

In the Matter of

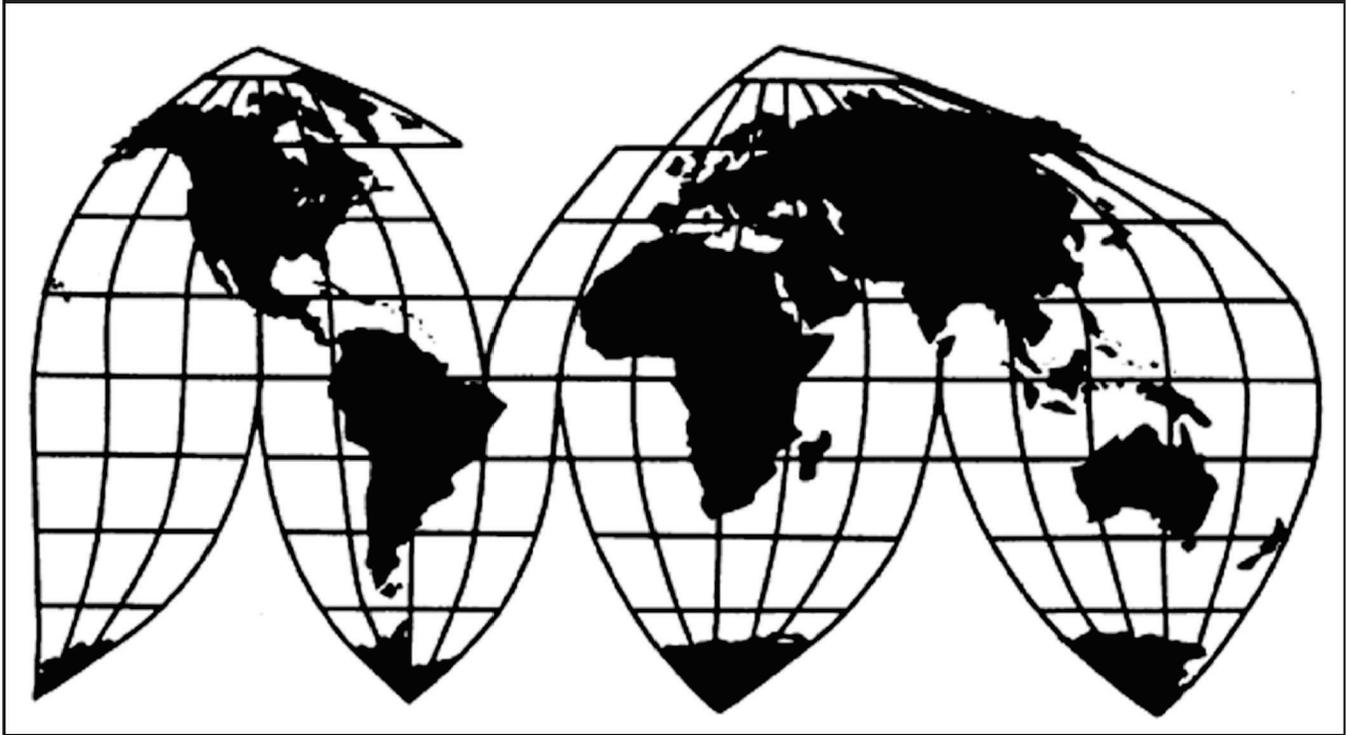
**CERTAIN NON-VOLATILE MEMORY
DEVICES AND PRODUCTS CONTAINING
SAME**

Investigation No. 337-TA-1046

Publication 4965

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

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

U.S. International Trade Commission

Washington, DC 20436
www.usitc.gov

In the Matter of

CERTAIN NON-VOLATILE MEMORY DEVICES AND PRODUCTS CONTAINING SAME

Investigation No. 337-TA-1046



UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.

In the Matter of

**CERTAIN NON-VOLATILE MEMORY
DEVICES AND PRODUCTS
CONTAINING SAME**

Investigation No. 337-TA-1046

**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 in this investigation and has (1) issued a limited exclusion order prohibiting importation of infringing non-volatile memory devices and products containing the same and (2) issued cease and desist orders directed to the domestic respondents Toshiba America, Inc. and its subsidiaries, Toshiba America Electronic Components, Inc. and Toshiba America Information Systems, Inc. The investigation is terminated.

FOR FURTHER INFORMATION CONTACT: Panyin A. Hughes, Office of the General Counsel, U.S. International Trade Commission, 500 E Street, S.W., Washington, D.C. 20436, telephone 202-205-3042. 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, S.W., 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 Inv. No. 337-TA-1046 on April 12, 2017, based on a complaint filed by Macronix International Co., Ltd. of Hsin-chu, Taiwan and Macronix America, Inc. of Milpitas, California (collectively, "Macronix"). 82 FR 17687-88 (Apr. 12, 2017). The complaint alleges 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 non-volatile memory devices and products containing the same that infringe one or more of claims 1-8 of U.S. Patent No. 6,552,360 ("the '360 patent"); claims 1-12 and 16 of U.S. Patent No. 6,788,602 ("the '602 patent"); and claims 1-7, 11-16, and 18 of U.S. Patent No. 8,035,417 ("the '417

patent”). The notice of investigation named the following respondents: Toshiba Corporation of Tokyo, Japan; Toshiba America, Inc. of New York, New York; Toshiba America Electronic Components, Inc. of Irvine, California; Toshiba America Information Systems, Inc. of Irvine, California; and Toshiba Information Equipment (Philippines), Inc. of Binan, Philippines (collectively, “Toshiba”). The Office of Unfair Import Investigations is a party to the investigation.

On June 16, 2017, the Commission determined not to review the ALJ’s order (Order No. 11) granting an unopposed motion to amend the Notice of investigation to add Toshiba Memory Corporation of Tokyo, Japan as a respondent. *See* Order No. 11, Comm’n Notice of Non-Review (June 16, 2017).

On October 17, 2017, the Commission determined not to review the ALJ’s order (Order No. 20) granting an unopposed motion to terminate the investigation as to claims 11, 12, and 16 of the ’602 patent. *See* Order No. 20, Comm’n Notice of Non-Review (Oct. 17, 2017).

On October 4, 2017, the ALJ held a *Markman* hearing to construe certain disputed claim terms. On December 5, 2017, the ALJ issued Order No. 23 (*Markman* Order), setting forth her construction of the disputed claim terms.

On January 18, 2018, the Commission determined not to review the ALJ’s order (Order No. 24) granting an unopposed motion to terminate the investigation as to claims 1-7 and 18 of the ’417 patent. Order No. 24; Comm’n Notice of Non-Review (Jan. 18, 2018).

The ALJ held an evidentiary hearing from February 8, 2018, through February 14, 2018, and thereafter received post-hearing briefs.

On April, 27 2018, the ALJ issued her final ID, finding no violation of section 337 by Toshiba in connection with the remaining claims, *i.e.*, claims 1-8 of the ’360 patent; claims 1-10 of the ’602 patent; and claims 11-16 of the ’417 patent. Specifically, the ALJ found that the Commission has subject matter jurisdiction, *in rem* jurisdiction over the accused products, and *in personam* jurisdiction over Toshiba. ID at 15-17. The ALJ also found that Macronix satisfied the importation requirement of section 337 (19 U.S.C. 1337(a)(1)(B)). *Id.* The ALJ, however, found that the accused products do not infringe the asserted claims of the ’360 patent and ’417 patent. *See* ID at 19-65, 118-130. The ALJ also found that Toshiba failed to establish that the asserted claims of the ’417 patent are invalid for obviousness. ID at 132-141. Toshiba did not challenge the validity of the ’360 patent. ID at 70. With respect to the ’602 patent, the ALJ found that certain accused products infringe asserted claims 1-10, but that claims 1-5 and 7-10 are invalid for obviousness. ID at 71-88, 91-117. Finally, the ALJ found that Macronix failed to establish the existence of a domestic industry that practices the asserted patents under 19 U.S.C. 1337(a)(2) and also failed to show a domestic industry in the process of being established. *See* ID at 257-261, 288-294.

On May 10, 2018, the ALJ issued her recommended determination on remedy and bonding. Recommended Determination on Remedy and Bonding (“RD”). The ALJ recommends that in the event the Commission finds a violation of section 337, the Commission

should issue a limited exclusion order prohibiting the importation of Toshiba's accused products that infringe the asserted claims of the asserted patents. RD at 1-5. The ALJ also recommends issuance of cease and desist orders against the domestic Toshiba respondents based on the presence of commercially significant inventory in the United States. RD at 5. With respect to the amount of bond that should be posted during the period of Presidential review, the ALJ recommends that the Commission set a bond in the amount of 100 percent of entered value for Toshiba flash memory devices and solid state drives, and a bond in the amount of six percent of entered value for Toshiba PCs imported during the period of Presidential review. RD at 6-9.

On May 14, 2018, Macronix filed a petition for review challenging the ID's finding of no violation of section 337. The IA also filed a petition for review that day, challenging the ID's finding that Macronix failed to establish a domestic industry in the process of being established and certain findings as to the '602 patent. Also on May 14, 2018, Toshiba filed a contingent petition for review of the ID "in the event that the Commission decides to review the ID." On May 22, 2018, Macronix and Toshiba filed their respective responses to the petitions for review. On May 23, 2018, the IA filed a response to the private parties' petitions for review. The Chairman granted the IA's motion for leave to file the response one day late.

On June 28, 2018, the Commission determined to review the final ID in part and requested the parties to brief certain issues. *See* 83 FR 31416-18 (July 5, 2018). Specifically, the Commission determined to review the following: (1) the finding that Macronix failed to satisfy the domestic industry requirement; and (2) the findings of infringement and invalidity as to the '602 patent. On July 12, 2018, the parties filed submissions to the Commission's questions and also briefed the issues of remedy, the public interest and bonding. On July 19, 2018, the parties filed responses to the initial submissions.

Having examined the record of this investigation, including the final ID, and the parties' submissions, the Commission has determined to (1) reverse the ALJ's finding that the accused products do not directly infringe the asserted claims of the '602 patent; (2) affirm the ALJ's indirect infringement and invalidity findings as to the '602 patent; and (3) reverse the ALJ's finding that Macronix failed to establish a domestic industry in the process of being established. The Commission adopts the ID's findings to the extent they are not inconsistent with the Commission opinion issued herewith. The Commission action results in a violation of section 337 as to claim 6 of the '602 patent.

Having found a violation of section 337 in this investigation, the Commission has determined that the appropriate form of relief is: (1) a limited exclusion order prohibiting the unlicensed entry of non-volatile memory devices and products containing the same that infringe claim 6 of the '602 patent 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 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 '602 patent except under license of the patent owner or as provided by law; and (2) cease and desist orders prohibiting domestic respondents Toshiba America, Inc. and its subsidiaries, Toshiba America Electronic Components, Inc. and Toshiba America Information Systems, Inc. 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, non-volatile memory device and products containing same covered by claim 6 of the '602 patent.

