alter the heading setting.’” (*Id.* (citing RPB at 11).)

Public Version

According to iRobot, Respondents have waived this non-infringement argument. Regardless, iRobot explains, “Respondents’ reasoning is also incorrect, because the heading setting of the accused iLife products is the data value that controls the number of degrees the robot adjusts its heading when turning.” (*Id.* at 14 (citing CX-0221C at Q95, 155-156, 197-198, 238).) iRobot claims that “every time the iLife robots execute a turn, a new value is created” and therefore “the robot alters its heading setting with each turn it makes.” (*Id.*) iRobot explains, through its own expert and Respondents’ expert, “[t]his heading setting is always relative to the robot’s previous position.” (*Id.* (citing CX-0221C at Q239; RX-2087C at Q20).) iRobot characterizes Respondents’ defense as “hyper-technical” that ignores my claim construction and the language of the claims. (*Id.*) Rather, according to iRobot, “Respondents have not disputed, because they cannot, that the accused iLife products perform the functionality at the heart of this claim: slowing down and speeding up while travelling in a straight line.” (*Id.*)

Respondents’ Position

In their responsive brief, Respondents contend “[c]laim 4, through its dependency on claim 1, requires continuing straight according to a “heading setting.” The accused products do not have such a heading setting.” (RRSB at 13.) Respondents continue “[t]he claims also require that this heading setting be ‘altered’ when the robot turns” and argue the iLife Products do not do this. (*Id.* (citing RX-2088C at Q40-41).) Respondents explain that their source code expert, Dr. Crockett, testified that the angle parameters iRobot has identified as the “heading setting” “are exclusively used during turning—and not at all when driving straight.” (*Id.* (citing RX-2087C at Q20-21).) Respondents add “an iLife robots wants to turn right by 30 degrees,[
] as required
by the claims.” (*Id.* (citing Hr’g Tr. at 130:19-131:17).)

Public Version

More specifically, Respondents explain that iRobot has identified [

] (*Id.* at 14 (citing CX-0221C at Q156, 198, 239).) Respondents contend this value is simply “the amount of a turn” and “turning angles are not considered during straight travel.” (*Id.*) Thus, according to Respondents “[d]uring straight travel there simply is no heading setting.” (*Id.* (referring to RX-2087C at Q21; RX-2088C at Q42).) In Respondents’ view, “[t]his is fatal for iRobot’s allegations because the claims require that when the robot *slows down* it is configured to do so *according to the heading setting* and when the robot *speeds back up* it must do so *according to the heading setting*.” (*Id.*) Respondents urge that any time the robot travels in a straight line,[

] (*Id.* at 14-15.) Respondents cite their expert who testified:

[

]

(*Id.* at 15 (citing RX-2088C at Q45).)

Respondents acknowledge that their expert “confirmed that when a robot is going straight it can have a heading setting of zero” (*id.* (citing Hr’g Tr. at 249:21-25)), but this was in the context of prior art which still has a discrete “heading setting” variable called “NAV_yaw” (*id.* citing Hr’g Tr. at 334:7-10)). Respondents repeat, “the accused products have no such data value.”

Public Version

Analysis

At the outset, I agree with iRobot that Respondents did not properly identify a lack of an “altered” heading setting as a basis for non-infringement in their pre-hearing brief. (See CRPB at 13-14.) Respondents’ pre-hearing brief states:

Claim 4 depends from claim 1. Claim 1 requires an autonomous robot that is configured to use a “heading setting” in specific ways: (1) “configured to maneuver the robot according to a heading setting;” (2) “continuing to advance the robot according to the heading setting;” (3) “continuing to advance according to the heading setting;” and (4) “configured to alter the heading setting.”

....

iRobot analyzes heading setting in the abstract and does not tie it back to the claim limitations. Doing so, however, shows that the accused iLife products do not practice the various heading setting limitations, *especially the limitations that require continuing to advance according to the heading setting.*

(RPB at 10 (emphasis added).) Indeed, as previewed by the last sentence of this excerpt, the remainder of Respondents’ pre-hearing brief *exclusively* addresses the “continuing to advance” limitations. (See *id.* at 10-12.) Respondents’ non-infringement expert limited his testimony in the same way. (See RX-2088C at Q38-50.) Thus, I find Respondents have waived the argument that the heading setting is not “altered” under Ground Rule 11.2.

Moving on, I find the “heading setting” limitations are met in the iLife Products. Credible testimony from iRobot’s expert identifies a data value in these products which represents an amount of turn which is called on by a function to change the direction the robots point (*i.e.*, used to rotate/yaw the robot). (See CIB at 18-19 (citing CX-0221C at 155-159, 197-199, 238-239; Hr’g Tr. at 480:22-481:3, 482:5-11; RX-2087 at Q20).) Credible testimony also describes how the robots will so turn after physically contacting an obstacle through their bump sensor. (CX-0221C at Q173-174, 214-215, 254-255.) Respondents do not dispute the identity

Public Version

and role of this function and data value. (See RRSB at 13 (citing RX-2087C at Q20-21; Hr’g Tr. at 130:19-131:17).) Instead, Respondents argue that because the function and value are not called upon (*i.e.*, ignored) during straight travel, the robots’ drive systems do not “continu[e] to advance the robot according to the heading setting” as required by the claim. (*Id.*)

I disagree. The robot’s failure to call upon the angular data value and turning functions during straight travel does not mean that the straight travel is not “according” to that value. To the contrary, the robot is pointed in the direction it is pointed because of that value. If the robot then proceeds forward in a straight line (both wheels of constant diameter rotating at same speed) it is proceeding “according” to that value; *i.e.*, “according to the heading setting.” Put another way, when Respondents argue “[t]he products may continue traveling straight in certain instances, but that is by virtue of coordinated wheel speed and not according to a data value representing a particular direction,” they miss what it is that makes the wheel speed “coordinated.” It is the absence of the data value.

Thus, I find a preponderance of the evidence shows the iLife Products meet the “continuing to advance the robot according to the heading setting” and “continuing to advance according to the heading setting” claim limitations.

d. Disputed Method Claims

Claims 11, 12, 13, and 22 are method claims. (See ’553 patent at cl. 11 (“A method of navigating . . .”).) iRobot’s opening post-hearing brief states “[d]uring use, the iLife Products consistently perform each step of [claim 11] and its asserted dependent claims” and “Dr. Hooper concluded that a typical user operating the robot in its intended fashion would experience performance of these method steps.” (CIB at 23 (citing CX-0221C at Q178, 219, 259; CX-0372C at 9:21-13:3).) iRobot adds “iLife further admitted that its customers use the Products in

Public Version

the U.S.” and “[Respondents’ expert] performed the method limitations at his home in North Carolina.” (*Id.* (citing CX-1147C at RFA Nos. 2, 11; Hr’g Tr. at 499:25-501:3).)

Respondents dispute that these claims are infringed because:

iRobot’s infringement theory on asserted method claims 12 and 22 is limited to users operating the products in the United States. (iRobot PHB at p.23.) In other words, iRobot’s theory is limited to indirect infringement of these claims. As explained separately in § VII, iRobot’s combined indirect infringement theory is deficient as a matter of law, because it includes no particular explanation for how the ’553 patent and the methods claimed therein were knowingly encouraged to be infringed.

(RRSB at 16.)

In its reply brief, iRobot states “[t]he method steps of claims 12 and 22, and the claims from which they depend, have been performed in the United States by iLife’s customers and Dr. Locke.” (CRPB at 14.) In iRobot’s view, “there is no dispute between the parties on the general operation of the products, but only whether this undisputed behavior satisfies the limitations of the claims. Performance of the method steps, therefore, rises and falls with whether the iLife products have been used in the United States.” (*Id.* at 15.)

iRobot looks to *Lucent Techs., Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1318 (Fed. Cir. 2009) for the proposition that circumstantial evidence of direct infringement of a method claim is “not only sufficient, but may also be more certain, satisfying and persuasive than direct evidence.” (*Id.*) iRobot adds “Dr. Locke admitted to using the accused functionality at his home in North Carolina” (*id.* (citing Hr’g Tr. at 499:25-501:3)), “iLife admitted that customers in the United States have used its products” (*id.* (citing CX-1147C at RFA Nos. 2, 11)), and “there can be no dispute that iLife specifically included the accused functionality in its products and that the functionality would be used during normal operation of the iLife products” (*id.*).

I find that Respondents’ challenge has merit. The issue is whether iRobot has shown Respondents have *directly* infringed the method claims of 11, 12, 13, and 22. The Federal

Public Version

Circuit instructs that this is not shown simply by an accused infringer selling an article which itself performs all the steps of the method—which is the case with claims 11, 12, 13, and 22.

Ericsson, Inc. v. D-Link Systems, Inc., 773 F.3d 1201, 1221-22 (Fed. Cir. 2014) (discussing *SiRF Technology, Inc. v. Intern. Trade Comm’n*, 601 F.3d 1319 (Fed. Cir. 2010); *Ricoh Co., Ltd. v. Quanta Computer Inc.*, 550 F.3d 1325 (Fed. Cir. 2008))).

Moreover, I agree that iRobot’s prehearing brief does not adequately allege direct infringement of these method claims by Respondents as opposed to Respondents’ customers. (See CPB at 17 (“[d]uring use, the iLife Products consistently perform each step of the method claim . . . and would do so when being used by a typical user operating the robot in its intended fashion. . . . The iLife Products have been sold in the U.S.”), 18 at n.4 (“[f]or this and other limitations marked ‘undisputed’ for method claims 11, 12, and 22 of the ’553 patent, iLife does not dispute that the limitations are met, however they do dispute whether iRobot has shown the method is performed by consumers in the U.S.”).) To the extent *Lucent Techs.*, cited by iRobot, is instructive regarding “circumstantial evidence” of direct infringement, 580 F.3d at 1317-1318, it does not remove iRobot’s duty to clearly articulate its theories of infringement in its prehearing brief under G.R. 11.2.

Thus, I find iRobot has not shown or alleged *direct* infringement by Respondents of method claims 11, 12, 13, and 22. The limitations of these claims, however, are met by the iLife Products for purposes of analyzing indirect infringement.

2. Indirect Infringement by iLife

With respect to indirect infringement, iRobot presents inducement and contributory infringement theories for, assumedly, every asserted claim under every asserted patent, for every accused product. (See generally CIB at 103-108.) iRobot presents no theory particularly tailored

Public Version

to the '553 patent, yet it is understood that only iLife is accused of indirectly infringing this patent.

Regardless, iRobot contends “extensive sales, distribution of instruction manuals, and testimony from an infringement expert” as circumstantial evidence that direct infringement within the U.S. has occurred. (*See id.* at 104.) iRobot refers to *Symantec Corp. v. Computer Assocs. Int'l, Inc.*, 522 F.3d 1279, 1293 (Fed. Cir. 2008) for the premise that Respondents’ intent to induce infringement “can be inferred from the distribution of a product, the use of which infringes.” (*id.* at 103.)

For iLife in particular, iRobot notes that iLife has confirmed it imports or sells for importation the iLife Products in the U.S. (*Id.* at 106 (citing CX-0220C at Q655; CX-0221C at Q505; CX-1148C at RFA Nos. 1, 10, 110, 117; CX-0372C at 7:14-15, 8:19-9:12, 17:4-15, 40:1-11, 42:6-14; RX-0735C).) iRobot alleges “[c]ircumstantial evidence again shows that end users *actually* use the accused products, and that the asserted claims represent the standard and expected use of the accused products. This is shown by the extensive sales and distribution of product manuals in the U.S” and “iLife also imports and sells components and spare parts for these products in the U.S., including brushes, dustbins, and filters.” (*Id.* at 106-107.) iRobot further argues, through its expert, that no non-infringing use for the iLife Products exists. (*Id.* (citing CX-0220C at Q658).) Regarding knowledge of the asserted patents, iRobot explains “iLife’s corporate designee, Chan Leung, testified that [

] (*id.* at 107 (citing CX-0278C at 130:20-133:16; CX-0220C at Q657; CX-0221C at Q507)) and “iLife’s emails show

[

] (*id.* (citing CX-0292C at 6153; CX-1401C at 9212-9214)).

Public Version

Respondents dispute the alleged indirect infringement. Generally, and with respect to inducement, Respondents argue:

iRobot has not proven: (1) knowledge of infringement of the each of the asserted patents; (2) another was induced to infringe the asserted method claims of the '553 and '090 patents; and (3) specific intent to induce infringe of the asserted method claims of the '553 and '090 patents.

(RRSB at 57.) Regarding contributory infringement, Respondents argue:

iRobot has failed to prove: (1) knowledge of the patent and infringement; (2) direct infringement by another; and (3) that the accused products have no substantial non-infringing uses, which requires a claim by claim analysis.

(*Id.* at 58.) For knowledge of the patents, Respondents do not mention iLife but argue “none of bObsweep’s, Silver Star’s, or Hoover’s testimony and emails specifically identify any of the asserted patents. . . . None of the asserted patents are acknowledged, and infringement of the asserted patents is certainly not established.” (*Id.*) Respondents conclude the requisite knowledge of the patent and infringement thereof has not been shown as required by *Commil USA, LLC v. Cisco Sys. Inc.*, 135 S. Ct. 1920, 1926 (2015). (*Id.*)

Respondents continue to claim that iRobot has not shown that an end user in the United States has used the product in the United States. (*See id.*) Respondents believe “[t]o do so, iRobot would have had to provide an analysis of the patent claims as compared to the actions of end users—such analysis is missing.” (*Id.*) Respondents argue iRobot’s use of “extensive sales are not circumstantial evidence of inducement or an infringing use.” (*Id.*)

Following this, iRobot’s reply brief argues “Respondents do little more than recite legal tests and summarily conclude that iRobot has not met them; however, iRobot previously presented substantial evidence (which Respondents have ignored) for each of these elements.” (CRPB at 41.) iRobot repeats its claim that circumstantial evidence, such as extensive sales and technical support, is sufficient to establish direct infringement for purposes of indirect

Public Version

infringement. (*Id.* (citing *Tinnus Enters., LLC v. Telebrands Corp.*, 846 F.3d 1190, 1204 (Fed. Cir. 2017)).)

Regarding the requisite intent and the '553 patent, iRobot states "Dr. Locke admitted that the light touch behavior occurred 'within the normal working conditions of the accused iLife products.'" (*Id.* (citing Hr'g Tr. at 499:25-501:3).) iRobot summarizes the claimed features of these two patents are "part-and-parcel of the normal operation" intended by Respondents, and that this defeats any claim the accused products do not directly infringe when put into use. (*Id.* (citations omitted).)

Regarding knowledge of the patent, iRobot claims it has "established Respondents' knowledge of the asserted patents . . . at least as early as the filing of the complaint in this Investigation." Before the complaint, iRobot alleges iLife had knowledge from their "investigating iRobot products" which are marked as protected by patents. (*Id.* at 43 (citing CX-0305C at 93:7-96:14; 97:19-98:5; CX-0278C at 30:9-10, 33:15-34:20).) iRobot reasons "[iLife's] extensive investigations into the iRobot products put Respondents on notice of the asserted patents." (*Id.*) iRobot then claims intent and knowledge of the patents cannot reasonably be disputed. (*Id.* at 44.) iRobot also confirms that its indirect infringement theory is "that Respondents indirectly infringe *all the asserted claims of the asserted patents.*" (*Id.*)

A finding of indirect infringement requires a predicate finding of direct infringement by any actor. *Met-Coil*, 803 F.2d at 687. As discussed above, I find the iLife Products meet the apparatus and method claims of the '553 patent. It has been admitted that iLife imports or sells for importation the iLife Products into the U.S. for customer end use. Thus, it is entirely reasonable to conclude, based on this circumstantial evidence, direct infringement of the apparatus and method claims of the '553 patent has occurred inside the U.S. by customers who

Public Version

purchased the iLife Products. *Lucent Techs.*, 580 F.3d at 1318. I note that Respondents do not, and could not credibly, claim that there is no use of their products within the United States by purchasing customers. (See RRSB at 56-59.) They simply argue, *incorrectly*, that it has not been “shown.” (*Id.* at 58-59.)

Regarding inducement, I find iLife have been shown to actively and knowingly aid customer’s use of the iLife Products through, for example, instruction manuals and customer service (see CIB at 106 (citations omitted); see, e.g., CX-0221C at Q509)) as well as encouraging third parties to sell the products (see *id.* at 107 (citations omitted); see, e.g., CX-0221C at Q509)) Regarding contributory infringement, I agree that the provision of replacement parts can contribute to the infringement of the asserted claims. (See *id.* at 106-107; see, e.g., CX-0221C at Q506.)

For both inducement and contributory infringement, however, I do not find sufficient evidence that iLife had knowledge of infringement of the patent. The only evidence iRobot provides for the ’553 patent is an *untranslated* email [

] (CIB at 107 (citing CX-1401C at 9212-9214).) Without translation or other evidence showing some knowledge of the scope of the ’553 patent, I cannot find the requisite knowledge from this document. *Symantec*, 522 F.3d at 1292-93 (“inducement requires evidence of culpable conduct, directed to encouraging another’s infringement, not merely that the inducer had knowledge of the direct infringer’s activities.”); see *Commil*, 135 S.Ct. at 1926 (“Like induced infringement, contributory infringement requires knowledge of the patent in suit and knowledge of patent infringement.”). Further, the testimony iRobot references as showing “iLife’s corporate designee, Chan Leung, testified that [

] (CIB at 107 (citing CX-

Public Version

0278C at 130:20-133:16)) does not at all evidence “review” of the patents or “awareness” of all asserted patents before the Investigation. All the witness testified was that he [] (CX-0278C at 130:20-133:16 (discussing CX-0292C).)

Thus, it is my determination that iRobot has not shown that iLife induced or contributed to infringement of the ’553 patent by others.

E. Domestic Industry - Technical Prong

iRobot alleges the iRobot Products practice claims 1 and 10 of the ’553 patent. There is no dispute that iRobot has met the technical prong for the ’553 patent. (See CIB at 26; RRSB at 3-16.)

Starting with claim 1, it requires “[a]n autonomous coverage robot.” (’553 patent at cl. 1.) I find credible and un rebutted testimony shows the iRobot Products are floor cleaning robots that use intelligence to navigate a space without human involvement. (See CIB at 26 (citing CX-0221C at Q132, 287).) The limitation is met.

Claim 1 further requires, “a drive system configured to maneuver the robot according to a heading setting and a speed setting.” (’553 patent at cl. 1.) I find credible and un rebutted testimony shows the iRobot Products have powered wheels with independent motors. (See CIB at 26-27 (citing CX-0221C at Q133, 288).) I further find sufficient evidence showing the motors are controlled according to a speed setting and wheel position sensed with an encoder, as found in [] and [] source code files. (See *id.* at 26 (citing RX-2048C at 80:1-6, 80:11-19, 81:23-25; CPX-0004C (internal description omitted)).) This would be considered a “speed setting.” I further find sufficient evidence showing the iRobot Products turn according to a target angle in a closed loop fashion, as found in the [] source code file. (See *id.* at 27 (citing RX-2048C at 80:1-6, 80:11-19, 81:23-25; CPX-0004C).) This would be the

Public Version

“heading setting.” The limitation is met.

Claim 1 further requires, “a bump sensor responsive to a collision of the robot with an obstacle in a forward direction.” (’553 patent at cl. 1.) I find credible and unrebutted testimony shows the iRobot Products include bumpers on the front of the housing which depress when contact is made and send a signal to a controller which interprets the signal as a collision in the forward direction. (*See* CIB at 27 (citing CX-0221C at Q136, 290).) The limitation is met.

Claim 1 further requires, “a proximity sensor responsive to a potential obstacle forward of the robot.” (’553 patent at cl. 1.) I find credible and unrebutted testimony shows the iRobot Products include infrared sensors directed forwards and responsive to obstacles at a distance before sending a signal to the controller. (*See* CIB at 27-28 (citing CX-0221C at Q134-135, 291).) The limitation is met.

Claim 1 further requires, “wherein the drive system is configured to reduce the speed setting in response to a signal from the proximity sensor indicating detection of a potential obstacle, while continuing to advance the robot according to the heading setting.” (’553 patent at cl. 1.) I find credible and unrebutted testimony shows the iRobot Products employ a “light touch” behavior where detection of an obstacle by the proximity sensor causes the robot to slow down but maintain its movement in the forward direction. (*See* CIB at 28 (citing CX-0221C at Q292; RX-2048C at 82:7-83:25).) The limitation is met.

Claim 1 further requires, “wherein the drive system is configured to increase the speed setting if the drive system does not receive a subsequent signal indicating the presence of an obstacle while continuing to advance according to the heading setting and the reduced speed setting.” (’553 patent at cl. 1.) I find credible and unrebutted testimony shows the iRobot Products will increase their speed and maintain their heading if an obstacle, which had

Public Version

previously caused the robot to slow down, is removed. (See CIB at 28 (citing CX-0221C at Q293; RX-2048C at 79:21-25, 82:7-83:5).) The limitation is met.

Claim 1 finally requires, “wherein the drive system is configured to alter the heading setting in response to a signal received from the bump sensor indicating contact with an obstacle.” (’553 patent at cl. 1.) I find credible and un rebutted testimony shows the iRobot Products will stop and alter course when they physically collide with an obstacle that triggers the bump sensor. (See CIB at 28 (citing CX-0221C at Q294; RX-2048C at 79:21-25, 122:24-123:10).) The limitation is met.

Claim 10 requires, “[t]he robot of claim 1 wherein the drive system is configured to increase the speed setting if the drive system does not receive the subsequent signal from the bump sensor indicating the presence of an obstacle within an elapsed time after the speed setting is reduced.” (’553 patent at cl. 1.) I find credible and un rebutted testimony shows the iRobot Products will increase their speed and maintain their heading if an obstacle, which had previously caused the robot to slow down, fails, for whatever reason, to trigger the bump sensor on the front of the robot. (See CIB at 29 (citing CX-0221C at Q295; RX-2048C at 82:7-83:5).) The limitation is met.

Thus, I find iRobot has proven by a preponderance of the evidence that the iRobot Products practice claims 1 and 10 of the ’553 patent.

F. Validity

Respondents’ initial post-hearing brief identifies the following invalidity theories against the asserted claims of the ’553 patent:

Claims	Theory
1, 12	Anticipated by Suckmaster

Public Version

4, 12, 13, 22	Rendered obvious by Suckmaster in light of Mobile Robots
---------------	--

1. Alleged Prior Art

Respondents allege the “Suckmaster” robot is prior art to the ’553 patent under § 102(b) because it was in public use at “the Atlanta Hobby Robot Club” in 2002, 2003, and 2004. (RIB at 11.) Respondents explain the robot was created by Dale Heatherington and won the Atlanta Hobby Robot Club Vacuum Contest in each of these years, which was open to the public. (*Id.* at 10 (citing RX-2043C at 10:10-11, 13:1-18, 13:24-14:9, 14:16-23, 16:6-18).)

Additionally, Respondents contend certain source code was used to operate the robot in the 2002 contests and had not changed the code for any of the victories. (*Id.* at 11 (referring to RX-0052 at 9:17-10:9, 25:13-22).) Respondents explain further:

Mr. Heatherington published an article describing the Suckmaster II on his website in February 2002. (RX-0052 at 6-10; RX-2043C at 7:15-9:16.) Mr. Heatherington’s article was freely available to the public. (RX-2043C at 10:12-14.) It was archived by the Internet Archive’s “Wayback Machine” beginning in June, 2002. (RX-0052 at 43-49; RX-2043C at 12:4-14.) The article contained a direct link to a zip file containing the source code that was used in the Suckmaster robot. (RX-0052 at 6, 43; RX-2043C at 17:14-17.) The source code contains a date showing that Mr. Heatherington last revised the code in January, 2002. (RX-0052 at 12; RX-2043C at 10:1-9.) The Suckmaster article is prior art under § 102(b) because it was published in 2002. The source code is part of the article because it was published as part of the same webpage. Alternatively, the source code is incorporated by reference into the article because it is linked from the article, and the article states “If you want to see the schematics an source code click here.” (RX-0052.006.) *Husky Injection Molding v. Athena Automation Ltd.*, 838 F.3d 1236, 1248 (Fed. Cir. 2016) (“The incorporation standard relies only on the reasonably skilled artisan and his or her ability to deduce ... what a host document aims to incorporate.”)

Public Version

(*Id.* at 11-12.) Respondents conclude with an assertion that the robot, code, and article are all prior art and describe each other—*i.e.*, “source code was used in the robot” and “article accurately describes the robot.” (*Id.* at 12 (citing RX-2043C at 9:17-109, 8:18-21).)

In its responsive brief, iRobot claims Respondents “cannot prove that the alleged Suckmaster source code is actually prior art to the ’553 patent” and “much less that it is the code used during the 2002 AHRC rally.” (CRSB at 5.) iRobot also argues the Wayback Machine archive of the source code has a date of 2012, seven years after the priority of the ’553 patent. (*Id.*)

Moving on, iRobot faults Respondents for “fail[ing] to obtain the actual Suckmaster robot . . . and are now trying to piece together a prior art system through a combination of archived internet references, an article, and source code.” (*Id.* at 10.) iRobot argues the source code might also not be complete as Respondents never attempted to compile it, which casts doubt onto whether it was the code used in the robot. (*Id.* at 10-11 (citing Hr’g Tr. at 723:4-13, 723:14-724:13, 645:21-647:13, 730:22-731:9).) iRobot then argues Respondents cannot meet their clear and convincing burden without “firm proof that they have the correct source code.” (*Id.* at 11 (citing *Adenta GmbH v. OrthoArm, Inc.*, 501 F.3d 1364, 1371 (Fed. Cir. 2007))). iRobot reasons “[t]herefore, Respondents have not met their burden to show that the Suckmaster’s AHRC performances qualify as invalidating public uses.” (*Id.*)

iRobot then claims the Suckmaster source code is not prior art to the ’553 patent because, as mentioned, it was “first archived seven years after the ’553 patent’s 2005 priority date.” (*Id.* (citing CX-0106).) iRobot contends this fails to show the source code was publicly accessible one year before the ’553 patent’s provisional application in December 2005.” (*Id.* at 12 (citing *In re Hall*, 781 F.2d 897, 899 (Fed. Cir. 1986); *In re Lister*, 583 F.3d 1307, 1311 (Fed. Cir.

Public Version

2009)).) iRobot view Respondents as “posit[ing] that the Wayback Machine captured and archived the Suckmaster article in June 2002.” (*Id.*) Any attempt to argue the code was available in 2002, according to iRobot, “ignore[s] the simplest explanation as to why the source code was not archived in 2002: it was *not* available.” (*Id.*) iRobot continues:

Respondents fail to address the various possibilities regarding why the code was not archived in 2002. In fact, it is just as likely that the absence of a 2002 archive indicates the source code was not available during that time. For example, the purported hyperlink from the article to the code could have been a broken link not fixed until 2012. The source code may not have been posted contemporaneously with the article. Simply put, the mere existence of the link does not establish public accessibility.

(*Id.* at 13.) iRobot argues that neither the testimony from Mr. Heatherington and Respondents’ expert, nor the date comments within the source code itself cure this deficiency. (*Id.* at 13 (citing RX-2043C at 10:1-9, 17:14-17; Hr’g Tr. at 261:24-264:12, 645:21-647:11, 723:8-724:13, 730:22-731:9).) iRobot also references a failed IPR petition from Respondents based on the article and source code. (*Id.* at 14 (citing *Shenzhen Zhiyi Tech. Co., Ltd. v. iRobot Corp.*, IPR2017-02133, Paper No. 8, at *11 (PTAB March 28, 2018)).) iRobot concludes “[f]or these reasons, the Suckmaster robot and source code are not prior art on which Respondents may rely. (*Id.*)

In their reply brief, Respondents notes “iRobot does not dispute that the article and the link were published in 2002” or that “the Suckmaster robot itself was publicly used in the AHRC robot competition in 2002-2004.” (RRPB at 5.) Respondents then recollect that body of evidence which they argue shows the article and code “accurately describes the actual Suckmaster system that ran during the AHRC competition in 2002.” (*Id.* at 5-6 (citing RX-2043C at 8:9-21, 18:21-19:18, 9:17-10:9, 25:13-22; RX-0052.002; Hr’g Tr. at 723:23-24).) Respondents contest the assertion that Mr. Heatherington never actually states when the source code became available. (*Id.* at 6 (citing RX-2043C at 8:15-17, 17:4-18:9; RX-0052.002, 006;

Public Version

RX-1211).) Respondents contend iRobot's criticisms of the Wayback Machine archive are unsubstantiated attorney argument, and the nature of the evidence gathered would otherwise satisfy my G.R. 14.2. (*See id.* at 6-7.) Lastly, Respondents provide several reasons why, in their view, the failed IPR petition should not be given much weight, including lack of deposition testimony and other evidence. (*Id.* at 7.)

I find the parties' dispute here is actually quite limited. iRobot does not dispute that Mr. Heatherington ran a robot called the Suckmaster at the AHRC competition in 2002 (or 2003 or 2004 for that matter). iRobot also does not dispute that the Suckmaster article was published on the internet sometime in 2002. In this way, there is no dispute that the Suckmaster robot qualifies as prior art to the '553 patent under § 102(b) and § 102(g). *See* 35 U.S.C. § 102(g)(2) ("before such person's invention thereof, the invention was made in this country by another inventor who had not abandoned, suppressed, or concealed it."). Similarly, there is no dispute that the article, which describes that robot, is itself prior art under § 102(b).

Rather, iRobot's resistance to Suckmaster as prior art is focused on the source code, arguing both of: (1) it is not clear the source code obtained was that which ran on the Suckmaster during the 2002 AHRC competition; and (2) it can't be used at all "because it is not prior art to the '553 patent. . . . that code was first archived seven years after the '553 patent's 2005 priority date." (*See* CRSB at 10-12.)

The second challenge is the least persuasive. iRobot argues "[w]hile Respondents contort themselves to formulate some explanation as to why code archived in 2012 would have been publicly available in 2002, Respondents ignore the simplest explanation as to why the source code was not archived in 2002: it was *not* available." (CRSB at 12 (emphasis in original).) I disagree. The Wayback Machine's failure to archive a webpage during a certain time is by no

Public Version

means proof the webpage did not exist at that time. To conclude otherwise is to treat the Wayback Machine as a perfect observer and recorder of the internet. This cannot be so. Moreover, under some circumstances, the law allows post-priority date records to show pre-priority public use. *Syntex (U.S.A.) LLC v. Apotex, Inc.*, 407 F.3d 1371, 1379 (Fed. Cir. 2005). Thus, even if the source code was indisputably created after the '553 patent priority date (*see, e.g.,* CRSB at 12-13), it can still corroborate or explain a public use of the '553 patent's invention before that date—*e.g.,* the Suckmaster's performance at the AHRC competitions. iRobot's argument, therefore, on why the source code is not itself prior art is beside the point.

Regarding whether the source code which was obtained was that which actually ran on the Suckmaster during the 2002 AHRC competition, Mr. Heatherington submitted testimony in this investigation that it was. (*See* RX-2043C at 9:17-10:14, 37:3-10.) He also provided convincing testimony that the code was not changed, at least materially, over the years it was in competition:

Q. And I believe you testified that you entered the Suckmaster II in the 2002, 2003 and 2004 competition?

A. And the 2006.

Q. Did you ever change the design of the Suckmaster II from year to year?

A. No. No.

Q. And why was that?

A. Because it won. If it's working, don't change it.

(*Id.* at 25:13-22.) On the source code itself, the opening comment line says January 16, 2002 (RX-0052.012) which Mr. Heatherington testified was the last time he modified it (RX-2043C at 10:1-5). iRobot does not dispute this fact, it only argues sufficiency; “this *single comment* in the code *does not prove* the source code was actually modified on that date.” (CRSB at 13

Public Version

(emphasis added).) Also, all of the files located with that code in the zip file obtained by Respondents through the Wayback Machine (*see* CRSB at 11) have a “Date modified” of February 16, 2002 (RX-1211) which is the date Mr. Heatherington testified he uploaded it to his website (RX-2043C at 8:5-17) and the same date at the top of the article published on that website (RX-0052.006).

In order to conclude that the source code was not that which ran on the Suckmaster robot, I must have reason to doubt the above body of corroborating evidence, and iRobot does not provide me much reason. Beyond the Wayback Machine archival issue, iRobot theorizes “there is no indication that the source code is even complete” and “[w]ith no evidence offered to show that the code was maintained using a change management system or procedure, Dr. Hooper testified that one cannot ‘know what source code was compiled and loaded into the robot.’” (CRSB at 11 (citation omitted).) This is not evidence of contradiction, however; it is argument on what could have been done to further corroborate.

The Federal Circuit instructs that “[a]ssessing the sufficiency of evidence which corroborates a witness’s testimony concerning invalidating activities has been analyzed under the ‘rule of reason’ test, and it is a jury question.” *Adenta*, 501 F.3d at 1372. With the exception of the Wayback Machine 2012 capture date for the code, the content and chronology of Respondents’ collection of evidence is consistent with itself and with Mr. Heatherington’s testimony. In light of this, I find it is reasonable to conclude that the source code contained in RX-0052 describes the operation of the Suckmaster robot which operated in the AHRC competitions between 2002 and 2006. I do not make a determination as to whether the source code is prior art by itself because, as mentioned above, this is beside the point.

Public Version

Respondents' invalidity case also uses "a prior art book, entitled *Mobile Robots* [{"Mobile Robots"}], that is 'geared towards people who are new to the field of robotics.'" (RIB at 26 (citing RX-0084).) Respondents do not identify why *Mobile Robots* is prior art to the '553 patent, however. (See RIB at 7-33.) Nevertheless, I find *Mobile Robots* was published in 1999 based on copyright date. (RX-0084.003.) Compared to a priority date of December 2, 2005 for the '553 patent (see RIB at 5), I find *Mobile Robots* qualifies as prior art under § 102(b).

2. 35 U.S.C. § 102

In its opening brief, Respondents contend claims 1, 11, and 12 of the '553 patent are anticipated by the Suckmaster Robot. (See RIB at 12, 22, 23.) As discussed below, Respondents have shown apparatus claim 1 anticipated by clear and convincing evidence, but not method claims 11 and 12 (through its dependency on claim 11).

a. Claim 1

Claim 1 requires, "[a]n autonomous coverage robot." ('553 patent at cl. 1.) Respondents argue Suckmaster "operates without human guidance in the 8-foot square simulated room of the AHRC contest, and seeks to maximize coverage of that room in order to pick up as much rice as possible. (See RIB at 12 (citing RX-2081C at Q158).) Respondents identify a dispute as to whether Suckmaster is "autonomous," and then cite to their expert to confirm it is autonomous. (*Id.* at 12-13 (citing Hr'g Tr. at 321:15-20).) Respondents suggest iRobot's dispute is really over how efficient the Suckmaster is at cleaning. (*Id.* at 13.) Respondents argue "what matters is that when the Suckmaster is switched on, its starts cleaning entirely on its own, following the program set forth [in] its source code and the inputs from its sensors. (*Id.* at 13-14 (citing Hr'g Tr. at 420:23-321:20).) In its responsive brief, iRobot does not dispute this limitation. (CRSB at 15-19.) I agree it is met.

Public Version

Claim 1 further requires, “a drive system configured to maneuver the robot according to a heading setting and a speed setting.” (’553 patent at cl. 1.) I find clear and un rebutted evidence demonstrates the limitation was met in the Suckmaster Robot through the identified speed and heading settings. (See RIB at 14-15 (citing RX-2081C at Q161, 162; RX-0052.007, 008, 031).)

Claim 1 further requires, “a bump sensor responsive to a collision of the robot with an obstacle in a forward direction.” (’553 patent at cl. 1.) I find clear and un rebutted evidence demonstrates the limitation was met in the Suckmaster Robot through the identified maneuvering actions. (See RIB at 15 (citing RX-2081C at Q163-165; RX-0052.007, 009, 034).)

Claim 1 further requires, “a proximity sensor responsive to a potential obstacle forward of the robot.” (’553 patent at cl. 1.) I find clear and un rebutted evidence demonstrates the limitation was met in the Suckmaster Robot through the identified sonar system. (See RIB at 15 (citing RX-2081C at Q166-168; RX-0052.007).)

Claim 1 further requires, “wherein the drive system is configured to reduce the speed setting in response to a signal from the proximity sensor indicating detection of a potential obstacle, while continuing to advance the robot according to the heading setting” and “wherein the drive system is configured to increase the speed setting if the drive system does not receive a subsequent signal indicating the presence of an obstacle while continuing to advance according to the heading setting and the reduced speed setting.” (’553 patent at cl. 1.) Respondents explain:

The Suckmaster article shows that when the robot slows down and speeds up it stays straight. It explains that when Suckmaster is first turned on, for 12 seconds it follows a wall on its left hand side. (RX-0052.009.) After 12 seconds, the robot changes its mode to “move forward until something is touched” and “begins random pattern cleaning” (RX-0052.009.) “To avoid crashing into objects at high speed, sonar is used to detect the presence of objects and slow down when near. High speed operation is resumed when the front sonars see no objects closer than 20 inches.” (RX-0052.009.)

Public Version

That operation—“move forward until something is touched” but “slow down when near” objects—is what satisfies the claims.

(RIB at 16.) Respondents then state, “[t]hat operation—‘move forward until something is touched’ but ‘slow down when near’ objects—is what satisfies the claims.” (*Id.*) Respondents add “Dr. Martens testified that the Suckmaster article and source code show that when the robot slows down and speeds up it stays straight.” (*Id.* at 18 (citing RX-2081C at Q174).) Respondents claim there is no dispute the robot slows down in this way and speeds back up “in response to not receiving a signal from the proximity sensors.” (*Id.* (citing Hr’g Tr. at 664:4-6, 674:5-7).) Respondents thus view the dispute as whether the “robot continues straight as it slows down.” (*Id.*) Respondents claim that during the first 90 seconds of operation, the robot only turns when and if it hits an obstacle. (*Id.* at 19 (citing RX-0052.009-010).) Respondents contend any claim that the Suckmaster would turn or veer during the slowing down/speeding up process is unsubstantiated by the record. (*Id.* at 19-20 (referring to CX-1825C at Q35-36; Hr’g Tr. at 675:9-18, 681:4-21)).) According to Respondents, “A_WALL_LEFT” and “A_WALL_RIGHT” functions are only called when the robot bumps into something. (*Id.* at 20 (citing RX-0052.073; Hr’g Tr. at 680:19-681:13, 686:16-22, 687:14-19).) Similar functions, “A_TURN_RIGHT” and “A_TURN_LEFT,” will turn a robot before it bumps something, but Respondents contend these are never used during the first 90 seconds of operation. (RIB at 20-21 (citing RX-0052.069; Hr’g Tr. at 727:14-729:17).)

In its responsive brief, iRobot argues “Respondents rely on two sentences taken out of context from the Suckmaster article to purportedly show that this limitation is satisfied.” (CRSB at 15.) iRobot states:

Dr. Hooper explained that Suckmaster never passes from the high- to slow-speed states without changing its heading. Dr. Hooper’s review of the code confirmed that every time the Suckmaster transitioned to its

Public Version

slow-speed state, it would execute code that had it twitch or veer, causing a change in its heading.

(*Id.* (referring to Hr'g Tr. at 675:19-24, 674:8-675:18).) iRobot claims Mr. Heatherington confirmed "that the Suckmaster will change its heading by 'veer[ing] left or right' upon detecting an obstacle, which is what causes it to slow." (*Id.* at 16 (citing RX-2043C at 55:6-16; 52:8-18, 62:10-63:5).) iRobot then challenges whether the Suckmaster article sufficiently describes slowing without changing heading or different slow down behaviors before and after a 90 second mark. (*Id.* (citing RX-2081C at Q171, 174).) For the source code, iRobot faults Respondents for "cit[ing] to discrete segments of code instead of analyzing the code's logical flow to prove this is true." (*Id.*) For the initial 90 second period, iRobot also criticizes Respondents' expert as "remarkably thin" when it comes to discussing the slow down and speed up behaviors. (*Id.* at 17 (citing RX-2081C at Q171, 174).) iRobot continues:

Perhaps recognizing that their own expert's analysis of the Suckmaster source code was facially deficient, Respondents turned to Dr. Hooper during cross-examination. Respondents hoped to have him prove that Suckmaster satisfies this limitation but they were unsuccessful. As Dr. Hooper testified, the Suckmaster source code is more complicated than Dr. Martens and Respondents suggest, and cannot be fairly analyzed by looking to discrete snippets without examining the code in full. (Hrg. Tr., Hooper at 679:13-680:8, 661:5-17, 729:19-730:7.) Dr. Hooper explained that the Suckmaster source code creates a state machine where various defined operational states are entered into, and exited out of, in real-time based partly upon sensor input. (*Id.* at 679:13-680:8.) Dr. Hooper's review of the code confirmed that the Suckmaster always veered or turned as part of its entering the slow speed state, including during the first 90 seconds of its operation. (*Id.* at 675:19-24, 674:8-675:18.)

(*Id.*) iRobot also explains how, in its view, Mr. Heatherington's understanding of his robot supports their view that veering or turning always occurs:

Mr. Heatherington was asked, with emphasis added to show the relied upon disclosure: "Q: And what does it mean that -- when would it happen in that situation that a *high speed operation would be resumed when the front sonars see no objects closer than 20 inches?* How would that come to be?" (RX-2043C, Heatherington at 55:6-10.) Mr. Heatherington's

Public Version

response was clear; he explained that the robot would sense an object, slow down, “*veer left or right*” if the object was within 20 inches of the robot, and speed up if obstacle was no longer present. (*Id.* at 55:11-23 (emphasis added).) Mr. Heatherington’s response that, during the same 90-second time period Respondents rely upon, the Suckmaster would veer upon sensing an obstacle supports Dr. Hooper’s opinion and shows that Suckmaster does *not* satisfy this limitation.

(*Id.* at 18.)

In their reply brief, Respondents argue flatly that Dr. Hooper was simply unable to support his conclusion about what the source code showed. (RRPB at 7.) Respondents further argue the article’s disclosure of “move forward until something is touched” means no veering occurs. (*Id.* at 8 (referencing RX-0052.009).) Respondents highlight the article’s disclosure of “avoid crashing into objects at high speed, sonar is used to detect the presence of objects and slow down when near. High speed operation is resumed when the front sensors see no objects closer than 20 inches.” (*Id.* (citing RX-0052.009).) Respondents confirm its view that “Suckmaster slows down and speeds up based on its sonar proximity sensors” (*id.* at 9 (citing Hr’g Tr. at 664:4-6, 674:5-7)) and does not turn in response to sonar sensors during the first 90 seconds (*id.* at 9-10 (citing, *inter alia*, RX-0052.033; Hr’g Tr. at 730:8-18; RX-2081C at Q171, 174)). Respondents finally contend that Mr. Heatherington’s testimony on “veer left or right,” when viewed in context, was about operation after the first 90 seconds—“[a]ll of Mr. Heatherington’s veering testimony relates to steering around objects in this after-90-second mode, which is not the mode that respondents rely upon.” (*Id.* at 11-12.)

I find clear and convincing evidence shows the limitation is met. The 2002 article describing Suckmaster’s modes of operation states:

The Suckmaster II is started with its left side against the wall of the simulated room. It moves forward [sic] until it touches the far wall and executes at 90 degree right turn and moves until it touches the next wall and executes another 90 degree right turn. It then runs until it touches the speaker box and executes a 90 degree right turn. The robot is now pointed

Public Version

at the middle of the room. By this time the 12 second timer has expired and changed the mode to “move forward until something is touched” and begins random pattern cleaning.

To avoid crashing to objects at high speed, sonar is used to detect the presence of objects and slow down when near. High speed operation is resumed when the front sonars see no objects closer than 20 inches.

When the robot touches something (bump switch detection) it will turn in the direction with the greatest free space as indicated by the side looking sonar. It will continue to turn until the forward sonar sees a clear path. Sometimes a random additional rotation is added to help randomize the cleaning pattern.

After 90 seconds the mode is changed to “move forward until sonar sees an object within 8 inches”. The robot now steers around objects without touching them (usually). If the sonar fails to detect a small object such as the leg of the folding chair the bump switch will command the robot to backup and turn away.

(RX-0052 at 5176-5177.) I find this passage discloses a robot which, in the 13-90 second time window, operates in a “move forward until something is touched” mode; *i.e.*, the robot moves in straight lines. In this mode, “sonar is used to detect the presence of objects and slow down when near. High speed operation is resumed when the front sonars see not objects closer than 20 inches.” Also in this mode, turning only occurs once the bump sensor registers contact—*i.e.*, “move forward until something is touched.” This is different from the next mode of operation, “move forward until sonar sees an object within 8 inches” starting at the 91st second, where turning will happen while moving so that the robot “steers around objects without touching them.” I note these conclusions can be reached without consulting the source code.

iRobot’s resistance to these limitations is rooted in the supposition that, in the “move forward until something is touched” mode, turning will always occur before the robot hits an obstacle. (CRSB at 15 (citing Hr’g Tr. at 675:19-24, 674:8-675:18).) I find this to be contrary but not completely incompatible with what is disclosed by the article; “move forward” could

Public Version

potentially allow for small heading adjustments, like veering. Yet, as demonstrated at the hearing, iRobot's expert could not initially explain where this supposed pre-collision turning behavior was within the Suckmaster code. (Hr'g Tr. at 678:17-681:21.) When the expert was further questioned, he identified "A_WALL_LEFT" and "A_WALL_RIGHT" turning functions (*id.* at 684:22-686:15), but admitted these only occur in response to a bump sensor signal (*id.* at 687:12-21.) On redirect, the expert pointed to different turning functions "A_TURN_RIGHT" and "A_TURN_LEFT" (*id.* at 722:16-25 (pointing to RX-0052 at 5197)), but Respondents have clearly shown these functions "are inactive during the first 90 seconds, when the 'move forward until something is touched' mode is active" (RRPB at 10 (citing Hr'g Tr. at 726:22-730:18)). I thus find it clear and convincing that in the "move forward until something is touched" mode, the evidence shows the robot would turn only after the bump sensor is contacted. Thus, the limitations are met.

Claim 1 further requires, "wherein the drive system is configured to alter the heading setting in response to a signal received from the bump sensor indicating contact with an obstacle." ('553 patent at cl. 1.) I find clear and un rebutted evidence demonstrates the limitation was met in the Suckmaster Robot through the identified bump switch detection function. (*See* RIB at 22 (citing RX-2081C at Q175-178; RX-0052.009).)

b. Claim 11

Claim 11 requires, "A method of navigating an autonomous coverage robot with respect to an object on a floor." ('553 patent at cl. 11.) I find clear and un rebutted evidence demonstrates the limitation was met by the Suckmaster Robot, for the same reasons discussed above for claim 1. (*See* RIB at 22.)

Claim 11 further requires, "autonomously traversing the floor in a cleaning mode at a cleaning speed." ('553 patent at cl. 11.) Respondents argue this limitation is "subsumed" by a

Public Version

similar limitation in claim 1 and satisfied for the same reason. (RIB at 22 (citing RX-2081C at Q183-195).) iRobot argues the Suckmaster is not autonomous because the '553 patent supposedly redefines autonomy as “robots which can perform tasks in unstructured environments without continuous human guidance” and “Suckmaster was built for an environment that was anything but unstructured.” (CRSB at 19 (referring to '553 patent at 1:21-22).) More specifically, according to iRobot, “Suckmaster was hard-coded with advance knowledge of the structured AHRC environment in which it was designed to operate.” (*Id.* at 20 (citing CX-1825C at Q45-47).) iRobot also points to testimony from Mr. Heatherington where he described that with the robot, “there ‘was no learning involved whatsoever’ about its environment and that instead ‘it was all programmed.’” (*Id.* (citing RX-2043C at 31:2-6).) iRobot also claims the robot’s starting position “with a left side up against a wall at startup” was a necessity and shows lack of autonomy. (*Id.* (citing CX-1825C at Q48; RX-0052 at 5176; Hr’g Tr. at 265:11-15, 667:25-668:25; RX-2043C at 28:19-29:1, 31:15-18, 44:3-14).)

In their reply brief, Respondents points to expert testimony that “if the Suckmaster were turned on in an new environment it would ‘absolutely’ drive around” and that “it is ‘constantly responding to sensors.’” (RRPB at 12 (citing Hr’g Tr. at 321:15-20, 320:23-321:11).)

I find the limitation is squarely met. To start, the '553 patent does not redefine, or act as its own lexicographer, to redefine “autonomous” through the statement “robots which can perform tasks in unstructured environments without continuous human guidance” (CRSB at 19.)⁵ When placed in context, it is clear this sentence is one of many which simply provide examples of autonomous robots capability and work environments:

⁵ iRobot also misquotes the specification. It reads “[a]utonomous robots are robots which can perform *desired* tasks in unstructured environments without continuous human guidance.” ('553 patent at 1:21-22.)

Public Version

BACKGROUND

Autonomous robots are robots which can perform desired tasks in unstructured environments without continuous human guidance. Many kinds of robots are autonomous to some degree. Different robots can be autonomous in different ways. An autonomous coverage robot traverses a work surface without continuous human guidance to perform one or more tasks. In the field of home, office and/or consumer-oriented robotics, mobile robots that perform household functions such as vacuum cleaning, floor washing, patrolling, lawn cutting and other such tasks have been widely adopted.

(’553 patent at 1:21-30.) Even if I were to accept the first sentence of this paragraph as an explicit redefinition of the common term “autonomous,” the Suckmaster would satisfy it. It certainly operates without continuous human guidance. (See RX-0052.009-010) and nothing prevents the Suckmaster from “performing desired tasks in unstructured environments.” It will run its programmed routine, without human intervention, and according to its sensors’ responses to that environment, wherever it is placed, as Respondents’ expert very credibly testified. (Hr’g Tr. at 320:18-31:20.) Indeed, how well it can operate without human guidance was likely the point of the AHRC contest it was a part of. The limitation is met.

Claim 11 further requires, “upon sensing a proximity of the object forward of the robot, reducing the cleaning speed to a reduced speed while continuing towards the object.” (’553 patent at cl. 11.) Claim 11 further requires, “in response to not sensing the presence of the object while advancing at the reduced speed, increasing the speed setting.” (’553 patent at cl. 11.) Both Respondents and iRobot treat these limitations as equivalent to those of independent claim 1. (See RIB at 22; CRSB at 20-21.)

I agree the limitations are similar, but unlike the apparatus of claim 1 which required a “drive system” “configured” to take certain actions, claim 11 is a *method* claim and thus requires its steps to actually have taken place. *Schumer v. Lab. Computer Sys., Inc.*, 308 F.3d 1304, 1312 (Fed. Cir. 2002).

Public Version

I do not find clear and convincing evidence that the corresponding *method step* of claim 11 was actually performed by the Suckmaster robot; specifically, “in response to not sensing the presence of the object while advancing at the reduced speed, increasing the speed setting.” (’553 patent at cl. 11.) According to the evidence, and as discussed above, the robot was *configured* to use sonar “to detect the presence of objects and slow down when near. High speed operation is resumed when the front sonars see no objects closer than 20 inches.” (RX-0052 at 5176.) This was within a “move forward until something is touched” mode of operation.

In order for this configuration to perform the method step, however, the Suckmaster would have needed to: 1) sensed an object, 2) slowed down, 3) ceased sensing an object, and then 4) sped back up, *all without having bumped into that object*. This does not seem likely while operating within a “move forward until something is touched” mode. It could possibly happen if an object was placed in front of the robot and moved before contact (*e.g.*, a person walking by) (*see* RX-2043 at 55:17-56:5), but by all indications, the AHRC contest involved a static environment. (RX-1213; RX-2043 at 30:18-20, 62:10-17.) I therefore do not find clear and convincing evidence shows this method step was actually performed.

Claim 11 further requires, “in response to sensing contact with the object, turning with respect to the object and cleaning next to the object.” (’553 patent at cl. 11.) Respondents contend this is met because:

The source code shows that the robot starts in “vacuum perimeter” mode. (RX-0052.009.) In that mode, which it uses for the first 12 seconds, it follows the perimeters of obstacles—specifically walls—in order to clean next to them. (RX-0052.009; RX-2081 at Q202.) Additionally, when it senses contact with a wall in front of it, it turns 90 degrees with respect that wall, and then cleans next to it, exactly as required by the claim:

The Suckmaster II is started with its left side against the wall of the simulated room. It moves forward[sic] until it touches the far wall and executes at 90 degree right turn and moves until it touches the next wall and executes another 90 degree right turn. It then runs

Public Version

until it touches the speaker box and executes a 90 degree right turn. The robot is now pointed at the middle of the room. By this time the 12 second timer has expired and changed the mode to ‘move forward until something is touched’ and begins random pattern cleaning. (RX-0052.009.)

(RIB at 23.) Respondents point out that the robot is “configured to follow the wall to its left by physically contacting it and sliding along it, which it accomplishes by driving the right wheel slightly faster than the left wheel (setting FWD5 for the right wheel and FWD4 for the left wheel).” (*Id.* at 24 (citing RX-0052.035).) Respondents claim that during later operation, “in some cases, after Suckmaster hits a wall, it will turn until its path is clear” and at that moment, the expert explained, “ ‘the robot will then proceed straight following right alongside the wall that it ran into. In other words, it turns with respect to the wall that it hit, and then follows the perimeter of that wall, just as in the claim.’ ” (RIB at 25 (citing RX-2081C at Q202; RX-0052.031, 034).) Respondents, addressing claim 12 in tandem with this limitation, argue it is wrong to require proximity sensor based wall following here. (*Id.*)

iRobot argues the limitation is not met because “Suckmaster operates with knowledge that the wall is present next to it. There is nothing responsive about this behavior, and Suckmaster therefore cannot satisfy this limitation.” (CRSB at 21.) iRobot explains “[t]here is no dispute about how the Suckmaster operates during its startup routine, which Respondents rely on to argue that this limitation is satisfied.” (*Id.*)

In their reply brief, Respondents suggest “iRobot acknowledges that Suckmaster has a vacuum perimeter mode where it cleans next to a wall, bumps the wall in front of it, and in response to sensing that contact, turns and cleans adjacent to the wall it bumped.” (RRPB at 13 (citing Hr’g Tr. at 653:14-654:10; RX-0052.009).) Respondents argue that setting the robot next to a wall, and an alleged “*a priori* knowledge” that a wall is beside it, does not matter because

Public Version

the claims do not require the absence of these things. (*Id.*) The bottom line, according to

Respondents, is:

The admitted behavior that was described the article and publicly used in the 2002-2004 AHRC competitions includes the required method steps: Suckmaster moved forward, contacted a wall, turned in response to the contact, and cleaned next to the wall it contacted while following along it with a “constant following distance” of zero. (*See* claims 11-13, RX-0052.009, Tr. 663:4-16 (Dr. Hooper agreeing Suckmaster is “following the perimeter of an obstacle” in the contest.) Thus, the claims are anticipated. (RX-2081 at Q202.)

(*Id.* at 13-14.)

I find the limitation from claim 11, “in response to sensing contact with the object, turning with respect to the object and cleaning next to the object,” is met. The evidence indisputably shows, during the first 12 seconds of operation, Suckmaster was programmed to proceed forward until it senses contact with a wall, whereupon it will turn to the right and again proceed forward, with the right wheel rotating slightly faster than the left. When the Suckmaster did this in the contest’s arena, it undisputed that it rode, slid, or skidded along the wall following the right turn due to the difference in speed between its two driving wheels. This is exactly “turning with respect to the object and cleaning next to the object” as required by the claim.

I agree with Respondents that the limitation does not require the absence of *a priori* knowledge of the cleaning environment or a starting position that is already up against an object, and iRobot offers no intrinsic evidence to read these requirements in to the claim. I would also note that, contrary to iRobot’s description, the robot does not “know the wall is up against its left side.” (CRSB at 21.) Mr. Heatherington knew this, which is why he could program the right wheel to rotate faster than the left and still expect the robot to move in a forward direction as opposed to spinning in circles—at least for the first 12 seconds. The method step was

Public Version

performed, and thus, the limitation is met. Why it was performed is not at issue. The Federal Circuit has explained:

If this were a product patent, the concept of capability would have relevance. So too it would have relevance if this process patent were tied to a “particular machine or apparatus.” But here we deal with a method claim which is not tied to a particular device but that “operate[s] to change articles or materials to a ‘different state or thing.’ ” *Gottschalk*, 409 U.S. at 71, 93 S.Ct. 253. Such a claim must be interpreted to cover *any process* that performs the method steps. Here in claim 1 the method is identified as “receiving a definition of a second coordinate system for the digitizer, which ... is not congruent with the digitizer's coordinate system because one of the following elements is different ...” ‘492 patent, col. 49, ll. 55–61. One of those elements is scale. Thus, for example, a method that translates from a device where only the scale is different is within the literal scope of the claim. The method is performed if any of the three features of a coordinate system is translated, and thus, infringement occurs if any one of these translations is performed.

Schumer, 308 F.3d at 1312 (emphasis added).

c. Claim 12

Dependent claim 12 requires, “[t]he method of claim 11 wherein the robot follows a perimeter of the object while cleaning next to the object.” (‘553 patent at cl. 12.) Respondents’ contention on this claim is captured above in the final limitation of claim 11. (*See* RIB at 23.) iRobot similarly claims that “because the Suckmaster does not, for example, use any sensors to sense or track the wall, but instead operates with “*a priori* knowledge” that a wall is beside it, it does not follow an object as claimed by the ‘553 patent.” (CRPB at 22 (citing Hr’g Tr. at 662:1-16, 663:4-16; CX-1825C at Q61).) Here, however, iRobot continues to argue the ‘553 patent specification “actually supports that following is distinct from driving into an object repeatedly.” (*Id.* at 22-23 (referring to ‘553 patent at 4:6-16).)

I again find the limitation is met. The issue is whether this method step was performed—not why it was performed. *Schumer*, 308 F.3d at 1312. It is undisputed the Suckmaster, in its first 12 seconds of operation, hit a wall, turned right in response to hitting that wall (as opposed

Public Version

to a timer elapsing) and rode, slid, or skidded along the next wall segment while sucking up rice. Even though the technique for following (sliding or skidding along a wall) might be considered crude, this is still “follow[ing] a perimeter of the object while cleaning next to the object.” The ’553 patent specification excerpt iRobot refers to does not support its position but rather supports the idea that riding, sliding, or skidding against a wall is one way of following a perimeter of an object. (See ’553 patent at 4:2-22.) Thus, the limitation is met in the Suckmaster.

3. 35 U.S.C. § 103

In its opening brief, Respondents contend claims 4, 12, 13, and 22 of the ’553 patent are rendered obvious by the Suckmaster Robot in light of Mobile Robots. (See RIB at 26.) As discussed below, I do not find clear and convincing evidence supports finding any of claims 4, 12, 13, and 22 obvious.

a. Claim 4

Dependent claim 4 requires, “The robot of claim 1 wherein the proximity sensor comprises at least one infrared emitter and receive pair.” (’553 patent at cl. 4.) Respondents “acknowledge that the proximity sensors of Suckmaster are not infrared, they are sonar sensors,” yet argue “infrared sensors were a well-known and predictable alternative to sonar sensors.” (RIB at 27 (referencing ’553 patent at 3:57-64).) Respondents contend “*Mobile Robots* discloses infrared sensors were known for use in performing the same function as Suckmaster’s sonar sensors—sensing proximal objects.” (*Id.* (citing RX-0084.070, 075, 078).) Respondents also point to expert testimony that “a person of skill in the art would be motivated to use infrared sensors, such as the ones shown in *Mobile Robots*, to ‘lower the cost’ of building a Suckmaster.” (*Id.* at 28 (citing Hr’g Tr. at 269:2-6, 313:23-315:9, 318:1-17, 319:24-320:17, 321:21-322:5).)

Public Version

In its responsive brief, iRobot argues “[u]sing the ’553 patent as a guide through the lens of hindsight, Respondents treat the Mobile Robots reference as an endless list of ingredients from which to choose an allegedly obvious combination.” (CRSB at 23.) iRobot continues:

[T]he Suckmaster is one of a kind and was built for the AHRC Competition. It was optimized for the competition with parts of the competition environment hard-coded into it and its operation set for just four minutes. It lacked many features commonly found in floor cleaning robots, including a vacuum and brushes. (Hrg. Tr., Martens at 256:22-257:17.)

(*Id.* at 24.) For claim 4 specifically, iRobot argues “POSITA would not be motivated to switch from a sonar to an infrared sensor without good reason because sonar sensors are more robust than infrared sensors.” (*Id.* at 25 (citing Hr’g Tr. at 58:10-20).) iRobot continues:

For example, Suckmaster used its sonar sensors to calculate distance from an object. (Hrg. Tr., Martens at 269:7-13; RX-2081C, Martens DWS at Q207.) Infrared sensors are generally not used for detecting distance, and using them in this manner requires significant knowledge about operating conditions. (Hrg. Tr., Martens at 269:25-271:3; *see also* CX-1825C, Hooper RWS at Q70.) Also, Dr. Martens’ testified that sonar is capable of detecting obstacles out to 20-30 inches ahead of it, whereas infrared is useful out to approximately 10 inches. (Hrg. Tr., Martens at 319:24-320:17.) Sonar’s increased range is necessary for the Suckmaster considering how fast it moves (600 mm/sec), as Respondents acknowledge. (Resp. PostHB at 28.)

(*Id.*) iRobot adds that, beyond different applications, substitution of infrared for sonar is “far from trivial.” (*Id.* (citing CX-1825C at Q71, 73, 76; Hr’g Tr. at 694:12-695:22).) iRobot claims Respondents’ expert effectively concedes the intensity of work involved without explaining “how one of skill would do any of these things to arrive at a functional infrared-based robot.” (*Id.* at 26 (citing Hr’g Tr. at 329:17-333:13; RX-2081C at Q208-211).) iRobot also claims that Respondents’ reference to the background discussion of proximity sensors in the ’553 patent is a form of impermissible hindsight. (*See id.* at 26-27 (citing *Millennium Pharm., Inc. v. Sandoz Inc.*, 862 F.3d 1356, 1367 (Fed. Cir. 2017)).) Additionally, iRobot reasons that because the

Public Version

Suckmaster already used infrared sensors for homing purposes only, replacing the sonar with *more* infrared is, again, impermissible hindsight. (*See id.* at 26-27 (RX-0052 at 5174; RX-2043C at 31:19-22).)

In their reply brief, Respondents repeat their assertion that “infrared sensors were a known alternative to sonar and a person of skill in the art would have been motivated to use infrared on Suckmaster in order to achieve predictable results.” (RRPB at 14.) Respondents look to *Mobile Robots* for a teaching “that it was ‘a simpler strategy’ to do exactly that: use discrete infrared sensors instead of sonar rangefinders for detecting and following objects.” (*Id.* (citing RX-0084.0075, 0076).) Respondents add “there was good reason to make this combination.” (*Id.*) Respondents also note that the patent’s background discussion of sonar and infrared as alternatives is not a description of how the inventor arrived at the ’553 patent invention, and so *Millennium Pharm* is inapplicable. (*Id.* at 15, n.4.) Respondents conclude:

Instead, iRobot relied on Dr. Hooper’s assertion that it was not a “straightforward task” and a “substantial effort” to use infrared sensors. (CRB at 25-26.) That testimony from Dr. Hooper is directly contradicted by the *Mobile Robots* book—as evidenced by the fact that Dr. Hooper said “I respectfully disagree with this book.” (Tr. 696:2-11.) The complexity in Dr. Hooper’s analysis seems to be flowing from his analysis of whether it was obvious “to make a commercial product.” (*Id.*) As to simply building an operational robot, Dr. Hooper admitted that a hobbyist could use IR sensors to build a robot that moved “around the floor.” (*Id.*)

(*Id.* at 16.)

I find truth to iRobot’s statements, “the Suckmaster is one of a kind and was built for the AHRC Competition. It was optimized for the competition with parts of the competition environment hard-coded into it and its operation set for just four minutes” and “Suckmaster used its sonar sensors to calculate distance from an object. . . . Infrared sensors are generally not used for detecting distance, and using them in this manner requires significant knowledge about operating conditions.” (CRSB at 24, 25.) I also find these facts create a major question over the

Public Version

obviousness of an invention—why the purported combination would be made. *KSR*, 550 U.S. at 399 (“The proper question was whether a pedal designer of ordinary skill in the art, facing the wide range of needs created by developments in the field, would have seen an obvious benefit to upgrading Asano with a sensor”).

To wit, Respondents speak specifically of replacing the Suckmaster’s sonar system with an infrared one as an “alternative.” (See RIB at 27-28.) I find clear evidence, from the ’553 patent itself and prior art like Mobile Robots, that sonar and infrared were known alternatives for proximity sensing. (See, e.g., ’553 patent at 3:57-64.) I also find clear evidence supports finding that infrared systems are generally less expensive and simpler, again in light of the disclosures in Mobile Robots and Respondents’ expert testimony. (See, e.g., RX-0084.070-078; Hr’g Tr. at 569:2-6.)

I do not find clear evidence, however, that infrared object detection would have improved the Suckmaster for its intended purpose—winning the AHRC contest. *Smith & Nephew, Inc. v. Rea*, 721 F.3d 1371, 1381 (Fed. Cir. 2013) (discussing whether prior art, after modification, would still have worked for its intended purpose); *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 567 F.3d 1314, 1326-28 (Fed. Cir. 2009) (holding the proposed modification would increase likelihood of inoperability and thus “a person of ordinary skill would have been deterred from combining Puno and Anderson in the manner that Medtronic proposes.”). iRobot’s arguments regarding Suckmaster’s dependence on the enhanced capabilities of sonar as compared to infrared (see CRSB at 25) go unanswered in Respondents’ briefing. I had the same thoughts at the hearing. If infrared obstacle detection would not have made Suckmaster better for its intended purpose—winning the AHRC contest—then it is hard to see why a person having

Public Version

ordinary skill would make the modification.⁶ Respondents do not address this but instead discuss making the infrared-sonar substitution as part of larger effort to adapt Suckmaster to work in a home environment. (See RIB at 28 (citing Hr'g Tr. at 313:23-315:9).) Changing the environment just introduces another modification which needs explanation, however. As Mr. Heatherington testified:

Q. So let me ask you this: Would you say the Suckmaster II was specifically designed for the robot vacuum cleaner contest?

A. Absolutely 100 percent. It was not designed to be a general purpose, clean your house robot.

(RX-2043 at 35:2-7; see also CX-1825C at Q64-66; RX-2043 at 44:22-14.)

Thus, I agree that both infrared and sonar were known techniques for object proximity sensing, and perhaps the substitution could have been accomplished by one with ordinary skill in the art, but I do not see clear and convincing evidence that such a person would have done this to improve the Suckmaster. I do not find Respondents have shown the claim would have been obvious.

b. Claim 12

Dependent claim 12 requires, “[t]he method of claim 11 wherein the robot follows a perimeter of the object while cleaning next to the object.” (’553 patent at cl. 12.) As determined above, I find clear and un rebutted evidence demonstrates this method step was actually disclosed by the Suckmaster robot for anticipation purposes. Respondents similarly argue “[n]evertheless, iRobot insists that this claim requires using proximity sensors to do sensor-based wall following for these claims. If sensor-based wall following is required, Suckmaster in view of *Mobile Robots* renders this claim obvious.” (RIB at 31.) According to Respondents, Mobile Robots

⁶ It is also worth considering if anyone would have modified it at all. Suckmaster won the contest four years in a row. (RX-0052.006)

Public Version

“promotes using infrared sensors as a ‘simpler strategy’ than sonar for accomplishing ‘following behaviors,’ the first of which is sensor-based wall following.” (*Id.* (citing RX-0084.075-076).)

Respondents also view Mobile Robots as “explain[ing] to its readers that ‘following behaviors are easy to implement on a mobile robot.’” (*id.* (citing RX-0084.075)), and as explained by Mobile Robots’ author, wall-following is “a ‘practical solution’ that was used to maximize coverage of the robot.” (*Id.* at 31-32 (citing RX-2090C at 121:17-122:6).)

Respondents conclude, “[t]herefore, would have been obvious to implement sensor-based, non-zero wall following in Suckmaster and claims 12 and 13 are rendered obvious by Suckmaster in view of *Mobile Robots*” and “[t]his analysis is only necessary to the extent the ALJ determines that claims 12 and 13 require sensor-based wall following.” (*Id.* at 32.)

In its responsive brief, iRobot argues that following a wall at a non-zero distance, as opposed to the sliding, skidding, or grinding the Suckmaster did against the contest arena walls, would only be relevant to a home environment and “Suckmaster was never intended to be a home-cleaning robot, and a POSITA would not use Suckmaster as starting point for creating one.” (CRSB at 28 (citations omitted).) Further, iRobot claims the proposed combination is actually confusing as Mobile Robot’s infrared sensors would not return the right kind of data for the lateral wall distance calculation function already present and assumedly leveraged to accomplish the claim. (*See id.* (referencing CX-2081C at Q207; CX-1825C at Q76; RX-0084 at 126).)

In their reply brief, Respondents explain:

As already explained above, Suckmaster teaches “cleaning next to the object” in response to sensing contact. iRobot’s brief never states it, but the argument for why these claim limitations are not anticipated is because iRobot proposes interpreting them to require proximity sensor-based wall following. (CRB at 21-23, 27-28; RIB at 23-25, 30-32.) If this interpretation is adopted, the claims are obvious. The court need not reach

Public Version

this decision if it is separately determined that Suckmaster “cleans next to the object” under a plain reading of the claims.

(RRPB at 17 (emphasis in original).) Respondents then repeat their position that *Mobile Robots* essentially teaches wall-based following techniques are routine to implement and it would have been obvious to do so. (*See id.* at 18 (citations omitted).) Regarding motivation, Respondents contend Suckmaster had a vacuum perimeter mode and a POSITA would have been motivated to try known alternatives, such as the sensor based wall following in *Mobile Robots* at least because it was a “known option within his or her technical grasp.” (*Id.* (citing KSR, 550 U.S. at 421).)

I agree with iRobot that Respondents’ approach to this claim is confusing in that they address claim 13 at the same time as claim 12 for obviousness, but not for anticipation. (*Compare* RIB at 23-25 *with* RIB at 30-32.) Thus, even if I were to find the method step of claim 13 actually performed by Suckmaster, that would not resolve the issue before me—whether it would have been obvious to implement proximity sensor-based wall-following in Suckmaster. (*See id.* at 32.) I am also not convinced that requiring proximity sensor-based wall-following is what iRobot contends the claim requires. (*See* RRPB at 17 (“iRobot’s brief never states it, but the argument for why these claim limitations are not anticipated is because . . .”).)

Regardless, I find modifying Suckmaster to include proximity sensor-based wall-following has not been shown with clear and convincing evidence for the same reasons discussed with respect to claim 4. Specifically, I do not find clear evidence that sensor-based wall-following would have improved the Suckmaster for its intended purpose—winning the AHRC contest. I agree that *Mobile Robots* shows wall-following behavior was known and perhaps easy to implement. (*See* RX-0084.070-078; RX-2090C at 121:17-122:6.) The only suggestion as to *why* this would be implemented in Suckmaster, however, is Respondents’ statement “Joseph Jones was questioned about sensor based wall-following with respect to strategies that predate

Public Version

the '553 patent and he testified that such wall-following was [

]” (RRPB at 18 (citing RX-2090C at 121:17-122:6).) The Suckmaster robot, after all, was designed to pick up as much rice as possible and so maximizing coverage would fit this goal. iRobot does not dispute this shared objective. (See CRSB at 27-28.)

The quoted testimony, however, is not as clear as Respondents make it out to be. In context it reads:

[

]

(RX-2090C at 121:17-122:6 (emphasis added).) The “it” in Mr. Jones’s highlighted answer could apply to either wall following or bounce mode—not necessarily wall following mode as Respondents contend. This testimony, by itself, does not equate to clear and convincing evidence that proximity sensor-based wall-following would have been obvious to implement in Suckmaster, even if routine and well known in the art. I therefore find Respondents have not shown claim 12 would have been obvious.

c. Claim 13

Dependent claim 13 requires, “[t]he method of claim 11 wherein the robot maintains a substantially constant following distance from the object while cleaning next to the object in

Public Version

response to the contact with the object.” (’553 patent at cl. 13.) Respondents discuss claim 13 and claim 12 in tandem, arguing, as discussed above, that both claims would have been obvious in light of Suckmaster and the sensor-based wall following mode disclosed in Mobile Robots. (See RIB at 30-32.) iRobot does the same arguing both are not obvious. (CRSB at 27-28.) As with claim 12, and for the same reasons, I find Respondents have not shown claim 13 to have been obvious.

d. Claim 22

Dependent claim 22 requires, “[t]he method of claim 13 wherein the cleaning speed of the robot is about 300 mm/sec.” (’553 patent at cl. 22.) Respondents argue this would have been obvious over Suckmaster in light of Mobile Robots. (RIB at 29-30.) Respondents acknowledge “Suckmaster utilizes a cleaning speed of 600 mm/sec which is described as FWD5 in the code” but can slow down to, assumedly non-defined, speeds FWD3 and FWD2. (*Id.* at 29 (citing RX-2081C at Q218).) Respondents contend “[i]t would have been simple and predictable to adjust Suckmaster’s normal speed to be about 300 mm/sec.” (*Id.* at 29 (citing RX-2081C at Q218).) Respondents explain, however, that the modification would be done for better use in the home rather than to win a competition. (*Id.* (citing Hr’g Tr. at 314:14-315:4).) Respondents claimed benefits include better battery life, collision damage, and cleaning efficacy. (*Id.* (citing Hr’g Tr. at 313:7-315:4; RX-0882 at 8:21-26).) Additionally, Respondents argue that a person of ordinary skill would use “about 300 mm/sec,” in part because this roughly 1 ft/s, a speed that person would know is suitable for a home robot. (*Id.* at 30 (citing RX-2081C at Q218; RX-0084.137; RX-0882 at 7:32-33).)

In its responsive brief, iRobot agrees “Suckmaster’s normal speed was 2 ft/sec (approximately 600mm/sec)” (CRSB at 28 (citing Hr’g Tr. at 313:19-22; RX-0052 at 5174)), but

Public Version

argues the 1 ft/s speed from Mobile Robots is only mentioned once and not described as typical or beneficial (*id.* at 29). That passage reads:

For instance, a higher pulse a higher pulse-width ratio of voltage across the motor is needed to keep the robot moving up a ramp at one foot per second than would be required to make it move along a flat tile floor at one foot per second.

(RX-0084 at 249 (RX-0084.137.) iRobot claims this speed is referenced for an example power calculation, and at that, a calculation for use in a robot which is not a cleaner—and would therefore not be thought of as a “cleaning speed.” (*Id.* (citing CX-1825C at Q68, 94).) iRobot claims Respondents’ expert agreed there was nothing in Mobile Robots suggesting 1 ft/s was the best cleaning speed. (*Id.* (citing Hr’g Tr. at 275:15-276:4).) iRobot concludes, “Suckmaster was a specialized, pre-programmed robot designed for a known environment. In fact, Suckmaster was not designed to be a general purpose, ‘clean your house robot.’” (*Id.* at 30 (citing RX-2043 at 35:2-7).) Thus, according to iRobot, a person of skill would not reduce Suckmaster’s speed.

In their reply brief, Respondents state clearly “[i]t would have been obvious to slow Suckmaster down.” (RRPB at 16.) Respondents claim that there does not need to be evidence that 300 mm/s is the “best,” but it suffices that 300 mm/s was known and sometimes the Suckmaster would slow it during operation. (*See id.*) Respondents argue “[w]hether or not 1 foot per second is the “best” speed does not mean it would have been any less obvious for a person of skill in the art to at least try the speed taught for Rug Warrior.” (*Id.* at 17.)

I find this to be a close issue in that 1 ft/s is, due to its absolute simplicity, would seem to be an obvious to try. Mobile Robots, which Respondents rely on to teach this limitation, does not reference this speed in any meaningful or instructive way however. The only passage in which it appears (reproduced above) clearly uses it as a placeholder for any speed and not as part of a calculation—and certainly not of any kind of beneficial performance. It is also used with no

Public Version

connection to cleaning activity. (RX-0084 at 249 (RX-0084.137).) It could have read 20 ft/s or 20 mm/s and it would have made no difference to the example. I therefore do not see how this passage would motivate a person of ordinary skill to set a cleaning robot to 1 ft/s, and I do not find clear and convincing evidence shows claim 22 was obvious.

I also find there is insufficient evidence from Respondents on how obvious it would have been to use the Suckmaster in the home considering its extensive configuration to the specific AHRC contest arena. (See RIB at 28-30; RRPB at 16.) Without this established, the motivation for reducing Suckmaster's speed becomes even more attenuated as it is counterintuitive that slowing Suckmaster down would have improved it for its intended purpose—winning the AHRC contest. For at least these reasons, again, I do not find clear and convincing evidence shows claim 22 was obvious.

e. Secondary Considerations

Secondary considerations of non-obviousness are used to overturn an otherwise prima facie case of obviousness. *Pfizer, Inc. v. Apotex, Inc.*, 480 F.3d 1348, 1360 (Fed. Cir. 2007). As discussed above, I do not find any of the challenged claims obvious.

Nevertheless, for the '553 patent specifically, iRobot argues copying, praise from others, and commercial show the claims are nonobvious. (CIB at 111-112.) Specifically, iRobot argues "Respondents' efforts to copy have a clear connection with the '553 patent, which claims various systems, including sensors, for navigating around a room, including following an obstacle, such as a wall." (*id.* at 111 (citing CX-0221C at Q512).) iRobot claims iLife tested [] and that this has a direct connection to the '553 patent claims which cover following objects' perimeters after contact. (*Id.*) iRobot also references evidence that respondent iLife [] in developing its

Public Version

own products. (*Id.* at 109 (citing CX-0305C at 93:7-96:14, 97:19-98:5; CX-0278C at 30:9-10, 33:15-34:20)), 111.)

iRobot also contends there is a connection between industry praise, commercial success, and the '553 patent. (*Id.* at 111.) iRobot argues the praise is for iRobot's "cleaning efficiency and the resultant commercial success are due, in part, to the technology patented in the '553 patent." (*Id.* (citing CX-0221C at Q514-515, 517).) iRobot references a survey document which indicates customers value cleaning efficiency and smart navigation. (*Id.* (citing CX-0221C at Q514-515, 517).) iRobot continues to claim that its "light touch" feature improves that the robots' cleaning efficiency and is also the focus of the '553 patent. (*See id.* at 111-112 (citing Hr'g Tr. at 637:3-638:3, 25:12-25, 24:1-4; CX-0405C).)

In its responsive brief, iRobot addresses secondary considerations again, discussing the largely the same evidence as in its opening brief, and generally arguing "[t]he obvious conclusion is that Respondents developed their products by adopting iRobot's technology, from the overall design down to the specific features claimed in iRobot's patents." (CRSB at 85.) iRobot also cites *Demaco Corp. v. F. Von Langsdorff Licensing Ltd.*, 851 F.2d 1387, 1392-93 (Fed. Cir. 1988), for the contention that it has presented a *prima facie* case of nexus "between that which is patented and that which is sold," and the burden has now shifted to Respondents to present evidence in rebuttal. (*Id.* at 85-86.) For the '553 patent, and also '490 patent, iRobot claims its claims "are coextensive with the DI Products and are not merely components thereof—they relate to the whole robot and the software that controls the whole robot." (*Id.* at 86.) iRobot continues:

Dr. Hooper testified that the '553 patent discloses a novel approach to obstacle processing that was unique among contemporaneous robots. While other robots attempted to avoid obstacles at all costs, the '553 patent teaches slowing down the robot and continuing to approach the

Public Version

obstacle. (Hrg. Tr., Hooper at 636:22-638:12.) The considerable cleaning efficiency gained from this novel technique (and lighter impact upon contacted furniture) is undisputed.

(*Id.* at 87.)

In its reply brief, iRobot only argues that it was proper for iRobot to have addressed secondary considerations in its opening brief, and improper for Respondents to have not addressed the same in their responsive brief. (CRPB at 45 (citing *Pfizer, Inc. v. Apotex, Inc.*, 480 F.3d 1348, 1360 (Fed. Cir. 2007); *Prometheus Labs., Inc. v. Roxane Labs., Inc.*, 805 F.3d 1092, 1101 (Fed. Cir. 2015)).)

Respondents opening brief largely addresses the law surrounding secondary considerations, as opposed to the evidence. (See RIB at 123-124.) Respondents note “for any ‘objective evidence of secondary considerations to be accorded substantial weight, its proponent must establish a nexus between the evidence and the merits of the claimed invention.’” (*Id.* (citing *In re Kao*, 639 F.3d at 1068; *Martin Co. v. Alliance Mach. Sys. Int’l LLC*, 618 F.3d 1294, 1305 (Fed. Cir. 2010); *J.T. Eaton & Co. v. Atl. Paste & Glue Co.*, 106 F.3d 1563, 1571 (Fed. Cir. 1997)).) Respondents also describe the required nexus as between the secondary consideration and “what is both claimed and novel in the claim.” (*Id.* at 124 (citing *In re Kao*, 639 F.3d at 1068; *Tokai Corp. v. Easton Enters., Inc.*, 632 F.3d 1358, 1369 (Fed. Cir. 2011)).) Respondents contend that even if the iRobot’s considerations are given weight, they do not overturn the strong *prima facie* cases of obviousness put forward. (*Id.* (citing *Wyers v. Master Lock Co.*, 616 F.3d 1231, 1246 (Fed. Cir. 2010)).)

In their responsive brief, Respondents argue it was improper for iRobot to discuss this topic in their opening brief. (RRSB at 59 (citing *Wm. Wrigley Jr. Co. v. Cadbury Adams USA LLC*, 683 F.3d 1356, 1364 (Fed. Cir. 2012); MPEP § 2145).) Respondents also repeat their

Public Version

contention that nexus must be shown with respect to the claims and what is novel within those claims. (*Id.*)

Finally, in their reply brief, Respondents address the evidence. (*See* RRPB at 56-60.) Respondents' chief complaint is that "iRobot completely fails to connect the alleged copying, success, and praise to what is both claimed and novel in the claims." (*Id.* at 56 (citing *In re Kao*, 639 F.3d at 1068).) For the '553 patent, Respondents, as an example, point to a lack of evidence that the subject matter of claim 22 (300 mm/s cleaning speed) was a source of success or praise. (*Id.*) Respondents characterize much of iRobot's copying evidence as "general," "which shows nothing." (*See id.* at 57-58 (citing *Certain Access Control Systems and Components Thereof*, Inv. No. 337-TA-1016, Initial Determination at 117 (Nov. 21, 2017); CX-0986C; Hr'g Tr. at 67:14-16; RX-2060C at 138:8-23, 141:7-25; RX-2090C at 113:21-14:9; RX-0082 at Fig. 1).)

Respondents view iRobot's cited case, *Demaco*, as supporting their own position that "the patentee bears the burden of proving that 'the claimed invention itself was responsible for this commercial success.'" (*Id.* at 59 (citing *Demaco*, 851 F.2d at 1393).) Respondents also generally dispute that the asserted patents, like the '553 patent, are "coextensive" with the iRobot Products, and are instead "directed to highly specific features, such as the use of sonar instead of infrared, or the use of buttons for manually inputting modes." (*Id.*) Respondents also paint iRobot's industry praise as praise for the company, not the patented features. (*Id.* at 59-60 (citing *Apple Inc. v. Samsung Elecs. Co.*, 839 F.3d 1034, 1052-58 (Fed. Cir. 2016); *ClassCo, Inc. v. Apple, Inc.*, 838 F.3d 1214, 1220 (Fed. Cir. 2016)).) Respondents conclude by arguing that even if some considerations receive weight, it is weak and will not overcome the strong *prima facie* case for obviousness Respondents put forward. (*Id.* at 60 (citing, *inter alia*, *Media Techs.*

Public Version

Licensing, LLC v. Upper Deck Co., 596 F.3d 1334, 1339 (Fed. Cir. 2010); *Ryko Mfg. Co. v. Nu-Star, Inc.*, 950 F.2d 714, 719 (Fed. Cir. 1991).)

For the '553 patent specifically, I find iRobot's secondary consideration evidence is weak but not non-existent. It is generally agreed that the novel part of the claims, if there is one, would be the limitations concerning slow down and speed up in response to sensed obstacles, embodied, at least one way, by the "light-touch" behavior of the iRobot Products. General references to obstacle following, on the other hand, should not be considered the claimed and novel aspect to the invention, in light of prior art such as Mobile Robots. (See RX-0084.075-.076 (describing strategies for wall following behavior).) I further find that the particular slow down and speed up behavior as claimed likely allows a robot to more closely and safely clean next to an object's perimeter, which would naturally result in improved cleaning coverage or efficiency. I also see, however, that this concept is in the prior art:

The operation of the robot 100 at slow speed in the vicinity of obstacles minimize the chance of the robot 100 damaging itself or the obstacle when contact is finally made. This not only allows rapid operation for most of the time, but also allows the robot 100 to clean as close to obstacles as possible (i.e. touching) without damage.

(RX-0882 at 8:21-26; compare RX-0882 at 8:21-26 with Hr'g. Tr., Hooper at 636:22-638:12.)

Based on the evidence cited in iRobot's briefing (CIB at 109-112), and in their expert's testimony (CX-0221C at Q511-513) for alleged copying I ultimately find only an attenuated nexus to this feature set. The testimony cited by iRobot (CX-0305C at 93:1-100:4; CX-0278C at 26:1-53:22, 92:1-97:25, 127:13-133:18) only mentions slow down and speed up behavior momentarily (CX-0278C at 97:4-25), and this is not in the context of what iRobot does as opposed to how the iLife Products operate. The documents and other evidence cited by iRobot (CX-0986C; CX-0405C (not translated); CX-0983C; CX-0985C; CX-0423C; CX-0193C; CX-0989C; CX-0990C; CX-0988C; CX-0987C) also do not mention or indicate an intent to use or

Public Version

copy the slow down speed up feature set (*see, e.g.*, CX-0193C at 6003 (“[i]t runs into obstacles during cleaning; side brush decelerates; but the machine doesn’t decelerate; the machine doesn’t slow down on the way home; it travels along the wall sometimes and cleans normally sometimes.”)). Some of the documents which iRobot claims show copying (*see* CX-0221C at Q513), show only basic research. (*See* CX-0987C; CX-0988C; CX-0989C; CX-0990C). Thus, I do not find a secondary consideration of copying to have meaningful weight for the claims of the ’553 patent.

Based on the evidence cited in iRobot’s briefing (CIB at 110-112), and in their expert’s testimony (CX-0221C at Q514-517) for alleged commercial success and praise from others, I find only slightly more support. iRobot presents sufficient evidence to conclude that it has significant success in the market and is used as a benchmark by others (*see, e.g.*, CX-0221C at Q514; CX-0418C at 9159; CPX-1974C; CX-0410C at 147:3-15; CX-0324C at 41:4-19; CX-0278 at 35:7-36:25, 42:18-22; CX-0992; CX-0994C), but, again, I see no *particular* connection to the slow down and speed up feature set of the ’553 patent (*see* CX-0968C at 1823 (mentioning only general desirability of “go under furniture”)). The same is especially true for iRobot’s claim of praise from others. Yet, there is some evidence that iRobot’s success is due to the robots’ overall cleaning efficiency and coverage—which, as mentioned above, is related to the slow down and speed up feature set. Thus, I find a secondary considerations of commercial success and praise have nominal weight for the claims of the ’553 patent.

V. U.S. PATENT NO. 6,809,490

A. Level of Ordinary Skill in the Art

As mentioned above, in Order No. 27 I found a person of ordinary skill in the art for each of the asserted patents at the time of the invention would be an individual with a bachelor’s

Public Version

degree in physics, electrical engineering, mechanical engineering, computer science, or a related discipline, and has at least three years of experience in the design and implementation of robots and embedded systems, or some other equivalent combination of education and experience.

(Order No. 27 at 9.)

B. Claims-at-Issue

The following claims of the '490 patent are at-issue in this investigation, either through allegations of infringement or technical prong domestic industry:

1. A mobile robot comprising:
 - (a) means for moving the robot over a surface;
 - (b) an obstacle detection sensor;
 - (c) and a control system operatively connected to said obstacle detection sensor and said means for moving;
 - (d) said control system configured to operate the robot in a plurality of operational modes and to select from among the plurality of modes in real time in response to signals generated by the obstacle detection sensor, said plurality of operational modes comprising: a spot-coverage mode whereby the robot operates in an isolated area, an obstacle following mode whereby said robot travels adjacent to an obstacle, and a bounce mode whereby the robot travels substantially in a direction away from an obstacle after encountering the obstacle, and wherein, when in the obstacle following mode, the robot travels adjacent to an obstacle for a distance at least twice the work width of the robot.

7. A mobile robot according to claim 1, whereby said obstacle detection sensor comprises a tactile sensor.

8. A mobile robot according to claim 7, whereby said obstacle detection sensor further comprises an IR sensor.

12. The mobile robot according to claim 1, further comprising a means for manually selecting an operational mode.

Public Version

42. A mobile robot comprising:

- (a) means for moving the robot over a surface;
- (b) an obstacle detection sensor;
- (c) a cliff sensor; and
- (d) a control system operatively connected to said obstacle detection sensor, said cliff sensor, and said means for moving;
- (e) said control system configured to operate the robot in a plurality of operational modes, said plurality of operational modes comprising: a spot-coverage mode whereby the robot operates in an isolated area, an obstacle following mode whereby said robot travels adjacent to an obstacle for a distance at least twice the work width of the robot, and a bounce mode whereby the robot travels substantially in a direction away from an obstacle after encountering the obstacle.

(CIB at 9.)⁷

C. Claim Construction

As part of the Markman process, the following terms of the '490 patent were construed, either as-agreed between the parties or determined by Order No. 27:

Claim Term	Construction
a bounce mode whereby the robot travels substantially in a direction away from an obstacle after encountering the obstacle (claims 1, 42)	Plain and ordinary meaning
means for manually selecting an operational mode (claim 12)	Function: manually selecting an operational mode Structure: an input element [such as] a selector switch, push button, or remote control [by which] the user can select the particular operational mode

⁷ While claims 1 and 7 are not asserted for infringement or domestic industry, they are implicated by asserted claims 8 and 12.

Public Version

means for moving the robot over a surface (claims 1, 13, 21, 26, 36, 42)	Function: moving the robot over a driving surface Structure: two wheels and motors 21 for driving them independently
control system configured to operate the robot in a plurality of operational modes and to select from among the plurality of modes in real time in response to signals generated by the obstacle detection sensor (claim 1)	Means-plus-function is not applicable

(See Order No. 27 at 10-11, 55.)

Both iRobot and Respondents identify remaining claim construction issues for this initial determination—the proper construction of “control system configured to operate the robot in a plurality of operational modes” as found in claims 1 and 42, and “select from among the plurality of modes” as found in claim 1. (CIB at 32; RIB at 52, 53.) I present those terms and my understanding of the parties’ proposed constructions in the below table:

Claim Term	iRobot’s Construction	Respondents’ Construction
control system configured to operate the robot in a plurality of operational modes (claims 1, 42)	Does not require autonomous switching between each of the three modes	Requires autonomous switching between each of the three modes
select from among the plurality of modes (claim 1)	“from among” means “one or more of”	“from among” does not mean “one or more of”

iRobot’s Position

In its opening brief, iRobot argue the limitations “do not require that the controller select every mode.” (CIB at 33 (citing various expert testimony).) More specifically, iRobot claims the limitations “do[] not require that the control system switch into all the modes based on sensor

Public Version

signals.” (*Id.*) iRobot claims “as evidenced by dependent claim 12, claims 1 and 42 contemplate that some modes may be entered manually, as claim 12 is limited to ‘manually selecting’ one of the plurality of modes from claim 1.” (*Id.*) iRobot then observes that Respondents’ experts offered contrasting and “irreconcilable” readings of the claims. (*Id.* (referring to Hr’g Tr. at 502:5-18, 506:16-507:6, 557:9-16).) Regarding “from among,” iRobot suggests that Respondents’ expert’s inability “to identify *any* embodiment described in the specification in which one of the claimed modes, the spot-coverage mode, was entered into based on obstacle detection user signals” supports its interpretation of the limitation. (*Id.* at 34 (citing Hr’g Tr. at 510:2-21).)

In its responsive brief, and with respect to the “configured to operate” limitation, iRobot attacks Respondents’ use of the ’490 patent title in lieu of the actual claim language. (CRSB at 40 (referring to RIB at 52; *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1312 (Fed. Cir. 1999).) More generally, iRobot argues that the prosecution history does not overcome the “heavy presumption” that the plain and ordinary meaning should control. (*Id.* at 41 (citing *Epistar*, 566 F.3d at 1334.) iRobot repeats its position that “claim 12’s manual mode selection should be considered within the scope of claim 1.” (*See id.* at 41-42 (citing *Wright Med. Tech., Inc. v. Osteonics Corp.*, 122 F.3d 1440, 1445 (Fed. Cir. 1997); *Laitram Corp. v. NEC Corp.*, 62 F.3d 1388, 1392-93 (Fed. Cir. 1995)).)

With respect to the “from among” limitation, iRobot again suggests the plain meaning should control—a plain meaning which “does not require, as Respondents argue, that each mode from the plurality must be selected in this manner.” (*Id.* at 42.) Here too, iRobot argues the manual mode selection recited in claim 12 defeats Respondents’ construction. (*See id.*)

Public Version

In its reply brief, and with respect to the “configured to operate” limitation, iRobot claims “Respondents’ ultimate argument—that all three recited modes must be selected autonomously to read on the claim—fails no matter which limitation[(“configured to operate” or “from among”)] Respondents rely upon.” (CRPB at 18.) iRobot then addresses the prosecution history and remarks that were made with respect to the Ueno prior art reference, and argues that Ueno was avoided because it simply lacked any kind of obstacle following mode—not that it lacked selecting all of its modes autonomously. (*Id.* at 19 (citing JX-0013 at 8759, 8764).) iRobot claims what is clear is that “the control system effectuates the transition to all three modes, including spot mode, which is all this limitation requires.” (*Id.* (citing expert testimony).)

With respect to the “from among” limitation, iRobot describes Respondents as “seem[ing] to intertwine the claim term ‘comprising’ with the separate ‘select from among the plurality of modes’ limitation” which “does not follow and seeks to inject confusion where there is no debate.” (*Id.* at 20.) In iRobot’s view, “[t]his limitation means that when the control system selects a mode, that mode comes from that plurality of modes.” (*Id.*) iRobot concludes:

Finally, it is of no consequence that an embodiment includes limited disclosure concerning a robot entering spot coverage mode based on sensor input. Dr. Locke was unaware of such disclosure in the specification, and therefore he at least did not consider this disclosure critical. (Hrg. Tr., Locke at 510:2-21.) In any event, it is a fundamental claim construction principle that claims should not be limited by embodiments disclosed in the specification. *Phillips*, 415 F.3d at 1323 (holding that claims should not be limited to disclosed embodiments “because persons of ordinary skill in the art rarely would confine their definitions of terms to the exact representations depicted in the embodiments”). Therefore, Respondents’ interpretation should be rejected.

(*Id.* at 21.)

Respondents’ Position

In their opening brief, and unlike iRobot’s opening brief, Respondents address the “configured to operate” and “select from among” limitations separately. (*See* RIB at 52-54.) For

Public Version

“configured to operate,” Respondents argue “[w]here the claim states that the control system is configured to operate the robot in these three modes, the plain meaning is that the control system, not the user, autonomously switches between each of the three modes.” (*Id.* at 52.) Respondents contend this meaning came out during prosecution against the Ueno reference (U.S. Patent No. 6,076,025) when the applicants essentially “argued that the [claimed] control system switches between the three modes.” (*Id.* at 52-53 (citing RX-0708 at 357).) With respect to dependent claim 12—which recites “further comprising a means for manually selecting an operational mode”—Respondents claim “[i]n other words, claim 1 is purely autonomous, whereas claim 12 *further comprises* a means for manually overriding the autonomous modes in claim 1.” (*Id.* at 53.) Respondents reason “[i]n order for the control system to be configured to operate the robot in a plurality of modes it must autonomously, without user intervention, select each of the three modes. The control system, not a user, is configured to operate the robot in the three modes.” (*Id.*)

For the “select from among” limitation, Respondents begin with “[t]his element was added during prosecution and should be interpreted according to its plain meaning.” (*Id.*) Respondents suggest that interpreting “from among” as “one or more of” is not the plain meaning, but rather, “from the defined group” is. (*See id.* at 53-54.)

In their responsive brief and with respect to “configured to operate,” Respondents repeat the notion that “a manual mechanism for selecting the third mode” is not within the scope of the “configured to operate” limitation. (RRSB at 19.) Respondents argue “[t]he plain meaning is that the control system, not the user, causes the robot to operate in the ‘plurality of operational modes.’” (*Id.* at 20.) With respect to dependent claim 12, Respondents argue “[u]nder iRobot’s interpretation of the claims, the “control system” of claim 1 would already include a means for

Public Version

manually selecting one of the modes, because only two of the three required modes are autonomously selected by the control system.” (*Id.* at 20 (comparing to the term “steel baffles” in *Phillips*, 415 F.3d at 1314).) Respondents then address the prosecution history moment regarding Ueno and explain:

iRobot then explained that “It is the combination of all three modes ... that allows the claimed robot to outperform Ueno in real world environments.” (*Id.*) These statements show that when iRobot was seeking allowance of its claims, it told the Patent Office that its claimed control system was different and better than Ueno’s two-mode system because it was configured to operate the robot in a combination of all three modes. The applicants’ statements then contradict the position iRobot is now taking - that the claimed control system need only be able to select two modes.

(*Id.* at 21 (citing JX-0013 at 8759, 8770).)

For the “select from among” limitation, Respondents argue:

The purpose of the ‘from among’ language is to address the fact that only one of the three modes can be selected at a time. If it were removed, claim 1 would read “select the plurality of modes in real time ...” which would not make sense because multiple modes cannot be selected at once; *i.e.* the robot only operates in one mode at a time.

(RRSB at 23.) Respondents also dispute that the specification is silent on how an obstacle sensor can trigger a spot-coverage (spiral) mode. (*Id.*) Respondents state:

[T]he ‘490 patent describes multiple ways in which obstacle signals can cause the robot to enter spiral mode. For example, “the robot keeps a record of the average distance travelled between bumps,” and if this is “above a predetermined threshold, the robot will again give priority to the SPIRAL behavior.” (‘490 patent at 16:54-60.) Similarly, “the robot may have a maximum number of bump events before the SPIRAL behavior will again be given priority.” (*Id.* at 16:60-62.)

(*Id.* at 23.)

Analysis

For the “configured to operate” limitation, iRobot has the more persuasive position. I do not agree with Respondents’ central conclusion that the plain and ordinary meaning of these

Public Version

three words is “the control system, not the user, autonomously switches between each of the three modes.” (RIB at 52.) Rather, a system “configured to operate the robot in a plurality of operational modes” is simply a system which can run in several modes. The word “operate” does not speak to the manner of “switching” between those modes—autonomous or otherwise.

The specification also does not support such a reading. It uses “operate” in the much more general sense of running according to a mode:

A robot that moves in a purely randomly fashion in a closed environment has a cleaning rate that decreases relative to the robot's coverage rate as a function of time. This is because the longer the robot operates the more likely it is to revisit already cleaned areas.

(’490 patent at 1:56-60);

Compared to a robot with a deterministic algorithm, a random cleaning robot must operate for a longer time to achieve acceptable coverage.

(*id.* at 3:31-34);

It is an object of the present invention to provide a system and method to allow a mobile robot to operate in a plurality of modes in order to effectively cover an area.

It is an object of the present invention to provide a mobile robot, with at least one sensor, to operate in a number of modes including spot-coverage, obstacle following and bounce.

(*id.* at 3:65-4:4);

In FIG. 13A, the path of robot 10 is traced as line 54 as robot 10 operates on in random bounce mode. The robot 10 is unable to move from room 116 into 115 during the limited run because the robot's random behavior did not happen to lead the robot through passageway 105.

....

The portions of the path 99 in which the robot 10 operates in wall following mode are labeled 51. This method provides greatly increased coverage, along with attendant increases in cleaning rate and perceived effectiveness.

Public Version

(*id.* at 16:18-35). Dependent claims 10 and 11 also both speak to how the robot “operates” in a mode, as opposed to switch between modes. (*See id.* at cls. 10, 11.)

Dependent claim 12, on the other hand, does not use the term “operate” but Respondents argue that its language (“further comprising a means for manually selecting an operational mode”) must mean that “claim 1 is purely autonomous, whereas claim 12 further comprises a means for manually overriding the autonomous modes in claim 1.” (RIB at 53.) I do not agree because, again, I do not see any intrinsic evidence to support “operating” in modes means “autonomous switching” between modes.

Respondents go on to argue “[u]nder iRobot’s interpretation of the claims, the “control system” of claim 1 would already include a means for manually selecting one of the modes, because only two of the three required modes are autonomously selected by the control system.” (RRSB at 20 (comparing to the term “steel baffles” in *Phillips*, 415 F.3d at 1314).) This reasoning is also not persuasive.

Immediately, nothing in the language of claim 1 limits the system to “two of three required modes are autonomously selected by the control system” as Respondents contend, even under iRobot’s interpretation of the claims. Claim 12 is simple and introduces a means for “manually selecting an operational mode.” (’490 patent at cl. 12.) The only conclusion that can be drawn is that the apparatus of claim 1 does not already *exclude* this feature—not that it already includes (*i.e.*, requires) it. *Phillips*, 415 F.3d at 1324 (“[t]he inclusion of such a specific limitation on the term ‘baffles’ in [dependent] claim 2 makes it likely that the patentee did not contemplate that the term ‘baffles’ [from independent claim 1] already contained that limitation”). iRobot does not argue otherwise, stating “as evidenced by dependent claim 12,

Public Version

claims 1 and 42 contemplate that some modes *may be* entered manually, as claim 12 is limited to ‘manually selecting’ one of the plurality of modes from claim 1.” (CIB at 33 (emphasis added).)

Regarding Respondents’ citations to the prosecution history, I do not find they rise to the level of explicit disclaimer required to deviate from the plain and ordinary meaning. *Edwards*, 582 F.3d at 1329. For that remark from the Applicant which reads “[t]hus, Ueno teaches a device having a predetermined sequence of operation, including predetermined spiral and “random” movement. Ueno does not teach or suggest a control system configured to operate the robot in a combination of multiple operational modes, as in the claims of the present invention” (JX-0013 at 8759), I find this could be interpreted to distinguish Ueno as having only “a” sequence of operation as opposed to “a combination of multiple operational modes.” I also find the remark invokes a “*combination* of multiple operational modes,” which is term not used in the claims at that time or at present. (*See id.* at 98751-98757.) Moreover, to the extent Ueno’s spiral and random pattern movements are considered more than one mode, the Applicant had just previously described Ueno as switching between spiral and random movement patterns based on “remote detection of a boundary.” (*Id.* at 98758.) So it makes little sense for the Applicant to distinguish its own claims from Ueno on the ground that its “control system, not the user, causes the robot to operate in the ‘plurality of operational modes.’” (RRSB at 20.)

In sum, I find the plain and ordinary meaning of the terms control here. “Configured to operate the robot in a plurality of operational modes” (claims 1, 42) does not mean “configured to autonomously switch” the robot between a plurality of operational modes. It simply means “configured to *run* the robot in a plurality of operational modes.”

Public Version

For the “select from among” limitation, Respondents have the more persuasive interpretation. I was inclined to find in iRobot’s favor when, as revealed at the hearing and recorded in their initial *and* responsive post-hearing briefs:

[Respondents’ expert] Dr. Locke was also unable to identify *any* embodiment described in the specification in which one of the claimed modes, the spot-coverage mode, was entered into based on obstacle detection sensor signals.

(CIB at 34 (citing Hr’g Tr. at 510:2-21));

Finally, Respondents’ expert, Dr. Locke, could not explain the purpose of the “from among” clause in the limitation under his interpretation and could not identify any support in the specification that every mode recited must be entered in response to obstacle sensor signals.

(CRSB at 42 (citing Hr’g Tr. at 504:18-505:19, 510:2-21)). Indeed, if the ’490 patent specification was devoid of any teaching of entering or switching into the claimed “spot-coverage mode” based on “signals generated by the obstacle detection sensor,” that would be strong intrinsic evidence that “select from among” did not mean all three operational modes (following, bounce, spot) must be so selectable, and that perhaps only one or two would suffice.

As Respondents point out in their responsive briefing, however, the ’490 patent does teach an embodiment in which the spot-coverage mode is entered into based on obstacle detection sensor signals, just as bounce and obstacle following modes are. (*See* RRSB at 23.) The ’490 patent discloses how the robot will enter into a “SPIRAL behavior” (*i.e.*, spot-coverage mode) when distances between obstacle detections hit certain limits:

In a preferred embodiment, the robot keeps a record of the average distance traveled between bumps. The robot then calculates an average bump distance (ABD) using the following formula: $(\frac{3}{4} \times ABD) + (\frac{1}{4} \times \text{most recent distance between bumps})$. If the ABD is above a predetermined threshold, the robot will again give priority to the SPIRAL behavior. In still other embodiments, the robot may have a minimum number of bump events before the SPIRAL behavior will again be given priority. In other embodiments, the robot may enter SPIRAL behavior if it travels a maximum distance, for example 20 feet, without a bump event.

Public Version

(’490 patent at 16:54-64.) In fact, the claims themselves describe using obstacle detection signals to enter into spot-coverage mode. Dependent claim 6 reads, “[a] mobile robot according to claim 2 in which the control system is configured to return to said spot-coverage mode if the average distance between obstacle interactions is above a predetermined threshold.” (*Id.* at cl. 6; *see id.* at cls. 2, 3.)

This disclosure obviously contradicts iRobot’s earlier suggestion, which is why iRobot’s final reply brief changes tack to somehow argue that what is actually significant is that

Respondents’ expert didn’t know about this disclosure:

Finally, it is of no consequence that an embodiment includes limited disclosure concerning a robot entering spot coverage mode based on sensor input. Dr. Locke was unaware of such disclosure in the specification, and therefore he at least did not consider this disclosure critical.

(CRPB at 21 (citing Hr’g Tr. at 510:2-21).) I disagree that an expert’s ability to remember what is disclosed in a patent is important to claim construction. *See generally Phillips*, 415 F.3d at 1318 (“a court should discount any expert testimony ‘that is clearly at odds with the claim construction mandated by the claims themselves, the written description, and the prosecution history, in other words, with the written record of the patent.’”) (internal citation omitted).

iRobot’s only other reference to the intrinsic evidence does not support its position either. iRobot argues that dependent claim 12 (discussed above and reciting manual selection of a mode) evidences “claims 1 and 42 contemplate that some modes may be entered manually.” (CIB at 33.) I agree only to the extent that claim 12 shows claim 1 does not *exclude* manual

Public Version

selection from its scope.⁸ As discussed above with respect to “configured to operate, this is different from imputing that claim 1 requires manual selection of at least one of its modes.

With that, I turn back to the plain and ordinary meaning of “configured . . . to select from among a plurality of operational modes” and I find the meaning is that each mode must be selectable. For example, if I were to visit a Roomba store and the salesperson informed me I could “select from among” three models—the 600, 800 or 900—and I select the 600 only to be told the 600 is out of stock; then it was not true that I could “select from among” three models. Clearly, the group of models I could “select from among” was just the 800 or the 900. This is the plain and ordinary meaning of “select from among.”

I would also note that there is a common drafting technique that would have captured the all or less-than-all interpretation iRobot argues for—“at least one of.” The limitation could easily have been written “configured . . . to select *at least one of* the plurality of operational modes” or even “configured . . . to select *an* operational mode;” but it was not.

In sum, I find the plain and ordinary meaning of the terms control here. “Configured to . . . select from among the plurality of modes in real time in response to signals generated by the obstacle detection sensor” (claim 1) means that each of the plurality of modes can be so selected.

D. Infringement

According to iRobot’s post-hearing briefing, the following products are accused of infringing the following claims of the ’490 patent:

Product	Claims
----------------	---------------

⁸ Claim 12 does not depend from claim 42, and even then claim 42 does not include the “select from among” limitation. (’490 patent at cl. 42; *see* CRPB at 20, n.7.)

Public Version

iLife Products	1, 12, 42
Hoover Products	42
bObsweep Products	1, 12, 42

1. Direct Infringement by the iLife Products

For the reasons explained below, I find iRobot has shown by a preponderance of the evidence that the iLife Products meet the limitations of asserted claim 42, and thus, that iLife directly infringes that claim.

a. Undisputed Claim Limitations

As reflected in the parties' post-hearing briefing, most of the '490 patent asserted claim limitations in the iLife Products are not in dispute. (*See, e.g.*, RRSB at 16-24.) These undisputed limitations, along with my findings, are summarized below.

Independent claim 1 is not listed as an asserted claim by iRobot, but it is effectively asserted through dependent claim 12. Claim 1 requires, “[a] mobile robot.” ('490 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the iLife Products are robots which can move around or navigate a room by themselves using intelligence. (*See* CIB at 34 (citing CX-0221C at Q87, 102, 118, 152, 194, 235; RX-2088C at Q30).) The limitation is met.

Claim 1 further requires “(a) means for moving the robot over a surface.” ('490 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the iLife Products include two motorized wheels which drive the robot around a room. (*See* CIB at 34-35 (citing CX-0221C at Q88, 103, 119, 392, 417, 440; RX-2088C at Q30).) The limitation is met.

Claim 1 further requires “(b) an obstacle detection sensor.” ('490 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the iLife Products include a bump sensor and infrared proximity sensors which detect contacted obstacles or those at a distance. (*See* CIB at

Public Version

35 (citing CX-0221C at Q89-90, 92, 104-105, 107, 120, 122, 393, 418, 441).) The limitation is met.

Claim 1 further requires “(c) and a control system operatively connected to said obstacle detection sensor and said means for moving.” (’490 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the iLife Products include a control system to use the outputs from the sensors towards controlling the robot’s movement around a room. (See CIB at 35 (citing CX-0221C at Q93, 108, 123, 394, 419, 442).) The limitation is met.

Dependent claim 12 requires, “[t]he mobile robot according to claim 1, further comprising a means for manually selecting an operational mode.” (’490 patent at cl. 12.) I find credible and un rebutted testimony demonstrates the iLife Products include, at least, a button on the top of the robots which is used to select one of the operational modes. (See CIB at 38 (citing CX-0221C at Q100, 403, 449; CX-0305C at 22:7-23:14, 40:17-41:3; CX-0306C at 112:5-18, 129:9-18).) The limitation is met.

Independent claim 42 requires, “[a] mobile robot.” (’490 patent at cl. 42.) I find credible and un rebutted testimony demonstrates the iLife Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 42 further requires, “(a) means for moving the robot over a surface.” (’490 patent at cl. 42.) I find credible and un rebutted testimony demonstrates the iLife Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 42 further requires, “(b) an obstacle detection sensor.” (’490 patent at cl. 42.) I find credible and un rebutted testimony demonstrates the iLife Products meet this limitation for the same reasons discussed under claim 1, above.

Public Version

Claim 42 further requires, “(c) a cliff sensor.” (’490 patent at cl. 42.) I find credible and un rebutted testimony demonstrates the iLife Products include sensors located on the underside of the robots which detect drop-offs in the surface the robot travels on. (See CIB at 39 (citing CX-0221C at Q91, 106, 121, 407, 431, 453; CX-0305C at 35:2-16, 52:16-25).) The limitation is met.

Claim 42 further requires, “(d) a control system operatively connected to said obstacle detection sensor, said cliff sensor, and said means for moving.” (’490 patent at cl. 42.) I find credible and un rebutted testimony demonstrates the iLife Products meet this limitation for the same reasons discussed under claim 1, above.

b. Disputed Claim Limitations Concerning “Twice the Work Width”

In addition to those limitations listed above, claim 1 requires:

(d) said control system configured to operate the robot in a plurality of operational modes and to select from among the plurality of modes in real time in response to signals generated by the obstacle detection sensor, said plurality of operational modes comprising: a spot-coverage mode whereby the robot operates in an isolated area, an obstacle following mode whereby said robot travels adjacent to an obstacle, and a bounce mode whereby the robot travels substantially in a direction away from an obstacle after encountering the obstacle, and wherein, when in the obstacle following mode, the robot travels adjacent to an obstacle for a distance at least twice the work width of the robot.

(’490 patent at cl. 1.) Claim 42 similarly requires:

(e) said control system configured to operate the robot in a plurality of operational modes, said plurality of operational modes comprising: a spot-coverage mode whereby the robot operates in an isolated area, an obstacle following mode whereby said robot travels adjacent to an obstacle for a distance at least twice the work width of the robot, and a bounce mode whereby the robot travels substantially in a direction away from an obstacle after encountering the obstacle.

(’490 patent at cl. 42.) Respondents dispute that these limitations are met by the iLife Products.

Public Version

iRobot's Position

In its opening brief, iRobot takes the position that much of these two limitations is not in dispute. Specifically, iRobot claims it is not disputed that “[t]he control system in the iLife Products is configured to run the robot in a spot-coverage mode whereby the robot operates in an isolated area.” (CIB at 36 (citing CX-0221C at Q99, 114, 129, 398, 423, 445).) I find credible and unrebutted testimony demonstrates the iLife Products have a spot coverage mode where the robots will move in a spiral pattern outwards and then back inwards. (*See id.* (citing CX-0305C at 22:7-23:19, 49:6-18, 63:16-22, 73:4-15).) Similarly, iRobot claims it is not disputed that “[t]he control system in the iLife Products is configured to operate the robot in an obstacle following mode whereby said robot travels adjacent to an obstacle.” (*See id.* at 37 (citing CX-0221C at Q97-98, 112-113, 127-128, 399, 424, 446).) I find credible and unrebutted testimony demonstrates the iLife Products have an obstacle following mode where the robots will travel adjacent an obstacle such as a wall in an “edge-cleaning mode.” (*See id.* (referring back to ’553 patent discussion of claim 11).)

Further, iRobot claims it is not disputed that “[t]he control system in the iLife Products is configured to operate the robot in a bounce mode whereby the robot travels substantially in a direction away from an obstacle after encountering the obstacle.” (*See id.* (citing CX-0221C at Q95-96, 110-111, 125-126, 400, 425, 447).) I find credible and unrebutted testimony demonstrates the iLife Products will, at times, approach and contact obstacles before turning sharply and moving away from the point of contact. (*See id.* (citing Hr’g Tr. at 115:10-119:3, 516:12-16, 501:21-502:1).)

The portion of this limitation which refers to the robot travelling “twice the work width,” however, is in dispute. iRobot argues the limitation does not require “a pre-set minimum

Public Version

distance such that the minimum is *always* met.” (*See id.* at 30.) iRobot contends that, “for apparatus claims requiring a particular configuration, ‘it is well settled that an accused device that sometimes, but not always, embodies a claim nonetheless infringes’” (*id.* (citing *Broadcom Corp. v. Emulex Corp.*, 732 F.3d 1325, 1333 (Fed. Cir. 2013))), and so there is no merit to Respondents’ expert’s opinion that “a robot could never infringe this claim if, even one time, it followed an object less than twice its work width” (*id.* (referring to Hr’g Tr. at 559:10-24).)

iRobot continues to note that, actually, “iLife does not dispute that the A6 satisfies this limitation” because “[t]he A6 will always travel twice its work width [of about 34 cm] in edge-follow mode.” (CIB at 37-38 (citing Hr’g Tr. at 518:5-12, 519:11-21; CX-0221C at Q426).) iRobot claims the A6 will follow “any particular wall” for at least 71 cm and up to 400 cm. (*Id.* at 38 (citing CX-0305C at 50:15-24; CPX-1934; CPX-1937).)

For the V5s product line, iRobot claims the limitation is met despite Respondents’ dispute because the “V5s can travel in its edge-follow mode for up to four meters,” as testified to and shown in operational videos, which is well in excess of twice its work width of 33 cm. (*Id.* (citing CX-0221C at Q401; CX-0305C at 26:8-10; CPX-1933; CPX-1937).) The X751, iRobot argues, also can travel in edge-follow mode for more than twice its work width of 35 cm, as shown in operational videos. (*Id.* (citing CX-0221C at Q448; CPX-1926).)

In its reply brief, iRobot primarily discusses how, in its view, “Federal Circuit precedent unambiguously permits an infringement finding when apparatus claims are satisfied some of the time—*i.e.*, through capability of the system.” (CRPB at 16-17 (discussing *Broadcom*, 732 F.3d at 1329-30; *Profectus Tech. LLC v. Huawei Techs. Co.*, 823 F.3d 1375, 1381 (Fed. Cir. 2016); *Finjan, Inc. v. Secure Computing Corp.*, 626 F.3d 1197, 1204 (Fed. Cir. 2010))). iRobot adds that Respondents’ suggestion—where a robot which follows for less than twice the work width

Public Version

even one time can't infringe—would effectively preclude infringement since household items themselves smaller than twice the work width (*e.g.*, a shoe, or wastebasket) are regularly encountered. (*See* CIB at 17.) iRobot suggests that this claim interpretation would lead to a nonsensical result and should be avoided. (*Id.* (citing *Ortho-McNeil Pharm., Inc. v. Mylan Labs., Inc.*, 520 F.3d 1358, 1363 (Fed. Cir. 2008)).)

Respondents' Position

In their responsive brief, Respondents first explain how the limitation is invalid as a “method step in an apparatus claim,” and if not invalid, “it must mean that the control system is ‘configured’ so that when the robot is in obstacle-following mode, the robot travels ‘at least twice the work width of the robot’ in that mode.” (RRSB at 17 (citing RX-2088C at Q90).)

Respondents continue:

In other words, the robot must be configured (*i.e.* programmed) to have a minimum distance that it travels in obstacle-following mode, and that minimum distance must be more than twice the robot's work width. (RX-2079C at Q68-69.) The specification and prosecution history of the '490 patent confirm this limitation cannot be met merely by the robot accidentally or randomly traveling adjacent an obstacle for a distance at least twice the work width of the robot. (RX-2079C at Q47-56; Q68-69.)

(*Id.* at 17-18.)

Following this, Respondents appear to break the accused products into two groups. (*See id.* at 18.) First, Respondents claim there is no minimum distance requirement incorporated into the obstacle-following mode for the “accused iLife X751 and X781 products and Silver Star products.” (*Id.* at 18 (citing RX-2088C at Q97-98; RX-2079C at Q92-98, 111-114, 127-134).)⁹

⁹ Respondents write “Silver Star products” here but they do not explicitly define this group in their briefing which leads to great confusion because Silver Star has their own product at issue, the BD2, while also being the manufacturer for bObsweep and Hoover respondents. Respondents also mix and match how they refer to their products on this page as either D6/bObi

Public Version

Respondents contend there is no dispute here. (*Id.* (citing Hr'g Tr. at 147:17-20, 148:5-8, 148:9-12, 151:12-21).) Second, for the "iLife V3s, V3s Pro, V5s, and V5s Pro," Respondents contend there is a minimum distance programmed in and it is 64 cm, which is less than twice a work width of 33 cm (*i.e.*, 66 cm). (*Id.* (citing RX-2088C at Q93-95).) Respondents do not discuss the A6 accused iLife Product. (*See generally id.* at 17-19.)

Analysis

As I review the parties' briefs, iRobot's theory for the V5 products and X751 products appears to be that the limitation can be met simply by these robots traveling in obstacle following mode for more than twice their work width, whether by programming or happenstance. In its opening brief, iRobot explains:

Because the V5s can travel in its edge-follow mode for up to four meters as Mr. Song testified, CX-0305C, Song at 26:8-10, and as is shown in operational videos, *e.g.*, CPX-1933; CPX-1937, the V5s travels in edge-follow mode for more than twice its work width.

(CIB at 38);

Similarly, for the X751, the work width is about 35 cm. (CX-0221C, Hooper DWS at Q448.) Operational videos show the X751 traveling in edge-follow mode for more than twice its work width, *i.e.*, 70 cm. (CPX-1926). The X751 source code supports this capability as well. (CPX-0002C at 1283-97 (RandomRuning.c ll. 576-1375); 1342-49 at 42 (WallFollowShort.c l. 22).)

(*id.*).

iRobot's expert similarly opines:

The work width of the V5s [is] 33 centimeters measured from one side brush to the other. Using this work width, the V5s satisfies this limitation if obstacle following mode operates for 66 centimeters.

....

product, B3/bOb product, Hoover product/X6. (*See* RRSB at 18 (middle paragraph citation sentences).)

Public Version

I understand the claims to require the capability of obstacle following. Observation of the robot supports my opinion that the V5s satisfies this limitation because *observation sufficiently demonstrates capability*. However, I do not think performance of the robot is required to satisfy this limitation.

(CX-0221C at Q401, 402 (emphasis added).)

I find iRobot's theory is misplaced as it ignores the effect of the claim term "configured." To meet this limitation, the robot must be "configured to operate" in an obstacle following mode wherein "the robot travels adjacent to an obstacle for a distance at least twice the work width of the robot." Thus, the relevant question is whether an accused product is *configured* to travel adjacent an obstacle for twice the work width; and not simply whether it does or can do this all or some of the time. There must be a "configuration" of some kind to point to.

The '490 patent specification supports such a reading. It discloses in fair detail how the robot has programming, perhaps not so far as to ensure the robot follows for twice the work width, but at least to attempt that distance because of its perceived optimal efficiency:

It is yet another object of the invention to optimize the distance the robot travels in an obstacle following mode as a function of the frequency of obstacle following and the work width of the robot, and to provide a minimum and maximum distance for operating in obstacle following mode.

('490 patent at 4:15-20);

FIG. 9B is a flow-chart illustration showing this embodiment of determining when to exit WALL-FOLLOWING (WF) behavior. The robot first determines the minimum distance to follow the wall (d_{min}) and the maximum distance to follow the wall (d_{max}). While in wall (or obstacle) following mode, the control system tracks the distance the robot has traveled in that mode (d_{WF}). If d_{WF} is greater than d_{max} (step 350), then the robot exits wall-following mode (step 380). If, however, d_{WF} is less than d_{max} (step 350) and d_{WF} is less than d_{min} (step 360), the robot remains in wall-following mode (step 385). If d_{WF} is greater than d_{min} (step 360) and an obstacle is encountered (step 370), the robot exits wall-following mode (step 380).

(*id.* at 11:41-53);

Public Version

Theoretically, the optimal distance for the robot to travel in WALL-FOLLOWING behavior is a function of room size and configuration and robot size. In a preferred embodiment, the minimum and maximum distances to remain in WALL-FOLLOWING are set based upon the approximate room size, the robots width and a random component, where by the average minimum travel distance is $2 w/p$, where w is the width of the work element of the robot and p is the probability that the robot will enter WALL-FOLLOWING behavior in a given interaction with an obstacle.

(*id.* at 11:54-63);

The distance that the robot travels in wall following mode can also be set by the robot depending on the number and frequency of objects encountered (as determined by other sensors), which is a measure of room “clutter.” If more objects are encountered, the robot would wall follow for a greater distance in order to get into all the areas of the floor. Conversely, if few obstacles are encountered, the robot would wall follow less in order to not over-cover the edges of the space in favor of passes through the center of the space. An initial wall-following distance can also be included to allow the robot to follow the wall a longer or shorter distance during its initial period where the WALL-FOLLOWING behavior has control.

(*id.* at 12:12-24).

For what it is worth, I agree with iRobot that the limitation can be met “some of the time” (*see* CRPB at 16 (comparing to *Broadcom Corp. v. Emulex Corp.*, 732 F.3d 1325, 1329-30 (Fed. Cir. 2013))) in that an accused product will meet the limitation even if it is “configured . . . to travel adjacent to an obstacle for a distance at least twice the work width” some of the time. This does not take away from the need, however, for that product to have a “configuration” to do this travel and not just accomplish it happenstance.¹⁰

Thus, infringement for the V5s and X751 (A6 is not disputed) turns on whether they have a “configuration” to travel adjacent to an obstacle for a distance at least twice their work width,

¹⁰ Indeed, the need for a “configuration” is what justifies iRobot’s expert’s opinion “[t]he claim does not require the obstacle follow to be performed” (CX-0221C at Q402) and, as discussed in the below invalidity section, keeps the limitation from being indefinite for reciting a method step within an apparatus claim.

Public Version

and not simply whether a video shows it happening. For the V5s, iRobot points to testimony of iLife's corporate designee who testified that the robot will exit edge-cleaning mode based on a random distance value that could be as low as 64 cm and as high as 4 m. (CIB at 38 (citing CX-0305C at 26:8-10).) Respondents do not dispute this "configuration" but rather argue the robot's work width is 33 cm and 64 is less than 66 cm, therefore the limitation is not met. (RRSB at 18.) In this way, Respondents imply that, to infringe, a robot must never be "configured" to travel less than twice the work width. This is not in accordance with the law, which allows for sometimes-but-not-always, infringement, *Broadcom*, 732 F.3d at 1333, and I find the limitation is met based on those times the V5s is configured to travel adjacent to an obstacle for more than 66 cm while in obstacle following mode.

For the X751, iRobot's expert opines that the work width is about 35 cm and its source code calls a [] which [] with a maximum distance much greater than twice the work width." (CX-0221C at Q448 (citing CPX-0002C).) Again, Respondents do not dispute that there is such maximum distance programming, only that "there is no minimum distance requirement." (RRSB at 18 (citing RX-2088C at Q97-98).) As with the V5s, it stands to reason then, at least sometimes, the X751 is "configured" to travel adjacent to an obstacle for that maximum distance which is more than 70 cm, and I find the limitation is met. *Broadcom*, 732 F.3d at 1333.¹¹

c. Disputed Claim Limitations Concerning "Configured to Operate the Robot"

As presented in the disputed limitations above, both of claims 1 and 42 require "said control system configured to operate the robot in a plurality of operational modes." ('490 patent at cls. 1, 42.) Respondents dispute that these limitations are met by the iLife Products.

¹¹ I note that, as far as I can tell, Respondents do not address *Broadcom*.

Public Version

iRobot's Position

In its opening brief, iRobot claims the limitation is met because “Mr. Song, iLife’s corporate designee, testified that these products have several operational modes including the automatic cleaning mode, sport mode, and edge-follow mode” (CIB at 35-36 (citing CX-0305C at 22:4-6, 62:5-63:22, 65:13-18, 73:4-15)) in addition to product manuals and operational videos which show the same (*id.* at 36 (citing CX-0779C at 5557; CX-0776C at 5483-5484; CPX-1933; CPX1940; CPX-1941; CPX-1934; CPX-1929; CPX-1926; CPX-1927)). In its reply brief, iRobot notes that Respondents do not dispute these three modes exist in the iLife Products but erroneously argue the limitation requires “each mode must be autonomously entered into.” (CRPB at 18.)

Respondents' Position

In their responsive brief, Respondents indeed acknowledge “[t]here is no dispute that the accused products have three distinct modes that correspond to the three modes required by the claims, *i.e.*, a spot-coverage (spiral) mode, an obstacle-following mode, and a bounce (random) mode.” (RRSB at 19.) Respondents add, however, “[i]t is also undisputed that the spot-coverage mode in the accused products is only entered when an end user manually pushes a spot-clean button.” (*Id.* (citing RX-2088C at Q76-77; RX-2087C at Q15-16; RX-2079C at Q90-91, 107-110; Hr’g Tr. at 148:23-149:13).) Respondents then explain why the claims should be interpreted to require that all three operational modes be entered into autonomously based on this limitation. (*See generally id.* at 19-22.)

Analysis

As I determined in the above claim construction discussion, I do not find *this limitation* requires the robot to be able to autonomously enter into or select all of the listed operational

Public Version

modes. Rather, “configured to operate the robot in a plurality of operational modes” simply means “configured to run the robot in a plurality of operational modes.” Thus, as it is not in dispute that the iLife Products operate in all three operational modes (RRSB at 19, 22; CIB at 35-36 (citing CX-0305C at 22:4-6, 62:5-63:22, 65:13-18, 73:4-15)) the limitation is met in the iLife Products.

d. Disputed Claim Limitation Concerning “Select From Among the Plurality of Modes”

As presented above, claim 1 requires “to select from among the plurality of modes in real time in response to signals generated by the obstacle detection sensor.” (’490 patent at cl. 1.) Respondents dispute that this limitation is met by the iLife Products.

iRobot’s Position

In its opening brief, iRobot characterizes Respondents’ position as a “results-driven construction” (CIB at 31) and a rewriting of the claim from “select from among the plurality” to “select each of the plurality” (*id.* (citing Hr’g Tr. at 283:8-20, 503:12-504:13).) iRobot contends the claim is satisfied by the iLife Products because it is undisputed that the bounce and obstacle-following modes are entered into in response to obstacle detection sensors; even if the spot-mode is not. (*See id.* (citing RX-2088C at Q76; RX-2079C at Q87).) iRobot reasons “[t]hese modes are among the plurality of modes recited by the claim.” (*Id.* (citing RX-2088C at Q73).) In its reply brief, iRobot solely discusses claim interpretation. (*See generally* CRPB at 20-21.)

Respondents’ Position

In their responsive brief, Respondents confirm “that in the accused products, only two of the three modes (bounce and obstacle-following) can be selected by the control system in response to signals from the obstacle sensor, while the third mode (spot-coverage) is only entered when an end-user manually pushes a spot-clean button.” (RRSB at 22-23 (citing RX-

Public Version

2088C at Q76-77; RX-2087C at Q15-16; RX-2079C at Q90-91, 107-110; Hr’g Tr. at 148:23-149:13).) Respondents reason “[t]his means that the accused products cannot infringe, because their control systems can only select from among two modes in response to signals from obstacle sensors, and the claims require selecting from among at least three modes.” (*Id.*) Respondents then continue to discuss claim interpretation. (*See generally id.* at 23-24.)

Analysis

As I determined above, “configured . . . to select from among the plurality of modes in real time in response to signals generated by the obstacle detection sensor” means each of the modes can be selected. This limitation, therefore, is not met by a product whose “spot-coverage mode” is not entered into “in response to signals generated by the obstacle detection sensor.” As there is no dispute that the iLife Products do not enter into their spot-coverage modes in response to obstacle detection sensor signals (CIB at 31 (citing RX-2088C at Q76; RX-2079C at Q87; RRSB at 22-23 (citing RX-2088C at Q76-77; RX-2087C at Q15-16; RX-2079C at Q90-91, 107-110; Hr’g Tr. at 148:23-149:13))), the iLife Products do not meet this limitation.

2. Direct Infringement by the Hoover Products

For the reasons explained below, I find iRobot has shown by a preponderance of the evidence that the Hoover Products meet the limitations of asserted claim 42, and thus, that Hoover directly infringes that claim.

a. Undisputed Claim Limitations

As reflected in the parties’ post-hearing briefing, most of the ’490 patent asserted claim limitations in the Hoover Products are not in dispute. (*See, e.g.*, RRSB at 16-22, 24-26.) These undisputed limitations, along with my findings, are summarized below.

Independent claim 42 requires, “[a] mobile robot.” (’490 patent at cl. 42.) I find credible and un rebutted testimony demonstrates the Hoover Products are robots which can move around

Public Version

or navigate a room by themselves using intelligence. (*See* CIB at 39-40 (citing CX-0221C at Q306).) The limitation is met.

Claim 42 further requires, “(a) means for moving the robot over a surface.” (’490 patent at cl. 42.) I find credible and unrebutted testimony demonstrates the Hoover Products include two motorized wheels which drive the robot around a room. (*See* CIB at 40 (citing CX-0221C at Q30, 307; CX-0347C at 52:3-19, 51:8-16).) The limitation is met.

Claim 42 further requires, “(b) an obstacle detection sensor.” (’490 patent at cl. 42.) I find credible and unrebutted testimony demonstrates the Hoover Products include a bump sensor and a laser rangefinder to detect obstacles in a room. (*See* CIB at 40 (citing CX-0221C at Q31-33, 308; RX-2079C at Q131).) The limitation is met.

Claim 42 further requires, “(c) a cliff sensor.” (’490 patent at cl. 42.) I find credible and unrebutted testimony demonstrates the Hoover Products include sensors which detect when there is a drop off in the surface the robot moves around on. (*See* CIB at 40 (citing CX-0221C at Q34-35, 309; CX-0329C at 38:19-25, 39:1-40:11, 44:13-45:5, 50:15-51:11, 76:4-77:11, 80:11-18).) The limitation is met.

Claim 42 further requires, “(d) a control system operatively connected to said obstacle detection sensor, said cliff sensor, and said means for moving.” (’490 patent at cl. 42.) I find credible and unrebutted testimony demonstrates the Hoover Products include a control system which use the outputs from the sensors to control the robot’s movement around a room. (*See* CIB at 40-41 (citing CX-0221C at Q29, 310; CX-0329C at 36:13-16, 72:22-73:10, 41:6-8; 70:18-71:11).) The limitation is met.

Public Version

b. Disputed Claim Limitation Concerning “Twice the Work Width”

As explained above, Claim 42 requires:

(e) said control system configured to operate the robot in a plurality of operational modes, said plurality of operational modes comprising: a spot-coverage mode whereby the robot operates in an isolated area, an obstacle following mode whereby said robot travels adjacent to an obstacle for a distance at least twice the work width of the robot, and a bounce mode whereby the robot travels substantially in a direction away from an obstacle after encountering the obstacle.

(’490 patent at cl. 42.) Respondents dispute that this limitation is met by the Hoover Products.

iRobot’s Position

In its opening brief, iRobot takes the position that much of these two limitations is not in dispute. Specifically, iRobot claims it is not disputed that “[t]he Hoover/Y2 Products include a spot-coverage mode whereby the robot operates in an isolated area.” (CIB at 41 (citing CX-0221C at Q37, 40, 313-314).) I find sufficient evidence demonstrates the Hoover Products have a spot coverage mode where the robot moves in a limited grid pattern. (*See id.* (citing CX-0398 at 7422; CPX-1864; CPX-1867; CX-0426C at 5899).) Similarly, iRobot claims it is not disputed that “[t]he Hoover/Y2 Products have a bounce mode whereby the robot travels substantially in a direction away from an obstacle after encountering the obstacle.” (*See id.* at 42 (citing CX-0221C at Q37, 322).) I find sufficient evidence demonstrates the Hoover Products have a bounce mode where the robots will move away from an obstacle contacted and thus detected by a bump sensor. (*See id.* (citing CPX-1863; CPX-1859; CPX-1869; CX-0398 at 7422; CPX-1861).)

The portion of this limitation which refers to the robot travelling “twice the work width,” however, is in dispute. iRobot argues “[t]he Hoover/Y2 Products were designed to include an ‘along the wall’ mode” where a behavior known as “servoing” was observed by iRobot’s expert.

Public Version

(See CIB at 41-42 (citing CX-0221C at Q38-39, 315-321; CX-0351C at 2419; Hr’g Tr. at 156:11-160:12).) iRobot claims the Quest 1000 product has a work width of 29 cm and videos show it “operating in along the wall mode for 119 cm and 315 cm. (*Id.* at 42 (citing CX-0221C at Q38, 316; CPX-1872; CPX-1866).) iRobot claims the Rogue 900 has a work width of 30 cm and videos show it “operating in along the wall mode for 298 cm and 92 cm. (*Id.* (citing CX-0221C at Q39, 316; CPX-1869; CPX-1871).)

Respondents’ Position

Respondents’ position on this limitation has largely been summarized above. Specifically, Respondents claim the limitation is not met by the Hoover Products because “there is no minimum distance requirement for obstacle-following mode” in their programming. (RRSB at 18 (citing RX-2079C at Q127-134).) Thus, according to Respondents, they are not “configured to travel ‘at least twice the work width of the robot’ in obstacle-following mode.” (*Id.*)

Analysis

As I determined in the above discussion of the iLife Products, the relevant question for this limitation is whether an accused product is, at least some of the time, “configured” to travel adjacent an obstacle for at least twice the work width. Unlike with the iLife Products, however, iRobot’s expert only briefly opines that “[i]t appears that the Quest 1000 has []” without further identifying where in the code this takes place. (See CX-0221C at Q317; see CX-0221C at Q38, 315-318.) Nevertheless, Respondents do not dispute that there is an “along the wall” mode, as iRobot’s expert testifies (*see id.* at Q37-38, 315-321), and I find credible testimony explains that the “servoing” behavior observed in the Hoover Products during this mode (CIB at 41 (citing

Public Version

CX-0221C at Q321; Hr’g Tr. at 156:11-160:12)) reflects a “configuration” for the robot to travel adjacent a wall. I find those videos provided by iRobot which show the Hoover Products travelling in this way for longer than twice the work width before abruptly stopping and turning away from the wall (*see* CPX-1866 at 2:50-3:15; CPX-1869 at 2:10-2:30; CPX-1871 at 1:25-1:35; CPX-1872 at 0:00-0:13; *see also* ’490 patent at 11:20-40 (describing how a robot may “remain in WALL-FOLLOWING behavior until the robot has either traveled the maximum distance (FIG. 8D) or traveled at least the minimum distance and encountered an obstacle 101 (FIG. 8C))) are sufficient evidence that there is a “configuration” for that “along the wall” mode to last for the required duration. The limitation is met by the Hoover Products.

c. Disputed Claim Limitation Concerning “Configured to Operate the Robot”

As presented in the disputed limitation above, claim 42 requires “said control system configured to operate the robot in a plurality of operational modes.” (’490 patent at cl. 42.) Respondents dispute that this limitation is met by the Hoover Products.

iRobot’s Position

In its opening brief, iRobot claims the limitation is met because the Hoover Products “have a control system configured to operate the robot in a plurality of operational modes, including automatic cleaning (“AUTO” mode), spot mode, and an along the wall mode.” (CIB at 41 (citing CX-0221C at Q37, 311).) More specifically, iRobot claims “AUTO” and spot modes are described in manuals and videos show the robots operating in and “selecting modes automatically.” (*Id.* (citing CX-0398 at 7422; CX-0426C at 5895-5896; CPX-1864; CPX-1865; CPX-1867; CPX-1863; CPX-1871).) In its reply brief, iRobot notes that Respondents’ do dispute whether the Hoover products have an obstacle-following mode as required by the claims,

Public Version

but, overall, Respondents are incorrect when they are the limitation requires “each mode must be autonomously entered into.” (CRPB at 17-18.)

Respondents’ Position

Respondents’ position on this limitation has largely been summarized above. Specifically, Respondents claim the limitation should be “interpreted to require all three modes to be selected by the control system, and not the user.” (RRSB at 22.) Thus, the limitation is not met by the Hoover Products, assumedly, because they “do not enter spot coverage on their own.” (*Id.* at 19 (citing Hr’g Tr. at 148:23-149:13).)

Analysis

As I determined in the above claim construction discussion, I do not find *this limitation* requires the robot to be able to autonomously enter into or select all of the listed operational modes. Rather, “configured to operate the robot in a plurality of operational modes” simply means “configured to run the robot in a plurality of operational modes.” Thus, as it is not in dispute that the Hoover Products operate in all three operational modes (CIB at 41 (citing CX-0221C at Q37, 311); CRPB at 17-18; RRSB at 19, 22))¹² the limitation is met in the Hoover Products.

d. Disputed Claim Limitations Concerning “Obstacle Following Mode”

As presented in the disputed limitation above, claim 42 requires “an obstacle following mode whereby said robot travels adjacent to an obstacle for a distance at least twice the work width of the robot.” (’490 patent at cl. 42.) Respondents dispute that this limitation is met by the Hoover Products.

¹² Subject to the next discussion of “obstacle following mode.”

Public Version

iRobot's Position

In its opening brief, iRobot distinguishes the alleged “straight line” behavior of the Hoover Products from the prior art which, according to iRobot, “were not capable of evaluating their environment, whereas the Hoover Products use laser scanning sensors to evaluate the room and coordinate cleaning modes.” (CIB at 31-32 (citing CX-0221C at Q320; CPX-1859; CX-0333C at 2268).) iRobot claims Respondents’ expert admitted the products will follow a wall after scanning the area and doubts that expert’s opinion that the scanning laser is blind to close-up objects. (*Id.* at 32 (referring to Hr’g Tr. at 561:6-17, 562:16-563:6, 566:13-25, 567:12-568:2).) Regardless, iRobot claims the behavior known as “servoing” proves the existence of an obstacle following mode. (*Id.* (citing CPX-1872; CPX-1869; CX-0221C at Q321; Hr’g Tr. at 156:11-160:12, 293:21-295:4, 516:21-517:6).)

Additionally, iRobot claims the Hoover Products “have a control system configured to operate the robot in a plurality of operational modes, including automatic cleaning (“AUTO” mode), spot mode, and an along the wall mode.” (*Id.* at 41 (citing CX-0221C at Q37, 311).) According to iRobot, “[t]esting videos confirm that the robots operate in these modes” and “show the robots selecting modes automatically.” (*Id.* (citing CPX-1864; CPX-1865; CPX-1867; CPX-1863; CPX-1871).)

In its reply brief, iRobot acknowledges that the Hoover Products “use their laser sensor to pre-scan and roughly map an area. . . . While cleaning, the Hoover robots use their laser sensor to react to obstacles without use of this map.” (CRPB at 21 (citing CX-0221C at Q31-33).) According to iRobot, “[t]he laser sensor’s ability to respond to obstacles while cleaning allows the Hoover robots to track and follow alongside an obstacle such as a wall.” (*Id.*) iRobot claims this is different from cleaning along a predetermined path. (*Id.* (citing CX-0221C at Q320-321).]

Public Version

[iRobot further claims the robots' use of "their laser sensor to render a new map every time the robot is switched on" means they "cannot fairly be categorized as moving according to a set path preloaded into memory in a highly controlled environment." (*Id.* at 22 (citing CX-0221C at Q31; CPX-1859).) iRobot claims video evidence shows the robots reacting to obstacles not in the map, as in a laundry basket suddenly placed in its way. (*Id.* (citing CPX-1859).) Overall, iRobot posits a "servoing" behavior takes place which further "indicates active tracking, and following, of the wall." (*Id.* at 24 (citing Hr'g Tr. at 156:11-160:12, 293:21-295:4, 516:21-517:6; CPX-1872).)

Respondents' Position

In their responsive brief, Respondents argue the products lack an "obstacle following mode." (RRSB at 24.) Specifically, Respondents state, "the Hoover products use laser rangefinder positioning system to scan the clean area, map the best cleaning path, and clean in a predetermined path similar to the 'deterministic cleaning' systems described in the Background (prior art) section of the '490 patent." (*Id.* (citing RX-2079 at Q38-40, 120; Hr'g Tr. at 146:21-147:6).) Respondents contend this is important because "[t]here is no dispute the '490 patent expressly disclaims this type of predetermined mapping system." (*Id.* (citing '490 patent at 2:30-34, Fig. 1A; Hr'g Tr. at 154:11-24).) Respondents argue this disclaimer also arose during prosecution when, according to Respondents, "iRobot argued that following 'predetermined paths' including a 'stored map' is not multiple modes as claimed." (*Id.* (citing JX-0013 at 8758).)

Respondents continue to argue that an obstacle following mode "requires keeping the obstacle under surveillance" or "tracking" it. (*See id.* at 25 (citing RX-2079C at Q65-67; Hr'g Tr. at 152:17-19).) Respondents reason that "[m]erely traveling in a straight line adjacent to an

Public Version

obstacle is different,” such as that shown in Figure 1A of the '490 patent, and reproduced below with Respondents' annotation:

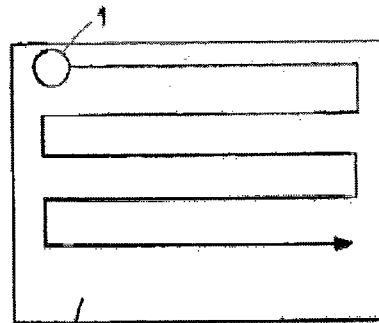


FIG. 1A

RDX-34

(*Id.* (citing '490 patent at Fig. 1).) Respondents state both “[t]he accused Hoover products operate in *the same manner as* the prior art robot behavior shown in FIG. 1A” and “the Hoover products that follow and operate *similar to* prior art products shown in FIG. 1A of the '490 patent.” (*Id.* (emphasis added).)

Analysis

As can likely be surmised from the previous analysis of “twice the work width,” I find it more likely than not the Hoover Products include an “obstacle following mode” in accordance with the claim. Both experts agree that an obstacle following mode, or a wall-follow mode, involves “surveillance” or “tracking” of a structure’s edge (*see* RRSB at 25 (citing RX-2079 at Q65-67; Hr’g Tr. at 152:17-19)) for which it is trying to follow and clean against (*see* '490 patent at 10:27-34 (describing this as “edge cleaning”). At the hearing, iRobot’s expert described agreed this is also described as “moving relative to an obstacle it has tracked.” (Hr’g Tr. at 152:17-19.)

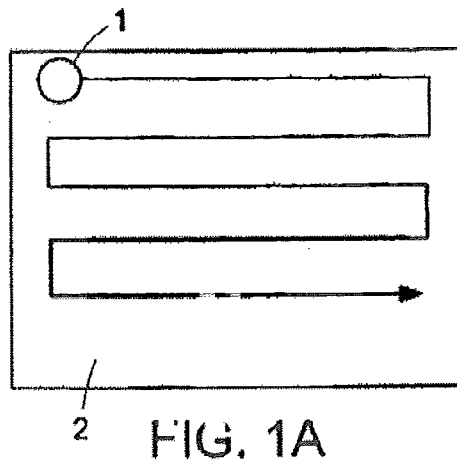
Public Version

iRobot has presented video evidence of the Hoover Robots performing active tracking of an obstacle, in this case a wall. In particular, CPX-1866 at 2:50-3:20, shows the robot acting as if it is trying to find a wall, and once found, ride alongside it through minor course adjustments. More specifically, at the beginning of the clip (CPX-1866 at 2:50-2:58), the wall is found and the robot actually drifts away before promptly stopping, rotating in the direction of the wall, and then proceeding back against it. From there, the robot encounters an internal wall corner, navigates it closely, then continues down a straight wall section with very subtle course adjustments so as to stay as close to that wall as possible (*i.e.*, clean the edge) before abruptly stopping after a considerable distance and turning away. CPX-1869 is another good example. Here, the robot travels in much the same way but then it specifically follows the contour of a doorframe and door that is set back from the straight wall it had been following. (CPX-1869 at 2:07-2:33.)

iRobot has presented credible expert testimony that the subtle course adjustments shown in this video and others are known as “servoing” or “hunting” and reflect “active tracking” of the wall. (Hr’g Tr. at 157:24-159:23.) I find this kind of behavior meets the claim limitation “obstacle following mode.”

Respondents have not offered a persuasive explanation for the behavior shown in video clips such as CPX-1866 that is not obstacle following. Primarily, Respondents make the broad assertion that the Hoover Products use a laser rangefinder to “scan the clean area, map the best cleaning path, and clean in a predetermined path,” thereby practicing a method “the ’490 patent expressly disclaims.” (RRSB at 24 (referring to ’490 patent at 2:30-34); *see* RX-2079 at Q128 (referencing prosecution history at 357)).) In other words, the Hoover Products “operate in the same manner as the prior art robot behavior shown in FIG. 1A:”

Public Version



(RRSB at 25; '490 patent at Fig. 1A.)

While there is no dispute the Hoover Products are perhaps unique among the products at issue in this investigation through their use of a laser rangefinder to create a predetermined path, a critical aspect of Respondents' argument is missing—that the Hoover Products do not *also* use a wall-following behavior when walls or other obstacles are discovered/observed during operation. (See RRSB at 24-26; CX-2079 at Q127-132.) This is important because there is video evidence in the record of the Hoover Products behaving outside of a predetermined path which Respondents claim is “straight.” (Compare CPX-1869 at 2:07-2:33 with RRSB at 25 (“merely traveling in a straight line adjacent to an obstacle is different”); Hr’g Tr. at 567:2-568:2 (discussing straight line behavior).)

Respondents add that they cannot meet this limitation because “the Hoover Products do not have a sensor to keep the wall/obstacle under surveillance as the robot travels adjacent the wall or obstacle.” (RRSB at 26 (citing RX-2079C at Q128-132).) I find this position is likely based in an undisclosed but overly narrow definition of “sensor to keep the wall/obstacle under surveillance” because there is no dispute the Hoover Products have a bump sensor, and the videos discussed above show the robot following walls in ways that could easily be in response

Public Version

to signals or lack of signals coming from the bump sensor. This would also explain how the following is accomplished even though, *if true*, Respondents’ “[.]” (RX-2079 at Q132.)

There is also no dispute the laser rangefinder is capable of detecting obstacles at a distance. (*See, e.g.*, CX-0221C at Q23; RX-2079 at Q128-132.) Thus, I find the limitation is met in the Hoover Products.

3. Direct Infringement by the bObsweep Products

For the reasons explained below, I find iRobot has shown by a preponderance of the evidence that the Bob products meet the limitations of asserted claim 42, and thus, that bObsweep directly infringes that claim.

a. Undisputed Claim Limitations

As reflected in the parties’ post-hearing briefing, most of the ’490 patent asserted claim limitations in the bObsweep Products are not in dispute. (*See, e.g.*, RRSB at 16-24.) These undisputed limitations, along with my findings, are summarized below.

Independent claim 1 is not listed as an asserted claim by iRobot, but it is effectively asserted through dependent claim 12. Claim 1 requires, “[a] mobile robot.” (’490 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the bObsweep Products are robots which can move around or navigate a room by themselves using intelligence. (*See* CIB at 42 (citing CX-0221C at Q44, 60, 324, 365).) The limitation is met.

Claim 1 further requires “(a) means for moving the robot over a surface.” (’490 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the bObsweep Products include two motorized wheels which drive the robot around a room. (*See* CIB at 42-43 (citing CX-0221C at Q45, 62, 325, 366; CX-0329C at 26:9-12).) The limitation is met.

Public Version

Claim 1 further requires “(b) an obstacle detection sensor.” (’490 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the bObsweep Products include bump sensors and infrared proximity sensors which detect contacted obstacles or those at a distance. (See CIB at 43 (citing CX-0221C at Q47, 64-66, 326, 366; CX-0296C at 47:20-24, 48:17-19, 23:23-25, 30:23-33:25; 36:2-5, 82:6-18; CX-0329C at 86:15-23, 94:23-96:5, 87:19-88:3).) The limitation is met.

Claim 1 further requires “(c) and a control system operatively connected to said obstacle detection sensor and said means for moving.” (’490 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the bObsweep Products include a control system to use the outputs from the sensors towards controlling the robot’s movement around a room. (See CIB at 43 (citing CX-0221C at Q46, 63, 327, 368; CX-0329C at 98:19-21).) The limitation is met.

Dependent claim 12 requires, “[t]he mobile robot according to claim 1, further comprising a means for manually selecting an operational mode.” (’490 patent at cl. 12.) I find credible and un rebutted testimony demonstrates the bObsweep Products include, at least, buttons on the robots to select one of the operational modes. (See CIB at 46 (citing CX-0221C at Q73, 349-351, 379).) The limitation is met.

Independent claim 42 requires, “[a] mobile robot.” (’490 patent at cl. 42.) I find credible and un rebutted testimony demonstrates the bObsweep Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 42 further requires, “(a) means for moving the robot over a surface.” (’490 patent at cl. 42.) I find credible and un rebutted testimony demonstrates the bObsweep Products meet this limitation for the same reasons discussed under claim 1, above.

Public Version

Claim 42 further requires, “(b) an obstacle detection sensor.” (’490 patent at cl. 42.) I find credible and un rebutted testimony demonstrates the bObsweep Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 42 further requires, “(c) a cliff sensor.” (’490 patent at cl. 42.) I find credible and un rebutted testimony demonstrates the bObsweep Products include sensors which detect drop-offs in the surface the robot travels on. (*See* CIB at 47 (citing CX-0221C at Q65, 355-356, 383; CX-0347C at 84:25-85:2; CX-0296C at 38:18-39:1; 46:8-10, 30:20-23, 38:18-39:1; 77:18-78:6; CX-0329C at 92:17-93:4, 92:23-93:4).) The limitation is met.

Claim 42 further requires, “(d) a control system operatively connected to said obstacle detection sensor, said cliff sensor, and said means for moving.” (’490 patent at cl. 42.) I find credible and un rebutted testimony demonstrates the bObsweep Products meet this limitation for the same reasons discussed under claim 1, above.

b. Disputed Claim Limitations Concerning “Twice the Work Width”

As explained above, claim 1 requires:

(d) said control system configured to operate the robot in a plurality of operational modes and to select from among the plurality of modes in real time in response to signals generated by the obstacle detection sensor, said plurality of operational modes comprising: a spot-coverage mode whereby the robot operates in an isolated area, an obstacle following mode whereby said robot travels adjacent to an obstacle, and a bounce mode whereby the robot travels substantially in a direction away from an obstacle after encountering the obstacle, and wherein, when in the obstacle following mode, the robot travels adjacent to an obstacle for a distance at least twice the work width of the robot.

(’490 patent at cl. 1.) Claim 42 similarly requires:

(e) said control system configured to operate the robot in a plurality of operational modes, said plurality of operational modes comprising: a spot-coverage mode whereby the robot operates in an isolated area, an obstacle following mode whereby said robot travels adjacent to an obstacle for a distance at least twice the work width of the robot, and a bounce mode

Public Version

whereby the robot travels substantially in a direction away from an obstacle after encountering the obstacle.

(‘490 patent at cl. 42.) Respondents dispute that these limitations are met by the bObsweep Products.

iRobot’s Position

In its opening brief, iRobot takes the position that much of these two limitations is not in dispute. Specifically, iRobot claims it is not disputed that “[t]he bObsweep Products include a spot-coverage mode whereby the robot operates in an isolated area.” (CIB at 44 (citing CX-0221C at Q53, 69, 335, 374).) I find credible and unrebutted testimony demonstrates the bObsweep Products can move in a waffle or spiral pattern which constitutes a spot mode. (*See id.* at 44-45 (citing Hr’g Tr. at 556:9-19; CX-0296C at 28:6-8, 39:8-10, 41:7-42:25, 63:18-64:10; CX-0329C at 7:17-24).) iRobot also claims it is not dispute that the bObsweep Products are “configured to operate the robot in an obstacle following mode whereby said robot travels adjacent to an obstacle.” (*Id.* at 45 (citing CX-0221C at Q53-54, 56, 67-68, 71, 336-340, 373, 375).) I find credible and unrebutted testimony demonstrates the bObsweep Products use bump and proximity sensors to detect the presence of an object and allow the robot to clean along the object’s edge. (*See id.* (citing Hr’g Tr. at 556:20-22; CX-0296C at 43:12-20, 109:6-14, 27:20-28:17, 30:8-14, 68:15-69:25).) Additionally, iRobot claims it is not in dispute that the bObsweep Products are “configured to operate the robot in a bounce mode whereby the robot travels substantially in a direction away from an obstacle after encountering the obstacle.” (*Id.* (citing CX-0221C at Q53, 55, 67, 70, 341-342, 376).) I find credible and unrebutted testimony demonstrates the bObsweep Products can bounce around a cleaning area in a random pattern and contact then turn away from detected obstacles. (*See id.* at 45-46 (citing Hr’g Tr. at 556:12-14; CX-0296C at 43:12-15, 45:16-21, 23:23-25, 27:20-28:17, 30:8-14, 32:8-24).)

Public Version

The portion of this limitation which refers to the robot travelling “twice the work width,” however, is in dispute. iRobot argues the work width of the bObi products is about 29 centimeters, and video evidence shows the robot travelling at least 58 cm in obstacle following mode. (*Id.* at 46 (citing CX-0221C at Q340, 346-347; CPX-1853; CPX-1939; CPX-1937).) Similarly, according to iRobot, the work width of the bOb products is about 32 cm and video evidence as well as corporate testimony confirms the robot will follow a wall for up to about 2 m or at least as long as twice the 32 cm work width. (*Id.* (citing CX-0221C at Q68, 377; CX-0296C at 30:8-14; CPX-1938; CPX-1937).)

Respondents’ Position

Respondents’ position on this limitation has largely been summarized above. Specifically, Respondents claim the limitation is not met by the bObsweep Products because “there is no minimum distance requirement for obstacle-following mode” in their programming. (RRSB at 18 (citing RX-2079C at Q92-98, 111-114; *see also* Hr’g Tr. at 147:17-147:20, 148:5-8, 151:12-21).) Thus, according to Respondents, they are not “configured to travel ‘at least twice the work width of the robot’ in obstacle-following mode.” (*Id.*)

Analysis

As I determined in the above discussions of the iLife and Hoover Products, the relevant question for this limitation is whether an accused product is, at least some of the time, “configured” to travel adjacent an obstacle for at least twice the work width. iRobot contends the work width of the bObsweep Products is between 29 and 32 cm, which Respondents do not dispute. (CIB at 46 (citing CX-0221C at Q346, 377); RRSB at 18.) Respondents also do not dispute that the bObsweep Products operate in a wall follow mode, as iRobot’s expert explains. (CX-0221C at Q54, 68, 345-348.)

Public Version

For the bObi products in particular, iRobot acknowledges that a bObsweep corporate representative testified that they “[

]” (CIB at 46 (alluding to CX-0296C at 111:4-24)) but nevertheless claims video evidence show them travelling at least twice the work width (> 58 cm) (*id.* (citing CPX-1853; CPX-1939; CPX-1937)).¹³ Upon review of the video evidence, I do not find that it sufficiently shows the limitations is met. CPX-1853 is a promotional video which may be a computer generated production and otherwise does not clearly show the robot operating in wall following mode. Rather, the robot is shown perfectly driving alongside a wall while the narrator asserts it may “then move along the walls or into different rooms.” (CPX-1853 at 0:51-0:55.) CPX-1937 does not show any robot at all but rather the measurement of a dresser, used for a demonstration in CPX-1939. CPX-1939 appears to show a wall-follow mode, however, but it is not clear when the wall-follow mode actually begins and if it lasts for more than 58 cm. (*See* CPX-1939.) In short, this video is very different from those created for the iLife Products which more concretely show a “servoing” behavior and abrupt cessation of a wall-following mode. With no other evidence, I do not find iRobot has shown this limitation is met in the bObi products.

The Bob products, however, are a different story. Here, iRobot points to corporate representative testimony that [], which would be found in the source code. (CIB at 46 (citing CX-0296C at 30:8-14).)] Additionally, the video of CPX-1938 clearly shows wall-follow behavior as the robot wraps around the external corners of a dresser shown and measured in CPX-1937, for longer than twice its work width (64 cm). (*See* CPX-1938 at 0:08-27.) Again, Respondents only dispute here is

¹³ Notably, iRobot does not look to its expert’s testimony on a timer (CX-0221C at Q348) for support on this limitation.

Public Version

that “there is no minimum distance requirement for obstacle-following mode” (RRSB at 18) which is not a proper interpretation of the patent claim. Thus, I find iRobot has sufficiently shown the limitation is met in the Bob products.

c. Disputed Claim Limitations Concerning “Configured to Operate the Robot”

As presented in the disputed limitations above, both of claims 1 and 42 require “said control system configured to operate the robot in a plurality of operational modes.” (’490 patent at cls. 1, 42.) Respondents dispute that these limitations are met by the bObsweep Products.

iRobot’s Position

In its opening brief, iRobot claims the limitation is met because “product manuals explain that the robots have an automatic mode, spot mode, and edge-follow mode” and “Mr. Liang confirmed these operational modes in his testimony.” (CIB at 43-44 (citing CX-0615 at 0914; CX-0617 at 1030; X-0296 at 43:12-20, 27:20-28:17, 32:8-24).) In its reply brief, iRobot notes that Respondents do not dispute these three modes exist in the bObsweep Products but erroneously argue the limitation requires “each mode must be autonomously entered into.” (CRPB at 18.)

Respondents’ Position

Respondents’ position on this limitation has largely been summarized above. Specifically, Respondents claim the limitation should be “interpreted to require all three modes to be selected by the control system, and not the user.” (RRSB at 22.) Thus, the limitation is not met by the bObsweep Products because they “do not enter spot coverage on their own.” (*Id.* at 19 (citing Hr’g Tr. at 148:23-149:13).)

Public Version

Analysis

As I determined in the above claim construction discussion, I do not find *this limitation* requires the robot to be able to autonomously enter into or select all of the listed operational modes. Rather, “configured to operate the robot in a plurality of operational modes” simply means “configured to run the robot in a plurality of operational modes.” Thus, as it is not in dispute that the bObsweep Products operate in all three operational modes (CIB at 43-44 (citing CX-0615 at 0914; CX-0617 at 1030; X-0296 at 43:12-20, 27:20-28:17, 32:8-24); CRPB at 18; RRSB at 19, 22)) the limitation is met in the bObsweep Products.

d. Disputed Claim Limitation Concerning “Select From Among the Plurality of Modes”

As presented above, claim1 requires “to select from among the plurality of modes in real time in response to signals generated by the obstacle detection sensor.” (’490 patent at cl. 1.) Respondents dispute that this limitation is met by the bObsweep Products.

iRobot’s Position

In its opening brief, iRobot contends the claim is satisfied by the bObsweep Products because they “switch between modes in real time, for example, selecting between automatic and edge-following mode.” (CIB at 44 (citing CX-0221C at Q70-72, 330, 370; *see also* Hr’g Tr. at 556:9-19; CX-0567 at 8261; CX-0296 at 46:11-19, 48:20-49:1; 115:2-5, 83:9-84:4).) iRobot argues the products’ source code confirms that the transition can occur “by reacting to signals from sensors to switch.” (*Id.* (citing CPX-0001C at 0476, 0457, 0548, 0531, 0563, 0603-0618, 0592).) In its reply brief, iRobot solely discusses claim interpretation. (*See generally* CRPB at 20-21.)

Public Version

Respondents' Position

Respondents' position on this limitation has largely been summarized above. Specifically, Respondents confirm "that in the accused products, only two of the three modes (bounce and obstacle-following) can be selected by the control system in response to signals from the obstacle sensor, while the third mode (spot-coverage) is only entered when an end-user manually pushes a spot-clean button." (RRSB at 22-23 (citing RX-2088C at Q76-77; RX-2087C at Q15-16; RX-2079C at Q90-91, 107-110; Hr'g Tr. at 148:23-149:13).) Respondents reason "[t]his means that the accused products cannot infringe, because their control systems can only select from among two modes in response to signals from obstacle sensors, and the claims require selecting from among at least three modes." (*Id.*) Respondents then continue to discuss claim interpretation. (*See generally id.* at 23-24.)

Analysis

As I determined above, "configured . . . to select from among the plurality of modes in real time in response to signals generated by the obstacle detection sensor" means each of the modes can be so selected. This limitation, therefore, is not met by a product whose "spot-coverage mode" is not entered into "in response to signals generated by the obstacle detection sensor." As there is no dispute that the iLife Products do not enter into their spot-coverage modes in response to obstacle detection sensor signals (CIB at 31 (citing RX-2088C at Q76; RX-2079C at Q87; RRSB at 22-23 (citing RX-2088C at Q76-77; RX-2087C at Q15-16; RX-2079C at Q90-91, 107-110; Hr'g Tr. at 148:23-149:13)), the iLife Products do not meet this limitation.

4. Indirect Infringement

As noted in the prior '553 patent indirect infringement section, iRobot's inducement and contributory infringement theories are generalized to encompass asserted claim under every asserted patent, for every accused product. (*See generally* CIB at 103-108; CRPB at 44.) Thus,

Public Version

as with the '553 patent, there is no theory specific to the '490 patent apart from brief mentions of intent and knowledge. Yet it is understood that each of iLife, Hoover, and bObsweep is accused of indirectly infringing the '490 patent.

For iLife, as I found above with respect to the '553 patent, iRobot has not presented sufficient evidence of knowledge of infringement of the '490 patent, which is required for both inducement and contributory infringement. *Commil*, 135 S.Ct. at 1926.

For Hoover, iRobot explains “Hoover imports and sells the Hoover Products that practice the claims of the patents described above in the U.S. and that are manufactured by SSSIT in China.” (CIB at 107 (citing CX-0220C at Q660; CX-0221 at Q494; CX-0410C at 94:11-13, 109:18-21, 111:19-112:3, 114:25-115:8, 115:18-24).) iRobot argues that use of the Hoover Products by Hoover’s customers, and resale of the Hoover Products by third parties, and Hoover’s intent to have them be so used and sold, are all evidenced “not only by the sales of these products throughout the U.S., but also through the distribution of product manuals instructing users to operate the robots as intended” and availability of customer support services. (*See id.* at 107-108 (citing CX-0220C at Q661, 664; CX-0221C at Q496, 498; CX-0425C at 6527, 6539-6542; CX-0426 at 6589, 6601-6604; CX-1117C; CX-0410C at 94:11-13; CX-0388C at 81:17-19, 57:14-22).) iRobot also alleges Hoover and SSSIT contribute to infringement in the U.S. through the provision of spare parts. (*Id.* at 108 (citing CX-0220C at Q[664]; CX-0221C at Q494; CX-0393C at 0035; CX-0388C at 57:14-22; CX-1117C).) iRobot also contends “[b]oth Hoover and SSSIT were aware of the asserted patents” and []. (*Id.* (citing CX-0220C at Q662; CX-0221C at Q496; CX-0959 at 8470-8473; CX-0410C at 219:17-220:21, 224:7-225:23).) Regarding, iRobot argues the

Public Version

“button or switch” on the accused products “which initiates cleaning and the automatic selection of operational modes required by the ’490 patent.” (*Id.* at 42 (internal citations omitted).)

As with iLife discussed in the prior ’553 patent section, I find sufficient circumstantial evidence shows Hoover’s customers use the Hoover Products in the U.S., and that Hoover induces them to do so, for example, through extensive sales, instruction manuals, and customer support. (*See, e.g.*, CX-0221C at Q494-498; CX-0220C at Q660-664.) I also agree that the Hoover’s provision of replacement parts can contribute to the infringement of the asserted claims. (*See* CIB at 108; *see, e.g.*, CX-0410C at 85:18-86:21.)

Regarding the requisite knowledge of the ’490 patent and direct infringement by customers or third parties, I do not find sufficient evidence showing this for Hoover in any of the materials cited in iRobot’s briefs (CIB at 107-108; CRPB at 43-44) or expert witness statements (CX-0221C at Q496; *see* CX-0220C at Q662). CX-0959C does not appear to be related to the ’490 patent (discussing “[. . .]”). CX-0329, and emails CX-0343C and CX-0344C (which *have* been translated), are perhaps evidence of respondent SSSIT’s knowledge of [. . .]—but not Hoover’s. Rather, iRobot seems to impute knowledge to Hoover in light of testimony that [. . .]. (*See* CX-0410C at 218:17-228:13.)

Even with this, however, I do not see sufficient evidence of the culpable intent needed for indirect infringement. Moreover, iRobot’s suggestion that “button or switch” on the accused products “which initiates cleaning and the automatic selection of operational modes required by the ’490 patent” is evidence of intent (CRPB at 42 (internal citations omitted)), yet knowledge of the direct infringer’s actions is not enough. *Symantec*, 522 F.3d at 1293.

Public Version

Thus, it is my determination that iRobot has not shown that Hoover induced or contributed to infringement of the '490 patent by others.

For the remaining respondent accused of infringing the '490 patent, bObsweep, iRobot explains "bObsweep imports and sells in the U.S. the accused bObi and Bob Products that SSSIT manufactures in China. (CIB at 104 (citing CX-0220C at Q650; CX-0221C at Q499; CX-0247C at 100:6-8, 100:21-102:1, 114:4-18, 215:23-216:8).) iRobot argues that circumstantial evidence establishes that customers actually use the bObsweep Products in the U.S., for example, through extensive sales, instruction manuals, and customer support. (*Id.* at 104-105 (citing CX-0247C at 107:19-23, 240:3-12, 267:21-23; CPX-1995C; CPX-1994C; CX-0220C at Q651, 654; CX-0221C at Q500, 503; CX-0399 at 23229; CX-0567 at 8253; CX-0617; CX-0621; CX-0388C at 81:17-19).) iRobot also alleges bObsweep and SSSIT contribute to infringement in the U.S. through the provision of spare parts. (*Id.* at 106 (citing CX-1141C; CX-0247C at 44:25-46:10, 144:11-25).) iRobot finally contends "bObsweep and SSSIT knew of the asserted patents before the Investigation," were concerned over "patent related issues," and discussed this many times. (*Id.* at 105 (citing CX-0986C; CX-0985C; CX-0220C at Q652; CX-0221C at Q501; CX-0247C at 173:5-174:7; CX-0242C at 97:24-100:10; CX-0343C; CX-0344C; CX-0329C at 118:9-121:11, 122:5-127:15).)

As with iLife and Hoover, I find sufficient circumstantial evidence shows bObsweep's customers use the bObsweep Products in the U.S., and bObsweep Hoover induces them to do so, for example, through its sales, instruction manuals, and customer support. (*See, e.g.*, CX-0221C at Q499-503; CX-0220C at Q650-654.) I also agree that the bObsweep's provision of replacement parts can contribute to the infringement of the asserted claims. (*See* CIB at 106; CX-0247C at 44:25-45:12).)

Public Version

Regarding the requisite knowledge of the '490 patent and direct infringement, however, I do not find a sufficient showing in the evidence cited in iRobot's briefs (CIB at 104-106; CRPB at 43-44) or expert witness statements (CX-0221C at Q501; *see* CX-0220C at Q652). Again, iRobot references the knowledge of supplier SSSIT here, and

[*see, e.g.,* CX-0247C at 173:17-174:7), but it is not possible to derive the requisite knowledge of the '490 patent from this. The cited emails, CX-0986C and CX-0985C, and related testimony (CX-0242C at 97:24-100:10), do not fare any better; they relay []. The remaining evidence cited is the same that presented for Hoover and is specific to SSSIT—not bObsweep. (*See* CIB at 105 (citing CX-0343C; CX-0344C; CX-0329C); *see also* CX-0220C at Q652; CX-0221C at Q501.)

Thus, it is my determination that iRobot has not shown that bObsweep induced or contributed to infringement of the '490 patent by others.

Now, even though the SSSIT Product (BD2) is not accused of meeting the limitations of the '490 patent (or the '233 patent), iRobot's briefing implies that SSSIT nevertheless indirectly infringes the '490, '090, and '233 patents through its relationship with respondents Hoover and bObsweep. (*See* CIB at 104-106, 107-108.) I do not see any evidence cited, however, that establishes SSSIT has a relationship with end users of the accused products in the U.S.—their relationship is with Hoover and bObsweep as manufacturer and customer. It is Hoover or bObsweep which sell the products, include the instruction manuals, offer customer support, and provide spare parts. This makes it difficult to find that SSSIT induces or contributes to the infringement of others in the U.S. Moreover, for the SSSIT Product specifically, there is no discussion of it in iRobot's briefing.

Public Version

Thus, it is my determination that iRobot has not shown that SSSIT induced or contributed to infringement of the '490 patent by others.

E. Domestic Industry – Technical Prong

iRobot alleges the iRobot Products practice claims 8 and 42 of the '490 patent, which necessarily invoke claims 1 and 7. Respondents argue only that:

iRobot has not established that the DI products practice claims 1 or 8 of the '490 patent because their control systems only select from among two modes in response to signals from obstacle sensors. Dr. Hooper admitted that the DI products do not enter into spot coverage mode based on any sensor.

(RRSB at 26.) Thus, it is undisputed that the iRobot Products practice claim 42 which does not recite the contested “from among” limitation. I find that iRobot has shown it practices claim 42 but not claims 1, 7, or 8 (through their dependence on claim 1). My limitation-by-limitation findings are presented below.

Starting with independent claim 1, it requires “[a] mobile robot comprising.” ('490 patent at cl. 1.) I find credible and unrebutted testimony shows the iRobot Products are floor cleaning robots that use intelligence to navigate a space. (*See* CIB at 47 (citing CX-0221C at Q132, 462).) The limitation is met.

Claim 1 further requires, “(a) means for moving the robot over a surface.” ('490 patent at cl.1.) I find credible and unrebutted testimony shows the iRobot Products have powered wheels with independent motors. (*See* CIB at 47-48 (citing CX-0221C at Q133, 463.)) The limitation is met.

Claim 1 further requires, “(b) an obstacle detection sensor.” ('490 patent at cl.1.) I find credible and unrebutted testimony shows the iRobot Products include bump sensors and proximity sensors. (*See* CIB at 48 (citing CX-0221C at Q134-136, 464-466).) The limitation is met.

Public Version

Claim 1 further requires, “(c) and a control system operatively connected to said obstacle detection sensor and said means for moving.” (’490 patent at cl.1.) I find credible and unrebutted testimony shows the iRobot Product’ bump and proximity sensors are connected to a controller, which uses signals from those sensors to control its movement. (See CIB at 48 (citing CX-0221C at Q137, 467).) The limitation is met.

Claim 1 further requires:

(d) said control system configured to operate the robot in a plurality of operational modes and to select from among the plurality of modes in real time in response to signals generated by the obstacle detection sensor, said plurality of operational modes comprising: a spot-coverage mode whereby the robot operates in an isolated area, an obstacle following mode whereby said robot travels adjacent to an obstacle, and a bounce mode whereby the robot travels substantially in a direction away from an obstacle after encountering the obstacle, and wherein, when in the obstacle following mode, the robot travels adjacent to an obstacle for a distance at least twice the work width of the robot.”

(’490 patent at cl.1.) In arguing this limitation is met, iRobot explains that the iRobot Products include a clean mode, spot mode, bounce mode, and wall following mode. (See CIB at 48 (citing CX-0221C at Q138.) iRobot explains “[t]he Roomba’s control system determines which mode to run based, in part, on information received from the Roomba’s sensors.” (*Id.* (citing CX-0221C at Q142; CX-0498 at 2642, 2652).) iRobot acknowledges that only “[b]ounce and wall-follow mode may be triggered by sensor signals.” (*Id.* at 49 (citing CPX-0004C).)

iRobot continues with a description of the “spot mode” as where “the robot will spiral outward from the place where the button was pressed until it reaches its maximum spiral distance, then it will spiral back until it is at its starting place” and notes this behavior is defined in [] source code files. (*Id.* (citing CX-0221C at Q472; RX-2079C at Q153; CX-0499 at 2686-2687; CX-0495 at 0102-0103; CPX-0004C).) iRobot contends its wall following mode is an obstacle following behavior and defined in a [] source code

Public Version

file. (*Id.* (citing CX-0221C at Q474; CX-2048C at 48:19-49:13, 133:11-15; CPX-0004C).)

iRobot also contends its “bounce mode” involves the robot travelling substantially in a direction away from an obstacle (*e.g.*, “crisscross behavior”) after encountering (*e.g.*, contacting) that obstacle—a behavior defined in the [] source code file (*Id.* at 49-50 (citing CX-0221C at Q475; CX-0498 at 2646; RX-2058C at 122:24-123:10; CPX-0004C).) Finally, iRobot claims its robots have a work width of about 29 cm and [

] (*Id.* at 50 (citing CX-0221C at Q140, 476; RX-2048C at 133:11-15; CPX-0004C).)

Respondents argue succinctly that this limitation is not practiced because:

[T]heir control systems only select from among two modes in response to signals from obstacle sensors. Dr. Hooper admitted that the DI products do not enter into spot coverage mode based on any sensor. (Tr. at 148:13-148:22.).

(RRSB at 26.)

I find the limitation is not met. It is not disputed that the iRobot Products will not enter into spot mode based on any sensor. (RRSB at 26 (citing Hr’g Tr. at 148:13-148:22); CIB at 31 (citing RX-2088C at Q71, 74, 75; RX-2079C at Q87).) In light of the claim construction determination above, where “select from among the plurality of modes” means that each of the plurality of modes (including spot mode) can be selected in response to signals from the obstacle detection sensor, I find the limitation cannot be met.