The Commission has also determined that the public interest factors enumerated in section 337(d) and (f) (19 U.S.C. 1337(d) and (f)) do not preclude issuance of the limited exclusion order or cease and desist orders. Finally, the Commission has determined that a bond in the amount of 100 percent of entered value for Toshiba flash memory devices, solid-state drives, USB flash drives, and microcontroller units; and a bond in the amount of six percent of entered value for Toshiba personal computers, multi-function printers, and air conditioners is required to permit temporary importation during the period of Presidential review (19 U.S.C. 1337(j)) of products that are subject to the remedial orders. 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', with a large, stylized flourish at the end.

Lisa R. Barton
Secretary to the Commission

Issued: October 9, 2018

PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **NOTICE** has been served by hand upon the Commission Investigative Attorney, **Vu Bui, Esq.**, and the following parties as indicated, on 10/9/2018



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

**On Behalf of Complainants Macronix International
Co., Ltd. and Macronix America, Inc.:**

Christian A. Chu, Esq.
FISH & RICHARDSON P.C.
1000 Maine Ave, SW
Suite 1000
Washington, D.C. 20024

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

**On Behalf of Respondents Toshiba Corporation, Toshiba
America, Inc., Toshiba America Electronic Components, Inc.,
Toshiba America Information Systems, Inc., Toshiba
Information Equipment (Philippines), Inc., and Toshiba
Memory Corporation:**

Aaron Wainscoat, Esq.
DLA PIPER LLP (US)
2000 University Avenue
East Palo Alto, CA 94303

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- Via First Class Mail
- Other: _____

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

In the Matter of

**CERTAIN NON-VOLATILE MEMORY
DEVICES AND PRODUCTS
CONTAINING SAME**

Investigation No. 337-TA-1046

LIMITED EXCLUSION ORDER

The United States International Trade Commission (“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 within the United States after importation by Toshiba Corporation; Toshiba America, Inc.; Toshiba America Electronic Components, Inc.; Toshiba America Information Systems, Inc.; Toshiba Information Equipment (Philippines), Inc.; and Toshiba Memory Corporation (collectively “Respondents”) of certain non-volatile memory devices and products containing same covered by claim 6 of U.S. Patent No. 6,788,602 (“the ’602 patent”).

Having reviewed the record of 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 infringing non-volatile memory devices and products containing same that are manufactured abroad 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) do not preclude issuance of the limited exclusion order, and that a bond in the amount of 100 percent of entered value for Toshiba flash memory devices, solid-state drives, USB flash drives, and microcontroller units; and a bond in the amount of six percent of entered value for Toshiba personal computers, multi-function printers, and air conditioners shall be required for products imported during the period of Presidential review period.

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

1. Non-volatile memory devices and products containing same that infringe claim 6 of the '602 patent that are 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, 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. Notwithstanding paragraph 1 of this Order, the aforesaid non-volatile memory devices and products containing same 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 by posting a bond in the amount of 100 percent of entered value for Toshiba flash memory devices, solid-state drives, USB flash drives, and microcontroller units; and a bond in the amount of six percent of entered value for Toshiba personal computers, multi-function printers, and air conditioners pursuant to subsection (j) of section 337 of the Tariff Act of 1930, as amended, 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, and until such time as the United States Trade Representative notifies the Commission that this action is approved or disapproved but, in any event, not later than sixty (60) days after the issuance of receipt of this Order.

3. At the discretion of U.S. Customs and Border Protection (“CBP”) and pursuant to procedures it establishes, persons seeking to import non-volatile memory devices and products containing same 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 this certification.
4. In accordance with 19 U.S.C. § 1337(l), the provisions of this Order shall not apply to infringing non-volatile memory devices and products containing same 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.
5. 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).
6. The Secretary shall serve copies of this Order upon each party of record in this investigation and upon CBP.

7. 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', written in a cursive style.

Lisa R. Barton
Secretary to the Commission

Issued: October 9, 2018

PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **ORDER** has been served by hand upon the Commission Investigative Attorney, **Vu Bui, Esq.**, and the following parties as indicated, on 10/9/2018



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

**On Behalf of Complainants Macronix International
Co., Ltd. and Macronix America, Inc.:**

Christian A. Chu, Esq.
FISH & RICHARDSON P.C.
1000 Maine Ave, SW
Suite 1000
Washington, D.C. 20024

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

**On Behalf of Respondents Toshiba Corporation, Toshiba
America, Inc., Toshiba America Electronic Components, Inc.,
Toshiba America Information Systems, Inc., Toshiba
Information Equipment (Philippines), Inc., and Toshiba
Memory Corporation:**

Aaron Wainscoat, Esq.
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East Palo Alto, CA 94303

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- Other: _____

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.

In the Matter of

**CERTAIN NON-VOLATILE MEMORY
DEVICES AND PRODUCTS
CONTAINING SAME**

Investigation No. 337-TA-1046

CEASE AND DESIST ORDER

IT IS HEREBY ORDERED THAT Toshiba America Electronic Components, Inc. of Irvine, California cease and desist from conducting any of the following activities in the United States: importing, selling, offering for sale, marketing, advertising, distributing, transferring (except for exportation), and soliciting U.S. agents or distributors for, or aiding and abetting other entities in the importation, sale for importation, sale after importation, transfer (except for exportation), or distribution of non-volatile memory devices and products containing same that infringe claim 6 of U.S. Patent No. 6,788,602 (“the ’602 patent”).

I.
Definitions

As used in this order:

- (A) “Commission” shall mean the United States International Trade Commission.
- (B) “Complainants” shall mean Macronix International Co., Ltd. of Hsin-chu, Taiwan, and Macronix America, Inc. of Milpitas, CA.
- (C) “Respondent” shall mean Toshiba America Electronic Components, Inc. of Irvine, California.
- (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 non-volatile memory devices and products containing same that infringe claim 6 of the ’602 patent.

II. Applicability

The provisions of this Cease and Desist order shall apply to the 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 ’602 patent, Respondent shall not:

- (A) import, sell for importation into the United States, or sell after importation covered products;
- (B) market, distribute, offer for sale, 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 imported 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: (1) in a written instrument, the owner of the '602 patent licenses or authorizes such specific conduct, or (2) 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, 2019. This reporting requirement shall continue in force until such time as Respondent has truthfully reported, in two consecutive timely filed reports, that it has 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-1046”) 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 Complainants’ 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. Record-Keeping 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, 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

¹ Complainants 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.

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, financial statements, income statements, tax returns, and other records and documents, both 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 dates of the '602 patent.

VIII.
Confidentiality

Any request for confidential treatment of information obtained by the Commission pursuant to Section V or 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, as amended (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 100 percent of entered value for Toshiba flash memory devices, solid-state drives, USB flash drives, and microcontroller units; and a bond in the amount of six percent of entered value for Toshiba personal computers, multi-function printers, and air conditioners. 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 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 complainants 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 Complainants' 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.

² *See* note 1 above.

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 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: October 9, 2018

PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **ORDER** has been served by hand upon the Commission Investigative Attorney, **Vu Bui, Esq.**, and the following parties as indicated, on 10/9/2018



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

**On Behalf of Complainants Macronix International
Co., Ltd. and Macronix America, Inc.:**

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Suite 1000
Washington, D.C. 20024

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**On Behalf of Respondents Toshiba Corporation, Toshiba
America, Inc., Toshiba America Electronic Components, Inc.,
Toshiba America Information Systems, Inc., Toshiba
Information Equipment (Philippines), Inc., and Toshiba
Memory Corporation:**

Aaron Wainscoat, Esq.
DLA PIPER LLP (US)
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**UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.**

In the Matter of

**CERTAIN NON-VOLATILE MEMORY
DEVICES AND PRODUCTS
CONTAINING SAME**

Investigation No. 337-TA-1046

CEASE AND DESIST ORDER

IT IS HEREBY ORDERED THAT Toshiba America Information Systems, Inc. of Irvine, California cease and desist from conducting any of the following activities in the United States: importing, selling, offering for sale, marketing, advertising, distributing, transferring (except for exportation), and soliciting U.S. agents or distributors for, or aiding and abetting other entities in the importation, sale for importation, sale after importation, transfer (except for exportation), or distribution of non-volatile memory devices and products containing same that infringe claim 6 of U.S. Patent No. 6,788,602 (“the ’602 patent”).

**I.
Definitions**

As used in this order:

- (A) “Commission” shall mean the United States International Trade Commission.
- (B) “Complainants” shall mean Macronix International Co., Ltd. of Hsin-chu, Taiwan, and Macronix America, Inc. of Milpitas, CA.
- (C) “Respondent” shall mean Toshiba America Information Systems, Inc. of Irvine, California.
- (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 non-volatile memory devices and products containing same that infringe claim 6 of the ’602 patent.

II. Applicability

The provisions of this Cease and Desist order shall apply to the 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 ’602 patent, Respondent shall not:

- (A) import, sell for importation into the United States, or sell after importation covered products;
- (B) market, distribute, offer for sale, 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 imported 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: (1) in a written instrument, the owner of the '602 patent licenses or authorizes such specific conduct, or (2) 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, 2019. This reporting requirement shall continue in force until such time as Respondent has truthfully reported, in two consecutive timely filed reports, that it has 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-1046”) 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 Complainants’ 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. Record-Keeping 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, 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

¹ Complainants 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.

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, financial statements, income statements, tax returns, and other records and documents, both 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 dates of the '602 patent.

VIII.
Confidentiality

Any request for confidential treatment of information obtained by the Commission pursuant to Section V or 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, as amended (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 100 percent of entered value for Toshiba flash memory devices, solid-state drives, USB flash drives, and microcontroller units; and a bond in the amount of six percent of entered value for Toshiba personal computers, multi-function printers, and air conditioners. 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 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 complainants 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 Complainants' 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.

² See note 1 above.