Dependent claim 7 requires, “[a] mobile robot according to claim 1, whereby said obstacle detection sensor comprises a tactile sensor.” (’490 patent at cl. 7.) I find credible and un rebutted testimony shows the iRobot Products include bumpers on the front of the housing which depress when contact is made (*i.e.*, tactile response) and send a signal to a controller

Public Version

which interprets the signal as a collision in the forward direction. (*See* CIB at 50 (citing CX-0221C at Q477).) The limitation is met.

Dependent claim 8 requires, “[a] mobile robot according to claim 7, whereby said obstacle detection sensor further comprises an IR sensor.” (’490 patent at cl. 8.) I find credible and unrebutted testimony shows the iRobot Products include bumpers which use IR break sensors to determine when they have been depressed (*i.e.*, contacted). (*See* CIB at 50-51 (citing CX-0221C at 136).) The limitation is met.

Independent claim 42 requires, “[a] mobile robot.” (’490 patent at cl. 42.) I find credible and unrebutted testimony shows the iRobot Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 42 further requires, “(a) means for moving the robot over a surface.” (’490 patent at cl. 42.) I find credible and unrebutted testimony shows the iRobot Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 42 further requires, “(b) an obstacle detection sensor.” (’490 patent at cl. 42.) I find credible and unrebutted testimony shows the iRobot Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 42 further requires, “(c) a cliff sensor.” (’490 patent at cl. 42.) I find credible and unrebutted testimony shows the iRobot Products include cliff sensors positioned on the underside of the forward half of the robots. (*See* CIB at 51 (citing CX-0221C at Q135, 482).) The limitation is met.

Claim 42 further requires, “(d) a control system operatively connected to said obstacle detection sensor, said cliff sensor, and said means for moving.” (’490 patent at cl. 42.) I find

Public Version

credible and un rebutted testimony shows the iRobot Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 42 further requires, “(e) said control system configured to operate the robot in a plurality of operational modes, said plurality of operational modes comprising: a spot-coverage mode whereby the robot operates in an isolated area, an obstacle following mode whereby said robot travels adjacent to an obstacle for a distance at least twice the work width of the robot, and a bounce mode whereby the robot travels substantially in a direction away from an obstacle after encountering the obstacle.” (’490 patent at cl. 42.) I find credible and un rebutted testimony shows the iRobot Products meet this limitation for the same reasons discussed under claim 1, above.

Thus, I find iRobot has proven by a preponderance of the evidence that the iRobot Products practice independent claim 42 of the ’490 patent but not dependent claim 8 due to the “from among” limitation of independent claim 1.

F. Validity

Respondents’ initial post-hearing brief identifies the following invalidity theories against the asserted claims of the ’490 patent:

Claims	Theory
1, 12	Anticipated by Ueno
12, 42	Rendered obvious by the Ueno in light of known cliff sensors

1. Alleged Prior Art

Respondents allege the “Ueno” reference, number JP H11-212642 (RX-0886) is prior art to the ’490 patent because it “was published on August 6, 1999.” (RIB at 35.) iRobot does not

Public Version

contest the prior art status of Ueno and I find it qualifies, at least, as prior art under § 102(b).

Respondents provide a translation of Ueno which is RX-0885. (*Id.*)

Respondents' invalidity case also uses Mobile Robots (RIB at 46 (citing RX-0084)), but Respondents do not identify why Mobile Robots is prior art to the '490 patent. (*See* RIB at 34-54.) As mentioned above, Mobile Robots has a 1999 copyright date. (RX-0084.003.)

Compared to a priority date of June 12, 2001 for the '490 patent (*see* RIB at 6), I find Mobile Robots qualifies as prior art under § 102(b).

Respondents' invalidity case also uses "a 1993 Electrolux patent application" ("Electrolux 93") (RIB at 46 (citing RX-0882)), but Respondents do not identify why Electrolux 93 is prior art to the '490 patent. (*See* RIB at 34-54.) I find Electrolux 93 has a publication date on its face of February 18, 1993. (RX-0882.001.) Compared to a priority date of June 12, 2001 for the '490 patent (*see* RIB at 6), I find Electrolux 93 qualifies as prior art under § 102(b).

Respondents' invalidity case also uses U.S. Patent Nos. 5,787,545 ("Colens"), 5,109,566 ("Kobayashi"), and 6,076,226 ("Reed") (*see* RIB at 46-47), but Respondents do not particularly identify why each of these is prior art (*see* RIB at 34-54). Upon inspection, Colens has a publication date of August 4, 1998 (RX-1225); Kobayashi has a publication date of May 5, 1992 (RX-0865); and Reed has a publication date of June 20, 2000 (RX-0060). Compared to a priority date of June 12, 2001 for the '490 patent (*see* RIB at 6), I find Colens and Kobayashi qualify as prior art under § 102(b), and Reed qualifies as prior art under § 102(e).

2. 35 U.S.C. § 102

In its opening brief, Respondents contend claims 1 and 12 of the '490 patent are anticipated by the Ueno reference. (*See* RIB at 34.) Respondents allege anticipation of claim 1 is undisputed. (*Id.*) As discussed below, I agree claim 1 is anticipated by Ueno, but claim 12 is not.

Public Version

a. Claim 1

Independent claim 1 is not listed as an asserted claim by iRobot, but it is effectively asserted through dependent claim 12. Claim 1 requires, “[a] mobile robot.” (’490 patent at cl. 1.) I find clear and un rebutted evidence demonstrates the limitation was disclosed in Ueno through the identified disclosure of a “self-propelled robot.” (See RIB at 35-36 (citing RX-2081C at Q55-57; RX-0885 at [0015]).)

Claim 1 further requires “(a) means for moving the robot over a surface.” (’490 patent at cl. 1.) I find clear and un rebutted evidence demonstrates the limitation was disclosed in Ueno through the identified wheels and motors. (See RIB at 36 (citing RX-2081C at Q58-62; RX-0885 at [0019]).)

Claim 1 further requires “(b) an obstacle detection sensor.” (’490 patent at cl. 1.) I find clear and un rebutted evidence demonstrates the limitation was disclosed in Ueno through the identified contact sensor. (See RIB at 36-37 (citing RX-2081C at Q63-65; RX-0885 at [0015]-[0016], Fig. 1).)

Claim 1 further requires “(c) and a control system operatively connected to said obstacle detection sensor and said means for moving.” (’490 patent at cl. 1.) I find clear and un rebutted evidence demonstrates the limitation was disclosed in Ueno through the identified CPU. (See RIB at 37 (citing RX-2081C at Q66-68; RX-0885 at [0019]-[0021]).)

Claim 1 further requires “(d) said control system configured to operate the robot in a plurality of operational modes and to select from among the plurality of modes in real time in response to signals generated by the obstacle detection sensor, said plurality of operational modes comprising: a spot-coverage mode whereby the robot operates in an isolated area, an obstacle following mode whereby said robot travels adjacent to an obstacle, and a bounce mode whereby the robot travels substantially in a direction away from an obstacle after encountering

Public Version

the obstacle, and wherein, when in the obstacle following mode, the robot travels adjacent to an obstacle for a distance at least twice the work width of the robot.” (’490 patent at cl. 1.) I find clear and un rebutted evidence demonstrates the limitation was disclosed in Ueno through the identified “random,” “spiral,” and “border-following” modes and processes for switching therebetween. (See RIB at 37-40 (citing RX-2081C at Q69-97; RX-0885 at [0023]-[0026], [0028], [0030], [0045], [0052], Figs. 6, 9, 15).)

b. Claim 12

Dependent claim 12 requires, “[t]he mobile robot according to claim 1, further comprising a means for manually selecting an operational mode.” (’490 patent at cl. 12.)

Respondents’ Position

Respondents argue Ueno discloses this limitation which:

[I]s a means-plus-function limitation whose function has been construed as “manually selecting an operational mode,” and whose structure has been construed as “*an input element such as a selector switch, push button, or remote control by which the user can select the particular operational mode.*”

(RIB at 41.) Respondents contend the following passage discloses a worker (*i.e.*, user) manually selecting an operational mode:

Of course, it is possible that by making other various combination sequences, for instance, spiral - border-following - random as a set, these can be repeated ... And it can be designed such that *the worker can set up these and register each time* or can preregister and select and set up at work start time. Like this, the combination sequence of the travel modes thus set up and registered is temporarily stored in memory and the travel mode to be executed as of now is instructed sequentially ...

(*Id.* (citing RX-0885 at [0036]) (emphasis by Respondents).) Respondents point to their expert’s testimony that it would readily understood “Ueno uses buttons. . . . because ‘you need to have an input element of some sort in order to manually select the operational modes.’” (*Id.* (referring to Hr’g Tr. at 301:17-302:3, 328:4-14; RX-2081C at Q104).)

Public Version

Respondents address their perception of iRobot's opposition with:

Nonetheless, iRobot argues that Ueno does not satisfy this limitation because it is "possible" that a user could manually input a sequence of modes on a separate computer, and then transfer that sequence of modes to the robot somehow, *e.g.* using a floppy disk. (Tr. 304:10-305:20; iRobot PHB at 50.) iRobot's argument is factually illogical because a user operating a cleaning robot "would be with the robot in the room to be cleaned," and would not want to go to a separate computer in order to manually input a series of modes for the robot to use. (RX-2081 at Q109; Tr. 304:19-305:20.)

(*Id.* at 42.) Respondents further argue iRobot ignores law which allows anticipation to consider "what one skilled in the art would 'reasonably understand or infer from' the prior art reference."

(*Id.* (citing *In re Baxter Travenol Labs.*, 952 F.2d 388, 390 (Fed. Cir. 1991); *Astrazeneca LP v. Apotex, Inc.*, 633 F.3d 1042, 1055 (Fed. Cir. 2010); *Blue Calypso, LLC v. Groupon, Inc.*, 815 F.3d 1331, 1341 (Fed. Cir. 2017); *In re Petering*, 49 C.C.P.A. 993, 301 F.2d 676, 681 (1962); *Scripps Clinic & Research Found. v. Genentech, Inc.*, 927 F.2d 1565, 1576 (Fed. Cir. 1991); *Studiengesellschaft Kohle, mbH v. Dart Indus., Inc.*, 726 F.2d 724, 727 (Fed. Cir. 1984)).) Put another way, Respondents explain "a person of ordinary skill in the art would reasonably understand or infer from Ueno that the required 'input element' was present." (*Id.* at 42-43.)

Respondents also highlight the "such as" portion of the agreed construction, which, according to Respondents, does not limit the requisite "input element" to just switches, buttons, or remote controls. (*See id.* at 43 (referring to pre-AIA 35 U.S.C. § 112(6)).) Respondents continue, "iRobot separately argues that Ueno only discloses a user selecting a 'sequence' of modes, not a 'particular' mode as required by the claim construction. That argument is wrong because a 'particular' mode is selected as part of selecting a sequence of modes." (*Id.*)

Respondents add "[t]here is no question that Ueno discloses a user manually selecting particular modes to be part of a sequence." (*Id.* at 44.) Respondents lastly add that the '490 patent itself

Public Version

describes manual input means as ordinary or well-known, which defeats any assertion from iRobot that this limitation by itself was novel. (*See id.* (citing '490 patent at 17:5-10, 8:42-44).)

In their reply brief, Respondents reframe the issue as:

iRobot concedes that Ueno discloses the claimed function: “manually selecting an operational mode.” (CRB at 33-34.) Similarly, Dr. Hooper acknowledged Ueno teaches “some means” of manually inputting modes into the robot. (Tr. 707:21-708:2.) So, iRobot admits that Ueno discloses “manually selecting an operational mode,” but disputes that a skilled roboticist would have known to do that with “an input element.” (CRB at 33-34.)

(RRPB at 19-20.)

Regarding an “input element,” Respondent turn back to their expert’s testimony of “[t]here are many well –known ways of getting a user’s input for something like this,’ including ‘using buttons on the robot,’ and a POSITA ‘would naturally think of using an input element like buttons or maybe a remote control’ as the way to manually select the modes in Ueno.” (*Id.* at 20 (citing RX-2081C at Q105, 109; Hr’g Tr. at 301:22-302:22).) Respondents claim, under the law, “Ueno did not need to provide specific examples of input elements for a POSITA to know that they were there.” (*Id.* (citing *Visual Memory LLC v. NVIDIA Corp.*, 867 F.3d 1253, 1261 (Fed. Cir. 2017); Hr’g Tr. at 303:22-304:9, 309:21-310:21; RX-2081C at Q105).)

Respondents argue that iRobot’s proffered external-computer-disk-transfer approach still falls under the agreed construction, as an external computer is still an input element “or at the very least as an equivalent.” (*Id.* (referring to CRSB at 34, 36; Hr’g Tr. at 716:8-14).)

Respondents further argue, as they did in their initial brief, that there is no merit to an argument that the limitation of claim 12 was novel and nonobvious, in part “because a POSITA ‘thinking about how to allow the user of a Ueno robot to select modes, would naturally think of using an input element like buttons or maybe a remote control.’” (*See id.* at 21 (citing, *inter alia*, RX-2081C at Q109; Hr’g Tr. 309:25-310:21)).) Respondents then dispute the law from *In re Baxter*

Public Version

is essentially the law of inherency, thus requiring a “necessarily disclosed” standard. (*Id.* at 22 (referring to CRSB at 34-35; MPEP § 2131.01).) Respondents conclude:

A POSITA would have understood that buttons or other similar input elements would be used in Ueno, just as a person of ordinary skill would have understood that Ueno had a power supply, even though that fact is not expressly mentioned. (*Id.*) iRobot has no reasonable response to this, because it is not reasonably possible to say that a person with three years of experience in robotics in 2001 would not have realized that input elements could be used to input modes into a robot.

(*Id.* at 23.)

iRobot's Position

In its responsive brief, iRobot argues that “[i]t is undisputed that Ueno fails to explicitly disclose this limitation.” (CRSB at 33 (citing Hr’g Tr. at 298:12-299:8; RX-2081C at Q105).) iRobot contends the only other option for anticipation by Ueno for this claim, then, is inherency. (*Id.* (citing *Omeprazole Patent Litig.*, 483 F.3d 1364, 1371 (Fed. Cir. 2007).)

iRobot argues Respondents “have not shown that the required input means is necessarily present in Ueno.” (*Id.*) iRobot explains:

Respondents cite a passage in Ueno whereby a user may preregister a *sequence of* (*i.e.*, multiple) travel patterns. (RX-0885 at ¶ 36.) Dr. Hooper explained that there are several ways to preregister a sequence of travel patterns without using manual means, including transferring a separately programmed sequence of patterns to the robot using a physical medium such as a disc. (CX-1825C, Hooper RWS at Q130-33; Hrg. Tr., Hooper at 708:8-709:8.) This practice was common in the mid-1990s, in part because the visual displays required to input a sequence of modes were not practical for mobile robots. (*Id.*) Also, this would be a practical option for workers because operational sequences are likely to be reused without change for routine cleaning. A worker would find it convenient to use an interface like a computer to arrange sequences off-line, and then load them on the robot indefinitely for routine operation. Dr. Martens conceded that this is one way a POSITA could implement Ueno’s mode preregistration. (Hrg. Tr., Martens at 302:4-303:17, 304:10-16.)

(*Id.* at 33-34.) iRobot argues that removable media disks are not equivalent to a button, switch, or remote controls. (*Id.* at 34 (citing RX-1825C at Q130-133; Hr’g Tr. at 708:8-709:8).)

Public Version

iRobot then discusses the facts behind *In re Baxter* to argue it was essentially an inherency decision. (*See id.* at 34-35 (discussing 952 F.3d at 390; *Bettcher Indus., Inc. v. Bunzl USA, Inc.*, 661 F.3d 629, 639 (Fed. Cir. 2011)).) iRobot argues *AstraZeneca*, cited by Respondents, actually supports its own position that anticipation does not ask whether a reference “suggests” the claimed subject matter. (*See id.* at 35 (citing 633 F.3d at 1055).) iRobot adds that any argument from Respondents that “claim 12 may not satisfy 35 U.S.C. § 112’s enablement requirement” was not made previously and has been waived. (*Id.* at 35, n.5.)

Analysis

At the outset, I find it is not true as iRobot suggests, that “it is undisputed that Ueno fails to explicitly disclose this limitation” thereby forcing an analysis of inherency. (*See* CRSB at 33.) All that Respondents’ expert confirmed at the hearing was Ueno does not disclose any of a selector switch, push button, or remote control. (*See* Hr’g Tr. at 2 298:12-299:8.) I do however agree with iRobot’s understanding of the meaning of *In re Baxter* and its progeny. In *AstraZeneca*, the Federal Circuit (almost twenty years after *In re Baxter*) explained:

While the question is close, this court agrees with *AstraZeneca* that the district court correctly determined that *AstraZeneca* has demonstrated that the asserted method claims will likely withstand the validity challenge presented by the *Thorax* advertisement. In the context of anticipation, the question is not whether a prior art reference “suggests” the claimed subject matter as posited by *Apotex*. Rather, “the dispositive question regarding anticipation [is] whether one skilled in the art would reasonably understand or infer from a [prior art reference]” that every claim element is disclosed in that reference. *In re Baxter Travenol Labs.*, 952 F.2d 388, 390 (Fed.Cir.1991).

633 F.3d at 1055. Three years earlier, the Federal Circuit included *In re Baxter* within a citation paragraph discussing the explicit versus inherent disclosure dichotomy available to theories of anticipation. *In re Omeprazole Patent Litigation*, 483 F.3d 1364, 1377-78 (Fed. Cir. 2007); *see Dayco Prods., Inc. v. Total Containment, Inc.*, 329 F.3d 1358, 1368-69 (Fed. Cir. 2003) (citing

Public Version

In re Baxter). I find these uses to suggest *In re Baxter* does not provide a “distinct basis” from anticipation by inherency. (See RRPB at 22.) I also note Respondents’ paraphrasing of *In re Baxter* leaves out an important phrase to make it look otherwise. Respondents state “what one skilled in the art would ‘reasonably understand or infer from’ the prior art reference” (see RIB at 42), while the Federal Circuit held “‘whether one skilled in the art would reasonably understand or infer from a [prior art reference]’ *that every claim element is disclosed in that reference.*” *In re Baxter*, 952 F.2d at 391 (emphasis added). Additionally, MPEP § 2131, as cited by Respondents, does not instruct that *In re Baxter* is different from inherency. (See RRSB at 22.) That portion of the MPEP is an instruction to patent office examiners and practitioners that extrinsic evidence may be used to show what is inherent, citing *In re Baxter* for support.

Thus, even in light of *In re Baxter*, I do not see reason to depart from the well understood rule that “[a]nticipation’ in patent usage means that the claimed invention was previously known and described in a printed publication, explicitly or inherently.” *Abbott Labs. v. Sandoz, Inc.*, 544 F.3d 1341, 1345 (Fed. Cir. 2008).

With this legal principle in mind, I thus look to whether Ueno explicitly or inherently discloses “an input element [such as] a selector switch, push button, or remote control [by which] the user can select the particular operational mode.” I find Ueno does not do either. Ueno is very much focused on pre-programmed routines and decisions for when to switch between cleaning modes. (See, e.g., RX-0885 at [0022], [0036], [0050].) The closest paragraph disclosing what a user or “worker” would do is paragraph [0036] which only confirms the pre-programmed nature of the device:

Of course, it is possible that by making other various combination sequences, for instance, spiral – border-following – random as a set, these can be repeated by the same sequence or changed sequence, but as in spiral – random – border-following – random – spiral, at least one of

Public Version

border-following travel and spiral travel is alternatively executed between two random travels that are before and after.

And it can be designed such that the worker can set up these and register each time or can preregister and select and set up at work start time. Like this, the combination sequence of the travel modes thus set up and registered is temporarily stored in memory and the travel mode to be executed as of now is instructed sequentially by aforementioned pointer (not shown in figure)[.]

(RX-0885 at [0036]; *see* Hr'g Tr. at 328:15-19.)

I do not find, under a plain and ordinary meaning, that pre-programming a routine of modes is a manual selection of a particular operational mode. If it were, then all manner of autonomous operation would also be considered “manually input” in that all programming at some point originates from a human programmer. This difference is supported by the '490 patent, where a manual selection of operational modes is offered as an alternative to the programming the robot operates under to select modes itself (*i.e.*, autonomously)—in other words, an override:

Of course, a manual control for selecting between operational modes can also be used. For example, a remote control could be used to change or influence operational modes or behaviors. Likewise, a switch mounted on the shell itself could be used to set the operation mode or the switching between modes.

('490 patent at 17:5-10.)

Ueno simply does not mention such a feature not any others which would make the feature inherent. For instance, Respondents' expert testified that it “[t]o me it jumps out that it's going to have buttons for a worker,” (*see* RIB at 41 (citing Hr'g Tr. at 328:2-7)), but this jumping is not identified as coming from any particular disclosure in Ueno as required by, for example, *In re Baxter*. 952 F.2d at 391 (“whether one skilled in the art would reasonably understand or infer from a [prior art reference]’ *that every claim element is disclosed in that reference.*”) (emphasis added).

Public Version

I therefore do not find clear or convincing evidence that Ueno discloses, explicitly or inherently, “manually selecting an operational mode” via “an input element [such as] a selector switch, push button, or remote control [by which] the user can select the particular operational mode.”

3. 35 U.S.C. § 103

In its opening brief, Respondents contend claims 12 and 42 of the '490 patent are rendered obvious by the Ueno in light of known cliff sensors. (*See* RIB at 46-50.) As discussed below, I find clear and convincing evidence supports the obviousness of both claims 12 and 42.

a. Claim 12

As discussed above, I find dependent claim 12 is not anticipated by Ueno. Nevertheless, Respondents argue it would have been obvious because “it is illogical to suggest that the use of ‘an input element such as a selector switch, push button, or remote control’ was not obvious, as of 2001, to a person with three years of experience designing and building robots.” (RIB at 45 (citing RX-2081C at Q105, 109; Hr’g Tr. at 304:19-305:20).) Respondents argue iRobot’s expert effectively conceded this claim was not particularly innovative. (*See id.* (citing Hr’g Tr. at 708:10-709:11, 709:15-710:14).) Respondents add “[g]iven the complete lack of detail in the '490 patent about how to implement input elements such as buttons for selecting modes, there cannot be any dispute that a person with three years of experience in robotics would know how to implement such buttons on a vacuum robot” and “Dr. Martens explained a clear motivation for putting buttons on Ueno (if they are found to not already be disclosed) because ‘the user would be with the robot in the room to be cleaned and would want a way to put in the desired modes.’” (*Id.* at 45-46 (citing RX-2081C at Q109).)

In its responsive brief, iRobot observes that “Dr. Martens provided *no* testimony about whether claim 12 would be obvious to a POSITA in view of Ueno alone.” (CRSB at 36.)

Public Version

Rather, iRobot points to its own expert who did supposedly testify “[w]hile buttons were generally known in the art as a standalone feature, it would not have been obvious in view of Ueno to use them for preregistering a sequence of modes on a floor cleaning robot.” (*See id.* (citing Hr’g Tr. at 713:9-716:18).) iRobot concludes:

Ultimately, Respondents proffer no prior art reference explicitly teaching the use of a manual input means to select a particular mode. Nor do Respondents provide any expert testimony in support of their argument. As such, Respondents’ contention is nothing more than attorney argument that should be rejected.

(*Id.*)

In their reply brief, Respondents dispute that their expert offered no testimony relevant to an obviousness theory. (RRPB at 21-22.) Respondents also claim iRobot may have waived its nonobvious arguments by arguing simply “that Ueno ‘does not satisfy claim 12 for the reasons articulated with respect to anticipation.’” (*Id.* at 22 (citing [CPB] at 54-55).)

I find clear and convincing evidence that adding a manual input means for selecting an operational mode into Ueno would have been obvious. There is unrebutted testimony from iRobot’s expert that: buttons positioned directly on electronic devices were known and were used for programming; Ueno discloses a desire to have worker program a sequence of routines; and that manual means for selecting a mode is not particularly innovative. (*See* Hr’g Tr. at 708:8-711:2.) There is also persuasive testimony from Respondents’ expert that:

To me it seems that the person of ordinary skill in the art, thinking about how to allow the user of a Ueno robot to select modes, would naturally think of using an input element like buttons or maybe a remote control. Using a disk drive is so much more complicated. It would probably require software on an external computer to use to create the file with the user-selected modes; there would need to be a syntax for the file; it would just not be a natural choice when instead you could put 4 or 5 buttons and a small LCD screen on the robot. Besides, the user would be with the robot in the room to be cleaned and would want a way to put in the desired modes while looking at the room so that the sequence can be set based on the specific geometry of the particular room to be cleaned.

Public Version

(RX-2081C at Q109.) Thus, clear and convincing evidence supports finding claim 12 is an obvious modification to Ueno; and, as Ueno discloses all elements of independent claim 1, I find dependent claim 12 invalid.

b. Claim 42

In their opening brief, Respondents explain “[t]here is no dispute that except for limitation 42[c] (‘a cliff sensor’), Ueno discloses the limitations of claim 42 for the same reasons that Ueno anticipates claim 1.” (RIB at 46 (citing CPB at 55).) As found above, I agree Ueno discloses and thereby anticipates claim 1. I also agree that the limitations of claim 42 are effectively identical to claim 1 with the exception of “a cliff sensor.” Thus, whether or not claim 42 is obvious turns on whether it would have been obvious to include “a cliff sensor” into the Ueno. (*See* RIB at 46-50; CRSB at 36-38.)

Respondents’ Position

Respondents take the position that “[t]here is no dispute that prior to 2001, cliff sensors were known for use on vacuum robots.” (RIB at 46 (citing Hr’g Tr. at 699:1-5, 701:15-18; *see* RX-0084.184; RX-2081C at Q129).) Respondents claim a 1993 Electrolux patent application described such an apparatus. (*Id.* (citing RX-0882.005, 001; RX-2081C at Q132).) Respondents also allege iRobot likely knew of this Electrolux feature based on early Roomba development efforts. (*Id.* (citing RX-2090C at 113:23-114:9).) Respondents further point to disclosures in the ’490 patent itself to support the idea that cliff sensors were known. (*Id.* (’490 patent at 8:23-33; *see* Hr’g Tr. at 719:20-720:1, 720:2-11, 720:12-15).) Respondents further allege iRobot’s expert “admitted that a person of ordinary skill would have a good reason to put a cliff detector in a floor cleaning robot.” (*Id.* at 47 (citing Hr’g Tr. at 702:13-21); *see id.* at 48 (citing Hr’g Tr. at 703:13-15).) Respondents point to their own expert’s testimony for the same conclusion. (*Id.* (citing RX-2081C at Q132).)

Public Version

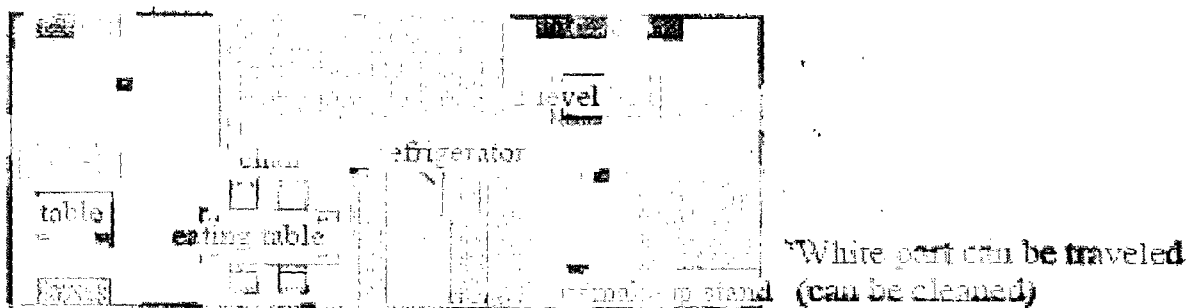
Thus, Respondents reason:

Here, as described above, it is undisputed that cliff detection was a well-known technique that was widely used on vacuum robots, and was known to provide the benefit of avoiding drop-offs, such as stairs. It is also undisputed that Ueno describes a vacuum robot. Thus, claim 42 is obvious based on Ueno because it would result from applying a known technique (cliff detection on vacuum robots) to improve a similar device (the Ueno vacuum robot) in the same way (by providing the benefit of avoiding drop-offs such as stairs).

(*Id.* at 47-48.)

Respondents view iRobot's resistance to obviousness as "there is no disclosure or other suggestion that Ueno was designed to operate near stairs." (*Id.* at 48 (citing CPB at 53; Hr'g Tr. at 703:4-7).) Respondents reject this argument as "Ueno shows that it was designed to operate in a typical household environment such as the one shown in Figure 13." (*Id.*)

[Fig. 13]



(RX-0885 at Fig. 13.) Respondents continue, "a person of ordinary skill would know that many home environments have stairs." (RIB at 48 (citing RX-2081C at Q132).) Further, even if Ueno does not disclose stairs, Respondents contend:

In *KSR*, the Supreme Court expressly rejected the "teaching, suggestion, or motivation test ... under which a patent claim is only proved obvious if some motivation or suggestion to combine the prior art teachings can be found in the prior art." *KSR*, 550 U.S. at 407, 415. The Supreme Court then held: "[I]f a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve

Public Version

similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.” *Id.* at 417.

(*Id.* at 48-49.) Respondents then point to the ’490 patent to argue “the physical design of the robot is not part of the invention” so that it should not be understood that adding a cliff detector was particularly inventive. (*Id.* at 49 (citing ’490 patent at 7:20-33, 8:18-25).)

In their reply brief, Respondents highlight “iRobot does not dispute that its own expert admitted a POSITA would be motivated to put a cliff detector in a floor cleaning robot to avoid stairs” or that “prior art states that cleaning robots ‘advantageously’ use infrared cliff sensors to avoid drop-offs such as stairs.” (RRPB at 23 (citing Hr’g Tr. at 702:13-21; RX-0882.005).)

Respondents claim any argument that the cliff detector must be infrared is incorrect and otherwise waived. (*Id.* at 23-24.) Likewise, Respondents claim iRobot’s arguments regarding Ueno Figure 6 and a RoboScrub robot are strawmen. (*See id.* at 24-25.) Respondents also argue the Ohman reference, RX-0882, is certainly analogous art that a PHOSITA would consider, especially given iRobot’s own early research into the Electrolux robot vacuum line. (*See id.* at 25 (citing RX-0882; RX-2090C at 113:23-114:9).)

Respondents then dispute the idea that their theory is based on hindsight given the multiple prior art references which teach cliff detectors. (*Id.* at 26 (citing ’490 patent at 7:20-33, 8:18-25; Hr’g Tr. at 719:20-720:1).) Similarly, Respondents dispute their theory relies on the inventor’s own path toward the invention, as described by *Millennium Pharm.*, 862 F.3d at 1367. (*Id.*)

Finally, Respondents complain that any argument from iRobot that “a cliff sensor” can only be “an infrared cliff sensor” has been waived (*id.* at 27), and if not waived, incorrect. Respondents argue the ’490 patent’s comparison to wheel-drop sensors does not affect such a

Public Version

limitation. Respondents then argue even infrared cliff detectors “were well known for use on vacuum robots.” (*Id.* (citing RX-0882.006; RX-0084.184; RX-2081C at Q129).)

iRobot's Position

In its responsive brief, iRobot views Respondents’ theory as showing cliff sensors were known but not showing a motivation to combine. (CRSB at 36 (citing CX-1825C at Q157-167, 171).) iRobot claims it would not be “common sense” to upgrade Ueno with a cliff sensor because the goal of Ueno was to keep complexity and price down. (*Id.* at 37 (Citing RX-0885 at [0003], Figs. 6, 13; CX-1825C at Q158-159).) iRobot also argues Ueno was designed to “operate in confined regions such as ‘a rectangle room surrounded by a wall surface.’” (*Id.* (citing RX-0885 at [0028]).) iRobot reasons “[t]hus, cliff sensors were not indicated at all in Ueno and a POSITA would have been led away from this additional expense and complexity.” (*Id.*) iRobot then address the “RoboScrub” embodiment from Mobile Robots and argues there is no motivation to combine this with Ueno as it “is not an autonomous home-cleaning robot—it is a large, commercial floor-scrubbing robot that follows a preprogrammed path.” (*Id.* (citing RX-0084 at 339; *see* CX-1825C at Q161).)

iRobot then argues that any reference to the background section of the ’490 patent is obviously the impermissible use of hindsight bias to arrive at the claimed invention. (*See id.* at 38 (citing *Millennium Pharm.*, 862 F.3d at 1367).) iRobot continues “[s]etting aside this bias, there is no evidence that it would have been obvious to a POSITA to implement a cliff sensor in the Ueno robot.” (*Id.* (citing Hr’g Tr. at 703:8-704:2; CX-1825C at Q157-164, 171).)

For other sensors disclosed in the ’490 patent, iRobot argues they are not “cliff sensors” but rather “mechanical means for detecting drop-offs.” (*See id.* (citing ’490 patent at 5:53-55, 7:20-24).) iRobot argues these are just one of many options for avoiding drop-offs, which shows

Public Version

“[s]electing an infrared cliff sensor in particular for use in Ueno simply would not have been obvious.” (*Id.* (citing Hr’g Tr. at 703:17-704:2; CX-1825C at Q157-164, 171).)

Analysis

I find clear and convincing evidence shows the limitation would have been obvious over Ueno in light of Mobile Robots. The brevity, and therefore breadth, of the one limitation which Ueno does not already disclose, “(c) a cliff sensor,” supports this conclusion. There is no limit on what type of cliff sensor, how it operates, where it is directed, where it is positioned on the robot, how it interacts with other components, or what action is taken should a cliff be sensed. All that is required is that somewhere, somehow, the mobile robot includes “a cliff sensor.” Mobile Robots shows that such sensors were well known in autonomous floor traversing robots for detecting and thereby avoiding sudden drop-off hazards (*e.g.*, cliffs). (RX-0084.184 (teaching a “forward-looking infrared (FLIR) cliff detector”), 185 (disclosing a robot with a “method of detecting cliffs and sensing collisions”).) Electrolux 93 teaches the same. (*See* RX-0882.005 (teaching a “drop-off sensor”), 001 (disclosing detecting “overhanging furniture and steps”).) Respondents’ and iRobot’s experts persuasively confirmed that persons of ordinary skill would know of cliff sensors and how they benefit floor cleaning robots. (RX-2081C at Q132; Hr’g Tr. at 702:13-21.) Respondents’ expert also credibly explained why adding the sensor (which, according to the breadth of the claim could be placed anywhere and in any configuration) would be a straightforward task for such a person. (*Id.* at Q133.)

None of iRobot’s arguments to the contrary is persuasive. iRobot claims a POSITA would have been led away from adding a cliff sensor because of “additional expense and complexity.” (CRSB at 37 (citing RX-0885 at ¶ 3).) I do not find the general statement in Ueno seeking to improve on complex robots to rise to the level of teaching away. iRobot also points to

Public Version

Ueno's description of its operating environment as "a rectangle room surrounded by a wall surface" to mean a room without stairs and therefore a person of ordinary skill would not think of adding a stair/cliff sensor. (See CRSB at 37 (citing RX-0885 at ¶ 28).) Respondents successfully explained how iRobot takes this phrase out of context (see RRPB at 24) and, to the contrary, Figure 13 of Ueno (reproduced above) shows the robot is meant to work in the home, which even laypersons understand could include stairs (see RRPB at 24-25). iRobot's other reference to Mobile Robots as disclosing a cliff detector in an "unsatisfactory" and "not [] autonomous" robot called RoboScrub is unavailing. RoboScrub and Ueno are still in the same field of endeavor—robot floor cleaning—and a person of ordinary skill would look to one to improve the other. Moreover, any alleged motivation problems with "RoboScrub" are superseded by the cliff sensor disclosures in the "RoboKent" robot in Mobile Robots (RX-0084.185) and Electrolux 93 (RX-0885), among others.

With all other limitations of claim 42 disclosed by Ueno, I therefore find clear and convincing evidence shows claim 42 was obvious.

c. Secondary Considerations

Secondary considerations of non-obviousness are used to overturn an otherwise prima facie case of obviousness. *Pfizer, Inc. v. Apotex, Inc.*, 480 F.3d 1348, 1360 (Fed. Cir. 2007). As discussed above, I find claims 12 and 42 obvious. Additionally, much of the parties' arguments concerning secondary considerations has already been captured above, with respect to the '553 patent.

For the '490 patent specifically, iRobot points immediately to "[]" as having a direct connection to the limitations of claims 1, 12, and 42. (CIB at 112 (citing CX-0221C at Q512).) iRobot also notes suspicious similarities between Respondents' products and the DI Products: "three modes of operation including spot-coverage

Public Version

(all entered into manually), bounce, and obstacle follow; and having approximately the same work width.” (*Id.* (citing CX-0221C at Q140, 38, 316, 346, 377, 401, 426, 448).) iRobot further argues that iLife testing resulted in “[]” for the iRobot product (*Id.* (citing CX-0278C at 47:11-19, 48:3-6; CX-0192C).) iRobot lastly points to their expert’s testimony on a survey which supposedly showed “strong cleaning efficiency is critical for consumers” as well as navigation. (*Id.* at 112-113 (citing CX-0221C at Q515, 517).) iRobot argues this evidence reflects commercial success and praise with a connection to the ’490 patent claims. (*Id.* at 113.)

In its responsive brief, iRobot again makes the assertion that the claims of the ’490 patent are “coextensive with the DI Products and are not merely components thereof—they relate to the whole robot and the software that controls the whole robot.” (CRSB at 86 (referencing *Demaco*, 851 F.2d at 1392-1393).) iRobot also introduces the ideas that the ’490 patent “teaches the optimal assortment of features” and “what makes the ’490 patent inventive is that it claims precisely what is needed and nothing more, which Dr. Hooper explained is often a struggle in engineering.” (*Id.* at 87 (citing Hr’g Tr. at 638:31-639:15).)

As with the ’553 patent, Respondents generally dispute the effect of the alleged secondary considerations due to a lack of nexus to the ’490 patent’s claims *and* inventive elements. (*See generally* RIB at 123-124; RRSB at 59 (citing *In re Kao*, 639 F.3d at 1068); RRPB at 58-60.)

In their reply brief, Respondents address the ’490 patent a little more specifically and argue “[f]or claim 12 of the ’490 patent, there is no evidence that iRobot received praise for coming up with the idea of using buttons to provide an input to a robot.” (RRPB at 56.) Respondents state flatly “[i]ndeed, iRobot has not identified the patented novel features of each

Public Version

of the asserted patents” and dispute that the claims are directed to overall robots as opposed to “highly specific features, such as the use of sonar instead of infrared, or the use of buttons for manually inputting modes.” (*Id.* at 59.) Respondents contend success or praise of the company overall is not sufficient. (*See generally id.* at 56-60 (citing, *inter alia*, *ClassCo.*, 838 F.3d at 1220).)

I find, as with the ’553 patent, there is only minimal connection between iRobot’s identified praise and commercial success and the patented and novel features of the ’490 patent claims—*e.g.*, a plurality of modes which are can be selected by the robot autonomously in response to obstacle detection sensor signals, and/or the specific cleaning techniques configured into each mode. These features do relate to an overall end result of increased cleaning efficiency, however, which iRobot is praised for. Thus, I find a secondary considerations of commercial success and praise have nominal weight for the claims of the ’490 patent, but ultimately do not overturn my finding that claims 12 and 42 would have been obvious.

4. 35 U.S.C. § 112

In their opening brief, Respondents argue the limitations “when in the obstacle following mode, the robot travels adjacent to an obstacle for a distance at least twice the work width of the robot” (claim 1) and “whereby said robot travels adjacent to an obstacle for a distance at least twice the work width of the robot” (claim 42) are invalid as indefinite for reciting a method step within an apparatus claim. (RIB at 50-51 (citing *IPXL Holdings*, 430 F.3d at 1383-84).)

Respondents contend that iRobot views these limitations as satisfied whenever a robot “is observed to travel in obstacle following mode for more than twice its work width.” (*Id.* at 51 (referring to CX-0221C at Q401).) Such an interpretation renders the asserted claims, which all include the twice-the-work-width limitation, indefinite.

Public Version

Respondents argue that any attempt to read “capable of” traveling in this way into the claim, so as to avoid the indefiniteness, is improper. (*Id.* (referencing *Chef America Inc. v.*

Lamb-Weston, Inc., 358 F.3d 1371 (Fed. Cir. 2004)). Respondents continue:

Moreover, adding the words “capable of” to the claims would also effectively read the “at least” twice the work width limitation out of the claim, because if a robot merely has the capability to exceed twice the work width, that means it is possible, *but not necessary*, for the robot to do that, which is also improper. *E.g. Telemac Cellular Corp. v. Topp Telecom, Inc.*, 247 F.3d 1316, 1325 (Fed. Cir. 2001) (rejecting an interpretation that would make another claim limitation “mere surplusage”); *Phillips v. AWH Corp.*, 415 F.3d 1303, 1314 (Fed. Cir. 2005) (*en banc*) (“the claim in this case refers to ‘steel baffles,’ which strongly implies that the term baffles’ does not inherently mean objects made of steel”).

(*Id.*) Respondents conclude:

If any portion of the claim is to be read into this claim limitation it should be that the “control system is configured to...” which would mean that the robot is configured to always go at least twice the work width once it enters obstacle following mode. (RX-2079C at Q68-71, 73.) This is a less natural reading than the one that renders the claim invalid, but it at least stays true to the claim language.

(*Id.* at 52.)

In its responsive brief, iRobot confirms its expert’s view that “the twice the work width limitation was satisfied by a robot *capable* of travelling twice its work width in obstacle following mode” (CRPB at 39 (citing CX-0221C at Q402)), and that observation of this travelled distance is “but one part of his analysis ‘because observation sufficiently demonstrates capability.’” (*Id.* (citing CX-0221C at Q402).) iRobot compares the challenged limitations to those in *MasterMine Software, Inc. v. Microsoft Corp.*, 874 F.3d 1307, 1316 (Fed. Cir. 2017), as both sets differ from “claims found indefinite in the *IPXL* line [which] often ‘focus on specific actions performed by the user.’” (*Id.* (citing *MasterMine*, 874 F.3d at 1316).) iRobot adds “[a]ll of Respondents’ experts opining on the ’490 patent agreed that a POSITA would know whether

Public Version

the robot satisfies the twice the work width limitation based on its design and without operating the robot.” (*Id.* (citing Hr’g Tr. at 513:14-515:1, 559:25-560:16, 290:17-291:16, 292:17-293:5).) iRobot claims this satisfies the more general “reasonable certainty” test under *Nautilus, Inc. v. Biosig Instr., Inc.*, 134 S. Ct 2120, 2129 (2014). iRobot concludes that the limitation in no way means a robot must “*always* travel at least twice its work width in obstacle following mode.” (*Id.* at 40.)

In their reply brief, Respondents confirm their view that “to preserve validity under *IPXL*, the claims would be read to require a minimum distance traveled during wall follow which is “at least” twice the work width. (RRPB at 27.) Respondents discuss *MasterMine* and contend the difference there was that the present tense verb limitations (“presents” and “receives”) were specifically tied to structure, whereas with the ’490 patent, “the claims do not refer to any claimed structure.” (*Id.* at 28.) Thus, according to Respondents, the claims at issue are more like *IPXL* than *MasterMine*. (*Id.*)

I disagree with Respondents. The problematic claim language in *IPXL* was:

The *system of claim 2* [including an input means] wherein the predicted transaction information comprises both a transaction type and transaction parameters associated with that transaction type, and *the user uses the input means* to either change the predicted transaction information or accept the displayed transaction type and transaction parameters.

430 F.3d at 1384 (emphasis in original). This language was held invalid because:

[I]t is unclear whether infringement of claim 25 occurs when one creates a system that allows the user to change the predicted transaction information or accept the displayed transaction, or whether infringement occurs when the user actually uses the input means to change transaction information or uses the input means to accept a displayed transaction

Id. The challenged claim language in *MasterMine* was:

[W]herein the reporting module installed within the CRM software application *presents* a set of user-selectable database fields as a function of the selected report template, *receives from the user a selection* of one or

Public Version

more of the user-selectable database fields, and *generates* a database query as a function of the user selected database fields,

874 F.3d at 1315 (emphasis in original). This language was held not invalid because the claims “merely claim that the system ‘possess[es] the recited structure [which is] capable of performing the recited functions’” and were distinguishable from those that involve a “user's act of selection” as opposed to “the system's capability to receive and respond to user selection.” *Id.* at 1316.

I find the '490 patent claims are also tied to structure. In *MasterMine* the structure is a “reporting module” which “presents,” “receives,” and “generates.” In the '490 patent it is a “robot” which “travels” and also “operates.” ('490 at cl. 1.) In *IPXL*, on the other hand, it was the “user” and not any structure which “uses” an input device. For a system, this leads to confusion over whether infringement occurs when the system is created versus when it is used. *IPXL*, 430 F.3d at 1384. For the '490 patent, infringement occurs when the robot is created with that configuration; there is no reason to infer that infringement occurs through use of the robot. Thus, I do not find the limitation indefinite.

VI. U.S. PATENT NO. 8,474,090

A. Level of Ordinary Skill in the Art

As mentioned above, in Order No. 27 I found a person of ordinary skill in the art for each of the asserted patents at the time of the invention would be an individual with a bachelor's degree in physics, electrical engineering, mechanical engineering, computer science, or a related discipline, and has at least three years of experience in the design and implementation of robots and embedded systems, or some other equivalent combination of education and experience. (Order No. 27 at 9.)

Public Version

B. Claims-at-Issue

The following claims of the '090 patent are at-issue in this investigation, either through allegations of infringement or technical prong domestic industry:

1. A floor cleaning robot comprising:

a housing and a chassis;

wheels and at least one motor to drive the wheels disposed at least partially within the housing and configured to move the floor cleaning robot across a floor, each of the wheels being attached to the chassis via a respective arm having a distal end and a proximal end;

a control module disposed within the housing and directing movement of the floor cleaning robot across the floor;

at least one sensor for detecting an obstacle and communicating obstacle information to the control module so that the control module can cause the floor cleaning robot to react to the obstacle;

a removable bin disposed at least partially within the housing and configured to receive particulates; and

a first rotating member configured to direct particulates toward the bin,

wherein one of the wheels is rotatably attached to the distal end of each arm, and the proximal end of each arm is pivotably attached to the chassis,

wherein each wheel is biased to an extended position away from the robot chassis by a spring extending between the arm and the robot chassis, and

wherein, during cleaning, the weight of the floor cleaning robot overcomes a force from the spring biasing the wheels to an extended position.

2. The floor cleaning robot of claim 1, further comprising a second rotating member configured to cooperate with the first rotating member to direct particulates toward the bin.

Public Version

3. The floor cleaning robot of claim 2, wherein the first rotating member contacts the floor and agitates particulates and directs the particulates toward the second rotating member.
4. The floor cleaning robot of claim 3, wherein the second rotating member is positioned to receive particulates from the first rotating member and direct the particulates toward the removable bin.
5. The floor cleaning robot of claim 1, further comprising an air moving system disposed at least partially within the housing and configured to ingest particulates and direct particulates toward the removable bin.
7. The floor cleaning robot of claim 5, wherein air moved by the air moving system passes through a filter before exiting the housing.
10. A floor cleaning robot comprising:
 - a housing and a chassis;
 - a first wheel and a first arm for attaching the first wheel to the chassis, the first arm having a proximal end pivotably attached to the chassis and a distal end to which the first wheel is rotatably mounted;
 - a first resilient member connecting the first arm to the chassis and biasing the distal end of the first arm and the first wheel to an extended position;
 - a second wheel and a second arm for attaching the second wheel to the chassis, the second arm having a proximal end pivotably attached to the chassis and a distal end to which the second wheel is rotatably mounted;
 - a second resilient member connecting the second arm to the chassis and biasing the distal end of the second arm and the second wheel to an extended position;
 - at least one motor disposed at least partially within the housing and configured to drive the first and second wheels to move the floor cleaning robot across a floor;
 - a control module disposed within the housing and directing movement of the floor cleaning robot across the floor;

Public Version

at least one sensor for detecting an obstacle and communicating obstacle information to the control module so that the control module can cause the floor cleaning robot to react to the obstacle;

a removable bin disposed at least partially within the housing and configured to receive particulates;

a rotating brush configured to agitate particulates and direct particulates toward the removable bin;

wherein, during cleaning, the weight of the floor cleaning robot overcomes a force from the first and second resilient members that biases the wheels to an extended position.

17. A method for directing particulates from a floor into a bin, the method comprising:

driving wheels to move a cleaning robot across a floor, the wheels being attached to a chassis of the cleaning robot by a pivoting arm and being biased to an extended position by a spring extending between the arm and the chassis;

allowing the weight of the cleaning robot to overcome the spring force biasing the wheels to an extended position when the cleaning robot is positioned for use;

sensing obstacles;

causing the cleaning robot to avoid the sensed obstacles; agitating particulates from the floor and directing the particulates toward a removable bin of the cleaning robot;

generating a negative pressure to direct agitated particulates toward the removable bin; and

holding particulates in the removable bin.

(CIB at 9.)¹⁴

¹⁴ iRobot does not list claim 5 but asserted claim 7 depends from claim 5.

Public Version

C. Claim Construction

As part of the Markman process, the following terms of the '090 patent were construed, either as-agreed between the parties or determined by Order No. 27:

Claim Term	Construction
chassis (claims 1,10, 17)	the frame of the floor cleaning robot to which components are attached or integrated
housing (claims 1, 5, 7, 10, 13, 14, 16)	a peripheral structure that contains or covers other components

(See Order No. 27 at 10, 55.) The parties do not identify any further claim construction issues.

(See CIB at 55; see generally RIB at 84-85.)

D. Infringement

According to iRobot's post-hearing briefing, the following products are accused of infringing the following claims of the '090 patent:

Product	Claims
iLife V5s products	1, 2, 5, 7, 10, 17
iLife A6 products	1, 2, 3, 5, 7, 10, 17
iLife X751	1, 2, 5, 7, 10, 17
iLife X781	1, 2, 3, 5, 7, 10, 17
Hoover Products	1, 2, 3, 5, 7, 10, 17
SSSIT Product	1, 2, 3, 5, 7, 10, 17
bObi products	1, 2, 3, 5, 7, 10, 17

Public Version

1. Direct Infringement by the iLife Products

For the reasons explained below, I find iRobot has shown by a preponderance of the evidence that the iLife V5s and X751 products meet the limitations of claims 1, 2, 5, 7, 10, 17; and the A6 and X781 products meet the limitations of claims 1, 2, 3, 5, 7, 10, 17. Thus, iRobot has sufficiently shown that iLife directly infringes those apparatus claims, but, under the same reasoning as for the method claims of the '553 patent, iRobot has not shown iLife performs the steps of method claim 17 of the '090 patent for purposes of direct infringement.

a. Undisputed Claim Limitations

As reflected in the parties' post-hearing briefing, most of '090 patent asserted claim limitations in the iLife Products are not in dispute. (*See, e.g.*, RRSB at 26-44.) These undisputed limitations, along with my findings, are summarized below.

Independent claim 1 requires, “[a] floor cleaning robot.” ('090 patent at cl. 1.) I find credible and unrebutted testimony demonstrates the iLife Products are robots which move themselves across a floor for cleaning purposes. (*See* CIB at 55 (citing CX-0220C at Q21, 30, 38, 284, 335, 387).) The limitation is met.

Claim 1 further requires, “a housing and a chassis.” ('090 patent at cl. 1.) I find credible and unrebutted testimony demonstrates the iLife Products include rigid structures which serve as a housing and a chassis. (*See* CIB at 55 (citing CX-0220C at Q22, 31, 39, 285, 336, 388).) The limitation is met.

Claim 1 further requires, “a control module disposed within the housing and directing movement of the floor cleaning robot across the floor.” ('090 patent at cl. 1.) I find credible and unrebutted testimony demonstrates the iLife Products include a microcontroller that connects to both wheel motors and sensors to navigate the robots around a room. (*See* CIB at 56 (citing CX-0220C at Q24-25, 33, 42, 289, 340, 395; CX-0305C at 73:4-19).) The limitation is met.

Public Version

Claim 1 further requires, “at least one sensor for detecting an obstacle and communicating obstacle information to the control module so that the control module can cause the floor cleaning robot to react to the obstacle.” (’090 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the iLife Products include bump and proximity sensors to detect contacted obstacles and those at a distance, and, in response to this detection, the robot will change its movement. (See CIB at 56-57 (citing CX-0220C at Q25-26, 33-34, 42-43, 290-291, 341-342, 396-397; CX-0305C at 26:21-30:3, 32:12-18, 35:2-8, 42:13-45:5, 51:9-20, 53:18-24, 52:16-20, 65:2-12, 67:3-17, 68:10-17; CX-0278C at Q79:3-22, 105:2-11).) The limitation is met.

Claim 1 further requires, “a removable bin disposed at least partially within the housing and configured to receive particulates.” (’090 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the iLife Products include a bin which receives particulates swept or picked up from the floor surface, and can be removed by a user for emptying. (See CIB at 56-57 (citing CX-0220C at Q27, 35, 44, 292, 343, 398).) The limitation is met.

Claim 1 further requires, “a first rotating member configured to direct particulates toward the bin.” (’090 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the iLife Products include either a main brush or side brushes which rotate and direct particulates from the floor surface into the bin. (See CIB at 57 (citing CX-0220C at 28, 36, 45, 293, 344-347, 399-402; Hr’g Tr. at 454:25-455:6).)¹⁵ The limitation is met.

Claim 1 further requires, “wherein, during cleaning, the weight of the floor cleaning robot overcomes a force from the spring biasing the wheels to an extended position.” (’090 patent at

¹⁵ iRobot describes this limitation as “undisputed for all products except V5s and X751,” but there is no dispute over this limitation in Respondents’ responsive post-hearing brief. (See RRSB at 26-44.) Thus, if there is a dispute, it has been waived.

Public Version

cl. 1.) I find credible and unrebutted testimony demonstrates the iLife Products include wheels on pivotable arms which pivot in response to placing the robot on the ground—*i.e.*, pivoting as the result of the weight of the robot overcoming a spring. (*See* CIB at 60-61 (citing CX-0220C at Q[23], 32, 40-41, 301, 356, 410).) The limitation is met.

Dependent claim 2 requires, “[t]he floor cleaning robot of claim 1, further comprising a second rotating member configured to cooperate with the first rotating member to direct particulates toward the bin.” (’090 patent at cl. 2.) I find credible and unrebutted testimony demonstrates the iLife Products include either a main brush and a side brush, or two side brushes, where each rotate and work together to get particulates into the bin. (*See* CIB at 61 (citing CX-0220C at Q28, 36, [45], 302, 357, 411).) The limitation is met.

Dependent claim 3 requires, “[t]he floor cleaning robot of claim 2, wherein the first rotating member contacts the floor and agitates particulates and directs the particulates toward the second rotating member.” (’090 patent at cl. 3.) I find credible and unrebutted testimony demonstrates the A6 and X781, which are the only iLife Products accused under this claim (*see* CIB at 61) include side brushes which contact the floor and direct particulates over to a main brush (*id.* (citing CX-0220C at Q28, 45, 302, 412).) The limitation is met.

Dependent claim 5 requires, “[t]he floor cleaning robot of claim 1, further comprising an air moving system disposed at least partially within the housing and configured to ingest particulates and direct particulates toward the removable bin.” (’090 patent at cl. 5.) I find credible and unrebutted testimony demonstrates the iLife Products include a vacuum device which sucks air and particulates into the bin. (*See* CIB at 71-72 (citing CX-0220C at Q70, 516; CX-0347C at 75:13-76:16, 86:7-87:21).) The limitation is met.

Public Version

Dependent claim 7 requires, “[t]he floor cleaning robot of claim 5, wherein air moved by the air moving system passes through a filter before exiting the housing.” (’090 patent at cl. 7.) I find credible and un rebutted testimony demonstrates the iLife Products include a filter as part of the vacuum device. (See CIB at 72 (citing CX-0220C at Q70, 517; CX-0347C at 87:6-15).) The limitation is met.

Independent claim 10 requires, “[a] floor cleaning robot.” (’090 patent at cl. 10.) I find credible and un rebutted testimony demonstrates the iLife Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 10 further requires, “a housing and a chassis.” (’090 patent at cl. 10.) I find credible and un rebutted testimony demonstrates the iLife Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 10 further requires, “at least one motor disposed at least partially within the housing and configured to drive the first and second wheels to move the floor cleaning robot across a floor.” (’090 patent at cl. 10.) I find credible and un rebutted testimony demonstrates the iLife Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 10 further requires, “a control module disposed within the housing and directing movement of the floor cleaning robot across the floor.” (’090 patent at cl. 10.) I find credible and un rebutted testimony demonstrates the iLife Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 10 further requires, “at least one sensor for detecting an obstacle and communicating obstacle information to the control module so that the control module can cause the floor cleaning robot to react to the obstacle.” (’090 patent at cl. 10.) I find credible and

Public Version

unrebutted testimony demonstrates the iLife Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 10 further requires, “a removable bin disposed at least partially within the housing and configured to receive particulates.” (’090 patent at cl. 10.) I find credible and unrebutted testimony demonstrates the iLife Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 10 further requires, “a rotating brush configured to agitate particulates and direct particulates toward the removable bin.” (’090 patent at cl. 10.) I find credible and unrebutted testimony demonstrates the iLife Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 10 further requires, “wherein, during cleaning, the weight of the floor cleaning robot overcomes a force from the first and second resilient members that biases the wheels to an extended position.” (’090 patent at cl. 10.) I find credible and unrebutted testimony demonstrates the iLife Products meet this limitation for the same reasons discussed under claim 1, above.

Independent claim 17 requires, “[a] method for directing particulates from a floor into a bin.” (’090 patent at cl. 17.) I find credible and unrebutted testimony demonstrates the iLife Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 17 further requires, “allowing the weight of the cleaning robot to overcome the spring force biasing the wheels to an extended position when the cleaning robot is positioned for use.” (’090 patent at cl. 17.) I find credible and unrebutted testimony demonstrates the iLife Products meet this limitation for the same reasons discussed under claim 1, above.

Public Version

Claim 17 further requires, “sensing obstacles.” (’090 patent at cl. 17.) I find credible and un rebutted testimony demonstrates the iLife Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 17 further requires, “causing the cleaning robot to avoid the sensed obstacles.” (’090 patent at cl. 17.) I find credible and un rebutted testimony demonstrates the iLife Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 17 further requires, “agitating particulates from the floor and directing the particulates toward a removable bin of the cleaning robot.” (’090 patent at cl. 17.) I find credible and un rebutted testimony demonstrates the iLife Products meet this limitation for the same reasons discussed under claims 1-3, above.

Claim 17 further requires, “generating a negative pressure to direct agitated particulates toward the removable bin.” (’090 patent at cl. 17.) I find credible and un rebutted testimony demonstrates the iLife Products meet this limitation for the same reasons discussed under claim 5, above.

Claim 17 further requires, “holding particulates in the removable bin.” (’090 patent at cl. 17.) I find credible and un rebutted testimony demonstrates the iLife Products meet this limitation for the same reasons discussed under claim 1, above.

b. Disputed Claim Limitations Concerning an Arm Attached to Chassis

In addition to those limitations listed above, claim 1 requires, “wheels and at least one motor to drive the wheels disposed at least partially within the housing and configured to move the floor cleaning robot across a floor, each of the wheels being attached to the chassis via a respective arm having a distal end and a proximal end” and “wherein one of the wheels is rotatably attached to the distal end of each arm, and the proximal end of each arm is pivotably

Public Version

attached to the chassis.” (’090 patent at cl. 1.) Claim 10 similarly requires, “a first wheel and a first arm for attaching the first wheel to the chassis, the first arm having a proximal end pivotably attached to the chassis and a distal end to which the first wheel is rotatably mounted” and “a second wheel and a second arm for attaching the second wheel to the chassis, the second arm having a proximal end pivotably attached to the chassis and a distal end to which the second wheel is rotatably mounted.” (’090 patent at cl. 10.) Claim 17 similarly requires “driving wheels to move a cleaning robot across a floor, the wheels being attached to a chassis of the cleaning robot by a pivoting arm and being biased to an extended position by a spring extending between the arm and the chassis.” (’090 patent at cl. 17.) Respondents dispute that these limitations are met by the iLife Products.

iRobot’s Position

In its opening brief, iRobot takes the position that much of these limitations is not in dispute. Specifically, iRobot claims it is not disputed that “[t]he iLife Products include wheels and at least one motor to drive the wheels disposed at least partially within the housing and configured to move the floor cleaning robot across a floor” (CIB at 55 (citing CX-0220C at Q32, 40-41, 286-288, 337-339, 389-391)) and the “drive wheels attach to the chassis via an arm with a distal end (that connects to the wheels) and a proximal end (that connects to a wheel plate that is part of the chassis)” (*id.* at 56 (citing CX-0665C; CX-0285C; CX-1797C; CX-0849C)). I find sufficient evidence demonstrates the iLife Products have wheels attached to a chassis via an arm which has two ends.

The portion of these limitations which refer to an end of the arm being “pivotably attached to the chassis” however, is in dispute. iRobot describes this dispute as limited, with Respondents offering a “forced and impractical non-infringement argument concerning which

Public Version

parts of the implicated robots are chassis and which are not.” (CIB at 51-52.) Essentially, in iRobot’s view, Respondents’ non-infringement position claims a plastic piece to which a wheel arm and a spring attach is not “chassis” thereby negating claim limitations which require that wheel arm or spring to be “attached” to the “chassis.” (*Id.* at 52.) iRobot argues:

This argument fails because (1) it contradicts the ALJ’s claim construction for “chassis,” (2) it contradicts the patent specification, (3) it is thoroughly refuted by the analysis of iRobot’s expert, Dr. Nikos, (4) it contradicts Respondents’ own invalidity experts, and (5) Respondents’ non-infringement experts did not present credible testimony on the issue.

(*Id.*)

Taking into account my ordered construction for “chassis” as “the frame of the floor cleaning robot to which components are attached or integrated,” iRobot contends the plastic piece in the accused products satisfies this construction as “serv[ing] no other function than ‘attaching or integrating’ the wheels, arms, and motors in the products.” (*Id.* (citing CX-0220C at Q295, 349; *see* Hr’g Tr. at 467:5-21, 468:2-7).) iRobot disputes the importance of Respondents’ observation that “the wheel plate or cover is manufactured as a separate piece from the rest of the robot chassis.” (*Id.* at 52-53.) Similarly, iRobot disputes the idea that a “chassis” “must be manufactured as a single piece of plastic,” as it “is based on a misreading of the patent specification and is at odds with Respondents’ own validity expert.” (*Id.* at 53 (referring to ’090 patent at 3:30-35; *see* Hr’g Tr. at 386:17-387:4).) iRobot also alleges inconsistencies in Respondents’ non-infringement expert’s opinion on which iLife products have direct or indirect spring attachments. (*Id.* at 54 (citing Hr’g Tr. at 472:7-11).)

Specifically for the iLife Products, iRobot observes “the arm in the A6 and X751 connects to the chassis via a plate that is part of the chassis when secured to the rest of the robot.” (*Id.* at 58 (citing CX-0831C at 7342; CX-0665C; CX-1797C; CX-1034C; *see* CX-0220C at Q392-394).) iRobot argues squarely:

Public Version

The plate “attache[s] or integrate[s]” the wheel arm, motor, and wheel, and when bolted to the rest of the robot chassis, it serves as part of “the frame of the floor cleaning robot.” Accordingly, the plate satisfies the agreed construction for “chassis.” (*See* Order No. 27 at 10.)

(*Id.*) iRobot continues, “in the V5s Series products, as shown in the annotated images below, the arm connects to the chassis via a wheel cover that is part of the chassis when secured to the rest of the robot.” (*Id.* at 59 (citing CX-0285C; CX-0830 at 7327-7328).) Again, iRobot argues:

This wheel cover, just like the plate discussed above, “attache[s] or integrate[s]” the wheel arm, motor, and wheel, and when bolted to the rest of the robot chassis, it serves as part of “the frame of the floor cleaning robot.” Accordingly, it also satisfies the agreed construction for “chassis.”

(*Id.*)

In its reply brief, iRobot confirms its view that “[t]he only dispute with respect to infringement of the ’090 patent is whether the wheel plates and wheel covers in the accused and domestic industry products satisfy the ALJ’s construction for ‘chassis.’” (CRPB at 24.) iRobot calls Respondents’ position an exercise in semantics and box-drawing. (*See id.* at 24-25.) iRobot continues to claim that any argument from Respondents that these components cannot be “chassis” is out of time and not properly before me in this investigation, as never mentioned in Respondents’ pre-hearing brief. (*Id.* at 25.) iRobot also disputes any claim that it is effectively pursuing its own out-of-time doctrine of equivalents theory. (*See id.* at 25-26 (referring to Hr’g Tr. at 386:17-387:4; Order No. 27 at 10).) iRobot adds two more general points:

Respondents have no rebuttal to the fact that the patent specification contemplates wheel “wells of the chassis” for mounting “wheel subassemblies” that comprise wheel arms and wheels, (JX-0003 at 5:53-63), which is the precise configuration that Respondents and iRobot use in the products at issue. (*See, e.g.*, iRobot PostHB at 59, 65.)

....

Respondents do not even attempt to square their argument that one interpretation of an embodiment from the specification limits the claims at issue to a single-piece chassis with the controlling law that “particular

Public Version

embodiments appearing in a specification will not be read into the claims when the claim language is broader than such embodiments.” *Electro Med. Sys., S.A. v. Cooper Life Sciences, Inc.*, 34 F.3d 1048, 1054 (Fed. Cir. 1994).

(*Id.* at 27.)

For the iLife Products in particular, iRobot remarks “[o]ddly, Respondents do not attempt to rehabilitate their non-infringement expert for the iLife products in this Investigation (despite his only inspecting a minority of the iLife product families) or address that his testimony on non-infringement is simply not credible.” (*Id.* at 28 (referring to Hr’g Tr. at 460:21-461:8, 472:7-11).) iRobot contends the wheel modules in the iLife Products may be separately manufactured from the chassis, but this “a multi-piece chassis is irrelevant to whether or not they infringe, because the claims of the ’090 patent do not require a single piece chassis.” (*Id.*) Lastly, iRobot repeats its theory that for the most contentious iLife Product, the V5s, “the wheel cover of the V5s Series products, just like the wheel plate of the A6 Series and X751 Series products, is part of the chassis of those products.” (*Id.* at 29.)

Respondents’ Position

In their responsive brief, Respondents argue simply “Respondents’ Products Do Not Infringe Because They Use Replaceable Wheel Modules.” (RRSB at 29.) Respondents highlight the design of the original Roomba in 2002 as an example of a structure which meets the disputed “chassis” limitations. (*Id.* at 26-27.) In that product, as Respondents explain, the wheel assemblies were not replaceable which meant the wheel pivot arms and springs attaching directly to the chassis. (*Id.* at 26 (citing RX-2088C at Q124).) In Respondents’ view, the accused product designs with discrete wheel modules or wheel covers (implemented so as to assist replacing the wheel assemblies upon failure) are “mechanically different” designs and do not meet the “chassis” limitations. (*Id.* at 27-28.) Respondents note the law as “[w]here a claim

Public Version

does not read on an accused device exactly, there can be no literal infringement.” (*Id.* at 28 (citing *Nike Inc. v. Wolverine World Wide, Inc.*, 43 F.3d 644, 647 (Fed. Cir. 1994)).)

Respondents contend the theory where a piece, such as a wheel module or cover, is not part of the chassis when detached from the robot, but becomes part of the chassis when attached, is without merit. (*Id.* (referring to Hr’g Tr. at 178:20-23, 180:23-181:1, 181:22-25).)

Respondents also remind that iRobot has not pursued any doctrine of equivalence theory (*id.*) and, overall:

iRobot’s argument distorts the agreed construction and the claims of the ’090 patent in an effort to make them cover a new and mechanically-different design that it did not have in mind in 2002 when it released the original Roomba and filed the application that led to the ’090 patent.

(*id.* at 29).

More specifically, Respondents describe their position in the context of accused products’ structure as:

Because the wheel arm is not attached to the chassis (either directly or indirectly through a fastener or screw), the wheel arm is not pivotably attached to the chassis. (*Id.*) Similarly, the spring is contained entirely within each detachable wheel module; thus, it does not connect to the chassis or extend between the chassis and the arm. (RX-2088C at Q119 (iLife V5s), Q120 (iLife A6), Q120 (iLife X751); RX-2078C at Q114-118 (Hoover X6), Q120-122 (Hoover Y1), Q156-162 (bObi D6), Q180-182 (BD2 product); RDX-01C.029-030, 039, 051, 068.) Consequently, the wheel arm and the spring in each of the accused products do not connect to the chassis as required by the asserted claims of the ’090 patent.

(*Id.* at 30.) Respondents then argue that iRobot’s explanation of the wheel module as “serv[ing] no other function than ‘attaching or integrating the wheels, arms, and motors in the products.’ . . . is nothing more than a veiled attempt to introduce a doctrine of equivalents analysis.” (*Id.*)

Regarding whether “the wheel cover or plate of the wheel module acts as an intermediate connecting piece,” Respondents argue it is not because, as iRobot’s expert admits, “a wheel module is ‘one component that gets attached to the chassis.’” (*Id.* at 32 (citing Hr’g Tr. at 187:6-

Public Version

8.) Respondents highlight “iRobot’s own documents call the chassis and the wheel module separate assemblies.” (*Id.* (citing RX-0141.024; RX-0226C.0020).) Respondents add “as Dr. Abraham explained at the hearing, wheel covers or wheel plates cannot be considered to be intermediate connecting pieces that become part of the chassis because they are made of different materials and serve different purposes from the chassis.” (*Id.* (citing Hr’g Tr. at 630:8-631:9).) Respondents note the ’90 patent specification speaks of the “chassis 21” as “preferably molded from a material such as plastic as a unitary element that includes a plurality of preformed wells, recesses, and structural members.” (*Id.* (citing ’90 patent at 3:30-34).) Respondents reason:

As such, the inventors of the ’90 patent envisioned the chassis to be a unitary element that includes a plurality of preformed wells, recesses, and structural members. Thus, a POSITA would understand in the context of the specification that a wheel module is a “component” which is attached to the chassis rather than the chassis itself. (RX-2078C at Q96, 97.)

(*Id.* at 33.) Respondents then proceed with a product-by-product analysis, where, for the iLife products, Respondents state:

Each of the accused iLife products uses a detachable wheel module that is a distinct piece from the chassis and it is this distinct wheel module to which the wheel arm attaches. (RX-2088C at Q119 (iLife V5s), Q120 (iLife A6), Q120 (iLife X751).) Because the wheel arm is not attached to the chassis (either directly or indirectly through a fastener or screw), the wheel arm is not pivotably attached to the chassis. (*Id.*) Indeed, Dr. Nikos admitted that iLife’s wheel modules are “separately manufactured from the chassis.” (Tr. at 178:20-23.)

(*Id.* at 34.)

Analysis

On this issue, the structure of the iLife Products is not in dispute. Each motorized wheel is rotatably attached to a wheel arm at one end, where the opposite end of the arm is rotatably attached to a plastic piece called a “cover,” “module,” or “plate.” It is this plastic cover/module/plate which is then *fixed* to a much larger frame structure readily identifiable as a

Public Version

“chassis.” Obviously, the chassis and every component which it supports get moved around a room for cleaning because they are ultimately attached to the motorized wheels. In this way, it cannot be disputed that the wheel arm attaches to the chassis through an intermediate member.

The issue, then, is whether this arrangement can satisfy claim limitations which read “proximal end of each arm is pivotably attached to the chassis” (claim 1), “a proximal end pivotably attached to the chassis” (claim 10),” and “wheels being attached to a chassis of the cleaning robot by a pivoting arm” (claim 17). I find it can because a plain and ordinary meaning of “attached” allows for direct or indirect attachment.

The intrinsic evidence of the '090 patent does not suggest otherwise. In a clear example, many other claim limitations recite components being “attached” to one another, even though the specification shows them separated by several intervening parts. For example, claim 1 reads “wheels being attached to the chassis,” claim 10 reads “a first/second arm for attaching the first/second wheel to the chassis,” and claim 17 reads “wheels being attached to a chassis.” ('090 patent at cls. 1, 10, 17.) Yet there is not a single embodiment in the '090 patent where a wheel is *directly* attached to the chassis. This is strong intrinsic evidence to support a reading which allows indirect attachment. *Powell v. Home Depot U.S.A., Inc.*, 663 F.3d 1221, 1231-32 (Fed. Cir. 2011) (looking to specification to see if separately claimed elements could not be combined in an accused product); *Linear Tech. Corp. v. Int'l Trade Comm'n*, 566 F.3d 1049, 1055 (“there is nothing in the claim language or specification that supports narrowly construing the terms to require a specific structural requirement or entirely distinct ‘second’ and ‘third’ circuits. . . . Accordingly, we think the terms ‘second circuit’ and ‘third circuit’ should be accorded their full scope.”).

Public Version

Claim terms are supposed to be interpreted as they would be those of ordinary skill in the art. *Phillips*, 415 F.3d at 1313. Persons of ordinary skill are practical; and it is not practical to consider the wheel arm as not “attached” to the chassis in the iLife Products or any other of the accused products. They wouldn’t operate correctly. *Tinnus Enters., LLC v. Telebrands Corp.*, 846 F.3d 1190, 1204 (Fed. Cir. 2017) (holding a lower court’s finding—that a “tube attached to the housing” was met because otherwise the product wouldn’t operate—was reasonable).

Regarding whether or not wheel module covers or plates, like those in the iLife Products, can be considered “chassis” (*i.e.*, part of the “frame of the floor cleaning robot to which components are attached or integrated”), I find on a balance of the evidence that they can.¹⁶ iRobot provided credible testimony that these components are simply a matter of “segmenting the chassis” which “allows for easier manufacture and wheel replacement, but it does not change the identify or function of the segment.” (CX-0220C at Q295.) Respondents provided their own highly credible invalidity expert who testified:

Q. Now with respect to the claim’s use of that term “chassis,” you’d agree with me that a chassis can be made up of multiple components that are attached together; right?

A. Potentially. I mean, once constructed, it create – it forms a frame to which other components are attached. I believe that’s the construction that the Court has adopted.

Q. Well, for avoidance of doubt, it’s your opinion that a chassis could be multiple components attached together, isn’t that right?

A. It’s conceivable. I’d have to see the particular artifact that you’re talking about to give you a definitive answer. But yes, potentially it’s possible.

¹⁶ I also find Respondents have not waived this argument as iRobot suggests. (*Compare* CRPB at 25 *with* RPB at 100.)

Public Version

Q. But – and just to be sure, so it’s your opinion that a chassis could be multiple components attached together or it could be a single integral part; right?

A. That’s right.

Q. Okay. And it’s your opinion that whether something is considered part of a chassis or not depends on its function; isn’t that right?

A. Yes.

Q. And you’d agree that for something to be part of the chassis, it would have to have its primary function as being the structural member supporting other components; isn’t that right?

A. Yes.

(Hr’g Tr. at 386:3-387:4.)

The contrasting position comes from Respondents’ non-infringement experts who I find to be less experienced in this field and thus, less persuasive. The expert for iLife opines “[p]ieces which are not the chassis do not become the chassis when they are plugged into the chassis.” (RX-2088C at Q114, 126.) Similarly, the expert for Hoover, SSSIT, and bObsweep opines “[t]he chassis of the robot is the main part to which all the other subcomponents are attached, like the processor, vacuum system, housing, etc. The wheel modules are just another one of those subcomponents and not the chassis.” (RX-2078C at Q97.) This expert also relies on the ’090 patent’s reference to a chassis as “preferably molded from a material such as a plastic as a unitary element” to claim “[a]ccording to the ’090 patent specification, the wheel module cover cannot be part of the chassis.” (*Id.* at Q96.)

I strongly disagree with this expert that such a preferred embodiment should be read into the claims so as to exclude any multi-piece chassis. (Hr’g Tr. at 591:8-12, 592:20-593:6.) I also do not find these arguments persuasive as neither addresses the fact that the core functionality of the wheel covers or plates is to integrate the wheel, wheel arm, and motor into the rest of the

Public Version

robot. (See Hr'g Tr. at 467:5-468:19, 469:5-22; CRPB at 25 (discussing no identification of supposed "different purposes" served by the wheel covers or plates).) Thus, I find the limitation is met in the iLife Products.

c. Disputed Claim Limitations Concerning a Spring and a Chassis

In addition to those limitations listed above, claim 1 requires, "wherein each wheel is biased to an extended position away from the robot chassis by a spring extending between the arm and the robot chassis." ('090 patent at cl. 1.) Claim 10 similarly requires, "a first resilient member connecting the first arm to the chassis and biasing the distal end of the first arm and the first wheel to an extended position" and "a second resilient member connecting the second arm to the chassis and biasing the distal end of the second arm and the second wheel to an extended position." ('090 patent at cl. 10.) Claim 17 similarly requires "driving wheels to move a cleaning robot across a floor, the wheels being attached to a chassis of the cleaning robot by a pivoting arm and being biased to an extended position by a spring extending between the arm and the chassis." ('090 patent at cl. 17.) Respondents dispute that these limitations are met by the iLife V5s products, but do not dispute they are met by the A6 and X751 products. (RRSB at 38-39.)

iRobot's Position

Much of iRobot's position on this limitation has largely been summarized above in the discussion of the wheel arm-chassis connection in the iLife Products—the wheel cover or plate in these robots constitutes "chassis" so that the wheel arm and, in this case, spring which attach to that cover or plate are therefore attached to "chassis." For the spring in particular, iRobot first notes that:

With respect to the A6 and X751 Products, although iLife disputed the satisfaction of this limitation in their prehearing brief because it claimed

Public Version

that its wheel-biasing spring did not attach to the products' chassis, iLife's expert conceded at the Hearing that his earlier analysis was erroneous and that the spring of the A6 and X751 does attach directly to what all parties agree is part of the chassis of the robot. (Hrg. Tr., Locke at 470:20-473:11.) Accordingly, there is no longer any legitimate dispute that this limitation is satisfied by the A6 and X751 Products.

(CIB at 60 (citing CX-1033C; CX-1035C; CX-0831 at 7343; CX-0848C; CX-0850C).) iRobot continues, that for the V5s Products, "the wheel-biasing spring connects on one end to the wheel arm and on the other end to the wheel cover." (*Id.* (citing CX-0830C at 7332, 7327-7328).)

Respondents' Position

Similar to iRobot, much of Respondents' position on this limitation has been summarized above in the discussion of the wheel arm-chassis connection in the iLife Products—the wheel cover or plate in these robots cannot constitute "chassis" so that the wheel arm and, in this case, spring which attach to that cover or plate cannot be attached to "chassis" as required by the claim. For the spring in particular, Respondents argue "POSITA would understand the ordinary meaning of this limitation to describe a spring that is positioned between the arm at one end and the chassis at the other end." (RRSB at 38 (citing RX-2078C at Q79-81).) Moreover, and for the iLife Products in particular, Respondents argue:

In each of the V5s grouping of iLife products (V3s, V3s Pro, V5s, and V5s Pro), the spring is contained entirely within each detachable wheel module; thus, it does not connect to the chassis or extend between the chassis and the arm. (RX-2088C at Q119 (iLife V5s), Q120 (iLife A6), Q120 (iLife X751).) Indeed, Dr. Nikos admitted that iLife's wheel modules are "separately manufactured from the chassis." (Tr. at 178:20-23.)

(*Id.*) Respondents acknowledge the A6 and X751 iLife Products do meet this limitation in that "the spring is not contained within the detachable wheel modules." (*Id.* at 39.)

Analysis

To start, I agree with the undisputed conclusion that the A6 and X751 products meet this limitation, as their springs attach to the wheel arm at one end and to the chassis at the other.

Public Version

(CIB at 60 (citing Hr'g Tr. at 470:20-473:1; CX-0220C at Q23, 299-300, 407-409; CX-1033C; CX-1035C; CX-0831C at 7343; CX-0848C; CX-0850C); RRSB at 38-39.)

For the V5s products, where a dispute remains, the parties' have largely treated the spring-chassis limitations in the same way as the wheel-arm chassis limitation discussed above. I too find the spring-chassis limitations are met under similar reasoning in the V5s products. It is not disputed that in these robots, the spring is attached to the wheel arm on one end and to a tip of the wheel cover at the other end. (CX-0220C at Q353; CX-0830 at 7327.) It is also clear the drive wheels of the V5s products are biased by this spring "to an extended position away from the robot chassis." (CX-0220C at Q353; CX-0830 at 7332.) Having already found credible testimony supports treating the wheel module covers as "chassis," I find the spring "extend[s] between the arm and the chassis" (claims 1, 17) and "connect[s] the [first/second] arm to the chassis" (claim 10). Thus, these limitations are met in the iLife Products.

2. Direct Infringement by the Hoover Products

For the reasons explained below, I find iRobot has shown by a preponderance of the evidence that the Hoover Products meet the limitations of claims 1, 2, 3, 5, 7, 10, 17. Thus, iRobot has sufficiently shown that Hoover directly infringes those apparatus claims, but, under the same reasoning as for the method claims of the '553 patent, iRobot has not shown Hoover performs the steps of method claim 17 of the '090 patent for purposes of direct infringement.

a. Undisputed Claim Limitations

As reflected in the parties' post-hearing briefing, most of the '090 patent asserted claim limitations in the Hoover Products are not in dispute. (*See, e.g.*, RRSB at 26-44.) These undisputed limitations, along with my findings, are summarized below.

Independent claim 1 requires, "[a] floor cleaning robot." ('090 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the Hoover Products are robots which move

Public Version

themselves across a floor for cleaning purposes. (*See* CIB at 63 (citing CX-0220C at Q49, 443).)

The limitation is met.

Claim 1 further requires, “a housing and a chassis.” (’090 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the Hoover Products include rigid structures which serve as a housing and a chassis. (*See* CIB at 63 (citing CX-0220C at Q49, 443; CX-0347C at 39:4-24, 42:11-25).) The limitation is met.

Claim 1 further requires, “a control module disposed within the housing and directing movement of the floor cleaning robot across the floor.” (’090 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the Hoover Products include a microcontroller that connects to both wheel motors and sensors to navigate the robots around a room. (*See* CIB at 64 (citing CX-0220C at Q51, 452).) The limitation is met.

Claim 1 further requires, “at least one sensor for detecting an obstacle and communicating obstacle information to the control module so that the control module can cause the floor cleaning robot to react to the obstacle.” (’090 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the Hoover Products include bump and laser sensors to detect contacted obstacles and those at a distance, and, in response to this detection, the robot will change its movement. (*See* CIB at 64 (citing CX-0220C at Q51-56, 453-454).) The limitation is met.

Claim 1 further requires, “a removable bin disposed at least partially within the housing and configured to receive particulates.” (’090 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the Hoover Products include a bin which receives particulates swept or picked up from the floor surface, and can be removed by a user for emptying. (*See* CIB at 64 (citing CX-0220C at Q57, 455).) The limitation is met.

Public Version

Claim 1 further requires, “a first rotating member configured to direct particulates toward the bin.” (’090 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the Hoover Products include either a main brush and a side brush which both rotate and direct particulates from the floor surface into the bin. (See CIB at 64-65 (citing CX-0220C at Q58, 456).) The limitation is met.

Claim 1 further requires, “wherein, during cleaning, the weight of the floor cleaning robot overcomes a force from the spring biasing the wheels to an extended position.” (’090 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the Hoover Products include wheels on pivotable arms which pivot in response to placing the robot on the ground—*i.e.*, pivoting as the result of the weight of the robot overcoming a spring. (See CIB at 66 (citing CX-0221C at Q50, 462; CX-0347C at 60:16-23).) The limitation is met.

Dependent claim 2 requires, “[t]he floor cleaning robot of claim 1, further comprising a second rotating member configured to cooperate with the first rotating member to direct particulates toward the bin.” (’090 patent at cl. 2.) I find credible and un rebutted testimony demonstrates the Hoover Products include a side brush which rotates and pushes particulates into the center of the device, whereupon a main brush picks them up and directs them into the removable bin. (See CIB at 66 (citing CX-0220C at Q58, 4673; CX-0347C at 66:8-10).) The limitation is met.

Dependent claim 3 requires, “[t]he floor cleaning robot of claim 2, wherein the first rotating member contacts the floor and agitates particulates and directs the particulates toward the second rotating member.” (’090 patent at cl. 3.) I find credible and un rebutted testimony demonstrates the Hoover Products include side brushes which contact the floor and direct

Public Version

particulates over to a main brush. (See CIB at 66-67 (citing CX-0220C at Q58, 464; CX-0347C at 66:8-10).) The limitation is met.

Dependent claim 5 requires, “[t]he floor cleaning robot of claim 1, further comprising an air moving system disposed at least partially within the housing and configured to ingest particulates and direct particulates toward the removable bin.” (’090 patent at cl. 5.) I find credible and un rebutted testimony demonstrates the Hoover Products include a vacuum device which sucks air and particulates into the bin. (See CIB at 67 (citing CX-0347C at 50:10-18).) The limitation is met.

Dependent claim 7 requires, “[t]he floor cleaning robot of claim 5, wherein air moved by the air moving system passes through a filter before exiting the housing.” (’090 patent at cl. 7.) I find credible and un rebutted testimony demonstrates the Hoover Products include a filter as part of the vacuum device. (See CIB at 67 (citing CX-0220C at Q59, 466).) The limitation is met.

Independent claim 10 requires, “[a] floor cleaning robot.” (’090 patent at cl. 10.) I find credible and un rebutted testimony demonstrates the Hoover Products meet this limitation for the same reasons discussed under claim 1, above

Claim 10 further requires, “a housing and a chassis.” (’090 patent at cl. 10.) I find credible and un rebutted testimony demonstrates the Hoover Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 10 further requires, “at least one motor disposed at least partially within the housing and configured to drive the first and second wheels to move the floor cleaning robot across a floor.” (’090 patent at cl. 10.) I find credible and un rebutted testimony demonstrates the Hoover Products meet this limitation for the same reasons discussed under claim 1, above.

Public Version

Claim 10 further requires, “a control module disposed within the housing and directing movement of the floor cleaning robot across the floor.” (’090 patent at cl. 10.) I find credible and unrebutted testimony demonstrates the Hoover Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 10 further requires, “at least one sensor for detecting an obstacle and communicating obstacle information to the control module so that the control module can cause the floor cleaning robot to react to the obstacle.” (’090 patent at cl. 10.) I find credible and unrebutted testimony demonstrates the Hoover Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 10 further requires, “a removable bin disposed at least partially within the housing and configured to receive particulates.” (’090 patent at cl. 10.) I find credible and unrebutted testimony demonstrates the Hoover Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 10 further requires, “a rotating brush configured to agitate particulates and direct particulates toward the removable bin.” (’090 patent at cl. 10.) I find credible and unrebutted testimony demonstrates the Hoover Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 10 further requires, “wherein, during cleaning, the weight of the floor cleaning robot overcomes a force from the first and second resilient members that biases the wheels to an extended position.” (’090 patent at cl. 10.) I find credible and unrebutted testimony demonstrates the Hoover Products meet this limitation for the same reasons discussed under claim 1, above.

Public Version

Independent claim 17 requires, “[a] method for directing particulates from a floor into a bin.” (’090 patent at cl. 17.) I find credible and unrebutted testimony demonstrates the Hoover Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 17 further requires, “allowing the weight of the cleaning robot to overcome the spring force biasing the wheels to an extended position when the cleaning robot is positioned for use.” (’090 patent at cl. 17.) I find credible and unrebutted testimony demonstrates the Hoover Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 17 further requires, “sensing obstacles.” (’090 patent at cl. 17.) I find credible and unrebutted testimony demonstrates the Hoover Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 17 further requires, “causing the cleaning robot to avoid the sensed obstacles.” (’090 patent at cl. 17.) I find credible and unrebutted testimony demonstrates the Hoover Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 17 further requires, “agitating particulates from the floor and directing the particulates toward a removable bin of the cleaning robot.” (’090 patent at cl. 17.) I find credible and unrebutted testimony demonstrates the Hoover Products meet this limitation for the same reasons discussed under claims 1-3, above.