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 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: October 9, 2018

PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **ORDER** has been served by hand upon the Commission Investigative Attorney, **Vu Bui, Esq.**, and the following parties as indicated, on 10/9/2018



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

**On Behalf of Complainants Macronix International
Co., Ltd. and Macronix America, Inc.:**

Christian A. Chu, Esq.
FISH & RICHARDSON P.C.
1000 Maine Ave, SW
Suite 1000
Washington, D.C. 20024

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

**On Behalf of Respondents Toshiba Corporation, Toshiba
America, Inc., Toshiba America Electronic Components, Inc.,
Toshiba America Information Systems, Inc., Toshiba
Information Equipment (Philippines), Inc., and Toshiba
Memory Corporation:**

Aaron Wainscoat, Esq.
DLA PIPER LLP (US)
2000 University Avenue
East Palo Alto, CA 94303

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

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

In the Matter of

**CERTAIN NON-VOLATILE MEMORY
DEVICES AND PRODUCTS
CONTAINING SAME**

Investigation No. 337-TA-1046

CEASE AND DESIST ORDER

IT IS HEREBY ORDERED THAT Toshiba America, Inc. of New York, New York cease and desist from conducting any of the following activities in the United States: importing, selling, offering for sale, marketing, advertising, distributing, transferring (except for exportation), and soliciting U.S. agents or distributors for, or aiding and abetting other entities in the importation, sale for importation, sale after importation, transfer (except for exportation), or distribution of non-volatile memory devices and products containing same that infringe claim 6 of U.S. Patent No. 6,788,602 (“the ’602 patent”).

**I.
Definitions**

As used in this order:

- (A) “Commission” shall mean the United States International Trade Commission.
- (B) “Complainants” shall mean Macronix International Co., Ltd. of Hsin-chu, Taiwan, and Macronix America, Inc. of Milpitas, CA.
- (C) “Respondent” shall mean Toshiba America, Inc. of New York, New York.
- (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 non-volatile memory devices and products containing same that infringe claim 6 of the ’602 patent.

**II.
Applicability**

The provisions of this Cease and Desist order shall apply to the 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 ’602 patent, Respondent shall not:

- (A) import, sell for importation into the United States, or sell after importation covered products;
- (B) market, distribute, offer for sale, 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 imported 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: (1) in a written instrument, the owner of the '602 patent licenses or authorizes such specific conduct, or (2) 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, 2019. This reporting requirement shall continue in force until such time as Respondent has truthfully reported, in two consecutive timely filed reports, that it has 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-1046”) 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 Complainants’ 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. Record-Keeping 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, 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

¹ Complainants 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.

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, financial statements, income statements, tax returns, and other records and documents, both 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 dates of the '602 patent.

VIII.
Confidentiality

Any request for confidential treatment of information obtained by the Commission pursuant to Section V or 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, as amended (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 100 percent of entered value for Toshiba flash memory devices, solid-state drives, USB flash drives, and microcontroller units; and a bond in the amount of six percent of entered value for Toshiba personal computers, multi-function printers, and air conditioners. 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 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 complainants 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 Complainants' 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.

² See note 1 above.

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 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 'L. Barton', written in a cursive style.

Lisa R. Barton
Secretary to the Commission

Issued: October 9, 2018

PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **ORDER** has been served by hand upon the Commission Investigative Attorney, **Vu Bui, Esq.**, and the following parties as indicated, on 10/9/2018



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

**On Behalf of Complainants Macronix International
Co., Ltd. and Macronix America, Inc.:**

Christian A. Chu, Esq.
FISH & RICHARDSON P.C.
1000 Maine Ave, SW
Suite 1000
Washington, D.C. 20024

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

**On Behalf of Respondents Toshiba Corporation, Toshiba
America, Inc., Toshiba America Electronic Components, Inc.,
Toshiba America Information Systems, Inc., Toshiba
Information Equipment (Philippines), Inc., and Toshiba
Memory Corporation:**

Aaron Wainscoat, Esq.
DLA PIPER LLP (US)
2000 University Avenue
East Palo Alto, CA 94303

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

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.

In the Matter of

**CERTAIN NON-VOLATILE MEMORY
DEVICES AND PRODUCTS
CONTAINING THE SAME**

Investigation No. 337-TA-1046

COMMISSION OPINION

This investigation is before the Commission for a final determination on the issues under review, as well as issues concerning remedy, the public interest, and bonding. The Commission has determined to affirm the presiding administrative law judge's ("ALJ") initial determination ("ID") that Respondents, Toshiba Corporation of Tokyo, Japan; Toshiba America, Inc. of New York, New York; Toshiba America Electronic Components, Inc. of Irvine, California; Toshiba America Information Systems, Inc. of Irvine, California; and Toshiba Information Equipment (Philippines), Inc. of Binan, Philippines (collectively, "Toshiba") have not violated section 337 of the Tariff Act of 1930, as amended (19 U.S.C. § 1337), in connection with claims 1-8 of U.S. Patent No. 6,552,360 ("the '360 patent"); claims 1-5 and 7-10 of U.S. Patent No. 6,788,602 ("the '602 patent"); and claims 11-16 of U.S. Patent No. 8,035,417 ("the '417 patent"). The Commission has, however, determined to reverse the ID's finding of no violation of section 337 in connection with claim 6 of the '602 patent.

Specifically, the Commission has determined to (1) reverse the ID's finding that the accused products do not directly infringe the asserted claims of the '602 patent; (2) affirm the ID's indirect infringement and invalidity findings as to the '602 patent; and (3) reverse the ID's finding that Macronix failed to establish a domestic industry in the process of being established.

Having found a violation of section 337, the Commission has determined that the

appropriate remedy is a limited exclusion order and cease and desist orders. The limited exclusion order prohibits entry of the respondents' infringing non-volatile memory devices and products containing the same for consumption in the United States. The cease and desist orders prohibit, among other things, the importation, sale, and distribution of infringing products by domestic respondents. The Commission finds that the public interest factors set out in sections 337(d) and (f) do not preclude issuance of the remedial orders. The Commission has determined to set a bond in the amount of 100 percent of entered value for Toshiba flash memory devices, solid-state drives ("SSDs"), USB Flash Drives, and microcontroller units ("MCUs"), and set a bond in the amount of six percent of entered value for Toshiba personal computers, multi-function printers ("MFPs"), and air conditioners imported during the period of Presidential review.

I. BACKGROUND

A. Procedural History

The Commission instituted Inv. No. 337-TA-1046 on April 12, 2017, based on a complaint filed by Macronix International Co., Ltd. of Hsin-chu, Taiwan and Macronix America, Inc. of Milpitas, California (collectively, "Macronix"). 82 *Fed. Reg.* 17687-88 (Apr. 12, 2017). The complaint alleges 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 non-volatile memory devices and products containing the same that infringe one or more of claims 1-8 of the '360 patent; claims 1-12 and 16 of the '602 patent; and claims 1-7, 11-16, and 18 of the '417 patent. The Notice of Investigation names the Toshiba entities listed above as respondents. The Office of Unfair Import Investigations is a party to the investigation.

On June 16, 2017, the Commission determined not to review the ALJ's order (Order No. 11) granting an unopposed motion to amend the Notice of Investigation to add Toshiba Memory Corporation of Tokyo, Japan as a respondent. *See* Order No. 11, Comm'n Notice of Non-Review (June 16, 2017).

On October 17, 2017, the Commission determined not to review the ALJ's order (Order No. 20) granting an unopposed motion to terminate the investigation as to claims 11, 12, and 16 of the '602 patent. *See* Order No. 20, Comm'n Notice of Non-Review (Oct. 17, 2017).

On October 4, 2017, the ALJ held a *Markman* hearing to construe certain disputed claim terms. On December 5, 2017, the ALJ issued Order No. 23 (*Markman* Order), setting forth her construction of the disputed claim terms.

On January 18, 2018, the Commission determined not to review the ALJ's order (Order No. 24) granting an unopposed motion to terminate the investigation as to claims 1-7 and 18 of the '417 patent. Order No. 24; Comm'n Notice of Non-Review (Jan. 18, 2018).

The ALJ held an evidentiary hearing from February 8, 2018 through February 14, 2018, and thereafter received post-hearing briefs.

On April 27, 2018, the ALJ issued her final ID, finding no violation of section 337 by Toshiba in connection with the pending claims, *i.e.*, claims 1-8 of the '360 patent; claims 1-10 of the '602 patent; and claims 11-16 of the '417 patent. Specifically, the ALJ found that the Commission has subject matter jurisdiction, *in rem* jurisdiction over the accused products, and *in personam* jurisdiction over Toshiba. ID at 15-17. The ALJ also found that Macronix satisfied the importation requirement of section 337 (19 U.S.C. § 1337(a)(1)(B)). *Id.* The ALJ, however, found that the accused products do not infringe the asserted claims of the '360 patent and '417 patent. *See* ID at 19-65, 118-130. The ALJ also found that Toshiba failed to establish that the

asserted claims of the '417 patent are invalid for obviousness. ID at 132-141. Toshiba did not challenge the validity of the '360 patent. ID at 70. With respect to the '602 patent, the ALJ found that Macronix proved that Toshiba induces infringement of asserted claims 1-10, but that claims 1-5 and 7-10 are invalid for obviousness. ID at 71-88, 91-117. Notably, the ALJ did not find claim 6 invalid for obviousness. Finally, the ALJ found that Macronix failed to establish the existence of a domestic industry that practices the asserted patents under 19 U.S.C. § 1337(a)(2) and also failed to show a domestic industry in the process of being established. *See* ID at 142-153, 154-186. Specifically, the ALJ found that Macronix failed to establish the economic prong of the domestic industry requirement for all asserted patents. She also found that Macronix failed to establish the technical prong for the '360 patent, but established the technical prong for the '602 and '417 patents. *See id.*

On May 10, 2018, the ALJ issued her recommended determination on remedy and bonding. Recommended Determination on Remedy and Bonding (“RD”). The ALJ recommends that in the event the Commission finds a violation of section 337, the Commission should issue a limited exclusion order prohibiting the importation of Toshiba’s accused products that infringe the asserted claims of the asserted patents. RD at 1-5. The ALJ also recommends issuance of cease and desist orders against the domestic Toshiba respondents based on the presence of commercially significant inventory in the United States. RD at 5. The ALJ further recommends that the Commission set a bond in the amount of 100 percent of entered value for Toshiba flash memory devices and SSDs, and a bond in the amount of [[]] of entered value for Toshiba PCs imported during the period of Presidential review. RD at 6-9.

On May 14, 2018, Macronix filed a petition for review challenging the ID’s finding of no

violation of section 337.¹ The Commission investigative attorney (“IA” or “Staff”) also filed a petition for review that same day, challenging the ID’s finding that Macronix failed to demonstrate a domestic industry in the process of being established and certain findings as to the ’602 patent.² Also on May 14, 2018, Toshiba filed a contingent petition for review of the ID, offering alternative grounds for affirming the ID “in the event that the Commission decides to review the ID.”^{3, 4}

On May 22, 2018, Macronix and Toshiba filed their respective responses to the petitions for review.⁵ On May 23, 2018, the IA filed a response to the private parties’ petitions for review.⁶

On June 28, 2018, the Commission determined to review the final ID in part and requested the parties to brief certain issues. *See* 83 *Fed. Reg.* 31416-18 (July 5, 2018). The Commission determined to review the following issues in the final ID: (1) the finding that Macronix failed to satisfy the domestic industry requirement; and (2) the findings of infringement

¹ *See* Complainants Macronix International Co., Ltd and Macronix America, Inc.’s Petition for Review of the Initial Determination (“Macronix Pet.”).