Claim 17 further requires, “generating a negative pressure to direct agitated particulates toward the removable bin.” (’090 patent at cl. 17.) I find credible and unrebutted testimony demonstrates the Hoover Products meet this limitation for the same reasons discussed under claim 5, above.

Public Version

Claim 17 further requires, “holding particulates in the removable bin.” (’090 patent at cl. 17.) I find credible and unrebutted testimony demonstrates the Hoover Products meet this limitation for the same reasons discussed under claim 1, above.

b. Disputed Claim Limitations Concerning an Arm Attached to Chassis

As presented above, claim 1 additionally requires, “wheels and at least one motor to drive the wheels disposed at least partially within the housing and configured to move the floor cleaning robot across a floor, each of the wheels being attached to the chassis via a respective arm having a distal end and a proximal end” and “wherein one of the wheels is rotatably attached to the distal end of each arm, and the proximal end of each arm is pivotably attached to the chassis.” (’090 patent at cl. 1.) Claim 10 similarly requires, “a first wheel and a first arm for attaching the first wheel to the chassis, the first arm having a proximal end pivotably attached to the chassis and a distal end to which the first wheel is rotatably mounted” and “a second wheel and a second arm for attaching the second wheel to the chassis, the second arm having a proximal end pivotably attached to the chassis and a distal end to which the second wheel is rotatably mounted.” (’090 patent at cl. 10.) Claim 17 similarly requires “driving wheels to move a cleaning robot across a floor, the wheels being attached to a chassis of the cleaning robot by a pivoting arm and being biased to an extended position by a spring extending between the arm and the chassis.” (’090 patent at cl. 17.) Respondents dispute that these limitations are met by the Hoover Products.

iRobot’s Position

In its opening brief, iRobot takes the position that, as with the iLife Products, much of these limitations is not in dispute. Specifically, iRobot claims it is not disputed that “[t]he Hoover Products include wheels and at least one motor to drive the wheels disposed at least

Public Version

partially within the housing and configured to move the floor cleaning robot across a floor” (CIB at 64 (citing CX-0220C at Q50, 444-51)) and the “drive wheels attach to the chassis via an arm with a distal end (that connects to the wheels) and a proximal end (that connects to a wheel plate that is part of the chassis)” (*id.* at 64 (citing CX-0931C at 0914-0916, 0925; CX-0928 at 7316, 7319)). I find sufficient evidence demonstrates the Hoover Products have wheels attached to a chassis via an arm which has two ends.

The portion of these limitations which refer to an end of the arm being “pivotably attached to the chassis” however, is in dispute. As outlined above, iRobot understands that Respondents dispute this feature “because they contend the wheel cover to which the arm attaches is not part of the chassis.” (CIB at 65.) Specifically, for the Hoover Products, iRobot describes how “the arm of the Hoover Products connects to the chassis via a wheel cover that is part of the chassis when bolted to the rest of the robot.” (*Id.* (citing CX-0802C; CX-0152).)

iRobot continues:

The wheel cover “attaches or integrates” the wheel arm, motor, and wheel, and when bolted to the rest of the robot chassis, it serves as part of “the frame of the floor cleaning robot.” Accordingly, the wheel cover satisfies the construction for “chassis.” (*See* Order No. 27 at 10.)

(*Id.*) iRobot contends the ’090 patent actually describes “wells of the chassis” for mounting “wheel subassemblies” that comprise wheel arms and wheels. (*Id.* (citing ’090 patent at 5:53-63).)

In its reply brief, and for the Hoover Products in particular, iRobot questions whether particular expert testimony from Respondents should be struck (*see* CRPB at 29), but otherwise argues it is not supported by any evidence (*see id.* at 29-30). iRobot adds that whatever different purposes the wheel covers are alleged to have, Respondents have not identified them and

Public Version

otherwise do not overcome their own expert's testimony that the purpose is to "attach and integrate the wheel module of the robot." (*Id.* at 30 (citing CX-0220C at Q447).)

Respondents' Position

Much of Respondents' position on this limitation has been summarized above in the discussion of the wheel arm-chassis connection in the iLife Products—the wheel cover or plate in the Hoover robots cannot constitute "chassis" so that the wheel arm cannot be attached to "chassis" as required by the claim.

For the Hoover Products specifically, Respondents argue "[t]he evidence shows the X6 and Y1 Products do not have an arm with a distal or proximal end which attaches it to the chassis or connects to the wheel." (RRSB at 34 (citing RX-2078C at Q96, 97, 100, 101, 105, 106, 108, 109, 111, 112).)¹⁷ Respondents state "[t]he wheel modules is attached to the chassis of the X6 and Y1 Products via a wheel module cover." (*Id.* at 35 (citing RX-2078 at Q100, 104).) Respondents add "[t]he wheel module covers are not intermediate pieces of the chassis because they are made of different materials and serve different purposes from the chassis." (*Id.* (citing Hr'g Tr. at 630:8-631:9).) Respondents conclude "[a]s shown above, there is no attachment between the wheel arm and the chassis in the X6 and Y1 Products." (*Id.* at 36 (citing RX-2078C at Q100, 101, 105, 106, 108, 109, 111, 112).)

Analysis

As explained in the above section for the iLife Products, I find the plain and ordinary meaning of the term "attached" allows for direct and indirect attachment. The structure of the

¹⁷ Again, by way of background, the X6 product is SSSIT's designation for the Hoover Quest 1000. (CIB at 82.) Similarly, the D6 product is SSSIT's designation for the bObi Pet product. (*Id.*) The Y1 is SSSIT's designation for the Hoover Rogue products. (*Id.*) The B3 product is SSSIT's designation for the Bob PetHair product. (*Id.*)

Public Version

Hoover Products is not in dispute—a wheel module cover serves as an intermediate piece between the wheel arm and the structure which is indisputably chassis. This is an indirect attachment between the wheel arm and chassis in satisfaction of the claim. I also find the wheel module cover can be considered “chassis” by those in this art based on its structure and function. Thus, I find the limitation is met in the Hoover Products.

c. Disputed Claim Limitations Concerning a Spring and a Chassis

In addition to those limitations listed above, claim 1 requires, “wherein each wheel is biased to an extended position away from the robot chassis by a spring extending between the arm and the robot chassis.” (’090 patent at cl. 1.) Claim 10 similarly requires, “a first resilient member connecting the first arm to the chassis and biasing the distal end of the first arm and the first wheel to an extended position” and “a second resilient member connecting the second arm to the chassis and biasing the distal end of the second arm and the second wheel to an extended position.” (’090 patent at cl. 10.) Claim 17 similarly requires “driving wheels to move a cleaning robot across a floor, the wheels being attached to a chassis of the cleaning robot by a pivoting arm and being biased to an extended position by a spring extending between the arm and the chassis.” (’090 patent at cl. 17.) Respondents dispute that these limitations are met by the Hoover Products.

iRobot’s Position

Much of iRobot’s position on this limitation has largely been summarized above in the discussion of the wheel arm-chassis connection in the iLife Products—the wheel cover or plate in the Hoover Products constitutes “chassis” so that the wheel arm and, in this case, spring which attach to that cover or plate are therefore attached to “chassis.” For the spring in particular, iRobot claims:

Public Version

As shown in the image of a Quest 1000 above, CX-0152, the wheel-biasing spring connects on one end to the wheel arm and on the other end to the wheel cover, which is part of the robot chassis when bolted to the rest of the robot. The bias away from the robot is shown on CX-0928C at 7321. (*See also* CX-0931C at 0923-24, Rogue images.) When the robot is positioned upside down, the biasing force pulls the proximal end of the arm thereby pushing the distal end of the arm (and the wheels) out from the robot's housing.

(CIB at 66.) In the reply brief, iRobot repeats "Respondents do not dispute that a spring extends between the wheel arm and wheel cover, they only dispute that the wheel cover is part of the chassis." (CRPB at 30.)

Respondents' Position

Similar to iRobot, much of Respondents' position on this limitation has been summarized above in the discussion of the wheel arm-chassis connection in the iLife Products—the wheel cover or plate in the Hoover Products cannot constitute "chassis" so that the wheel arm and, in this case, spring which attach to that cover or plate cannot be attached to "chassis" as required by the claim.

Regarding the spring in the Hoover Products, specifically, Respondents argue:

The evidence shows that none of the wheels of the X6 and Y1 products includes a spring extending between the arm and the robot chassis. (RX-2078C at Q114-117, 120, 121.) Instead, the spring of the X6 and Y1 products extends between the arm and a part on the wheel module. (*Id.*) Dr. Nikos admitted that the spring in the Hoover product is included in the wheel module. (Tr. at 207:6-11.) In the X6 product, the spring is contained within a recess of the wheel module cover. (*Id.* at 115-117.) In the Y1 product, the spring sits atop the wheel module and does not extend or connect to the chassis, which is positioned below. (*Id.* at Q120-121.)

(RRSB at 39.)

Analysis

As with the iLife Products discussed above, the relevant structure of the Hoover Products is not in dispute. In these robots, the spring is attached to the wheel arm on one end and to a tip

Public Version

of the wheel cover at the other end. (CX-0220C at Q459; CX-0153.) It is also clear the drive wheels are biased by this spring “to an extended position away from the robot chassis.” (CX-0220C at Q459; CX-0928 at 7321.) Having already found credible testimony supports treating the wheel module covers as “chassis,” I find the spring “extend[s] between the arm and the chassis” (claims 1, 17) and “connect[s] the [first/second] arm to the chassis” (claim 10). Thus, these limitations are met in the Hoover Products.

3. Direct Infringement by the SSSIT Product

For the reasons explained below, I find iRobot has shown by a preponderance of the evidence that the SSSIT Product meets the limitations of claims 1, 2, 3, 5, 7, 10, 17. Thus, iRobot has sufficiently shown that SSSIT directly infringes those apparatus claims, but, under the same reasoning as for the method claims of the '553 patent, iRobot has not shown SSSIT performs the steps of method claim 17 of the '090 patent for purposes of direct infringement.

a. Undisputed Claim Limitations

As reflected in the parties' post-hearing briefing, most of the '090 patent asserted claim limitations in the SSSIT Product are not in dispute. (*See, e.g.*, RRSB at 26-44.) These undisputed limitations, along with my findings, are summarized below.

Independent claim 1 requires, “[a] floor cleaning robot.” ('090 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the SSSIT Product is a robot which moves itself across a floor for cleaning purposes. (*See* CIB at 73 (citing CX-0220C at Q84-86, 545).) The limitation is met.

Claim 1 further requires, “a housing and a chassis.” ('090 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the SSSIT Product includes rigid structures which serve as a housing and a chassis. (*See* CIB at 73 (citing CX-0220C at Q88, 546).) The limitation is met.

Public Version

Claim 1 further requires, “a control module disposed within the housing and directing movement of the floor cleaning robot across the floor.” (’090 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the SSSIT Product includes a microcontroller that connects to both wheel motors and sensors to navigate the robot around a room. (See CIB at 73-74 (citing CX-0220C at Q90-91, 555).) The limitation is met.

Claim 1 further requires, “at least one sensor for detecting an obstacle and communicating obstacle information to the control module so that the control module can cause the floor cleaning robot to react to the obstacle.” (’090 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the SSSIT Product includes bump and proximity sensors to detect contacted obstacles and those at a distance, and, in response to this detection, the robot will change its movement. (See CIB at 74 (citing CX-0220C at Q92, 556-557).) The limitation is met.

Claim 1 further requires, “a removable bin disposed at least partially within the housing and configured to receive particulates.” (’090 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the SSSIT Product includes a bin which receives particulates swept or picked up from the floor surface, and can be removed by a user for emptying. (See CIB at 74 (citing CX-0220C at Q93, 558; CX-0347C at 107:8-108:1, 115:13-16).) The limitation is met.

Claim 1 further requires, “a first rotating member configured to direct particulates toward the bin.” (’090 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the SSSIT Product includes a main brush and side brushes which rotate and direct particulates from the floor surface into the bin. (See CIB at 74 (citing CX-0220C at Q94, 559).) The limitation is met.

Claim 1 further requires, “wherein, during cleaning, the weight of the floor cleaning robot overcomes a force from the spring biasing the wheels to an extended position.” (’090 patent at

Public Version

cl. 1.) I find credible and un rebutted testimony demonstrates the SSSIT Product includes wheels on pivotable arms which pivot in response to placing the robot on the ground—*i.e.*, pivoting as the result of the weight of the robot overcoming a spring. (*See* CIB at 75-76 (citing CX-0220C at Q89, 567).) The limitation is met.

Dependent claim 2 requires, “[t]he floor cleaning robot of claim 1, further comprising a second rotating member configured to cooperate with the first rotating member to direct particulates toward the bin.” (’090 patent at cl. 2.) I find credible and un rebutted testimony demonstrates the SSSIT Product includes a main brush and side brushes where each rotate and work together to get particulates into the bin. (*See* CIB at 76 (citing CX-0220C at Q94, 568).) The limitation is met.

Dependent claim 3 requires, “[t]he floor cleaning robot of claim 2, wherein the first rotating member contacts the floor and agitates particulates and directs the particulates toward the second rotating member.” (’090 patent at cl. 3.) I find credible and un rebutted testimony demonstrates the SSSIT Product include side brushes which contact the floor and direct particulates over to a main brush. (*See* CIB at 76 (citing CX-0220C at Q94, 569).) The limitation is met.

Dependent claim 5 requires, “[t]he floor cleaning robot of claim 1, further comprising an air moving system disposed at least partially within the housing and configured to ingest particulates and direct particulates toward the removable bin.” (’090 patent at cl. 5.) I find credible and un rebutted testimony demonstrates the SSSIT Product includes a vacuum device which sucks air and particulates into the bin. (*See* CIB at 76 (citing CX-0220C at Q95, 570; CX-0347 at 110:24-111:13, 107:8-108:1, 115:13-16).) The limitation is met.

Public Version

Dependent claim 7 requires, “[t]he floor cleaning robot of claim 5, wherein air moved by the air moving system passes through a filter before exiting the housing.” (’090 patent at cl. 7.) I find credible and un rebutted testimony demonstrates the SSSIT Product includes a filter as part of the vacuum device. (See CIB at 76 (citing CX-0220C at Q95, 571).) The limitation is met.

Independent claim 10 requires, “[a] floor cleaning robot.” (’090 patent at cl. 10.) I find credible and un rebutted testimony demonstrates the SSSIT Product meets this limitation for the same reasons discussed under claim 1, above.

Claim 10 further requires, “a housing and a chassis.” (’090 patent at cl. 10.) I find credible and un rebutted testimony demonstrates the SSSIT Product meets this limitation for the same reasons discussed under claim 1, above.

Claim 10 further requires, “at least one motor disposed at least partially within the housing and configured to drive the first and second wheels to move the floor cleaning robot across a floor.” (’090 patent at cl. 10.) I find credible and un rebutted testimony demonstrates the SSSIT Product meets this limitation for the same reasons discussed under claim 1, above.

Claim 10 further requires, “a control module disposed within the housing and directing movement of the floor cleaning robot across the floor.” (’090 patent at cl. 10.) I find credible and un rebutted testimony demonstrates the SSSIT Product meets this limitation for the same reasons discussed under claim 1, above.

Claim 10 further requires, “at least one sensor for detecting an obstacle and communicating obstacle information to the control module so that the control module can cause the floor cleaning robot to react to the obstacle.” (’090 patent at cl. 10.) I find credible and un rebutted testimony demonstrates the SSSIT Product meets this limitation for the same reasons discussed under claim 1, above.

Public Version

Claim 10 further requires, “a removable bin disposed at least partially within the housing and configured to receive particulates.” (’090 patent at cl. 10.) I find credible and unrebutted testimony demonstrates the SSSIT Product meets this limitation for the same reasons discussed under claim 1, above.

Claim 10 further requires, “a rotating brush configured to agitate particulates and direct particulates toward the removable bin.” (’090 patent at cl. 10.) I find credible and unrebutted testimony demonstrates the SSSIT Product meets this limitation for the same reasons discussed under claim 1, above.

Claim 10 further requires, “wherein, during cleaning, the weight of the floor cleaning robot overcomes a force from the first and second resilient members that biases the wheels to an extended position.” (’090 patent at cl. 10.) I find credible and unrebutted testimony demonstrates the SSSIT Product meets this limitation for the same reasons discussed under claim 1, above.

Independent claim 17 requires, “[a] method for directing particulates from a floor into a bin.” (’090 patent at cl. 17.) I find credible and unrebutted testimony demonstrates the SSSIT Product meets this limitation for the same reasons discussed under claim 1, above.

Claim 17 further requires, “allowing the weight of the cleaning robot to overcome the spring force biasing the wheels to an extended position when the cleaning robot is positioned for use.” (’090 patent at cl. 17.) I find credible and unrebutted testimony demonstrates the SSSIT Product meets this limitation for the same reasons discussed under claim 1, above.

Claim 17 further requires, “sensing obstacles.” (’090 patent at cl. 17.) I find credible and unrebutted testimony demonstrates the SSSIT meets this limitation for the same reasons discussed under claim 1, above.

Public Version

Claim 17 further requires, “causing the cleaning robot to avoid the sensed obstacles.” (’090 patent at cl. 17.) I find credible and un rebutted testimony demonstrates the SSSIT Product meets this limitation for the same reasons discussed under claim 1, above.

Claim 17 further requires, “agitating particulates from the floor and directing the particulates toward a removable bin of the cleaning robot.” (’090 patent at cl. 17.) I find credible and un rebutted testimony demonstrates the SSSIT Product meets this limitation for the same reasons discussed under claims 1-3, above.

Claim 17 further requires, “generating a negative pressure to direct agitated particulates toward the removable bin.” (’090 patent at cl. 17.) I find credible and un rebutted testimony demonstrates the SSSIT Product meets this limitation for the same reasons discussed under claim 5, above.

Claim 17 further requires, “holding particulates in the removable bin.” (’090 patent at cl. 17.) I find credible and un rebutted testimony demonstrates the SSSIT Product meets this limitation for the same reasons discussed under claim 1, above.

b. Disputed Claim Limitations Concerning an Arm Attached to Chassis

As presented above, claim 1 additionally requires, “wheels and at least one motor to drive the wheels disposed at least partially within the housing and configured to move the floor cleaning robot across a floor, each of the wheels being attached to the chassis via a respective arm having a distal end and a proximal end” and “wherein one of the wheels is rotatably attached to the distal end of each arm, and the proximal end of each arm is pivotably attached to the chassis.” (’090 patent at cl. 1.) Claim 10 similarly requires, “a first wheel and a first arm for attaching the first wheel to the chassis, the first arm having a proximal end pivotably attached to the chassis and a distal end to which the first wheel is rotatably mounted” and “a second wheel

Public Version

and a second arm for attaching the second wheel to the chassis, the second arm having a proximal end pivotably attached to the chassis and a distal end to which the second wheel is rotatably mounted.” (’090 patent at cl. 10.) Claim 17 similarly requires “driving wheels to move a cleaning robot across a floor, the wheels being attached to a chassis of the cleaning robot by a pivoting arm and being biased to an extended position by a spring extending between the arm and the chassis.” (’090 patent at cl. 17.) Respondents dispute that these limitations are met by the SSSIT Product.

iRobot’s Position

In its opening brief, iRobot takes the position that, as with the iLife and Hoover Products, much of these limitations is not in dispute. Specifically, iRobot claims it is not disputed that “[t]he BD2 product includes wheels and at least one motor to drive the wheels disposed at least partially within the housing and configured to move the floor cleaning robot across a floor” (CIB at 73 (citing CX-0220C at Q89, 547-554)) and the “[motorized] wheels attach to the chassis via an arm with a distal end (that connects to the wheels) and a proximal end (that rests in a recess of the chassis)” (*id.* (citing CX-0220C at Q89, 547-554)). I find sufficient evidence demonstrates the SSSIT Product has wheels attached to a chassis via an arm which has two ends.

The portion of these limitations which refer to an end of the arm being “pivotably attached to the chassis” however, is in dispute. iRobot claims “[t]he arm connects to the chassis via a recess in the chassis in which the arm rests, as seen in images of a BD2.” (*Id.* (citing CX-1038C at 7354-7355).) Beyond that already discussed with respect to the Hoover Products, iRobot’s reply brief adds that Respondents resistance to this limitation in the SSSIT Product is not supported by their expert who “offer[ed] no opinion on this limitation with respect to the

Public Version

BD2 product” and only discussed the spring-chassis attachment. (See CRPB at 31 (referring to RX-2078C at Q177-178).)

Respondents’ Position

Much of Respondents’ position on this limitation has been summarized above in the discussion of the wheel arm-chassis connection in the iLife and Hoover Products—the wheel cover or plate in the SSSIT robot cannot constitute “chassis” so that the wheel arm cannot be attached to “chassis” as required by the claim.

For the SSSIT Product specifically, Respondents argue “[t]he evidence shows that the BD2 Product does not have an arm with a distal or proximal end which attaches it to the chassis or connects to the wheel let alone pivotably attached to the chassis.” (RRSB at 37 (citing RX-2078C at Q180).) Respondents explain, “in the BD2 Product, the wheel and wheel arm are covered by a wheel module cover which is attached to the chassis” (*id.* (citing RX-2078C at Q180)) and, according to Respondents, that cover cannot be “intermediate pieces of the chassis” because it is a different material and serves a different purpose from the chassis—*i.e.*, “[t]he wheel arm does not connect to the chassis” (*id.* (citing Hr’g Tr. at 630:8-631:9).)

Analysis

As explained in the above section for the iLife and Hoover Products, I find the plain and ordinary meaning of the term “attached” allows for direct and indirect attachment. The structure of the SSSIT Product is not in dispute—a wheel module cover serves as an intermediate piece between the wheel arm and the structure which is indisputably chassis. This is an indirect attachment between the wheel arm and chassis in satisfaction of the claim. I also find the wheel module cover can be considered “chassis” by those in this art based on its structure and function. Thus, I find this limitation is met in the SSSIT Product.

Public Version

c. Disputed Claim Limitations Concerning a Spring and a Chassis

In addition to those limitations listed above, claim 1 requires, “wherein each wheel is biased to an extended position away from the robot chassis by a spring extending between the arm and the robot chassis.” (’090 patent at cl. 1.) Claim 10 similarly requires, “a first resilient member connecting the first arm to the chassis and biasing the distal end of the first arm and the first wheel to an extended position” and “a second resilient member connecting the second arm to the chassis and biasing the distal end of the second arm and the second wheel to an extended position.” (’090 patent at cl. 10.) Claim 17 similarly requires “driving wheels to move a cleaning robot across a floor, the wheels being attached to a chassis of the cleaning robot by a pivoting arm and being biased to an extended position by a spring extending between the arm and the chassis.” (’090 patent at cl. 17.) Respondents dispute that these limitations are met by the SSSIT Product.

iRobot’s Position

Much of iRobot’s position on this limitation has largely been summarized above in the discussion of the wheel arm-chassis connection in the iLife and Hoover Products—the wheel cover or plate in the SSSIT Product constitutes “chassis” so that the wheel arm and, in this case, spring which attach to that cover or plate are therefore attached to “chassis.” For the spring in particular, iRobot explains its view that “SSSIT disputes that this limitation is met because it does not consider the wheel cover to which the springs extend to be part of the robot’s chassis.” (CIB at 75.) iRobot reasons, however:

However, this wheel cover “attaches or integrates” the wheel arm, motor, and wheel, and when secured to the rest of the robot chassis, it serves as part of “the frame of the floor cleaning robot.” Accordingly, the wheel cover satisfies the construction for “chassis.” (See Order No. 27 at 10.)

(*Id.*)

Public Version

Respondents' Position

Similar to iRobot, much of Respondents' position on this limitation has been summarized above in the discussion of the wheel arm-chassis connection in the iLife and Hoover Products—the wheel cover or plate in the SSSIT Product cannot constitute “chassis” so that the wheel arm and, in this case, spring which attach to that cover or plate cannot be attached to “chassis” as required by the claim.

Regarding the spring in the SSSIT Product, specifically, Respondents argue:

The spring in the BD2 product is a compression-type spring that is positioned within the wheel assembly, above the wheel arm, and below the cover. (*Id.*) The spring does not connect to any object and also does not extend between the arm and the chassis. (*Id.*) Dr. Nikos admitted the spring in the BD2 product sits between the wheel module cover and the wheel arm. (Tr. at 207:25-208:11.)

(RRSB at 41-42.)

Analysis

As with the iLife and Hoover Products discussed above, the relevant structure of the SSSIT Product is not in dispute. In this robot, the spring is attached to the wheel arm on one end and to a tip of the wheel cover at the other end. (CX-0220C at Q562; CX-1038 at 7356.) It is also clear the drive wheels are biased by this spring “to an extended position away from the robot chassis.” (CX-0220C at Q562; CX-1038 at 7357.) Having already found credible testimony supports treating the wheel module covers as “chassis,” I find the spring “extend[s] between the arm and the chassis” (claims 1, 17) and “connect[s] the [first/second] arm to the chassis” (claim 10). Thus, these limitations are met in the SSSIT Product.

4. Direct Infringement by the bObi Products

For the reasons explained below, I find iRobot has shown by a preponderance of the evidence that bObi products meet the limitations of claims 1, 2, 3, 5, 7, 10, 17. Thus, iRobot has

Public Version

sufficiently shown that bObsweep directly infringes those apparatus claims, but, under the same reasoning as for the method claims of the '553 patent, iRobot has not shown bObsweep performs the steps of method claim 17 of the '090 patent for purposes of direct infringement.

a. Undisputed Claim Limitations

As reflected in the parties' post-hearing briefing, most of the '090 patent asserted claim limitations in the bObsweep Products are not in dispute. (*See, e.g.*, RRSB at 26-44.) These undisputed limitations, along with my findings, are summarized below.

Independent claim 1 requires, “[a] floor cleaning robot.” ('090 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the bObi products are robots which move themselves across a floor for cleaning purposes. (*See* CIB at 68 (citing CX-0220C at Q60-62, 494; CX-0347C at 76:20-25).) The limitation is met.

Claim 1 further requires, “a housing and a chassis.” ('090 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the bObi products include rigid structures which serve as a housing and a chassis. (*See* CIB at 68 (citing CX-0220C at Q63, 495; CX-0347C at 71:6-74:15).) The limitation is met.

Claim 1 further requires, “a control module disposed within the housing and directing movement of the floor cleaning robot across the floor.” ('090 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the bObi products include a microcontroller that connects to both wheel motors and sensors to navigate the robots around a room. (*See* CIB at 69 (citing CX-0220C at Q65, 503; CX-0329C at 98:19-21; CX-0296C at 139:5-11).) The limitation is met.

Claim 1 further requires, “at least one sensor for detecting an obstacle and communicating obstacle information to the control module so that the control module can cause the floor cleaning robot to react to the obstacle.” ('090 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the bObi products include bump and proximity sensors to

Public Version

detect contacted obstacles and those at a distance, and, in response to this detection, the robot will change its movement. (*See* CIB at 69 (citing CX-0220C at Q65-67, 504-505).) The limitation is met.

Claim 1 further requires, “a removable bin disposed at least partially within the housing and configured to receive particulates.” (’090 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the bObi products include a bin which receives particulates swept or picked up from the floor surface, and can be removed by a user for emptying. (*See* CIB at 69 (citing CX-0220C at Q68, 506).) The limitation is met.

Claim 1 further requires, “a first rotating member configured to direct particulates toward the bin.” (’090 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the bObi products include a main brush and a side brush which rotate and direct particulates from the floor surface into the bin. (*See* CIB at 69 (citing CX-0220C at Q69, 507).) The limitation is met.

Claim 1 further requires, “wherein, during cleaning, the weight of the floor cleaning robot overcomes a force from the spring biasing the wheels to an extended position.” (’090 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the bObi products include wheels on pivotable arms which do pivot in response to placing the robot on the ground—where that pivoting is the result of the weight of the robot overcoming a spring. (*See* CIB at 71 (citing CX-0220C at Q34, 513).) The limitation is met.

Dependent claim 2 requires, “[t]he floor cleaning robot of claim 1, further comprising a second rotating member configured to cooperate with the first rotating member to direct particulates toward the bin.” (’090 patent at cl. 2.) I find credible and un rebutted testimony demonstrates the bObi products include a main brush and a side brush where each rotate and

Public Version

work together to get particulates into the bin. (*See* CIB at 71 (citing CX-0220C at Q69, 514; CX-0347C at 86:22-91:20).) The limitation is met.

Dependent claim 3 requires, “[t]he floor cleaning robot of claim 2, wherein the first rotating member contacts the floor and agitates particulates and directs the particulates toward the second rotating member.” (’090 patent at cl. 3.) I find credible and un rebutted testimony demonstrates the bObi products include a side brush which contacts the floor and directs particulates over to a main brush. (*See* CIB at 71 (citing CX-0220C at Q69, 515; CX-0347C at 86:22-91:20).) The limitation is met.

Dependent claim 5 requires, “[t]he floor cleaning robot of claim 1, further comprising an air moving system disposed at least partially within the housing and configured to ingest particulates and direct particulates toward the removable bin.” (’090 patent at cl. 5.) I find credible and un rebutted testimony demonstrates the bObi products include a vacuum device which sucks air and particulates into the bin. (*See* CIB at 71-72 (citing CX-0220C at Q70, 516; CX-0347C at 75:13-76:16, 86:7-87:21).) The limitation is met.

Dependent claim 7 requires, “[t]he floor cleaning robot of claim 5, wherein air moved by the air moving system passes through a filter before exiting the housing.” (’090 patent at cl. 7.) I find credible and un rebutted testimony demonstrates the bObi products include a filter as part of the vacuum device. (*See* CIB at 72 (citing CX-0220C at Q70, 517; CX-0347C at 87:6-15).) The limitation is met.

Independent claim 10 requires, “[a] floor cleaning robot.” (’090 patent at cl. 10.) I find credible and un rebutted testimony demonstrates the bObi products meet this limitation for the same reasons discussed under claim 1, above.

Public Version

Claim 10 further requires, “a housing and a chassis.” (’090 patent at cl. 10.) I find credible and un rebutted testimony demonstrates the bObi products meet this limitation for the same reasons discussed under claim 1, above.

Claim 10 further requires, “at least one motor disposed at least partially within the housing and configured to drive the first and second wheels to move the floor cleaning robot across a floor.” (’090 patent at cl. 10.) I find credible and un rebutted testimony demonstrates the bObi products meet this limitation for the same reasons discussed under claim 1, above.

Claim 10 further requires, “a control module disposed within the housing and directing movement of the floor cleaning robot across the floor.” (’090 patent at cl. 10.) I find credible and un rebutted testimony demonstrates the bObi products meet this limitation for the same reasons discussed under claim 1, above.

Claim 10 further requires, “at least one sensor for detecting an obstacle and communicating obstacle information to the control module so that the control module can cause the floor cleaning robot to react to the obstacle.” (’090 patent at cl. 10.) I find credible and un rebutted testimony demonstrates the bObi products meet this limitation for the same reasons discussed under claim 1, above.

Claim 10 further requires, “a removable bin disposed at least partially within the housing and configured to receive particulates.” (’090 patent at cl. 10.) I find credible and un rebutted testimony demonstrates the bObi products meet this limitation for the same reasons discussed under claim 1, above.

Claim 10 further requires, “a rotating brush configured to agitate particulates and direct particulates toward the removable bin.” (’090 patent at cl. 10.) I find credible and un rebutted

Public Version

testimony demonstrates the bObi products meet this limitation for the same reasons discussed under claim 1, above.

Claim 10 further requires, “wherein, during cleaning, the weight of the floor cleaning robot overcomes a force from the first and second resilient members that biases the wheels to an extended position.” (’090 patent at cl. 10.) I find credible and un rebutted testimony demonstrates the bObi products meet this limitation for the same reasons discussed under claim 1, above.

Independent claim 17 requires, “[a] method for directing particulates from a floor into a bin.” (’090 patent at cl. 17.) I find credible and un rebutted testimony demonstrates the bObi products meet this limitation for the same reasons discussed under claim 1, above.

Claim 17 further requires, “allowing the weight of the cleaning robot to overcome the spring force biasing the wheels to an extended position when the cleaning robot is positioned for use.” (’090 patent at cl. 17.) I find credible and un rebutted testimony demonstrates the bObi products meet this limitation for the same reasons discussed under claim 1, above.

Claim 17 further requires, “sensing obstacles.” (’090 patent at cl. 17.) I find credible and un rebutted testimony demonstrates the bObi products meet this limitation for the same reasons discussed under claim 1, above.

Claim 17 further requires, “causing the cleaning robot to avoid the sensed obstacles.” (’090 patent at cl. 17.) I find credible and un rebutted testimony demonstrates the bObi products meet this limitation for the same reasons discussed under claim 1, above.

Claim 17 further requires, “agitating particulates from the floor and directing the particulates toward a removable bin of the cleaning robot.” (’090 patent at cl. 17.) I find

Public Version

credible and un rebutted testimony demonstrates the bObi products meet this limitation for the same reasons discussed under claims 1-3, above.

Claim 17 further requires, “generating a negative pressure to direct agitated particulates toward the removable bin.” (’090 patent at cl. 17.) I find credible and un rebutted testimony demonstrates the bObi products meet this limitation for the same reasons discussed under claim 5, above.

Claim 17 further requires, “holding particulates in the removable bin.” (’090 patent at cl. 17.) I find credible and un rebutted testimony demonstrates the bObi products meet this limitation for the same reasons discussed under claim 1, above.

b. Disputed Claim Limitations Concerning an Arm Attached to Chassis

As presented above, claim 1 additionally requires, “wheels and at least one motor to drive the wheels disposed at least partially within the housing and configured to move the floor cleaning robot across a floor, each of the wheels being attached to the chassis via a respective arm having a distal end and a proximal end” and “wherein one of the wheels is rotatably attached to the distal end of each arm, and the proximal end of each arm is pivotably attached to the chassis.” (’090 patent at cl. 1.) Claim 10 similarly requires, “a first wheel and a first arm for attaching the first wheel to the chassis, the first arm having a proximal end pivotably attached to the chassis and a distal end to which the first wheel is rotatably mounted” and “a second wheel and a second arm for attaching the second wheel to the chassis, the second arm having a proximal end pivotably attached to the chassis and a distal end to which the second wheel is rotatably mounted.” (’090 patent at cl. 10.) Claim 17 similarly requires “driving wheels to move a cleaning robot across a floor, the wheels being attached to a chassis of the cleaning robot by a pivoting arm and being biased to an extended position by a spring extending between the arm

Public Version

and the chassis.” (’090 patent at cl. 17.) Respondents dispute that these limitations are met by the bObi products.

iRobot’s Position

In its opening brief, iRobot takes the position that, as with the previous accused products, much of these limitations are not in dispute. Specifically, iRobot claims it is not disputed that “[t]he bObi Products include wheels and at least one motor to drive the wheels disposed at least partially within the housing and configured to move the floor cleaning robot across a floor” (CIB at 68 (citing CX-0220C at Q64, 496-502; CX-0347C at 77:1-82:7)) and the “[motorized] wheels connect to the chassis via an arm with a distal end (that connects to the wheels) and a proximal end (that connects to a wheel plate that is part of the chassis)” (*id.* (citing CX-0165C; CX-0166C; CX-0167C)). I find sufficient evidence demonstrates the bObi products have wheels attached to a chassis via an arm which has two ends.

The portion of these limitations which refer to an end of the arm being “pivotably attached to the chassis” however, is in dispute. As outlined above, iRobot understands that Respondents dispute this feature “because they contend the wheel cover to which the arm attaches is not part of the chassis.” (CIB at 70.) Specifically, for the bObi products, iRobot describes how “the arm connects to the chassis via a plate that is part of the chassis when secured to the rest of the robot.” (*Id.* (citing CX-0167C; CX-0168).) iRobot reasons:

The plate “attache[s] or integrate[s]” the wheel arm, motor, and wheel, and when bolted to the rest of the robot chassis, it is part of “the frame of the floor cleaning robot.” Accordingly, the plate satisfies the construction for “chassis.” (*See* Order No. 27 at 10.)

(*Id.*)

Public Version

Respondents' Position

Much of Respondents' position on this limitation has been summarized above in the discussion of the wheel arm-chassis connection in the previous accused products—the wheel cover or plate in the bObi products cannot constitute “chassis” so that the wheel arm cannot be attached to “chassis” as required by the claim.

For the bObi products specifically, Respondents argue “[t]he evidence shows that the D6 Product does not have an arm with a distal or proximal end which attaches it to the chassis or connects to the wheel.” (RRSB at 36 (citing RX-2078C at Q143, 146-151, 154).) Respondents explain:

The D6 Product includes wheel modules on the right and left sides of the robot. (*Id.* at Q144.) The wheel modules include a plate, a motor casing/shell of gear box, a wheel arm and a wheel. (*Id.* at Q147.) It is the plate which attaches the wheel module to the chassis, not the wheel or the wheel arm. (*Id.* at Q147.) The plate is not an intermediate piece of the chassis because it is made of different materials and serves different purposes from the chassis. (Tr. at 630:8-631:9.)

(*Id.*)

Analysis

As explained in the above section for the iLife, Hoover, and SSSIT Product, I find the plain and ordinary meaning of the term “attached” allows for direct and indirect attachment. The structure of the bObi products is not in dispute—a plate serves as an intermediate piece between the wheel arm and the structure which is indisputably chassis. This is an indirect attachment between the wheel arm and chassis in satisfaction of the claim. I also find the plate can be considered “chassis” by those in this art based on its structure and function. Thus, I find this limitation is met in the bObi products.

Public Version

c. Disputed Claim Limitations Concerning a Spring and a Chassis

In addition to those limitations listed above, claim 1 requires, “wherein each wheel is biased to an extended position away from the robot chassis by a spring extending between the arm and the robot chassis.” (’090 patent at cl. 1.) Claim 10 similarly requires, “a first resilient member connecting the first arm to the chassis and biasing the distal end of the first arm and the first wheel to an extended position” and “a second resilient member connecting the second arm to the chassis and biasing the distal end of the second arm and the second wheel to an extended position.” (’090 patent at cl. 10.) Claim 17 similarly requires “driving wheels to move a cleaning robot across a floor, the wheels being attached to a chassis of the cleaning robot by a pivoting arm and being biased to an extended position by a spring extending between the arm and the chassis.” (’090 patent at cl. 17.) Respondents dispute that these limitations are met by the bObi products.

iRobot’s Position

Much of iRobot’s position on this limitation has largely been summarized above in the discussion of the wheel arm-chassis connection in the previous accused products—the wheel cover or plate in these robots constitutes “chassis” so that the wheel arm and, in this case, spring which attach to that cover or plate are therefore attached to “chassis.” For the spring of the bObi products in particular, iRobot argues “the wheel-biasing spring connects on one end to the wheel arm and on the other end to the wheel plate, which is part of the robot chassis when secured to the rest of the robot.” (CIB at 70 (citing CX-0165C).)

Respondents’ Position

Similar to iRobot, much of Respondents’ position on this limitation has been summarized above in the discussion of the wheel arm-chassis connection in the previous accused products—

Public Version

the wheel cover or plate in these robots cannot constitute “chassis” so that the wheel arm and, in this case, spring which attach to that cover or plate cannot be attached to “chassis” as required by the claim.

Regarding the spring in the bObi products, specifically, Respondents argue:

Rather, the spring in the D6 product is contained within a recess of the wheel module, and does not extend to the chassis. (*Id.* at Q158-160.) Dr. Nikos conceded that the spring of the D6 Product is contained within the wheel module. (Tr. at 208:21-209:9.)

(RRSB at 40.)

Analysis

As with the iLife, Hoover, and SSSIT Product discussed above, the relevant structure of the bObi products is not in dispute. In these robots, the spring is attached to the wheel arm on one end and to a tip of the wheel cover or plate at the other end. (CX-0220C at Q510; CX-0165.) It is also clear the drive wheels are biased by this spring “to an extended position away from the robot chassis.” (CX-0220C at Q510; CX-0832 at 7410.) Having already found credible testimony supports treating the wheel module covers and plates as “chassis,” I find the spring “extend[s] between the arm and the chassis” (claims 1, 17) and “connect[s] the [first/second] arm to the chassis” (claim 10). Thus, these limitations are met in the bObi products.

5. Indirect Infringement

As noted in the prior indirect infringement sections, iRobot’s inducement and contributory infringement theories are generalized to encompass asserted claim under every asserted patent, for every accused product. (*See generally* CIB at 103-108; CRPB at 44.) Thus, there is no theory specific to the ’090 patent and all of the argument captured in the above ’553 and ’490 patent indirect infringement sections is considered to apply here.

Public Version

My analysis of that evidence also applies here. Specifically, I do not find iRobot has sufficiently shown knowledge of the '090 patent and its infringement by any of the respondents. The closest respondent to that knowledge would be SSSIT, but they do not appear to have a relationship with end users (*i.e.*, the direct infringers) here in the U.S.

Thus, it is my determination that iRobot has not shown indirect infringement of the '090 patent.

E. Domestic Industry - Technical Prong

iRobot alleges the iRobot Products practice claims 1, 2, 3, 4, 10, 17 of the '090 patent. (CIB at 77-82.) The dispute over whether iRobot has met the technical prong for the '090 patent mirrors the infringement issues. (*See* CIB at 79; RRSB at 44-46.) My limitation-by-limitation findings are presented below. I find iRobot has satisfied the technical prong for these claims.

a. Undisputed Claim Limitations

Independent claim 1 requires, “[a] floor cleaning robot.” ('090 patent at cl. 1.) I find credible and unrebutted testimony demonstrates the iRobot Products are floor cleaning robots that use intelligence to navigate a space. (*See* CIB at 77 (citing CX-0220C at Q96, 599).) The limitation is met.

Claim 1 further requires, “a housing and a chassis.” ('090 patent at cl. 1.) I find credible and unrebutted testimony demonstrates the iRobot Products include a housing which forms a peripheral structure that covers and protects internal components, and a rigid structure within that housing that serves as a chassis. (*See* CIB at 77-78 (citing CX-0220C at Q97, 600).) The limitation is met.

Claim 1 further requires, “a control module disposed within the housing and directing movement of the floor cleaning robot across the floor.” ('090 patent at cl. 1.) I find credible and unrebutted testimony demonstrates the iRobot Products include a microcontroller in

Public Version

communication with sensors and the motors which control the wheels of the robot. (*See* CIB at 78 (citing CX-0220C at Q99, 604).) The limitation is met.

Claim 1 further requires, “at least one sensor for detecting an obstacle and communicating obstacle information to the control module so that the control module can cause the floor cleaning robot to react to the obstacle.” (’090 patent at cl. 1.) I find credible and unrebutted testimony demonstrates the iRobot Products include at least proximity and bump (*i.e.*, contact) sensors to detect obstacles which the controller uses to navigate the robot. (*See* CIB at 78 (citing CX-0220C at Q99-103, 605).) The limitation is met.

Claim 1 further requires, “a removable bin disposed at least partially within the housing and configured to receive particulates.” (’090 patent at cl. 1.) I find credible and unrebutted testimony demonstrates the iRobot Products include a bin which is a particulate receptacle and located on the underside of the robot and within the housing. (*See* CIB at 78 (citing CX-0220C at Q104, 606).) The limitation is met.

Claim 1 further requires, “a first rotating member configured to direct particulates toward the bin.” (’090 patent at cl. 1.) I find credible and unrebutted testimony demonstrates the iRobot Products include a central main brush(es) and side brushes which all rotate and direct particulates toward the bin on the underside of the robot. (*See* CIB at 78-79 (citing CX-0220C at Q105-108, 607).) The limitation is met.

Claim 1 further requires, “wherein, during cleaning, the weight of the floor cleaning robot overcomes a force from the spring biasing the wheels to an extended position.” (’090 patent at cl. 1.) I find credible and unrebutted testimony demonstrates the iRobot Products, when placed on the ground, will cause the wheel arm to rotate against the force of its spring, which in turn

Public Version

moves the wheel located at the end of the arm closer to the housing. (*See* CIB at 80 (citing CX-0220C at Q98, 613-615).) The limitation is met.

Dependent claim 2 requires, “[t]he floor cleaning robot of claim 1, further comprising a second rotating member configured to cooperate with the first rotating member to direct particulates toward the bin.” (’090 patent at cl. 2.) I find credible and un rebutted testimony demonstrates the iRobot Products include a rotating side brush that drives particulates and debris towards the more central main brush(es), which then move the particulates into an adjacent bin. (*See* CIB at 80 (citing CX-0220C at Q105-108, 617).) The limitation is met.

Dependent claim 3 requires, “[t]he floor cleaning robot of claim 2, wherein the first rotating member contacts the floor and agitates particulates and directs the particulates toward the second rotating member.” (’090 patent at cl. 3.) As mentioned for claim 2, I find credible and un rebutted testimony demonstrates the iRobot Products include a rotating side brush that drives particulates and debris towards the more central main brush(es), which then move the particulates into an adjacent bin. (*See* CIB at 80-81 (citing CX-0220C at Q105-108, 618).) The limitation is met.

Dependent claim 4 requires, “[t]he floor cleaning robot of claim 3, wherein the second rotating member is positioned to receive particulates from the first rotating member and direct the particulates toward the removable bin.” (’090 patent at cl. 4.) Again, as mentioned, I find credible and un rebutted testimony demonstrates the iRobot Products include a rotating side brush that drives particulates and debris towards the more central main brush(es), which then move the particulates into an adjacent bin. (*See* CIB at 81 (citing CX-0220C at Q105-108, 619).) The limitation is met.

Public Version

Independent claim 10 requires, “[a] floor cleaning robot.” (’090 patent at cl. 10.) I find credible and un rebutted testimony shows the iRobot Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 10 further requires, “a housing and a chassis.” (’090 patent at cl. 10.) I find credible and un rebutted testimony shows the iRobot Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 10 further requires, “at least one motor disposed at least partially within the housing and configured to drive the first and second wheels to move the floor cleaning robot across a floor.” (’090 patent at cl. 10.) I find credible and un rebutted testimony shows the iRobot Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 10 further requires, “a control module disposed within the housing and directing movement of the floor cleaning robot across the floor.” (’090 patent at cl. 10.) I find credible and un rebutted testimony shows the iRobot Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 10 further requires, “at least one sensor for detecting an obstacle and communicating obstacle information to the control module so that the control module can cause the floor cleaning robot to react to the obstacle.” (’090 patent at cl. 10.) I find credible and un rebutted testimony shows the iRobot Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 10 further requires, “a removable bin disposed at least partially within the housing and configured to receive particulates.” (’090 patent at cl. 10.) I find credible and un rebutted testimony shows the iRobot Products meet this limitation for the same reasons discussed under claim 1, above.

Public Version

Claim 10 further requires, “a rotating brush configured to agitate particulates and direct particulates toward the removable bin.” (’090 patent at cl. 10.) I find credible and un rebutted testimony shows the iRobot Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 10 further requires, “wherein, during cleaning, the weight of the floor cleaning robot overcomes a force from the first and second resilient members that biases the wheels to an extended position.” (’090 patent at cl. 10.) I find credible and un rebutted testimony shows the iRobot Products meet this limitation for the same reasons discussed under claim 1, above.

Independent claim 17 requires, “[a] method for directing particulates from a floor into a bin.” (’090 patent at cl. 17.) I find credible and un rebutted testimony shows the iRobot Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 17 further requires, “allowing the weight of the cleaning robot to overcome the spring force biasing the wheels to an extended position when the cleaning robot is positioned for use.” (’090 patent at cl. 17.) I find credible and un rebutted testimony shows the iRobot Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 17 further requires, “sensing obstacles.” (’090 patent at cl. 17.) I find credible and un rebutted testimony shows the iRobot Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 17 further requires, “causing the cleaning robot to avoid the sensed obstacles.” (’090 patent at cl. 17.) I find credible and un rebutted testimony shows the iRobot Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 17 further requires, “agitating particulates from the floor and directing the particulates toward a removable bin of the cleaning robot.” (’090 patent at cl. 17.) I find

Public Version

credible and un rebutted testimony shows the iRobot Products meet this limitation for the same reasons discussed under claims 1, 2, and 3, above.

Claim 17 further requires, “generating a negative pressure to direct agitated particulates toward the removable bin.” (’090 patent at cl. 17.) I find credible and un rebutted testimony demonstrates the iRobot Products include vacuums which generate negative pressure to assist in moving particulates into the bins. (*See* CIB at 82 (citing CX-0220C at Q104)¹⁸.) The limitation is met.

Claim 17 further requires, “holding particulates in the removable bin.” (’090 patent at cl. 17.) I find credible and un rebutted testimony shows the iRobot Products meet this limitation for the same reasons discussed under claim 1, above.

b. Disputed Claim Limitations Concerning an Arm Attached to Chassis

In addition to those limitations listed above, claim 1 requires, “wheels and at least one motor to drive the wheels disposed at least partially within the housing and configured to move the floor cleaning robot across a floor, each of the wheels being attached to the chassis via a respective arm having a distal end and a proximal end.” (’090 patent at cl. 1.) Claim 10 similarly requires, “a first wheel and a first arm for attaching the first wheel to the chassis, the first arm having a proximal end pivotably attached to the chassis and a distal end to which the first wheel is rotatably mounted” and “a second wheel and a second arm for attaching the second wheel to the chassis, the second arm having a proximal end pivotably attached to the chassis and a distal end to which the second wheel is rotatably mounted.” (’090 patent at cl. 10.) Claim 17 similarly requires “driving wheels to move a cleaning robot across a floor, the wheels being

¹⁸ I note iRobot does not cite to Q642—where the actual opinion that the limitation is met—because it is mistakenly incorporates by reference testimony on claim 5 which does not exist. (*See* CX-0220C at Q642.)

Public Version

attached to a chassis of the cleaning robot by a pivoting arm and being biased to an extended position by a spring extending between the arm and the chassis.” (’090 patent at cl. 17.)

Respondents dispute that these limitations are met by the iRobot Products.¹⁹

iRobot’s Position

In its opening brief, iRobot argues the limitation is met (*id.* at 79 (citing CX-0220C at Q98, 608-612)) and criticizes Respondents’ expert for holding a contrary opinion even though he “neither inspected nor disassembled a single DI Product because, even though he asked for one, he was informed that ‘there wasn’t one available’” (*id.* (citing Hr’g Tr. at 474:8-11)). iRobot uses annotated photographs of the wheel modules to show how:

[T]he arm connects to the chassis via the cover of a wheel module that is part of the chassis when secured to the rest of the robot. The wheel module cover “attaches or integrates” the wheel arm, motor, and wheel, and when bolted to the rest of the robot chassis, it is part of “frame of the floor cleaning robot.”

(*Id.*)

In its reply brief, iRobot challenges Respondents’ assertion that “wheel covers and plates are not chassis ‘because they are made of different materials and serve different purposes from the chassis.’” (CRPB at 25 (citing RRSB at 32, 35, 37, 46).) iRobot claims this argument is untimely based on pre-hearing materials and otherwise “has no analytical underpinning.” (*Id.*) iRobot disputes that its own discussion of “function” is somehow a new equivalents theory (*id.* (referring to RRSB at 28; Hr’g Tr. at 386:17-387:4; Order No. 27 at 10)), and notes that Respondents claim the wheel modules and plates have different purposes than a chassis but don’t explain what those purposes are (*id.*). For the iRobot Products in particular, iRobot claims the

¹⁹ While iRobot considers “wheels being attached to the chassis,” as part of its limitation ’090-1[B], as undisputed (*see* CIB at 78)—I give the benefit of the doubt to Respondents and consider that limitation to be disputed in the same way as the arm/spring-chassis attachment which is more explicit (*see* RRSB at 44-46).

Public Version

product manuals which identify a “chassis” piece weren’t drafted with my claim construction in mind and “has no bearing on whether the cover of iRobot’s wheel modules satisfies the construction.” (*Id.* at 26.) Similarly, iRobot claims its 2002 design, which is not relied on for domestic industry, is irrelevant. (*Id.*; *see id.* at 31-32.) iRobot adds that Respondents’ own expert admitted a “chassis” may be more than one piece (*id.* at 27 (citing Hr’g Tr. at 386:17-387:4)) and the ’090 patent’s specification discusses wheel wells as part of the chassis (*id.* (citing ’090 patent at 5:53-63)).

Respondents’ Position

Respondents begin their dispute over these limitations with a comparison to a 2002 Roomba model where the “pivot-arms were attached to the chassis, and the springs extended between the arms and the chassis” in satisfaction of the claim. (RRSB at 44 (citing Hr’g Tr. at 101:2-10; RX-2088C at Q124).) Respondents explain that when the design changed with the “R3 version of the Roomba,” and moved to replaceable wheel assemblies, the satisfaction was lost. (*Id.* (citing RX-2048C at 146:7-15, 148:3-17).) Essentially, as in the present iRobot Products, Respondents contend there are “stand-alone wheel modules to which the spring is attached and the arm is pivotably attached. . . . The spring and the wheel arm of the stand-alone wheel modules are not connected to the chassis.” (*Id.* at 45 (citing Hr’g Tr. at 183:4-184:11, 187:6-8).) Respondents conclude with “the cover of a wheel module is not an intermediate piece of the chassis because it is made of different materials and serves different purposes from the chassis.” (*Id.* at 46 (citing Hr’g Tr. at 630:8-631:9).)

Analysis

As explained in the above section for the accused products, I find the plain and ordinary meaning of the term “attached” allows for direct and indirect attachment. The structure of the

Public Version

iRobot Products is not in dispute—a wheel module cover as an intermediate piece between the wheel arm and the structure which is indisputably chassis. This is an indirect attachment between the wheel arm and chassis in satisfaction of the claim. I also find the cover can be considered “chassis” by those in this art based on its structure and function. Thus, I find this limitation is met in the iRobot Products.

c. Disputed Claim Limitations Concerning a Spring and a Chassis

In addition to those limitations listed above, claim 1 requires, “wherein each wheel is biased to an extended position away from the robot chassis by a spring extending between the arm and the robot chassis.” (’090 patent at cl. 1.) Claim 10 similarly requires, “a first resilient member connecting the first arm to the chassis and biasing the distal end of the first arm and the first wheel to an extended position” and “a second resilient member connecting the second arm to the chassis and biasing the distal end of the second arm and the second wheel to an extended position.” (’090 patent at cl. 10.) Claim 17 similarly requires “driving wheels to move a cleaning robot across a floor, the wheels being attached to a chassis of the cleaning robot by a pivoting arm and being biased to an extended position by a spring extending between the arm and the chassis.” (’090 patent at cl. 17.)

iRobot’s and Respondents’ contentions on these limitations largely mirror their contentions on the previous disputed limitation, and for the accused products. Neither party disputes that the spring is attached to a wheel module cover or plate in the iRobot Products. Rather the parties dispute whether that wheel module cover or plate qualifies as “chassis.” (*See* CIB at 80; RRSB at 44-46; CRPB at 25-27, 31-32.)

Public Version

Under the same reasoning as above, I find the iRobot Products' use of wheel modules do not bar practicing of these limitations in claim 1, 10, and 17. Accordingly, I find iRobot has shown by a preponderance of the evidence that the limitation is met in the iRobot Products.

F. Validity

Respondents' initial post-hearing brief identifies the following invalidity theories against the asserted claims of the '090 patent:

Claims	Theory
1, 5, 7, 10, 17	Anticipated by Allen
1, 5, 7, 10, 17	Rendered obvious by Allen
2, 3, 4	Rendered obvious by Allen in light of Soupert
1, 5, 7, 10, 17	Rendered obvious by Haegermarck in light of combinations of Kirkpatrick and removable bins
2, 3, 4	Rendered obvious by Haegermarck in light of combinations of Kirkpatrick, Tangenberg, and removable bins

1. Alleged Prior Art

Respondents allege the "Allen" reference, U.S. Patent No. 5,995,884 (RX-0080) is prior art to the '090 patent because it "issued in 1999." (RIB at 57.) iRobot does not contest the prior art status of Allen and I find it qualifies, at least, as prior art under § 102(b).

Respondents' invalidity case also uses U.S. Patent No. 5,341,540 ("Soupert") (RIB at 71 (citing RX-0089)), but Respondents do not identify why Soupert is prior art to the '090 patent. (See RIB at 54-85.) I find Soupert was published on August 30, 1994. (RX-0089.) Compared to

Public Version

a priority date of December 16, 2002 for the '090 patent (RIB at 6), I find Soupert qualifies as prior art under § 102(b).

Respondents' invalidity case also uses patent application WO 00/38026 ("Bisset") (RIB at 70 (citing RX-0081)), but Respondents do not identify why Bisset is prior art to the '090 patent. (See RIB at 54-85.) I find Bisset was published on June 29, 2000. (RX-0081.) Compared to a priority date of December 16, 2002 for the '090 patent (RIB at 6), I find Bisset qualifies as prior art under § 102(b).

Respondents' invalidity case also uses patent application WO 99/28800 ("Colens 2") (RIB at 71), but Respondents do not identify why Colens 2 is prior art to the '090 patent. (See *id.* at 54-85.) I find Colens 2 was published on June 10, 1999. (RX-0079.) Compared to a priority date of December 16, 2002 for the '090 patent (RIB at 6), I find Colens 2 qualifies as prior art under § 102(b).

Respondents' invalidity case also uses a magazine entitled "Radio Control Car Action" (RX-2100). (See, e.g., RIB at 65.) Respondents do not identify why this magazine is prior art to the '090 patent. (See RIB at 54-85.) I find Radio Control Car Action has an issue date of March 1991. (See RX-2100.) Compared to a priority date of December 16, 2002 for the '090 patent (RIB at 6), I find Radio Control Car Action qualifies as prior art under § 102(b).

Respondents next allege the "Haegermarck" reference, number WO 02/067744 (RX-0082) is prior art to the '090 patent because it "was published on September 6, 2002." (RIB at 73.) iRobot does not contest the prior art status of Haegermarck and I find it qualifies, at least, as prior art under § 102(e).

Respondents next allege the "Kirkpatrick" reference, U.S. Patent No. 6,481,515 (RX-0083) is prior art to the '090 patent because it "was published on November 19, 2002." (RIB at

Public Version

74.) iRobot does not contest the prior art status of Kirkpatrick and I find it qualifies, at least, as prior art under § 102(e).

Respondents also draw upon the Tangenberg reference, U.S. Patent No. 500,974 (RX-0090) as prior art against the '090 patent. (RIB at 82-84.) Based on its publication date of July 4, 1893, I find Tangenberg qualifies as prior art under § 102(b).

2. 35 U.S.C. § 102

In its opening brief, Respondents contend claims 1, 5, 7, 10, and 17 of the '090 patent are anticipated by the Allen reference. (*See* RIB at 58-69.) For the reason discussed below, I do not find these claims are anticipated by Allen.

a. Claim 1

Independent claim 1 requires, “[a] floor cleaning robot.” ('090 patent at cl. 1.) Respondents identify a dispute over this limitation because, in their view, “iRobot posits that because the ‘higher level navigation and control functions’ of Allen are computed on an external computer, rather than on the ‘vehicle’ that actually drives around and cleans the room, it is not a ‘robot.’” (RIB at 58 (citing CPB at 91).) Respondents argue this is incorrect because: Allen describes itself as a robot (*id.* (citing RX-0080 at 3:9-10, 48:60-61)); it contains an onboard control system with pre-programmed command sequences (*id.* (citing RX-2082C at Q186)); other well known robots operate in similar ways (*id.* at 58-59 (citing Hr’g Tr. at 416:7-417:11)); and iRobot’s expert admits robots can be remote controlled or “telerobotic” (*id.* at 59 (citing Hr’g Tr. at 808:19-809:7, 809:8-810:8)).

Respondents further argue Allen “discloses cleaning robots with fully onboard control systems, even though it describes them as undesirably expensive.” (*Id.* (citing RX-0080 at 1:22-38).) Respondents argue this “provides a separate and independent reason to find that Allen

Public Version

discloses the limitation” under *Celeritas Techs. Ltd. v. Rockwell Int’l Corp.*, 150 F.3d 1354, 1360 (Fed. Cir. 1998). (*Id.*)

In its responsive brief, iRobot argues “Allen’s mobile vehicle 1 alone is not ‘a floor cleaning robot.’” (CRSB at 44.) Rather, iRobot explains, Allen is an “automatic guided vehicle” or “AGV,” which, according to Allen, is a sort of “computer peripheral device in a home or office environment already equipped with a computer.” (*Id.* (citing RX-0080 at 1:7-10; CX-1824C at Q71).) iRobot argues this computer peripheral device “does not contain the control capabilities required by the robot of the ’090 patent.” (*Id.*) Regarding its expert, iRobot alleges he has been consistent across his testimony and pre-litigation statements, and, overall, “testified that a telerobotic system is different from the robot systems of the ’090 patent.” (*Id.* at 45 (citing Hr’g Tr. at 808:19-23, 752:3-5).)

In their reply brief, Respondents view iRobot as failing to address Allen’s own description of itself, the extent of the local control system, similarity with well known robots, and the disparaging disclosure of fully-onboard control systems. (*See* RRPB at 28-29.) Respondents argue clearly, “[t]he point is that receiving remote (yet automated) commands means the device is a robot,” which is why, according to Respondents, “Dr. Nikos filed a patent that states that a ‘robotic vehicle’ may be controlled by ‘remote control.’” (*Id.* (citing Hr’g Tr. at 809:8-810:8).)

I find the limitation is met. Neither party argues “robot” as used in the preamble should be assigned anything beyond its plain and ordinary meaning. iRobot focuses greatly on Allen’s description of itself as an “automatic guided vehicle” and, therefore, not a robot. (*See* CRSB at 44.) Yet, Allen compares and discusses AGVs in the greater field of robotics and, at times, calls itself a “robot:”

Public Version

[T]here is a great deal of interest in using AGVs for automatic cleaning tasks. Despite extensive work and progress in the fields of AGV design, navigation, and control, the promise of ubiquitous cleaning robots suitable for ordinary household use remains substantially unfulfilled.

(RX-0080 at 1:17-21);

The present invention addresses the requirements of an automated cleaning device for use in a home or office environment. The requirements of such an environment are markedly different from those of industrial robot applications described in the prior art, such as hospital delivery systems or warehouse.

(*id.* at 2:39-44);

Thereby the present invention seeks to fulfill the promise of ubiquitous self-running cleaning robots suitable for ordinary household use.

(*id.* at 3:8-10);

FIG. 1 shows the primary components of robot cleaning system. . . . FIG. 3 shows a block diagram of robot system connection with host computer.

(*id.* at 3:13-19);

The proposed automatic cleaning robot system consists of three major elements:

(*id.* at 10:1-2);

Robot System Components

FIG. 1 shows all the components of the robot system as they would appear to an end-user. The robot system is composed of a mobile vehicle 1, a charging station 2, a host interface module 3, several reflector strips 4, special keep-out reflectors 5, a reference stick 6, distribution media 7 containing a control program, and an installation and instruction booklet 8.

(*id.* at 10:54-61);

In short, the present invention can fulfill the promise of AGV technology and robotics in general: To create ubiquitous cleaning robots which reduce at least some of the drudgery in the lives of ordinary people.

(*id.* at 48:59-63). Thus, there is strong evidence within Allen that it discloses a “robot” in a plain and ordinary sense. Beyond this, the parties mainly rely on the dueling opinions of their experts,

Public Version

but I find iRobot's opinion is undercut by prior out-of-court statements on telerobotic systems. (See RIB at 59 (citing Hr'g Tr. at 805:8-10).) iRobot attempts to downplay this with "the use of the term 'robot' in an unrelated patent filed years after the '090 patent does not amount to an inconsistent pre-litigation statement. In fact, Dr. Nikos's testimony that a telerobotic system is different from the robot systems of the '090 patent" (CRSB at 45) only serves to miss the point—whether Allen's vehicle is a "robot" under a plain and ordinary meaning. I find clear and convincing evidence that it fits this broad term.

Claim 1 further requires, "a housing and a chassis." ('090 patent at cl. 1.) I find clear and un rebutted evidence demonstrates the limitation was disclosed in Allen through the identified chassis 37 and outer shell. (See RIB at 60 (citing RX-2082C at Q149-152; RX-0080 at 3:24-25, 13:25-28).)

Claim 1 further requires, "wheels and at least one motor to drive the wheels disposed at least partially within the housing and configured to move the floor cleaning robot across a floor, each of the wheels being attached to the chassis via a respective arm having a distal end and a proximal end." ('090 patent at cl. 1.) I find clear and un rebutted evidence demonstrates the limitation was disclosed in Allen through the identified rear wheels, DC motor, shell, and suspension members 52 with springs. (See RIB at 60 (citing RX-2082C at Q159-165, 171-176; RX-0080 at 13:25-31, Fig. 7).)

Claim 1 further requires, "a control module disposed within the housing and directing movement of the floor cleaning robot across the floor." ('090 patent at cl. 1.) Respondents identify the dispute on this limitation as the same as the dispute over the preamble. (RIB at 61.) With particular regard to the "control module" in Allen, Respondents cite it as "a 'simple and inexpensive' local processor 'to control the various vehicle systems in response to simple

Public Version

commands from host computer 9.” (*Id.* (citing RX-0080 at 23:8-11, 23:19).) Respondents identify such systems as “sensors, propulsion system, and steering system.” (*Id.* (citing RX-0080 at 23:11-14, Fig. 24).) Respondents continue:

The local processor stores commands in a command queue and then directs the propulsion and steering systems as needed to execute those commands. (*Id.* at Fig. 24 (block 123 “command queue”); 25:1-58; RX-2082C at Q186 (explaining that a sequence of driving commands can be programmed into the robot, and this “can avoid the need for support from a real-time operating system” and citing RX-0080 at 25:48-49).) These commands can be relatively complex; for example, the local processor can direct the robot to travel in a straight line as part of processing a “distance deferred” command from its command queue. (*Id.* at Fig. 26 (steps 143 (“distance deferred cmd?”) and 144 “gone far enough?”); RX-2082C at Q185 (explaining that Fig. 26 shows that “the local processor requires autonomy itself to execute the commands when the commands become compounded and more sophisticated”).) In sum, the Allen robot is capable of navigating “on its own using its pre-programmed command sequences,” which as Dr. Messner explained, shows that Allen’s local processor “direct[s] movement of the floor cleaning robot across the floor.” (RX-2082C at Q186; Tr. 418:18-419:11.)

(*Id.*) Respondents then dispute that a “robot” requires “autonomously generating commands for directing movement” but can allow for remote control. (*Id.* at 61-62 (citing Hr’g Tr. at 419:1-21, 416:7-417:11, 419:16-21, 809:8-810:8).)

In its responsive brief, iRobot argues Allen does not disclose this limitation because it is “a vehicle controlled via radio link from a remote host computer.” (CRSB at 45 (citing CX-1824C at Q75-86).) iRobot explains “[t]he remote computer hosts the ‘control program’ and transmits commands to the vehicle based on the vehicle’s sensor readings,” and it is this remote computer which therefore “directs movement.” (*Id.* (citing RX-0080 at 23:2-16, Fig. 45; CX-1825C at Q75).) iRobot contends:

[Allen’s] local processor does not “direct[] movement” of the vehicle; it merely actuates “vehicle subsystems in response to simple commands received from host 9 via communication subsystem 122.” (RX-0080 at 23:53-55; RX-2082C, Messner DWS at Q182-84; CX-1824C, Nikos RWS at Q75). Allen teaches that “no means whatsoever are provided in control

Public Version

system 41 for . . . planning an intended path.” (RX-0080 at 23:4-8.) “The processing and control functions carried out by control system 41 contained within vehicle 1 itself are kept to a bare minimum.” (RX-0080 at 23:2-4; CX-1824C, Nikos RWS at Q76.) Respondents’ expert argues that because the local processor can store multiple commands from the remote computer in a “command queue,” it constitutes the claimed “control module.” This argument is erroneous. The local processor in Allen executes one command at a time *based on the command from the host computer*. (RX-0080 at Fig. 26; CX-1824C, Nikos RWS at Q79.) Moreover, the local processor has no autonomy whatsoever and does not “direct” the vehicle—it merely executes the command sent to it by the host. (RX-0080 at 25:3-50.) If the local processor does not receive commands from the remote host computer, it does nothing. (CX-1824C, Nikos RWS at Q79.) Without instructions from control program 16, “vehicle 1 will simply stop and await further commands.” (RX-0080, Allen at 25:49-50.) The only decision-making process on the mobile vehicle is whether to “reflexively stop” the vehicle in response to contact with the sensors. (RX-0080 at 23:67-24:2, CX-1824C, Nikos RWS at Q77.) But even Dr. Messner admitted that “reflexively stopping” does not amount to directing the movement of the mobile vehicle 1. (Hrg. Tr., Messner at 364:4-7.)

(*Id.*) iRobot concludes to argue that, regardless of their complexity, commands are always received at the vehicle from the remote host. (*Id.* at 47.)

In their reply brief, Respondents claim iRobot has missed the issue which is whether the “bare minimum” local processor in Allen still “directs movement.” (RRPB at 30.) Respondents argue it does—“it causes the vehicle to react to its sensors and to navigate on its own using commands stored in its command queue.” (*Id.* (citing RX-2082C at Q186; Hr’g Tr. 416:7-417:11, 419:1-21).) Respondents again dispute the claim requires autonomy and claim iRobot fails to address “why a local processor is not ‘directing movement’ when it processes commands stored in a command queue and causes the robot to move across the floor.” (*Id.*) Respondents claim the Allen local processor not only makes the decision to stop but also can check to see if it has “gone far enough to execute a distance-deferred command.” (*Id.* at 30, n.5 (citing RX-0080 at Fig. 26; RX-2082C at Q185).) Regardless, Respondents contend the claims do not require a “decision-making process” as opposed to “directing movement.” (*Id.*) Yet, Respondents argue,

Public Version

if the claims so require this, Allen still discloses a fully onboard control system, even if viewed as more expensive. (*Id.* at 31 (referring to *Celeritas*, 150 F.3d at 1356-1360).)

Here, I find this is a close issue but ultimately the limitation is met. To begin, I disagree with Respondents that the dispute over this limitation “is the same as the ‘robot’ dispute.” (*See* RIB at 61.) That dispute turned on the plain and ordinary meaning of “robot.” This dispute turns on the plain and ordinary meaning of “directing movement.” iRobot essentially equates “directing movement” with the generation of movement commands, *i.e.*, decision making. (*See* CRSB at 46 (“the local processor has no autonomy whatsoever and does not ‘direct’ the vehicle—it merely executes the command sent to it by the host”).) Respondents contend the execution of received movement commands is enough. (*See* RRPB at 30 (“iRobot does not offer any reason why a local processor is not ‘directing movement’ when it processes commands stored in a command queue and causes the robot to move across the floor. . . . the claims do not require a ‘decision-making process.’”).) Put another way, the parties’ debate is whether “directing movement” means “deciding movement” (iRobot) or the more general “causing movement” (Respondents).

I find the former is more in line with the plain and ordinary meaning of “directing movement.” The ’090 patent specification offers little guidance on the meaning of this term but it generally speaks of robot vehicles which decide for themselves whether to go left, right, forward, or reverse; *i.e.*, are autonomous or “operable without human intervention.” (*See, e.g.*, ’090 patent at 1:62-64, 3:51-4:3.) The ’090 patent does not identify or suggest an embodiment where movement decisions are made externally and then fed to the robot. In fact, the ’090 patent claims require the control module to decide such things at least when obstacles are encountered—“at least one sensor for detecting an obstacle and communicating obstacle

Public Version

information to the control module so that the control module can cause the floor cleaning robot to react to the obstacle.” (’090 patent at cls. 1, 10.) Independent claim 10 goes one step further and delineates between the control module for “directing movement” and “at least one motor . . . configured to drive the first and second wheels to move the floor cleaning robot across a floor.” (*Id.* at cl. 10.) This difference tells me there is more to “directing movement” than just controlling the energization of wheel and steering motors—the extent of Allen’s on-board control system 41:

The processing and control functions carried out by control system 41 contained within vehicle 1 itself are kept to a bare minimum. In the preferred embodiment, no means whatsoever are provided in control system 41 for constructing or storing a map of the environment, determining vehicle 1's location, planning an intended path, or evading obstacles. Virtually the only two functions of onboard control system 41 are (1) to relay information from the various vehicle sensors to control program 16 on host computer 9, and (2) to control the various vehicle systems in response to simple commands from host computer 9. *The only other control function which resides in control system 41 is a reflexive action to stop moving if any bumpers 46 or whiskers 47 register contact with an obstacle.* All higher-level navigation and control functions are left to control program 16 on host computer 9.

(RX-0080 at 23:2-16 (emphasis added).)

I had been inclined to find that a decision to stop (as Allen discloses at 8:12-16) was, perhaps, a form of “directing movement,” but Respondents’ expert acknowledged at the hearing that this does not comport with the plain and ordinary meaning:

Q. And, for example, those whiskers we talked about earlier, a deflection signal from those would be relayed to the control program on the host computer for processing; isn’t that right?

A. That’s part of their function. The – the controller on board the robot would also take that information and, you know, stop the vehicle should there -- it encounter an obstacle.

Q. Thank you sir, Now, in your witness statement, you note that the local processor of Allen – well, actually, withdrawn. Let me just back up for a minute. With regard to the whiskers, as you just mentioned, aside from –

Public Version

in addition to their data signals indicating a collision with an object, in addition to that going back to the host computer, you said that the local system here can reflexively stop as a result of that; isn't that correct?

A. Yes.

Q. Okay. And – and you'd agree with me that stopping is different than moving the robot across the floor; right?

A. Yes.

....

Q. Okay. But, again, all of those commands, they all came from the host computer; correct?

A. That's right.

Q. Okay. And, in fact, you'd agree with me, sir, that if the vehicle of Allen lost contact with the host computer long enough, the queue would empty; isn't that right?

A. Yes, that's right.

Q. Okay. And doesn't Allen teach that in such a situation, the vehicle will actually stop and await further commands from the host computer?

A. That's right.

Q. And, again, you'd agree with me that stopping to wait for commands, that's different than directing movement of the vehicle across the floor; right?

A. Yes, stopping is different than directing.

(Hr'g Tr. at 363:11-364:7, 366:6-21.) Thus, there is very little reason for me to conclude that “directing movement” simply means “causing movement” as opposed to “deciding movement.”

Respondents argue that the limitation is still disclosed, however, by Allen's discussions of the prior art. (See RIB at 59-60; RRPB at 31.) Allen discloses:

Most AGV systems described in the prior art use an onboard computer for control and guidance. U.S. Pat. No. 5,109,566 to Kobayashi, et al, describes a method for subdividing an area to be cleaned into a regular grid. As the AGV traverses the area, ultrasonic sensors detect the presence or absence of an obstacle within each grid square. The onboard computer

Public Version

system stores this information and uses it to guide the vehicle through the environment. A principal limitation of this system (and many similar systems, such as another taught by U.S. Pat. No. 5,305,217 to Nakamura et al.) is the high cost and/or limited capabilities of the onboard computer. If the vehicle includes an inexpensive computer, its storage, processing, and user-interface capabilities are necessarily limited. If the vehicle includes a computer system with plentiful storage and CPU resources, the cost of the system is increased beyond the reach of many consumers.

(RX-0080 at 1:23-39.) Respondents' contention that this disclosure-but-disparagement is still sufficient for anticipation is persuasive. The Federal Circuit has instructed that "[a] reference is no less anticipatory if, after disclosing the invention, the reference then disparages it." *Celeritas*, 150 F.3d at 1361. The above excerpt shows Allen discloses a construction of "directing movement" that means "deciding movement." iRobot offers no response to this law or its application onto Allen's disclosures. (See CRSB at 45-47.) Thus, I find the limitation is met.

Claim 1 further requires, "at least one sensor for detecting an obstacle and communicating obstacle information to the control module so that the control module can cause the floor cleaning robot to react to the obstacle." ('090 patent at cl. 1.) I find clear and un rebutted evidence demonstrates the limitation was disclosed in Allen through the identified bumpers 46 and whiskers 47. (See RIB at 63 (citing RX-2082C at Q192-196; RX-0080 at 23:8-14; Hr'g Tr. at 804:23-805:3).)

Claim 1 further requires, "a removable bin disposed at least partially within the housing and configured to receive particulates." ('090 patent at cl. 1.) For this limitation, Respondents argue:

Allen discloses a removable "bag" that is disposed at least partially within the housing and configured to receive particulates. (RX-0080 at Fig. 11, 47:62, 14:43-60.) Allen also discloses a removable "bin" because: (1) Allen explains that "vacuum cleaning systems of this type are well known, and a variety of equivalent configurations will readily suggest themselves to persons of ordinary skill in the art" (*Id.* at 14:57-60); and (2) it was well known that vacuum cleaning systems could use either bins or bags. (RX-2082C at Q206, 209-211.) Confirming this, Dr. Papanikolopoulos

Public Version

acknowledged at the hearing that “a person of ordinary skill in the art knew that vacuum cleaning systems could generally use either bins or bags.” (Tr. 814:8-22.) There is no dispute that Allen meets this limitation. (iRobot PHB at 91-93.)

(RIB at 63.) While it is true that iRobot does not dispute this limitation is met (*see* CRSB at 44-50), I find it difficult to see how it is. Respondents’ explanation for why Allen discloses “a removable bin” is because: (1) “Allen explains that ‘vacuum cleaning systems of this type are well known, and a variety of equivalent configurations will readily suggest themselves to persons of ordinary skill in the art;’” and (2) “it was well known that vacuum cleaning systems could use either bins or bags.” (*Id.*)

Neither of these statements supports finding that Allen explicitly or inherently discloses “a removable bin.” Rather, the latter makes it clear that bins and bags are different things, and the former is patent specification legalese which does not disclose anything. Upon my own review of Allen I do not find any disclosure of a removable bin as opposed to a removable bag. I am inclined to believe it would have been an obvious modification (*see, e.g.*, RIB at 84-85 (discussing obvious substitution of removable bag to removable bin); RX-2082C at Q214 (establishing “Allen only expressly disclose[s] a bag”)) but I cannot rightly find Allen discloses this limitation for anticipation purposes. Thus, the limitation is not met.

Claim 1 further requires, “a first rotating member configured to direct particulates toward the bin.” (’090 patent at cl. 1.) I find clear and un rebutted evidence demonstrates the limitation was disclosed in Allen through the identified agitator brush. (*See* RIB at 63 (citing RX-2082C at Q222-225; RX-0080 at 15:1-4, Fig. 11).)

Claim 1 further requires, “wherein one of the wheels is rotatably attached to the distal end of each arm, and the proximal end of each arm is pivotably attached to the chassis.” (’090 patent at cl. 1.) Respondents argue this limitation is met through Allen’s suspension members 52. (*See*

Public Version

RIB at 64-66.) Respondents highlight that portion of Allen which reads “each wheel (50 or 51) and axle is attached to chassis 37 by suspension members 52 and springs which provide for some degree of vertical travel (typically 3-10mm) as vehicle rolls over uneven surfaces.” (*Id.* at 64 (citing RX-0080 at 13:25-28).) Respondents argue their expert “explained that a person of ordinary would recognize from Figure 7 and the text that Allen’s ‘suspension members 52’ are arms that are pivotably attached to the chassis and rotatably attached to the wheels” and was not cross-examined on this point. (*Id.* at 65 (citing RX-2082 at Q171-176).) Respondents also note Allen’s reference to remote control car suspensions, which Respondents’ expert testified would be recognized by a PHOSITA as something like that shown in an issue of Radio Control Car Action magazine. (*Id.* (citing RX-2082C at Q174-175; RX-2100.046).)

Respondents dispute, as iRobot argues, “that one cannot tell whether Allen’s arms pivot or whether its wheels are rotatably attached.” (*Id.* (citing CX-1824C at Q88).) Respondents argue rotatably attachment should properly be inferred from Allen’s disclosure. (*Id.* at 65-66 (citing, *inter alia*, *In re Baxter*, 952 F.2d at 390).) Respondents contend iRobot’s expert conceded this when he testified “that there was a ‘strong possibility’ that suspension members 52 pivot.” (*Id.* at 66 (citing Hr’g Tr. at 812:5-813:1).)

In its responsive brief, iRobot argues:

Neither figure 7 of Allen nor the associated description that its wheels are ‘attached to chassis 37 by suspension members 52 and springs which provide for some degree of vertical travel (typically 3-10mm)’ constitutes a disclosure of the rotatable and pivotable movement particularly claimed in the asserted limitations

(CRSB at 47 (citing RX-2082C at Q172-173; RX-0080 at 13:25-28; CX-1824C at Q88-90).)

iRobot continues “[v]ertical movement can be achieved without pivotable attachment.” (*Id.* (citing Hr’g Tr. at 838:7-20).) iRobot argues Allen’s reference to remote control toy cars is of no available because “Allen does not explain the configuration of the “inexpensive remote-control

Public Version

toy car” suspension that it refers to, and Dr. Messner fails to match Allen’s disclosure to the specific requirements of the claim limitations.” (*Id.* (citing CX-1824C at Q91-94).) iRobot adds an argument in footnote that “[o]ne expects a remote-control toy car to have a different suspension than those found in the floor-cleaning robots of the ’090 patent. Toy cars are often designed for racing and frequent crashes, but neither speed nor frequent crashing are the objectives of the ’090 patent suspension.” (*Id.* at 48, n.8 (no citation).)

iRobot then points to counteracting testimony from its expert that his “strong possibility” comment from moments earlier was an “overstatement” and that he is not sure whether the suspension members 52 pivot or not. (*Id.* (citing Hr’g Tr. at 811:13-17, 812:5-12).) iRobot contends this ambiguity precisely means Allen does not disclose the limitation. (*Id.* (citing *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631 (Fed. Cir. 1987); *Cont’l Can Co. USA v. Monsanto Co.*, 948 F.2d 1264, 1268 (Fed. Cir. 1991); *Motorola Mobility, LLC v. Int’l Trade Comm’n*, 737 F.3d 1345, 1350 (Fed. Cir. 2013)).)

In their reply brief, Respondents fault iRobot as failing to explain how the vertical travel of Allen’s suspension can be accomplished without pivotable arms. (RRPB at 31 (referring to CX-1824C at Q88-89).) Respondents argue the “hub and a spring” hypothetical arrangement iRobot’s expert conceived of at the hearing is inconsistent with Allen’s disclosure that “each wheel (50 or 51) and axle is attached to chassis 37 by suspension members 52 and springs which provide for some degree of vertical travel.” (*Id.* at 31-32 (citing RX-0080 at 13:25-27).) Respondents also point out that iRobot’s expert never “unequivocally” said Allen does not disclose pivoting arms, but rather he was “not sure.” (*See id.* (citing Hr’g Tr. at 812:13-813:9).)

Regarding toy cars, Respondents argue:

iRobot does not dispute that these toy cars use pivoting arm suspensions, instead iRobot tries to distinguish them based on the fact that they “could

Public Version

not accommodate many standard carpets.” (CRB at FN 8.) This operating on carpet argument is uncited and, in any event, is not anything required by the claims.

(*Id.*) Respondents then contend there is flexibility to use secondary references for anticipation to either explain the meaning of a term or to show that something is inherent. (*Id.* at 32-33 (citing MPEP § 2131.01; *In Re Baxter*, 952 F.2d at 390).) Regarding *In re Baxter*, Respondents argue “*In re Baxter* is not about inherency. *In re Baxter* is about what a POSITA would have understood from the literal words of the prior art reference and shows that what matters is not hypothetical ‘possibilities’ but what a POSITA would ‘reasonably infer.’” (*Id.* at 33.)

I find, for this limitation in particular, Respondents’ expert to be far more credible than iRobot’s. iRobot’s expert takes the position Allen does not disclose a wheel rotatably attached to the suspension arms 52 because it is actually a “hub” which the wheel is attached to. (CX-1824C at Q88-90.) As I discussed with respect to infringement, where iRobot was on the other side of this coin, the ’090 patent claims allow for indirect attachment. Indeed under a simple, plain reading of Allen, the wheel must be rotatably attached to the suspension arm in order for the robot to move. iRobot’s expert avoids this plain and ordinary meaning of “attached” to arrive at his conclusion. Thus, this part of the limitation is met.

Regarding the pivoting of suspension members 52 with respect to the chassis 37, I find Respondents properly invoke *In re Baxter* to show *what is disclosed in* Allen via the Radio Control Car Action magazine.²⁰ Allen’s suspension members 52 are shown, simply, as triangles in the following figure:

²⁰ This is opposed to Respondents’ use of *In re Baxter* for the ’490 patent, which was used to try and show that a person of skill would have understood a Ueno robot, in reality, to have a button to select an operational mode. (See RIB at 42-43.)

Public Version

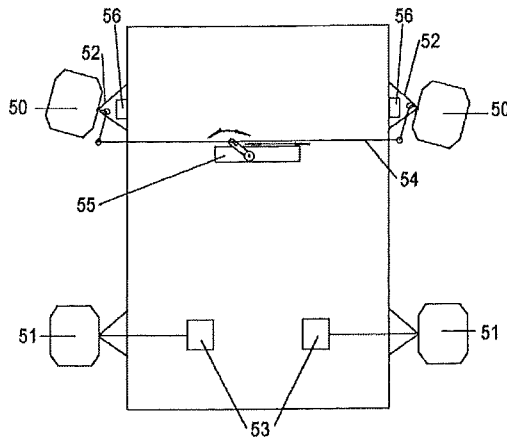
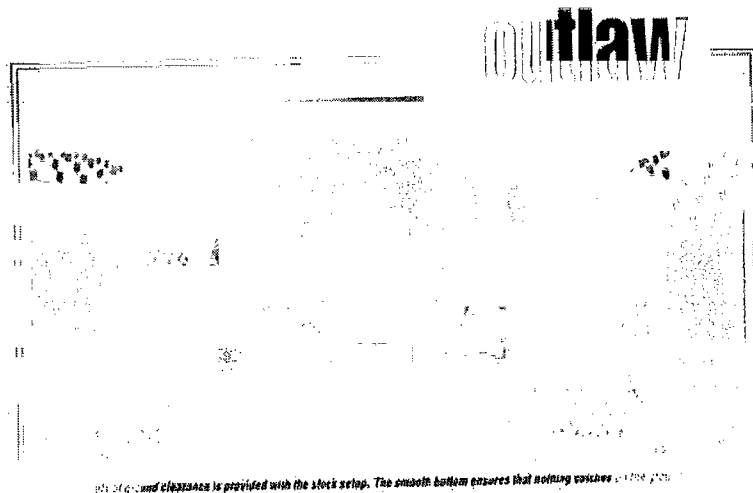


FIG 7

(RX-0080 at Fig. 7.) Allen explicitly discloses these members provide vertical travel of 3-10mm. (RX-0080 at 13:25-28.) Respondents' expert credibly and persuasively testified that in order to accomplish this, the triangles mean "the pivoting axis of the arms in Allen's Figure 7 are in the front-to-back direction of the robot." (RX-2082C at Q173-175.) Respondents and their expert use the Radio Control Car Action magazine to show how these triangular suspension arms appear in practice:



(RX-2100.046); which a POSITA would be familiar with according to Allen just a few lines prior:

The Suspension, Chassis, and Propulsion Systems

Public Version

FIG. 7 is a simplified block diagram showing the relationships between components of suspension system 38, propulsion system 39, and the steering system. All are similar to those widely used in inexpensive remote-control toy cars. Front wheels 50 and rear wheels 51 comprise hollow, semi-pneumatic tires with "knobs", or other well-known high-traction tread design, mounted on a plastic center attached to an axle. Each wheel (50 or 51) and axle is attached to chassis 37 by suspension members 52 and springs which provide for some degree of vertical travel (typically 3-10mm) as vehicle 1 rolls over uneven surfaces.

(RX-0080 at 13:17-28). The only evidence against this conclusion as to what Allen discloses is iRobot's expert testimony—which, as explained above, is not credible on this point in light of his position on the rotatable wheels and tacit admission that pivoting arms are a "strong possibility." Thus, I find the limitation is disclosed by clear and convincing evidence.

Claim 1 finally requires, "wherein each wheel is biased to an extended position away from the robot chassis by a spring extending between the arm and the robot chassis" and "wherein, during cleaning, the weight of the floor cleaning robot overcomes a force from the spring biasing the wheels to an extended position." ('090 patent at cl. 1.)

Respondents argue Allen discloses the use of springs in its suspension. (RIB at 66 (citing RX-0080 at 13:25-28).) Respondents also argue "Allen also states that its bumpers are configured to be 1-3 cm from the floor 'when vehicle 1 sits on its suspension 38.'" (*Id.* (citing RX-0080 at 16:8-10).) Respondents also describe a "microswitch" in Allen which detects when the vehicle has been picked up by a user. (*Id.* at 66-67 (citing RX-0080 at 44:17-27).)

Respondents continue:

As Dr. Messner explained, these disclosures show that Allen discloses these limitations, including overcoming the force. (RX-2082C at Q230-237.) In particular, Dr. Messner testified that Allen's disclosure of "springs which provide for some degree of vertical travel as vehicle 1 rolls over uneven surfaces" would be understood by a person of ordinary skill to describe springs that extend between the chassis and the pivot arms ("suspension members 52") and that bias the wheels to an extended position away from the chassis. (*Id.* at Q231.) Dr. Messner also testified that one of ordinary skill would know that "the weight of the floor

Public Version

cleaning robot overcomes a force from the spring biasing the wheels to an extended position” because of Allen’s disclosure that the robot and has a “microswitch attached to suspension member 52” in order to detect whether the robot has been picked up, and thus is no longer “sitting on its suspension.” (*Id.* at Q232-235.) As Dr. Messner explained, “[w]hen the robot is picked up, its weight is no longer sitting on its suspension, so the wheels are pushed away from the body, and that movement is detected by the suspension sensor. So, basically, the fact that Allen has a suspension sensor confirms that this limitation is disclosed.” (*Id.* at Q235.)

(*Id.* at 67.) Respondents reason “the ‘sits on its suspension’ phrase would not make any sense, and the suspension sensor would not work, if the weight of the robot did not cause the wheels to partially retract from their extended positions.” (*Id.*) Respondents argue iRobot has ignored what “sitting on its suspension” means to a POSITA in their dispute over this limitation. (*See id.* at 68.)

In its responsive brief, iRobot argues “Dr. Messner did not identify, and Respondents have failed to show, how the Allen reference discloses this limitation.” (CRSB at 49.) iRobot disputes that “any deflection or deformation of a suspension spring satisfies this limitation.” (*Id.* (referring to Hr’g Tr. at 380:22-381:9).) iRobot, through its expert, argues this interpretation renders the claim term “overcomes” meaningless. (*Id.* (citing CX-1824C atQ103).) Regarding Allen’s specific disclosure of “sitting on its suspension,” iRobot argues :

That Allen’s robot sits on a suspension that affords the robot minimal vertical travel does not show that the wheels are biased away from the robot, or that the robot overcomes force from the springs. Indeed, Dr. Nikos testified that there could be several other arrangements of a suspension system allowing for vertical movement without a pivoting suspension system. (*See, e.g.*, Hrg. Tr., Nikos at 838:7-20 (describing a suspension capable of vertical movement without any pivoting arms).)

(*Id.* at 49-50.)

In their reply brief, Respondents argue clearly:

There is no dispute that the Allen robot has a spring suspension, and no dispute that it contains a wheel-drop sensor. Thus, the strength of Allen’s spring is taught to be strong enough that the wheels bias away from the

Public Version

robot when it is picked up, but to retract and “sit on the suspension” when on the floor such that its wheel drop sensor can sense when the robot is lifted. (RX-0080 at 44:17-27.)

(RRPB at 34.) Respondents contend “iRobot’s argument about rendering ‘overcome’ meaningless either misunderstands the nature of a spring, misunderstands the claim language, or both.” (*Id.*) Respondents state clearly, that it satisfies the claim “when the robot is placed on the floor, the wheels must partially retract from the extended position.” (*Id.* (citing ’090 patent at 6:16-21, 6:23-28; Hr’g Tr. at 381:2-6, 424:7-16; RX-0082 at 6:27-30).) Respondents conclude:

iRobot’s own infringement theory shows that this logic is correct. iRobot asserts that both respondents’ products and its own products infringe because “[w]hen the robot is positioned upside down” the wheels are pushed out, and “when the robot is positioned with its wheels on the floor” the “wheels move inward.” (CIB at 62, 67, 71, 75, 79-80, 84, 89.) iRobot asserts that this shows that “the weight of the robot overcomes the spring biasing force” and satisfies the claims. (CIB at 62, 67, 71, 75, 80, 84-85, 89.) Thus, iRobot’s infringement theory is the same as respondents’ invalidity theory: both rely on the fact that the wheels move inwards when the robot is put on the ground to show the limitation is met. *See Amazon.com, Inc. v. Barnesandnoble.com, Inc.*, 239 F.3d 1343, 1351 (Fed. Cir. 2001) (“A patent may not, like a ‘nose of wax,’ be twisted one way to avoid anticipation and another to find infringement.”)

(*Id.* at 35.)

I find Respondents have the vastly superior position here. The claim reads “the weight of the floor cleaning robot overcomes a force from the spring biasing the wheels to an extended position.” (’090 patent at cl. 1; *see* ’090 patent at cls. 10, 17.) The plain and ordinary meaning of this phrase is that the weight of the robot overcomes the force which biases, or moves, the wheels to an extended position. It is basic physics that any time a spring is compressed against its resistive force, the compression force has, by definition, overcome that resistive force—resulting in movement. (*See* Hr’g Tr. at 424:3-16 (discussing Hooke’s Law).) Thus, if the weight of the robot moves the wheel arm from an extended position to a less extended position (*i.e.*, moves it inward), the spring’s resistive force has been overcome. So I disagree that

Public Version

“overcome” means a spring is completely compressed which is the only interpretation that can be gleaned from iRobot’s briefing.

Thus, when Allen discloses springs on its suspension members and springs “which provide for some degree of vertical travel (typically 3-10mm) as vehicle 1 rolls over uneven surfaces,” it discloses the springs act to bias the wheels outwardly. If the springs did not do this there would be no variability in vertical travel—the weight of the robot would bottom out and not ever come back up. (*See* RX-2082C at Q232.) This variability in vertical travel also means that the spring compresses and expands during locomotion; *i.e.*, the weight of the robot overcomes the bias force from the spring. (*See id.*)

Allen’s disclosure of microswitches further supports the weight of the robot overcomes the bias from the spring to some extent. I disagree with iRobot that Allen’s microswitches are “described in Allen’s collision detection system section rather than a section describing the suspension system.” (CRSB at 49.) To the contrary, Allen discloses these switches as involved in determining if the vehicle has been picked up so that it no longer sits on its suspension:

A self-running vacuum vehicle deployed in homes must be able to deal gracefully with interference by pets and children. In particular, the vehicle may be bodily picked up and moved to another location not under its own power (by a dog, child, or even an adult). Position-determination subsystem 151 must be able to detect such a condition, and, if detected, somehow determine the vehicle's new location. The system of the preferred embodiment incorporates a simple sensor which detects whether vehicle 1 is sitting on its suspension 38 (a simple microswitch attached to suspension member 52, for example). If vehicle 1 is lifted off the floor, position-determination subsystem 151 responds by invalidating the estimated vehicle position 152 and executing a special "seek" mode.

(RX-0080 at 44:16-29.) Respondents’ expert persuasively explained how this passage further confirms the weight of the robot overcomes the bias force of the spring. (*See* RX-2082C at Q235.) Thus, I find the limitations are disclosed by clear and convincing evidence in Allen.

Public Version

b. Claim 5

Dependent claim 5 requires, “[t]he floor cleaning robot of claim 1, further comprising an air moving system disposed at least partially within the housing and configured to ingest particulates and direct particulates toward the removable bin.” (’090 patent at cl. 5.) I find clear and un rebutted evidence demonstrates the limitation was disclosed in Allen through the identified vacuum system 43. (*See* RIB at 69 (citing RX-2082C at Q246-249, 252, 254-257; RX-0080 at 14:43-60); CRSB at 50.)

c. Claim 7

Dependent claim 7 requires, “[t]he floor cleaning robot of claim 5, wherein air moved by the air moving system passes through a filter before exiting the housing.” (’090 patent at cl. 7.) I find clear and un rebutted evidence demonstrates the limitation was disclosed in Allen through the identified air filter 71. (*See* RIB at 69 (citing RX-2082C at Q246-249, 252, 254-257; RX-0080 at 14:43-60); CRSB at 50.)

d. Claim 10

Independent claim 10 is very similar to independent claim 1. Both iRobot and Respondents do not treat claim 10 any differently than claim 1. (*See* RIB at 69; CRSB at 50.) Under the present circumstances, I agree claim 1 is effectively representative of claim 10. Thus, I find claim 10 is not disclosed in its entirety by Allen for the same reason claim 1 is not so disclosed.

e. Claim 17

Independent claim 17 is very similar to independent claim 1 and dependent claim 5. Both iRobot and Respondents do not treat claim 17 any differently than claims 1 and 5. (*See* RIB at 69; CRSB at 50.) Under the present circumstances, I agree claims 1 and 5 are effectively

Public Version

representative of claim 17. Thus, I find claim 17 is not disclosed in its entirety by Allen for the same reason claim 1 is not so disclosed.

3. 35 U.S.C. § 103

In its opening brief, Respondents contend claims 1, 2, 3, 4, 5, 7, 10, and 17 of the '090 patent are rendered obvious by the Allen reference in light of known control systems, known pivoting spring suspensions, and Soupert. (*See* RIB at 69, 71.) Respondents also contend claims 1, 2, 3, 4, 5, 7, 10, and 17 are rendered obvious by the Haegermarck reference in light of combinations of Kirkpatrick, Tangenberg, Bisset, and Colens. (*See id.* at 75-85.)

For the reasons discussed below, I find claims 1, 2, 3, 4, 5, 7, 10, and 17 have not been shown to be obvious by combinations of Allen. I find claims 1, 2, 3, 4, 5, 7, 10, and 17 have been shown to be obvious by combinations of Haegermarck.

a. Claim 1

Obviousness by Allen

As discussed above, I find claim 1 is not anticipated by Allen because it lacks a removable bin. Respondents, however, allege Allen would anyways render claim 1 obvious:

If Allen is found not to disclose a “robot”, or not to disclose an onboard control module that “direct[s] movement of the [] robot across the floor,” then as of December 2002 it would have been obvious to modify Allen to use a fully on-board control module, as described for example in the background of Allen itself. (RX-2082C at Q187-189.) This modification would satisfy the “robot” and “control module” limitations.

.....

If Allen is found not to disclose the use of pivoting arms for its suspension, then as of December 2002 it would have been obvious to modify Allen to use pivoting arms.

(RIB at 69-70.)

Public Version

Clearly, these obviousness arguments do not cover Allen's failure to disclose "a removable bin." Thus, even if I were to agree with Respondents on the obviousness of the "robot," "control module . . . directing movement," and "pivot arm" limitations, claim 1 would still not be shown to be obvious. Nevertheless, I discuss below whether or not these limitations would have been obvious, if not already disclosed, by Allen and other prior art.

Claim 1 requires, "a floor cleaning robot" and "a control module disposed within the housing and directing movement of the floor cleaning robot across the floor." ('090 patent at cl. 1.) Respondents argue it would have been obvious to "modify Allen to use a fully on-board control module," which would satisfy both the "robot" and "control module . . . directing movement" limitations. (RIB at 69.) Respondents point out that Allen already discloses how "most automatic guided vehicle systems . . . use an onboard computer for control and guidance" but the cost of such an arrangement encouraged Allen to make the computer external. (*See id.* (citing RX-0080 at 2:21-29).) Respondents reason that if cost was not a consideration, a person of ordinary skill would know the computer could be moved back to the vehicle (*i.e.*, making it "on-board"), "to avoid the complications of communicating back and forth with an off-board computer." (*See id.* at 69-70 (citing RX-2082C at Q188-189).) Respondents argue that these costs did come down between 1997, when Allen was filed, and 2002, the priority of the '090 patent. (*Id.* at 70 (citing RX-2082C at Q188-189; Hr'g Tr. at 420:1-422:24).) Respondents claim Bisset (RX-0081), Haegermarck (RX-0082), and Kirkpatrick (RX-0083) are all examples of 2002 robots with such on-board control modules. (*Id.*)

In its responsive brief, iRobot argues flatly:

Respondents suggest that a POSITA would have found it obvious to move the control program of Allen's remote computer onto Allen's remote-controlled vehicle. (RX-2082C, Messner DWS at Q187-89.) This is directly contradictory to Allen's teaching. Allen disparages systems that

Public Version

incorporated a control program on a vehicle in light of “the high cost and/or limited capabilities of the onboard computer.” (RX-0080 at 1:23-39, 23:17-20; Hrg. Tr., Messner at 367:9-10; *see also* RX-2082C, Messner DWS at Q188).

(CRSB at 52.) iRobot also argues “Allen discloses that the reason automated guided vehicles ‘have not been widely accepted for home or office use . . . is significantly due to the high cost of the onboard computers used for guidance and control.’” (*Id.* at 53 (citing RX-0080 at 2:24-29).) iRobot adds that “the only basis Respondents identify for making this modification is allegedly lower controller costs by 2002. . . . Respondents have not explained why these lower costs would actually motivate a POSITA to move the controller onto the mobile vehicle.” (*Id.* at 53.)

In their reply brief, Respondents dispute, generally, that they have failed to provide motivation for the proposed modifications of Allen. (*See generally* RRPB at 35-36.) Respondents also remind that “[a]n unclaimed feature cannot show nonobviousness.” (*Id.* at 36 (citing *Broadcom Corp. v. Qualcomm Inc.*, 543 F. 3d 683, 688-689 (Fed. Cir. 2008)).)

I find the limitation would have been obvious. Clearly, Allen discloses that persons of ordinary skill in the art were familiar with on-board control systems for directing movement of mobile robots. (*See generally* RX-0080 at 1:11-2:35.) Respondents are persuasive when they argue a person of ordinary skill would use such-on board systems to avoid the complications of communicating with an external computer. (RIB at 70.)

iRobot contends the combination would not be made because of Allen’s disparagement of an on-board control module. I disagree. Allen does not disparage the claimed arrangement as opposed to acknowledge its cost can be prohibitive for some users and applications. Allen states “[i]f the vehicle includes a computer system with plentiful storage and CPU resources, the cost of the system is increased beyond the reach of many consumers” and “[t]hat such systems have not been widely accepted for home or office use (as of the date of this application) despite much

Public Version

progress in the field of AGVs is significantly due to the high cost of the onboard computers used for guidance and control.” (RX-0080 at 1:36-39, 2:24-29.) Allen even lists “principal objects and advantages of the present invention,” that, beyond low cost, all apply equally to on-board control systems for directing movement. (*See id.* at 2:44-3:2.)

With that said, iRobot does cite Allen as supposedly warning against “the high cost and/or limited capabilities of the onboard computer.” (CRSB at 52 (citing ’090 patent at 1:23-39).) iRobot pulls this phrase out of its context, however. The larger passage reads:

A principal limitation of this system (and many similar systems, such as another taught by U.S. Pat. No. 5,305,217 to Nakamura et al.) is the high cost and/or limited capabilities of the onboard computer. If the vehicle includes an inexpensive computer, its storage, processing, and user-interface capabilities are necessarily limited. If the vehicle includes a computer system with plentiful storage and CPU resources, the cost of the system is increased beyond the reach of many consumers.

(’090 patent at 1:30-39.) I do not find Allen’s concern over cost does not rise to the level of disparagement as understood in the nonobviousness analysis. *Millennium Pharm.*, 862 F.3d at 1366-67 (“would have been unattractive to a person of ordinary skill for fear of disturbing the chemical properties. . . . a person of ordinary skill would have avoided creating an ester with mannitol because several different esters, each with different chemical and possibly biological properties, could have formed”); *In re Urbanski*, 809 F.3d 1237, 1244 (Fed. Cir. 2016) (“Although Gross generally discloses a relatively longer reaction time that results in fiber capable of forming stable dispersions, Gross does not criticize or discredit the use of a shorter reaction time”); *see In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994) (“Although a reference that teaches away is a significant factor to be considered in determining unobviousness, the nature of the teaching is highly relevant, and must be weighed in substance. A known or obvious composition does not become patentable simply because it has been described as somewhat inferior to some other product for the same use.”).

Public Version

Thus, I find the limitation would have been an obvious modification to the external-control system embodiment of Allen.

Claim 1 further requires, “wherein one of the wheels is rotatably attached to the distal end of each arm, and the proximal end of each arm is pivotably attached to the chassis;” “wherein each wheel is biased to an extended position away from the robot chassis by a spring extending between the arm and the robot chassis;” and “wherein, during cleaning, the weight of the floor cleaning robot overcomes a force from the spring biasing the wheels to an extended position.” (’090 patent at cl. 1.) Respondents argue it would have been obvious to “modify Allen to use pivoting arms” in satisfaction of these claim limitations. (RIB at 70.) Respondents argue Kirkpatrick (RX-0083) and Colens (RX-0079) show that such pivoting arms were known, in addition to Allen’s own explicit reference to “suspension system 38” and “similar to those widely used in inexpensive remote-control toy cars.” (*Id.* at 71 (citing RX-2100.046).) Thus, Respondents reason, “at a minimum it was [an] obvious design choice to implement the pivoting arm toy car suspension that Allen encourages persons of skill in the art to use.” (*Id.* (referring to RX-2100.046; RX-2082C at Q174-175).)

In its responsive brief, iRobot describes Respondents as:

[R]ather than provide any explanation for why a POSITA would attempt to incorporate a pivoting suspension arm into the Allen system, Respondents simply identify a few systems and conclude these modifications are mere design choices. (*Id.*) Respondents’ mere identification of Kirkpatrick, Colens, and “inexpensive remote control toy cars” does not provide any explanation of the motivation a POSITA would have to actually make the combinations Respondents list. Thus, Respondents are unable to meet their heavy burden.

(CRSB at 53.) iRobot argues that suspensions are not a mere design choice as, for a cleaning robot as opposed to a racing toy, it must be “optimized for cleaning efficiency and unpredictable obstacles.” (*Id.* at 53-54 (citing RX-1824C at Q89).) More specifically, iRobot argues:

Public Version

[S]uspension system in the robot vacuum cleaner must be created and tuned to ensure the main brush assembly remains substantially in contact with various surfaces to be cleaned, from hardwood floors to tall carpeting. (*Id.* at Q96.) The suspension system must be created to effectively transition between different floor surfaces. (*Id.*) In contrast, the suspension systems of inexpensive remote controlled toy cars are designed for rugged terrain and may require greater bounce. (*Id.* at Q89.) Unlike an effective robot vacuum cleaner, an operator can avoid challenging terrain by steering the toy around it. Developing the innovative suspension system for a robot vacuum cleaner is more than a mere selection of a suspension system from a toy car. The '090 patent's innovative suspension system is also fundamentally different from the elevating suspension disclosed in Kirkpatrick as explained in detail below.

(*Id.* at 54.) Regarding a spring bias to extend a wheel and overcoming that bias with weight, iRobot contends Respondents have failed to explain why this would happen in a modified Allen robot. (*Id.*) iRobot also claims that Respondents waived any reliance on Colens (RX-0079) for a suspension. (*Id.* at 53, n.9.)

In their reply brief, Respondents repeat their view that:

[T]here is no dispute that in remote-controlled cars with suspensions, the wheels are on pivoting arms (*e.g.* RX-2100.046), and Allen states that its "suspension system 38" is "similar to those widely used in inexpensive remote-control toy cars." (RX-0080 at 13:17-22.) That is not just motivation, it is an express teaching.

(RRPB at 36.) Respondents also characterize iRobot's claims regarding design considerations as improperly using unclaimed features to show nonobviousness. (*Id.* (citing *Broadcom Corp. v. Qualcomm Inc.*, 543 F.3d at 688-689).)

Here, I find Respondents have simply failed to allege any motivation to use what they refer to as "an obvious design choice." (RIB at 71.) In other words, for this particular obviousness theory, they have not identified a benefit from using a pivot arm suspension that a person of ordinary skill would recognize. (*See generally id.* at 70-71; RRPB at 35-36.) Rather, Respondents only establish that pivot-arm suspensions were known and even disclosed in Allen. Respondents state, "Allen states that its 'suspension system 38' is 'similar to those widely used

Public Version

in inexpensive remote-control toy cars.’ . . . That is not just motivation, it is an express teaching.” (RRPB at 36.) I agree with Respondents that Allen includes an express teaching of this limitation (see discussion above on anticipation); but I do not agree this express teaching also provides motivation to use such a suspension. I do not see Respondents’ expert supplying a motivation either. (*See generally* RX-2082C at Q171-180.) I thus cannot find Respondents have met their clear and convincing burden for this obviousness theory. *Takeda Chem. Indus., Ltd. v. Alphapharm Pty., Ltd.*, 492 F.3d 1350, 1356–57 (Fed. Cir. 2007) (“While the *KSR* Court rejected a rigid application of the teaching, suggestion, or motivation (‘TSM’) test in an obviousness inquiry, the Court acknowledged the importance of identifying ‘a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does’ in an obviousness determination.”)

Obviousness by Haegermarck

Independent claim 1 requires, “[a] floor cleaning robot.” (’090 patent at cl. 1.) I find clear and un rebutted evidence demonstrates the limitation was disclosed in Haegermarck through the identified description of “robot vacuum cleaner.” (*See* RIB at 75 (citing RX-2082C at Q307-308; RX-0082 at Abstract).)

Claim 1 further requires, “a housing and a chassis.” (’090 patent at cl. 1.) I find clear and un rebutted evidence demonstrates the limitation was disclosed in Haegermarck through the identified housing and chassis. (*See* RIB at 75-76 (citing RX-0082 at 1:9-11, 5:19-21).)

Claim 1 further requires, “wheels and at least one motor to drive the wheels disposed at least partially within the housing and configured to move the floor cleaning robot across a floor, each of the wheels being attached to the chassis via a respective arm having a distal end and a proximal end.” (’090 patent at cl. 1.) I find clear and un rebutted evidence demonstrates the first

Public Version

clause of the limitation (“wheels and at least one motor . . .”) was disclosed in Haegermarck through the identified wheels and motors. (*See* RIB at 76 (citing RX-2082C at Q321-322; RX-0082 at 3:15-17, 3:30-4:6, Figs. 1, 3).) I also find clear and un rebutted evidence demonstrates the second clause of the limitation (“each of the wheels . . .”) was disclosed in Kirkpatrick through the identified arm, chassis, and pivot pin. (*See id.* at 79 (citing RX-2082C at Q332-333; RX-0083 at Fig. 7, 9:36-39; Hr’g Tr. at 830:7-10).)

iRobot does not dispute that this limitation, and those later ones which recite further detail of the pivotable arm, are disclosed in each of Haegermarck and Kirkpatrick. (*See* CRSB at 58-65.) Rather, iRobot disputes that Kirkpatrick and Haegermarck would be obvious to combine, for a variety of reasons.

First, however, Respondents argue that Haegermarck “provides an express suggestion to combine the Haegermarck robot with a pivot-arm suspension like the one in Kirkpatrick, because pivot arms were well known mechanisms for guiding the vertical movement of wheels in suspensions.” (RIB at 81 (citing RX-2082C at Q330; RX-0082 at 4:28-30).) Respondents claim this substitution “unites old elements with no change in their respective functions’ and ‘does no more than yield predictable results.” (*Id.* (citing *KSR*, 550 U.S. at 416).) Respondents continue to argue that iRobot has failed to allege “any component of its claims that was not previously known, that any claimed component is used in a new way that changes its established function, or that the combination of the components yields more than predictable results,” and that the opposite is true. (*Id.* (citing RX-2082C at Q329-331).) Respondents also argue that iRobot’s expert admits Kirkpatrick’s system solves a problem of “skating out,” and that would motivate one of ordinary skill to solve the same problem with the same solution in Haegermarck. (*Id.* at 82 (citing CX-1824C at Q61).)

Public Version

In its responsive brief, iRobot disagrees and claims the “other guide means” invitation in Haegermarck is limited to “substitution of the vertical rail for something else to guide the vertical movement.” (CRSB at 61.) iRobot promptly concludes “[a]s such, Respondents cannot meet their clear and convincing burden [on obviousness].” (*Id.* (citing *Ivera Med. Corp. v. Hospira, Inc.*, 801 F.3d 1336, 1344 (Fed. Cir. 2015)).) iRobot adds that Haegermarck’s significant focus on its “particular wheel support design” would dissuade a person of ordinary skill to substitute it for a pivotable one. (*Id.* (referring to RX-0082 at 2:5-8).)

iRobot also argues the two references are directed to completely different applications, with Kirkpatrick not “disclos[ing] any vacuum components whatsoever” and Haegermarck not “contemplate[ing]” the “skating out” problem. (*Id.* at 64 (citing RX-0083 at 5:33-40, 15:49-51, 10:6-8; CX-1824C at Q214-220).) iRobot repeats its position that, due to Haegermarck’s focus on its suspension, “[a] POSITA reading Haegermarck would not seek to discard the crux of the reference.” (*Id.* (citing CX-1824C at Q185).) iRobot also argues the two suspension systems “use different components that restrict the operation of the wheels in different ways.” (*Id.* at 65.)

In their reply brief, Respondents point back to Haegermarck’s disclosure of “other guide means” and faults iRobot’s argument for “favor[ing] semantics over reality.” (RRPB at 40.) Respondents contend that, regardless, Kirkpatrick’s system does guide vertical movement in addition to lateral movement. (*Id.* (citing Hr’g Tr. at 375:6-9, 375:24-376:1).) Respondents also dispute there is any legal merit to iRobot’s “crux of Haegermarck” argument, citing *EWP Corp. v. Reliance Universal Inc.*, 755 F.2d 898, 907 (Fed. Cir. 1985), for the rule “[a] reference must be considered for everything it teaches by way of technology and is not limited to the particular invention it is describing and attempting to protect.” (*Id.*)

Public Version

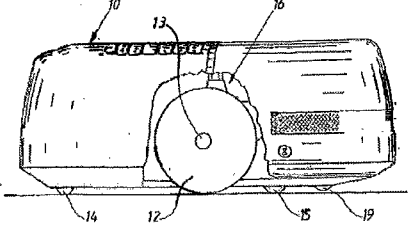
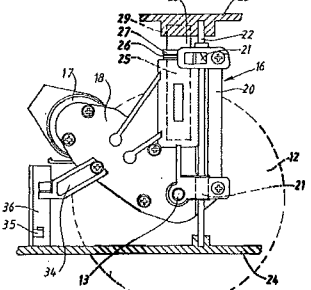
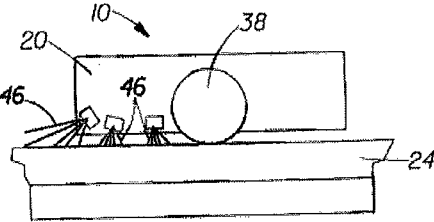
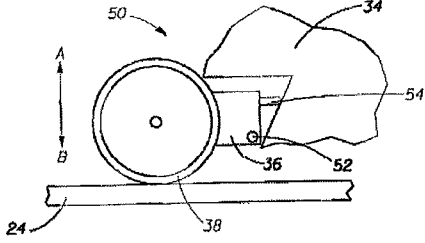
From a structural perspective, Respondents argue Haegermarck and Kirkpatrick both have arm or arm-like motor gearbox arrangements. (*Id.* at 41 (citing RX-0083 at 9:36-38, 9:58-61, Fig 7; RX-0082 at 3:30- 4:6; Figs. 4, 6).) Respondents argue it is undisputed that a POSITA could easily perform the claimed substation or that it would not produce unexpected results. (*Id.* (citing RX-2082C at Q331, 365-367).) Respondents address the “skating out” problem with:

iRobot asserts that Haegermarck does not contemplate the problem of avoiding skate-out. (CRB at 64.) But that is precisely the point: Kirkpatrick teaches a suspension system that avoids skate-out, so using it would provide an obvious benefit to the Haegermarck system. Both are small consumer-oriented vacuum robots and solving the problem of skate-out provides the same obvious benefit to Haegermarck that it does to Kirkpatrick. *See KSR*, 550 U.S. at 399 (“The proper question was whether a pedal designer of ordinary skill in the art ... would have seen an obvious benefit to upgrading Asano with a sensor”).

(*Id.* at 41.)

I find that Haegermarck and Kirkpatrick are sufficiently analogous that one of ordinary skill in the art would consider one to improve the other. The two references are in the same field of endeavor—autonomous mobile robots which do work upon a floor surface. Haegermarck is entitled “Wheel Support Arrangement for an Autonomous Cleaning Apparatus” and is a vacuum while Kirkpatrick is entitled “Autonomous Mobile Surface Treating Apparatus” and “treats” a surface. (RX-0082; RX-0083.) Additionally, both references share a focus on the suspensions of their respective autonomous mobile robots, as shown below:

Public Version

<p>Haegermarck (RX-0082)</p>	 <p>FIG. 2</p>	 <p>FIG. 4</p>
<p>Kirkpatrick (RX-0083)</p>	 <p>Fig. 5</p>	 <p>Fig. 7A</p>

Further still, Kirkpatrick mentions autonomous mobile robot vacuum cleaners in its discussion of its own prior art. (See RX-0083 at 1:12-2:10.) The references are clearly in the same field of endeavor and thus analogous.

iRobot disputes this because Kirkpatrick is not a vacuum and has functions other than surface treating, like playing music. (See CRSB at 64.) As shown by Kirkpatrick’s “Background of the Invention” discussion, this is not a persuasive position. Even then, the difference between cleaning a surface versus “treating” a surface, and an additional music player, do not take away from the overwhelming similarity of the two references shown above. Indeed, iRobot acknowledges that both are directed to mobile robot suspensions when it argues this subject matter overlap is a reason they would not be combined. (*Id.* at 64-65 (citing *Plas-Pak Indus. v. Sulzer Mixpac AG*, 600 F. App’x 755, 758 (Fed. Cir. 2015)).)

Public Version

iRobot final contends a person of ordinary skill seeking to improve Haegermarck would not consider Kirkpatrick because Kirkpatrick addresses a “skating out” problem “not contemplated by Haegermarck of the ’090 patent.” (*Id.*) To the contrary, this is the exact reason a person of ordinary skill might combine the two, to address a problem that applies equally to both robots but not already “contemplated” by one of them. *See KSR*, 550 U.S. at 417 (“[I]f a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.”). To make its point, iRobot needed to show that “skating out” does not apply to Haegermarck. This would have defeated Respondents’ primary reason for combining the two devices. Yet iRobot has not argued this. (*See* CRSB at 64-65.)

With that, I find Respondents have clearly and convincingly shown the references are analogous and a motivation to improve Haegermarck with the suspension system of Kirkpatrick.

Claim 1 further requires, “a control module disposed within the housing and directing movement of the floor cleaning robot across the floor.” (’090 patent at cl. 1.) I find clear and un rebutted evidence demonstrates the limitation was disclosed in Haegermarck through the identified microprocessor. (*See* RIB at 76 (citing RX-2082C at Q338-339; RX-0082 at 3:8-14).)

Claim 1 further requires, “at least one sensor for detecting an obstacle and communicating obstacle information to the control module so that the control module can cause the floor cleaning robot to react to the obstacle.” (’090 patent at cl. 1.) I find clear and un rebutted evidence demonstrates the limitation was disclosed in Haegermarck through the identified ultrasonic transmitters and receivers. (*See* RIB at 76 (citing RX-2082C at Q343-344; RX-0082 at 3:8-14).)

Public Version

Claim 1 further requires, “a removable bin disposed at least partially within the housing and configured to receive particulates.” (’090 patent at cl. 1.) Here, Respondents point to Haegermarck’s “container F,” as satisfying “a removable bin.” (RIB at 76 (citing RX-0082 at 3:2-6, Fig. 3).) Respondents continue:

While “container F” is illustrated in figure 3 as being a bag, not a bin, Haegermarck states that “container F” may alternatively be a “filter cassette” or a “centrifuge cyclone separator” that is “inserted” into a “chamber” in the robot. (RX-0082 at 2:25-3:2.) As Dr. Messner explained, both of these things are “removable bins.” (RX-2082C at Q351-353; *see also* Q290-291 (explaining that a cyclonic separator is a “bin”).)

(*Id.* at 77.) Respondents contend that iRobot has no real dispute over this limitation, as it was revealed at the hearing that iRobot’s expert’s opinion required reading two *alternate* structures in Haegermarck *at the same time*. (*See id.* (citing CX-1824C at Q163; Hr’g Tr. at 817:4-17; RX-0082 at 2:24-28).) In Respondents’ view, “Haegermarck discloses both a removable bin and a removable bag.” (*Id.*)

In its responsive brief, iRobot argues “Haegermarck does not disclose a removable bin as shown in the annotated figure below—only a filter cassette.” (CRSB at 59 (citing RX-0082 at 2:24-2, Fig. 3).) iRobot claims the disclosed “filter cassette” is “just a filter that removes the dirt and debris from the air before it is deposited in the bag.” (*Id.* (citing CX-1824C at Q163, 180).) iRobot claims Respondents’ expert’s testimony is “self-serving” and otherwise “fails to provide any explanation for why the disclosure of a bag necessarily discloses something entirely different.” (*Id.*) iRobot further claims its expert did not offer testimony inconsistent with Haegermarck, as “Dr. Nikos described the filter cassette as “a housing for a filter” that could be used with a removable bag.” (*Id.* (citing CX-1824C at Q163).) iRobot continues:

While Dr. Nikos testified that a filter cassette and bag could both be present in some circumstances, Dr. Nikos never testified that Haegermarck ***must always*** contain both a filter cassette and a removable bag (as opposed to a bag alone). (Resp. PostHIB at 77.) Dr. Nikos explained that

Public Version

one alternative is for the Haegermarck system to use a filter cassette and removable bag. Haegermarck does not disclose that the filter cassette and removable bag are mutually exclusive. For example, consistent with Dr. Nikos' testimony, the filter cassette can be inserted into the system to filter the incoming air and then the dirt and debris can then be deposited into a removable bag for convenient disposal. (CX-1824C, Nikos RWS at Q163.) Another alternative that Haegermarck discloses is to sometimes use a filter cassette and at other times use a bag. (RX-0082 at 2:24-3:6.) Thus, Dr. Nikos' opinion is consistent with Haegermarck and fails to show that Haegermarck renders obvious the use of a removable bin.

(*Id.* at 59-60.)

In their reply brief, Respondents disagree that the disclosed "filter cassette" is not a bin because "Haegermarck discloses removable 'cassettes' and removable 'containers' as available alternatives." (RRPB at 38 (citing RX-0082 at 2:24-28 ("cover 11 concealing a chamber in which a dust container or collector, designed as a filter cassette or a filter container F, is inserted"), 3:5-6; RX-2082C at Q351-353).) Respondents also point out Haegermarck discloses a "cyclone separator" and allege iRobot has not disputed is a removable bin. (*See id.* (citing RX-2082C at Q351-353, 290-291; RX-0082 at 2:25-3:2).)

I find the limitation is met. Haegermarck discloses:

With reference to Figs. 1-3, the autonomous cleaning apparatus, or robot vacuum cleaner in accordance with the present invention, has a circular housing 10 with a cover 11 concealing a chamber in which a dust container or collector, designed as a filter cassette or a filter container F, is inserted. Alternatively, the housing might enclose a centrifuge cyclone separator well known in the art, by means of which dust and particles are separate from the air and are collected in the dust container F.

(RX-0082 at 2:24-3:2.) Respondents' expert persuasively explained why a cyclonic separator and a filter cassette are both bins. (RX-2082 at Q290-291, 295.)

As Respondents note, iRobot does not even address the cyclonic separator disclosure, and instead attacks the "filter cassette" as "simply the housing for filter [sic] that removes the particulate from the air before it is deposited in Haegermarck's bag." (CX-1824C at Q163.)

Public Version

This does not comport with the text of Haegermarck which teaches the structure F *is a dust collector* itself and not just a filter that precedes some other collector. (RX-0082 at 2:24-27.)

Moreover, the filter in a vacuum cleans the air as it leaves whatever receptacle is the actual dust collector—not before. So iRobot’s interpretation of Haegermarck makes no sense from the start. I find the limitation is met.

Nevertheless, Respondents also contend “if Haegermarck does not disclose a removable bin, that would have been obvious from its disclosure of a bag.” (RIB at 84-85.) Respondents essentially argue bins were well known and “[t]he choice between a bin and a bag was also a design choice—and implementation detail—that was well within the realm of a person of ordinary skill. . . . It was not an inventive contribution.” (*Id.* at 84 (citing, *inter alia*, RX-2082C at Q207-208); *see id.* at 84-85 (citing RX-2062C at 47:18-48:3, 49:22-50:3, 52:2-10; RX-2042C at 113:5-9).) iRobot does not appear to meaningfully dispute this theory. (*See* CRSB at 60 (“Thus, Dr. Niko’s opinion is consistent with Haegermarck and fails to show that Haegermarck renders obvious the use of a removable bin.”).) I agree with Respondents and the unrebutted clear and convincing evidence that substitution of a bag for a bin would have been obvious.

Claim 1 further requires, “a first rotating member configured to direct particulates toward the bin.” (’090 patent at cl. 1.) I find clear and unrebutted evidence demonstrates the limitation was disclosed in Haegermarck through the identified nozzle M and brush roll S. (*See* RIB at 77-78 (citing RX-2082C at Q358-359; RX-0082 at 3:4-8, Fig. 3).)

Claim 1 further requires, “wherein one of the wheels is rotatably attached to the distal end of each arm, and the proximal end of each arm is pivotably attached to the chassis.” (’090 patent at cl. 1.) I also find clear and unrebutted evidence demonstrates the limitation was disclosed in

Public Version

Kirkpatrick through the identified arm, chassis, and pivot pin. (*See id.* at 79 (citing RX-2082C at Q332-333; RX-0083 at Fig. 7, 9:36-39; Hr’g Tr. at 830:7-10).)

Claim 1 further requires, “wherein each wheel is biased to an extended position away from the robot chassis by a spring extending between the arm and the robot chassis” and “wherein, during cleaning, the weight of the floor cleaning robot overcomes a force from the spring biasing the wheels to an extended position.” (’090 patent at cl. 1.) Respondents argue this is disclosed in Kirkpatrick by the suspension system shown in Figure 7A:

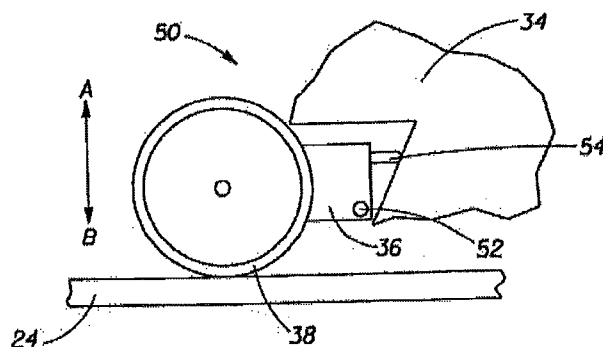


Fig. 7A

(RIB at 79 (citing RX-0083 at Fig. 7A).) Respondents highlight “resilient element 54” which Kirkpatrick describes as a “spring biased pin mounted in or on chassis 34” which “resists ‘upward rotation of motor gearbox 36 in direction A.’” (*Id.* (citing RX-0083 at 9:44-55).) Respondents allege “Kirkpatrick explains that this arrangement enables ‘suspension sensors’ that determine if the robot is ‘lifted up’ or if ‘one or both wheels loses contact with the floor.’” (*Id.* (citing RX-0083 at 10:9-19, 10:41-51).) Respondents argue this meets the limitations.

In its responsive brief, iRobot disputes the limitation regarding “overcomes a force” is disclosed in Kirkpatrick. (*See* CRSB at 62-63.) Specifically, iRobot argues that full retraction of the wheels is what the claim requires, whereas Respondents have only shown “partial” retraction.

Public Version

(See CRSB at 62 (quoting '090 patent specification).) iRobot claims that reading the limitation otherwise would “render[] the entire limitation superfluous.” (*Id.*) iRobot continues:

Kirkpatrick does not disclose a system in which the weight overcomes the force of the spring (CX-1824C, Nikos RWS at Q193). To the contrary, the springs in Kirkpatrick necessarily maintain the robot above the cleaning surface. (*Id.*) Even Dr. Messner admitted that the Kirkpatrick system maintains the robot at some height above the cleaning surface. (Hrg. Tr., Messner at 378:2-8.)

(*Id.*) iRobot views Kirkpatrick as disclosing “that the robot does not overcome the force of the resilient element during operation.” (*Id.* (citing RX-0083 at 9:64-10:3; CX-1824C at Q190).) iRobot reasons that Kirkpatrick’s solution to “skating out” is precisely why it does not practice this limitation as “Dr. Messner admitted that the weight of the robot would not completely compress the springs absent external downward force.”

In their reply brief, Respondents describe iRobot as “overcomplicating” the “overcomes the force of the spring” “beyond what the patent contemplated and beyond what its own infringement theory applies.” (RRPB at 38-39.) Respondents provide an illustration (an unnumbered demonstrative) to illustrate how the weight of Kirkpatrick would overcome the spring bias force. (*Id.* at 39.) Respondents further point to Kirkpatrick’s disclosure of a “contact sensor” that “sense if pin 56 has reached a predetermined extended position, i.e. the position that is occupied by pin 56 when [the robot] is lifted.” (*Id.* (citing RX-0083 at 10:42-47).) Respondents reason that this feature would not work “if the wheels didn’t move up with the robot was set on the ground.” (*Id.*) Respondents conclude iRobot’s infringement theory matches their own invalidity approach with Kirkpatrick. (*See id.* at 39-40.)

I find the limitation is met. As Respondents point out, Kirkpatrick discloses:

Similarly, another contact sensor 62 may be positioned within each of the motor gearboxes 62 to sense if pin 56 has reached a predetermined extended position, i.e., the position that is occupied by pin 56 when

Public Version

autonomous mobile surface treating apparatus 10 is lifted or at least one of the wheels 38 loses contact with the floor or other surface 24.

(RX-0083 at 10:42-47.) This embodiment is shown in Figure 7B:

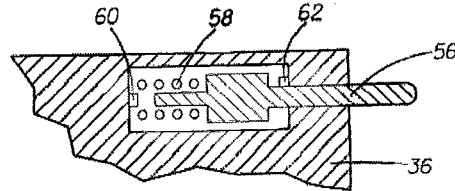


Fig. 7B

(*Id.* at Fig. 7B.) Based on this passage and figure, the only way contact sensor 62 will sense pin 56 when the robot is “lifted or at least one of the wheels 38 loses contact with the floor” is if contact sensor 62 *does not already* sense pin 56 when the robot is on the ground. Thus, when on the ground, pin 56 must be distanced from contact sensor 62. The only way for this to happen is if spring 58 is compressed; *i.e.*, the spring force is overcome by the weight of the robot. Thus, the limitation is inherent in Kirkpatrick. This conclusion is in no way weakened by iRobot’s assertion that “[t]o the contrary, the springs in Kirkpatrick necessarily maintain the robot above the cleaning surface.” (CRSB at 62.)

iRobot also contends reading the limitation in a way that allows for partial retraction or compression of the spring renders the entire limitation superfluous. (CRSB at 62.) iRobot reasons:

Despite the teaching of the '090 patent that the weight of the robot “gravitationally biases each main wheel subassembly 42A, 42B into a retracted or operating position wherein axis of rotation of the wheels are approximately coplanar with bottom plane of the chassis 21,” Respondents identify only a “partial” retraction. (Resp. PostHB at 80.) This interpretation is unreasonable and renders this entire limitation superfluous.

(*Id.*) The problem here is two-fold. First, iRobot does not provide a cite to the '090 patent to show this “teaching;” and second, if it had, the citation would be to the specification at 6:23-28

Public Version

and not to any claim. Thus, iRobot makes an argument about rendering claim language superfluous without identifying that language. This is far from persuasive. Indeed, upon my own review, I do not find any claim language that is rendered superfluous by a reading of “overcomes a force from the spring” that allows for partial retraction. Again, I find the limitation is met.

b. Claim 2

Dependent claim 2 requires, “[t]he floor cleaning robot of claim 1, further comprising a second rotating member configured to cooperate with the first rotating member to direct particulates toward the bin.” (’090 patent at cl. 2.)

Obviousness by Allen

Respondents allege claim 2 is obvious over Allen in light of Soupert. (RIB at 71-73.) Specifically, Respondents explain “Allen discloses one primary brush for picking up dirt. However, it would have been obvious to use two brushes.” (*Id.* at 71.) According to Respondents, Allen itself identifies such a prior art teaching in Soupert (RX-0089). (*Id.* (citing RX-0080 at 1:48-55).) Respondents allege “Soupert discloses using two counter-rotating brushes to pick up dirt” (*id.* at 72 (citing RX-0089 at Fig. 1, 7:9-18; RX-2082C at Q117-119)), and it would have been obvious to use two in Allen “because a pair of counter-rotating brushes would be more effective at picking up dirt than a single brush” (*id.* (citing RX-2082C at Q264-269).) Respondents also claim that Soupert “explains that one and two brush designs are alternatives for one another.” (*Id.* (citing RX-0089 at 5:2-3, 7:9-11).)

In its responsive brief, iRobot first reminds that claim 2 is dependent on claim 1, and if claim 1 has not been shown to be obvious, then neither can claim 2. (CRSB at 55.) Moving on, iRobot claims “no motivation to combine Allen and Soupert exists.” (*Id.* (citing CX-1824C at Q136).) iRobot claims Soupert “does not disclose a floor cleaning robot as described in the ’090

Public Version

patent and is directed to a different field of endeavor than Allen and the '090 patent.” (*Id.* (citing CX-1824C at Q143-144).)

More specifically, iRobot claims Soupert “is directed to a vehicle that is so large that it incorporates flashing lights and horns to warn people nearby of its approach.” (*Id.* (citing RX-0080 at 1:7-10, 9:53-57; RX-0089 at 6:9-11, 8:7-21; CX-1824C at Q135-38).) iRobot contends Soupert’s “vast size” automatically makes it “inapplicable to the innovations embodied in the '090 patent.” (*Id.* (citing Hr’g Tr. at 765:13-17); *see also id.* at 57-58.) iRobot also claims Soupert and Allen have incompatible designs. (*Id.* at 55-56.) iRobot claims Allen has an external computer to cut costs, whereas Soupert has an on-board computer which is noted by Soupert as expensive. (*Id.* at 56 (citing RX-0080 at 9:50-53, 23:2-4, 31:47-54; RX-0089 at 1:61-2:16, 2:32-37, 4:21-31, 4:38-50).) iRobot also claims Allen disparages Soupert for requiring “an operator to manually guide the system during a learning mode of operation.” (*Id.* at 57 (referring to RX-0080 at 1:48-55; 31:51-58; CX-1824C at Q148).) Lastly, iRobot argues:

A POSITA would not seek to combine Allen with Soupert because Allen specifically describes Soupert as having a “laborious, time-consuming, or error-prone installation process [that would] be subject to substantial resistance from consumers.” (CX-1824C, Nikos RWS at Q148; RX-0080 at 1:48-55.) Allen’s disparagement of Soupert dispenses with any motivation to make the combination Respondents allege. Obviousness may be defeated if the prior art teaches away from the invention. *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 567 F.3d 1314, 1326 (Fed. Cir. 2009)

(*Id.* at 58.)

In their reply brief, Respondents argue that all iRobot has done is identify a variety of differences between Allen and Soupert, like size, learning operations, or video cameras. (*See* RRPB at 36-37.) Respondents counter that they “are not arguing that a POSITA would merge the smaller Allen robot with the larger Soupert robot. Rather, Respondents have shown that it would be obvious to modify Allen’s singular agitator brush to use a pair of counter-rotating

Public Version

brushes—as shown in Soupert.” (*Id.* at 37.) Respondents continue to urge that Allen, through its statement “a variety of equivalent configurations will readily suggest themselves,” “provides an express teaching and motivation to look at other references.” (*Id.* (citing RX-0080 at 14:57-60).) Respondents, through their expert, repeat that “it would make sense to add a pair of counter-rotating brushes because that would be more effective at picking up dirt than a single brush.” (*Id.* (citing RX-2082C at Q264-269).)

I find clear and convincing evidence supports modifying the brush in Allen to resemble the counter-rotating dual brush in Soupert. iRobot’s arguments to the contrary are misplaced as they address combining Soupert as a whole with Allen. As Respondents note in their reply brief, an overall combination between the two machines is not their theory—just the brushes are combined. (*See* RRPB at 37.) Both machines use rotating brushes to lift particulates off the floor and into a bin, and are thus analogous or at least directed to the same problem. To this end, Respondents’ expert provides clear and persuasive testimony on why a second brush would benefit Allen’s ability to pick up particulates and would not be beyond ordinary skill to implement. (*See* RX-2082C at Q266-269, 275-276, 280, 283.) When this modification is done, the limitation of dependent claim 2 is met. iRobot offers no real resistance to this limited modification.

Obviousness by Haegermarck

For dependent claim 2, and claims 3 and 4, Respondents introduce the Tangenberg reference (RX-0090) into the combination of Haegermarck and Kirkpatrick. (*See* RIB at 82-84.) Respondents argue “[i]t would have been obvious to add the Tangenberg side brush to the modified Haegermarck robot, in order to allow it to clean in corners.” (*Id.* at 82 (referring to RX-0090 at 3:4-9, Figs. 1-3; RX-2082C at Q120-123).) Respondents continue:

Public Version

This is exactly the sort of teaching that a person of ordinary skill in the art would look to in designing a cleaning robot. (RX-2082C at Q270-274.) A person of ordinary skill in the art would recognize that it was desirable for a floor cleaning robot such as the modified Haegermarck robot to be able to clean in corners, and thus would have been motivated to apply the solution described in Tangenberg *i.e.*, adding side brushes to reach into the corners and throw dirt inward so it can be taken up by the main brush. (RX-2082C at Q387.)

(*Id.*) Respondents argue iRobot's agreement agrees with this assessment. (*Id.* at 83 (citing Hr'g Tr. at 798:18-22).) Respondents thus conclude adding a side brush, as in Tangenberg, would have been obvious under *KSR*, 550 U.S. at 417, and when done, the limitations of claim 2 (and claims 3 and 4) are met. (*Id.*)

In its responsive brief, iRobot does not dispute Tangenberg discloses a side brush or that it would not have been obvious to add such a brush to the combination of Haegermarck and Kirkpatrick. (*See* CRSB at 65; RRPB at 41-42.) Rather, iRobot rests on its earlier contention that it would not have been obvious to combine Haegermarck and Kirkpatrick, and due to that, the further combination with Tangenberg also fails. (*Id.*)

I find clear and convincing evidence shows the proposed modification, adding a rotating side brush to direct particulates toward the center of the robot as in Tangenberg, would have been recognized by a person of ordinary skill as beneficial to Haegermarck and Kirkpatrick, and further, would not have exceeded that person's skill to implement. When the modification is made, I find claim 2 is met.

c. Claim 3

Dependent claim 3 requires, "[t]he floor cleaning robot of claim 2, wherein the first rotating member contacts the floor and agitates particulates and directs the particulates toward the second rotating member." ('090 patent at cl. 3.)

Public Version

Obviousness by Allen

Dependent claim 3 adds detail to the brush arrangement of dependent claim 2. Both iRobot and Respondents address claim 3 concurrently with claim 2. (RIB at 73; CRSB at 55-58.) As determined above, I find it would have been obvious to add a second counter-rotating brush to Allen as arranged in Soupert. When this is done, the limitation of dependent claim 3 is met by the combination.

Obviousness by Haegermarck

Dependent claim 3 adds detail to the brush arrangement of dependent claim 2. Both iRobot and Respondents address claim 3 concurrently with claim 2. (RIB at 83-84; CRSB at 65.) As determined above, I find it would have been obvious to add a side brush to Haegermarck and Kirkpatrick as disclosed in Tangenberg. When this is done, the limitation of dependent claim 3 is met by the combination.

d. Claim 4

Dependent claim 4 requires, “[t]he floor cleaning robot of claim 3, wherein the second rotating member is positioned to receive particulates from the first rotating member and direct the particulates toward the removable bin.” (’090 patent at cl. 4.)

Obviousness by Allen

Dependent claim 4 adds detail to the brush arrangement of dependent claim 3. Both iRobot and Respondents address claim 4 concurrently with claims 2 and 3. (RIB at 73; CRSB at 55-58.) As determined above, I find it would have been obvious to add a second counter-rotating brush to Allen as arranged in Soupert. When this is done, the limitation of dependent claim 4 is met by the combination.

Public Version

Obviousness by Haegermarck

Dependent claim 4 adds detail to the brush arrangement of dependent claim 3. Both iRobot and Respondents address claim 4 concurrently with claims 2 and 3. (RIB at 83-84; CRSB at 65.) As determined above, I find it would have been obvious to add a side brush to Haegermarck and Kirkpatrick as disclosed in Tangenberg. When this is done, the limitation of dependent claim 4 is met by the combination.

e. Claim 5

Obviousness by Allen

As discussed above, I find the limitation of dependent claim 5 is disclosed by Allen. Respondents also allege Allen renders claim 5 obvious (RIB at 69 (implied by alleging further dependent claim 7 is obvious), but do not discuss modifying Allen in any way with respect to its subject matter (*see id.* at 69-71). Thus, the obviousness of claim 5 by Allen rises or falls with the claim 1, which, as determined above, has not been shown to be anticipated or obvious.

Obviousness by Haegermarck

Dependent claim 5 requires, “[t]he floor cleaning robot of claim 1, further comprising an air moving system disposed at least partially within the housing and configured to ingest particulates and direct particulates toward the removable bin.” (’090 patent at cl. 5.) I find clear and un rebutted evidence demonstrates the limitation was disclosed in Haegermarck through the identified vacuum system and air filter. (See RIB at 78 (citing RX-2082C at Q380-381; RX-0082 at 3:2-8, 6:23-26).)

f. Claim 7

Obviousness by Allen

As discussed above, I find the limitation of dependent claim 7 is disclosed by Allen. Respondents also allege Allen renders claim 7 obvious (RIB at 69), but do not discuss modifying

Public Version

Allen in any way with respect to its subject matter (*see id.* at 69-71). Thus, the obviousness of claim 7 rises or falls with claim 1, which, as determined above, has not been shown to be anticipated or obvious.

Obviousness by Haegermarck

Dependent claim 7 requires, “[t]he floor cleaning robot of claim 5, wherein air moved by the air moving system passes through a filter before exiting the housing.” (’090 patent at cl. 7.) I find clear and un rebutted evidence demonstrates the limitation was disclosed in Haegermarck through the identified vacuum system and air filter. (*See* RIB at 78 (citing RX-2082C at Q380-381; RX-0082 at 3:2-8, 6:23-26).)

g. Claim 10

Independent claim 10 is very similar to independent claim 1. Both iRobot and Respondents do not treat claim 10 any differently than claim 1. (*See* RIB at 69-70, 78; CRSB at 63-64.) Under the present circumstances, I agree claim 1 is effectively representative of claim 10. Thus, I find claim 10 has been shown to be obvious by the combinations involving Haegermarck, but not Allen.

h. Claim 17

Independent claim 17 is very similar to independent claim 1 and dependent claim 5. Both iRobot and Respondents do not treat claim 17 any differently than claims 1 and 5. (*See* RIB at 69-70, 78; CRSB at 63-64.) Under the present circumstances, I agree claims 1 and 5 are effectively representative of claim 17. Thus, I find claim 17 has been shown to be obvious by the combinations involving Haegermarck, but not Allen.

i. Secondary Considerations

Secondary considerations of non-obviousness are used to overturn an otherwise prima facie case of obviousness. *Pfizer, Inc. v. Apotex, Inc.*, 480 F.3d 1348, 1360 (Fed. Cir. 2007). As

Public Version

discussed above, I do find the challenged claims obvious. Additionally, much of the parties' arguments concerning secondary considerations has already been captured above.

For the '090 patent specifically, iRobot argues "[e]fforts to copy, commercial success, and praise by others" have a clear relationship to this patent. (CIB at 113.) iRobot contends "iLife specifically looked at the components claimed in the '090 patent and addressed in this Investigation, including the housing and chassis." (*Id.* (citing CX-0305C at 96:2-3).) iRobot then ties the '090 patent's "innovative suspension system" to the overall cleaning efficiency of the robots which has been praised. (*See id.* (citing CX-0220C at Q670-674; CX-0968C; CX-0418C).) In its responsive brief, iRobot explains its view that:

It is self-evident that consumers would not purchase hundreds of millions of dollars of floor cleaning robots if those robots could not effectively navigate a floor surface because it has rugs or door thresholds. The '090 patent, which claims a specific suspension system for the drive wheels of a floor cleaning robot, is what enables the robot to efficiently navigate a floor surface.

(CRSB at 86.)

As with the previous two patents, Respondents generally dispute the effect of the alleged secondary considerations due to a lack of nexus to the '090 patent's claims *and* inventive elements. (*See generally* RIB at 123-124; RRSB at 59 (citing *In re Kao*, 639 F.3d at 1068); RRPB at 57-60.)

I find, as with the '553 and '490 patents, only minimal evidence in the record of a connection between iRobot's identified copying, praise, and commercial success and the patented and novel features of the '090 patent. Indeed, for the '090 patent specifically, I struggle to determine (as iRobot has not identified) which claim limitations represent the inventive concept as each seem very ordinary—*e.g.*, obstacle sensor, removable bin, or wheels on a spring-biased suspension arm. These features *might* relate to an overall end result of increased cleaning

Public Version

efficiency, however, which iRobot is praised for. Thus, I find only secondary considerations of commercial success and praise have nominal weight for the claims of the '090 patent, but ultimately do not overturn my finding that claims 1, 2, 3, 4, 5, 7, 10, and 17 would have been obvious.

VII. U.S. PATENT NO. 9,038,233

A. Level of Ordinary Skill in the Art

As mentioned above, in Order No. 27 I found a person of ordinary skill in the art for each of the asserted patents at the time of the invention would be an individual with a bachelor's degree in physics, electrical engineering, mechanical engineering, computer science, or a related discipline, and has at least three years of experience in the design and implementation of robots and embedded systems, or some other equivalent combination of education and experience.

(Order No. 27 at 9.)

B. Claims-at-Issue

The following claims of the '233 patent are at-issue in this investigation, either through allegations of infringement or technical prong domestic industry:

1. A self-propelled floor-cleaning robot comprising:

a housing defining a housing perimeter;

a powered primary brush assembly disposed within the housing perimeter and positioned to engage a floor surface, the primary brush assembly being configured to rotate about an axis generally parallel to the floor surface;

a cliff detector carried by the housing and configured to direct a beam toward the floor surface and to respond to a falling edge of the floor surface; and

a powered side brush extending beyond the housing perimeter and positioned to brush floor surface debris from beyond the housing perimeter, the side brush being configured to rotate about an axis generally perpendicular

Public Version

to the floor surface and to rotate in a direction to direct debris toward the robot along a projected direction of movement of the powered primary brush assembly, the side brush having bundles of bristles and being positioned such that the bundles of bristles pass between the cliff detector and the floor surface during a rotation of the side brush around the axis, the bundles of bristles being separated by a gap, the gap being configured to prevent occlusion of the cliff detector beam during at least part of the rotation of the side brush around the axis;

a particulate receptacle positioned to receive and collect particulates brushed from the floor surface by the primary brush assembly and the powered side brush;

an obstacle detector responsive to obstacles encountered by the robot; and

a control circuit in electrical communication with a motor drive and configured to control the motor drive to maneuver the robot about detected obstacles across the floor surface during a floor-cleaning operation.

9. The floor cleaning robot of claim 1, further comprising at least one friction pad secured to the underside of the housing and positioned to engage the floor surface and inhibit robot motion when a forward wheel of the robot travels beyond a falling edge of the floor surface.

10. The floor cleaning robot of claim 1, wherein the obstacle detector comprises a displaceable bumper disposed at the housing perimeter, and a bumper displacement sensor responsive to displacement of the bumper with respect to the housing.

11. The floor cleaning robot of claim 1, wherein the control circuit is configured to move the robot in a wall-following mode to maneuver the robot along a wall in a direction that places the side brush against the wall.

14. The floor cleaning robot of claim 1, wherein a portion of the bundles of bristles of the powered side brush passes between a portion of a drive wheel of the robot and the cleaning surface during the rotation of the side brush around the axis.

15. A self-propelled floor-cleaning robot comprising:

Public Version

wheels operably connected to a motor drive to propel the robot across the floor surface;

a controller in electrical communication with the motor drive and configured to control the motor drive to autonomously maneuver the robot about detected obstacles encountered on the floor surface during a floor-cleaning operation;

a housing defining a housing perimeter;

a cleaning head disposed within the housing perimeter and positioned to engage a floor surface;

a cliff detector carried by the housing and configured to direct a beam toward the floor surface and to respond to a falling edge of the floor surface; and

a powered rotating side brush extending beyond the housing perimeter and positioned to brush floor surface debris from beyond the housing perimeter toward a projected path of the cleaning head, the powered rotating side brush rotating in a direction that brushes debris toward the robot ahead of a rotating axis of the brush along the projected path of the cleaning head, the side brush having bundles of bristles and being positioned such that the bundles of bristles pass between the cliff detector and the floor surface during a rotation of the side brush around the axis, the bundles of bristles being separated by a gap, the gap being configured to prevent occlusion of the cliff detector beam during at least a portion of a rotation of the side brush around the axis;

the controller being configured to move the robot in a wall-following mode to maneuver the robot along a wall in a direction that places the powered rotating side brush adjacent the wall.

16. The floor cleaning robot of claim 15, wherein the cleaning head comprises a powered primary brush assembly disposed within the housing perimeter and positioned to engage the floor surface.

(CIB at 9.)

Public Version

C. Claim Construction

As part of the Markman process, the following terms of the '233 patent were construed, either as-agreed between the parties or determined by Order No. 27:

Claim Term	Construction
passes between a portion of a drive wheel of the robot and the cleaning surface (claim 14)	passes under a portion of a drive wheel not in contact with the floor surface being cleaned.
the side brush having bundles of bristles and being positioned such that the bundles of bristles pass between the cliff detector and the floor surface during a rotation of the side brush around the axis, the bundles of bristles being separated by a gap, the gap being configured to prevent occlusion of the cliff detector beam during at least part of the [/a portion of a] rotation of the side brush around the axis (claims 1, 15)	the bundles of bristles pass through the area the light beam occupies when it is on, during a rotation of the side brush around the axis, the bundles of bristles being separated by a gap, the gap being configured to prevent occlusion of the cliff detector beam

(See Order No. 27 at 10.) The parties do not discuss any further discrete claim construction issues. (See CIB at 85; see generally RIB at 123.)

D. Infringement

According to iRobot's post-hearing *briefing*,²¹ the following products are accused of infringing the following claims of the '090 patent:

Product	Claims
iLife A6 products	1, 10, 11, 14, 15, 16
bObi products	1, 11, 14, 15, 16

²¹ Here, iRobot misrepresents the accused products. Its briefing implies the Hoover Rogue/Y1 products infringe claim 14 in one place (CIB at 93), but states they are specifically not accused later on (*id.* at 99, n. 18).

Public Version

Bob products	1, 10, 11, 15, 16
Hoover Quest 1000	1, 10, 11, 14, 15, 16
Hoover Rogue/Y1	1, 10, 11, 15, 16
Hoover Y2	1, 10, 11, 15, 16

1. Direct Infringement by the A6 Series

As reflected in the parties' post-hearing briefing, infringement by the iLife A6 products under the '233 patent is not in dispute. (*See, e.g.*, CIB at 85 (citing RX-2088C at Q101); RRSB at 46-56.) These undisputed claim limitations are summarized below, and I find that iRobot has shown the A6 products infringe claims 1, 10, 11, 14, 15, and 16.

Independent claim 1 requires, “[a] self-propelled floor-cleaning robot.” ('233 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the iLife A6 products are robots vacuum cleaner that moves itself around a room for cleaning purposes. (*See* CIB at 85 (citing CX-0220C at Q117, 120-121; CX-1147C at RFA No. 25.) The limitation is met.

Claim 1 further requires, “a housing defining a housing perimeter.” ('233 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the iLife A6 products include a rigid structure which serves as a housing. (*See* CIB at 85 (citing CX-0220C at Q22, 118).) The limitation is met.

Claim 1 further requires, “a powered primary brush assembly disposed within the housing perimeter and positioned to engage a floor surface, the primary brush assembly being configured to rotate about an axis generally parallel to the floor surface.” ('233 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the iLife A6 products include a main brush

Public Version

which contacts the ground so as to pick up particulates and whose axis is parallel to the ground. (See CIB at 85-86 (citing CX-0220C at Q28, 119).) The limitation is met.

Claim 1 further requires, “a cliff detector carried by the housing and configured to direct a beam toward the floor surface and to respond to a falling edge of the floor surface.” (’233 patent at cl. 1.) I find credible and unrebutted testimony demonstrates the iLife A6 products include a sensor on the underside of the robot which detects changes in the distance to the surface the robot rides on. (See CIB at 86 (citing CX-0220C at Q25-26, 120; CX-0305C at 52:16-20, 53:18-20; 53:22-24; CX-0278C at 105:2-11; CX-1147C at RFA No. 40).) The limitation is met.

Claim 1 further requires:

a powered side brush extending beyond the housing perimeter and positioned to brush floor surface debris from beyond the housing perimeter, the side brush being configured to rotate about an axis generally perpendicular to the floor surface and to rotate in a direction to direct debris toward the robot along a projected direction of movement of the powered primary brush assembly, the side brush having bundles of bristles and being positioned such that the bundles of bristles pass between the cliff detector and the floor surface during a rotation of the side brush around the axis, the bundles of bristles being separated by a gap, the gap being configured to prevent occlusion of the cliff detector beam during at least part of the rotation of the side brush around the axis.

(’233 patent at cl. 1.) I find credible and unrebutted testimony demonstrates the iLife A6 products includes a powered side brush which rotates around an axis perpendicular to that of the main brush (*i.e.*, perpendicular to the ground) and assist in directing particulates that lie outside of the housing’s perimeter over to the main brush for pickup. (See CIB at 86 (citing CX-0220C at Q121-122; CX-0278C at 105:12-17).) The side brush also includes bristles which, due to their length, pass through the area the light beam occupies when it is on, and also includes gaps which are so large it is more likely than not that the beam passes through without any occlusion. (See

Public Version

CX-0220C at Q122 (citing CX-0215C at 1219; CX-0637C at 335; CX-0831 at 7339-7347); CPX-0018.) Thus, the limitation is met.

Claim 1 further requires, “a particulate receptacle positioned to receive and collect particulates brushed from the floor surface by the primary brush assembly and the powered side brush.” (’233 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the iLife A6 products include a removable bin which receives particulates picked up from the ground’s surface including those swept by the powered main and side brushes. (See CIB at 86 (citing CX-0220C at Q27, 123; CX-0278C at 69:22-70:22; CX-1147C at RFA No. 58).) The limitation is met.

Claim 1 further requires, “an obstacle detector responsive to obstacles encountered by the robot.” (’233 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the iLife A6 products include bump and proximity sensors to detect contacted obstacles and those at a distance, and, in response to this detection, the robot will change its movement. (See CIB at 86-87 (citing CX-0220C at Q124-126; CX-0305C at 28:20-22, 42:13-15, 51:9-20, 53:16-20; CX-0306C at 124:12-24, 134:11-16).) The limitation is met.

Claim 1 further requires, “a control circuit in electrical communication with a motor drive and configured to control the motor drive to maneuver the robot about detected obstacles across the floor surface during a floor-cleaning operation.” (’233 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the iLife A6 products include a microcontroller that connects to wheel motors and sensors to navigate the robot around a room. (See CIB at 87 (citing CX-0220C at Q25, 126-127).) The limitation is met.

Dependent claim 10 requires, “[t]he floor cleaning robot of claim 1, wherein the obstacle detector comprises a displaceable bumper disposed at the housing perimeter, and a bumper

Public Version

displacement sensor responsive to displacement of the bumper with respect to the housing.” (’233 patent at cl. 10.) I find credible and un rebutted testimony demonstrates the iLife A6 products include a bump sensor at a leading edge of the robot’s housing which, when depressed by an obstacle, triggers a signal to the microcontroller. (See CIB at 87 (citing CX-0220C at Q26, 128; CX-0305C at 28:20-22; 43:13-215, 51:14-20).) The limitation is met.

Dependent claim 11 requires, “[t]he floor cleaning robot of claim 1, wherein the control circuit is configured to move the robot in a wall-following mode to maneuver the robot along a wall in a direction that places the side brush against the wall.” (’233 patent at cl. 11.) I find credible and un rebutted testimony demonstrates the iLife A6 products include a wall-following mode which places the powered side brush up against the followed wall. (See CIB at 87-88 (citing CX-0220C at Q25, 129-130; CX-0305C at 50:25-51:4).) The limitation is met.

Dependent claim 14 requires, “[t]he floor cleaning robot of claim 1, wherein a portion of the bundles of bristles of the powered side brush passes between a portion of a drive wheel of the robot and the cleaning surface during the rotation of the side brush around the axis.” (’233 patent at cl. 14.) I find credible and un rebutted testimony demonstrates the iLife A6 products include a region under the wheel which is traversed by the bristles of the powered side brush. (See CIB at 88 (citing CX-0220C at Q131; Hr’g Tr. at 803:1-16).) The limitation is met.

Independent claim 15 requires, “[a] self-propelled floor-cleaning robot.” (’233 patent at cl. 15.) I find credible and un rebutted testimony demonstrates the iLife A6 products meet this limitation for the same reasons discussed under claim 1, above.

Claim 15 further requires, “wheels operably connected to a motor drive to propel the robot across the floor surface.” (’233 patent at cl. 15.) I find credible and un rebutted testimony demonstrates the iLife A6 products meet this limitation for the same reasons discussed under

Public Version

claim 1 of the '090 patent. (See CIB at 88 (referring to similar limitation in the '090 patent).)

The limitation is met.

Claim 15 further requires, “a controller in electrical communication with the motor drive and configured to control the motor drive to autonomously maneuver the robot about detected obstacles encountered on the floor surface during a floor-cleaning operation.” ('233 patent at cl. 15.) I find credible and un rebutted testimony demonstrates the iLife A6 products meet this limitation for the same reasons discussed under claim 1, above.

Claim 15 further requires, “a housing defining a housing perimeter.” ('233 patent at cl. 15.) I find credible and un rebutted testimony demonstrates the iLife A6 products meet this limitation for the same reasons discussed under claim 1, above.

Claim 15 further requires, “a cleaning head disposed within the housing perimeter and positioned to engage a floor surface.” ('233 patent at cl. 15.) I find credible and un rebutted testimony demonstrates the iLife A6 products meet this limitation for the same reasons discussed under claim 1, above.

Claim 15 further requires, “a cliff detector carried by the housing and configured to direct a beam toward the floor surface and to respond to a falling edge of the floor surface.” ('233 patent at cl. 15.) I find credible and un rebutted testimony demonstrates the iLife A6 products meet this limitation for the same reasons discussed under claim 1, above.

Claim 15 further requires:

a powered rotating side brush extending beyond the housing perimeter and positioned to brush floor surface debris from beyond the housing perimeter toward a projected path of the cleaning head, the powered rotating side brush rotating in a direction that brushes debris toward the robot ahead of a rotating axis of the brush along the projected path of the cleaning head, the side brush having bundles of bristles and being positioned such that the bundles of bristles pass between the cliff detector and the floor surface during a rotation of the side brush around the axis,

Public Version

the bundles of bristles being separated by a gap, the gap being configured to prevent occlusion of the cliff detector beam during at least a portion of a rotation of the side brush around the axis.

(’233 patent at cl. 15.) I find credible and un rebutted testimony demonstrates the iLife A6 products meet this limitation for the same reasons discussed under claim 1, above.

Claim 15 further requires, “the controller being configured to move the robot in a wall-following mode to maneuver the robot along a wall in a direction that places the powered rotating side brush adjacent the wall.” (’233 patent at cl. 15.) I find credible and un rebutted testimony demonstrates the iLife A6 products meet this limitation for the same reasons discussed under claim 11, above.

Dependent claim 16 requires, “[t]he floor cleaning robot of claim 15, wherein the cleaning head comprises a powered primary brush assembly disposed within the housing perimeter and positioned to engage the floor surface.” (’233 patent at cl. 16.) I find credible and un rebutted testimony demonstrates the iLife A6 products meet this limitation for the same reasons discussed under claim 1, above.

2. Direct Infringement by the bObsweep Products

As reflected in the parties’ post-hearing briefing, infringement by the bObsweep Products under the ’233 patent is not in dispute. (*See, e.g.*, CIB at 89-93; RRSB at 46-56.) These undisputed claim limitations are summarized below, and I find that iRobot has shown the bObi products infringe claims 1, 11, 14, 15, 16; and the Bob products infringe claims 1, 10, 11, 15, 16.

Independent claim 1 requires, “[a] self-propelled floor-cleaning robot.” (’233 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the bObsweep Products are is a robot vacuum cleaners that move themselves around a room for cleaning purposes. (*See* CIB at 89 (citing CX-0220C at Q60-62, 71-73, 173; CX-0357C at 76:20-25).) The limitation is met.

Public Version

Claim 1 further requires, “a housing defining a housing perimeter.” (’233 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the bObsweep Products include a rigid structure which serves as a housing. (See CIB at 89 (citing CX-0220C at Q63, 75, 143, 174; CX-0347C at 71:6-25; 94:12-95:24).) The limitation is met.

Claim 1 further requires, “a powered primary brush assembly disposed within the housing perimeter and positioned to engage a floor surface, the primary brush assembly being configured to rotate about an axis generally parallel to the floor surface.” (’233 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the bObsweep Products include a main brush which contacts the ground so as to pick up particulates and whose axis is parallel to the ground. (See CIB at 89 (citing CX-0220C at 69, 82, 144-147, 175-178; CX-0347C at 87:22-91:20, 101:23-103:19).) The limitation is met.

Claim 1 further requires, “a cliff detector carried by the housing and configured to direct a beam toward the floor surface and to respond to a falling edge of the floor surface.” (’233 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the bObsweep Products include a sensor on the underside of the robot which detects changes in the distance to the surface the robot ride on. (See CIB at 89-90 (citing CX-0220C at Q67, 78-79, 148-150, 179-180; CX-0329C at 11:22-12:6, 96:6-23, 91:9-15, 92:14-93:8).) The limitation is met.

Claim 1 further requires:

a powered side brush extending beyond the housing perimeter and positioned to brush floor surface debris from beyond the housing perimeter, the side brush being configured to rotate about an axis generally perpendicular to the floor surface and to rotate in a direction to direct debris toward the robot along a projected direction of movement of the powered primary brush assembly, the side brush having bundles of bristles and being positioned such that the bundles of bristles pass between the cliff detector and the floor surface during a rotation of the side brush around the axis, the bundles of bristles being separated by a gap, the gap

Public Version

being configured to prevent occlusion of the cliff detector beam during at least part of the rotation of the side brush around the axis.

(’233 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the bObsweep Products include a powered side brush which rotates around an axis perpendicular to that of the main brush (*i.e.*, perpendicular to the ground) and assists in directing particulates that lie outside of the housing’s perimeter over to the main brush for pickup. (*See* CIB at 90 (citing CX-0220C at Q69, 82-83, 151-152, 181-182; CX-0347C at 87:22-91:20, 102:19-103:19).) The side brush also includes bristles which, due to their length, pass through the area the light beam occupies when it is on, and also includes gaps which are so large it is more likely than not that the beam passes through without any occlusion. (*See* CX-0220C at Q152 (citing CX-1765C; CX-1016), 182; CPX-0006; CPX-0007.) Thus, the limitation is met.

Claim 1 further requires, “a particulate receptacle positioned to receive and collect particulates brushed from the floor surface by the primary brush assembly and the powered side brush.” (’233 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the bObsweep Products include a removable bin which receives particulates picked up from the ground’s surface including those swept by the powered main and side brushes. (*See* CIB at 90 (citing CX-0220C at Q68, 81, 153, 183).) The limitation is met.

Claim 1 further requires, “an obstacle detector responsive to obstacles encountered by the robot.” (’233 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the bObsweep Products include bump and proximity sensors to detect contacted obstacles and those at a distance, and, in response to this detection, the robot will change its movement. (*See* CIB at 90-91 (citing CX-0220C at Q67, 76, 154-155, 184; CX-0296C at 47:20-24, 48:7-16; 107:16-23; 113:6-21; CX-0329C at 85:23-87:23).) The limitation is met.

Public Version

Claim 1 further requires, “a control circuit in electrical communication with a motor drive and configured to control the motor drive to maneuver the robot about detected obstacles across the floor surface during a floor-cleaning operation.” (’233 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the bObsweep Products include a microcontroller that connects to wheel motors and sensors to navigate the robot around a room. (*See* CIB at 91 (citing CX-0220C at Q65, 76-81, 156, 185; CX-0329C at 98:19-21, 26:9-12; CX-0296C at 139:5-11).) The limitation is met.

Dependent claim 10 requires, “[t]he floor cleaning robot of claim 1, wherein the obstacle detector comprises a displaceable bumper disposed at the housing perimeter, and a bumper displacement sensor responsive to displacement of the bumper with respect to the housing.” (’233 patent at cl. 10.) I find credible and un rebutted testimony demonstrates the Bob products (as opposed to the bObi products, which are not accused under this particular claim (*see* CIB at 92, n. 16)) include a bump sensor at a leading edge of the robot’s housing which, when depressed by an obstacle, triggers a signal to the microcontroller (*see* CIB at 92 (citing CX-0220C at Q78, 80, 186-187)). The limitation is met.

Dependent claim 11 requires, “[t]he floor cleaning robot of claim 1, wherein the control circuit is configured to move the robot in a wall-following mode to maneuver the robot along a wall in a direction that places the side brush against the wall.” (’233 patent at cl. 11.) I find credible and un rebutted testimony demonstrates the bObsweep Products include a wall-following mode which places the powered side brush up against the followed wall. (*See* CIB at 92 (citing CX-0220C at Q65-66, 76-77, 157-158, 188-189).) The limitation is met.

Dependent claim 14 requires, “[t]he floor cleaning robot of claim 1, wherein a portion of the bundles of bristles of the powered side brush passes between a portion of a drive wheel of the

Public Version

robot and the cleaning surface during the rotation of the side brush around the axis.” (’233 patent at cl. 14.) I find credible and un rebutted testimony demonstrates that bObi products (as opposed to the Bob products, which are not accused under this particular claim (*see* CIB at 92, n. 17)) include a region under the wheel which is traversed by the bristles of the powered side brush. (*See* CIB at 92 (citing CX-0220C at Q69, 159-160; Hr’g Tr. at 803:1-16).) The limitation is met.

Independent claim 15 requires, “A self-propelled floor-cleaning robot.” (’233 patent at cl. 15.) I find credible and un rebutted testimony demonstrates the bObsweep Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 15 further requires, “wheels operably connected to a motor drive to propel the robot across the floor surface.” (’233 patent at cl. 15.) I find credible and un rebutted testimony demonstrates the bObi products meet this limitation for the same reasons discussed under claim 1 of the ’090 patent. (*See* CIB at 88 (referring to similar limitation in the ’090 patent).) Further, I find credible and un rebutted testimony demonstrates the Bob products include motorized wheels that drive the robot across a surface. (*See* CIB at 93 (citing CX-0220C at Q75; CX-0347C at 97:22-98:17, 98:24-99:1; CX-0329C at 26:9-12).) The limitation is met.

Claim 15 further requires, “a controller in electrical communication with the motor drive and configured to control the motor drive to autonomously maneuver the robot about detected obstacles encountered on the floor surface during a floor-cleaning operation.” (’233 patent at cl. 15.) I find credible and un rebutted testimony demonstrates the bObsweep Products meet this limitation for the same reasons discussed under claim 1, above.

Public Version

Claim 15 further requires, “a housing defining a housing perimeter.” (’233 patent at cl. 15.) I find credible and un rebutted testimony demonstrates the bObsweep meet this limitation for the same reasons discussed under claim 1, above.

Claim 15 further requires, “a cleaning head disposed within the housing perimeter and positioned to engage a floor surface.” (’233 patent at cl. 15.) I find credible and un rebutted testimony demonstrates the bObsweep Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 15 further requires, “a cliff detector carried by the housing and configured to direct a beam toward the floor surface and to respond to a falling edge of the floor surface.” (’233 patent at cl. 15.) I find credible and un rebutted testimony demonstrates the bObsweep Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 15 further requires:

a powered rotating side brush extending beyond the housing perimeter and positioned to brush floor surface debris from beyond the housing perimeter toward a projected path of the cleaning head, the powered rotating side brush rotating in a direction that brushes debris toward the robot ahead of a rotating axis of the brush along the projected path of the cleaning head, the side brush having bundles of bristles and being positioned such that the bundles of bristles pass between the cliff detector and the floor surface during a rotation of the side brush around the axis, the bundles of bristles being separated by a gap, the gap being configured to prevent occlusion of the cliff detector beam during at least a portion of a rotation of the side brush around the axis

(’233 patent at cl. 15.) I find credible and un rebutted testimony demonstrates the bObsweep Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 15 further requires, “the controller being configured to move the robot in a wall-following mode to maneuver the robot along a wall in a direction that places the powered rotating side brush adjacent the wall.” (’233 patent at cl. 15.) I find credible and un rebutted

Public Version

testimony demonstrates the bObsweep Products meet this limitation for the same reasons discussed under claim 11, above.

Dependent claim 16 requires, “[t]he floor cleaning robot of claim 15, wherein the cleaning head comprises a powered primary brush assembly disposed within the housing perimeter and positioned to engage the floor surface.” (’233 patent at cl. 16.) I find credible and un rebutted testimony demonstrates the bObsweep Products meet this limitation for the same reasons discussed under claim 1, above.

3. Direct Infringement by the Hoover Products

For the reasons explained below, I find iRobot has shown by a preponderance of the evidence that only the Hoover Quest 1000 products meet the limitations of asserted claims 1, 10, 11, 14, 15, 16.

a. Undisputed Claim Limitations

As reflected in the parties’ post-hearing briefing, most of the asserted claim limitations under the ’233 patent are not in dispute with respect to the Hoover Products, and infringement is not disputed at all for the Hoover Quest 1000 product. (*See, e.g.*, CIB at 93-99; RRSB at 46-56.) These undisputed claim limitations, along with my findings, are summarized below.

Independent claim 1 requires, “[a] self-propelled floor-cleaning robot.” (’233 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the Hoover Products are robot vacuum cleaners that moves themselves around a room for cleaning purposes. (*See* CIB at 93-94 (citing CX-0220C at Q47-48, 202).) The limitation is met.

Claim 1 further requires, “a housing defining a housing perimeter.” (’233 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the Hoover Products include a rigid structure which serves as a housing. (*See* CIB at 94 (citing CX-0220C at Q49, 203).) The limitation is met.

Public Version

Claim 1 further requires, “a powered primary brush assembly disposed within the housing perimeter and positioned to engage a floor surface, the primary brush assembly being configured to rotate about an axis generally parallel to the floor surface.” (’233 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the Hoover Products include a main brush which contacts the ground so as to pick up particulates and whose axis is parallel to the ground. (See CIB at 94 (citing CX-0220C at Q58, 204-206; CX-0347C at 55:6-16, 63:17-20, 64:14-65:12; CX-0410C at 246:11-22).) The limitation is met.

Claim 1 further requires, “a cliff detector carried by the housing and configured to direct a beam toward the floor surface and to respond to a falling edge of the floor surface.” (’233 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the Hoover Products include a sensor on the underside of the robot which detects changes in the distance to the surface the robot ride on. (See CIB at 94-95 (citing CX-0220C at Q55-56, 207-209; CX-0329C at 38:1:14, 76:4-77:11, 53:25-54, 55:6-56:4; CX-0410C at 246:3-7).) The limitation is met.

Claim 1 further requires, “a particulate receptacle positioned to receive and collect particulates brushed from the floor surface by the primary brush assembly and the powered side brush.” (’233 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the Hoover Products include a removable bin which receives particulates picked up from the ground’s surface including those swept by the powered main and side brushes. (See CIB at 97 (citing CX-0220C at Q57, 214).) The limitation is met.

Claim 1 further requires, “an obstacle detector responsive to obstacles encountered by the robot.” (’233 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the Hoover Products include bump and proximity sensors to detect contacted obstacles and those at a distance, and, in response to this detection, the robot will change its movement. (See CIB at 97-

Public Version

98 (citing CX-0220C at Q53-56, 215-216; CX-0329C at 40:14-41:8, 56:8-57:6, 61:2-63:18, 72:22-73:10, 79:21-80:10).) The limitation is met.

Claim 1 further requires, “a control circuit in electrical communication with a motor drive and configured to control the motor drive to maneuver the robot about detected obstacles across the floor surface during a floor-cleaning operation.” (’233 patent at cl. 1.) I find credible and unrebutted testimony demonstrates the Hoover Products include a microcontroller that connects to wheel motors and sensors to navigate the robot around a room. (See CIB at 98 (citing CX-0220C at Q51-56, 217; CX-0329C at 40:14-41:8, 64:19-65:12, 68:6-71:11).) The limitation is met.

Dependent claim 10 requires, “[t]he floor cleaning robot of claim 1, wherein the obstacle detector comprises a displaceable bumper disposed at the housing perimeter, and a bumper displacement sensor responsive to displacement of the bumper with respect to the housing.” (’233 patent at cl. 10.) I find credible and unrebutted testimony demonstrates the Hoover Products include a bump sensor at a leading edge of the robot’s housing which, when depressed by an obstacle, triggers a signal to the microcontroller. (See CIB at 98 (citing CX-0220C at Q54, 56, 218-219; CX-0347C at 62:2-63:15; CX-0410C at 83:7-16).) The limitation is met.

Dependent claim 11 requires, “[t]he floor cleaning robot of claim 1, wherein the control circuit is configured to move the robot in a wall-following mode to maneuver the robot along a wall in a direction that places the side brush against the wall.” (’233 patent at cl. 11.) I find credible and unrebutted testimony demonstrates the Hoover Products include a wall-following mode which places the powered side brush up against the followed wall. (See CIB at 98-99 (citing CX-0220C at Q52, 220-222).) The limitation is met.

Public Version

Dependent claim 14 requires, “[t]he floor cleaning robot of claim 1, wherein a portion of the bundles of bristles of the powered side brush passes between a portion of a drive wheel of the robot and the cleaning surface during the rotation of the side brush around the axis.” (’233 patent at cl. 14.) iRobot indicates this claim is not asserted against the Hoover Rogue (Y1) or Y2 products (CIB at 99), and I find credible and unrebutted testimony demonstrates that *only the* Quest 1000 product includes a region under the wheel which is traversed by the bristles of the powered side brush. (See CIB at 99 (citing CX-0220C at Q58, 223).) The limitation is met.

Independent claim 15 requires, “[a] self-propelled floor-cleaning robot.” (’233 patent at cl. 15.) I find credible and unrebutted testimony demonstrates the Hoover Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 15 further requires, “wheels operably connected to a motor drive to propel the robot across the floor surface.” (’233 patent at cl. 15.) I find credible and unrebutted testimony demonstrates the Hoover Products meet this limitation for the same reasons discussed under claim 1 of the ’090 patent. (See CIB at 99 (referring to similar limitation in the ’090 patent).)

Claim 15 further requires, “a controller in electrical communication with the motor drive and configured to control the motor drive to autonomously maneuver the robot about detected obstacles encountered on the floor surface during a floor-cleaning operation.” (’233 patent at cl. 15.) I find credible and unrebutted testimony demonstrates the Hoover Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 15 further requires, “a housing defining a housing perimeter.” (’233 patent at cl. 15.) I find credible and unrebutted testimony demonstrates the Hoover Products meet this limitation for the same reasons discussed under claim 1, above.