² *See* Petition of the Office of Unfair Import investigations for Review-in-Part of the Initial Determination on Violation of Section 337 (“IA Pet.”).

³ *See* Respondents’ Contingent Petition for Review of the Initial Determination on Violation of Section 337 (“Toshiba Pet.”)

⁴ Under the Commission’s rules, contingent petitions for review are treated as petitions for review. 19 C.F.R. § 210.43(b)(3).

⁵ *See* Response of Complainants Macronix International Co., Ltd and Macronix America Inc. to the Toshiba Respondents’ and the Investigative Attorney’s Respective Petitions for Review of the Initial Determination (Macronix Resp.); Respondents’ Combined Response to Complainants’ and Staff’s Petitions for Review of the Initial Determination (“Toshiba Resp.”).

⁶ *See* Response of the Office of Unfair Import Investigations to the Private Parties’ Petitions for Review of the Initial Determination on Violation of Section 337 (“IA Resp.”). We note that the Chairman granted the IA’s motion for leave to file the response a day late.

and invalidity as to the '602 patent. *Id.* In its notice of review, the Commission posed the following questions as to the issues under review:

1. Would one of ordinary skill in the art understand that the claim term “coupled” in the asserted claims of the '602 patent construed to mean “conductively connected” requires select transistors? If yes, how does it affect the ID’s infringement, domestic industry technical prong, and invalidity findings?
2. Would one of ordinary skill in the art understand that the claim term “memory array” in the asserted claims of the '602 patent construed to mean “multiple memory cells coupled to a grid of word lines and bit lines” necessarily includes select transistors? If yes, how does it affect the ID’s infringement, domestic industry technical prong, and invalidity findings?
3. The ID states that under the adopted construction of “memory array” (set forth above), “a memory array consistent with the '602 patent . . . could span an entire plane or only a subset of memory cells in a plane.” ID at 80. Is this additional language consistent with the ID’s construction? If that additional language is omitted, how will the ID’s infringement, domestic industry technical prong, and invalidity findings be affected?
4. Please discuss the showing necessary to meet the statutory requirement of “articles protected by the patent” for a domestic industry in the process of being established under section 337(a)(2).

The Commission further posed the following questions with respect to the public interest:

1. If an exclusion order issues against Toshiba’s accused products, can Dell’s other SSD suppliers or other SSD suppliers in general fill any void that may be created?
2. What domestic Dell products will be impacted by an exclusion order?
3. Toshiba and Dell request a delay in implementing any exclusion order. If an exclusion order issues, what specific product(s) should a delay apply to? What should be the duration of the delay?
4. Macronix and Toshiba present vastly different views about the ability of suppliers to satisfy domestic demand if an exclusion order issues. Please discuss the ability of suppliers other than Toshiba to satisfy domestic demand for each and every product that may be affected by an exclusion order.

On July 12, 2018, the parties filed submissions regarding the Commission's questions and also briefed the issues of remedy, the public interest and bonding.⁷ On July 19, 2018, the parties filed responses to the initial submissions.⁸

B. Patents and Technology at Issue

The technology at issue in this investigation relates generally to the structure and operation of non-volatile memory devices. ID at 3.

The '602 patent entitled "Memory Device and Operation Thereof" issued on September 7, 2004. The patent describes a system and method to prevent dummy cells from over-erasing in a memory device. '602 patent, col.1 ll.7-9. In conventional memory devices, memory cells are arranged in an array of word and bit lines. *Id.* at col.1 ll.13-17. The word lines and bit lines at the edge of the device are often unusable because they are etched partially or completely, and the unused word line at the edge is referred to as a "dummy" word line. *Id.* at col.1 ll.17-28. Conventionally, these dummy word lines are coupled to ground, and this leads to over-erasure of the dummy cells over time. *Id.* at col.1 ll.29-36. The '602 patent solves this problem by coupling the dummy word line to a positive bias during an erase operation. *Id.* at Abstract.

⁷ See Submission of Complainants Macronix International Co., Ltd. and Macronix America, Inc. in Response to the Commission's Notice of Partial Review ("Macronix Sub."); Respondents' Opening Brief to Commission on the Issues Under Review and on Remedy, the Public Interest and Bonding ("Resp. Sub."); Response of the Office of Unfair Import Investigations to the Commission's Request for Written Submissions on the Issues Under Review and on Remedy, the Public Interest, and Bonding ("IA Sub."); Statement of Third Parties Dell Technologies Inc. and Dell Inc. in Response to Notice of Commission Determination to Review in Part a Final Initial Determination Finding No Violation of Section 337 (July 12, 2018) ("Dell Sub.")

⁸ See Combined Reply of the Macronix Complainants to the Respective Submissions of the Toshiba Respondents, the Office of Unfair Import Investigations, and Dell in Response to the Commission's Notice of Partial Review ("Macronix Rep."); Respondents' Reply Brief to Commission on the Issues Under Review and on Remedy, the Public Interest and Bonding ("Resp. Rep."); Response of the Office of Unfair Import Investigations to Written Submissions on the Issues Under Review and on Remedy, the Public Interest, and Bonding ("IA Rep.").

Independent claims 1 and 7 and dependent claims 2-6 (depending from claim 1) and 8-10 (depending from claim 7) are at issue in this investigation. Claims 1 and 7 recite:

1. A semiconductor memory device, comprising:

a memory cell;

a dummy word line arranged at an edge of a **memory array** coupled to the memory cell;

a control logic for supplying a positive bias to the dummy word line during an erase operation; and

at least one bit line **coupled to** the memory cell.

'602 patent, col.5 l.59-col.6 l.3.

7. A semiconductor memory array, comprising:

a memory cell;

at least one bit line arranged in a first direction and coupled to the memory cell; and

at least one dummy word line arranged at an edge of a **memory array** arranged in a second direction perpendicular to the at least one bit line and **coupled to** the memory cell,

wherein a positive bias is selectively supplied to the at least one dummy word line at least during erase operation.

Id. at col.6 ll.21-31.

The '417 patent entitled "Output Buffer Circuit with Variable Drive Strength" issued on October 11, 2011. The patent describes an arrangement of multiple output buffer circuits that "have a variable combined output drive strength, depending on a set of buffer enable signals." '417 patent, Abstract. According to the specification, conventional output buffer circuits in the prior art would either be on or off, resulting in a "one size fits all" design for output drive strength. *Id.* at col.1 ll.9-10. The disclosed arrangement provides an improvement

over conventional output buffer circuits. Independent claim 11 with its dependent claims 12-16 are at issue in this investigation. Claim 11 recites:

11. An apparatus, comprising:

a plurality of output buffer circuits coupled in parallel to provide a combined output drive strength, each output buffer circuit of the plurality of output buffer circuits including a buffer data output providing a data output signal having a drive strength,

wherein the data output signal is combined across the plurality of output buffer circuits to provide a combined data output signal having the combined output drive strength, and the combined output drive strength is tuned by buffer enable signals customized across the plurality of output buffer circuits,

wherein the buffer enable signals are received together with complements of the buffer enable signals, and the buffer enable signals and the complements of the buffer enable signals control pairs of transistors having opposite conductivity types.

'417 patent, col.11 l.54-col.12 l.3.

The '360 patent entitled "Method and Circuit Layout for Reducing Post Chemical Mechanical Polishing Defect Count" issued on April 22, 2003. The patent describes a method and a circuit layout on a substrate of a semiconductor wafer, suitable for reducing defects during a chemical mechanical polishing process. '360 patent, Abstract.

Chemical Mechanical Polishing ("CMP") is used in semiconductor fabrication to planarize dielectric and metal layers of a semiconductor wafer. '360 patent, col.1 ll.13-17. CMP uses mechanical pressure in combination with a chemical reaction to level the surface of the wafer. *Id.* at col.1 ll.31-34. During the CMP process, a polishing head presses the wafer against a polishing pad and drives the wafer to rotate in one direction while the polishing pad rotates in the opposite direction. *Id.* at col.1 ll.35-38. While the wafer is pressed against the polishing pad, polishing slurry is injected between the wafer and the polishing pad. *Id.* at col.1 ll.38-40. The

polishing slurry chemically reacts with the wafer's surface and aids in planarizing the wafer. *Id.* at col.1 ll.31-34, ll.41-45; *see* ID at 3-6. Independent claim 1 with its dependent claims 2-8 are at issue in this investigation. Claim 1 recites:

1. A circuit layout on a substrate of a semiconductor wafer, suitable for reducing defects during a chemical mechanical polishing process, said substrate comprising a plurality of strips of first circuit structure, said circuit layout comprising:

at least two strips of second circuit structure located on said substrate of said semiconductor wafer, each of said two strips of second circuit structure respectively linking the front end and the rear end of said plurality of strips of said first circuit structure, utilizing to average polishing pressure performed upon the front end and the rear end of said plurality of strips of said first circuit structure during said chemical mechanical polishing process for reducing defects occurred [sic].

'360 patent, col.6 ll.2-14.

C. Products at Issue

The products at issue are non-volatile memory devices, which are also known as flash memory devices. ID at 12-13. Specifically, the accused products include NAND flash memory, solid state drives (SSDs) containing such NAND flash memory, and certain downstream products containing those SSDs, including personal computers, USB flash drives, microcontroller units, multi-function printers, and air conditioners. *See* CX-0002C at TT 6-8.

The parties stipulated that [[]] are representative of all of the accused products in this investigation. *Id.*; CX-0003C at 4-6, Appendix A.

II. ISSUES UNDER REVIEW

A. Whether the Accused Products Infringe the Asserted Claims of the '602 Patent

Macronix and the IA petitioned for review of the ID's finding that the accused Toshiba products do not satisfy the "coupled to" limitation. *See* Macronix Pet. at 39; IA Pet. at 7.

Infringement determination is a two-step process. First a tribunal determines the scope and meaning of disputed claim terms as a matter of law. Second, the properly construed claims are compared to the accused products to determine infringement. *Advanced Cardiovascular Sys., Inc. v. Scimed Life Sys., Inc.*, 261 F.3d 1329, 1336 (Fed. Cir. 2001).

**1. Whether the Accused Toshiba Products Satisfy the Claim Limitation:
“A Dummy Word Line Arranged at an Edge of a Memory Array
Coupled to the Memory Cell”**

i. The ID

The ID finds that “a ‘memory array’ in the context of the ’602 patent shall be construed to mean multiple memory cells coupled to a grid of word lines and bit lines” and that “[u]nder this construction, a memory array consistent with the ’602 patent does not have to include or exclude select transistors, and it could span an entire plane or only a subset of memory cells in a plane.” ID at 80. The ID rejects Macronix’s proposal to construe the claim limitation to “exclude non-memory components, such as the select transistors in the accused products.” *Id.* at 77. Macronix’s expert, Dr. Liu, testified that “a memory array in the context of the ’602 patent ‘is a group of memory cells that are coupled to bit lines and word lines and are demarcated by non-memory elements, such as select gate transistors.’” *Id.* (citing CX-3840C at Q/A 346-49). The ID finds that although the evidence cited by Dr. Liu “shows that the term ‘memory array’ is used to describe memory cells arranged in a grid, nothing cited by Dr. Liu supports the adoption of a negative limitation excluding non-memory elements.” *Id.*

The ID also rejects Macronix’s alternative argument for excluding the select gate transistors. *Id.* Macronix argued that “a memory array must be a continuous grid of memory cells, without other intervening components.” *Id.* The ID states that “[t]here is no support, intrinsic or extrinsic, however, for importing a ‘continuous’ limitation into the claim” and that

“[t]he language in the claims and specification of the ’602 patent do not impose such limitations on the memory array.” *Id.* Instead, the ID finds that “[t]he relevant specification language is not restrictive, stating that the memory array ‘generally includes the memory cells coupled to a grid of word lines and bit lines.’” *Id.* (citing ’602 patent, col. 1:15-17).

The ID finds that the accused Toshiba products satisfy this limitation. The ID states that “[t]he memory array identified by Dr. Liu includes [[

]]” and that “Dr. Liu’s analysis is consistent with the claim construction discussed above, which allows for a subset of memory cells in a block or plane to form a memory array.” *Id.* at 80 (citing CX-3840C at Q/A 343-44). The ID finds that “Toshiba’s and Staff’s non-infringement arguments rely on more restrictive constructions which . . . are not supported by the intrinsic and extrinsic evidence.” *Id.*

ii. Commission Review

The ID construes “memory array” to mean “multiple memory cells coupled to a grid of word lines and bit lines.” ID at 80. No one challenges this construction. The ID, however, adds that “[u]nder this construction, a memory array consistent with the ’602 patent does not have to include or exclude select transistors, and it could span an entire plane or only a subset of memory cells in a plane.” *Id.* The IA and Toshiba petitioned for review, arguing that this additional language is in error. The Commission determined to review and, as noted above, asked the parties to brief certain issues related to the issue

a. Whether the “Memory Array” Claim Limitation Requires Select Transistors

i. Complainants’ Submission

Macronix argues that the term “coupled,” construed to mean “conductively connected,” “does not require select transistors, which are a feature of particular memory architectures such

as NAND flash memory.” Macronix Sub. at 1. According to Macronix, all the experts agree that “the ’602 patent is not limited to any particular memory architecture, as it covers memory architectures that do not even use select transistors, such as NOR flash memory.” *Id.* (citing Tr. (Liu) at 272:13-274:4; Tr. (Rhyne) 1074:13-25; Tr. (Baker) at 892:19-21). Specifically, Macronix explains that “[b]ecause the ’602 patent’s invention broadly applies to many different kinds of memory architectures, the parties’ experts unanimously agreed that its claims are not limited to any particular memory architecture. *Id.* (citing JX-0002 at 3:60-65; Tr. (Liu) at 272:13-274:4; Tr. (Rhyne) 1074:13-25; Tr. (Baker) at 892:19-21). Macronix contends that “the ’602 patent is explicit on this point, stating that its memory cells could include floating-gate cells—as used in NOR and NAND—as well as SONOS nonvolatile cells, among other types of memory.” *Id.* at 2 (citing JX-0002 at 3:60-65; Tr. (Liu) at 272:13-274:4. Macronix adds that “Toshiba’s own expert, Dr. Rhyne, was also very clear in his testimony on this point, explaining that the ’602 patent ‘doesn’t care what kind of memory it is’ because it ‘doesn’t specifically limit itself’ to any particular memory architectures like NAND or NOR” and that “Toshiba’s other expert, Dr. Baker, likewise admitted that the ’602 patent is not limited to NOR flash memory or its architecture.” *Id.* (citing Tr. (Rhyne) 1074:13-25). Tr. (Baker) at 892:19-21. Macronix argues that because “select transistors are included in some, but not all, of these types of memory, a person skilled in the art understands that the ’602 patent’s claims, including the term ‘coupled,’ neither precludes nor requires the use of select transistors.” *Id.* (citing Tr. (Liu) at 272:13-274:4 (explaining that select transistors are more common in NAND flash, but that the ’602 patent also covers other types of memory).] Tr. (Rhyne) at 1074:13-25 (the ’602 patent “does not show a select gate [transistor] because . . . it doesn’t care what kind of memory it is.”)

Macronix further contends that the experts also agree that “a bit line ‘conductively

connected' to a memory cell simply requires that there can be an electrical path from the bit line to the memory cell, without mandating select transistors" but that "[e]ven if select transistors were (erroneously) required, it would provide no basis to disturb the [ID's] infringement finding because Toshiba's products undisputedly [[]]." *Id.* (citing ID at 72-73; RX-1245C at Q/A71; CX-3840C at Q/A350-Q/A351; Tr. (Baker) at 773:18-774:18; CX-3840C at Q/A378-Q/A380).

ii. Respondents' Submission

Toshiba states that an ordinarily skilled artisan "would not understand the claim term 'coupled' in the asserted claims of the '602 patent, construed to mean 'conductively connected,' to by itself always require select transistors to practice the asserted claims in any potentially accused product or any alleged prior art." Toshiba Sub. at 1. Yet, Toshiba contends that because its accused NAND products are [[

]] and thus "prevents the 'coupled' claim limitation from being practiced in the accused products at the time of importation." *Id.* (citing ID at 81; RX-1245C at Q65, Q156-Q157, Q161, Q163, Q166.)

Toshiba, however, argues that "[o]ne of ordinary skill in the art understands that the claim term 'memory array' in the asserted claims of the '602 patent, construed to mean 'multiple memory cells coupled to a grid of word lines and bit lines,' necessarily includes select transistors in a NAND flash memory device, and does not include select transistors in a NOR flash memory device." *Id.* at 2. Toshiba explains that in a NAND flash memory device, "the construction of 'memory array' expressly includes the 'grid of word lines and bit lines'" and that "[t]his grid always includes the select transistors in a NAND memory array." *Id.*

iii. IA's Submission

The IA states that “in the context of the parties’ dispute in this investigation, one of ordinary skill in the art of the ‘602 patent would understand that the claim term ‘coupled’ in the asserted claims of the ‘602 patent construed to mean ‘conductively connected’ requires select transistors.” IA Sub. at 6-7. According to the IA, “the evidence shows that both Macronix’s technical expert (Dr. David Liu) and Toshiba’s technical experts (Dr. Jacob Baker and Dr. Thomas Rhyne) are persons of ordinary skill in the art who understand that the claim term ‘coupled,’ recited in the claim phrase ‘bit line . . . coupled to the memory cell’ and construed to mean ‘conductively connected,’ requires select transistors.” *Id.* at 7. The IA points to Dr. Liu’s testimony about the “connections between bit lines and memory cells in the NOR architecture and the NAND architecture, including the necessity of select transistors in the NAND architecture” but not in the NOR architecture *Id.* (citing Liu, Tr., 349:19 – 350:12, 352:10-25, 354:7-16, 355:13-20, and 356:4-14).

iv. Analysis

The Commission finds that the ID’s construction of “memory array” in the claim term “a dummy word line arranged at an edge of a memory array coupled to the memory cell,” is correct and does not specifically include or exclude select transistors. Thus, the Commission has determined to affirm the ID’s construction to mean “multiple memory cells coupled to a grid of word lines and bit lines.” ID at 80.

Macronix seeks to specifically exclude select transistors from the construction of “memory array.” The IA, on the other hand, argues that select transistors are necessarily present in the memory array architecture of NAND flash memories. In the IA’s view, the ID’s construction requires the memory cells to be coupled to the grid and bit lines, and the evidence

shows that the coupling must be done through select transistors. *See* IA Pet. at 8. The IA relies heavily on expert testimony that “in the NAND flash array architecture of the accused products, [[]].” IA Sub at 7 (citing Liu, Tr. 202:22-25 (Q. [[]] A. [[]])).

The evidence the IA points to shows that technical experts for both Macronix and Toshiba share that view. Dr. Liu testified that [[]]. Liu Tr., 202:22-25, 207:4-7, 304:2-11; IA Pet at 11. Dr. Baker, Toshiba’s technical expert testified that “[[]].” RX-1245C (Baker

RWS), Q/A 59. Dr. Rhyne, Toshiba’s expert, agreed, testifying as follows:

Q. It’s your opinion as one of ordinary skill in the art of the ’602 patent that a memory array includes select transistors, correct?

A. It’s my opinion that it does and it has to.

Q. One of ordinary skill in the art of the ’602 patent understood that a memory array includes the memory cells, including dummy cells, word lines, including dummy word lines, bit lines, and select transistors, correct?

A. Yes sir, they would have to include the select transistors in that definition.

Rhyne, Tr. 1088:3-19, 1981:5-9.

But this testimony disregards the undisputed fact that the ’602 patent is not limited to a NAND architecture. Indeed, the patent expressly states that “[o]ne of ordinary skill in the art will recognize that memory cell **260_{jk}**, and dummy cells **270_j** and **275_j** may be, for example, floating cells, SONOS . . . nonvolatile cells, etc.”). ’602 Patent, col.3 ll.60-64; *see also* Liu, Tr.,

349:19 – 350:12, 352:10-25, 354:7-16, 355:13-20, and 356:4-14; . Thus, while select transistors may be necessary for a NAND architecture, the claimed invention is not limited to NAND architectures and so expressly requiring select transistors would impermissibly exclude disclosed embodiments from the claim scope. *See Accent Packaging, Inc. v. Leggett & Platt, Inc.*, 707 F.3d 1318, 1326 (Fed. Cir. 2013) (“We have held that ‘a claim interpretation that excludes a preferred embodiment from the scope of the claim is rarely, if ever, correct’”); *Vitronics Corp. v. Conceptra Corp.*, 90 F.3d 1576, 1583 (Fed. Cir. 1996) (same).