Public Version

Claim 15 further requires, “a cleaning head disposed within the housing perimeter and positioned to engage a floor surface.” (’233 patent at cl. 15.) I find credible and unrebutted testimony demonstrates the Hoover Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 15 further requires, “a cliff detector carried by the housing and configured to direct a beam toward the floor surface and to respond to a falling edge of the floor surface.” (’233 patent at cl. 15.) I find credible and unrebutted testimony demonstrates the Hoover Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 15 further requires, “the controller being configured to move the robot in a wall-following mode to maneuver the robot along a wall in a direction that places the powered rotating side brush adjacent the wall.” (’233 patent at cl. 15.) I find credible and unrebutted testimony demonstrates the Hoover Products meet this limitation for the same reasons discussed under claim 11, above.

Dependent claim 16 requires, “[t]he floor cleaning robot of claim 15, wherein the cleaning head comprises a powered primary brush assembly disposed within the housing perimeter and positioned to engage the floor surface.” (’233 patent at cl. 16.) I find credible and unrebutted testimony demonstrates the Hoover Products meet this limitation for the same reasons discussed under claim 1, above.

b. Disputed Claim Limitations Concerning “Gap Being Configured to Prevent Occlusion”

As presented above, claim 1 additionally requires:

[A] powered side brush extending beyond the housing perimeter and positioned to brush floor surface debris from beyond the housing perimeter, the side brush being configured to rotate about an axis generally perpendicular to the floor surface and to rotate in a direction to direct debris toward the robot along a projected direction of movement of the powered primary brush assembly, the side brush having bundles of bristles

Public Version

and being positioned such that the bundles of bristles pass between the cliff detector and the floor surface during a rotation of the side brush around the axis, the bundles of bristles being separated by a gap, the gap being configured to prevent occlusion of the cliff detector beam during at least part of the rotation of the side brush around the axis;

(*233 patent at cl. 1.) Similarly, claim 15 requires:

[A] powered rotating side brush extending beyond the housing perimeter and positioned to brush floor surface debris from beyond the housing perimeter toward a projected path of the cleaning head, the powered rotating side brush rotating in a direction that brushes debris toward the robot ahead of a rotating axis of the brush along the projected path of the cleaning head, the side brush having bundles of bristles and being positioned such that the bundles of bristles pass between the cliff detector and the floor surface during a rotation of the side brush around the axis, the bundles of bristles being separated by a gap, the gap being configured to prevent occlusion of the cliff detector beam during at least a portion of a rotation of the side brush around the axis.

(*233 patent at cl. 15.) Respondents dispute that these limitations are met by the Hoover Products, with the exception of the Quest 1000, for which there is no dispute. (*See* CIB at 95 (citing RPB at 66-68; RX-2078C).) Indeed, I find credible and unrebutted testimony demonstrates the Hoover Quest 1000 product includes a powered side brush which rotates around an axis perpendicular to that of the main brush (*i.e.*, perpendicular to the ground) and assists in directing particulates that lie outside of the housing's perimeter over to the main brush for pickup. (*See id.* (citing CX-0220C at Q210).) The side brush also includes bristles which, due to their length, pass through the area the light beam occupies when it is on and include gaps that are configured in position and size to give the beam sufficient space to function. (*See* CX-0220C at 210 (citing, *inter alia*, CX-0928C; CX-0425C at 535-536); CPX-0005.)

Thus, Respondents dispute that the limitation is met for the Hoover Y1 (Rogue) and Y2 products and then also for a further brush variant, called the SB2, which uses rubber arms instead of bristles. On the SB2, Respondents claim iRobot has waived any sort of doctrine of equivalents theory for this variant. (*See* RRSB at 49.)

Public Version

iRobot counters and claims it “properly raised a doctrine of equivalents theory for the rubber side brush (SB2) in its Pre-Hearing Brief.” (CIB at 100 (citing CPB at 106-107).) iRobot then goes on to argue why the SB2 rubber arm brush “is equivalent to a bristled brush” under a function-way-result test. (See CIB at 100.) In this way, iRobot does not argue literal infringement by the Hoover Y2 product equipped with the SB2 rubber arm brush.

I need not make a determination on whether the rubber arm brush (without any bristles – but instead single piece whip like arms) is equivalent as alleged, because I do not find iRobot adequately pled doctrine of equivalents in its pre-hearing brief. Thus, the theory has been waived under G.R. 11.2. iRobot looks to pages 106 and 107 of its pre-hearing brief for support, but these pages actually acknowledge the theory had not yet been raised:

Had SSSIT imported a device properly at issue in the Investigation, Complainant would assert that the same claims are met by the rubber brush as the bristled brushes under the doctrine of equivalents, but SSSIT’s late and generally concealed importation of purported “non-infringing alternatives,” even if a standalone rubber brush is within the scope of the Investigation, hampered such an assertion. As such, Complainant reserves it right to make such an argument should SSSIT attempt to press the rubber side brush as a “non-infringing alternative” at the evidentiary hearing.

(CPB at 107.) With that, I do not consider the issue of whether or not the SB2 rubber brush meets the ’233 patent claim limitation of “a powered side brush” is properly before me.

iRobot’s Position

In its opening brief, iRobot characterizes Respondents’ as applying “an impermissible reinterpretation of the agreed construction of the side brush limitations of the asserted claims” through their argument that “gaps separating the bundles of bristles of each side brush are not configured to prevent occlusion because the bristles are too short to occlude the cliff detector.” (CIB at 7.) iRobot contends that, contrary to Respondents’ approach, the agreed construction does not require bristles to “completely block” the cliff detector. (*Id.* (citing RX-2078C at

Public Version

Q206).) Rather, according to iRobot, the bristles must merely “pass through the area the light beam occupies when it is on.” (*Id.* (citing Order No. 27 at 10).) iRobot proffers that any contention that the claims “require a showing that the product’s operation would be hindered *but for* the gaps in the bundles in bristles” should also be rejected as contrary to the agreed construction because, simply, “[t]he asserted claims recite no performance requirements for the cliff detector.” (*Id.*)

iRobot also explains that there are two bristled brushes accused of infringing this limitation, the longer bristled brush as found on the Y1 product, and a shorter bristle brush as found on the Y2 product. (CIB at 82.) iRobot identifies Respondents’ total occlusion (*i.e.*, completely blocked) theory as coming from Respondents’ expert. (*Id.* at 82-83 (referring to RX-2078 at Q206).) iRobot states simply; “the agreed construction does not require the bristles to ‘completely block’ the cliff detector” and both of the accused brushes (short and long bristles) satisfy the limitation because their bristles “are each long enough to pass through the area the light beam occupies when it is on.” (*Id.* at 83 (citing CX-0220C at Q58, 210, 213; Hr’g Tr. at 394:4-8).) iRobot claims this is shown for the shorter bristle brush in images where the “conical dispersion of the infrared beam remains wide enough for the bristles to pass through the area the beam occupies when it is on.” (*Id.* (citing CX-0120C; CX-0122C; CX-0137C).) iRobot then disputes the claims put any “performance requirements on the cliff detector, as in “the cliff detector to be non-functional but for the presence of the gaps.” (*Id.* at 84 (referencing RX-2078C at Q209).) iRobot argues that in the accused products:

Redirection of the accused products based on the cliff sensors is dependent upon whether the amount of IR light received by a sensor crosses a particular threshold. Thus, the sensor is affected if any part of the beam is interrupted, which is why the accused products all contain the claimed “gaps” in their side brushes. (*See, e.g.*, CX-0220C, Nikos DWS at Q180, 209 .)

Public Version

(Id.)

For the Hoover Products, and the Quest 1000 in particular, iRobot argues “Respondents do not dispute that the Quest 1000 satisfies this limitation,” in part because “[v]ideos show the side brush operating and rotating around an axis with the bundles of bristles passing through the cliff detector beam.” (*Id.* at 95 (citing RPB at 66-68; RX-2078C; CX-0220C at Q210; CPX-1917).)

For the “Rogue (Y1) and Y2 products,” iRobot argues that the shorter bristles on these brushes still satisfy the limitation “because the side brush bristles remain long enough to pass through the area the light beam of the cliff detector occupies when it is on.” (*Id.* (citing CX-00125C; CX-0120C; CX-0122C; CX-0137C).) iRobot continues, “[t]he cliff detector is arranged with an emitter on one side and a detector on the other. . . . Thus, bristles covering either the emitter or detector prove that the bristles pass through the area the light occupies when it is on.” (*Id.* at 96 (citing RX-0109.008; CPX-1867; CX-0220C at Q212).) iRobot then repeats its position that the claim should not be interpreted to require “but for” occlusion. (*See id.*) For the Y2, which has even shorter bristles than the Y1, iRobot claims the bristles still pass through the beam when it is on due to the conical nature of the light beam. (*Id.* at 96-97 (citing CX-0220C at Q210, 213; Hr’g Tr. at 394:4-8; RX-0122.004).)

In its reply brief, iRobot confirms that “[t]he only relevant difference between the products for which Respondents concede infringement and the Y1 and Y2 products is a shorter-bristled side brush on each of the latter products.” (CRPB at 33 (citing CX-0220C at Q210-211).) iRobot explains the gaps in the newer brushes are not modified in any way from the prior models. (*See id.*) Regarding how the gaps supposedly prevent occlusion, iRobot offers, more specifically, that “the gap defines a void between the bundles of bristles ensuring periods when

Public Version

no bristles ‘pass through the area the light beam occupies when it is on’ during rotation of the side brush.” (*Id.* at 34 (citing CX-0220C at Q210).) iRobot then disputes any claim from Respondents that an “adverse impact” means “completely non-functional” as an attempt to “defin[e] the purpose of the gaps in a negative way.” (*Id.*) iRobot suggests “[a]n adverse impact can interfere with the operation of the cliff detector, such as by reducing the amount of infrared light detected by the sensor without rendering it inoperable.” (*Id.* (referencing Hr’g Tr. at 199:4-8, 200:15-19; CX-0220C at Q210-211).) iRobot lastly claims there is no intrinsic evidence to support a completely inoperable interpretation, and even then, it would be contrary to the agreed construction. (*See id.* at 35-36 (referencing RRSB at 54; Order No. 27 at 10).)

Respondents’ Position

In their responsive brief, Respondents identify the critical issue as whether “the gap being configured to prevent occlusion of the cliff detector beam” is met by the “SB2 side brush, the Y1 product, the Y2 product, and the BD2 product.” (RRSB at 46.) Respondents claim their expert has properly interpreted the limitation “to require that if there is no gap in the bristles then the cliff detector beam would be occluded and the cliff detector would not function properly.” (*Id.*) Respondents claim iRobot’s expert “ignores this limitation and opines that if any portion of the cliff detector beam is interrupted by the bristles of the side brush, then this limitation is met.” (*Id.* (citing Hr’g Tr. at 199:4-8).) Respondents summarize, “[t]hus, the dispute is what ‘the gap being configured to prevent occlusion of the cliff detector beam’ means and specifically, what ‘occlusion’ means.” (*Id.*)

Respondents urge the ’233 patent specification “defines the term ‘occlusion’ to mean adversely impact the operation of the cliff detector” through the following passage:

[T]he use of opposed brush arms 76 of constant width is a trade-off (versus using a full or partial circular brush configuration) that ensures

Public Version

that the operation of the brush means 76 of the side brush assembly does not adversely impact (*i.e.* by occlusion) the operation of the adjacent cliff detector subassembly 54CD.

(*See id.* at 48 (citing '233 patent at 8:56-61).)

Respondents state clearly:

Blocking a portion of the beam is not occlusion if the cliff detector can continue to function normally. ('233 patent, col. 8, lines 56-61; Tr. at 204:12-24.) In other words, when the bristles are not long enough, there is no occlusion because the cone of intersection between the emitter and the detector is not blocked, and the operation of the cliff detector is not adversely impacted. (Tr. at 198:13-199:3.) If the limitation only required the bristles to pass through any portion of the light beam, there would be no need for the gaps in the bristles because the cliff detector would continue to function even if a portion of the light beam is blocked. (*Id.*)

(*Id.*) Respondents contend this version of “occlusion” went unchallenged at the hearing. (*Id.* (citing RX-2078C at Q206; Hr’g Tr. at 395:23-397:16, 398:14-399:11).) Respondents then discuss the rubber arm side brush known as SB2. (*See id.* at 48-52.)

Moving back to the Y1 product, Respondents argue “the bristles are too short to occlude the cliff detector beam” because they “are not positioned so that the bristles cover the cliff detector during rotation.” (*Id.* at 52 (citing RX-2078C at Q206, 209-210).) Respondents reason “the side brushes of the Y1 product do not adversely impact the operation of the cliff detector, and thus the gaps between the bristle bundles cannot function (are not “configured”) to prevent occlusion of the cliff detector beam as claimed.” (*Id.* (citing RX-2078C at Q209-210).) Respondents urge that if the brush were replaced with a solid disk (of same radius as brush), the cliff detector would still work—thus proving the gaps in the bundles of bristles are not configured to prevent occlusion. (*See id.* at 53 (referencing RX-2078C at Q206; Hr’g Tr. at 201:15-22).) Respondents conclude, “[b]ecause the bristles of the Y1 product do not adversely impact the operation of the cliff detector, then logically there also cannot be occlusion.” (*Id.* at 54.)

Public Version

Respondents then move onto the Y2 product, with even shorter bristles, and argue non-infringement for the same reason as the Y1—the bristles are too short and thus the gaps between them cannot function to prevent occlusion. (*See id.* at 54-56.) In fact, Respondents claim “Dr. Nikos admitted that he performed no testing to determine whether the side brushes of the Y2 adversely impact the operation of the cliff detector.” (*Id.* at 54-55 (citing Hr’g Tr. at 199:16-19).) Respondents characterize this as “focuse[d] solely on whether the bristles interfere with the light beam and ignor[ing] this critical limitation related to ‘occlusion.’” (*Id.* at 55 (citing Hr’g Tr. at 199:4-8).) Respondents contend the gaps in the Y2 side brush could be eliminated (*e.g.*, replaced by a solid disc) and the cliff detectors would not be obstructed. (*Id.* (citing Hr’g Tr. at 200:2-11).)

Analysis

I find the result on this limitation largely turns on the meaning of “prevent occlusion.” Respondents take a position that would require “that if there is no gap in the bristles then the cliff detector beam would be occluded and the cliff detector would not function properly.” (RRSB at 46.) iRobot disputes any such performance requirement for the cliff detector (CIB at 7 (“[t]he asserted claims recite no performance requirements for the cliff detector”)) but largely avoids offering its own definition in its opening brief (*see* CIB at 96 (“the claim language requires that ‘the gap is configured to prevent occlusion of the cliff detector beam.’ . . . And in the Y1 Products, the gaps between the bundles of bristles do exactly that: prevent occlusion”)).

In its reply brief, however, iRobot takes this step to offer the following reasoning for why the limitation is met (thereby providing a construction for the term):

The gap is configured to prevent occlusion because the gap defines a void between the bundles of bristles ensuring periods when no bristles “pass through the area the light beam occupies when it is on” during the rotation of the side brush.

Public Version

(CRPB at 34 (citing CX-0220C at Q210).) In this way, iRobot views “gap configured to prevent occlusion” as a converse of the prior limitation “bundles of bristles pass through the area the light beam occupies when it is on.”

I find iRobot’s construction is more closely aligned with the plain and ordinary meaning of “occlude” which is to block the passage of something, either partially or totally—and not, as Respondents claim, to necessarily “adversely impact” or altogether stop the sensor from working. (See RRSB at 48, 53.) The ’233 patent does not redefine “occlude” so as to cause a departure from the plain and ordinary meaning. (See *id.* at 48 (referencing ’233 patent at 8:56-61).) It merely explains the manner in which side brush assembly 70 might adversely impact the sensor—through occlusion.

A construction which avoids any kind of but-for inoperability for the cliff sensor is also supported by Respondents’ own approach to invalidity. There, Respondents argue the limitation would be met by a combination of two references because:

[I]f the Tangenberg side brush is added to the Bisset robot in a position that allows it to reach into corners—which as Tangenberg explains is the purpose of the side brush—then the bundles of bristles in the side brush will necessarily pass between cliff detector 274 or 276 and the floor. (*Id.* at Q439.) The presence of the gaps in the Tangenberg side brushes would predictably result in the cliff detector beam not being occluded during at least part of the rotation of the side brush around the axis as shown above. (*Id.* at Q440.)

(RIB at 113.) Notably, Respondents do not mention sensor performance here.

Additionally, the claim only requires the “gap” to “prevent occlusion” for a limited amount of time; namely, “during at least a portion of a rotation of the side brush around the axis.” (’233 patent at cl. 1.) This does not speak to the state of occlusion for those other “portion[s] of a rotation of the side brush around the axis.” This makes it further difficult to justify reading in a requirement that the beam be occluded by bristles to the point of inoperability

Public Version

as Respondents would have me do. (See RRSB at 48 (“[b]locking a portion of the beam is not occlusion if the cliff detector can continue to function normally”), 53 (“if the side brushes of the Y1 product were replaced by a solid disk, the cliff sensors would still work”), 54 (“[b]ecause the bristles of the Y1 product do not adversely impact the operation of the cliff detector, then logically there also cannot be occlusion”).)

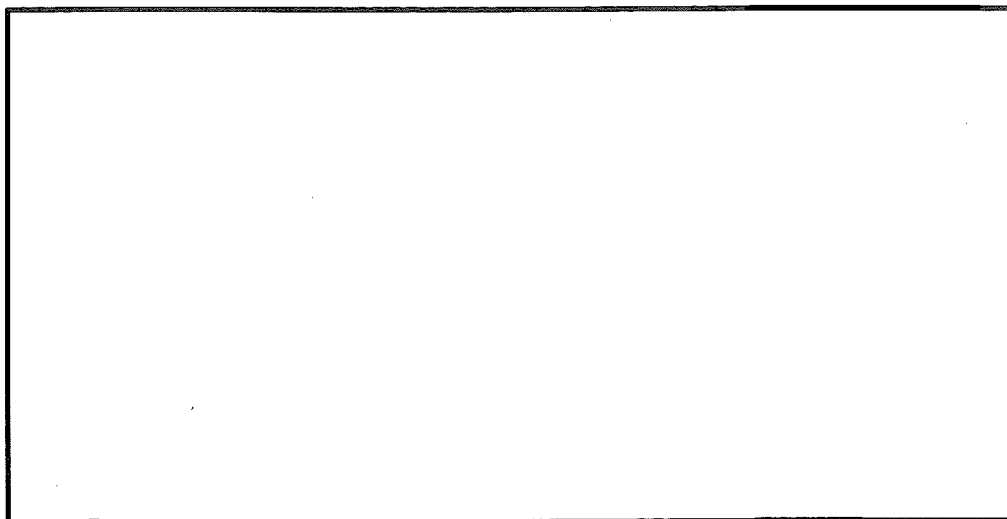
With that said, when the plain and ordinary meaning is applied to the Y1 and Y2 products, I find iRobot’s infringement theory suffers from a failure of proof. The bundles of bristles in the Y1 and Y2 products are quite dense:



(RX-0109.010 (Y1); RX-0122.03 (Y2); *see also* CX-220C at Q213 (citing CX-0120C; CX-0125C; CX-0122C; CX-0137C).) iRobot has certainly not shown that the gaps in between these bundles “ensur[e] periods when no bristles ‘pass through the area the light beam occupies when it is on’ during the rotation of the side brush” or that the gaps are “configured to prevent partial or total occlusion of the cliff detector beam.” According to iRobot’s expert, the cliff detector light is emitted in a conical dispersion pattern and the detector has a cone of detection as well. (Hr’g Tr. at 198:13-25; *see* CIB at 83 (citing CX-0137C), 97 (citing CX-0120C; CX-0122C).) There is almost no evidence in the record on the degree of this spread, however. The closest I

Public Version

can find in the record is a photograph of the Y2 product where a purple light is seen spreading quite wide before intercepting the tips of the spinning side brush:



(CX-0137C; *see also* RRSB at 55 (showing photograph with no exhibit number); CX-0220C at Q213.) If anything, based on the dimensions of the bundles of bristles and gaps, this photograph suggests there *might not be any time* that a single bristle is not somewhere within “the area the light beam occupies when it is on” for the Y2. I can comfortably draw the same conclusion for the Y1, where the bristles are even longer (*i.e.*, even harder to keep out of the light cone). (*See* CIB at 96; CX-0220C at Q213.) Thus, there is simply insufficient evidence to conclude the gaps in side brushes of the Y1 and Y2 “prevent [partial or total] occlusion.” (*See* CX-0220C at Q210-213 (limiting analysis of “prevent occlusion” to whether bristles pass through the beam—and not whether there are times when they don’t).)

In sum, I find iRobot has not sufficiently shown the Hoover Y1/Rogue or Y2 products meet these limitations.

4. Indirect Infringement

As noted in the prior indirect infringement sections, iRobot’s inducement and contributory infringement theories are generalized to encompass asserted claim under every asserted patent, for every accused product. (*See generally* CIB at 103-108; CRPB at 44.) Thus,

Public Version

there is no theory specific to the '233 patent and all of the argument captured in the above indirect infringement sections is considered to apply here.

My analysis of that evidence also applies here. Specifically, I do not find iRobot has sufficiently shown knowledge of the '233 patent and its infringement by any of the respondents. The closest respondent to that knowledge would be SSSIT, but they do not appear to have a relationship with end users (*i.e.*, the direct infringers) here in the U.S.

Thus, it is my determination that iRobot has not shown indirect infringement of the '233 patent.

E. Domestic Industry - Technical Prong

iRobot alleges the iRobot Products practice claims 1, 9, and 15 of the '233 patent. There is no dispute that iRobot has met the technical prong for the '233 patent. (*See* CIB at 101-103; RRSB at 46-56.)

Starting with claim 1, it requires, “[a] self-propelled floor-cleaning robot.” ('233 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the iRobot Products are floor cleaning robots that use intelligence to navigate a space using motorized wheels. (*See* CIB at 101 (citing CX-0220C at [Q248]); CX-0220C at Q96-98.) The limitation is met.

Claim 1 further requires, “a housing defining a housing perimeter.” ('233 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the iRobot Products include a housing which forms a peripheral structure that covers and protects internal components. (*See* CIB at 101 (citing CX-0220C at [Q249]).) The limitation is met.

Claim 1 further requires, “a powered primary brush assembly disposed within the housing perimeter and positioned to engage a floor surface, the primary brush assembly being configured to rotate about an axis generally parallel to the floor surface.” ('233 patent at cl. 1.) I

Public Version

find credible and un rebutted testimony demonstrates the iRobot Products include a powered brush as part of a “cleaning head module” which rotates so as to pick up debris on the floor (*i.e.*, rotate about an axis parallel to the floor surface). (*See* CIB at 101 (citing CX-0220C at Q105-106, [Q250]).) The limitation is met.

Claim 1 further requires, “a cliff detector carried by the housing and configured to direct a beam toward the floor surface and to respond to a falling edge of the floor surface.” (’233 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the iRobot Products include cliff detectors located on the bottom of the robots which respond to abrupt falling edges (*e.g.*, downward stairs). (*See* CIB at 101 (citing CX-0220C at Q99, 101, 109, [251]).) The limitation is met.

Claim 1 further requires:

a powered side brush extending beyond the housing perimeter and positioned to brush floor surface debris from beyond the housing perimeter, the side brush being configured to rotate about an axis generally perpendicular to the floor surface and to rotate in a direction to direct debris toward the robot along a projected direction of movement of the powered primary brush assembly, the side brush having bundles of bristles and being positioned such that the bundles of bristles pass between the cliff detector and the floor surface during a rotation of the side brush around the axis, the bundles of bristles being separated by a gap, the gap being configured to prevent occlusion of the cliff detector beam during at least part of the rotation of the side brush around the axis;

(’233 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the iRobot Products include a powered rotating side brush on the front half of the robot which rotates within a plane parallel to the floor surface (*i.e.*, about an axis generally perpendicular to the floor surface), and further, the side brush rotates so that debris is swept in from the outside and toward the “cleaning head module” primary brush in the center of the robot. (*See* CIB at 102 (citing CX-0220C at [Q252]); CX-0220C at Q105-108).) I also find sufficient evidence shows the bundles of bristles will pass through the area the cliff detector beam occupies when it is on, and also include gaps

Public Version

which are so large it is more likely than not that the beam passes through without any occlusion. (CX-0220C at [Q252]; CPX-0024; CPX-0025; CPX-0026 .) The limitation is met.

Claim 1 further requires, “a particulate receptacle positioned to receive and collect particulates brushed from the floor surface by the primary brush assembly and the powered side brush.” (’233 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the iRobot Products include a bin which is a particulate receptacle located proximate to the central brush on the underside of the robot. (See CIB at 102 (citing CX-0220C at [Q253]); CX-0220C at Q104-108.) The limitation is met.

Claim 1 further requires, “an obstacle detector responsive to obstacles encountered by the robot.” (’233 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the iRobot Products including proximity and bump sensors, which sense obstacles at a distance or after they have made contact with the robot, respectively. (See CIB at 102 (citing CX-0220C at [Q254-256]).) The limitation is met.

Claim 1 further requires, “a control circuit in electrical communication with a motor drive and configured to control the motor drive to maneuver the robot about detected obstacles across the floor surface during a floor-cleaning operation.” (’233 patent at cl. 1.) I find credible and un rebutted testimony demonstrates the iRobot Products depend on electrical communications between the sensors and a controller to control the robot’s movement across a floor and with respect to detected obstacles. (See CIB at 102 (citing CX-0220C at [Q257-258]).) The limitation is met.

Dependent claim 9 requires, “[t]he floor cleaning robot of claim 1, further comprising at least one friction pad secured to the underside of the housing and positioned to engage the floor surface and inhibit robot motion when a forward wheel of the robot travels beyond a falling edge

Public Version

of the floor surface.” (’233 patent at cl. 9.) I find credible and un rebutted testimony demonstrates the iRobot Products include a friction pad located on the bottom of the robot and before the main brush assembly. (See CIB at 102 (citing CX-0220C at [Q259]); CX-0220C at Q109.) The limitation is met.

Independent claim 15 requires, “A self-propelled floor-cleaning robot.” (’233 patent at cl. 15.) I find credible and un rebutted testimony shows the iRobot Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 15 further requires, “wheels operably connected to a motor drive to propel the robot across the floor surface.” (’233 patent at cl. 15.) I find credible and un rebutted testimony shows the iRobot Products meet this limitation for the same reasons discussed under claim 1 of the ’090 patent, above.

Claim 15 further requires, “a controller in electrical communication with the motor drive and configured to control the motor drive to autonomously maneuver the robot about detected obstacles encountered on the floor surface during a floor-cleaning operation.” (’233 patent at cl. 15.) I find credible and un rebutted testimony shows the iRobot Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 15 further requires, “a housing defining a housing perimeter.” (’233 patent at cl. 15.) I find credible and un rebutted testimony shows the iRobot Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 15 further requires, “a cleaning head disposed within the housing perimeter and positioned to engage a floor surface.” (’233 patent at cl. 15.) I find credible and un rebutted testimony shows the iRobot Products meet this limitation for the same reasons discussed under claim 1, above.

Public Version

Claim 15 further requires, “a cliff detector carried by the housing and configured to direct a beam toward the floor surface and to respond to a falling edge of the floor surface.” (’233 patent at cl. 15.) I find credible and un rebutted testimony shows the iRobot Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 15 further requires:

a powered rotating side brush extending beyond the housing perimeter and positioned to brush floor surface debris from beyond the housing perimeter toward a projected path of the cleaning head, the powered rotating side brush rotating in a direction that brushes debris toward the robot ahead of a rotating axis of the brush along the projected path of the cleaning head, the side brush having bundles of bristles and being positioned such that the bundles of bristles pass between the cliff detector and the floor surface during a rotation of the side brush around the axis, the bundles of bristles being separated by a gap, the gap being configured to prevent occlusion of the cliff detector beam during at least a portion of a rotation of the side brush around the axis

(’233 patent at cl. 15.) I find credible and un rebutted testimony shows the iRobot Products meet this limitation for the same reasons discussed under claim 1, above.

Claim 15 further requires, “the controller being configured to move the robot in a wall-following mode to maneuver the robot along a wall in a direction that places the powered rotating side brush adjacent the wall.” (’233 patent at cl. 15.) I find credible and un rebutted testimony demonstrates the iRobot Products include a wall following, or obstacle following, mode wherein the powered side brush is able to contact the wall while the robot moves alongside. (*See* CIB at 103 (citing CX-0220C at Q269); CX-0220C at Q100, 105-108.) The limitation is met.

Thus, I find iRobot has proven by a preponderance of the evidence that the iRobot Products practice claims 1, 9, and 15 of the ’233 patent.

Public Version

F. Validity

Respondents' initial post-hearing brief identifies the following invalidity theories against the asserted claims of the '233 patent:

Claims	Theory
1, 10, 11, 14, 15, 16	Anticipated by Jones-844
1, 10, 11, 14, 15, 16	Rendered obvious by Jones-844 in light of known side brushes with bristles
1, 11, 14, 15, 16	Rendered obvious by Bisset in light of Tangenberg
10	Rendered obvious by Bisset in light of Tangenberg and Mobile Robots

1. Alleged Prior Art

Respondents allege the “Jones-844” reference, U.S. Patent No. 6,594,844 (RX-0095) is prior art to the '233 patent under § 102(e) because it was filed on January 24, 2001 which is before the earliest alleged priority date for the '233 patent. (RIB at 87-88.) Respondents argue that Jones-844's prior art status is not negated because the inventor Jones is also an inventor of the '233 patent, as iRobot contends. “The fact that the application and reference have one or more inventors in common is immaterial,” according to Respondents. (*Id.* at 88 (citing *Ex parte DesOrmeaux*, 25 USPQ2d 2040 (Bd. Pat. App. & Inter. 1992); MPEP § 2136.04).) Respondents consider *EmeraChem Holdings, LLC v. Volkswagen Group of Am.*, 859 F.3d 1341 (Fed. Cir. 2017) to emphasize that Mr. Jones could have, but did not even attempt, to argue he was the sole inventor of the asserted claims of the '233 patent. (*See id.* at 88-89.)

In its responsive brief, iRobot takes the position that Jones-844 is not prior art under § 102(e) because it “is not the work of ‘another.’” (CRPB at 67 (citing *Riverwood Int'l Corp. v. R.*

Public Version

A. Jones & Co., 324 F.3d 1346, 1356 (Fed. Cir. 2003); *see also EmeraChem*, 859 F.3d at 1345).) iRobot reasons “[b]ecause Joseph Jones is the sole inventor of Jones-844, any subject matter disclosed in Jones-844 and also claimed in the ’233 patent must be Joseph Jones’ inventive work, therefore, Jones-844 cannot be prior art to the ’233 patent under section 102(e).” (*Id.*) iRobot faults Respondents for citing the MPEP and a BPAI decision instead of controlling law for the proposition that a different “inventive entity” is all that is needed. (*Id.* (comparing to *In re Blout*, 52 C.C.P.A. 751, 753-754 (C.C.P.A. 1964).) iRobot concludes that there can be no doubt Mr. Jones is the sole inventor of the Jones-844 patent as he is the only named inventor. (*Id.* at 67-68 (discussing *EmeraChem*, 859 F.3d 1341; *Ethicon, Inc. v. U.S. Surgical Corp.*, 135 F.3d 1456, 1460 (Fed. Cir. 1998)).)

In their reply brief, Respondents directly address *In re Blout* and point out the Court of Customs and Patent Appeals criticized the rule promulgated by *In re Blout* in *Application of Land*, 368 F.2d 866, 878 (C.C.P.A. 1966). (RRPB at 42-43.) Respondents argue *In re Blout* was “expressly overruled” by this decision. (*Id.* at 43.)

I find the *Riverwood* case cited by iRobot is the most applicable to the facts at hand. There, one of the challenged patents (the ’361 patent) listed an inventor, Ziegler, along with two others. *Riverwood*, 324 F.3d at 1356. A prior art reference applied against the ’361 patent (the ’806 patent) listed Ziegler along with three others as inventors. *Id.* at 1349. The court analyzed two of *Riverwood*’s claims: 1) that Ziegler was the sole inventor of the portions of the ’806 patent used to invalidate the ’361 patent; and 2) that Ziegler is actually the sole inventor of the ’361 patent. *Id.* at 1356. The court explained:

Prior to trial, *Riverwood* presented evidence that Ziegler was the sole inventor of the subject matter of the ’806 patent that Jones intended to rely on as prior art to the ’789 and ’361 patents. *Riverwood* also presented evidence that the only contributions made by Lashyro and Vulgamore

Public Version

toward the '361 patent were those claimed in the original application but deleted during prosecution. Thus, Riverwood claimed that the '361 patent erroneously names Lashyro and Vulgamore, and it asked the district court to correct inventorship pursuant to 35 U.S.C. § 256.

.....

If Ziegler was the sole inventor of the portions of the '806 patent relied upon by Jones in its obviousness arguments, then the '806 patent is not prior art to the '789 patent. *In addition, if Riverwood sustains its burden of proof that Ziegler is the sole inventor of the '361 patent, then the '806 patent would not be prior art to the '361 patent*, and the district court should order correction of the inventorship of that patent.

Id. at 1356-1357 (emphasis added).

The emphasized language above holds that the '806 patent would not be prior art under 102(e) only if two conditions are met: 1) Ziegler was the sole contributor of those portions of the '806 patent used to invalidate; and 2) Ziegler was the sole inventor of the challenged '361 patent.

Here we have the same situation, but iRobot has only shown the first condition. It cannot be disputed that Mr. Jones, as the sole named inventor of Jones-844, “conceived and invented the subject matter” of Jones-844. Yet iRobot has not shown, as Riverwood needed to do, that Jones is also the sole inventor of the challenged '233 patent claims. In other words, it has not been shown, as iRobot argues, that “any subject matter disclosed in Jones-844 and also claimed in the '233 patent must be Joseph Jones’ inventive work.” (CRPB at 67.)

iRobot’s citation of *EmeraChem* does not disrupt this conclusion, as that case considered the opposite situation—the prior art had four inventors and the challenged patent had a subset (two) of those inventors. 859 F.3d at 1344 (discussing '558 and '758 patents). Similarly, *Ethicon* confirms that different co-inventors (like those of the '233 patent) can contribute to different claims; *i.e.*, confirming that what is claimed and challenged in the '233 patent is not *necessarily* Jones’s own inventive work as opposed to one of the other co-inventors. I therefore find that Jones-844 is work “by another” and qualifies as prior art under 35 U.S.C. § 102(e).

Public Version

Respondents next allege the “Bisset” reference, number WO 00/38026 (RX-0081) is prior art to the ’233 patent because it “was published on June 29, 2000.” (RIB at 101 (citing RX-2082C at Q86).) iRobot does not contest the prior art status of Bisset and I find it qualifies, at least, as prior art under § 102(b).

Respondents next allege the “Tangenberg” reference, U.S. Patent No. 500,974 (RX-0090) is prior art to the ’233 patent because it “was known in the art of sweepers as of December 16, 2002.” (RIB at 102 (citing RX-2082C at Q122-123)).) iRobot does not contest the prior art status of Tangenberg and I find it qualifies, at least, as prior art under § 102(b).

Respondents also draw upon the Mobile Robots reference, which, as discussed above, has a copyright date of 1999. (RX-0084.003.) iRobot does not contest the prior art status of Mobile Robots to the ’233 patent and I find it qualifies, at least, as prior art under § 102(b).

2. 35 U.S.C. § 102

In its opening brief, Respondents contend claims 1, 10, 11, 14, 15, and 16 of the ’233 patent are anticipated by the Jones-844 reference. (*See* RIB at 90-100.) For the reasons discussed below, I do not find clear and convincing evidence supports finding anticipation.

a. Claim 1

Independent claim 1 requires, “[a] self-propelled floor-cleaning robot.” (’233 patent at cl. 1.) I find clear and un rebutted evidence demonstrates the limitation was disclosed in Jones-844 through, *inter alia*, its title. (*See* RIB at 90 (citing RX-2082C at Q479-480, 485-488; RX-0095.016, 017).)

Claim 1 further requires, “a housing defining a housing perimeter.” (’233 patent at cl. 1.) I find clear and un rebutted evidence demonstrates the limitation was disclosed in Jones-844 through the identified housing. (*See* RIB at 90 (citing RX-2082C at Q479-480, 485-488; RX-0095.016, 017).)

Public Version

Claim 1 further requires, “a powered primary brush assembly disposed within the housing perimeter and positioned to engage a floor surface, the primary brush assembly being configured to rotate about an axis generally parallel to the floor surface.” (’233 patent at cl. 1.) I find clear and un rebutted evidence demonstrates the limitation was disclosed in Jones-844 through the identified sweeping brush. (See RIB at 90-91 (citing RX-2082C at Q489-490; RX-0095 at 8:63-67, Figs. 24, 25).)

Claim 1 further requires, “a cliff detector carried by the housing and configured to direct a beam toward the floor surface and to respond to a falling edge of the floor surface.” (’233 patent at cl. 1.) I find clear and un rebutted evidence demonstrates the limitation was disclosed in Jones-844 through the identified four cliff detector subsystems. (See RIB at 91 (citing RX-2082C at Q495-498; RX-0095.024).)

Claim 1 further requires:

a powered side brush extending beyond the housing perimeter and positioned to brush floor surface debris from beyond the housing perimeter, the side brush being configured to rotate about an axis generally perpendicular to the floor surface and to rotate in a direction to direct debris toward the robot along a projected direction of movement of the powered primary brush assembly, the side brush having bundles of bristles and being positioned such that the bundles of bristles pass between the cliff detector and the floor surface during a rotation of the side brush around the axis, the bundles of bristles being separated by a gap, the gap being configured to prevent occlusion of the cliff detector beam during at least part of the rotation of the side brush around the axis.

(’233 patent at cl. 1.)

Respondents’ Position

Respondents contend “Figure 24 of Jones-844 shows powered side brushes as claimed” in that the figure shows side brushes extending beyond the perimeter of the housing, rotate about an axis perpendicular to the ground surface to direct particulates to the middle of the robot. (RIB at 91 (citing RX-2082C at Q502-503; RX-0095.016).) Respondents argue these brushes would

Public Version

be interpreted as “powered by electric motors, just like the ‘sweeping brush 342’ is powered by an electric motor, because Jones-844 explains that the robot is ‘autonomous’ and ‘battery operated’ in column 1, lines 21-22.” (*Id.* at 92. (citing RX2082C at Q504; RX-0095.021).)

Respondents reason “[i]t is apparent that those brushes are there for a cleaning purpose, and some power has to be delivered to them to make them rotate,” under, *inter alia*, *In re Baxter*. (*Id.* (citing RX-2082C at Q504; Hr’g Tr. at 790:6-22).) Additionally, Respondents draw upon the “as well” phrase in iRobot’s expert testimony that the brushes “can be passive brushes as well,” to argue anticipation by disclosing two alternatives under *Upsher-Smith v PamLab*, 412 F.3d 1319, 1322 (Fed. Cir. 2005). (*Id.* (referring to Hr’g Tr. at 790:6-22).)

Moving on, Respondents argue “a person of skill in the art would understand that the Jones-844 side brush has bristles.” (*Id.* at 93 (citing RX-2082C at Q507-509; Hr’g Tr. at 795:2-7).) Respondents contend the drawings in Figures 24 and 25 of Jones-844 “illustrated bristles to engineers in the field” supposedly evidenced by ’233 patent inventor testimony on non-patent engineering drawings. (*Id.* at 94 (citing RX-1290C; RX-2082C at Q509; RX-0095.016; RX-2042C at 90:2-91:12).) Respondents contend “there can be no genuine dispute that a person of ordinary skill would reasonably understand Jones-844 to show bristles.” (*Id.* at 95 (citing, *inter alia*, *In re Baxter*, 952 F.2d at 390).) Respondents argue iRobot’s expert actually did not deny that a person of ordinary skill would understand Jones-844’s side brushes to have bristles—only that they could also be rubber flappers. (*Id.* (citing Hr’g Tr. at 787:22-788:8).) Respondent repeat that this ambiguity is in fact a disclosure of two alternatives, which satisfies anticipation. (*Id.* at 95-96 (citing *Upsher-Smith Labs.*, 412 F.3d at 1323).)

Regarding the cliff detector, iRobot contends, through its expert:

[T]hat Figure 24 also shows that the side brushes pass between cliff detectors 342 and 348 and the floor, *i.e.* that they “pass through the area

Public Version

the [cliff detector's] light beam occupies when it is on,” and that the gaps in the side brushes are configured to prevent occlusion of the cliff detector as the side brush rotates. (RX-2082C at Q508; RX-0095.016.) Dr. Messner was never cross-examined on this testimony. That alone is enough to establish that Jones-844 discloses this limitation—particularly because it is corroborated by the drawings and testimony of iRobot’ engineers, as further described below.

(*Id.*)

In their reply brief, Respondents characterizes iRobot as “re-writ[ing] the disclosure standards to require that ‘inherency’ controls, even though this is a dispute about what is actually (not inherently) disclosed by the reference.” (RRPB at 43 (citing, *inter alia*, *Kennametal, Inc. v. Ingersoll Cutting Tool Co.*, 780 F.3d 1376, 1381 (Fed. Cir. 2015); *In re Baxter*, 952 F.2d at 390).)

Regarding the brushes as powered or not, Respondents contend iRobot’s concerns over passivity and space is “neither logical nor what a POSITA would reasonably understand.” (*Id.* at 44.) Respondents argue the brushes are disclosed as powered because ‘the robot disclosed is an ‘autonomous’ robot, and the side brushes function is to sweep dirt into the projected path of the main sweeping brush 342.” (*Id.* (citing RX-2082C at Q503, 504; RX-0095.021).) According to Respondents, “[u]npowered side brushes would not achieve this.” (*Id.* (citing RX-2082C at Q504).)

Regarding the brushes as having bristles or not, Respondents claim their expert “confirmed Jones-844 does disclose bundles of bristles that prevent occlusion.” (*Id.* at 45 (citing RX-2082C at Q507-509).) Further, Respondents state flatly “Figure 24 of Jones-844 is the best evidence and illustrates the claimed side brush with bundles of bristles.” (*Id.*) Respondents dispute iRobot’s position, that under *Upsher-Smith*, “Jones-844 does not disclose what is located at the end of the alleged brush and thus allows an open-ended list of possibilities to exist” because a “ ‘possibility’ does not actually fall within an endless list, the only other possibilities

Public Version

Dr. Nikos came up with were ‘a flap or a pad.’” (*Id.* (citing Hr’g Tr. at 787:22-788:2, 793:13-19).) Respondents also argue that iRobot’s engineering drawings (RX-1290C) do not “fill gaps” in Jones-844 but rather show what a POSITA would understand Jones-844 to disclose. (*Id.* (citing *Clinic & Research Found. v. Genentech, Inc.*, 927 F.2d 1565, 1576 (Fed. Cir. 1991)).)

iRobot’s Position

In its responsive brief, iRobot argues “Dr. Messner has not demonstrated that the side brush supposedly shown in the single figure he cites is “powered.” (CRSB at 69 (referring to RX-2082C at Q503-504; RX-0095 at Fig. 24; RX-1824C at Q296-300).) iRobot observes its own expert testified that the side brush of Jones-844 could be passive “designed to simply agitate the dirt and debris,” and, there “may not [be] sufficient space for a motor necessary to power the alleged side brush.” (*Id.* (citing Hr’g Tr. at 790:9-14; 791:19-792:6).) iRobot contends Respondents’ theory is a mere possibility and not inherent in the reference. (*See id.* (citing *Cont’l Can Co. v. Monsanto Co.*, 948 F.2d 1264, 1269 (Fed. Cir. 1991)).) iRobot also challenges whether the brush includes bristles, which are not shown or described at all by the reference, and are rather “rubbers arms than bristles.” (*Id.* at 69-70 (citing CX-1824C at Q296-300; Hr’g Tr. at 793:22-794:1).) iRobot adds “Jones-844 does not disclose bristles and Jones-844 need not necessarily require bristles. Thus, Respondents’ inherency argument fails.” (*Id.* at 70 (citing *Cont’l Can Co. v. Monsanto Co.*, 948 F.2d at 1269).)

Moving on, iRobot questions whether “a side brush is [even] depicted” by Jones-844’s figures and points to Respondents’ expert as admitting Jones-844 does not disclose that the side brush “rotates to brush debris from beyond the housing perimeter.” (*Id.* (citing RX-2082C at Q489-494, 502-506; RX-0095 at Fig. 24; CX-1824C at Q296-300).) iRobot also argues Respondents improperly cite *Upsher-Smith* because Jones-844 doesn’t disclose alternatives as in

Public Version

that case—it discloses nothing. (*See id.* at 70-71 (referring to 412 F.3d at 1322).) iRobot also dismiss the testimony of Mr. Nugent and RX-1290 as “irrelevant, extrinsic testimony” which also has limited probative value due to its age. (*See id.* at 71.)

Analysis

Regarding bristles, I find that if Jones-844 had included the word ‘bristle’ or shown something that looked like bristles in its figures, or ever described this structure as a “brush,” there would be no dispute over this limitation. Yet there is no written disclosure of this structure in the specification, and Figure 24 (described by Respondents as “the best evidence of bristles (see RRPB at 45)) only shows a structure with arc segments which do not look like bristles:

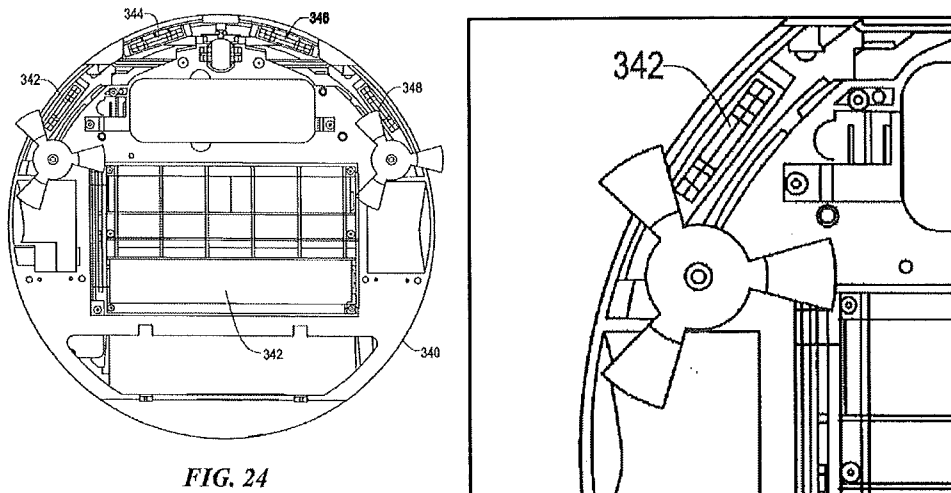


FIG. 24

(RX-0095 at Fig. 24.) I find Respondents would have a slightly stronger argument if Jones-844 had stopped at Figure 24 where things are two-dimensional. Then, the arc segment might be interpreted as a symbol for a bundle of bristles. Jones-844, however, went a step further in Figure 25, where the same polygonal shape is illustrated in three dimensions:

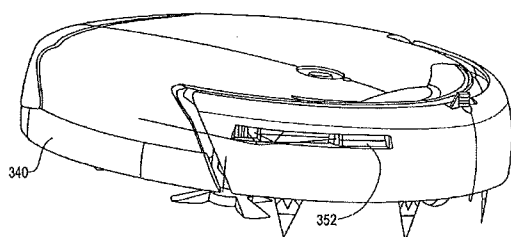
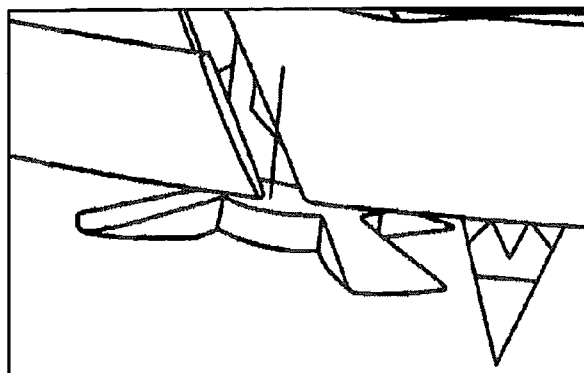


FIG. 25



(*Id.* at Fig. 25.) Figure 25 makes it seem as though the polygonal shape was intentional, and not merely a symbol for a bundle of bristles.

Overall, however, I find Jones-844's utter silence on these structures to be deafening. There is no way I can conclude the polygonal arc shape amounts to a clear and convincing disclosure of "bundle of bristles." If anything, the complete lack of discussion in Jones-844 for this structure means its details are not important; *i.e.*, the shape shown in the figures is a placeholder, not meant to be anything in particular. This lack of any description is not, as Respondents suggest, a disclosure of alternatives under *Upsher-Smith Labs.*, 412 F.3d at 1323. In that case, the subject patent required a certain vitamin composition "essentially free of antioxidants" and a prior art European Application disclosed the same composition but "optionally include[d]" antioxidants. *Id.* at 1321-1322. The Federal Circuit held "[t]he European Application's 'optional inclusion' of antioxidants teaches vitamin supplement compositions that both do and do not contain antioxidants." *Id.* at 1322. Jones-844, on the other hand, has no disclosure of *options* for the structure shown in Figures 24 and 25. It is just silent. If the law treated this silence as a disclosure of options, the very concept of anticipation would be turned on its head.

Public Version

I arrive at the same conclusion regarding whether these side structures are powered or not, despite the fact that passive structures would seem to be fairly ineffective at directing particulates in intended directions. I yet again arrive at the same conclusion regarding whether the bundles of bristles “pass between the cliff detector and the floor surface during a rotation of the side brush around the axis, the bundles of bristles being separated by a gap, the gap being configured to prevent occlusion of the cliff detector beam during at least part of the rotation of the side brush around the axis.” There is no disclosure of Jones-844 on the relationship between the cliff sensor and the structures which Respondents allege are bundles of bristles. I simply cannot conclude that Jones-844 discloses these limitations by clear and convincing evidence.

Claim 1 further requires, “a particulate receptacle positioned to receive and collect particulates brushed from the floor surface by the primary brush assembly and the powered side brush.” (’233 patent at cl. 1.) I find clear and un rebutted evidence demonstrates the limitation was disclosed in Jones-844 based on the breadth of the term “receptacle” and the identified purposes of capturing dirt gathered by the vacuum system. (*See* RIB at 96 (citing RX-2082C at Q512-513; RX-0095.016, 017).)

Claim 1 further requires, “an obstacle detector responsive to obstacles encountered by the robot.” (’233 patent at cl. 1.) I find clear and un rebutted evidence demonstrates the limitation was disclosed in Jones-844 through the identified wall detector subsystem. (*See* RIB at 96 (citing RX-2082C at Q515; RX-0095.016, 017, 024).)

Claim 1 further requires, “a control circuit in electrical communication with a motor drive and configured to control the motor drive to maneuver the robot about detected obstacles across the floor surface during a floor-cleaning operation.” (’233 patent at cl. 1.) I find clear and un rebutted evidence demonstrates the limitation was disclosed in Jones-844 through the

Public Version

identified microprocessor. (See RIB at 97 (citing RX-2082C at Q519-521; RX-0095 at 8:44-48).)

b. Claim 10

Dependent claim 10 requires, “[t]he floor cleaning robot of claim 1, wherein the obstacle detector comprises a displaceable bumper disposed at the housing perimeter, and a bumper displacement sensor responsive to displacement of the bumper with respect to the housing.”

(’233 patent at cl. 10.) Respondents argue:

Jones-844 discloses this limitation because it describes a robot with a displaceable bumper for sensing contact with an obstacle. (RX-2082C at Q530-531.) A person of skill in the art would recognize from the disclosures in Jones-844 that the robot includes a contact-sensitive bumper that uses a displacement sensor to identify displacement of the bumper and responds by sending a signal indicating that the robot has made contact with an obstacle. *Id.* Moreover, during cross examination, Dr. Papanikolopoulos identified the robot in Figure 25 of Jones-844 as having a structure that looks like a bumper and, therefore, this limitation is seemingly not disputed. (Tr. 831:1-14.)

(RIB at 97.)

In its responsive brief, iRobot argues “Jones-844 is not directed to a bumper sensor and fails to disclose a bumper sensor as Dr. Nikos testified.” (CRSB at 72 (citing Hr’g Tr. at 831:1-14).) iRobot contends Jones-844 disparages contact or tactile sensors as inefficient, which is why it “discloses an entirely different obstacle detection system.” (*Id.* (citing RX-0095 at 1:38-39, 1:42-43; CX-1824C at Q303-304; RX2082C at Q531).)

In their reply brief, Respondents allege “Dr. Messner testified to the contrary because Jones-844 discloses a bumper and it includes a displacement sensor to properly navigate, particularly in random bounce mode where it randomly collides with objects.” (RRPB at 46 (citing RX-2082C at Q530-531).) Respondents reason the bumper which iRobot’s expert guessed might be shown “would be ineffective in bounce mode if it did not include a displacement sensor

Public Version

for indicating to the ‘processing circuitry’ that there has been ‘contact with an obstacle.’” (*Id.* (citing RX-2082C at Q531; Hr’g Tr. at 831:1-14).)

I find the limitation is not disclosed in Jones-844. Jones-844 spends about as much time discussing a displaceable bumper as it did discussing powered side brushes—which is, not at all. This feature is just not a concern of Jones-844 which is instead focused on an improved cliff detector and movement patterns in response thereto. I can agree that Figure 25 suggests a displaceable bumper *if* one is familiar with iRobot’s products:

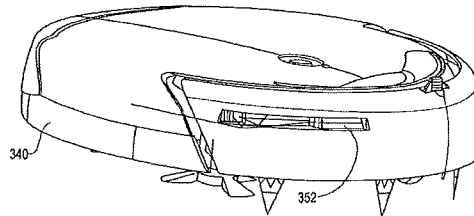


FIG. 25

(RX-0095 at Fig. 25.) Yet this is not a clear and convincing disclosure of “a displaceable bumper disposed at the housing perimeter, and a bumper displacement sensor responsive to displacement of the bumper with respect to the housing.”

In this way, I do not agree with Respondents that “Jones-844 discloses a bumper and it includes a displacement sensor to properly navigate. . . .” (RRPB at 46.) Indeed, The word “displac[.]” is only used in the specification three times, all in one paragraph, for an unrelated concept:

In this way, the logic interface between the sensor subsystem and the control circuitry of the robot is greatly simplified. As shown in the table of FIG. 10, when the displaced height is zero, that is the height of the sensor above the floor is nominal (e.g., 0.058 inches), the ratio of the area of overlap of the field of view and the field of emission is set at one but decreases almost linearly until there is no overlap at a displaced height equal to the maximum height obstacle the robot can successfully traverse (in this example a displaced distance of 0.050 inches). Thus, the overlap area is a function of the height of the sensor subsystem from the surface.

Public Version

(RX-0095 at 6:22-33.) Respondents' expert similarly draws his conclusion that the limitation is disclosed from passages which merely mention "contact with an obstacle" and "until it bumps into an object." (RX-2082C at Q531 (citing RX-0095 at 1:23-27, 5:1-13).) This is not enough. I do not find the limitation is disclosed, explicitly or inherently, in Jones-844.

c. Claim 11

Dependent claim 11 requires, "[t]he floor cleaning robot of claim 1, wherein the control circuit is configured to move the robot in a wall-following mode to maneuver the robot along a wall in a direction that places the side brush against the wall." ('233 patent at cl. 11.) I find clear and un rebutted evidence demonstrates the limitation was disclosed in Jones-844 through the identified wall following mode. (See RIB at 97-98 (citing RX-2082C at Q524-525; RX-0095 at 8:44-48, Fig. 24).)

d. Claim 14

Dependent claim 14 requires, "[t]he floor cleaning robot of claim 1, wherein a portion of the bundles of bristles of the powered side brush passes between a portion of a drive wheel of the robot and the cleaning surface during the rotation of the side brush around the axis." ('233 patent at cl. 14.) Respondents argue succinctly, "Jones-844 discloses this limitation because Figure 24 of Jones-844 shows powered side brushes, where for each side brush, a portion of the bundles of bristles of the side brush passes between a portion of the nearest drive wheel and the floor." (RIB at 98 (citing RX-2082C at Q529).)

In its responsive brief, iRobot disagrees. (CRSB at 72.) iRobot argues "Dr. Messner's citation to Figure 24 of Jones-844 is inapposite; this figure does not even show wheels for the Jones-844 system. (*Id.* (citing RX-2082C at Q528-29; CX-1827C at Q307-310).)

In their reply brief, Respondents contend iRobot's assertion regarding wheels "fails because Dr. Nikos admitted that Figure 24 shows cavities for the Jones-844 drive wheels . . . and

Public Version

that the propeller-shaped elements are side brushes.” (RRPB at 46 (citing Hr’g Tr. at 785:10-786:6, 786:19-787:13; RX-2082C at Q529).)

I find this limitation is not met, again, for the reasons discussed with respect to bundles of bristles and displaceable bumper. Jones-844 simply does not discuss the structures Respondents identify as side brushes. Jones-844 certainly does not show these structures passing between a portion of a wheel and the floor surface. As iRobot points out, Figure 24 only shows vacancies where wheels and/or wheel assemblies would be located without showing the wheels:

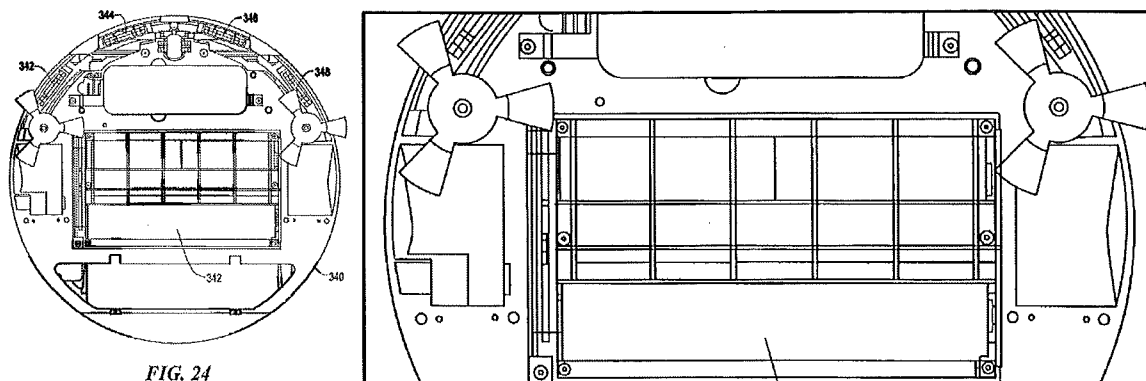


FIG. 24

(RX-0095 at Fig. 24.)

Again, one who was familiar with iRobot products could guess that wheels *might* fill most of the cavities and therefore the rotating side structures *might* pass under a wheel, but the document that is Jones-844 does not disclose this. I therefore cannot find anticipation by clear and convincing evidence.

e. Claim 15

Independent claim 15 is very similar to independent claim 1. Respondents largely rely on the reasoning and evidence discussed under claim 1 to show satisfaction of each of claim 15’s limitations. (See RIB at 98-100.) iRobot does not treat claim 15 any differently than claim 1 for purposes of evaluating invalidity. (See CRSB at 72.)

Public Version

Independent claim 15 requires, “A self-propelled floor-cleaning robot.” (’233 patent at cl. 15.) I find clear and un rebutted evidence demonstrates the limitation was disclosed in Jones-844 for the same reasons discussed under claim 1, above.

Claim 15 further requires, “wheels operably connected to a motor drive to propel the robot across the floor surface.” (’233 patent at cl. 15.) I find clear and un rebutted evidence demonstrates the limitation was disclosed in Jones-844 for the same reasons discussed under claim 1, above.

Claim 15 further requires, “a controller in electrical communication with the motor drive and configured to control the motor drive to autonomously maneuver the robot about detected obstacles encountered on the floor surface during a floor-cleaning operation.” (’233 patent at cl. 15.) I find clear and un rebutted evidence demonstrates the limitation was disclosed in Jones-844 for the same reasons discussed under claim 1, above. Additionally, both parties experts’ have testified the robot of Jones-844 is “autonomous.” (See RIB at 99 (citing RX-2082C at Q522-523; Hr’g Tr. at 782:19-24).)

Claim 15 further requires, “a housing defining a housing perimeter.” (’233 patent at cl. 15.) I find clear and un rebutted evidence demonstrates the limitation was disclosed in Jones-844 for the same reasons discussed under claim 1, above.²²

Claim 15 further requires, “a cleaning head disposed within the housing perimeter and positioned to engage a floor surface.” (’233 patent at cl. 15.) I find clear and un rebutted evidence demonstrates the limitation was disclosed in Jones-844 for the same reasons discussed under claim 1, above.

²² I note Respondents actually fail to mention this limitation in their various claim 15 groupings. (See RIB at 98-100.)

Public Version

Claim 15 further requires, “a cliff detector carried by the housing and configured to direct a beam toward the floor surface and to respond to a falling edge of the floor surface.” (’233 patent at cl. 15.) I find clear and un rebutted evidence demonstrates the limitation was disclosed in Jones-844 for the same reasons discussed under claim 1, above.

Claim 15 further requires:

a powered rotating side brush extending beyond the housing perimeter and positioned to brush floor surface debris from beyond the housing perimeter toward a projected path of the cleaning head, the powered rotating side brush rotating in a direction that brushes debris toward the robot ahead of a rotating axis of the brush along the projected path of the cleaning head, the side brush having bundles of bristles and being positioned such that the bundles of bristles pass between the cliff detector and the floor surface during a rotation of the side brush around the axis, the bundles of bristles being separated by a gap, the gap being configured to prevent occlusion of the cliff detector beam during at least a portion of a rotation of the side brush around the axis

(’233 patent at cl. 15.) For this critical limitation, both Respondents and iRobot defer to their discussions of claim 1. (See RIB at 98-99; CRSB at 72.) Thus, I reach the same determination here—Respondents have not shown that Jones-844 discloses this limitation.

Claim 15 further requires, “the controller being configured to move the robot in a wall-following mode to maneuver the robot along a wall in a direction that places the powered rotating side brush adjacent the wall.” (’233 patent at cl. 15.) I find clear and un rebutted evidence demonstrates the limitation was disclosed in Jones-844 for the same reasons discussed under claim 1, above. Additionally, I agree with Respondents that when in wall-following mode, “[o]ne of the side brushes shown in Figure 24 of Jones-844 will be placed against the wall as the robot is operated in wall-following mode.” (RIB at 100 (citing RX-2082C at Q525).)

f. Claim 16

Dependent claim 16 requires, “[t]he floor cleaning robot of claim 15, wherein the cleaning head comprises a powered primary brush assembly disposed within the housing

Public Version

perimeter and positioned to engage the floor surface.” (’233 patent at cl. 16.) I find clear and un rebutted evidence demonstrates the limitation was disclosed in Jones-844 for the same reasons discussed under claim 1, above.

3. 35 U.S.C. § 103

In its opening brief, Respondents contend claims 1, 10, 11, 14, 15, and 16 of the ’233 patent are rendered obvious by the Jones-844 reference in light of Tangenberg. (*See* RIB at 100-101.) Respondents also contend claims 1, 10, 11, 14, 15, and 16 are rendered obvious by the Bisset reference in light of combinations of Mobile Robots and Tangenberg. (*See id.* at 103-120.)²³

As to the first theory, however, Jones-844 is prior art under 102(e). It is also not disputed that Jones-844 was owned by the same entity at the time the claimed invention of the ’233 patent was made—iRobot. Thus, it is disqualified from use in an obviousness theory. 35 U.S.C. § 103(c) (pre-AIA). Respondents’ arguments to the contrary (RIB at 100-101) are, to put it mildly, far from persuasive in light of the clear statutory language. Only Respondents’ theory with respect to Bisset and Tangenberg is discussed below. For that theory, I do not find any of the claims have been shown to be obvious.

a. Claim 1

Independent claim 1 requires, “[a] self-propelled floor-cleaning robot.” (’233 patent at cl. 1.) I find clear and un rebutted evidence demonstrates the limitation was disclosed in Bisset

²³ As in much of their brief, Respondents are not consistent on this basic step of identifying which prior art references invalidate which claims. (*Compare* RIB at 106 (“Bisset in combination with Tangenberg renders obvious claims 1, 11, 14, 15 and 16 of the ’233 patent”) *with* RIB at 109 (“The Combination of Bisset with the Tangenberg Side Brushes Meets All the Limitations of Claims 1, 10, 11, 14, 15 and 16 and Shows that those Claims were Obvious as of December 2002”).)

Public Version

through the identified disclosure of an autonomous vacuum cleaner. (*See* RIB at 109-110 (citing RX-2082C at Q410-411; RX-0081 at 1:1-3, 3:22-4:5).)

Claim 1 further requires, “a housing defining a housing perimeter.” (’233 patent at cl. 1.) I find clear and un rebutted evidence demonstrates the limitation was disclosed in Bisset through the identified structure which contains functional components. (*See* RIB at 110 (citing RX-2082C at Q41-416; CX-1824C at Q244); RX-0081 at Fig. 1.)

Claim 1 further requires, “a powered primary brush assembly disposed within the housing perimeter and positioned to engage a floor surface, the primary brush assembly being configured to rotate about an axis generally parallel to the floor surface.” (’233 patent at cl. 1.) I find clear and un rebutted evidence demonstrates the limitation was disclosed in Bisset through the identified brush bar 125. (*See* RIB at 110 (citing RX-2082C at Q419-420; RX-0081.022, 026).)

Claim 1 further requires, “a cliff detector carried by the housing and configured to direct a beam toward the floor surface and to respond to a falling edge of the floor surface.” (’233 patent at cl. 1.) I find clear and un rebutted evidence demonstrates the limitation was disclosed in Bisset through the identified infrared sensors. (*See* RIB at 110-111 (citing RX-2082C at Q425-427; RX-0081.013, 026).)

Claim 1 further requires:

a powered side brush extending beyond the housing perimeter and positioned to brush floor surface debris from beyond the housing perimeter, the side brush being configured to rotate about an axis generally perpendicular to the floor surface and to rotate in a direction to direct debris toward the robot along a projected direction of movement of the powered primary brush assembly, the side brush having bundles of bristles and being positioned such that the bundles of bristles pass between the cliff detector and the floor surface during a rotation of the side brush around the axis, the bundles of bristles being separated by a gap, the gap

Public Version

being configured to prevent occlusion of the cliff detector beam during at least part of the rotation of the side brush around the axis;

(’233 patent at cl. 1.)

Respondents’ Position

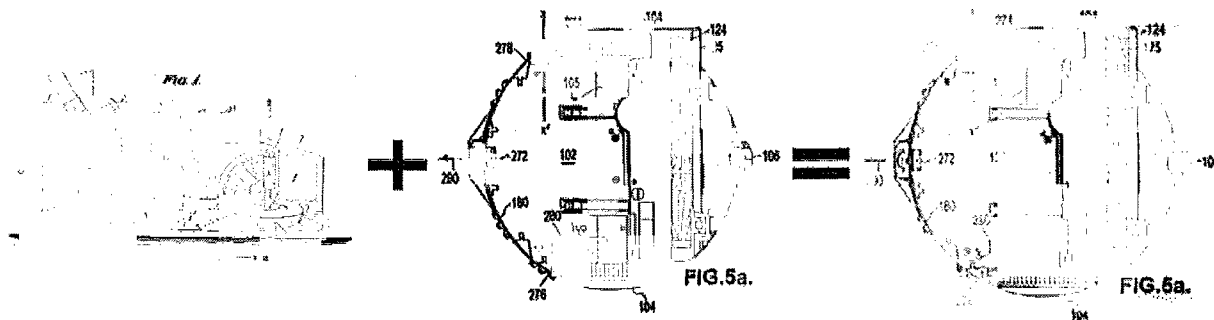
Respondents do not argue that this side brush limitation is disclosed in its entirety by either Bisset or Tangenberg, but rather, that the entire limitation is met when the side brushes of Tangenberg are installed into the vacuum robot of Bisset, according to certain naturally occurring side effects. (*See* RIB at 111-114.) Generally, Respondents explain:

Bisset describes a generally circular robot with two independent drive wheels on page 3, line 21-page 4, line 5. (RX-2082C at Q400; RX-0081.005.) The robot uses a rotating main brush in “cleaner head 122” as well as a vacuum system for picking up dirt as described on page 3, lines 22-34 and Figure 5A. *Id.* Tangenberg describes a manually operated floor sweeper that used side brushes in addition to a rotating main brush in order to allow the floor sweeper to reach into “corners and crevices that cannot be reached” by the main brush. (RX-2082C at Q403; RX-0090.002-003.)

(*Id.* at 106-107.)

When put into Bisset, Respondents contend that such a side brush would be obviously configured to “extend beyond the housing perimeter to brush floor surface debris from beyond the housing perimeter, just as is shown in Tangenberg Figures 2 and 3.” (*Id.* at 111 (citing RX-2082C at Q431-433; RX-0090.001, 003).) Similarly, Respondents contend “[t]he side brushes in the modified Bisset robot would be powered by electric motors, just like the main brush 125 is powered by an electric motor.” (*Id.* at 111-112 (citing RX-2082C at Q434).) Respondents contend the result would look like the below:

Public Version



(See generally *id.* at 112 (citing RX-2082C at Q460, 407).) Respondents argue the blue circles, representing where the Tangenberg brushes would be located on a modified Bisset robot, are the obvious location “based directly on the motivation expressed explicitly in Tangenberg;” namely, “in order to accomplish Tangenberg’s goal of digging into crevices.” (*Id.* (citing Hr’g Tr. at 409:8-411:23).) Respondents dispute any assertion that making these brushes powered would be beyond ordinary skill (*see* CX-824C at Q248-249) because “side brushes have to move, so of course they would be powered and Bisset already had a batter power source, wiring, etc.” (RIB at 112 (citing RX-2082C at Q406-408, 431-434)).

Moving on, Respondents argue the new side brushes, “as a result of the geometry of [Bisset] and the location of the cliff detectors in front of the drive wheels,” would also meet the limitations (as construed), “the bundles of bristles pass through the area the light beam occupies when it is on, during a rotation of the side brush around the axis, the bundles of bristles being separated by a gap, the gap being configured to prevent occlusion of the cliff detector beam .” (*Id.* at 113 (citing RX-2082C at Q438).) Respondents continue:

The presence of the gaps in the Tangenberg side brushes would predictably result in the cliff detector beam not being occluded during at least part of the rotation of the side brush around the axis as shown above. (*Id.* at Q440.) This is a result of the same well-known principle that allows one to see through a spinning propeller or a spoked wheel. *Id.*

Public Version

(*Id.*) Respondents observe that iRobot’s expert “stated he believes Dr. Messner showed the above, but has provided no counter-opinion as to whether the bristles pass under the light beam in the proposed combination.” (*Id.* at 114 (referring to Hr’g Tr. at 800:21-802:23).)

Respondents also cite the testimony of ’233 patent inventors, “Paul Sandin and Newton Eliot Mack, [who] agree that based on the configuration of a round robot like Bissett (and ultimately the Roomba) and the functions of the cliff detector and the side brush, the obvious result is to have the side brush bristles pass through the cliff detector beam,” one of whom went so far as to testify “I don’t think there’s any other choice.” (*See id.* (citing RX-2082C at Q443; RX-2041C at 126:4-20; RX-2062C at 42:5-13, 88:6-19).)

In their reply brief, Respondents argue iRobot has failed to rebut Respondents’ expert’s point that because Bisset is electrically powered, any added brushes would also be electrically powered. (RRPB at 47 (citing RX-2082C at Q434).) Similarly, Respondents observe Tangenberg’s side brush is actually powered—just mechanically as opposed to electrically. (*Id.* at 47-48 (citing RX-2082C at Q123, 434).) Respondents also argue that iRobot is mistaken when it says Respondents’ expert provides no support for his opinions, as the blue circle demonstratives illustrate. (*Id.* at 48 (citing RX-2082C at Q406, 407, 439; Hr’g Tr. at 408:13-24).) Respondents also dismiss any criticism that they did not build prototypes or test the proposed combinations. (*See id.* at 48-49 (citing *Allied Erecting and Dismantling Co., Inc. v. Genesis Attachments, LLC*, 825 F. 3d 1373, 1381 (Fed. Cir. 2016); *In re Sneed*, 710 F.2d 1544, 1550 (Fed. Cir. 1983); *In re Keller*, 642 F.2d 413, 425 (CCPA 1981); *see also In re Mouttet*, 686 F.3d 1322, 1332 (Fed. Cir. 2012); *Pfizer, Inc. v. Apotex, Inc.*, 480 F.3d 1348, 1361 (Fed. Cir. 2007)).)

Public Version

Finally, Respondents address whether their expert provided support for the opinion that “a POSITA would know that the gaps in the bundle of bristles would prevent occlusion of the cliff sensor.” (*Id.* at 49.) Respondents claim “Dr. Messner clearly stated during the hearing why this was the case and supported his conclusion why gaps in the bundle of bristles would prevent occlusion of the cliff sensor.” (*Id.* (citing Hr’g Tr. at 395:1-402:17; RX-2082C at Q440).)

Regarding motivation, Respondents argue “it is obvious to use a known technique to improve similar products in the same way. . . . That is precisely the case here.” (RIB at 105 (citing *KSR*, 550 U.S. at 417).) Respondents continue:

The manual cleaner of Tangenberg is specifically taught “to enter corners and crevices.” (RX-0090 at 2:4-9.) A person of skill in the art would recognize that the side brush of Tangenberg could be used on Bisset to improve the vacuums capabilities of getting into corners and crevices because, as designed, Bisset’s brush could not “dig into [the] edge” of a wall. (Tr. 408:20-409:16.)

(*Id.*) Respondents further argue “[o]ne of ordinary skill in the art would have considered manually operated carpet sweeper when designing a floor cleaning robot with cliff detectors” (*id.* at 107) and “the inventors admitted they looked to Bissel type cleaners, and the patent itself acknowledges that it seeks to solve the problem Tangenberg addressed—cleaning in crevices” (*id.* at 106 (citing ’233 patent at 8:28-34)). Respondents then contend Tangenberg’s brushes would have allowed Bisset to clean corners more effectively—thus providing the motivation to combine. (*See id.* at 107-108 (citing RX-2082C at Q404-405; Hr’g Tr. at 798:2-799:9, 409:8-16).) Respondents suggest “Drs. Messner and Papanikolopoulos are in agreement on the facts that give all the reason one could ask for to add side brushes to a robot like Bisset’s.” (*Id.* at 108.) To make this change in Bisset, Respondents highlight iRobot’s expert testimony that “in 2002 such side brushes would have been ‘desirable.’” (*Id.* at 112 (citing Hr’g Tr. at 798:18-799:9).)

Public Version

Respondents also argue the modification would be “a straightforward engineering task for a person of ordinary skill in the art” involving mostly “adding some basic circuitry to supply power to the side brushes” and perhaps “use a battery with more power or energy if it were necessary.” (*See id.* at 108-109 (citing RX-2082C at Q406-408).) Respondents dismiss iRobot’s expert’s perceived challenges as “not persuasive” as he “was unaware of what actually happened when the Roomba® was developed in the real world” and as the challenges have nothing to do with the claims. (*Id.* at 109 (referring to CX-1824C at Q276-277).))

In their reply brief, Respondents faults iRobot for citing no caselaw “supporting the point that prior art can be too old” with respect to Tangenberg. (RRPB at 51.) Respondents also fault iRobot for “improperly narrow[ing]” the test for analogous art when they assert “a POSITA would not look at manual carpet sweepers when looking to solve the problems recited in the ’233 patent.” (*Id.* (citing *In re Bigio*, 381 F.3d 1320, 1325 (Fed. Cir. 2004)).) Under the proper test, Respondents contend “[b]oth references are clearly related to vacuum cleaning apparatuses” which is not diminished by one being electrically powered. (*See id.* at 52 (citing, *inter alia*, *Leapfrog Enters., Inc. v. Fisher-Price, Inc.* 485 F.3d 1157, 1161 (Fed. Cir. 2007)).)

Respondents also dispute that Bisset’s offset main brush and consequent ability to clean near walls means a person of ordinary skill would not add in the brushes of Tangenberg. (*Id.*) According to Respondents, “[t]hat is misguided. Dr. Messner and Dr. Nikos agree that the Bisset robot is unable to enter and clean corners of a room” and “Tangenberg itself encourages using side brushes to enter corners that cannot be reached by the main brush.” (*Id.* at 52-53 (citing Hr’g Tr. at 408:17-409:16, 798:2-8, 798:19-799:9; RX-2082C at Q401, 270-274; *see* RX-0090 at 3:4-9, Figs. 1-3).) Respondents then argue, contrary to iRobot’s assertion, their expert did opine on “the minimal level of difficulty” towards “motorizing Tangenberg’s mechanical brush in the

Public Version

Bisset robot.” (*Id.* at 53 (citing RX-2082C at Q406-408).) On the other hand, Respondents argue, “Dr. Nikos’ statements regarding inserting a motor into confined space is not relevant” because “[t]he claims do not include size requirements.” (*Id.*) Finally, Respondents urge that no hindsight bias has taken place as “the claims were not used as a roadmap and Dr. Messner clearly explained that the precise size and location of the side brushes was dictated by Bisset’s geometry.” (*Id.* at 54 (citing RX-2082C at Q407; Hr’g Tr. at 407:14-409:16).)

iRobot’s Position

Regarding whether or not limitations would be met, iRobot argues Tangenberg “fails to disclose a powered side brush” because it instead “requires various mechanical components that must work together to make its side brushes function.” (CRSB at 74.) iRobot also argues that, even in a Bisset/Tangenberg combination, “Respondents have failed to show . . . that the bundles of bristles pass between the cliff detector and the floor as required by the claim.” (*Id.*) iRobot characterizes Respondents’ conclusion that this “would ‘necessarily’ occur” as “pure *ipse dixit* with no support in either reference and no additional explanation from Dr. Messner.” (*Id.* at 74-75 (referring to RX-2082C at Q439; CX-1824C at Q253).) iRobot argues the expert:

[M]ade no effort to test or construct this combination, and does not discuss the shortcomings with his opinion.¹² (Hrg. Tr., Messner at 401:13-19; CX-1824C, Nikos RWS at Q251.) Moreover, he provides no support for his conclusion that a POSITA would know that gaps in the bundles of bristles would prevent occlusion of the cliff sensor. (RX-2082C, Messner DWS at Q440.)

(*Id.* at 75.) Additionally, according to iRobot:

Dr. Messner does not show how the combination operates the light beam, what area the light beam occupies when it is on, or whether the bristles occupy that area. (Hrg. Tr., Messner at 401:20-25; CX-1824C, Nikos RWS at Q253.) Indeed, Respondents’ invalidity expert is inconsistent with their infringement expert who opined that the claim can only be satisfied if the gaps in the bundles of bristles actually prevent occlusion. (*See, e.g.*, RX-2078C, Abraham RWS at Q206.)

Public Version

(*Id.*)

Regarding motivation to combine, iRobot claims “Dr. Messner delved back over 100 years for art showing any brush with gaps between bristles, sought to combine it with a robot reference with cliff detectors, and arrived at his obviousness conclusion.” (*Id.* at 76 (citing CX-1824C at Q272).) iRobot argues “[t]his is impermissible hindsight.” (*Id.* (citing *Otsuka Pharm. Co., Ltd. v. Sandoz, Inc.*, 678 F.3d 1280, 1296 (Fed. Cir. 2012)).) iRobot also argues Bisset and Tangenberg are not even in the same field of endeavor or meant to solve similar problems. (*Id.*) Further, iRobot contends “Bisset already includes design elements that allow for cleaning a wall [an offset cleaning head], thus a POSITA would recognize that adding a side brush from Tangenberg would be pointless.” (*See id.* at 77 (citing RX-1824C at Q268-271, 275; RX-0081 at 4:17-20, 5:6-8).) iRobot continues:

Bisset does not express any deficiency in the ability to collect dust from a corner and Dr. Messner has not identified any disclosure in Bisset describing this problem. His conclusion that Bisset could not clean the corner of a room is unfounded, ignores its vacuum and brush, and is based on speculative illustrations with no testing. (Hrg. Tr., Messner at 401:13-19; RX-2082C, Messner DWS at Q401, 456; CX-1824C, Nikos RWS at Q276-78.)

(*Id.* at 77-78.) Here, iRobot points to the same inventor testimony as Respondents, where it was allegedly explained “one reason for putting the side brush in its location on the Roomba was because ‘the main cleaning brush does not extend . . . past the drive wheels.’” (*Id.* at 78 (citing RX-2062 at 45:5-13).) iRobot then observes that Bisset’s main brush already extends to the edge of the system. (*Id.* (citing RX-0081 at 5:6-8, Fig. 5; CX-1824C at Q271).) iRobot also suggests practical difficulties in adding brushes to Bisset would prevent a person of ordinary skill from doing so, in addition to unpredictable results. (*See id.* at 78-79 (citing CX-1824C at Q276-277; CX-1826 at 123:1-124:11, 124:13-18, 174:4-175:254 [sic]).) iRobot claims the blue circle

Public Version

demonstrative, reproduced above, is really a demonstration of how Respondents use the '233 patent as a roadmap. (*Id.* at 79 (citing Hr'g Tr. at 404:17-407:6).)

Analysis

At the outset, I find it is particularly difficult to show obviousness of this limitation because of the way it recites an undesirable configuration (bundles of bristles pass through the light beam when it is on) only to then recite an ameliorating configuration (bundles including a gap configured to prevent occlusion). Thus, any argument that it would have been obvious to modify a robot to include these features must overcome the limitation's self-contained motivation to not so include them. In other words, the risk of occluding preexisting cliff detectors would dissuade an engineer from adding side brushes that pass through those detectors' light beams. This may be why, despite corner side brushes being 100 years old (Tangenberg), there is no prior art in the record showing their bristles passing through a cliff detector beam. The critical limitation of this claim is not disclosed in any prior art.

Nevertheless, Respondents contend this would have been obvious. Specifically, Respondents propose modifying Bisset so that the negative configuration (bundles of bristles pass through the light beam when it is on) is a natural side effect rather than the intended result. More specifically, Respondents argue it would have been obvious to add Tangenberg's side brushes to Bisset, and those brushes would obviously be powered and placed in a certain location on Bisset's undercarriage, and as a result of being in that location, would cross through the light of the preexisting cliff detectors, and, because of the arrangement shown in Tangenberg, would also mean the gaps of those brushes would necessarily prevent occlusion, thereby satisfying the claim. (*See generally* RIB at 105-114; RX-2082C at Q431-442.) This is quite a chain of events to treat as obvious given the legal maxim that inventions must not be pieced together using the

Public Version

patent as a roadmap. *See, e.g., Otsuka Pharm.*, 678 F.3d at 1296 (“The inventor's own path itself never leads to a conclusion of obviousness; that is hindsight. What matters is the path that the person of ordinary skill in the art would have followed, as evidenced by the pertinent prior art.”). Similarly, and with respect to Respondents’ use of ’233 patent inventor testimony (*see* RIB at 114), “[p]atentability shall not be negative by the manner in which the invention was made.” 35 U.S.C. § 103(a) (pre-AIA).

Ultimately, I find Respondents’ use of Bisset’s illustrations—regarding where brushes would be located, and based on the proportions in those illustrations, how those brushes would interact with other components—to be clever. I also find Bisset and Tangenberg to be in the same field of endeavor and addressed to the same problem of cleaning floors. I also find a person of ordinary skill would probably appreciate a deficiency of Bisset to reach into corners as it cleans.

I do not find, however, clear and convincing evidence that prior to the ’233 patent, a person of *ordinary* skill would take the *extraordinary* step of passing bristles through Bisset’s cliff detector beams only to then add “gaps configured to prevent occlusion.” Moving the sensor so that there is no conflict is one option, as disclosed in Bisset, for example. (*See* RX-0081 at 14:23-29 (“As an alternative to the sideways diagonally downlooking sensor shown here, a downlooking sensor could be provided which looks directly downwards and which is mounted on an arm which extends sufficiently outwardly from the side of the cleaning device that the sensor has a clear line-of-sight to the floor surface.”). Shortening the bristles, or changing the angle of the detector beam is another. After all, even the slightest amount of extension past the housing perimeter by a side brush will improve Bisset’s ability to clean a corner—it doesn’t have to be as far as Respondents’ proffered blue circles.

Public Version

Overall, I find equal support in the record for the idea that the '233 patent team was the first to conceive and appreciate the trade-off between front side brushes which extend past the housing perimeter and effective cliff detectors. If there had been prior art which disclosed side brushes extending through cliff detector beams as required, but otherwise lacked other limitations that Bisset provides, obviousness would be a much closer question. That art, however, does not exist. The closest is iRobot's own Jones-844 reference, which, for statutory and good reasons, cannot be used to support obviousness of the '233 patent. Thus, I do not find the limitation has been shown to be obvious.

Claim 1 further requires, "a particulate receptacle positioned to receive and collect particulates brushed from the floor surface by the primary brush assembly and the powered side brush." ('233 patent at cl. 1.) I find clear and un rebutted evidence demonstrates the limitation would have been disclosed by the combination of the cyclonic separator 152 in Bisset and the side brush from Tangenberg. (*See* RIB at 114 (citing RX-20802C at Q447; RX-0081.001, 007; CX-1824C at Q254).)

Claim 1 further requires, "an obstacle detector responsive to obstacles encountered by the robot." ('233 patent at cl. 1.) I find clear and un rebutted evidence demonstrates the limitation was disclosed in Bisset through the identified ultrasonic sensors. (*See* RIB at 114 (citing RX-2082C at Q448-450).)

Claim 1 further requires, "a control circuit in electrical communication with a motor drive and configured to control the motor drive to maneuver the robot about detected obstacles across the floor surface during a floor-cleaning operation." ('233 patent at cl. 1.) I find clear and un rebutted evidence demonstrates the limitation was disclosed in Bisset through the identified

Public Version

control system circuitry. (See RIB at 115 (citing RX-2082C at Q451-453; RX-0081.007, 015, 031).)

b. Claim 10

Dependent claim 10 requires, “[t]he floor cleaning robot of claim 1, wherein the obstacle detector comprises a displaceable bumper disposed at the housing perimeter, and a bumper displacement sensor responsive to displacement of the bumper with respect to the housing.” (’233 patent at cl. 10.) For only this claim, Respondents combine Bisset with Tangenberg and Mobile Robots, as it is not disputed that neither Bisset nor Tangenberg discloses a bumper sensor. (See RIB at 118-120.) Respondents contend, however:

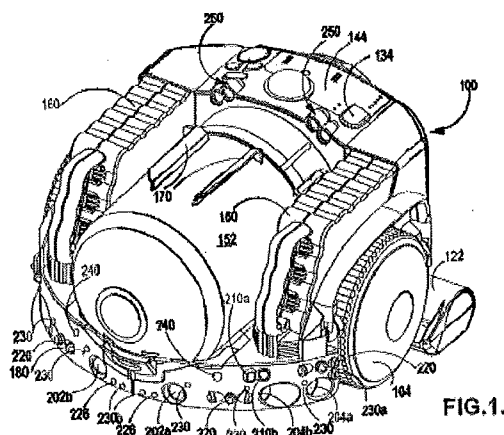
[B]umpers were well known and a person of skill in the art would have been motivated to implement a bumper in the proposed combination to improve it such that the ‘robot could reliably detect when the robot is in contact with another object, and to use that information to allow the robot to reliably maneuver away from collisions.

(*Id.* at 118-119 (citing RX-2082C at Q466).) Respondents cite Mobile Robots as one example of a prior art displaceable bumper, where it is disclosed “that contact sensors are advantageous because they ‘have proven the most reliable, exhibit the lowest noise, and produce the most easily interpreted signal of all sensors.’” (*Id.* at 119 (citing RX-2082C at Q464-465; RX-0084.081, 082).) Respondents argue it would have thus been obvious to include such a sensor in Bisset, as Bisset is a circular robot (which Mobile Robots specifically describes), and doing so “would have been simple and straightforward for a person of ordinary skill in the art.” (*Id.* (citing RX-2082C at Q466).) Respondents allege this is so even though Bisset “already has ultrasonic sensors” because “it is always beneficial, and rather common, to have some redundancy to enable the robot to avoid obstacles.” (*Id.* (citing RX-2082C at Q465).)