Toshiba does not dispute this, stating that an ordinarily skilled artisan “would not understand the claim term ‘coupled to’ in the asserted claims of the ’602 patent, construed to mean ‘conductively connected,’ to by itself always require select transistors to practice the asserted claims in any potentially accused product or any alleged prior art.” Toshiba Sub. at 1. Toshiba’s position, is that because its accused NAND [[

]]” and thus “prevents the “coupled” claim limitation from being practiced in the accused products at the time of importation” *Id.* As discussed below, the Commission finds this argument unpersuasive.

b. Whether the Claimed “Memory Array” Is Required to Span an Entire Plane Or Only a Subset of Memory Cells in a Plane

i. Complainants’ Submission

According to Macronix, the ID’s conclusion that “a memory array, as construed, ‘could span an entire plane or only a subset of memory cells in a plane’ is fully consistent with its construction.” Macronix Sub. at 29. Macronix states that the ID “undertook the construction of ‘memory array’ to address Toshiba’s argument that this term is limited to a NAND plane,” and that “[t]he record and the ’602 patent—which does not mention a ‘plane,’ much less restrict the

‘memory array’ based on the concept of a ‘plane’—compelled the [ID’s] construction and conclusion.” *Id.*

Macronix explains that “[u]nder the ’602 patent’s express definition, which the [ID] adopted, any group of ‘multiple memory cells’ that are ‘coupled to a grid of word lines and bit lines’ constitutes a memory array.” *Id.* at 32 (citing JX-0002 at 1:15-17; ID at 80). Macronix states that “a plane consisting solely of multiple memory cells coupled to a grid of word lines and bit lines could be a memory array under the [ID’s] construction” and that “where a plane includes multiple groups of memory cells, the [ID’s] construction also permits each of these groups to constitute the claimed ‘memory array,’ as long as the cells in a given group are coupled to a grid of word lines and bit lines.” *Id.* (citing Tr. (Liu) at 298:10-19 (explaining that a plane could be a memory array if it consists entirely of memory cells coupled to a grid of word lines and bit lines); Tr. (Liu) at 197:20-198:15, 267:23-268:9). Macronix avers that “the breadth of the construction merely reflects the diverse ways of implementing a ‘memory array.’” *Id.*

Macronix further argues that “there is no basis for injecting a limitation based on the concept of a ‘plane’ into the term ‘memory array’ or the [ID’s] construction.” *Id.* Macronix points to Dr. Baker’s statement that “the ’602 patent ‘does not refer to a memory array as a whole plane,’ and in fact does not even mention the concept of a ‘plane.’” *Id.* (citing Tr. (Baker) at 790:7-13). According to Macronix, “that is not surprising, because ‘plane’ is a ‘term of art’ for NAND flash, whereas the ’602 patent describes and claims its invention in general terms which, in addition to covering NAND, also encompass many other types of memory architectures that do not have ‘planes.’” *Id.* at 33 (citing JX-0002 at 3:60-65; Tr. (Rhyne) at 1074:13-25; Tr. (Liu) at 266:3-12, 272:13-274:4; (Tr. (Baker) at 791:4-7).

ii. Respondents' Submission

Toshiba asserts that “[t]he additional language ‘a memory array consistent with the ’602 patent . . . could span an entire plane or only a subset of memory cells in a plane’ is inconsistent with construing the ‘memory array’ as ‘multiple memory cells coupled to a grid of word lines and bit lines.’” Toshiba Sub. at 14. Toshiba explains that “because the ‘grid’ that comprises the memory array is coextensive with the plane, the grid could not ‘span . . . only a subset of memory cells in a plane.’” *Id.* According to Toshiba, “[[

]] *Id.* (citing RX-1245C at Q51-Q53; RX-1244C at Q119-Q120).

Toshiba states that “[[

]] *Id.* (citing RX-1244C at Q160; RX-1245C at Q79; RX-1016C; RX-1017C; Tr. at 184:3-7, 785:21-23, 786:22-787:2; RX-1245C at Q52-Q53, Q78-Q79; Tr. at 782:9-13; RX-1244C at Q119-Q121). Toshiba contends that “[[

]]

Id.

Toshiba further argues that “[a]ll of the components that collectively comprise the grid in the accused products [[

]]” *Id.* at 14-15 (citing RX 1245C at Q58-Q59; RX-1244C at Q162-Q166; RX-1261C; RDX-105.21C). Thus, according to Toshiba, “calling only a portion of the integrated grid structure a memory array does not make any sense, is arbitrary and would be contrary to the teaching of the ’602 patent.” *Id.* (citing RX-1245C at Q56-Q57; Tr. at 902:22-904:5, 916:8-917:8.).

iii. IA’s Submission

The IA states that “this additional language is consistent with the ID’s construction of the claim term ‘memory array’ (*i.e.*, ‘multiple memory cells coupled to a grid of word lines and bit lines’).” IA Sub. at 23. The IA explains that “the specification contains a statement defining a memory array: ‘Multiple memory cells may form a memory array, which generally includes memory cells coupled to a grid of word lines and bit lines.’” *Id.* at 23-24. According to the IA, “[n]otably absent from this statement is any restriction with respect to the quantity of memory cells in the memory array” and also “absent from this statement is any restriction with respect to the quantity of word lines and bit lines or the grid of word lines and bit lines.” *Id.* at 24 (citing ID at 76-78 (quoting JX-0002 (’602 patent), 1:15-17)).

The IA notes that Toshiba “relies on extrinsic evidence, including technical documents and deposition testimony (from a fact witness, Mr. Nakamura, and an expert witness, Dr. Baker).” *Id.* In the IA’s view, the ID does not err in finding “this extrinsic evidence to be of limited value, especially when some of the extrinsic evidence is contradictory.” *Id.*

iv. Analysis

The Commission finds that the ID’s statement that a memory array consistent with the ’602 patent “could span an entire plane or only a subset of memory cells in a plane” is not in error. ID at 80. The specification of the ’602 patent defines a memory array, stating that

“[m]ultiple memory cells may form a memory array, which generally includes memory cells coupled to a grid of word lines and bit lines.” ’602 patent, col.1 ll.15-17. The specification makes no mention of a plane, but only requires that a memory array include “memory cells coupled to a grid of word lines and bit lines.” *Id.* Consistent with this understanding, the ID states that a “‘memory array’ in the context of the ’602 patent shall be construed to mean multiple memory cells coupled to a grid of word lines and bit lines.” ID at 80.

The ID notes Toshiba’s argument that the claimed “memory array” requires the memory array to include the full extent of the word lines and bit lines in an accused product. ID at 77-78. The ID further notes that in support, Toshiba “relies on Dr. Baker’s review of Toshiba’s technical documents and the testimony of Toshiba engineer Hiroshi Nakamura, who describes [[]].” *Id.* at 78 (citing RX-1244C (Nakamura WS) at Q/A 126-138; RX-1245C (Baker RWS) at Q/A 54 (citing CX-2704C at MX104600017261; RX-0321C at MX104600052862; CX-2707C at MX104600017381; CX-2708C at MX104600017524)). The ID, however, finds that “[t]his extrinsic evidence is of limited value for claim construction” and that “[[]].” *Id.* The ID further notes that “Macronix identifies some contradictory evidence in Toshiba’s documents and Mr. Nakamura’s deposition testimony [[]].” *Id.* (citing CX-3840C (Liu DWS) at Q/A 348 (citing RX-0036C at 17); JX-0025C (Nakamura Deposition) at 186-87). The ID concludes that “[t]he fact that certain engineers [[]] is not compelling evidence for adopting this interpretation of the term “memory array” in the asserted ’602 patent claims.

The Commission finds that nothing in the patent’s intrinsic evidence compels limiting the claimed “memory array” to the entire grid of word lines and bit lines in a plane. Accordingly the Commission has determined to affirm the ID’s construction. The Commission has also determined to affirm the ALJ’s infringement findings regarding “memory array” for the reasons provided in the ID, to the extent that those findings are not inconsistent with this opinion.

2. Whether the Accused Toshiba Products Satisfy the “Coupled to” Limitation of the Asserted Claims

i. The ID

The ID finds that Macronix failed to prove that the accused Toshiba products directly infringe the asserted claims of the ’602 patent.⁹ ID at 84. The ID observes that the claim limitation “coupled to” was construed to mean “conductively connected.” ID at 81 (citing Order No. 23 at 37-40). The ID notes Macronix’s argument, supported by the IA, that the accused products infringe this limitation because [[

]]. *Id.* Macronix’s expert, Dr. Liu, testified that in the accused products, [[

]]. *Id.* (citing CX-3840C at Q/A 378). The ID, however, finds that “neither Dr. Liu nor any of the parties cites any support for interpreting this claim limitation to only require capability for conduction.” *Id.* The ID further finds that the “coupled to” limitation is not infringed when the select transistors are open. *Id.* at 82. The ID credits Toshiba’s argument that “because the

⁹ As noted above, the ALJ found that Macronix established that Toshiba induces infringement of the asserted claims of the ’602 patent. ID at 84-87. The ALJ noted that a complainant may prove the direct infringement necessary for inducement with evidence that the accused product “necessarily infringes the patent in suit.” ID at 85 (citing *ACCO Brands, Inc. v. ABA Locks Mfr. Co.*, 501 F.3d 1307, 1313 (Fed. Cir. 2007)). The ALJ then stated that “[t]here is no dispute that the ‘coupled’ limitation is infringed when select transistors are turned on in the accused products, creating a conductive connection between the bit lines and the memory cells.” *Id.* (citing Tr. at 772:15-773:2 (Baker)).

accused products [[]], there is no infringement of the ‘coupled’ limitation under section 337” and that the “Commission has held that “infringement, direct or indirect, must be based on the articles as imported to satisfy the requirements of section 337.” *Id.* (citing *Certain Electronic Devices with Image Processing Systems, Components Thereof and Associated Software*, Inv. No. 337-TA-724, Comm’n Op. at 14 (Dec. 2, 2011)).

The ID rejects Macronix’s argument that “it would be improper to require that accused products [[]], because an apparatus claim is infringed based on the structure of the accused product, not its operation.” *Id.* The IA similarly argued that “requiring the actual flow of electrons would not be consistent with the claim language of the ’602 patent.” *Id.* However, the ID finds that Dr. Baker, Toshiba’s expert, “is not importing a ‘powered on’ requirement into this limitation — the ‘coupled’ limitation does not require electricity to flow but in accordance with the *Markman* order, it does require a conductive connection.” *Id.* at 82-83.