In its responsive brief, iRobot takes issue with Respondents’ expert for “not explain[ing] how Mobile Robots discloses a displaceable bumper disposed at a housing perimeter.” (CRSB at

Public Version

80 (citing CX-1824C at Q279-285).) Moreover, argues iRobot, “it would require a significant amount of engineering work due to the crowded nature of the area under the vacuum system . . . the front of the robot is covered in sensors, including ultra-sonic sensors.” (*Id.* (citing RX-0081 at Figs. 1, 2, 5:10-13, 6:31-7:2; CX-1824C at Q281).) I reproduce Bisset’s Figure 1 below:



(RX-0081 at Fig. 1.) iRobot then argues that contact sensors reliability is not enough on its own to provide motivation to combine “into an already complex sensor system.” (CRSB at 81 (citing CX-1824C at Q283-285; RX-2082C at Q465).) Essentially, according to iRobot, all that Respondents have shown is that the combination could be made, not that it obviously would be. (*See id.*)

In their reply brief, Respondents quickly refute the idea that Mobile Robots does not disclose a moveable bumper at the housing perimeter. (RRPB at 54 (citing RX-0084.082; RX-2082C at Q465).) Respondents rely on their own expert to show, contrary to iRobot’s position, “that it would have actually been simple and straight forward for a POSITA to implement the contact sensitive bumper described in *Mobile Robots* in the Bisset robot.” (*Id.* (citing RX-2082C at Q466).)

Here, I find Mobile Robots does disclose a “a displaceable bumper disposed at the housing perimeter, and a bumper displacement sensor responsive to displacement of the bumper

Public Version

with respect to the housing” through the microswitches and floating skirt (*i.e.*, bumper) assembly Respondents identify. (RIB at 119 (citing RX-0084.082); *see* RRPB at 54.) I also find Respondents’ expert has credibly explained why a person of ordinary skill would be motivated to use such a displaceable bumper sensor—for its superior reliability and signal clarity. (RX-2082C at Q465-466.) He also credibly testified that it would be a straightforward task to make this modification in Bisset. (RX-2082C at Q466.) I find this opinion in particular is buttressed by the simplicity of the structure as shown in Mobile Robots:

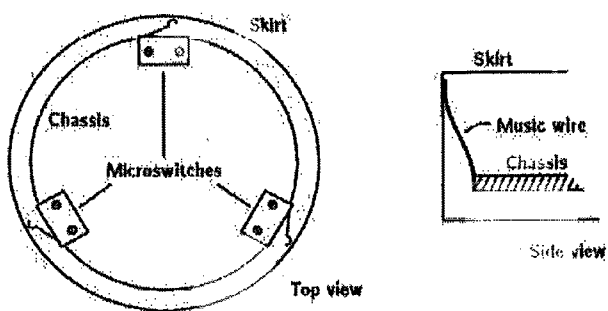


Figure 5.21. How a full-coverage, force-detecting bumper can be implemented on a cylindrical robot. Three microswitches are arranged symmetrically around

(RX-0084.082.)

iRobot’s expert is less persuasive as he views Respondents as simply arguing the “mere availability of reliable sensors” provides motivation. (CX-1824C at Q283.) Respondents’ argument is not so limited. According to Mobile Robots, force sensors are not only available they are superior; “force sensors have proven the most reliable, exhibit the lowest noise, and produce the most easily interpreted signal of all sensors.” (RX-0084.081-082.) I find this passage clearly evidences why a person of ordinary skill would at least try to implement force sensors, like that in Mobile Robots, in applications where collision sensing is important, like in the mobile cleaning robot of Bisset.

Public Version

Thus, I find the limitation has been shown with clear and convincing evidence to be an obvious modification of Bisset in light of Mobile Robots.

c. Claim 11

Dependent claim 11 requires, “[t]he floor cleaning robot of claim 1, wherein the control circuit is configured to move the robot in a wall-following mode to maneuver the robot along a wall in a direction that places the side brush against the wall.” (’233 patent at cl. 11.) I find clear and un rebutted evidence demonstrates a wall-following mode was disclosed in Bisset and, *if* Bisset had side brushes as Respondents propose, the limitation would be met. (See RIB at 115 (citing RX-2082C at Q460-461), 117-118 (citing RX-2082C at Q456-457; RX-0081.007, 009, 010, 017); CRSB at 75-76; RRPB at 50.)

d. Claim 14

Dependent claim 14 requires, “[t]he floor cleaning robot of claim 1, wherein a portion of the bundles of bristles of the powered side brush passes between a portion of a drive wheel of the robot and the cleaning surface during the rotation of the side brush around the axis.” (’233 patent at cl. 14.) Respondents contend “[t]he Bisset robot modified to use the Tangenberg side brushes” meet this limitation “as a consequence of the design requirements of the robot: the drive wheels need to be positioned on the diameter of the generally circular robot, and the side brushes need to be positioned so they can reach into corners.” (RIB at 115 (citing RX-2082C at Q462-463).) If this happens, Respondents reason the bristles will pass under the wheels as shown in Figure 5a of Bisset. (*Id.* at 116 (citing RX-2082C at Q462-463).)

In its responsive brief, iRobot contests the limitation because Respondents’ expert “has not explained how or why the brush of Tangenberg would be installed in Bisset such that a portion of its bundles of bristles would pass between the drive wheel and floor during rotation of the brush.” (CRSB at 76.) iRobot argues “he merely cites ‘design requirements’ for circular

Public Version

robots without support, ignoring that a number of references he cites are not circular.” (*Id.* (citing RX-2082C at Q463; RX-0080 at Fig. 1; RX-0089 at Fig. 2; CX-1824C at Q260-261).)

In their reply brief, Respondents explain:

In order to satisfy the motivation promoted by Tangenberg—cleaning in corners—the side brushes needed to extend at least slightly beyond the offset main brush. (RDX-05.144; RX-2082C at Q405-408, Q463; 409:20-411:23.) Dr. Nikos admitted that the wheels of the Bisset robot touch the ground at 6 o’clock in relation to their location on the robot and the bristles are located under the wheel around 8 o’clock as shown in RDX-05.144. (Tr. at 802:24-803:16.)

(RRPB at 51.)

I find, as I did with respect to the general side brush limitation in claim 1, that clear and convincing evidence does not support this limitation would have been obvious. Again, neither Bisset nor Tangenberg discloses this feature, and Respondents’ theory does not address the question of *why* a designer would choose to have “bundles of bristles passing between the drive wheel and floor during rotation of the brush.” Respondents only allege that this circumstance would naturally occur from adding a side brush in the exact position and configuration as detailed by Respondents’ expert. (*See* RX-2082C at Q463.) This is a clever use of Bisset’s illustrations but it ultimately does not convince me that this limitation *would obviously* occur from a person of ordinary skill seeking to add side brushes to Bisset. Thus, I find the limitation has not been shown to be obvious.

e. Claim 15

Again, independent claim 15 is very similar to independent claim 1. Respondents largely rely on the reasoning and evidence discussed under claim 1 to show satisfaction of each of claim 15’s limitations. (*See* RIB at 116-118.) iRobot does not treat claim 15 any differently than claim 1 for purposes of evaluating invalidity. (*See* CRSB at 76.)

Public Version

Independent claim 15 requires, “A self-propelled floor-cleaning robot.” (’233 patent at cl. 15.) I find clear and un rebutted evidence demonstrates the limitation was disclosed in Bisset for the same reasons discussed under claim 1, above.

Claim 15 further requires, “wheels operably connected to a motor drive to propel the robot across the floor surface.” (’233 patent at cl. 15.) I find clear and un rebutted evidence demonstrates the limitation was disclosed in Bisset for the same reasons discussed under claim 1, above.

Claim 15 further requires, “a controller in electrical communication with the motor drive and configured to control the motor drive to autonomously maneuver the robot about detected obstacles encountered on the floor surface during a floor-cleaning operation.” (’233 patent at cl. 15.) I find clear and un rebutted evidence demonstrates the limitation was disclosed in Bisset for the same reasons discussed under claim 1, above. Additionally, I find clear and un rebutted evidence that the Bisset robot is “autonomous.” (*See* RIB at 117 (citing RX-2082C at Q454-455).)

Claim 15 further requires, “a housing defining a housing perimeter.” (’233 patent at cl. 15.) I find clear and un rebutted evidence demonstrates the limitation was disclosed in Bisset for the same reasons discussed under claim 1, above.

Claim 15 further requires, “a cleaning head disposed within the housing perimeter and positioned to engage a floor surface.” (’233 patent at cl. 15.) I find clear and un rebutted evidence demonstrates the limitation requiring a cleaning head (i.e., a bush) was disclosed in Bisset for the same reasons discussed under claim 1, above.

Claim 15 further requires, “a cliff detector carried by the housing and configured to direct a beam toward the floor surface and to respond to a falling edge of the floor surface.” (’233

Public Version

patent at cl. 15.) I find clear and un rebutted evidence demonstrates the limitation was disclosed in Bisset for the same reasons discussed under claim 1, above.

Claim 15 further requires:

a powered rotating side brush extending beyond the housing perimeter and positioned to brush floor surface debris from beyond the housing perimeter toward a projected path of the cleaning head, the powered rotating side brush rotating in a direction that brushes debris toward the robot ahead of a rotating axis of the brush along the projected path of the cleaning head, the side brush having bundles of bristles and being positioned such that the bundles of bristles pass between the cliff detector and the floor surface during a rotation of the side brush around the axis, the bundles of bristles being separated by a gap, the gap being configured to prevent occlusion of the cliff detector beam during at least a portion of a rotation of the side brush around the axis

(’233 patent at cl. 15.) As determined for the similar limitation of claim 1, I do not find clear and convincing evidence demonstrates this limitation would have been obvious.

Claim 15 further requires, “the controller being configured to move the robot in a wall-following mode to maneuver the robot along a wall in a direction that places the powered rotating side brush adjacent the wall.” (’233 patent at cl. 15.) I find clear and un rebutted evidence demonstrates a wall-following mode was disclosed in Bisset and, *if* Bisset had side brushes as Respondents propose, this limitation would be met. (*See* RIB at 117-118 (citing RX-2082C at Q456-457; RX-0081.007, 009, 010, 017); CRSB at 75-76; RRPB at 50.)

f. Claim 16

Dependent claim 16 requires, “[t]he floor cleaning robot of claim 15, wherein the cleaning head comprises a powered primary brush assembly disposed within the housing perimeter and positioned to engage the floor surface.” (’233 patent at cl. 16.) I find clear and un rebutted evidence demonstrates the limitation was disclosed in Bisset for the same reasons discussed under claim 1, above.

Public Version

g. Secondary Considerations

Secondary considerations of non-obviousness are used to overturn an otherwise prima facie case of obviousness. *Pfizer, Inc. v. Apotex, Inc.*, 480 F.3d 1348, 1360 (Fed. Cir. 2007). As discussed above, I do not find any of the challenged claims obvious. Additionally, much of the parties' arguments concerning secondary considerations has already been captured above.

For the '233 patent specifically, iRobot contends "iLife [] and [] (CIB at 114 (citing CX-0305C at 95:1-9, 94:4-6).) iRobot then discusses the requirements of the '233 patent claims, in light of the undisputed infringement by the V5s and X751 iLife products, to conclude "iLife adopted the particular wall follow feature of the '233 patent embodied in the iRobot products." (*Id.* (citing CX-0193C).) Regarding success and praise, iRobot again links the '233 patent to the overall cleaning efficiency that consumers identify as important and that iRobot has been praised for. (*Id.* (citing CX-0220C at Q670-674).)²⁴ In its responsive brief, iRobot addresses nexus with "consumers would not purchase a floor cleaning robot if it could not clean edges or avoid falling down stairs. The '233 patent claims a specific configuration of sensors and brushes that enables a robot to do both." (CRSB at 86.)

As with the previous two patents, Respondents generally dispute the effect of the alleged secondary considerations due to a lack of nexus to the '233 patent's claims *and* inventive elements. (*See generally* RIB at 123-124; RRSB at 59 (citing *In re Kao*, 639 F.3d at 1068); RRPB at 57-60.) Applicable to the other three patents as well, Respondents instruct that they are

²⁴ I note here iRobot's experts' references to a Bissell survey (*see, e.g.*, CX-0221C at Q515; CX-0220C at Q672) which curiously is not mentioned with an exhibit number and, also, is mentioned with the same cut and paste language by each expert (*compare* CX-0221C at Q515 *with* CX-0220C at Q672 ("based in part on consumer survey document [sic] I have received from Bissell, it is my opinion that consumers desire robotic vacuums with high cleaning efficacy and intelligent navigation that can maneuver around edges."))

Public Version

positioned out past the housing, and thus beyond the cliff detector 54CD that is shown in Figure 3B.” (*Id.* at 121-122 (citing RX-2082C at Q539).) In short, “[b]ecause the drawings do not show where the cliff detector beam is, they do not disclose what the relationship is between the area occupied by the cliff detector beam and the bristles 78 as the brush rotates.” (*Id.* (citing RX-2082C at Q539).) Respondents consider the design of the 2002 Roomba robot to further support their views on the content of the ’233 patent specification. (*Id.* at 123 (citing RX-2082C at Q540).)

In its responsive brief, iRobot argues:

A POSITA would understand that a side brush with bundles of bristles has adequate support in the specification. For example, the disclosure of the brush arm is similar in terms of function and structure to a bundle of bristles as the claim requires. Further, a person of skill in the art reading the ’233 patent would understand that the disclosure of the “brush arm” is not a limiting example of the components that could occlude the cliff detector.

(CRSB at 82.) Regarding the first excerpt cited by Respondents (’233 patent at 8:55-62), iRobot views it as “mak[ing] clear that different configurations of the side brush are described, and only full or partially circular brush configurations are discouraged.” (CRSB at 82.) Regarding the “toothbrush configuration” excerpt (’233 patent at 9:3-8), iRobot similarly views it as “non-limiting and exemplary, inviting a POSITA to use alternative and similar configurations.” (CRSB at 82.) iRobot highlights the patent examiner had no written description objections even though they were added by amendment during prosecution. (*Id.*) Lastly, iRobot claims any consideration of a 2002 Roomba design is irrelevant as written description is an “objective inquiry into the four corners of the specification from the perspective of a person of ordinary skill in the art.” (*Id.* at 83 (citing *Boston Sci. Corp. v. Johnson & Johnson*, 647 F.3d 1353, 1366 (Fed. Cir. 2011)).)

Public Version

In their reply brief, Respondents label iRobot's position as pure attorney argument which "should get no weight." (RRPB at 55.) Respondents contend "suggesting what could have been disclosed or what other non-disclosed configurations might be similar to the claimed feature at issue, as iRobot suggests, does not meet the written description standard." (*Id.* (citing *Lockwood v. American Airlines, Inc.*, 107 F.3d 1565, 1572 (Fed. Cir. 1997).) Regarding the relevancy of the 2002 Roomba design, Respondents explain they are using it to "show that it is possible to design bristles similar to the '233 patent that do not have to pass through the area occupied by the cliff detector light beam when it is on." (*Id.* at 55-56 (citing CRSB at 83).)

I find there is sufficient support for the limitation, and consequent agreed construction, within the '233 patent and apart from any determination about what Jones-844 does nor does not disclose. The standard is whether the specification "reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date." *Boston Sci. Corp.*, 647 F.3d at 1362 (citation omitted). Respondents' highlight the '233 patent disclosure of, "[t]he set of bristles 78 is set in the outermost free end of each brush arm 76 (similar to a toothbrush configuration) to provide the sweeping capability of the side brush assembly 70" (RIB at 121 (citing '233 patent at 9:3-5)), and reason "[a] rotating side brush arms whose bristles were in a "toothbrush configuration" would have the arms, not the bristles, pass through the area the light beam occupies when it is on." (*Id.* (citing CX-2082C at Q537).)

I do not agree this conclusion is can be necessarily drawn from this brief mention of a "toothbrush configuration," and even along with Figures 2A and 3B. A reasonable reading of the entire passage in context is a more general concern over any part of brush assembly 70 interfering with the cliff detector by occlusion. (*See* '233 patent at 8:48-9:2.) This could include the bristles or brush arms.

Public Version

Respondents also base their challenge on the figures of the '233 patent, but I find the above passage (8:48-9:2) provides sufficient support for “bundles of bristles pass through the area the light beam occupies when it is on.” Thus, the limitation is not invalid for lack of written description.

VIII. DOMESTIC INDUSTRY - ECONOMIC PRONG

A. Relevant Law

In a patent-based complaint, a violation of Section 337 can be found “only if an industry in the United States, relating to the articles protected by the patent ... concerned, exists or is in the process of being established.” 19 U.S.C. § 1337(a)(2). Under Commission precedent, this “domestic industry requirement” of Section 337 consists of an economic prong and a technical prong. *Stringed Instruments*, Inv. No. 337-TA-586, Comm’n Op. at 12-14. The complainant bears the burden of establishing that the domestic industry requirement is satisfied. *See Certain Set-Top Boxes and Components Thereof*, Inv. No. 337-TA-454, Initial Determination at 294 (June 21, 2002) (not reviewed by Commission in relevant part).

The economic prong of the domestic industry requirement is defined in subsection (a)(3) of Section 337 as follows:

(3) For purposes of paragraph (2), an industry in the United States shall be considered to exist if there is in the United States, with respect to the articles protected by the patent, copyright, trademark or mask work concerned --

(A) Significant investment in plant and equipment;

(B) Significant employment of labor or capital; or

(C) Substantial investment in its exploitation, including engineering, research and development, or licensing.

19 U.S.C. § 1337(a)(3). The economic prong of the domestic industry requirement is satisfied by meeting the criteria of any one of the three factors listed above.

Public Version

Under Section 337(a)(3)(A) and (B), “a complainant's investment in plant and equipment or employment of labor or capital must be shown to be “significant” in relation to the articles protected by the intellectual property right concerned.” *Imaging Devices*, Inv. No. 337-TA-690, Comm’n Op. at 26. Before *Lelo*, the Commission had emphasized that “there is no threshold test for what is considered ‘significant’ within the meaning of the statute.” *Kinesiotherapy Devices*, Inv. No. 337-TA-823, Comm’n Op. at 33 (July 12, 2013). Instead, the Commission stated the determination is made by “an examination of the facts in each investigation, the article of commerce, and the realities of the marketplace.” *Certain Male Prophylactic Devices*, Inv. No. 337-TA-546, Comm’n Op. at 39 (August 1, 2007) (“*Male Prophylactics*”).

Section 337(a)(3)(C) provides for domestic industry based on “substantial investment” in the enumerated activities, including licensing of a patent. See *Certain Digital Processors and Digital Processing Systems, Components Thereof, and Products Containing Same*, Inv. No. 337-TA-559, ID at 88 (May 11, 2007) (“*Digital Processors*”). Mere ownership of the patent is insufficient to satisfy the domestic industry requirement. (*Id.* at 93 (citing the Senate and House Reports on the Omnibus Trade and Competitiveness Act of 1988, S.Rep. No. 71.) However, entities that are actively engaged in licensing their patents in the United States can meet the domestic industry requirement. (*Id.*)

The most recent precedential decision by Court of Appeals for the Federal Circuit addressing issues relevant to this investigation is *Lelo*, 786 F.3d 879 (Fed. Cir. 2015). In *Lelo*, the Federal Circuit restated law applicable to a number of issues surrounding the economic prong of domestic industry. In particular, the Federal Circuit held that the statutory terms “‘significant’ and ‘substantial’ refer to an increase in quantity, or to a benchmark in numbers” and “[a]n ‘investment in plant and equipment’ therefore is characterized quantitatively, *i.e.*, by the amount

Public Version

of money invested in the plant and equipment.” *Lelo*, 786 F.3d at 883. Continuing, the CAFC held that: “[a]ll of the foregoing requires a quantitative analysis in order to determine whether there is a ‘significant’ increase or attribution by virtue of the claimant’s asserted commercial activity in the United States.” *Id.* In short, “Qualitative factors cannot compensate for quantitative data that indicate insignificant investment and employment.” *Id.* at 885. Although not specifically addressed, it also makes sense to apply the same rationale to labor costs.

B. iRobot’s Position

In its opening brief, iRobot acknowledges that I granted summary determination that iRobot satisfied economic prong domestic industry under subsections (A) and (B), but nonetheless seeks a further determination that subsection (C) is also satisfied. (CIB at 114-115.) iRobot claims “Respondents did not present any rebuttal testimony or evidence” towards this issue and “chose not” to do so even before economic prong summary determination had been granted. (*Id.* at 115 (referencing Respondents’ Pre-Hearing Statement at 1-2).) iRobot reasons that this “confirm[s] that there is no meaningful dispute” over satisfaction of subsection (C). (*Id.*)

Continuing, iRobot reports that “[t]he overwhelming majority of iRobot’s engineering, research, and development work takes place in the U.S., in facilities in Bedford, MA and Pasadena, CA.” (*Id.* (citing CX-0222C at Q10-13; CX-0219C at Q37).) iRobot claims it has more than 400 employees engaged in engineering, research, and development across these two locations as compared to 10 or fewer outside the U.S. (*Id.* (citing CX-0219C at Q40; CX-0222C at Q10; CPX-0030C; CPX-0036C; CPX-0032C).) iRobot explains that engineering work is “tracked hourly on a per project basis” through timecards. (*Id.* (citing CX-0219C at Q43-44; CPX-0031C; CPX-0035C; RX-20149C at 112:18-113:14).)

Public Version

Regarding the nexus requirement of subsection (C), iRobot identifies which engineering projects related to which asserted patents, which I have put into following table:

Patent	Projects
'553 patent	IR&D HBU El Paso IR&D HBU R4 []
'490 patent	IR&D HBU El Paso []
'090 patent	IR&D HBU R4 []
'233 patent	SST HBU IEC Cliff Safety

(*Id.* at 115-116 (citing CX-0219C at Q92, 113-115).)

Regarding the [] iRobot claims it “implemented [] into the iRobot 960 robot” which also “required work on the [] (*Id.* at 116 (citing CX-0478 at 7589; CX-0920C at 7618; CX-1087 at 7634; CX-0921C at 7652; CX-0922C at 7688; CX-0479 at 7780).) iRobot claims this also involved updates to [] (*Id.* (citing CX-0918C at 7465; CX-0919C at 7487; CX-0923C at 7725; CX-0924C at 7744; CX-0919C at 7487).) iRobot contends that due to the recitation of [] in the claims of the '490, '090, and '233 patents, the IR&D HBU Laredo project has sufficient nexus to these patents. (*Id.* (citing CX-0221C at Q490; CX-0220C at Q272, 646).)

Regarding the SST HBU IEC Cliff Safety project, iRobot argues it was “aimed to ensure that Roomba’s cliff sensors comply with the IEC cliff international safety standard” for all DI products. (*Id.* (citing CX-0476 at 7308; CX-0477 at 7341; CX-0916C at 7345; CX-0917C at 7365).) iRobot contends that due to the recitation of cliff sensors in the claims of the '490, '090,

Public Version

and '233 patents, the SST HBU IEC Cliff Safety project has sufficient nexus to these patents. (*Id.* (citing CX-0221C at Q492; CX-0220C at Q274, 648).)

Regarding the IR&D HBU El Paso project, iRobot claims it “worked on improving the 900 Series’ obstacle detection and obstacle following, including by updating the robot’s control system.” (*Id.* (citing CX-0472 at 3942, 3945-3947; CX-0889 at 7117; CX-0473 at 7165; CX-0855 at 8689-8690).) iRobot continues to claim the project improved the robot’s ability to slow down based on sensed obstacles, its cliff sensors, the “powered brush assembly,” and the dustbin. (*Id.* at 117 (citing CX-0856 at 8749-8750; CX-0889 at 1622; CX-0855 at 8689; CX-0472 at 7150).) iRobot contends that due to the recitation of obstacle detection sensors , “the ability to follow or react to obstacles,” dustbins, and/or powered brushes in the claims of the ’490, ’090, ’233, and, assumedly, the ’553 patent, the IR&D HBU El Paso project has sufficient nexus to “each of the Asserted Patents.” (*Id.* (citing CX-0221C at Q297, 489; CX-0220C at Q271, 645).)

Regarding the IR&D HBU R4 project, iRobot argues it “involved design and development for all Roomba products” with improvements to bump and proximity sensors, wheel motors and drive system, along with associated changes to the robots’ control system. (*Id.* (citing CX-0473 at 7166; CX-0897 at 1425-1427).) iRobot contends that due to the recitation of proximity sensors, bump sensors, and/or motive systems in the claims of all four Asserted Patents, the IR&D HBU R4 project has sufficient nexus to each of these patents. (*Id.* (citing CX-0221C at Q298, 491; CX-0220C at Q273, 647).)

Regarding the [] iRobot claims it “aims to develop [] which necessitated significant changes to the technologies developed for earlier robots, including []” (*Id.* (citing CX-0890 at 7267; CX-0891 at 7278, 7280, 7288; CX-0892 at 7544; C-0893 at 7761; CX-

Public Version

0479 at 7779; CX-0894 at 7798; CX-0480 at 7816; CX-0915C at 9318).) Accordingly, iRobot argues, the project also significantly affected [

] (*Id.* (citing CX-0891 at 7278).) As

with the R4 and El Paso projects, iRobot contends that the claims of all four Asserted Patents recite [] and

thus the [] project has sufficient nexus to each of these patents. (*Id.* at 118 (citing CX-0221C at Q299, 493; CX-0220C at Q275, 649).)

Moving on to the quantitative value of its investments, iRobot contends that labor expenses can be calculated by multiplying the number of hours worked on each project, using timecards, by each employee's hourly salary—and that this was done by iRobot's expert, Dr. Vander Veen. (*See id.* at 118 (citing CX-0219C at Q42-50, 53-56, 92; CPX-0031C; CPX-0035C; CX-0433C; CPX-0032C; CPX-0036C).) The result, according to iRobot, is labor expenditures of [] for the '490, '090, and '233 patents; and [] for the '553 patent. (*Id.* (citing CX-0219C at Q93-94).) iRobot adds that managerial overhead investments increase the totals to [] and [] respectively. (*Id.* at 118 (citing CX-0219C at Q51-52, 95-96; CPX-0027C).)

For facilities, iRobot identifies total R&D operating expenses for each of its Bedford and Pasadena facilities, then uses allocation technique based on "the percentage of total R&D work at iRobot that was related to the Asserted Patents." (*Id.* at 119 (citing CX-0219C at Q59-62, 99-100; CPX-0034C; CPX-0027C).) The result, according to iRobot, is labor expenditures of [] for the '490, '090, and '233 patents; and [] for the '553 patent. (*Id.* (citing CX-0219C at Q99-100).)

Public Version

For capital equipment, iRobot identifies total equipment expenditures “at iRobot’s U.S. facilities,” then applies the same allocation from facilities to “calculate the portion of capital equipment expenditures related to exploitation of the Asserted Patents.” (*Id.* (citing CX-0219C at Q68; CPX-0028C).) The result, according to iRobot, is equipment expenditures of [] for the ’490, ’090, and ’233 patents; and [] for the ’553 patent.

iRobot lastly provides the sums of these investments as [] (including overhead) for the ’490, ’090, and ’233 patents; and [] (including overhead) for the ’553 patent. (*Id.* (citing CX-0219C at Q95-96, 101).) I present iRobot’s approaches with two tables below:

	'553 patent	'490 patent	'090 patent	'233 patent
<i>Labor</i>	[]	[]	[]	[]
<i>Facility</i>	[]	[]	[]	[]
<i>Capital</i>	[]	[]	[]	[]
<i>Total</i>	[]	[]	[]	[]

	'553 patent	'490 patent	'090 patent	'233 patent
<i>Labor (including mgmt. overhead)</i>	[]	[]	[]	[]
<i>Facility</i>	[]	[]	[]	[]
<i>Capital</i>	[]	[]	[]	[]
<i>Total</i>	[]	[]	[]	[]

Moving on, iRobot then argues its investments are “substantial” under the statute. (*Id.* at 119-121.) iRobot principally relies on my determination in Order No. 39 that a much lesser amount of [] was “significant by any measure.” (*Id.* at 119 (citing Order No. 39 at

Public Version

30.) iRobot reasons an amount which is “significant” under 19 U.S.C. § 1337(a)(3) (A) and (B) should also be “substantial” under 19 U.S.C. § 1337(a)(3) (C). (*Id.* at 119-120.) iRobot adds that its research and development investment is substantial because the amounts are, again, “significantly greater than the approximately \$14.4 million in total annual revenues for the Accused Products,” and the iRobot Products represent large percentages of iRobot’s overall sales. (*See id.* at 120-121.) iRobot reasons “[i]n the context of those sales, iRobot’s domestic investment into R&D is substantial, because virtually all of the research and development work related to exploiting the patents practiced by those products took place in the U.S.” (*Id.* at 120-121 (citing CX-0219C at Q120-122).) Finally, iRobot finds the amounts are substantial when compared to its total R&D activities—approximately [] (*id.* at 121 (citing CX-0219C at Q80, 103, 124; RX-1142))—and then when further looking at its R&D as a percentage of its revenues compared to its rivals. iRobot argues that in 2016, for example, Hoover invested 2.7% of its revenues in R&D whereas it invested [] limited just to R&D related to the Asserted Patents. (*Id.* (citing CX-0219C at Q125).)

In its reply brief, iRobot assures that its experts did assess and find the technical nexus between the five R&D projects discussed above and the Asserted Patents. (CRPB at 46 (referring to CX-0220C at Q270-275; CX-0221C at Q296-299).) iRobot observes there is no rebuttal testimony or cross examination towards its experts’ conclusions. (*Id.*) iRobot then argues, contrary to Respondents’ positions, that the research projects not only “do relate directly to the novel features” of the Asserted Patents (*id.* at 46-47 (internal citations omitted)) but also that there is no legal requirement they do so (*id.* at 47-48 (discussing *Certain Microlithographic Machines and Components Thereof*, Inv. No. 337-TA-468, Initial Determination (Jan. 29, 2003); *Certain Integrated Chips and Products Containing the Same*, Inv. No. 337-TA-859, Comm’n

Public Version

Op. at 49-50 (Aug. 22, 2014) (“*Integrated Chips*”).) iRobot explains its position as “the R&D directly relates to elements that are necessary for the claims to be practiced.” (*Id.* at 47.) iRobot distinguishes *Integrated Chips*, which Respondents rely on, on the grounds that, there, “none of the U.S. based investment related to the patented technology or even took advantage of the patented technology.” (*Id.* at 47-48 (citing *Integrated Chips*, Inv. No. 337-TA-859, Comm’n Op. at 26).) Finally, regarding whether iRobot’s failure to disaggregate R&D investments that do not relate to the Asserted Patents, iRobot claims there is no need to do so but even if there is, its expert showed it would reduce the investment by a nominal amount. (*See id.* at 48 (citing CX-0219C at Q95-96, 101, 108-112).)

C. Respondents’ Position

In their responsive brief, Respondents categorize their criticism of iRobot’s economic prong case as:

(1) failed to establish a sufficient nexus between the asserted patents and R&D project expenses; (2) failed to properly allocate its expenses to the DI products, as opposed to R&D projects; and (3) iRobot has overstated its investments.

(RRSB at 60.) Respondents add, “iRobot has many products that are not related to any of the asserted patents, such as the Roomba 500 series, Roomba 700 series, Braava, and Scooba products.” (*Id.* (citing RX-2049C at 20:24-25, 104:20-105:9, 106:3-107:4).)

Regarding nexus, Respondents’ chief complaints are that “iRobot’s technical experts did not review the particular expenses upon which iRobot relies to determine if they exploit the patents” (*id.* (citing CX-0220C at Q270-275, 644-649; CX-0221C at Q296-299, 488-493)) and “[t]he research projects may touch on the patented features, such as the side brushes or chassis, but the projects do not directly relate to the novel features; thus providing an insufficient nexus” (*id.*). On the latter, Respondents use the [] as an example because it “relates to a

Public Version

development of [] yet “[n]one of the asserted patents claims [] (*Id.*)

Respondents use *Integrated Chips* for the proposition “[c]ost saving production and model improvements are not exploitation of the patented technology.” (*Id.* (citing *Integrated Chips*, Inv. No. 337-TA-859, Comm’n Op. at 49-50).) Respondents conclude with, “[m]oreover, Respondents have shown that each of the R&D projects relates to features with *no* nexus to the technology claimed in the asserted patents.” (*Id.* at 62 (citing, *inter alia*, RX-2088C at Q111-130; RX-2078C at Q149-156) (emphasis added).)

Regarding allocation, Respondents argue that it is improper for iRobot to have “combine[d] all R&D project expenses, regardless of the projects relationship to the asserted patents, by identifying projects related to the overall product;” *i.e.*, “failed to disaggregate expenses related to the domestic products from the non-domestic products.” (*Id.*) Respondents contend this failure is “fatal.”

Regarding overstated amounts, Respondents explain they are so because they “includ[e] iRobot’s SST projects with the other R&D projects with no nexus to the asserted patents.” (*Id.* at 62-63 (citing RX-2049C).) Further, according to Respondents, “Dr. Vander Veen did not originally account for the actual number of hours worked by iRobot employees. . . . Rather, he concocted an alternative to just simply counting the actual hours.” (*Id.* at 63 (citing generally CX-0219C; CPX-0031; CX-0479C; RX-2049C; RX-2050C).)

Beyond this, Respondents claim “iRobot has not proven that its R&D project expenses are substantial in view of its overall R&D budget and its activities outside of the United States.” (*Id.*) This is important, Respondents urge, because “Commission precedent requires that the investments and activities are measured with respect to the nature of the activities and how they are significant or substantial to the domestic industry products, and not in the abstract.” (*Id.*)

Public Version

(citing *Certain Printing and Imaging Devices and Components Thereof*, Inv. No. 337-TA-690, Comm'n Op. at 26 (Feb. 17, 2011).) Respondents conclude:

iRobot contends that [] of its operating budget relates to the exploitation of the asserted patents. However, as explained, the activities and R&D project expenses are not an exploitation of the patents. Additionally, neither iRobot nor Dr. Vander Veen properly addressed the R&D project expenses in the context of iRobot's market segment. (*See* CX-0219C.) iRobot's purported market is ill defined by comparing to Hoover, a company with a strong market share in floor cleaning, but with an almost nonexistent market share in robotic cleaning devices. iRobot's R&D budget comparison to Hoover's R&D budget is misplaced and not persuasive

(*Id.* at 63-64.)

D. Analysis

Immediately, I find that if iRobot's accounting and division of R&D expenses to the asserted patents is reasonably accurate, the amounts (ranging between [] and [] are substantial by any measure.

The amounts, however, are challenged by Respondents on three grounds:

(1) failed to establish a sufficient nexus between the asserted patents and R&D project expenses; (2) failed to properly allocate its expenses to the DI products, as opposed to R&D projects; and (3) iRobot has overstated its investments.

(RRSB at 60.) I address each in turn and ultimately find them not persuasive.

Regarding nexus, the dispute is substantially legal rather than factual. iRobot presented un rebutted expert testimony which explains the focus of each of the five research projects and how they connect (*i.e.*, have nexus) to the asserted claims. (CX-0221C at Q296-299, 488-493; CX-0220C at Q270-275, 644-649.) Respondents acknowledge this testimony but complain "iRobot's technical experts did not review the *particular expenses* upon which iRobot relies to determine if they exploit the patents." (RRSB at 61 (emphasis added).) I, however, find no reason to believe the experts needed to do this, or even should have, given the absence of any

Public Version

challenge to the reliability of the business records which document the claimed expenses. (See CIB at 118-119 (citing economic expert testimony and financial records).) Indeed, Respondents cite no Commission precedent to support their perceived need for this detailed review (RRSB at 61), and I find the opposite is true. See *Integrated Chips*, Inv. 337-TA-859, Comm'n Op. at 42 (recognizing “most firms have little reason to keep research and development records on a patent-by-patent basis, as opposed to a project-by-project basis” and rejecting a requirement for such allocations).

Respondents' other challenge to nexus is best described by:

The research projects may touch on the patented features, such as the side brushes or chassis, but the projects do not directly relate to the novel features; thus providing an insufficient nexus.

....

iRobot has not pointed to a single R&D project that specifically relates to the pivot-arm suspension (the '090 patent), side brushes (the '233 patent), three cleaning modes ('490 patent), and slow down, speed up (the '553 patent).

(*Id.* at 61-62.) Again, Respondents make this claim without any explanation or exploration of what the five projects do relate to—with the exception of briefly mentioning [] (See *id.*) Additionally, their argument is based on an overly narrow characterization of the asserted claims. As just one example, the '233 patent claims recite “side brushes,” yes, but its focus is also indisputably on a cliff detector sensor—evidenced by, at least, the above discussions of infringement and validity. Moreover, unrebutted testimony ties the IR&D HUB El Paso, [] SST HBU IEC *Cliff Safety* (emphasis added), and [] [] projects directly to cliff sensors. (See CX-0220C at Q271, 272, 274, 275.) While the IR&D HBU R4 project has not been so described—it instead relates to obstacle detection sensors and

Public Version

the overall control system of the robot (CX-0220C at Q273)—there is still a strong connection to the '233 patent claims which read:

an obstacle detector responsive to obstacles encountered by the robot; and a control circuit in electrical communication with a motor drive and configured to control the motor drive to maneuver the robot about detected obstacles across the floor surface during a floor-cleaning operation.

('233 patent at cl. 1.) Thus, Respondents' challenge to nexus on the '233 patent, because the projects supposedly do not relate specifically to "side brushes," is overly strict.

It is the same for the other patents. Nexus to the '090 patent is not strictly limited to a connection to a "pivot-arm suspension." (*See* '090 patent at cl. 1 (reciting "a control module disposed within the housing and directing movement of the floor cleaning robot across the floor; at least one sensor for detecting an obstacle and communicating obstacle information to the control module so that the control module can cause the floor cleaning robot to react to the obstacle").) Nexus to the '553 patent is not strictly limited to a connection to "slow down, speed up." (*See* '553 patent at cl. 1 (reciting "a drive system configured to maneuver the robot according to a heading setting and a speed setting; a bump sensor responsive to a collision of the robot with an obstacle in a forward direction; and a proximity sensor responsive to a potential obstacle forward of the robot . . . wherein the drive system is configured to alter the heading setting in response to a signal received from the bump sensor indicating contact with an obstacle").) Nexus to the '490 patent is not strictly limited to a connection to "three cleaning modes," even though this is quite a broad descriptor. (*See* '490 patent at cl. 1 (reciting "(a) means for moving the robot over a surface; (b) an obstacle detection sensor; (c) and a control system operatively connected to said obstacle detection sensor and said means for moving . . . select from among the plurality of modes in real time in response to signals generated by the obstacle detection sensor").)

Public Version

The diverse limitations in these claims diminish the support *Integrated Chips* lends to Respondents' asserted lack of nexus. In a background discussion, the Commission explained:

Generally, the nexus between the asserted patent and the claimed investments has not been contested much in research and development cases. To the extent that the patented technology arises from endeavors in the United States, such a nexus would ordinarily exist. But engineering and research and development investments—particularly engineering and development investments—need not end there. “Exploitation” is generally a broad term that encompasses activities such as efforts to improve, develop, or otherwise take advantage of the asserted patent.

Integrated Chips, Inv. No. 337-TA-859, Comm'n Op. at 39. With respect to the patent at issue in that investigation, the Commission noted how the patent's claims focused on layers of an integrated circuit chip with bond pads. *Id.* at 44-45. The Commission found:

[I]t is undisputed that there has never been any domestic investment in the patented bond-pad technology of the '928 patent. Similarly, it is undisputed that there has never been any domestic investment into connecting the bond pad with other structures. . . . Nor did complainants offer any explanation of how the evidence supported an inference that the investments in some way constituted efforts to improve, develop, or otherwise take advantage of the patented technology. Instead, the . . . IPs . . . that represent Realtek's U.S. investment happen to be used in the domestic industry . . . chips that are otherwise developed abroad. But the . . . technologies appear to be extensively used as well in products that lack the patented bond pad, thus negating a possible inference that the R7D was in exploitation of the patented invention as embodied in the DI chips.

Id. at 45-46. In a footnote particularly relevant to this investigation, the Commission also explained “[h]ad the domestic-industry claims here included an additional limitation concerning structures connected to the bond pad, our outcome may have been different. . . . And additional limitation enlarging the scope of the claims to cover something more than merely bond pads could enable us to consider exploitation at least as to that additional limitation.” *Id.* at 45, n. 20.²⁵ The

²⁵ The Commission's use of “an additional limitation *enlarging* the scope of the claims” (emphasis added) is understood to mean enlarging the possible points of nexus to the claims—as opposed to claim scope which, by definition, is narrowed by an additional limitation.

Public Version

Commission concluded, “in showing the nexus between the protected articles and the ’928 patent, a qualitative discussion of the relationship between the patented bond pad and the domestic investment can suffice; we are not seeking precise numerical allocation.” *Id.* at 49-50.

Using this lens, I find iRobot has sufficiently shown nexus. The asserted claims explicitly recite structures which have been shown to be directly related to, or enjoy improvement from, the identified research and development projects. (See CX-0221C at Q296-299, 488-493; CX-0220C at Q270-275, 644-649.) Put another way, “the R&D directly relates to elements that are necessary for the claims to be practiced.” (CRPB at 47.) This is very different from *Integrated Chips* where “all or substantially all of the effort to connect the ’928 bond pad to the U.S.-researched structures occurred overseas.” Inv. No. 337-TA-859, Comm’n Op. at 50.

Regarding the supposed failure to allocate expenses to the DI products, I disagree. I note that Respondents complain of an allocation or “disaggregation” problem, but not in consistent contexts. To wit, Respondents state “iRobot has not disaggregated R&D project expenses that do not relate to the patents,” but then also state “iRobot’s own expert and corporate witness admitted that iRobot failed to disaggregate expenses related to the domestic products from the non-domestic products.” (RRSB at 62.) Respondents’ conflation of allocations based on patents versus allocations based on products evidences a misunderstanding of the law. See, e.g., *Certain Automated Teller Machines, ATM Products, Components Thereof, and Products Containing the Same*, Inv. No. 337-TA-972, Initial Determination at 194 (Nov. 30, 2016) (not reviewed in relevant part) (discussing an allocation based on practicing products does not “reliably tie the expenses to the exploitation of the asserted patents”).

Once nexus has been shown between a R&D project and an asserted patent, I do not understand any further parsing to be necessary, even if the project also supports or applies to

Public Version

non-practicing products. *See Integrated Chips*, Inv. 337-TA-859, Comm'n Op. at 46 (discussing that when “technologies appear to be extensively used as well in products that lack the patented bond pad [*i.e.*, non-practicing products],” this merely “negat[es] a possible inference” that nexus is *in*—as opposed to requiring an additional level of allocation). Respondents do not cite any precedent indicating otherwise. (*See* RRSB at 62.)

Regarding the alleged overstating of amounts, I find this argument is largely derivative of the claimed errors in nexus and disaggregation:

iRobot's R&D investments are overstated for including iRobot's SST projects with the other R&D projects with no nexus to the asserted patents iRobot has not accounted for R&D activities that do not have a nexus to the asserted patents. . . iRobot's R&D capital expenses are overstated as they do not meet the nexus requirement.

(RRSB at 62-63.) As I disagree that such errors are present, I do not find iRobot's claimed investments are overstated. Respondents' brief criticism on how labor hours were tallied (*id.* at 63) is not explained so as to show any meaningful effect on the calculus.

Finally, Respondents add the argument that iRobot's investments have not been proven to be substantial. (*See* RRSB at 63-64.) Boiled down, this argument is similarly derivative of Respondents' claimed errors in nexus. (*Id.* at 63 (“iRobot contends . . . as explained, the activities and R&D project expenses are not an exploitation of the patents.”).) Respondents also fault the comparison between iRobot and Hoover research budgets as Hoover has “an almost nonexistent market share in robot cleaning devices.” (*Id.*) I disagree this market share discrepancy negates the value of comparing iRobot's and Hoover's R&D investments, even if this was an accurate description of the comparison. (*See* CX-0219C at Q125 (comparing iRobot to Hoover's parent company, TTI, who also owns Oreck and Dirt Devil).)

In sum, once it has been determined that a sufficient nexus exists between the identified R&D projects and the asserted patents, there is no meaningful dispute left. Having found that

Public Version

nexus, I consequently find iRobot satisfies the economic prong of domestic industry under subsection (C) through its investments of between [] and [] depending on the patent.

IX. CONCLUSIONS OF LAW

1. The Commission has personal jurisdiction over the parties and subject-matter jurisdiction over the accused products.
2. The importation or sale requirement of Section 337 is satisfied for all Respondents.
3. iRobot practices claims 1 and 10 of the '553 patent.
4. The domestic industry requirement is satisfied with respect to the '553 patent.
5. Respondent iLife directly infringes claims 1 and 4 of the '553 patent.
6. Respondent iLife has not been shown to indirectly infringe any claim of the '553 patent.
7. Claim 1 of the '553 patent has been shown to be invalid under 35 U.S.C. § 102.
8. Claims 4, 11, 12, 13 and 22 have not been shown to be invalid under 35 U.S.C. § 102 or 35 U.S.C. § 103.
9. There is a violation of Section 337 with respect to the '553 patent.
10. iRobot practices claim 42 of the '490 patent.
11. The economic prong of the domestic industry requirement is satisfied with respect to the '490 patent.
12. Respondent iLife directly infringes claim 42 of the '490 patent.
13. Respondent Hoover directly infringes claim 42 of the '490 patent.
14. Respondent bObsweep directly infringes claim 42 of the '490 patent.
15. No respondent has been shown to indirectly infringe any claim of the '490 patent.
16. Claim 1 of the '490 patent has been shown to be invalid under 35 U.S.C. § 102.
17. Claims 12 and 42 have been shown to be invalid under 35 U.S.C. § 103.
18. Claims 1 and 42 have not been shown to be invalid under 35 U.S.C. § 112.
19. There is no violation of Section 337 with respect to the '490 patent.
20. iRobot practices claims 1, 2, 3, 4, 10, and 17 of the '090 patent.
21. The economic prong of the domestic industry requirement is satisfied with respect to the '090 patent.

Public Version

22. Respondent iLife directly infringes claims 1, 2, 3, 5, 7, and 10 of the '090 patent.
23. Respondent Hoover directly infringes claims 1, 2, 3, 5, 7, and 10 of the '090 patent.
24. Respondent SSSIT directly infringes claims 1, 2, 3, 5, 7, and 10 of the '090 patent.
25. Respondent bObsweep directly infringes claims 1, 2, 3, 5, 7, and 10 of the '090 patent.
26. No respondent has been shown to indirectly infringe any claim of the '090 patent.
27. Claims 1, 5, 7, 10, and 17 have not been shown to be invalid under 35 U.S.C. § 102.
28. Claims 1, 2, 3, 4, 5, 7, 10, and 17 have been shown to be invalid under 35 U.S.C. § 103.
29. There is no violation of Section 337 with respect to the '090 patent.
30. iRobot practices claims 1, 9, and 15 of the '233 patent.
31. The domestic industry requirement is satisfied with respect to the '233 patent.
32. Respondent iLife directly infringes claims 1, 10, 11, 14, 15, and 16 of the '233 patent.
33. Respondent Hoover directly infringes claims 1, 10, 11, 14, 15, and 16 of the '233 patent.
34. Respondent bObsweep directly infringes claims 1, 10, 11, 14, 15, and 16 of the '233 patent.
35. No respondent has been shown to indirectly infringe any claim of the '233 patent.
36. Claims 1, 10, 11, 14, 15, and 16 have not been shown to be invalid under 35 U.S.C. § 102.
37. Claims 1, 10, 11, 14, 15, and 16 have not been shown to be invalid under 35 U.S.C. § 103.
38. Claims 1 and 15 have not been shown to be invalid under 35 U.S.C. § 112.
39. There is a violation of Section 337 with respect to the '233 patent.

X. INITIAL DETERMINATION AND ORDER

Based on the foregoing,²⁶ it is my Initial Determination that there is a violation of Section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. § 1337, in the importation into the United States, the sale for importation, or the sale within the United States after importation of certain robotic vacuum cleaning devices and components thereof such as spare parts, in connection with the asserted claims of U.S. Patent Nos. 8,600,553 and 9,038,233.

Furthermore, it is my determination that a domestic industry in the United States exists that practices or exploits each of these patents.

The undersigned hereby CERTIFIES to the Commission this Initial Determination, together with the Record of the hearing in this investigation consisting of the following: the transcript of the evidentiary hearing, with appropriate corrections as may hereafter be ordered; and the exhibits accepted into evidence in this investigation as listed in the appendices hereto.²⁷

Pursuant to 19 C.F.R. § 210.42(h), this Initial Determination shall become the determination of the Commission unless a party files a petition for review pursuant to 19 C.F.R. § 210.43(a) or the Commission, pursuant to 19 C.F.R. § 210.44, orders on its own motion a review of the Initial Determination or certain issues therein.

²⁶ The failure to discuss any matter raised by the parties or any portion of the Record herein does not indicate that said matter was not considered. Rather, any such matter(s) or portion(s) of the Record has/have been determined to be irrelevant, immaterial or meritless. Arguments made on brief which were otherwise unsupported by Record evidence or legal precedent have been accorded no weight.

²⁷ The pleadings of the parties filed with the Secretary need not be certified as they are already in the Commission's possession in accordance with Commission rules.

Public Version

Confidentiality Notice:

This Initial Determination is being issued as confidential, and a public version will be issued pursuant to Commission Rule 210.5(f). Within seven (7) days of the date of this Initial Determination, the parties shall jointly submit: (1) a proposed public version of this opinion with any proposed redactions bracketed in red; and (2) a written justification for any proposed redactions specifically explaining why the piece of information sought to be redacted is confidential and why disclosure of the information would be likely to cause substantial harm or likely to have the effect of impairing the Commission's ability to obtain such information as is necessary to perform its statutory functions.²⁸

SO ORDERED.



Thomas B. Pender
Administrative Law Judge

²⁸ Under Commission Rules 210.5 and 201.6(a), confidential business information includes: information which concerns or relates to the trade secrets, processes, operations, style of works, or apparatus, or to the production, sales, shipments, purchases, transfers, identification of customers, inventories, or amount or source of any income, profits, losses, or expenditures of any person, firm, partnership, corporation, or other organization, or other information of commercial value, the disclosure of which is likely to have the effect of either impairing the Commission's ability to obtain such information as is necessary to perform its statutory functions, or causing substantial harm to the competitive position of the person, firm, partnership, corporation, or other organization from which the information was obtained, unless the Commission is required by law to disclose such information.

See 19 C.F.R. § 201.6(a). Thus, to constitute confidential business information the disclosure of the information sought to be designated confidential must ***likely have the effect of*** either: (1) impairing the Commission's ability to obtain such information as is necessary to perform its statutory functions; or (2) ***causing substantial harm*** to the competitive position of the person, firm, partnership, corporation, or other organization from which the information was obtained.

**CERTAIN ROBOTIC VACUUM CLEANING DEVICES AND
COMPONENTS THEREOF SUCH AS SPARE PARTS**

INV. NO. 337-TA-1057

PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **PUBLIC INITIAL DETERMINATION** has been served upon the following parties via first class mail and air mail where necessary, on

JUL 24 2018



Lisa R. Barton, Secretary
U.S. International Trade Commission
500 E Street SW, Room 112A
Washington, DC 20436

FOR COMPLAINANT IROBOT CORPORATION	
Stephen A. Marshall, Esq. FISH & RICHARDSON P.C. 1000 Maine Avenue SW, Suite 1000 Washington, DC 20024	<input type="checkbox"/> Via Hand Delivery <input checked="" type="checkbox"/> Express Delivery <input type="checkbox"/> Via First Class Mail <input type="checkbox"/> Other: _____
FOR RESPONDENTS SHENZHEN SILVER STAR INTELLIGENT TECHNOLOGY CO., LTD. HOOVER INC., & ROYAL APPLIANCE MANUFACTURING CO. D/B/A TTI FLOOR CARE NORTH AMERICA, INC. & BOBSWEEP USA, & BOBSWEEP INC.	
Kecia J. Reynolds, Esq. PILLSBURY WINTHROP SHAW PITTMAN, LLP. 1200 Seventeenth Street N.W. Washington, DC 20036	<input type="checkbox"/> Via Hand Delivery <input checked="" type="checkbox"/> Express Delivery <input type="checkbox"/> Via First Class Mail <input type="checkbox"/> Other: _____
FOR RESPONDENT SHENZHEN ZHIYI TECHNOLOGY CO., LTD.	
Patrick J. McCarthy, Esq. GREENBERG TRAURIG, LLP 2101 L Street N.W., Suite 1000 Washington, DC 20037	<input type="checkbox"/> Via Hand Delivery <input checked="" type="checkbox"/> Express Delivery <input type="checkbox"/> Via First Class Mail <input type="checkbox"/> Other: _____

Public Version

UNITED STATES INTERNATIONAL TRADE COMMISSION

Washington, D.C.

In the Matter of

**CERTAIN ROBOTIC VACUUM CLEANING
DEVICES AND COMPONENTS THEREOF SUCH
AS SPARE PARTS**

Inv. No. 337-TA-1057

RECOMMENDED DETERMINATION ON REMEDY AND BOND

Administrative Law Judge Thomas B. Pender

(June 25, 2018)

Pursuant to the Notice of Investigation and Commission Rule 210.42 of the Rules of Practice and Procedure of the United States International Trade Commission, this is my Recommended Determination on Remedy, Bond, and Public Interest, in the matter of *Certain Robotic Vacuum Cleaning Devices and Components Thereof Such as Spare Parts*, Investigation No. 337-TA-1057.

TABLE OF CONTENTS

	Page
I. INTRODUCTION.....	1
II. REMEDY AND BOND.....	1
A. <u>Limited Exclusion Order</u>	1
B. <u>Cease and Desist Order</u>	4
C. <u>Bond During Presidential Review Period</u>	9
III. CONCLUSION	13

TABLE OF ABBREVIATIONS

CDX	Complainant's Demonstrative Exhibit
CIB	Complainant's Initial Post-Hearing Brief
CPB	Complainant's Pre-Hearing Brief
CPX	Complainant's Physical Exhibit
CRPB	Complainant's Reply Post-Hearing Brief
CRSB	Complainant's Responsive Post-Hearing Brief
CX	Complainant's Exhibit
Dep. Tr.	Deposition Transcript
Hr'g Tr.	Hearing Transcript
JX	Joint Exhibit
RDX	Respondents' Demonstrative Exhibit
RIB	Respondents' Initial Post-Hearing Brief
RPB	Respondents' Pre-Hearing Brief
RPX	Respondents' Physical Exhibit
RRPB	Respondents' Reply Post-Hearing Brief
RRSB	Respondents' Responsive Post-Hearing Brief
RX	Respondents' Exhibit

I. INTRODUCTION

On June 25, 2018, I issued my Final Initial Determination in this Investigation.

[I]t my Initial Determination that there is a violation of Section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. § 1337, in the importation into the United States, the sale for importation, or the sale within the United States after importation of certain robotic vacuum cleaning devices and components thereof such as spare parts, in connection with the asserted claims of U.S. Patent Nos. 8,600,553 and 9,038,233.

ID at 372.

Pursuant to Commission Rule 210.42 and the Notice of Investigation, I must issue a recommended determination on: (1) the appropriate remedy in the event that the Commission finds a violation of Section 337; (2) the amount of the bond to be posted for importation and sale of affected products during the Presidential review period; and (3) the public interest under sections 337(d)(1) and (f)(1) when ordered by the Commission pursuant to Commission Rule 210.50(b)(1), which is not the case here. *See* 19 C.F.R. § 210.42(a)(1)(ii); 81 Fed. Reg. 52713 (Aug. 9, 2016).

II. REMEDY AND BOND

A. Limited Exclusion Order

Section 337 requires the Commission to issue limited exclusion orders against named respondents that are found to have imported, sold for importation, or sold after importation infringing articles:

If the Commission determines, as a result of an investigation under this section, that there is a violation of this section, it shall direct that the articles concerned, imported by any person violating the provision of this section, be excluded from entry into the United States

Public Version

See 19 U.S.C. § 1337(d)(1). See also *Spansion, Inc. v. Int'l Trade Comm'n*, 629 F.3d 1331, 1358 (Fed. Cir. 2010) (“[T]he Commission is required to issue an exclusion order upon the finding of a Section 337 violation absent a finding that the effects of one of the statutorily-enumerated public interest factors counsel otherwise.”).

Title 19, Section 1337(d)(1) of the United States Code states that “[i]f the Commission determines, as a result of an investigation under this section, that there is a violation of this section, it shall direct that the articles concerned, imported by any person violating the provision of this section, be excluded from entry into the United States[.]” 19 USC § 1337 (d)(1) (emphasis added.) In the Initial Determination, I found a violation of Section 337 with respect to asserted U.S. Patent No. 7,161,319.

Respondents argue that, following a finding that a violation has occurred, the limited exclusion order “should expressly exclude:”

- (1) products that are listed in Exhibit B of the Joint Stipulation between iRobot and Shenzhen Silver Star Intelligent Technology Co., Ltd. Regarding Sales and Importation (EDIS Doc. No. 638886);
- (2) products disclosed as within the scope of the Investigation, but where iRobot has not proven infringement;
- (3) replacement parts disclosed as within the scope of the Investigation, but where iRobot has not proven infringement;
- (4) any product or component thereof determined to noninfringing a valid and enforceable patent; and
- (5) products imported, sold for importation, or sold after importation by entities not named as a Respondents in this Investigation.

(RRSB at 64.) Respondents further argue a certification provision should be included which will allow importation of unencumbered lawful products. (*Id.*)

iRobot does not address any of these categories in their reply brief. (*See* CRPB at 48-53.) Similarly, iRobot does not address Respondents’ request for a certification provision. (*See id.*)

Public Version

Regarding the certification provision, I recommend that any limited exclusion order which may issue from a finding of violation include a certification provision. The Commission has indicated recently that such provisions “aid [Customs and Border Patrol] in enforcement of Commission orders” and “do not mandate that CBP accept certification as proof that the articles in question are not covered by the LEO.” *Certain Access Control Systems and Components Thereof*, Inv. No. 337-TA-1016, Comm’n Op. at 35 (March 23, 2018) (“*Access Control Systems*”).

Regarding Respondents’ five carve-outs from exclusion, I find the first is justifiable. In the referenced joint stipulation, it is stated, “[f]or the purpose of this Investigation, iRobot does not and will not dispute that the Other Silver Star Products specifically identified in Confidential Exhibit B are not accused in this Investigation and should a remedial order(s) issue in this Investigation, the Other Silver Star Products would not be subject to any such remedial order.” (EDIS Doc No. 638886 at 2.) This is an agreement from iRobot, the complainant, that those products listed in Exhibit B should not be excluded. I find the language of any limited exclusion order which issues from this investigation should reflect this.

I do not find good reason to include the remaining carve-outs, (2) through (5), in the language of a limited exclusion order, as they are coextensive (*i.e.*, redundant) with the ordinary terms of an LEO. For this investigation, those ordinary terms would read:

Robotic vacuum cleaning devices and components thereof such as spare parts that infringe one or more claims of [patent claims] that are manufactured by, or on behalf of, or are imported by or on behalf of [Respondents] or any of their affiliated companies, parents, subsidiaries, agents or other related business entities, or their successors or assigns, are excluded from entry . . . for the remaining term of the [patent] except under license of the patent owner or as provided by law.

See, e.g., Access Control Systems, Inv. 337-TA-1016, Comm’n Op. at 35. This language already provides for the importation of all products or parts which do not infringe a patent claim for which

Public Version

there has been shown to be a violation. Additionally, this language makes it clear that limited exclusion orders are not limited to exactly those entities which were named respondents; but apply also to named respondent “affiliated companies, parents, subsidiaries, agents or other related business entities, or their successors or assigns.” Respondents’ proposed carve-out number (5) would conflict with the breadth of typical limited exclusion order language and allow circumvention of the limited exclusion order.

Accordingly, I recommend that, should a violation be found, a limited exclusion order issue with respect to Respondents’ accused products and components thereof; wherein said exclusion order includes a certification provision for the importation of lawful articles, and also excludes those products listed in Exhibit B of the Joint Stipulation between iRobot and Shenzhen Silver Star Intelligent Technology Co., Ltd. Regarding Sales and Importation (EDIS Doc. No. 638886).

B. Cease and Desist Order

Section 337 provides that in addition to, or in lieu of, the issuance of an exclusion order, the Commission may issue a cease and desist order as a remedy for violation of section 337. (*See* 19 U.S.C. § 1337(f)(1).) The Commission generally issues a cease and desist order directed to a domestic respondent when there is a “commercially significant” amount of infringing, imported product in the United States that could be sold so as to undercut the remedy provided by an exclusion order. *See Certain Crystalline Cefadroxil Monohydrate*, Inv. No. 337-TA-293, USITC Pub. 2391, Comm’n Op. on Remedy, the Public Interest and Bonding at 37-42 (U.S.I.T.C. June 1991); *Certain Condensers, Parts Thereof and Products Containing Same, Including Air Conditioners for Automobiles*, Inv. No. 337-TA-334, Comm’n Op. at 26-28 (U.S.I.T.C. Aug. 27, 1997). The complainant bears the burden of proving that a respondent has a commercially significant inventory in the United States. *Certain Integrated Repeaters, Switches, Transceivers &*

Public Version

Products Containing Same, Inv. No. 337-TA-435, Comm'n Op., 2002 WL 31359028 (U.S.I.T.C. Aug. 16, 2002).

iRobot argues "Respondents have imported the infringing products into the U.S., and maintain a commercially significant inventory of Accused Products within the U.S." (CIB at 122 (citing CX-0219C at Q129, 133, 137, 141).) Specifically, iRobot alleges:

In particular, Hoover maintains inventory of [] units, equal to approximately [] months' worth of inventory. (CX-0219C, Vander Veen DWS at Q130-32; CX-1117C, Appx. E-F.) bObsweep maintains inventory of [] units, equal to approximately [] months' worth of inventory. (CX-0219C, Vander Veen DWS at Q134-36; CX-1111C, Appx. A; RX-2021.) iLife maintains inventory of [] units, equal to approximately [] months' worth of inventory. (CX-0219C, Vander Veen DWS at Q138-40; Joint Stip. Between iRobot and Zhiyi Regarding Sales, Importation, and Inventory, Appx. B.)

(*Id.*) iRobot contends that its expert's calculations of significance as per Respondents rather than per accused product is in line with Commission practice, and suited for the practicalities of exclusion order circumvention. (*See id.* (citing *Certain Protective Cases and Components Thereof*, Inv. No. 337-TA-780, Comm'n Op. at 28 (Nov. 19, 2012)).)

In their responsive brief, Respondents initially point out that "iRobot does not allege that Silver Star has domestic industry; thus, no CDO should issue for Silver Star." (RRSB at 64.) Continuing, Respondents criticize iRobot for failure to identify the inventor of "specific accused products." (*Id.* at 64-65 (emphasis in original).) Respondents argue product-by-product inventory counts are critical in the event, for example, "if Hoover's Quest 1000 and Rogue 970 are determined not to infringe, but the Rogue 950 is determined to infringe, then Hoover's alleged inventor of [] of the Rogue 950 is not commercially significant." (*Id.* at 65 (referencing CX-0219C at Q132-133).) Respondents argue the same for iLife "because many of the accused products have [] total units in inventory." (*Id.*)

Public Version

Continuing, Respondents also fault iRobot for not addressing the “location and ownership of the alleged inventories.” (*Id.*) Respondents claim that for bObsweep, its retailers own the inventory and not bObsweep, which was acknowledged by iRobot’s expert. (*Id.* (citing CX-0219C at Q136-137).) For iLife, Respondents argue “as of October 4, iLife had less than [] total combined units of its own inventory” (*id.* (citing EDIS Doc No. 634937)) in part because Amazon’s much larger inventory of iLife Products can not be attributed to iLife (*id.* (citing *Kyocera Wireless Corp. v. Int’l Trade Comm’n*, 545 F.3d 1340, 1358 (Fed. Cir. 2008)).

In its reply brief, iRobot argues flatly “The Inventory Relied Upon by iRobot is Owned by Respondents.” (CRPB at 48 (heading).) For iLife in particular, iRobot contends iLife *stipulated* the inventory warehoused by Amazon is its own. (*Id.* at 48-49 (citing EDIS Doc. No. 634937).)

Regarding bObsweep, iRobot argues:

Similarly, Respondents assert—incorrectly—that “iRobot’s expert found that bObsweep’s retailers—not bObsweep—own the inventory in the United States.” (Resp. RPostHB at 65.) That assertion is, frankly, made-up. There is no evidence anywhere in the record remotely suggesting that iRobot’s expert, Dr. Vander Veen, found that retailers own bObsweep’s inventory. Unsurprisingly, Respondents do not cite any evidence to support that statement. Instead, Respondents cite Q136-37 of Dr. Vander Veen’s direct witness statement, which does not even mention retailers. The only thing Q136-37 says related to ownership of the inventory is that “bObsweep held [] units of inventory in the U.S.” (CX-0219C, Vander Veen DWS at Q136.)

(*Id.* at 49.) iRobot then asserts that its expert specifically testified, in portions uncited by Respondents, that whatever numbers he used originated from bObsweep as its own inventory in the U.S. (*See id.* at 49-50 (citing Hr’g Tr. at 231:18-232:4; CX-1111C at ROG No. 33; RX-2021; CX-0247C at 238:6-16).)

Moving on, iRobot claims Respondents’ argument on product-by-product inventory counts is without merit because “iLife Products that have [] total units of inventory’ are

Public Version

stipulated by iLife as being part of a representative group that has significant inventory.” (*Id.* at 51. (citing EDIS Doc. No. 638887) (emphasis in original).) Thus, iRobot contends, “there is not a scenario in which only a product having insignificant inventory could be found to infringe.” (*Id.*)

I find iRobot has sufficiently shown the need for a cease-and-desist order based on the amounts of inventory *stipulated to by Respondents*. Respondents’ arguments to the contrary are not persuasive, and actually troubling. For iLife, the stipulation between the parties (EDIS Doc No. 634937) was entered into well before the evidentiary hearing and explicitly states:

5. Exhibit B provides Zhiyi’s United States inventory and associated market value of the Accused Products as of October 25, 2017 and the location of such inventories. Zhiyi will not dispute the accuracy of these U.S. inventory numbers.

6. Given Zhiyi’s representations herein regarding its importation and sale after importation into the United States of the Zhiyi Products identified in Confidential Exhibit A, and its inventory of those Zhiyi Products, the parties to this Stipulation agree that iRobot will not seek or pursue further discovery in this Investigation that is related solely to the importation or inventories of the Zhiyi Products. . . .

(EDIS Doc No. 634937.) It is incredulous for iLife to now claim that the [] units listed in the stipulation’s Exhibit B are anything but its own inventory. With accuracy of that number not disputed, I find unrebutted expert testimony supports the conclusion that it is commercially significant. (CX-0219C at Q138-140.) As iRobot argues, the parties’ joint stipulation on representative products does away with Respondents’ concerns over product specificity. I thus recommend a cease and desist order issue for respondent iLife.

For bObsweep, it is a different matter. The stipulation between bObsweep and iRobot did not address inventory. (*See* EDIS Doc. No. 638884.) iRobot states “bObsweep maintains inventory of [] units, equal to approximately [] months’ worth of inventory” and cites Q134-136 of its expert’s testimony (CX-0219C) for support, along with a interrogatory response (CX-1111C), and a

Public Version

sales table (RX-2021C). (See CIB at 122.) In its reply brief, iRobot further cites bObsweep corporate testimony (CX-0247C). (CRPB at 50.)

None of this evidence supports the critical [] unit count, however. iRobot's expert states the number without evidentiary basis in Q136. His relevant demonstrative (CDX-2022C) similarly does not include any citation to the record, which is a crucial mistake for any demonstrative. bObsweep's interrogatory response No. 33 (cited as CX-1111C) references a bates numbered page "[s]ee also bOb_ITC_00581313 for information regarding inventory of the Accused Products." (CX-1111C at 6.) It is unclear from iRobot's post-hearing briefing if this page corresponds to an exhibit in the record. Indeed, upon my own review of iRobot's exhibit list, I find no documents with production numbers close to bOb_ITC_00581313. Thus, if bObsweep did reveal an inventory of [] units, it appears that evidence did not make it into the record.

Further, the corporate testimony cited (CX-0247C at 268:6-16) merely acknowledges that some inventory is held in the U.S. in amounts shown in documents; "I believe we provided the – the documents. If you have it, I can look at it. That would be better than me testifying from memory." Finally, the sales exhibit (RX-2021C) is just that, a sales and customer table without information on inventory. From this evidence and briefing, I can only conclude that bObsweep more likely than not has non-zero inventory in the U.S.— not that it maintains a commercially significant inventory to warrant a cease and desist order. I thus do not recommend a cease and desist order issue for respondent bObsweep.

For Hoover, iRobot's claimed inventory comes not from stipulation but from an interrogatory response. iRobot states "Hoover maintains inventory of [] units, equal to approximately [] months' worth of inventory" and cites CX-1117C at Appendix E. I can see in this Appendix, in light of iRobot's expert testimony (CX-0219C at Q132) that Hoover concedes it maintained [] units in the U.S. Respondents do not dispute this figure. (See RRSB at 64-65.)

Public Version

Thus, with that amount and iRobot's un rebutted expert testimony that the amount is commercially significant (CX-0219C at Q132-133) I find a cease and desist order is warranted for respondent Hoover.

For the final respondent, SSSIT or Silver Star, iRobot does not seek a cease and desist order. (See generally CIB at 122-123; RRSB at 64.) I likewise decline to recommend one should issue.

Accordingly, I recommend that cease and desist orders issue in this investigation against the iLife and Hoover respondents.

C. Bond During Presidential Review Period

The administrative law judge and the Commission must determine the amount of bond to be required of a respondent, pursuant to section 337(j)(3), during the 60-day Presidential review period following the issuance of permanent relief, in the event that the Commission determines to order a remedy. The purpose of the bond is to protect the complainant from any injury. (19 CFR §§ 210.42(a)(1)(ii), 210.50(a)(3).) The complainant has the burden of supporting any bond amount it proposes. *Certain Rubber Antidegradants, Components Thereof, and Products Containing Same*, Inv. No. 337-TA-533, Comm'n Op., 2006 ITC LEXIS 591 (U.S.I.T.C. July 21, 2006).

When reliable price information is available, the Commission has often set the bond by eliminating the differential between the domestic product and the imported, infringing product. See *Certain Microsphere Adhesives, Processes for Making Same, and Products Containing Same, Including Self-Stick Repositionable Notes*, Inv. No. 337-TA-366, Comm'n Op. a 24 (U.S.I.T.C. 1995). In other cases, the Commission has turned to alternative approaches, especially when the level of a reasonable royalty rate could be ascertained. See, e.g., *Certain Integrated Circuit Telecommunication Chips and Products Containing Same, Including Dialing Apparatus*, Inv. No. 337-TA-337, Comm'n Op. at 41 (U.S.I.T.C. 1995).

Here, iRobot argues its expert calculated weighted average sales prices for each of its three

Public Version

series of domestic industry products—[] for 600 Series, [] for 800 Series, and [] for 900 Series.” (CIB at 123 (citing CX-0219C at Q149; CX-0454C; CPX-0029).) iRobot compares this to a weighted average sales price of [] for bObsweep Products which “compete broadly with all of the DI Products.” (*Id.* (citing CX-0219C at Q158-160; CX-0242C at 255:5-258:4; CX-0457C; CX-1111C at Appendices A and B).) iRobot reasons “the bond rate for bObsweep should be calculated as the percent difference in average price of all Roomba DI Products [] and the bObsweep Products [] a difference of [] (*Id.* (citing CX-0219C at Q161).)

For iLife, iRobot calculates the weighted average sales price as [] and views the iLife Products as competing primarily with the lower-end 600 series iRobot Products. (*Id.* (citing CX-0219C at Q164-166; CX-0458C; CX-0460C; CPX-0104C).) iRobot argues for a bond based on the corresponding price difference of [] (*See id.* at 123-124 (citing CX-0219C at Q167).)

For Hoover, iRobot calculates a weighted average sales price of [] and views the Hoover Products as competing most closely with the higher-end 900 series iRobot Products. (*Id.* at 124 (citing CX-0219C at Q154-156; CX-0456; CX-0117C at Appendix F; CX-0410C at 88:5-93:10).) iRobot argues for a bond based on the corresponding price difference of [] (*Id.* (citing CX-0219C at Q157).) iRobot disputes that use of the 900 series iRobot Products in this way was unfair. (*See id.* (citing, *inter alia*, CX-0423C; CX-0418C at 9160, 9162-9166, 9183; Hr’g Tr. at 233:7-24).)

iRobot does not discuss a bond amount for respondent SSSIT. (*See* CIB at 123-125.)

Respondents challenged iRobot’s requested bond amounts on two grounds. First, due to iRobot’s R&D-based domestic industry, Respondents allege iRobot has failed to show “how its engineering and research and development domestic industry will be harmed by the continued importation of products during the 60-day review period.” (RRSB at 66 (citing *Certain Rubber*

Public Version

Antidegradants, Components Thereof, Inv. No. 337-TA-533, Comm'n Op. at 38- 39 (Apr. 2008)).

Thus, according to Respondents, iRobot has not shown injury and is entitled to no bond. (*Id.*)

Second, if harm is found, “Respondents submit that iRobot has failed to do a proper apples-to-apples price comparison” which should result in a zero bond amount. (*Id.* at 66-67 (citing *Certain Reclósable Plastic Bags & Tubing*, Inv. No. 337-TA-266, Comm'n Op. at 6 (1987); *Certain Acid Washed Denim Garments & Accessories*, Inv. No. 337-TA-324, Comm'n Op. at 27 (1992))).

Respondents accuse iRobot of “improperly group[ing] together products within a series, e.g., 900 series includes Roomba 960 and Roomba 980 and 600 series includes Roomba 614 and Roomba 690” because “[t]here are different features for the products within each series. . . . And products within a series have different prices.” (*Id.* at 67 (citing CIB at 123-125; CX-0222C at Q33; Hr'g Tr. at 225:11-16).)

For Hoover specifically, Respondents contend it would only have been proper “to compare the price of iRobot’s most expensive product to Hoover’s most expensive product having the same or similar features.” (*Id.*) For bObsweep, Respondents claim it is “impossible” to determine if iRobot’s comparison between “all iRobot products to all bObsweep products” is reliable. (*See id.*) Respondents argue something similar for iLife even though, there, iRobot compared all iLife Products against the least-expensive iRobot Products—the 600 series. (*See id.* at 67-68.)

In its reply brief, iRobot contends Respondents have the law backwards in that the bond is to prevent injury, and “does not arise only after showing of injury.” (CRPB at 51 (citing 19 U.S.C. § 1337(j)(3); *Certain Cigarettes and Packaging Thereof*, Inv. No. 337-TA-643, Comm'n Op. (Oct. 1, 2009)).) iRobot summarizes, “here, the accused products are priced lower than the DI Products, such that the accused products would gain a competitive advantage, a bond should be imposed to protect the complainant from the injury that would result from that competitive advantage.” (*Id.* at 51-52 (citing *Certain Agricultural Vehicles and Components Thereof*, Inv. No. 337-TA-487,

Public Version

Comm'n Opp., at 463-65 (Dec. 2004)).) In other words, iRobot argues there is no law to support the requirement that bond only arrives after a showing of injury. (*See id.* at 52.) Moving on, iRobot defends its expert's use of weighted averages sales prices. (*Id.* (citing *Certain Stainless Steel Products*, Inv. No. 337-TA-933, Comm'n Op. (June 9, 2016)).) iRobot concludes with a suggestion that, due to the many products at issue from different respondents, there is precedent to simply set the bond at 100%, but notes it has instead opted for a more accurate approach. (*See id.* at 53 (citing *Certain Cigarettes and Packaging Thereof*, Inv. No. 337-TA-643, Comm'n Op. (Oct. 1, 2009)).)

I find iRobot's requested bond amounts are reasonable. I agree that there is no precedent requiring a complainant to show any kind of specific injury to its claimed domestic industry due to the lack of a bond during the presidential review period. Respondents cited support, *Certain Rubber Antidegradants*, Inv. No. 337-TA-533, Comm'n Op. at 38-39, does not show otherwise.

iRobot's expert's weighted sales average technique is acceptable as well given that "[w]here the record establishes that the calculation of a price differential is impractical *or there is insufficient evidence in the record* to determine a price differential or a reasonable royalty, the Commission has imposed a 100 percent bond." *Certain Stainless Steel*, Inv. No. 337-TA-933, Comm'n Op. at 52 (internal citation omitted) (emphasis added). There cannot be genuine concern over the iLife products which are compared to iRobot's least-expensive models. For bObsweep, iRobot's expert compared all models and cited bObsweep corporate testimony for support. (*See* CX-0219C at Q160; CX-0247 at 255:1-258:4.) That testimony offers a view that the bObsweep Products have features that no iRobot Product has. (CX-0247C at 256:6-257:8.) It is fair then to assume bObsweep Products compete broadly with all iRobot products.

Respondents' challenge against Hoover would be the most persuasive, but as explained at the hearing, iRobot's expert selected the iRobot 900 series robot as the comparison point because of Hoover's own corporate testimony that the Hoover Products were better than the 900 series. (*See*

Public Version

Hr'g Tr. at 229:16-231:13; CX-0410C at 93:3-10).) Respondents do not dispute this and I am satisfied it was the right comparison to make.

Thus, with the weighted average sales prices themselves not disputed, and the comparisons using those figures justified, I find iRobot's requested bond amounts should be ordered for the Presidential Review Period: [] for iLife, [] for bObsweep, and [] for Hoover.

III. CONCLUSION

Based on the foregoing, it is my Recommended Determination that, in the event the Commission finds a violation of Section 337: (1) a limited exclusion order should issue with respect to Respondents' Accused Products, and components therein, and it should include a certification provision for the importation of lawful articles, and explicitly exclude those products listed in Exhibit B of the Joint Stipulation between iRobot and Shenzhen Silver Star Intelligent Technology Co., Ltd. Regarding Sales and Importation (EDIS Doc. No. 638886); (2) a cease and desist order should issue against the iLife and Hoover respondents; and (3) Respondents' importations of Accused Products during the Presidential review period should be subject to a bond at rates of [] for iLife, [] for bObsweep, and [] rates for Hoover.

The undersigned hereby CERTIFIES to the Commission this Recommended Determination on Remedy and Bond.

Public Version

Confidentiality Notice:

This Recommended Determination is being issued as confidential, and a public version will be issued pursuant to Commission Rule 210.5(f). Within seven (7) days of the date of this Recommended Determination, the parties shall jointly submit: (1) a proposed public version of this opinion with any proposed redactions bracketed in red; and (2) a written justification for any proposed redactions specifically explaining why the piece of information sought to be redacted is confidential and why disclosure of the information would be likely to cause substantial harm or likely to have the effect of impairing the Commission's ability to obtain such information as is necessary to perform its statutory functions.¹

SO ORDERED.



Thomas B. Pender
Administrative Law Judge

¹ Under Commission Rules 210.5 and 201.6(a), confidential business information includes:

information which concerns or relates to the trade secrets, processes, operations, style of works, or apparatus, or to the production, sales, shipments, purchases, transfers, identification of customers, inventories, or amount or source of any income, profits, losses, or expenditures of any person, firm, partnership, corporation, or other organization, or other information of commercial value, the disclosure of which is likely to have the effect of either impairing the Commission's ability to obtain such information as is necessary to perform its statutory functions, or causing substantial harm to the competitive position of the person, firm, partnership, corporation, or other organization from which the information was obtained, unless the Commission is required by law to disclose such information.

See 19 C.F.R. § 201.6(a). Thus, to constitute confidential business information the disclosure of the information sought to be designated confidential must **likely have the effect of** either: (1) impairing the Commission's ability to obtain such information as is necessary to perform its statutory functions; or (2) **causing substantial harm** to the competitive position of the person, firm, partnership, corporation, or other organization from which the information was obtained.

CERTAIN ROBOTIC VACUUM CLEANING DEVICES AND COMPONENTS THEREOF SUCH AS SPARE PARTS

INV. NO. 337-TA-1057

PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **PUBLIC INITIAL RECOMMENDED DETERMINATION ON REMEDY AND BOND** has been served upon the following parties via first class mail and air mail where necessary, on

JUL 24 2018



Lisa R. Barton, Secretary
U.S. International Trade Commission
500 E Street SW, Room 112A
Washington, DC 20436

FOR COMPLAINANT IROBOT CORPORATION	
Stephen A. Marshall, Esq. FISH & RICHARDSON P.C. 1000 Maine Avenue SW, Suite 1000 Washington, DC 20024	<input type="checkbox"/> Via Hand Delivery <input checked="" type="checkbox"/> Express Delivery <input type="checkbox"/> Via First Class Mail <input type="checkbox"/> Other: _____
FOR RESPONDENTS THE BLACK & DECKER CORPORATION & BLACK & DECKER (U.S.) INC., SHENZHEN SILVER STAR INTELLIGENT TECHNOLOGY CO., LTD. HOOVER INC., & ROYAL APPLIANCE MANUFACTURING CO. D/B/A TTI FLOOR CARE NORTH AMERICA, INC. & BOBSWEEP USA, & BOBSWEEP INC.	
Kecia J. Reynolds, Esq. PILLSBURY WINTHROP SHAW PITTMAN, LLP. 1200 Seventeenth Street N.W. Washington, DC 20036	<input type="checkbox"/> Via Hand Delivery <input checked="" type="checkbox"/> Express Delivery <input type="checkbox"/> Via First Class Mail <input type="checkbox"/> Other: _____
FOR RESPONDENT SHENZHEN ZHIYI TECHNOLOGY CO., LTD.	
Patrick J. McCarthy, Esq. GREENBERG TRAURIG, LLP 2101 L Street N.W., Suite 1000 Washington, DC 20037	<input type="checkbox"/> Via Hand Delivery <input checked="" type="checkbox"/> Express Delivery <input type="checkbox"/> Via First Class Mail <input type="checkbox"/> Other: _____

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.

In the Matter of

**CERTAIN ROBOTIC VACUUM
CLEANING DEVICES AND
COMPONENTS THEREOF SUCH AS
SPARE PARTS**

Investigation No. 337-TA-1057

**NOTICE OF A COMMISSION DETERMINATION TO AFFIRM WITH
MODIFICATIONS AN INITIAL DETERMINATION GRANTING COMPLAINANT'S
MOTION FOR SUMMARY DETERMINATION THAT THE ECONOMIC PRONG OF
THE DOMESTIC INDUSTRY REQUIREMENT IS SATISFIED**

AGENCY: U.S. International Trade Commission.

ACTION: Notice.

SUMMARY: Notice is hereby given that the U.S. International Trade Commission has determined to affirm with modifications an initial determination ("ID") (Order No. 39) of the presiding administrative law judge ("ALJ") granting complainant's motion for summary determination that the economic prong of the domestic industry requirement is satisfied.

FOR FURTHER INFORMATION CONTACT: Cathy Chen, Esq., Office of the General Counsel, U.S. International Trade Commission, 500 E Street SW, Washington, DC 20436, telephone (202) 205-2392. Copies of non-confidential documents filed in connection with this investigation are or will be available for inspection during official business hours (8:45 a.m. to 5:15 p.m.) in the Office of the Secretary, U.S. International Trade Commission, 500 E Street SW, Washington, DC 20436, telephone (202) 205-2000. General information concerning the Commission may also be obtained by accessing its Internet server at <https://www.usitc.gov>. The public record for this investigation may be viewed on the Commission's electronic docket (EDIS) at <https://edis.usitc.gov>. Hearing-impaired persons are advised that information on this matter can be obtained by contacting the Commission's TDD terminal on (202) 205-1810.

SUPPLEMENTARY INFORMATION: The Commission instituted this investigation under section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. § 1337 ("section 337"), on May 23, 2017, based on a complaint filed by iRobot Corporation of Bedford, Massachusetts ("iRobot," or Complainant). 82 FR 23592-93 (May 23, 2017). The complaint alleges a violation of section 337 by reason of infringement of certain claims of U.S. Patent Nos. 6,809,490 ("the '490 patent"); 7,155,308 ("the '308 patent"); 8,474,090 ("the '090 patent"); 8,600,553 ("the '553 patent"); 9,038,233 ("the '233 patent"); and 9,486,924 ("the '924 patent"). *Id.* The complaint

names as respondents Bissell Homecare, Inc. of Grand Rapids, Michigan (“Bissell”); Hoover, Inc. of Glenwillow, Ohio; Royal Appliance Manufacturing Co., Inc. d/b/a TTI Floor Care North America, Inc. of Glenwillow, Ohio; Bobsweep, Inc. of Toronto, Canada; Bobsweep USA of Henderson, Nevada; The Black & Decker Corporation of Towson, Maryland and Black & Decker (U.S.) Inc. of Towson, Maryland (collectively, “Black & Decker”); Shenzhen ZhiYi Technology Co., Ltd., d/b/a iLife of Shenzhen, China; Matsutek Enterprises Co., Ltd. of Taipei City, Taiwan (“Matsutek”); Suzhou Real Power Electric Appliance Co., Ltd. of Suzhou, China; and Shenzhen Silver Star Intelligent Technology Co., Ltd. of Shenzhen, China. *Id.* at 23593. The Office of Unfair Import Investigations is not a party in this investigation. *Id.*

The investigation has been terminated with respect to respondents Black & Decker, Bissell, and Matsutek. *See* Order Nos. 31 and 34 (both unreviewed by the Commission). The ’924 patent and the ’308 patent are no longer part of the investigation. *See* Order Nos. 29 and 40 (both unreviewed by the Commission). The ’090, ’233, ’553, and ’490 patents (the “Asserted Patents”) remain in the investigation.

On January 8, 2018, iRobot moved for summary determination that it satisfied the economic prong of the domestic industry requirement under 19 U.S.C. § 1337(a)(3)(A) and (B). Respondents filed a joint opposition to the motion. On February 13, 2018, the ALJ granted iRobot’s motion for summary determination. *See* Order No. 39 at 31. No party petitioned for review of the subject ID.

On March 15, 2018, the Commission determined to review the ID in its entirety and requested the parties to brief issues under review. The parties filed timely responses and replies to the Commission’s request for briefing.

On March 29, 2018, non-parties Rovi Corporation and Rovi Guides, Inc. (collectively, “Rovi”) filed a motion for leave to submit an *amicus* brief in support of neither party in the investigation on the issues under review. This motion was denied.

On review, the Commission has determined to affirm with modifications the ID’s finding that complainant has satisfied the economic prong of the domestic industry requirement under 19 U.S.C. § 1337(a)(3)(B). The Commission has also determined to strike the portions of Respondents’ reply that respond to Rovi’s *amicus* brief. A Commission opinion will be forthcoming.

The authority for the Commission’s determination is contained in section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. 1337, and in Part 210 of the Commission’s Rules of Practice and Procedure, 19 CFR Part 210.

By order of the Commission.

A handwritten signature in black ink, appearing to read 'Lisa R. Barton', written in a cursive style.

Lisa R. Barton
Secretary to the Commission

Issued: July 16, 2018

PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **NOTICE** has been served upon the following parties as indicated, on July 16, 2018.



Lisa R. Barton, Secretary
U.S. International Trade Commission
500 E Street, SW, Room 112
Washington, DC 20436

On Behalf of Complainant iRobot Corporation:

Stephen A. Marshall
FISH & RICHARDSON P.C.
1000 Maine Ave SW
Suite 1000
Washington, DC 20024

- Via Hand Delivery
- Via Express Delivery
- Via First Class Mail
- Other: _____

**On Behalf of Respondents Shenzhen Silver Star Intelligent
Technology Co., Ltd., Hoover Inc., Royal Appliance
Manufacturing Co. Inc. d/b/a TTI Floor Care, bObsweep, Inc.
and bObsweep, USA:**

Kecia J. Reynolds
PILLSBURY WINTHROP SHAW PITTMAN LLP
1200 Seventeenth Street NW
Washington, DC 20036

- Via Hand Delivery
- Via Express Delivery
- Via First Class Mail
- Other: _____

**On Behalf of Respondents Shenzhen ZhiYi Technology Co.,
Ltd. d/b/a iLife:**

Nicholas A. Brown
GREENBERG TRAURIG, LLP
4 Embarcadero Center, Suite 3100
San Francisco, CA 94111

- Via Hand Delivery
- Via Express Delivery
- Via First Class Mail
- Other: _____

PUBLIC VERSION

**UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.**

In the Matter of

**CERTAIN ROBOTIC VACUUM CLEANING
DEVICES AND COMPONENTS THEREOF
SUCH AS SPARE PARTS**

Investigation No. 337-TA-1057

COMMISSION OPINION

On February 13, 2018, the presiding administrative law judge (“ALJ”) issued an initial determination (“ID”) (Order No. 39), granting summary determination that complainant iRobot Corporation (“iRobot”) of Bedford, Massachusetts has satisfied the economic prong of the domestic industry requirement. On March 15, 2018, the Commission determined to review the ID and requested the parties to brief the issue under review. Having considered the ID and the submissions of the parties, the Commission has determined to affirm with modifications the ID’s finding that iRobot has satisfied the economic prong of the domestic industry requirement.

I. BACKGROUND

A. Procedural History

The Commission instituted the investigation under section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. § 1337, on May 23, 2017, based on a complaint filed by iRobot. 82 Fed. Reg. 23592-93 (May 23, 2017). The complaint alleges a violation of section 337 by reason of infringement of certain claims of U.S. Patent Nos. 6,809,490 (“the ‘490 patent”); 7,155,308 (“the ‘308 patent”); 8,474,090 (“the ‘090 patent”); 8,600,553 (“the ‘553 patent”); 9,038,233 (“the ‘233 patent”); and 9,486,924 (“the ‘924 patent”). *Id.* The complaint names as respondents Bissell Homecare, Inc. of Grand Rapids, Michigan (“Bissell”); Hoover, Inc. of Glenwillow, Ohio; Royal Appliance Manufacturing Co., Inc. d/b/a TTI Floor Care North America, Inc. of Glenwillow,

PUBLIC VERSION

Ohio; Bobsweep, Inc. of Toronto, Canada; Bobsweep USA of Henderson, Nevada; The Black & Decker Corporation of Towson, Maryland and Black & Decker (U.S.) Inc. of Towson, Maryland (collectively, “Black & Decker”); Shenzhen ZhiYi Technology Co., Ltd., d/b/a iLife of Shenzhen, China; Matsutek Enterprises Co., Ltd. of Taipei City, Taiwan (“Matsutek”); Suzhou Real Power Electric Appliance Co., Ltd. of Suzhou, China; and Shenzhen Silver Star Intelligent Technology Co., Ltd. of Shenzhen, China. *Id.* at 23593. The Office of Unfair Import Investigations is not a party in this investigation. *Id.*

The investigation has been terminated with respect to respondents Black & Decker, Bissell, and Matsutek. *See* Order No. 31, *not reviewed* Notice (Jan. 31, 2018); Order No. 34, *not reviewed* Notice (Feb. 16, 2018).

The '924 patent and the '308 patent are no longer part of the investigation. *See* Order No. 29, *not reviewed* Notice (Jan. 16, 2018); Order No. 40, *not reviewed* Notice (Mar. 15, 2018). The '090, '233, '553, and '490 patents (the “Asserted Patents”) remain in the investigation.

On January 8, 2018, iRobot moved for summary determination that it satisfied the economic prong of the domestic industry requirement under 19 U.S.C. §§ 1337(a)(3)(A) and (B). Respondents filed a joint opposition to the motion. On February 13, 2018, the ALJ issued the subject ID granting iRobot’s motion for summary determination. *See* Order No. 39 at 31. No party petitioned for review of the ID.

On March 15, 2018, the Commission determined to review the ID and requested the parties to brief the issue under review. The parties filed timely responses and replies to the Commission’s request for briefing.¹

¹ Complainant’s Written Submission Regarding the Commission’s Notice of Review of the Initial Determination Granting Complainant’s Motion for Summary Determination That the

PUBLIC VERSION

On March 29, 2018, non-parties Rovi Corporation and Rovi Guides, Inc. (collectively, “Rovi”) filed a motion for leave to submit an *amicus* brief in support of neither party in the investigation on the issues under review. This motion was rejected.

B. The Patents and the Domestic Industry Products at Issue

The '090, '233, and '553 patents relate to structural components of autonomous floor-cleaning robots, including drive and control systems, various bump and proximity sensors, and a cleaning head subsystem with a dual-stage brush assembly. CSub at 4. The '490 patent generally relates to a control system for a mobile robot to effectively cover a given area by operating in a variety of coverage modes. *Id.*

iRobot contends that all of the Asserted Patents are practiced by the 600, 800, and 900 series of Roomba products (collectively, the “Domestic Industry Products”). *Id.* at 5.

II. THE ECONOMIC PRONG OF THE DOMESTIC INDUSTRY REQUIREMENT

A. The ID (Order No. 39)

On January 8, 2018, iRobot moved for summary determination that it satisfied the economic prong of the domestic industry requirement under section 337(a)(3)(A) and (B) through its investments into developing its Domestic Industry Products. ID at 1, 5. iRobot asserted that it was not seeking summary determination under section 337(a)(3)(C) and, thus, according to iRobot, resolution of the motion did not require determining whether it has

Economic Prong of the Domestic Industry Requirement is Satisfied (“CSub”) (Mar. 29, 2018); Respondents’ Comments On the Commission’s Questions Regarding the Initial Determination That the Economic Prong of the Domestic Industry Requirement Was Satisfied (“RSub”) (Mar. 29, 2018); Complainant’s Reply Submission Regarding the Commission’s Notice of Review of the Initial Determination Granting Complainant’s Motion for Summary Determination That the Economic Prong of the Domestic Industry Requirement is Satisfied (“CReply”) (Apr. 5, 2018); Respondents’ Reply to Complainant’s Written Submission and Amicus Brief of Non-Party Rovi Regarding the Commission’s Questions Regarding the Initial Determination That the Economic Prong of the Domestic Industry Requirement Was Satisfied (“RReply”) (Apr. 5, 2018).

PUBLIC VERSION

established a technical nexus between its investments and the Asserted Patents. *Id.* at 5. iRobot also asserted that the overwhelming majority of work on developing its Domestic Industry Products has taken place at its Bedford, Massachusetts and Pasadena, California locations, notwithstanding the fact that the manufacturing has taken place in China. *Id.* at 1, 6. iRobot further asserted that the tasks performed by its more than 400 U.S.-based engineers involved in research and development of the Domestic Industry Products include designing the mechanical parts, software, electrical functions, and chipsets for iRobot's products and managing supply chain, manufacturing, and quality assurance for those products. *Id.* at 6-7. Among other expenditures, iRobot relied on the cost of the engineering work and managerial overhead for sixteen (16) projects related to the Domestic Industry Products, which iRobot estimated to be about [[]] in labor investment. *Id.* at 10. iRobot contends that its domestic expenditures and investments related to the Domestic Industry Products are significant in the context of iRobot's total research and development activities. *Id.* at 11-12.

Respondents opposed iRobot's motion for two reasons. First, Respondents argued that iRobot's expenses are not related to manufacturing, which Respondents assert is the type of expense addressed by subparagraphs (A) and (B). *Id.* at 14. Respondents contended that iRobot's expenses are of the type Congress intended for showing exploitation of the patents under subparagraph (C), but Respondents assert that iRobot's motion did not map the expenses to exploitation of the patents. *Id.* Second, Respondents argued that iRobot's analysis is flawed because it is overstated and includes expenses that should have been disaggregated for future products and non-Domestic Industry Products. *Id.* at 15.

In considering iRobot's Motion for Summary Determination, the ID rejects Respondents' first argument that a complainant's research and development expenses can only be considered

PUBLIC VERSION

under subparagraph (C) of the statute, as opposed to subparagraphs (A) and (B). *Id.* at 16. The ID notes that this issue was the focus of the Commission Investigative Staff's petition for review in *Certain Electric Skin Care Devices, Brushes and Chargers Thereof, and Kits Containing the Same*, Inv. No. 337-TA-959 ("*Electric Skin Care Devices*"), in which the presiding ALJ determined that subparagraphs (A) and (B) were meant for manufacturing expenses and research and development must be considered in the subparagraph (C) context. *Id.* (citing Inv. No. 337-TA-959, Initial Determination at 24-26 (Apr. 11, 2016)). Even though the ID acknowledges that the Commission vacated and took no position on the issue, the ID finds, apparently based on the Commission's decision to vacate the issue, that "the legal theory that research and development can only be considered under subsection (C) is not the law." *Id.* Thus, the ID concludes that Respondents' argument based on this legal theory does not raise a genuine issue of material fact to preclude summary determination. *Id.*

The ID also rejects Respondents' second argument because even when all of Respondents' criticisms are accepted as true for purposes of the motion, the ID finds that iRobot has still invested well over [[]] dollars in engineering labor alone in furtherance of its Domestic Industry Products. *Id.* at 17. Specifically, the ID finds that iRobot clearly allocated its labor investments between its Domestic Industry Products and non-Domestic Industry Products for seven of the sixteen projects.² *Id.* The ID explains that Respondents, however, believe that iRobot should have allocated its labor investments in three other projects.³ *Id.* Even if these

² The seven projects allocated by iRobot's expert, Dr. Vander Veen, include projects identified as IR&D HBU Berlin, IR&D HBU Chicago, IR&D HBU Las Vegas, SST HBU Localization, SST HBU CEC, SST HBU IEC Cliff Safety, and SST HBU R3. CSub at 12.

³ The three projects that Respondents contend should also have been allocated include [[]], [[]], and IR&D San Antonio (Wells). CSub at 12 n.7.

PUBLIC VERSION

three other projects are allocated, the ID finds that “no genuine issue remains over whether iRobot has invested significantly in labor directed to the Domestic Industry Products based on remaining facts which are not in dispute.” *Id.* at 18. The ID concludes that “even when all facts are viewed favorably to the Opposing Respondents, there is no genuine dispute that iRobot has invested at least [[]] in engineering labor alone in furtherance of the Domestic Industry Products” and “this is quantitatively significant by any measure.”⁴ *Id.* at 30.

The ID also relies on iRobot’s observation that its investment “rivals the ‘*combined annual revenue for all Respondents’ accused products*, which totals approximately \$18,162,188.” *Id.* at 30-31. Because the ID finds the at least [[]] in engineering labor expenses alone to be significant, the ID does not consider iRobot’s additional expenditures for managerial overhead, facilities, or capital, which total approximately another [[]]. *Id.*

B. The Commission’s Request for Briefing

On review, the Commission asked the parties to brief two questions.

Question 1

With respect to the ID’s determination regarding the economic prong of the domestic industry requirement with respect to all of the asserted patents in this investigation, discuss whether Complainant is permitted to rely upon its research and development investments to satisfy the requirements under section 337(a)(3)(A) and (B) or whether such investments are only applicable to establishing a domestic industry under section 337(a)(3)(C). Explain all relevant statutory provisions, case law, legislative history, and Commission precedent pertaining to this issue.

Referring to the plain language of the statute, iRobot argues that “[n]othing in the statute limits subsection (A) or (B) to investments related to manufacturing or any other category, other

⁴ The ID finds that because “iRobot’s U.S.-based employees are engaged in engineering, research, and development for products sold both inside and outside the U.S., *i.e.* worldwide,” the number of hours for the ten projects requiring allocation should be reduced by applying an allocation equal to the percentage of iRobot’s total worldwide sales accounted for by the Domestic Industry Products. ID at 29; CSub at 12 n.8.

PUBLIC VERSION

than that the investments must be ‘with respect to the articles protected by the patent.’” CSub at 14. iRobot explains that investments in “‘plant and equipment’ may be necessary to support research and development related to articles protected by the patent, inasmuch as research and development activities often require physical plants or workspaces for those individuals conducting the research and development” and “various types of technological equipment may be required to conduct research and development activities.” CReply at 2. Similarly, iRobot asserts that the “same is true with employment of ‘labor or capital,’ which may include research scientists or engineers working on development of the articles protected by the patent.” *Id.*

Respondents argue that the “Commission’s historical position before Congress and the Federal Circuit’s precedent confirm that until Congress amended the statute in 1988,⁵ a domestic industry was required to be shown through manufacturing.” RSub at 8. Respondents also argue that in 1988, “Congress adopted the Commission’s practice of recognizing domestic manufacturing investments to establish the existence of an industry in the United States, which is now codified in subsections A and B of the statute.” *Id.* at 5-6. Respondents contend that the legislative reports for the 1988 Act support “the dichotomy between manufacturing related investments under subsections (A) and (B) and non-manufacturing related investments under subsection (C).” *Id.* at 8 (citing H.R. Rep. No. 100-40, at 157 (1987)).

Contrary to Respondents’ suggestion, iRobot argues that “[a]t no point does the legislative history identify subsections (A) and (B) as encompassing only manufacturing, and at no point does the legislative history identify subsection (C) as being the exclusive subsection for any entity that manufactures outside the United States.” CReply at 4. iRobot asserts that in

⁵ Omnibus Trade and Competitiveness Act of 1988, Pub.L. No. 100-418, 102 Stat. 1107 (1988) (codified at Section 337(a)) (“1988 Act”).

PUBLIC VERSION

1988, Congress added subparagraph (C) “to improve access by others who may not satisfy subsections (A) and (B)” because “Congress was particularly concerned about ensuring access to entities that *solely* conducted research and development or licensing, but who did not have the requisite ‘investment’ or ‘employment’ ‘with respect to the articles protected’ under subsections (A) or (B)—such as universities, who often conduct research not expressly directed to product development.” CSub at 20 (H.R. Rep. No. 100-40, at 157; S. Rep. No. 100-71, at 129 (1987)).

iRobot contends that extensive precedent from the Commission has “permitted a complainant to count research and development expenses related to the domestic industry products under subsections (A) and (B).” *Id.* at 14-16 (citing *Certain Marine Sonar Imaging Devices, Including Downscan and Sidescan Devices, Products Containing the Same, and Components Thereof*, Inv. No. 337-TA-921, Comm’n Op. at 58-59 (Jan. 6, 2016) (“*Marine Sonar Imaging*”); *Certain Wireless Communication Devices*, Inv. No. 337-TA-745, Comm’n Op. at 93-94 (Sept. 17, 2012) (“*Wireless Communication Devices*”); *Certain Ground Fault Circuit Interrupters*, Inv. No. 337-TA-739, Comm’n Op. at 79-80 (Jun. 8, 2012) (“*Ground Fault Circuit*”); *Certain Electronic Imaging Devices.*, Inv. No. 337-TA-850, Comm’n Op. at 92-95 (April 21, 2014) (“*Electronic Imaging*”)).

To the contrary, Respondents assert that none of the cases cited by iRobot “find that research and development investments that have not been found to exploit the patents – as is the case here – are applicable under subsections (A) and (B).” RReply at 5. Respondents contend that “iRobot must establish that the R&D and engineering expenses are substantial and exploit the patents, even if asserting that the expenses fall under subsections A and B.” RSub at 10, 11-13.

PUBLIC VERSION

Question 2

If Complainant is allowed to rely on such investments as a general matter, are all the specific types of research and development investments relied upon in this investigation appropriate?

iRobot asserts that “by carving out expenses for non-domestic industry products, Dr. Vander Veen’s methodology, as applied by the ALJ, results in identifying *only* that portion of iRobot’s research and development investments that are attributable solely to the Domestic Industry Products.” CSub at 22. “Paralleling the situation from *Marine Sonar Imaging*,” iRobot argues that its “research and development investment includes the costs in labor, capital, and other expenses it takes to conceive and bring to market a [robotic vacuum cleaner] in addition to the costs of refining products that are in the market and updating the operating software so that the [robots] run optimally and provide the users with the best possible user experience.” *Id.* (quoting Inv. No. 337-TA-921, Comm’n Op. at 58 n.28). iRobot argues that while its “research and development expenditures include expenditures that are not exclusively related to specific patented features, all of those expenses fall broadly into the categories of ‘conceiv[ing] and bringing to market,’ ‘refining products,’ ‘updating the operating software,’ and ‘provid[ing] the users with the best possible user experience,’ that *Marine Sonar Imaging* held were appropriately considered under subsections (A) and (B).” *Id.*

Respondents argue that Dr. Vander Veen admitted that he failed to disaggregate certain project expenses for non-domestic industry products. RSub at 14-15. Thus, according to Respondents, “there is no affirmative evidence that iRobot’s investments (regardless of whether those investments are proper under subsections (A) and (B) and regardless of whether iRobot needed to establish that the investments exploit the patents) are exclusive to the DI products and are significant.” *Id.* at 15.

PUBLIC VERSION

iRobot argues that “each of the arguments advanced in Respondents’ brief with respect to Question 2 were *already accepted by the ALJ* for purposes of the motion for summary determination, and were incorporated into the Initial Determination.” CReply at 10. “Even after accepting those arguments, for purposes of the motion, and assuming all disputed facts in Respondents favor,” iRobot points out that “the ALJ *still* found that there was at least [[
]] in labor investment related exclusively to the Domestic Industry Products. *Id.* (citing ID at 30).

C. Analysis

In patent proceedings under section 337, a complainant must establish that an industry “relating to the articles protected by the patent . . . exists or is in the process of being established” in the United States. 19 U.S.C. § 1337(a)(2). Under Commission precedent, the domestic industry requirement of section 337 consists of an “economic prong” and a “technical prong.” *See, e.g., Alloc, Inc. v. Int’l Trade Comm’n*, 342 F.3d 1361, 1375 (Fed. Cir. 2003).

The “economic prong” of the domestic industry requirement is satisfied when it is determined that the economic activities and investments set forth in subparagraphs (A), (B), and/or (C) of section 337(a)(3) have taken place or are taking place. *Certain Variable Speed Wind Turbines & Components Thereof*, Inv. No. 337-TA-376, USITC Pub. No. 3003, Comm’n Op. at 21 (Nov. 1996) (“*Wind Turbines*”). With respect to the “economic prong,” 19 U.S.C. § 1337(a)(3) provides that:

[A]n industry in the United States shall be considered to exist if there is in the United States, with respect to the articles protected by the patent, copyright, trademark, mask work, or design concerned—

- (A) significant investment in plant and equipment;
- (B) significant employment of labor or capital; or
- (C) substantial investment in its exploitation, including engineering, research and development or licensing.

PUBLIC VERSION

Given that these criteria are listed in the disjunctive, satisfaction of any one of them will be sufficient to meet the domestic industry requirement. *Wind Turbines*, Inv. No. 337-TA-376, Comm'n Op. at 15.

The ID finds that iRobot satisfies the economic prong of the domestic industry requirement under section 337(a)(3)(B) based on iRobot's domestic labor costs from research and development projects related to the articles that practice the asserted patents. In doing so, the ID summarily rejects Respondents' legal theories that labor costs from research and development can only be considered under section 337(a)(3)(C) and, in the alternative, that such costs must exploit the asserted patents even under subparagraphs (A) and (B). To support its conclusion, the ID cites only a case in which the Commission vacated and took no position on these issues. *See* ID at 16 (citing *Electric Skin Care Devices*, Inv. No. 337-TA-959, Comm'n Op. at 10 (Feb. 6, 2017)). Because the Commission vacated the ALJ's analysis and findings on these issues in *Electric Skin Care Devices*, the ID improperly relied on *Electric Skin Care Devices* to conclude that expenses in research and development can be a qualifying investment under subparagraphs (A) and (B). *See id.*; *see Certain Dynamic Random Access Memories, Components Thereof and Products Containing Same*, Inv. No. 337-TA-242, Pub. No. 2034, Comm'n Op. at 65 n.150 (Nov. 1987) ("We note that since the Commission vacated those portions of the ID concerning Hitachi, there are no findings of fact or conclusions of law remaining with regard to the '376 patent."). Thus, the Commission vacates the ID's discussion and citation of *Electric Skin Care Devices*. *See id.*

Nevertheless, the Commission has rejected the legal theory that labor costs from research and development can only be considered under subparagraph (C). Most recently, in *Certain Solid State Storage Drives, Stacked Electronics Components, and Products Containing Same*,

PUBLIC VERSION

Inv. No. 337-TA-1097 (“*Solid State Storage Drives*”), the Commission reasoned that the “statutory text of section 337 does not limit sections 337(a)(3)(A) and (B) to investments related to manufacturing or any other type of industry,”—“it only requires that the domestic investments in plant and equipment, and employment of labor or capital be ‘with respect to the articles protected by the patent.’” Comm’n Op. at 8 (Jun. 29, 2018). The Commission explained that “the legislative history surrounding the enactment of section 337(a)(3) suggests that Congress did not intend to limit subsections (A) or (B) to manufacturing activities in the United States.” *Id.* at 10 (citing S. Rep. No. 100-71, at 127-129; H. Rep. No. 99-581, at 112 (1986)); *see also* H.R. Rep. No. 100-40, at 157.

Since the 1988 Act, the Commission has permitted expenditures on plant and equipment and labor and capital employed in engineering and research and development activities to support a domestic industry under subsections (A) and (B), so long as the asserted expenditures satisfy the plain language of the statutory text. *Id.* at 10-12 (citing *Electronic Imaging*, Inv. No. 337-TA-850, Comm’n Op. at 92-93 (Mar. 21, 2014); *Wireless Communication Devices*, Inv. No. 337-TA-745, Comm’n Op. at 93-94 (Sep. 17, 2012); *Certain Digital Video Receivers and Hardware and Software Components Thereof*, Inv. No. 337-TA-1001 (“*Digital Video Receivers*”), Comm’n Op. at 35 (Dec. 6, 2017), ID at 578, 580 (May 26, 2017); *Marine Sonar Imaging*, Inv. No. 337-TA-921, Comm’n Op. at 58-59, 63-64 (Jan. 6, 2016)).

Commission precedent does not support Respondents’ additional arguments. Specifically, Respondents posit that even if section 337(a)(3)(B) permits consideration of iRobot’s domestic labor costs related to research and development, Respondents argue that iRobot must show “that the research and development investments exploit the patent.” RReply at 5. Respondents also argue that “the Commission has not taken a position on whether R&D

PUBLIC VERSION

expenses that have not been shown to be an exploitation of the patents are proper to satisfy the economic prong under subsections (A) and (B).” RSub at 9-10.

On the contrary, because the “statutory language concerning exploitation of a patent does not appear” in sections 337(a)(3)(A) and (B), *Ground Fault Circuit*, Inv. No. 337-TA-739, Comm’n Op. at 78, the “Commission has not required complainants to show exploitation of the patented technology (as the concept is understood under subsection (C)) to satisfy subsections (A) and (B).” *Solid State Storage Drives*, Inv. No. 337-TA-1097, Comm’n Op. at 13-14 (citing *Ground Fault Circuit*, Inv. No. 337-TA-739, Comm’n Op. at 80-81 (Jun. 8, 2012); *Wireless Communication Devices*, Inv. No. 337-TA-745, Comm’n Op. at 91-96); *Electronic Imaging*, Inv. No. 337-TA-850, Comm’n Op. at 92; *Marine Sonar Imaging*, Inv. No. 337-TA-921, Comm’n Op. at 58-64; *Digital Video Receivers*, Inv. No. 337-TA-1001, Final ID at 576-582).

Respondents provide no meaningful response to the Commission’s Question 2. Respondents’ only assertion is that, “iRobot should not be able to rely on its specific R&D investments because, as the ID correctly determined, some of iRobot’s R&D projects relate to non-domestic industry products.” RSub at 12-13. However, Respondents’ arguments with respect to Question 2 were already accepted by the ALJ for purposes of the motion for summary determination, and were incorporated into the Initial Determination. *See* ID at 17-18. Even after accepting Respondents’ arguments, the ALJ still found that there was at least [[] in labor expenditures related exclusively to the Domestic Industry Products. *See id.* at 30. Thus, the Commission affirms, with the modified analysis set forth above, the ID’s finding that iRobot has satisfied the economic prong of the domestic industry requirement under 19 U.S.C. § 1337(a)(3)(B).

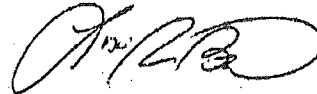
PUBLIC VERSION

Finally, Respondents' reply submission discusses the *amicus* brief submitted by non-party Rovi. *See* RReply at 1, 5. Since Rovi's motion for leave to submit an *amicus* brief was denied, the Commission strikes the portions of Respondents' reply that responds to Rovi's *amicus* brief.

III. CONCLUSION

For the reasons discussed above, the Commission affirms with modifications the ID's finding that complainant has satisfied the economic prong of the domestic industry requirement under 19 U.S.C. § 1337(a)(3)(B).

By Order of the Commission.



Lisa R. Barton
Secretary to the Commission

Issued: August 1, 2018

PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **OPINION, COMMISSION** has been served upon the following parties as indicated, on August 1, 2018.



Lisa R. Barton, Secretary
U.S. International Trade Commission
500 E Street, SW, Room 112
Washington, DC 20436

On Behalf of Complainant iRobot Corporation:

Stephen A. Marshall
FISH & RICHARDSON P.C.
1000 Maine Ave SW
Suite 1000
Washington, DC 20024

- Via Hand Delivery
- Via Express Delivery
- Via First Class Mail
- Other: _____

**On Behalf of Respondents Shenzhen Silver Star Intelligent
Technology Co., Ltd., Hoover Inc., Royal Appliance
Manufacturing Co. Inc. d/b/a TTI Floor Care, bObsweep, Inc.
and bObsweep, USA:**

Kecia J. Reynolds
PILLSBURY WINTHROP SHAW PITTMAN LLP
1200 Seventeenth Street NW
Washington, DC 20036

- Via Hand Delivery
- Via Express Delivery
- Via First Class Mail
- Other: _____

**On Behalf of Respondents Shenzhen ZhiYi Technology Co.,
Ltd. d/b/a iLife:**

Nicholas A. Brown
GREENBERG TRAUIG, LLP
4 Embarcadero Center, Suite 3100
San Francisco, CA 94111

- Via Hand Delivery
- Via Express Delivery
- Via First Class Mail
- Other: _____

UNITED STATES INTERNATIONAL TRADE COMMISSION

Washington, D.C.

In the Matter of

**CERTAIN ROBOTIC VACUUM CLEANING
DEVICES AND COMPONENTS THEREOF SUCH
AS SPARE PARTS**

Inv. No. 337-TA-1057

**ORDER NO. 39: INITIAL DETERMINATION GRANTING COMPLAINANT'S
MOTION FOR SUMMARY DETERMINATION THAT IT HAS
SATISFIED THE ECONOMIC PRONG OF THE DOMESTIC
INDUSTRY REQUIREMENT**

(February 13, 2018)

I. INTRODUCTION

On January 8, 2018, complainant iRobot Corporation (“iRobot”) moved for summary determination that it satisfied the “economic prong” of the domestic industry requirement of 19 U.S.C. § 1337(a)(3)(A) and (B). (Motion Docket No. 1057-033). iRobot simultaneously submitted a Memorandum and a proposed Statement of Undisputed Facts (SUF) in support of its motion.

iRobot contends that “[t]here can be no dispute that iRobot has established an economic domestic industry through its significant investments into developing its Domestic Industry Products—the market leading Roomba robotic vacuum cleaners. iRobot is a U.S. company and the overwhelming majority of work on developing its Domestic Industry Products has taken place in the United States.” (Mot. Mem. at 1.) The motion represents that:

iRobot further certifies that the it made a good faith effort to resolve this motion with Respondents, including through a meet and confer call to discuss the motion involving all parties, but was unable to do so. Respondents Shenzhen Silver Star Intelligent Technology Co., Ltd.; Hoover, Inc., Royal Appliance

PUBLIC VERSION

Manufacturing Co. Inc. d/b/a TTI Floor Care North America, Inc.; bObsweep, Inc.; and bObsweep USA oppose iRobot's motion. Respondents Bissell Homecare, Inc.; Matsutek Enterprises Co., Ltd.; and Shenzhen Zhiyi Technology Co., Ltd. d/b/a iLife take no position on iRobot's motion.

(Mot. at 1.)

On January 18, 2018, respondents Shenzhen Silver Star Intelligent Technology Co., Ltd., Hoover Inc., Royal Appliance Manufacturing Co., d/b/a TTI Floor Care North America Inc., bObsweep, Inc., and bObsweep USA (collectively "Opposing Respondents") filed an opposition in which they argue that iRobot relies on R&D expenses but fails to provide a required nexus to the asserted patents, and then also fails to "disaggregate" non-Domestic Industry related activities out of its claimed expenses. (*See* Opp. at 1.) The Opposing Respondents concurrently filed a response to iRobot's SUF which included their own proposed findings of fact ("Responsive SUF").

On January 23, 2018, iRobot filed a motion for leave to reply. (Motion Docket No. 1057-040.) which the Opposing Respondents opposed on January 26, 2018. iRobot's motion for leave to reply (Mot. Dkt. No. 1057-040) is DENIED.

II. STANDARDS OF LAW

Commission Rule 210.18 provides that "[a]ny party may move ... for a summary determination in its favor upon all or any part of the issues to be determined in the investigation." 19 C.F.R. § 210.18(a). Summary determination "shall be rendered if pleadings and any depositions, answers to interrogatories, and admissions on file, together with the affidavits, if any, show that there is no genuine issue as to any material fact and that the moving party is entitled to summary determination as a matter of law." 19 C.F.R. § 210.18(b).

In evaluating a motion for summary determination I must evaluate the evidence "in the light most favorable to the party opposing the motion." *See, e.g., Certain Personal Computers*

PUBLIC VERSION

and *Digital Display Devices*, Inv. No. 337-TA-606, Order No. 20 at 2 (Jan. 11, 2008) (“*Personal Computers*”). Nevertheless, the non-moving party “has the burden to submit more than averments in pleadings or allegations in legal memoranda. Mere denials or conclusory statements are insufficient.” *Certain Magnetic Response Injection Systems and Components Thereof*, Inv. No. 337-TA-434, Order No. 16 at 5 (Sept. 26, 2000) (citations omitted). This means the “[the non-moving party] must do more than simply show there is some metaphysical doubt as to the material facts” to avoid summary determination. *Certain Electronic Devices, Including Mobile Phones, Portable Music Players, and Computers*, Inv. No. 337-TA-701, Order No. 58 at 4, 10, 15 (quoting *Matsushita Elec. Indus. v. Zenith Radio Corp.*, 475 U.S. 574, 586 (1986)) (“*Electronic Devices*”); accord *Certain Electronic Devices with Image Processing Systems, Components Thereof, and Associated Software*, Inv. No. 337-TA-724, Order No. 29 at 3, 16-17 (Mar. 11, 2011) (non-reviewed).

To obtain relief in a Section 337 investigation, a complainant, in a patent-based case, must prove a domestic industry exploiting the patent(s) at issue exists in the United States. See 19 U.S.C. § 1337(a)(2); see also *Certain Microsphere Adhesives, Process for Making Same, and Products Containing Same, Including Self-Stick Repositionable Notes*, Inv. No. 337-TA-366, Comm’n Op. at 8 (1996). The domestic industry requirement of Section 337 in patent-based cases consists of a “technical prong” and an “economic prong.” See, e.g., *Certain Unified Communications Systems, Products Used with Such Systems, and Components Thereof*, Inv. No. 337-TA-598, Order No. 9 at 1-2 (Sept. 5, 2007) (“*Communications Systems*”). Complainants satisfy the “technical prong” when they prove their activities relate to an article protected by the patent. (See *id.*) Complainants satisfy the “economic prong” of the domestic industry requirement when they establish “that the economic activities set forth in subsections (A), (B),

and/or (C) of subsection 337(a)(3) have taken place or are taking place with respect to the protected articles.” Subsection 337(a)(3) states, in relevant part, that:

an industry in the United States shall be considered to exist if there is in the United States, with respect to the articles protected by the ... patent ... concerned –

(A) significant investment in plant and equipment;

(B) significant employment of labor or capital; or

(C) substantial investment in its exploitation, including engineering, research and development, or licensing.

19 U.S.C. § 1337(a)(3).

The “economic prong” of the domestic industry requirement is satisfied when there exists in the United States in connection with products practicing at least one claim of the patent at issue: (A) significant investment in plant and equipment; (B) significant employment of labor or capital; or (C) substantial investment in its exploitation, including engineering, research and development, and licensing. 19 U.S.C. § 1337(a)(3). Establishment of the “economic prong” is not dependent on any “minimum monetary expenditure” and there is no need for complainant “to define the industry itself in absolute mathematical terms.” *Certain Stringed Musical Instruments and Components Thereof*, Inv. No. 337-TA-586, Comm’n Op. at 25-26 (May 16, 2008) (“*Stringed Instruments*”). However, a complainant must substantiate the significance of its activities with respect to the articles protected by the patent. *Certain Printing and Imaging Devices and Components Thereof*, Inv. No. 337-TA-690, Comm’n Op. at 30 (February 17, 2011) (“*Imaging Devices*”). Further, a complainant can show that its activities are significant by showing how those activities are important to the articles protected by the patent in the context of the company’s operations, the marketplace, or the industry in question. *Id.* at 27-28. That significance, however, must be shown in a quantitative context. *Lelo Inc. v. Int’l Trade Comm’n*, 786 F.3d 879, 886 (Fed. Cir. 2015). The Federal Circuit noted that when the ITC first addressed

this requirement, it found the word “‘significant’ denoted ‘an assessment of the relative importance of the domestic activities.’” *Id.* at 883-4 (internal citation omitted) (emphasis added).

Recognizing that parties may not keep precise record of how their costs are incurred, the Commission stated: “[a] precise accounting is not necessary, as most people do not document their daily affairs in contemplation of possible litigation.” *Electronic Devices*, Order No. 58 at 5 (citations omitted). Thus, when complainants use reasonable allocations for the purposes of establishing the economic prong of the domestic industry requirement, that will be sufficient. *See, e.g., Certain Toner Cartridges and Components Thereof*, Inv. No. 337-TA-740, Order No. 26 at 12 (June 1, 2011) (relying on sales-based allocation which is “a formula accepted by the Commission in past investigations”); *Certain NOR and NAND Flash Memory Devices and Products Containing Same*, Inv. No. 337-TA-560, Order No. 37 at 5-6 (Nov. 17, 2006) (granting summary determination where complainant based investments on reasonable allocation).

III. DISCUSSION

a. iRobot’s Contentions

iRobot contends that it:

[S]eeks summary determination under only sub-prongs (A) and (B) of the domestic industry requirement of 19 U.S.C. § 1337(a)(3)—*i.e.*, that iRobot has significant investment in plant and equipment or significant employment of labor or capital related to its Domestic Industry Products. iRobot is not seeking summary determination under sub-prong (C)—that it has substantial investment into exploitation of the Asserted Patents.

(Mot. Memo at 1.) Thus, iRobot claims that “resolution of this motion does not require determining whether iRobot has established a technical nexus between its investments and the Asserted Patents.” (*Id.*) Generally, and with respect to alleged significance, iRobot explains “the amount calculated by Respondents’ expert equals the combined annual sales revenues for *all Respondents’ Accused Products.*” (*Id.* at 2 (emphasis in original).)

PUBLIC VERSION

iRobot's motion addresses five asserted patents: U.S. Patent No. 6,809,490 ("the '490 Patent"); U.S. Patent No. 7,155,308 ("the '308 Patent"); U.S. Patent No. 8,474,090 ("the '090 Patent"); U.S. Patent No. 8,600,553 ("the '553 Patent"); and U.S. Patent No. 9,038,233 ("the '233 Patent") (collectively, the "Asserted Patents"). (*Id.* at 3.) iRobot describes the '308 patent as related to autonomous navigation around obstacles; the '090, '233, and '553 patents to structural components; and the '490 patent to coverage modes. (*Id.* at 3-4.) iRobot contends that all of the Asserted Patents are practiced by the 600, 800, and 900 Series of Roomba products (collectively, the "Domestic Industry Products"). (*Id.* at 4.) iRobot asserts that the Domestic Industry Products made up [] of iRobot's worldwide sales revenue," and [] of iRobot's U.S. sales revenue," for the years 2014, 2015, and 2016, respectively. (*Id.* (citing Mot., Ex. 3; Mot., Ex. 4 at ¶ 56))

iRobot's motion focuses on investments into research and development behind the Domestic Industry Products in Bedford, Massachusetts and Pasadena, California locations (*see id.* at 4-5 (citing Mot., Ex. 5 at 107:5-10; Mot., Ex. 6 at ¶¶ 11, 12)) as opposed to, for example, manufacturing which takes place in China (*see id.* at 5 (citing Mot., Ex. 7; Mot., Ex. 5 at 109:6-8)). iRobot offers that "more than 400 employees are engaged in engineering, research, and development related to iRobot's products" across these two U.S. locations. (*Id.* (citing Mot., Ex. 8; Mot., Ex. 9; Mot., Ex. 4 at ¶ 32, Tab 4).) iRobot reports that it has "10 or fewer employees located outside the United States that engage in such activities." (*Id.* (citing Mot., Ex. 5 at 124:1-12; Mot., Ex. 10 at 66:12-20; Mot., Ex. 7).)

iRobot explains that its:

U.S.-based employees involved in research and development of the Domestic Industry Products include mechanical engineers, software engineers, electrical engineers, systems engineers, robotics engineers, testers, machinists, program managers, operations managers, and researchers, among other types. (See,

PUBLIC VERSION

e.g., Ex. 8 (IROBOT-ITC-00186589); see also Ex. 5 (Svendsen Depo Tr.) at 21:11-20.) The tasks performed by those employees include designing the mechanical parts, software, electrical functions, and chipsets for iRobot’s products. . . . Those tasks also include managing supply chain, manufacturing, and quality assurance for the products, (Ex. 5 (Svendsen Depo Tr.) at 23:13-16; Ex. 8 (IROBOT-ITC-00186589)) . . .

(*Id.* at 5-6.) iRobot adds that its engineering work is tracked hourly on a per project basis and presents tables of sixteen projects with alleged connections to the Domestic Industry Products, as shown below:

Project Name	Description
IR&D HBU Manhattan	Delivering a lower cost 600 Series robot with an updated look. (Ex. 5 (Svendsen Depo Tr.) at 127:5-10; <i>see also</i> Ex. 12 (Elder Depo Tr.) at 35:23-25; 51:5-14.)
IR&D HBU Ningbo	Developing a low cost robot for the 600 Series, by replacing a higher cost PCBA assembly with a low cost variant, (Ex. 5 (Svendsen Depo Tr.) at 129:24-130:7), and 600 series connected robot for overseas, (Ex. 11 (Svendsen Decl.) at ¶ 3).
SST HBU Localization	SKU releases for different regions for the 600 and 700 Series Roombas (Ex. 11 (Svendsen Decl.) at ¶ 3); and a “body of work supporting the 600 series” (Ex. 12 (Elder Depo Tr.) at 36:1-6).

Project Name	Description
800 Series Dual Sourcing	Increasing the number of factories for the 800 Series from one to two. (Ex. 11 (Svendsen Decl.) at ¶ 3.)
IR&D HRD San Antonio (Wells)	Updating the older 700 Series with the next generation cleaning systems. (Ex. 11 (Svendsen Decl.) at ¶ 3.)

PUBLIC VERSION

Project Name	Description
[]	Developing [] robots [] (Svendsen Depo Tr. at 120:11-18.)
IR&D HBU El Paso	Development of the Roomba 980. (Ex. 5 (Svendsen Depo Tr.) at 121:6-9; <i>id.</i> at 131:19-132:2; Ex. 10 (Saeger Depo Tr.) at 76:8-10.)
[]	[] for the Roomba 900 Series, [] (Ex. 5 (Svendsen Depo Tr.) at 131:19-132:2; Ex. 11 (Svendsen Decl.) at ¶ 3.)
IR&D HBU Lexington	Cleaning updates for the Roomba 980. (Ex. 11 (Svendsen Decl.) at ¶ 3; Ex. 5 (Svendsen Depo Tr.) at 131:19-132:2-19; 133:7-11.)
IR&D HBU R4	Roomba 980 development and advanced development that might also be used in future releases. (Ex. 5 (Svendsen Depo Tr.) at 134:12-14; Ex. 11 (Svendsen Decl.) at ¶ 3.)

Project Name	Description
IR&D HBU Berlin	Development of a virtual wall accessory, as used in all Roomba series (including also the 500 and 700 Series). (Ex. 5 (Svendsen Depo Tr.) at 109:22-110:5; 127:15-25.)
IR&D HRD Chicago	Docking for all Roomba products (including the 500 and 700 Series). (Ex. 11 (Svendsen Decl.) at ¶ 3.)
IR&D HRD Las Vegas	Updating lithium ion batteries and associated software for all three series of Domestic Industry Products (and one non-Roomba product). (Ex. 11 (Svendsen Decl.) at ¶ 3.)
SST HBU CEC	Compliance issues, applicable to all iRobot

PUBLIC VERSION

	products. (Ex. 11 (Svendsen Decl.) at ¶ 3.)
SST HBU IEC Cliff Safety	Obtaining safety certifications, and applies to all Roomba products (including the 500 Series and 700 Series). (Ex. 11 (Svendsen Decl.) at ¶ 3.)
[]	A continuous project related to [] (Ex. 11 (Svendsen Decl.) at ¶ 3.)

(Id. at 6-9 (internal citations omitted).)

iRobot then provides the following table as a summary of its labor, capital, plant, and equipment investments behind these projects:

	2014	2015	2016	Total
Labor (including Managerial Overhead)				
Facilities				
Capital Equipment				
Warehousing				
Total				

(Id. at 9.)

iRobot’s labor amounts generally come from the product of each R&D project’s recorded hours and an average hourly wage, calculated with the help of its expert, Dr. Vander Veen. (See *id.* at 10-12 (internal citations omitted).) For those projects which “relate to more than just the Domestic Industry Products,” iRobot applies a sales-based allocation based on “the percentage of total U.S. sales accounted for by the Domestic Industry Products.” (*Id.* at 12 (citing Mot., Ex. 4 at ¶ 53).) Specifically, iRobot uses [] for 2014, [] for 2015, and [] for 2016. (*Id.*) iRobot claims that the projects for which this allocation is needed include: IR&D HBU Berlin, IR&D HBU Chicago, IR&D HBU Las Vegas, SST HBU Localization, SST HBU CEC, SST

PUBLIC VERSION

HBU IEC Cliff Safety, and [] (*Id.* (citing Mot., Ex. 4 at ¶ 53; Mot., Ex. 11 at ¶ 3).)

iRobot also adds in the cost of the managerial overhead for these projects, calculated using a percentage of recorded labor hours (*see id.* at 12-13 (citing Mot., Ex. 4 at ¶ 36)), to arrive at its total of [] “in labor investment related to the Domestic Industry Products” (*id.* at 13).¹

iRobot’s facility amounts come from “operating expenses related to research and development business units” expended at its Bedford, MA and Pasadena, CA locations. (*Id.* at 13.) iRobot acknowledges that “the work at the Bedford and Pasadena facilities relates to all iRobot products” so as to require an apportionment of expenses, which its expert accomplished by using “the most conservative identification of hours worked on projects related to the Domestic Industry Products.” (*Id.* at 14.) To this end iRobot uses percentages of [] for 2014, [] for [2015], and [] for 2[016], and, when applied to the overall R&D expenses, results in []² (*Id.* (citing Mot., Ex. 4 at ¶ 54).)

iRobot’s capital equipment amounts come from “equipment related to its Domestic Industry Products, including computers, computer software, printers, welding machines, lab and machine shop furniture, and other office and lab equipment.” (*Id.*) iRobot uses the same allocation method for the investments behind this equipment as it used for its facilities (*id.*), to arrive at a total of \$832,286 (*id.* at 15 (citing Mot., Ex. 4 at ¶ 54)).

iRobot’s warehousing amounts come from expenditures into “third-party logistics services for warehousing of the Domestic Industry Products in the United States.” (*Id.*) iRobot

¹ iRobot has the correct figure of [] in its summary table, but incorrectly reports here that [] is the sum of [] (labor) and [] (managerial overhead). (Mot. Mem. at 13.)

² iRobot has the correct figure of [] in its summary table, but incorrectly reports here that [] is the sum of [] (Mot. Mem. at 14.)

acknowledges that “warehousing costs are attributable to all iRobot products” so that they must be apportioned by the “percentage of iRobot’s total U.S. sales that are for Domestic Industry Products.” (*Id.* (citing Mot., Ex. 4 at ¶ 48).) Again, iRobot uses [] for 2014, [] for 2015, and [] for 2016 for this allocation, which results in a total of [] (*Id.* (citing Mot., Ex. 4 at ¶ 49).)

Regarding the overall total of [] iRobot argues it is likely an underestimation as it does not “account for investments in labor in excess of employee salaries and bonuses, such as expenditures for health insurance, retirement contributions, and payroll taxes.” (*Id.* at 16.)

iRobot continues:

That the amount underestimates iRobot’s investment can also be seen by comparing it to the amount of research and development expenses reported by iRobot in its annual financial reports. iRobot’s reported research and development investment from 2014 to 2016 totaled approximately \$225 million. (Ex. 1 (iRobot 10K for FY 2016); Ex. 4 (Vander Veen Decl.) at ¶ 51.) Using the same allocation method described above, Dr. Vander Veen calculates that [] million of that investment is attributable to investment in the Domestic Industry Products, confirming that the [] amount described herein is, in fact, quite conservative and underestimates the true investment iRobot has made into the Domestic Industry Products. (Ex. 4 (Vander Veen Decl.) at ¶ 51.)

(*Id.*)

With respect to significance under subsections (A) and (B), iRobot argues:

Thus, because a large portion of iRobot’s worldwide revenues, and the vast majority of iRobot’s U.S. revenues, arise substantially from the work described herein with respect to the Domestic Industry Products, the expenditures and investments related to those products are significant.

(*Id.* at 20 (citing Mot, Ex. 4 at ¶¶ 56-57).) iRobot continues:

The development of the 900 Series required considerable investment in labor, capital, and engineering, which lasted for more than two years, and, by itself, totaled more than [] (*Id.*) That []—all of which is included in the investments

described supra Part II(C)—has now led to the release of the Roomba 960 and Roomba 980 product, which achieved U.S. revenues of nearly [] million by the end of 2016 alone. (*Id.*) Again, those expenditures and investment related to development the 900 Series, which took place almost exclusively in the United States, and which led to revenues [] those expenditures within little more than a year are, indisputably, significant. (*Id.*)

(*Id.* at 20-21 (citing Mot., Ex. 4 at ¶ 58).) iRobot concludes that its investments must be significant “in the context of iRobot’s total research and development activities.” (*Id.* at 21.) Specifically, its “10-K disclosures show that from 2014 to 2016, iRobot’s total research and development expenditures were \$226 million, of which [] million—approximately [] percent—related to the U.S. based development of the Domestic Industry Products.” (*Id.*) iRobot reasons that [] of total R&D is significant. (*Id.* (citing Mot., Ex. 4 at ¶ 59).)

Anticipating the Opposing Respondents’ rebuttal, iRobot argues that no “technical nexus between iRobot’s investments and the Asserted Patents, as required under sub-prong (C)” is required for the simple reason that it seeks domestic industry under subsections (A) and (B). (*Id.* at 22.) iRobot disagrees that the nature of its investments requires a subsection (C) approach, as that was a legal proposition considered and rejected in *Certain Digital Video Receivers and Hardware and Software Components Thereof*, Inv. No. 337-TA-1001, and *Certain Electric Skin Care Devices, Brushes and Chargers Thereof, and Kits Containing the Same*, Inv. No. 337-TA-959 (“*Electric Skin Care Devices*”). (*Id.*) iRobot argues that even if nexus was required, it is satisfied by the fact of its R&D projects being directed to its Domestic Industry Products. (*Id.* at 24 (citing *Certain Electronic Imaging Devices*, Inv. No. 337-TA-850, 2013 WL 5956227, Initial Determination at *106 (Sep. 30, 2013) (reviewed and affirmed in relevant part by Comm’n. Notice at *3 (Mar. 14, 2014))).)

PUBLIC VERSION

With respect to a comparison between its domestic and foreign activities, iRobot claims its “overseas operations are dwarfed by its domestic operations” and otherwise “relate[] almost exclusively to manufacturing, sales, and distribution—not product development.” (*Id.* at 25 (citing Mot., Ex. 7; Mot., Ex. 5 at 124:1-12; Mot., Ex. 10 at 66:12-20).) iRobot characterizes a foreign versus domestic challenge as “premised on the misguided assumption that because one set of investments is significant, no other investments can be so.” (*Id.*) “That is not the case. It is possible for iRobot’s overseas manufacturing expenditures to be significant and for iRobot’s domestic investments into research and development of the Domestic Industry Products to also be significant,” iRobot states. (*Id.*) iRobot reasons:

[W]ithout the development work described herein, taking place in the U.S., there would be no products to manufacture overseas. Without the development work described herein, taking place in the U.S., iRobot’s manufacturing expenditures overseas would be \$0. More importantly, without the development work described herein, taking place in the U.S., iRobot’s domestic and worldwide revenues for the Domestic Industry Products would be \$0.

(*Id.* at 25-26.) iRobot dismisses other anticipated argument from the Opposing Respondents as inaccurate or trivial. (*See id.* at 26-28.) iRobot reminds that “the Commission has explained that when proving the economic prong, ‘a precise accounting is not necessary, as most people do not conduct their daily affairs in contemplation of litigation.’” (*Id.* at 28 (citing *Certain Silicon Microphone Packages and Products Containing Same*, Inv. 337-TA-888, 2014 WL 2738540, Initial Determination at *8 (May 8, 2014)).)

Finally, iRobot suggests that even if all of Respondents’ criticisms are accepted, “it would still be appropriate to grant summary determination to iRobot on sub-prongs (A) and (B)” because the Opposing Respondents’ expert still values iRobot’s relevant labor investment at [] its facilities investment at [] and its capital investment at [] (*Id.* at 29 (citing Mot., Ex. 19 at Exhibits 3.1, 3.3, 3.4).) According to iRobot, the combined amount

of [] is still significant as it “is as much as the *combined annual revenue* for all Respondents’ accused products, which totals \$18,162,188.” (*Id.* (internal citations omitted).)

b. Opposing Respondents’ Contentions

The Opposing Respondents’ opposition consists largely of two points. First, the Opposing Respondents argue “it is clear from the legislative record that Congress intended Prongs A and B to address domestic manufacturing/production type activities.” (Opp. at 6 (citing *Certain Printing and Imaging Devices and Components Thereof*, Inv. No. 337-TA-690, Comm’n Op. at 15 (Feb. 17, 2011) (citing H.R. Rep. No. 40, 100th Cong., 1st Sess. Pt. 1 at 157 (1987); *InterDigital Comm’n, LLC v. ITC*, 707 F.3d 1295, 1300 (Fed. Cir. 2013)).) For subsection (C), the Opposing Respondents take the position that “[b]ecause investments under Prong (C) are not manufacturing in nature, Congress also required that the investments be ‘substantial’ and exploit the intellectual property at issue in the investigation.” (*Id.* at 7 (citing H.R. Rep. No. 40, 100th Cong., 1st Sess. Pt. 1 at 157 (1987); 19 U.S.C. §1337(a)(3)(C)).) Thus, according to the Opposing Respondents, subsection (C) “require[s] that a complainant establish a nexus between the substantial investments and the patents.” (*Id.* (citing *Certain Network Devices, Related Software and Components Thereof*, Inv. No. 337-TA-944, ID at 286-291 (Mar. 2, 2016) (“As such, Cisco has demonstrated that its investments in the DI Products have a direct nexus to the asserted patents.”) (affirmed, Comm’n Op., Apr. 19, 2017)).)

The Opposing Respondents reason that because iRobot’s expenses are “not related to manufacturing,” they must be “of the type Congress intended for showing exploitation of the patents.” (*Id.* at 7.) The Opposing Respondents argue that iRobot’s motion has not done this. (*Id.* at 7-8.) In particular, the Opposing Respondents point to deposition testimony from iRobot’s expert, Dr. Vander Veen, where he “admitted . . . that he did not map R&D project expenditures to exploitation of the patents.” (*Id.* at 8 (citing Opp., Ex. B at 44:21-25).)

PUBLIC VERSION

The Opposing Respondents then discuss *Digital Video Receivers* and *Electric Skin Care Devices* to argue that iRobot has “overstate[d] the Commission’s holding in both opinions” with respect to whether R&D can be considered under subsections (A) and (B). (*Id.* at 9-10.) In the Opposing Respondents view, “[t]he Commission specifically did not take a position on this issue as it was not necessary to the final decision in either Investigation.” (*Id.* at 9.)

The Opposing Respondents second point is that “iRobot’s and Dr. Vander Veen’s analysis is flawed because it is overstated and includes expenses that should have been disaggregated for future products and non-domestic industry products.” (*Id.* at 11 (citing Opp., Ex. C).) The Opposing Respondents point to the “Soho project” as an example and argue it is admittedly directed to a future product rather than a Domestic Industry Product. (*Id.* at 11-12 (citing Opp., Ex. B at 48:3-7; Opp., Ex. A at 50:12-15).) The Opposing Respondents make the same point for the “IR&D HBU R4 project.” (*Id.* at 12 (citing Opp., Ex. B at 26:7-22; Mot., Ex. 11; Opp., Ex. A at 50:12-15).)

As a summary, the Opposing Respondents present a table taken from an iRobot employee’s declaration and annotate it to show which R&D projects “affect[] future products and non-domestic industry products.” (*See* Opp. at 12-13 (citing Mot., Ex. 11 at 2-3).) Quite plainly, the Opposing Respondents contend that “Dr. Vander Veen has not disaggregated project expenses in the IR&D HBU R4 project for non-domestic industry products and has not disaggregated for any project the specific products alleged to practice the asserted patents.” (*See* Opp. at 13 (citing Opp., Ex. B at 64:24-65:14, 66:11-17).) The Opposing Respondents provide their own expert’s view that iRobot’s claimed expenses “are clearly not as large as iRobot alleges and call into question whether the expenses are significant or substantial.” (Opp. at 14 (citing Opp., Ex. C at ¶¶ 196-206).) The Opposing Respondents do acknowledge, however, “[w]here iRobot and Dr. Vander Veen allocate for plant and equipment expenses and capital

expenses, the allocation factor used is based on the same fatally flawed labor analysis, which does not disaggregate labor associated with non-domestic industry products and future products.” (*Id.* (citing Mot., Ex. 4 at ¶¶ 42-46).) The Opposing Respondents contend these are genuine issues of material fact which preclude summary determination. (*Id.* at 14-15.)

c. Analysis

At the outset, I dismiss the Opposing Respondents’ first point of opposition—the legal theory that a complainant’s research and development expenses can only be considered under subsection (C) of the statute, as opposed to (A) and (B). In *Electric Skin Care Devices*, the ALJ, after careful consideration of the language of the statute and the legislative history, concluded that subsections (A) and (B) were meant for manufacturing expenses and, as the Opposing Respondents would have it, research and development must be considered in the subsection (C) context. *Electric Skin Care Devices*, Initial Determination at 24-26 (Apr. 11, 2016). This exact holding was the focus of the Commission Investigative Staff’s petition for review (EDIS Doc. No. 579348 at 6-10) and, upon review, the Commission vacated it, *Electric Skin Care Devices*, Comm’n Op. at 10 (Feb. 6, 2017) (“2. Take no position on, and therefore vacate, the ID’s analysis and findings pertaining to the ID’s determination that the ‘non-manufacturing expenditures would need to be backed out of the calculation of qualifying investments under subsections (A) as well as (B).’ ID/RD at 25.”). Regardless of the particular facts of that investigation, the legal theory that research and development can only be considered under subsection (C) is not the law. For the portion of the Opposing Respondents’ opposition based in this theory (*see* Opp. at 6-11), I do not find it raises a genuine issue of material fact to preclude summary determination.

Regarding the Opposing Respondents’ second point—that iRobot has failed to “allocate for all R&D projects affecting non-domestic industry and future products” (*see* Opp. at 11-15)—

PUBLIC VERSION

I find that it too does not create a *genuine* dispute over a material fact either. As explained below, even when all of Respondents' criticisms are accepted as true, iRobot has still invested well over [] dollars in engineering labor alone in furtherance of its Domestic Industry Products.

To begin, it is clear iRobot did allocate (or as the Opposing Respondents call it, "disaggregate") its labor investments between Domestic Industry Products and non-Domestic Industry Products for *some* of the sixteen projects. The projects which iRobot believed deserve such an allocation is stated clearly:

Second, Dr. Vander Veen performed a separate, alternative calculation to account for the fact that some of the above-identified projects relate to more than just the Domestic Industry Products. Specifically, those projects include *IR&D HBU Berlin*, *IR&D HBU Chicago*, *IR&D HBU Las Vegas*, *SST HBU Localization*, *SST HBU CEC*, *SST HBU IEC Cliff Safety*, and [] (See Ex. 4 (Vander Veen Decl.) at ¶ 53; Ex. 11 (Svendsen Decl.) at ¶ 3.)

(Mot. Mem. at 12 (emphasis added).) As discussed above, iRobot used a commonly accepted sales-based allocation [] for 2014; [] for 2015; [] for 2016) to approximate how much of a given project's labors could be counted for its domestic industry. (*See id.*)

Thus, to the extent the Opposing Respondents' criticism is that iRobot failed to "allocate for all R&D projects affecting non-domestic industry and future products" (Opp. at 14), the criticism must hinge upon the word "all" because it is clear some amount of allocation has been made for some projects. Indeed, after a careful review of the Opposing Respondents' Opposition and Responsive SUF, I only count three projects mentioned as improperly left out: [

] IR&D HBU R4, and IR&D HRD San Antonio (Wells). (*Compare* Mot. Mem. at 12 *with* Opp. at 12-13; *see* Responsive SUF at ¶ 51.)³ As summary determination requires me to view

³ I note that the [] appears to be challenged in the Opposing Respondents' Opposition, but not in their Responsive SUF; whereas IR&D HRD San Antonio (Wells) appears

PUBLIC VERSION

the facts in a light favorably to the non-moving Opposing Respondents, I treat these projects as directed to more than just Domestic Industry Products and therefore requiring allocation. Even then, however, no genuine issue remains over whether iRobot has invested significantly in labor directed to the Domestic Industry Products based on remaining facts which are not in dispute. I list below those facts from iRobot's SUF which I adopt for the purposes of this determination (hereafter "Adopted Findings of Fact") with two caveats.

First, while certain adopted facts were listed as "disputed" in the Opposing Respondents' Responsive SUF (*compare* Adopted Findings of Fact at ¶¶ 30, 34, 46, 48, 50, 52, 54, 56 *with* Responsive SUF at ¶¶ 47, 51, 63, 65, 67, 69, 71, 73, 75), I do not find the disputes to be genuine. Each of these facts merely claims a "relationship" between an identified project and a subset of the Domestic Industry Products. (*See, e.g.*, Responsive SUF at ¶ 47 (stating "The SST HBU Localization project relates to the 600 Series Products.")) The Opposing Respondents "dispute" the fact, but only because of the belief that *other* non-Domestic Industry Products are also be "related." (*Id.* (stating "Response: Disputed. This project affects non-domestic industry and/or future products.")) That is not a true dispute because each of the proposed facts does not assert an exclusive relationship between project and the Domestic Industry Products. Moreover, the Opposing Respondents copy and paste the same "dispute" and broad evidentiary cite for each of these project-product relationship facts, further evidencing the dispute is *pro forma* and not genuine. (*See* Responsive SUF at ¶¶ 47, 51, 63, 65, 67, 69, 71, 73, 75 (each stating "Disputed. This project affects non-domestic industry and/or future products. See Motion Ex. 11, Svendson Decl.; Ex. C, Bakewell Decl. at p. 64-74.")) The only "disputed" fact which does not fit this pattern is Adopted Finding of Fact No. 62 which is a listing of all projects which allegedly

to be challenged in the Responsive SUF, but not mentioned in the Opposition. (*See* Opp. at 11-14; Responsive SUF at ¶¶ 47-75.)

PUBLIC VERSION

require allocation; but for this fact, as explained above, I adopt the Opposing Respondents’ criticism as true.

Second, when a sales-based allocation is used, it is critical to use the correct revenue amounts. In its proposed SUF, iRobot attests that the total revenue from the Domestic Industry Products in each of 2014, 2015, and 2016 “represent approximately, [] of iRobot’s worldwide sales revenue in each year, respectively” (*see* SUF at ¶ 27) and “represent approximately [] of iRobot’s U.S. sales revenue in each year, respectively” (*see id.* at ¶ 28). These are misstatements. Those percentages are the Domestic Industry Product revenue as a percent of “Global *Roomba* Sales” and “U.S. *Roomba* Sales,” respectively:

<i>Percent of Global Roomba Sales</i>		2014	2015	2016	Total
Roomba 600-Series	[A]+[D]				
Roomba 800-Series	[B]+[D]				
Roomba 900-Series	[C]+[D]				
Total					
<i>Percent of U.S. Roomba Sales</i>		2014	2015	2016	Total
Roomba 600-Series	[A]+[D]				
Roomba 800-Series	[B]+[D]				
Roomba 900-Series	[C]+[D]				
Total					

(*See* Mot., Ex. 4 at Tab 21a, Tab 21b (annotated).)

This is a meaningful difference because, as Tabs 21a and 21b show, iRobot sells many products other than Roombas in both the U.S. and foreign markets. (*Compare* Mot., Ex. 4 at Tab 21a *with* Mot., Ex. 4 at Tab 21b (showing revenues for “Scooba,” “Braava,” “Accessories,” and “Other”); *see also* Mot., Ex. 4 at Tab 16 (showing Domestic Industry Product “percent of all

U.S. Product Sales” of [] Thus, in the below Adopted Findings of Fact Nos. 10, 11, I correct the percentage values to reflect the submitted evidence, as explained in the below table:

	2014	2015	2016	
Domestic Industry Product (Revenue)				See Mot., Ex. 4 at Tab 21a
All iRobot Products (Net Sales, Global)				See Mot., Ex. 4 at Tab 21a
DI Product revenue as Percent of Global Sales (<i>Corrected</i>)				
DI Product revenue as Percent of U.S. Sales				See Mot., Ex. 4 at Tab 16

Accordingly, I adopt the below enumerated facts, which I find relevant for this determination and view them in a light most favorable to the Opposing Respondents.

1. For example, iRobot has developed shop cleaning robots, pool cleaning robots, gutter cleaning robots, and floor scrubbing robots. (SUF at ¶ 14 (citing Ex. 2 (iRobot History)).)
2. iRobot has also continued to improve upon the Roomba, developing new features and releasing new robots throughout the last 15 years. (SUF at ¶ 15 (citing *Id.*)).
3. In the last 18-months alone, iRobot has released the Roomba 690, the Roomba 890, and the Roomba 960. (SUF at ¶ 16 (citing *id.*; Mot., Ex. 1 (iRobot 10-K for FY 2016)).)
4. In total, since its founding, iRobot has sold more than 20 million robots, and today, iRobot is the market leader in consumer robots. (SUF at ¶ 18 (citing Mot., Ex. 2 (iRobot History); Mot., Ex. 1 (iRobot 10-K for FY 2016) at 22).)

PUBLIC VERSION

5. The '308 patent generally relates to a robot obstacle detection system that allows a robot to autonomously navigate around obstacles such as furniture, toys, and stairs. (SUF at ¶ 22 (citing '308 Patent).)

6. The '090, '233, and '553 patents address structural components of autonomous floor-cleaning robots, including drive and control systems, various bump and proximity sensors, and a cleaning head subsystem with a dual-stage brush assembly. (SUF at ¶ 23 (citing '090 Patent, '233 Patent, and '533 Patent).)

7. The '490 patent generally relates to a control system for a mobile robot to effectively cover a given area by operating in a variety of coverage modes. (SUF at ¶ 24 (citing '490 Patent).)

8. iRobot contends that the Asserted Patents are each practiced by three series of iRobot's Roomba products: the 600 Series Roombas (including model numbers R614020, R618020, R620020, R620400, R62511, R630020, R639000, R645020, 65099, R650020, R655020, R660020, R665020, and R669000); the 800 Series Roombas (including model numbers R805020, R860020; R870020, R877020, R879000, R880020, and R889000); and the 900 Series Roombas (including model numbers R960020, R960020E, R980020, and R989020) (collectively the "Domestic Industry Products"). (SUF at ¶ 25 (citing iRobot's August 23, 2017 Domestic Industry Contentions).)

9. Total revenue for iRobot's Domestic Industry Products was [] in 2014; [] in 2015; and [] in 2016. (SUF at ¶ 26 (citing Mot., Ex. 3 (IROBOT-ITC-00181944); Mot., Ex. 4 (Vander Veen Decl.) at ¶ 56, Tab 10).)

10. Those totals represent approximately, [] of iRobot's worldwide sales revenue in each year, respectively. (Mot., Ex. 4 at Tab 21a.)

PUBLIC VERSION

11. Those totals also represent approximately [] of iRobot's U.S. sales revenue in each year, respectively. (Mot., Ex. 4 at Tab 16.)

12. The overwhelming majority of iRobot's engineering, research, and development work related to its Domestic Industries rests in two operating facilities in the United States. (SUF at ¶ 29 (citing Mot., Ex. 7 (IROBOT-ITC-00181948); Mot., Ex. 5 (Svendsen Depo. Tr.); Mot., Ex. 10 (Saeger Depo Tr.); Mot., Ex. 6 (Dean Decl.)).)

13. The first facility is iRobot's headquarters in Bedford, Massachusetts. (SUF at ¶ 30 citing (Mot., Ex. 5 (Svendsen Depo Tr.) at 107:5-7).) Work related to the Domestic Industry Products taking place in Bedford includes product development, engineering, testing, quality control, and customer care. (SUF at ¶ 30 (citing Mot., Ex. 6 (Dean Decl.) at ¶ 11).)

14. iRobot's second U.S. facility is in Pasadena, California, where work related to the Domestic Industry Products includes product development, engineering, and testing. (SUF at ¶ 31 (citing Mot., Ex. 6 (Dean Decl.) at ¶ 12; Mot., Ex. 5 (Svendsen Depo Tr.) at 107:9-10).)

15. As of the close of 2016, iRobot had 539 employees in Bedford and 32 employees in Pasadena. (SUF at ¶ 32 (citing Mot., Ex. 7 (IROBOT-ITC-00181948)).)

16. Of that total number [of employees referenced in Adopted Finding of Fact No. 15], more than 400 employees are engaged in engineering, research, and development related to iRobot's products. (SUF at ¶ 33 (citing Mot., Ex. 8 (IROBOT-ITC-00186589); Mot., Ex. 9 (IROBOT-ITC-00206818); Mot., Ex. 4 (Vander Veen Decl.) at ¶ 32, Tab 4).)

17. In comparison to the more than 400 U.S.-based employees engaged in engineering, research, and development work, iRobot has 10 or fewer employees located outside the United States that engage in such activities. (SUF at ¶ 34 (citing Mot., Ex. 5 (Svendsen Depo Tr.) at 124:1-12; Mot., Ex. 10 (Saeger Depo. Tr.) at 66:12-20; Mot., Ex. 7 (IROBOT-ITC-00181948)).)

PUBLIC VERSION

18. In addition to its facilities in the United States, iRobot also has facilities and employees in China, where manufacturing of iRobot's products takes place. (SUF at ¶ 35 (citing Mot., Ex. 7 (IROBOT-ITC-00181948); Mot., Ex. 5 (Svendsen Depo Tr.) at 109:6-8).)

19. iRobot also has facilities in various other countries for work related to sales and distribution. (SUF at ¶ 36 (Mot., Ex. 7 (IROBOT-ITC-00181948); Mot., Ex. 5 (Svendsen Depo Tr.) at 107:12-108:5).)

20. iRobot's U.S.-based employees involved in research and development of the Domestic Industry Products include mechanical engineers, software engineers, electrical engineers, systems engineers, robotics engineers, testers, machinists, program managers, operations managers, and researchers, among other types. (SUF at ¶ 37 (citing Mot., Ex. 8 (IROBOT-ITC-00186589); Mot., Ex. 5 (Svendsen Depo Tr.) at 21:11-20).)

21. The tasks performed by those employees include designing the mechanical parts, software, electrical functions, and chipsets for iRobot's products. (SUF at ¶ 38 (citing Mot., Ex. 5 (Svendsen Depo Tr.) at 21:23-22:10; Mot., Ex. 8 (IROBOT-ITC-00186589)).)

22. Those tasks include designing the feature set—*e.g.*, user-facing functionality—of the products. (SUF at ¶ 39 (citing Mot., Ex. 5 (Svendsen Depo Tr.) at 22:11-16; Mot., Ex. 8 (IROBOT-ITC-00186589)).)

23. Those tasks also include managing supply chain, manufacturing, and quality assurance for the products, (SUF at ¶ 40 (citing Mot., Ex. 5 (Svendsen Depo Tr.) at 23:13-16; Mot., Ex. 8 (IROBOT-ITC-00186589))), as well as management and oversight of the various engineering, research, and development projects related to the products (SUF at ¶ 40 (citing mot., Ex. 5 (Svendsen Depo Tr.) at 23:25-24:2; Mot., Ex. 8 (IROBOT-ITC-00186589)).)

24. All engineering work done in Bedford and Pasadena related to product development is tracked hourly on a per project basis, as all engineers enter their hourly time for

PUBLIC VERSION

projects into iRobot's financial database systems ("timecard data"). (SUF at ¶ 41 (citing Mot., Ex. 5 (Svendsen Depo Tr.) at 112:18-113:14).)

25. Many of the tracked projects taking place in Bedford and Pasadena relate to iRobot's Domestic Industry Products. (SUF at ¶ 42 (citing Mot., Ex. 11 (Svendsen Decl.)).)

26. The IR&D HBU Manhattan project relates to iRobot's 600 Series products. (SUF at ¶ 43 (citing Mot., Ex. 5 (Svendsen Depo Tr.) at 112:3-16; 117:13-19, 127:5-10; Mot., Ex. 12 (Elder Depo Tr.) at 35:23-25; 51:5-14).)

27. The IR&D HBU Manhattan project relates to delivering a lower cost 600 Series robot with an updated look. (SUF at ¶ 44 (citing Mot., Ex. 5 (Svendsen Depo Tr.) at 127:5-10; Mot., Ex. 12 (Elder Depo Tr.) at 35:23-25; 51:5-14).)

28. The IR&D HBU Ningbo project relates to iRobot's 600 Series products. (SUF at ¶ 45 (citing Mot., Ex. 5 (Svendsen Depo Tr.) at 112:3-16; 117:13-19, 129:24-130:7; Mot., Ex. 11 (Svendsen Decl.)).)

29. The IR&D HBU Ningbo project relates to developing a low cost robot for the 600 Series, by replacing a higher cost PCBA assembly with a low cost variant, (SUF at ¶ 46 (citing Mot., Ex. 5 (Svendsen Depo Tr.) at 129:24-130:7)), and 600 series connected robot for overseas, (SUF at ¶ 46 (citing Mot., Ex. 11 (Svendsen Decl.) at ¶ 3)).

30. The SST HBU Localization project relates to the 600 Series products. (SUF at ¶ 47 (citing Mot., Ex. 5 (Svendsen Depo Tr.) at 112:3-16; 117:13-19; Mot., Ex. 11 (Svendsen Decl.)).)

31. The SST HBU Localization project relates to SKU releases for different regions for the 600 and 700 Series Roombas (SUF at ¶ 48 (citing Mot., Ex. 11 (Svendsen Decl.) at ¶ 3)); and a "body of work supporting the 600 series" (SUF at ¶ 48 (citing Mot., Ex. 12 (Elder Depo Tr.) at 36:1-6)).

PUBLIC VERSION

32. The 800 Series Dual Sourcing project relates to the 800 Series products. (SUF at ¶ 49 (citing Mot., Ex. 11 (Svendsen Decl.) at ¶ 3).)

33. The 800 Series Dual Sourcing project relates to increasing the number of factories for the 800 Series from one to two. (SUF at ¶ 50 (citing Mot., Ex. 11 (Svendsen Decl.) at ¶ 3).)

34. The IR&D HRD San Antonio (Wells) project relates to the 800 Series products. (SUF at ¶ 51 (citing Mot., Ex. 11 (Svendsen Decl.) at ¶ 3).)

35. The IR&D HRD San Antonio (Wells) project relates to updating the older 700 Series with the next generation cleaning systems. (SUF at ¶ 52 (citing Mot., Ex. 11 (Svendsen Decl.) at ¶ 3).)

36. The [] project relates to the 900 Series products. (SUF at ¶ 53 (citing Mot., Ex. 11 (Svendsen Decl.); Mot., Ex. 5 (Svendsen Depo Tr.).)

37. The [] (SUF at ¶ 54 (citing Mot., Ex. 5 (Svendsen Depo Tr.) at 120:11-18).)

38. [] began as a project directed toward [] for the 900 Series robots, and its work has been primarily related to that series, including substantially all of the work done from 2014 to 2016. (SUF at ¶ 55 (citing Mot., Ex. 5 (Svendsen Depo Tr.) at 120:25-121:7; 133:10-22; Mot., Ex. 10 (Saeger Depo Tr.) at 73:6-11; Mot., Ex. 11 (Svendsen Decl.) at ¶ 3).)

39. Beginning in 2017, [] scope has expanded to encompass other robots that [] (SUF at ¶ 56 (citing Mot., Ex. 5 (Svendsen Depo Tr.) at 121:10-21; 134:4-11; Mot., Ex. 11 (Svendsen Decl.) at ¶ 3).)

PUBLIC VERSION

40. The IR&D HBU El Paso project relates to the 900 Series of products. (SUF at ¶ 57 (citing Mot., Ex. 5 (Svendsen Depo Tr.) at 121:6-9, 131:19-132:2; Mot., Ex. 10 (Saeger Depo Tr.) at 76:8-10).)

41. IR&D HBU El Paso was the code name for developing the Roomba 980. (SUF at ¶ 58 (citing Mot., Ex. 5 (Svendsen Depo Tr.) at 121:6-9, 131:19-132:2; Mot., Ex. 10 (Saeger Depo Tr.) at 76:8-10).)

42. The [] project relates to the 900 Series of products. (SUF at ¶ 59 (citing Mot., Ex. 5 (Svendsen Depo Tr.) at 131:19-132:2; Mot., Ex. 11 (Svendsen Decl.) at ¶ 3).)

43. [] relates to [] (SUF at ¶ 60 (citing Mot., Ex. 5 (Svendsen Depo Tr.) at 131:19-132:2; Mot., Ex. 11 (Svendsen Decl.) at ¶ 3).)

44. The IR&D HBU Lexington project relates to the 900 Series of products. (SUF at ¶ 61 (citing Mot., Ex. 11 (Svendsen Decl.) at ¶ 3; Mot., Ex. 5 (Svendsen Depo Tr.) at 131:19-132:2-19; 133:7-11).)

45. IR&D HBU Lexington relates to cleaning updates for the Roomba 980. (SUF at ¶ 62 (citing Mot., Ex. 11 (Svendsen Decl.) at ¶ 3; Mot., Ex. 5 (Svendsen Depo Tr.) at 131:19-132:2-19; 133:7-11).)

46. The IR&D HBU R4 project relates to the 900 Series products. (SUF at ¶ 63 (citing Mot., Ex. 5 (Svendsen Depo Tr.) at 134:12-14; Mot., Ex. 11 (Svendsen Decl.) at ¶ 3).)

47. IR&D HBU R4 relates to Roomba 980 development and advanced development that might also be used in future releases. (SUF at ¶ 64 (citing Mot., Ex. 5 (Svendsen Depo Tr.) at 134:12-14; Mot., Ex. 11 (Svendsen Decl.) at ¶ 3).)

48. The IR&D HBU Berlin project relates to all three series of Domestic Industry Products. (SUF at ¶ 65 (citing Mot., Ex. 5 (Svendsen Depo Tr.) at 109:22-110:5; 127:15-25).)

PUBLIC VERSION

49. IR&D HBU Berlin relates to development of a virtual wall accessory, as used in all Roomba series. (SUF at ¶ 66 (citing Mot., Ex. 5 (Svendsen Depo Tr.) at 109:22-110:5, 127:15-25).)

50. The IR&D HRD Chicago project relates to all three series of Domestic Industry Products. (SUF at ¶ 67 (citing Mot., Ex. 11 (Svendsen Decl.) at ¶ 3).)

51. IR&D HRD Chicago relates to docking for all Roomba products (including the 500 and 700 Series). (SUF at ¶ 68 (citing Mot., Ex. 11 (Svendsen Decl.) at ¶ 3).)

52. The IR&D HRD Las Vegas project relates to all three series of Domestic Industry Products. (SUF at ¶ 69 (citing Mot., Ex. 11 (Svendsen Decl.) at ¶ 3).)

53. IR&D HRD Las Vegas relates to updating lithium ion batteries and associated software for all three series of Domestic Industry Products (and one non-Roomba product). (SUF at ¶ 70 (citing Mot., Ex. 11 (Svendsen Decl.) at ¶ 3).)

54. The SST HBU CEC project relates to all three series of Domestic Industry Products. (SUF at ¶ 71 (citing Mot., Ex. 11 (Svendsen Decl.) at ¶ 3).)

55. SST HBU CEC relates to compliance issues, applicable to all iRobot products. (SUF at ¶ 72 (citing Mot., Ex. 11 (Svendsen Decl.) at ¶ 3).)

56. The SST HBU IEC Cliff Safety project relates to all three series of Domestic Industry Products. (SUF at ¶ 73 (citing Mot., Ex. 11 (Svendsen Decl.) at ¶ 3).)

57. SST HBU IEC Cliff Safety relates to obtaining safety certifications, and applies to all Roomba products (including the 500 Series and 700 Series). (SUF at ¶ 74 (citing Mot., Ex. 11 (Svendsen Decl.) at ¶ 3).)

58. The [] project relates to all three series of Domestic Industry Products. (SUF at ¶ 75 (citing Mot., Ex. 11 (Svendsen Decl.) at ¶ 3).)

PUBLIC VERSION

59. [] was a continuous project related to []

(SUF at ¶ 76 (citing Mot., Ex. 11 (Svendsen Decl.) at ¶ 3).)

60. iRobot records expenses on an hourly basis by project codes. These codes are used by engineers to enter time worked. (SUF at ¶ 78 (citing Mot., Ex. 5 (Svendsen Depo Tr.) at 112:18-113:14; Mot., Ex. 12 (Elder Deposition Tr.) at 22:5-13; Mot., Ex. 20 (IROBOT-ITC-00186590)).)

61. Based on a 40-hour work week, multiplying each iRobot employee’s hourly salary by each employee’s hours worked on the projects related to the Domestic Industry Products reveals labor expenditures of [] from 2014 to 2016. (SUF at ¶ 83 (citing Mot., Ex. 4 (Vander Veen Decl.) at ¶ 35).)

62. Some iRobot projects relate to more than just the Domestic Industry Products. Specifically, those projects include IR&D HBU Berlin, IR&D HBU Chicago, IR&D HBU Las Vegas, SST HBU Localization, SST HBU CEC, SST HBU IEC Cliff Safety,[] IR&D HBU R4, and IR&D HRD San Antonio (Wells)]. (See SUF at ¶ 85 (citing Mot., Ex. 4 (Vander Veen Decl.) at ¶ 53; Mot., Ex. 11 (Svendsen Decl.) at ¶ 3); Opp. at 12; Responsive SUF at ¶¶ 51, 63, 85).)

63. The percentage of iRobot’s total U.S. sales accounted for by the Domestic Industry Products are as shown in the table below: (SUF at ¶ 86 (citing Mot., Ex. 4 (Vander Veen Decl.) at ¶ 53).)

<i>Percent of All U.S. Product Sales</i>		2014	2015	2016	Total
Roomba 600-Series	[A]+[E]				
Roomba 800-Series	[B]+[E]				
Roomba 900-Series	[C]+[E]				
Total					

PUBLIC VERSION

With these facts, the amounts iRobot spent on engineering labor between 2014 and 2016 for sixteen different projects is known. (See Adopted Findings of Fact ¶¶ 20-25, 60-61.) Further, the portion of those amounts properly attributable to the Domestic Industry Products, as opposed to other products, can be ascertained using a sales-based allocation. (See Adopted Findings of Fact ¶¶ 10, 11, 62.) The proper allocation, however, is not the U.S. sales-based allocation which iRobot employs. iRobot states plainly that “[i]n comparison to the more than 400 U.S.-based employees engaged in engineering, research, and development work, iRobot has 10 or fewer employees located outside the United States that engage in such activities.” (Mot. Mem. at 5 (citing Mot., Ex. 5 at 124:1-12; Mot., Ex. 10 at 66:12-20; Mot., Ex. 7).) The Opposing Respondents do not dispute this fact (see Responsive SUF) and it strongly implies that iRobot’s U.S.-based employees are engaged in engineering, research, and development for products sold both inside and outside the U.S.; *i.e.* worldwide. Thus, the allocation should come from Domestic Industry Product sales figures as a percentage of *worldwide* sales figures—not U.S. sales figures. When this allocation is applied to those projects iRobot and/or the Opposing Respondents have identified, a labor investment of over []million across 2014-2016 results.

This calculation is shown in the table below. The projects I have labeled as Group I receive no correction because neither iRobot nor the Opposing Respondents claim that allocation is needed. (See Mot. Mem. at 12; see *generally* Opp.) The Group II projects are those which iRobot had applied [] U.S.-sales based allocations (see Mot. Mem. at 12), and have thus been corrected to reflect what a worldwide-sales based allocation would have yielded. This was achieved by multiplying each investment amount by values of [

]—the worldwide sales % divided by U.S. sales % for each of years 2014, 2015, and 2016 respectively. (See Adopted Findings of Fact ¶¶ 10, 11.). The Group III projects are those three projects which the Opposing Respondents argue should have been allocated, but were not. They

PUBLIC VERSION

have been corrected using iRobot’s worldwide-sales based allocations of [] for each of years 2014, 2015, and 2016 respectively. (See Adopted Findings of Fact ¶ 10.)

		original			corrected		
		2014	2015	2016	2014	2015	2016
I	800 Dual Sourcing						
	IR&D HBU El Paso						
	IR&D HBU Manhattan						
	IR&D HBU Ningbo						
	IR&D HBU Lexington						
II	IR&D HBU Berlin						
	IR&D HRD Chicago						
	IR&D HRD Las Vegas						
	SST HBU CEC						
	SST HBU IEC Cliff Safety						
	IR&D HBU Lexington						
III	IR&D HBU R4						
	IR&D HRD San Antonio (Wells)						
	Subtotals						
	Total						

Thus, even when all facts are viewed favorably to the Opposing Respondents, there is no genuine dispute that iRobot has invested at least [] million in engineering labor alone in furtherance of the Domestic Industry Products. I find this is quantitatively significant by any measure, see *Certain Access Control Systems and Components Thereof*, Inv. No. 337-TA-1016, Initial Determination at 259, 289 (Nov. 21, 2017) (non-reviewed), but particularly supported by iRobot’s observation that its investments, in this case [] million, rivals the “combined annual revenue for all Respondents’ accused products, which totals approximately \$18,162,188.” (See

PUBLIC VERSION

Mot. Mem. at 29 (emphasis in original) (internal citations omitted.) I do not make any determinations regarding iRobot's claimed investments in managerial overhead, facilities or capital, as they are unnecessary given the engineering labor expenditures.

IV. CONCLUSION

For the reasons above, it is my Initial Determination to GRANT iRobot's Motion for Summary Determination that it has met the Economic Prong of the Domestic Industry Requirement. (Motion Docket No. 1057-033.)

This Initial Determination, along with any supporting documentation, is hereby certified to the Commission. Pursuant to 19 C.F.R. § 210.42(h), this Initial Determination shall become the determination of the Commission unless a party files a petition for review of the Initial Determination pursuant to 19 C.F.R. § 210.43(a), or the Commission, pursuant to 19 C.F.R. § 210.44, orders, on its own motion, a review of the Initial Determination or certain issues herein.

This Initial Determination is being issued as confidential, and a public version will be issued pursuant to Commission Rule 210.5(f). Within seven (7) days of the date of this Initial Determination, the parties shall jointly submit: (1) a proposed public version of this opinion with any proposed redactions bracketed in red; and (2) a written justification for any proposed redactions specifically explaining why the piece of information sought to be redacted is confidential

and why disclosure of the information would be likely to cause substantial harm or likely to have the effect of impairing the Commission's ability to obtain such information as is necessary to perform its statutory functions.^{4,5}

SO ORDERED.



Thomas B. Pender
Administrative Law Judge

⁴ Under Commission Rules 210.5 and 201.6(a), confidential business information includes: information which concerns or relates to the trade secrets, processes, operations, style of works, or apparatus, or to the production, sales, shipments, purchases, transfers, identification of customers, inventories, or amount or source of any income, profits, losses, or expenditures of any person, firm, partnership, corporation, or other organization, or other information of commercial value, the disclosure of which is likely to have the effect of either impairing the Commission's ability to obtain such information as is necessary to perform its statutory functions, or causing substantial harm to the competitive position of the person, firm, partnership, corporation, or other organization from which the information was obtained, unless the Commission is required by law to disclose such information.

See 19 C.F.R. § 201.6(a). Thus, to constitute confidential business information the disclosure of the information sought to be designated confidential must **likely have the effect of** either: (1) impairing the Commission's ability to obtain such information as is necessary to perform its statutory functions; or (2) **causing substantial harm** to the competitive position of the person, firm, partnership, corporation, or other organization from which the information was obtained.

⁵ While the parties are required to jointly submit the proposed redactions, there is no requirement that the parties must agree on all the redactions. However, the parties' written justification for any proposed redactions should distinguish between those redactions that are agreed upon and those proposed by the individual parties.

**CERTAIN ROBOTIC VACUUM CLEANING DEVICES AND
COMPONENTS THEREOF SUCH AS SPARE PARTS**

INV. NO. 337-TA-1057

PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **PUBLIC INITIAL DETERMINATION ORDER NO. 39** has been served upon the following parties via first class mail and air mail where necessary, on FEB 28 2010.



Lisa R. Barton, Secretary
U.S. International Trade Commission
500 E Street SW, Room 112A
Washington, DC 20436

FOR COMPLAINANT IROBOT CORPORATION	
Stephen A. Marshall, Esq. FISH & RICHARDSON P.C. The McPherson Building 901 15 th Street NW, 7 th Floor Washington, DC 20005	<input type="checkbox"/> Via Hand Delivery <input checked="" type="checkbox"/> Express Delivery <input type="checkbox"/> Via First Class Mail <input type="checkbox"/> Other: _____
FOR RESPONDENTS THE BLACK & DECKER CORPORATION & BLACK & DECKER (U.S.) INC., SHENZHEN SILVER STAR INTELLIGENT TECHNOLOGY CO., LTD. HOOVER INC., & ROYAL APPLIANCE MANUFACTURING CO. D/B/A TTI FLOOR CARE NORTH AMERICA, INC. & BOBSWEEP USA, & BOBSWEEP INC.	
Kecia J. Reynolds, Esq. PILLSBURY WINTHROP SHAW PITTMAN, LLP. 1200 Seventeenth Street N.W. Washington, DC 20036	<input type="checkbox"/> Via Hand Delivery <input checked="" type="checkbox"/> Express Delivery <input type="checkbox"/> Via First Class Mail <input type="checkbox"/> Other: _____
FOR RESPONDENT SHENZHEN ZHIYI TECHNOLOGY CO., LTD.	
Patrick J. McCarthy, Esq. GREENBERG TRAURIG, LLP 2101 L Street N.W., Suite 1000 Washington, DC 20037	<input type="checkbox"/> Via Hand Delivery <input checked="" type="checkbox"/> Express Delivery <input type="checkbox"/> Via First Class Mail <input type="checkbox"/> Other: _____