According to the ID, “[t]his limitation would be infringed whether the power was on or off in the memory device described in the specification, where the bit line is directly connected to the memory cells” but that the “[]], and Dr. Liu recognized the differences between the NOR memory architecture depicted in the ’602 patent and the NAND memory architecture [[]].” *Id.* at 83 (citing ’602 patent, Fig. 2). As the ID explains, in a “NOR architecture, the bit line is conductively connected to the memory cell at all times, and these products would infringe the ‘coupled’ limitation regardless of whether power is supplied” but that “in the NAND architecture [[]]

]], a select transistor must be powered on to make a conductive connection.” *Id.* The ID finds that because the “bit line [[]] is not coupled to the memory cell when

powered off,” “Toshiba does not directly infringe this limitation with respect to the accused products as imported, because the products are powered off.” *Id.*

ii. Commission Review

The Commission determined to review the ID’s finding. On review, the Commission has determined to reverse the ID’s finding that the accused Toshiba products do not satisfy the “coupled to” limitation. In particular, the ID erroneously transforms apparatus claims into method claims via claim construction. When this legal error is corrected, the undisputed record evidence shows that the claim term “coupled to” only requires a structure that provides an electrical path, which is satisfied by the structure of the accused products.

Claim 1 of the ’602 patent claims a semiconductor memory device that includes a memory cell; a dummy word line arranged at an edge of a memory array coupled to the memory cell; a control logic for supplying a positive bias to the dummy word line during an erase operation; and at least one bit line coupled to the memory cell. That is, the asserted claims are directed to an apparatus (*i.e.*, a semiconductor device) and not to a method. Yet the ID finds that “because the accused products are powered off at the time of importation, there is no infringement of the ‘coupled’ limitation under section 337.” ID at 82. The ID construed “coupled” to mean conductively connected (ID at 81 (citing Order No. 23 at 37-40)), and based on this construction, the ID apparently finds that infringement occurs only when the device is actively conducting power.

We disagree with the ID. We see no basis to find that the “coupled to” limitation is limited to devices that are shipped performing the functionality of actively conducting. We do not believe that the intrinsic evidence supports such a finding. The claim itself does not include language drawn to active performance and the specification does not limit the claims in this way.

For example, in discussing its Figure 2, the '602 patent states that “[b]it line 230j is arranged in a first direction and *is coupled* at one end to sense amplifier/column decoder circuit 210. Word line 240k, which *is coupled* to row decoder 220 at one end, is arranged approximately perpendicular to bit line 230j.” ’602 patent, 3:15-21 (emphasis added). In this passage, the patent does not refer to or even mention electron, voltage, or current flow or otherwise require the actual flow of electrons. Rather, the coupling appears to simply reference an ability for electrons to flow. This understanding is supported by extrinsic evidence. Expert testimony in the record shows that those of ordinary skill in the art reading the patent would understand that claim 1 is defined by the structural arrangement of a memory cell into a bit line and word line, and not by whether the bit line and word line are powered on. *See* CX-3840C at Q/A377-Q/A378; RX-1245C at Q/A52; Tr. (Baker) at 773:18-775:14. Accordingly, we reject the ID’s construction of “coupled” to the extent the ID understood it to require actively conducting power.

The ID, in effect, treats the apparatus claims as method claims. However, Federal Circuit precedents interpreting the text of section 271 draw a clear distinction between method and apparatus claims for purposes of infringement liability. *Cardiac Pacemakers, Inc. v. St. Jude Med., Inc.*, 576 F.3d 1348, 1363-64 (Fed. Cir. 2009) (*en banc* in relevant part). Infringement of a method claim only occurs after all steps of the patented method have been performed. *Id.* In contrast, apparatus claims with functional limitations can be directly infringed by accused structure that has the capability to satisfy the limitation at issue without the need for any modification. *See Texas Adv. Optoelectronic Solutions, Inc. v. Renesas Electronics America, Inc.*, 895 F.3d 1304, 1327 (Fed. Cir. 2018); *Broadcom Corp. v. Emulex Corp.*, 732 F.3d 1325, 1333 (Fed. Cir. 2013) (“It is well settled that an accused device that sometimes, but not always, embodies a claim nonetheless infringes.”). As described above, we do not find that the '602

patent limits its apparatus claims to active performance and there is no requirement under section 271 that an accused device be in actual use to infringe an apparatus claim. This arises from the principle that “apparatus claims cover what a device *is*, not what a device *does*.” *Hewlett-Packard Co. v. Bausch & Lomb, Inc.*, 909 F.2d 1464, 1468 (Fed. Cir. 1990) (emphasis in original). Further, as Macronix notes, the Commission has found infringement in similar circumstances. *See Certain Inject Ink Supplies And Components Thereof*, Inv. No. 337-TA-691, Comm’n Op. at 15-18 (Nov. 1, 2011) (Commission found infringement of claims requiring various parts to be “electrically coupled” to other parts or devices even though the accused ink cartridges were not powered on at the time of importation).

The ID states that “[t]his limitation would be infringed whether the power was on or off in the memory device described in the specification [of the ’602 patent], where the bit line is directly connected to the memory cells” but that the “[[

]].” ID at 83 (citing ’602 patent, Fig. 2). The ID adds that in a “NOR architecture [of the ’602 specification], the bit line is conductively connected to the memory cell at all times, and these products would infringe the ‘coupled’ limitation regardless of whether power is supplied” but that “in the NAND architecture [[]], a select transistor must be powered on to make a conductive connection.” *Id.* The ID appears to be comparing the accused products to an embodiment disclosed in the patent to analyze infringement. This is improper. The Federal Circuit has made clear that “[i]nfringement, literal or by equivalence, is determined by comparing an accused product not with a preferred embodiment described in the specification ... but with properly and previously construed claims in suit.” *SRI Int’l v. Matsushita Elec. Corp.*, 775 F.2d 1107, 1121 (Fed. Cir. 1985) (en banc).

The undisputed record evidence shows that the accused Toshiba products satisfy the “coupled to” limitation. Dr. Baker, Toshiba’s expert testified that the limitation as construed “means that there can be an electrical path between the bit line and the memory cell with some components” Tr. (Baker) at 773:18-773:25; 774:1-21. Dr. Liu, Macronix’s expert agreed that the [[

]].” CX-3840C at Q/A376. The ID, however, discounted this testimony because it imposed an erroneous requirement that the memory cells must be powered on at the time of importation for infringement. *See* ID at 84 (“The bit line [[]] is not coupled to the memory cell when powered off, and therefore Toshiba does not directly infringe this limitation with respect to the accused products as imported, because [[

]].”). Accordingly, based on the record evidence, the Commission has determined to reverse the ID’s non-infringement finding, and holds that Macronix has established that the accused Toshiba memory devices satisfy the “coupled to” claim limitation as properly construed.¹⁰

B. Whether Macronix Established the Economic Prong of the Domestic Industry Requirement

Macronix attempted to satisfy the economic prong of the domestic industry requirement as to all asserted patents in two distinct ways: (1) based on an industry in the process of being established via investments related to a semiconductor wafer referred to as the [[

]]; and (2) based on investments in “customer facing” engineering at its California subsidiary, MXA. ID at 142 (citing CIB at 166-94). The ALJ rejected both theories. The Commission determined to review the ID’s finding that Macronix failed to establish a domestic

¹⁰ The Commission adopts the ID’s finding that the accused products satisfy each limitation of claim 6 of the ’602 patent. ID at 87-88.

industry in the process of being developed based upon a petition for review by the IA and Macronix.

1. Applicable Law on Domestic Industry

Section 337 declares unlawful the importation, the sale for importation, or the sale in the United States after importation of articles that infringe a valid and enforceable U.S. patent. 19 U.S.C. § 1337(a)(1)(B). Section 337 further requires the presence of a domestic industry relating to the articles protected by the patent. 19 U.S.C. § 1337(a)(2). In a patent-based investigation, the complainant must show that an industry in the United States “relating to the articles protected by the patent . . . exists or is in the process of being established.” *Id.* The statute defines a domestic industry 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, 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.

19 U.S.C. § 1337(a)(3).

The domestic industry requirement consists of an economic prong and a technical prong. *Alloc, Inc. v. Int’l Trade Comm’n*, 342 F.3d 1361, 1375 (Fed. Cir. 2003). Satisfaction of the economic prong requires that there be a sufficient level of employment or investment in certain activities that meets the criteria of any one of the three factors listed above. *See, e.g., Lelo Inc. v. Int’l Trade Comm’n*, 786 F.3d 879 (Fed. Cir. 2015). Economic prong of the domestic industry requirement cannot be met based solely on qualitative factors. *Id.* Satisfaction of the technical

prong requires that the specified economic investments and activities must relate to articles that are “protected by the patent” under section 337(a)(3).

The Commission has held that a domestic industry is in the process of being established when (1) a patent owner takes “the necessary tangible steps to establish such an industry in the United States,” and (2) there is a “significant likelihood that the industry requirement will be satisfied in the future.” See *Certain Stringed Musical Instruments & Components Thereof*, Inv. No. 337-TA-586, Comm’n Op. at 13, 2008 WL 2139143, at *7 (U.S.I.T.C. May 16, 2008). The Commission’s analysis of this statutory emerging domestic industry provision in *Stringed Musical Instruments* quotes the 1988 legislative history, and states:

As for the legislative history of section 337(a)(2), an industry would be considered “in the process of being established” if the patent owner “can demonstrate that he is taking the necessary tangible steps to establish such an industry in the United States.” S. Rep. 100-71 at 130. “The owner of the intellectual property right must be actively engaged in steps leading to the exploitation of the intellectual property, including application engineering, design work, or other such activities. The Commission should determine whether the steps being taken indicate a significant likelihood that the industry requirement will be satisfied in the future.” H. Rep. 100-40 at 157. Moreover, “the mere ownership of a patent or other form of intellectual property rights would not be sufficient to satisfy this test.” S. Rep. 100-71 at 129.

Stringed Musical Instruments, Comm’n Op., 2008 WL 2139143, at *10. This standard is consistent with the Federal Circuit’s ruling that only a complainant that is “actively engaged in steps leading to the exploitation of the intellectual property” should have access to the Commission. See *John Mezzalingua Assocs., Inc. v. Int’l Trade Comm’n*, 660 F.3d 1322, 1328 (Fed. Cir. 2011) (quoting H.R. Rep. No. 100-40, at 157 (1987)).

2. Whether Macronix Has Proven a Domestic Industry in the Process of Being Established

i. The ID

Macronix presented its [[]] in support of its claim that it has a domestic industry in the process of being established. As the ID observes, the [[]] was developed in connection with a joint venture contract between Macronix and [[]]" and that regarding "investments in [[]] research, development, and manufacture, Macronix points to [[]] in plant and equipment expenditures, including [[]]."

]]." ID at 142-43 (citing CX-0435C). The ID further observes that "Macronix alleges a total of [[]] in expenditures for labor and capital investments by Macronix and its joint venture partner [[]] during the same time period" and that Macronix maintains that "the sum of these amounts, [[]], qualifies as research, development, and engineering." *Id.* at 143. Macronix contended that "the nexus requirement of subsection (C) can be presumed because 'the research investment is in an article embodying the asserted claims.'" *Id.* (citing RIB at 184-86).

The ID notes that work on [[]] and that "tape-out" (*i.e.*, manufacturing) of the [[]] was filed. *Id.* (citing Tr. at 633:18-20 (Bakewell); 647:25-648:5 (Bakewell)). The ID states that "Macronix does not dispute that the [[]] is not a commercial product" and that "Macronix's theory is that 'mass production and commercialization are not requirements of the domestic industry requirement generally, of the economic prong specifically, or of proof regarding an industry 'in the process of being established.'" *Id.* at 144 (citing CIB at 170-171). Macronix argued that "as long as 'the patented article' physically exists on or near the date the complaint is filed, there is a domestic industry in process" and that if mass production is required, "Macronix

relies on [[]].” *Id.* (citing Tr. at 651:9-652:11 (Bakewell); at 654:1-7).

The ID reasons that the “word ‘article’ in section (a)(2) is the same word that is used repeatedly in the statute to refer to an article of commerce, *i.e.*, a product for sale in the marketplace.” ID at 146 (citing 19 U.S.C. § 1337 (a)(1) (A), (B), (C), (E), (2), (3), (d)(1) (exclusion of articles from entry), (2) (exclusion of articles from entry), (e)(1) (exclusion of articles from entry), (f) (cease and desist from the production of like or directly competitive articles), (g)(2) (civil penalty for importation of articles), (h)(1) (forfeiture of any article) (3) (articles entitled to entry), (4)(A) (any article that is denied entry), (j)(3) (articles directed to be excluded from entry), and (1) (any article imported)). *Id.* The ID points to Supreme Court precedent that “identical words used in different parts of the same act are intended to have the same meaning.” *Id.* (citing *ClearCorrect LLC v. Int’l Trade Comm’n*, 810 F.3d 1283, 1294 (Fed. Cir. 2015) (quoting *Sullivan v. Stroop*, 496 U.S. 478 (1990))).

The ID notes that the Federal Circuit has construed the term “articles protected by the patent” to mean “products that are covered by the patent.” *Id.* at 146-47 (citing *InterDigital Commc’ns., LLC v. Int’l Trade Comm’n*, 707 F.3d 1295, 1298 (Fed. Cir. 2013)). In the ID’s view, “‘Articles’ as used in section 337 are ‘goods’ that are produced; articles are ‘products’ that can be licensed.” *Id.* at 147 (citing *ClearCorrect*, 810 F.3d at 1292 (“the word ‘article’ as ordinarily used in tariff acts embraces commodities generally, whether manufactured wholly or in part or not at all . . .”)) (quoting *Articles*, Dictionary of Tariff Information (1924)). Thus, the ID concludes that “the whole purpose of section 337 is to prevent importation of articles of commerce that compete unfairly in the American marketplace and to stop such articles from

being sold, if they are here” and that “[a]s a trade statute, the purpose of Section 337 is to regulate international commerce.” *Id.*

The ID states that “Section 337 is an enforcement statute enacted by Congress to stop at the border the entry of goods, *i.e.*, articles that are involved in unfair trade practices.” *Id.* (citing *InterDigital*, 707 F.3d at 1295 (holding requirement to demonstrate exploitation of intellectual property “with respect to the articles protected by the patent” satisfied “because the patents in suit protect the technology that is . . . found in the products that [InterDigital] has licensed and that it is attempting to exclude”). The ID finds that “[c]onsistent with the provisions and purpose of section 337, the word ‘articles’ in section (a)(2) means products or other commodities that are sold in the marketplace” and that “Section (a)(2) protects a complainant who has a product to be sold in the marketplace but does not yet have the resources to sell it.” ID at 147. Such a complainant, according to the ID, “will be protected as long as there is tangible evidence that the product will be sold in the marketplace within a reasonable time.” *Id.* (citing *Stringed Instruments*).

The ID concludes that “Section 337(a)(2), properly construed, thus provides protection in a fairly limited set of circumstances and does not, as Macronix suggests, create a loophole in the domestic industry requirement by permitting a company to establish a domestic industry based only on research expenditures, without relating those expenditures to an actual article of commerce.” *Id.* at 148. The ID reasons that “Section 337 (a)(2) cannot be read to protect research that is not embodied in an article of commerce” and found that “[o]n the facts in the record, the [[]] cannot be considered a prototype of an article of commerce” and that “it is at most a precursor of what may someday be a prototype or an actual article.” *Id.* at 148 n.30. Specifically, the ID finds that “the [[]] is not a product that is ready for

the marketplace and is not likely ever to be sold as a commercial product” and that the “[[]] research project, which has been in process since [[]] before it results in a product for sale, if it ever does.” *Id.* The ID acknowledges that undisputedly “the [[]]” but that “[t]here is no evidence in the record that any of these [[]] has been sold.” *Id.* Instead, the “evidence shows, on the contrary, that these [[]] were used to conduct further research.” *Id.*

ii. Commission Review

The Commission determined to review the finding that Macronix failed to satisfy the domestic industry requirement and posed the following question to the parties:

Please discuss the showing necessary to meet the statutory requirement of “articles protected by the patent” for a domestic industry in the process of being established under section 337(a)(2).

a) IA’s Submission

The IA notes that under Section 337(a)(2) and Commission precedent, a complainant seeking to show “an industry in the United States, relating to the articles protected by the patent . . . is in the process of being established” must demonstrate (i) that it is taking “the necessary tangible steps to establish such an industry”; and (ii) there is a “significant likelihood that the industry requirement will be satisfied in the future.” IA Sub. at 25 (citing 19 U.S.C. § 1337(a)(2); *Stringed Musical Instruments*, Comm’n Op. at 13). According to the IA, a complainant “can meet that statutory requirement by showing, for example, that an industry in the United States relating to ‘material things’ that ‘are covered by the patent’ (*i.e.*, technical prong) is in the process of being established. *Id.* (citing *ClearCorrect*, 810 F.3d at 1299

(construing “articles” to mean “material things”); *InterDigital*, 707 F.3d at 1298 (construing “articles protected by the patent” to mean “products that are covered by the patent”).

The IA asserts that “[c]ontrary to Federal Circuit and Commission precedent, the ID required a higher showing to meet the statutory requirement of ‘articles protected by the patent’ when the ID determined,” among other things “(i) that the word ‘article’ [sic] in Section 337(a)(2) is ‘the same word that is used repeatedly in the statute to refer an article of commerce, *i.e.*, a product for sale in the marketplace,’ and (ii) that the word ‘articles’ in Section 337(a)(2) means ‘products or other commodities that are sold in the marketplace.’” *Id.* (citing ID at 146-147).

According to the IA, “[t]he ID’s proposed requirement of “a product for sale in the marketplace” and, as a result, restriction against finding any domestic industry in the process of being established based on research and development expenditures (or engineering expenditures) that are not embodied in “a product for sale in the marketplace” is in conflict with Commission precedent.” *Id.* at 26. The IA points to *Certain Computers and Computer Peripheral Devices, and Components Thereof, and Products Containing Same* (“*Computers*”), Inv. No. 337-TA-841, and argues that there, the Commission specifically considered “whether establishing a domestic industry under 19 U.S.C. § 1337(a)(3)(C) requires proof of ‘articles protected by the patent’ (*i.e.*, a technical prong).” *Id.* (citing *Computers*, Inv. No. 337-TA-841, Comm’n Op. at 5 (Jan. 9, 2014) (quoting 19 U.S.C. § 1337(a)(3)(C)); *see also* 19 U.S.C. § 1337(a)(2) (reciting “articles protected by the patent”). The IA observes that “[a]fter requesting and receiving briefing from the parties on the statutory language, legislative history, Commission decisions, and Federal Circuit decisions relevant to that question, the Commission answered the question in the affirmative.” *Id.*

The IA explains that “in answering the question, the Commission considered but rejected the premise that the article protected by the patent ‘must be a product that came to market, or is

expected to come to market, under the protective umbrella of the asserted patent that the product commercializes.” *Id.* The IA asserts that the Commission considered “the plain meaning of the statute and its legislative history” and determined that neither one provides support for adopting that premise, which “would offer no relief to an inventor-complainant in certain circumstances, such as when an industry copies her invention -- maybe verbatim from the published patent -- before the complainant has had an opportunity to engage in production-oriented efforts of her own.” *Id.* at 26-27. The IA states that “in view of the Commission’s determination that ‘articles protected by the patent’ are not restricted to products that come to market, OUII respectfully submits that the ID’s finding that ‘articles protected by the patent’ must be embodied in ‘products for sale in the marketplace’ and, thus, the ID’s determination of no domestic industry in the process of being established, should be reversed.” *Id.* at 27.

b) Toshiba’s Submission

Toshiba contends that “[t]here is no dispute in this Investigation as to the proper test for determining whether an industry is ‘in the process of being established’ for purposes of Section 337(a)(2)” and that all the parties are in agreement as to the Commission’s two part test. Toshiba Sub. at 18 (citing *Stringed Instruments*, 2008 WL 2139143, at *8; *Certain Video Game Systems & Controllers*, Inv. No. 337-TA-743, Comm’n Op. 2011 WL 1523774 (April 14, 2011)).

According to Toshiba, “Macronix alleges that as of the date of the complaint, a domestic industry related to an experimental PCM non-volatile memory technology was in the process of being established” and that to “prove that the future PCM industry is related to articles protected by the patent, Macronix relies on fabrication of the so-called [[]] during the ongoing [[]] research conducted by Macronix and [[]].” *Id.* Toshiba contends that “the ID correctly concluded that the overwhelming evidence establishes that Macronix (a) failed to prove

it undertook the required necessary tangible steps to establish a PCM industry in the United States, and (b) failed to establish a ‘significant likelihood’ that a PCM industry related to articles protected by the patent will be satisfied in the future.” *Id.* at 18-19 (citing ID at 153). Toshiba argues that “[i]n the context of a domestic industry in the process of being established, it is not sufficient merely to establish that a product (or prototype) practices the asserted patents and satisfies the technical prong” but that “satisfaction of the two-part test articulated is still required.” *Id.* at 19 (citing *Video Game Systems*, Inv. No. 337-TA-743).

Toshiba relies on *Video Game Systems*, and contends that there, the Commission remanded an Initial Determination finding no economic prong to the ALJ to address four questions relevant to whether or not a domestic industry exists or is in the process of being established. *Video Game Systems*, Inv. No. 337-TA-743, ID, 2011 WL 6210524 at *79 (Nov. 2, 2011). According to Toshiba, “[o]n remand, the ID found that Complainant Motiva’s prototype device that was created prior to filing its complaint practiced the asserted patents and therefore satisfied the technical prong of the domestic industry requirement” but that “[n]otwithstanding this technical prong finding, the ALJ addressed the Commission’s specific questions, which included in relevant part:

- “How close was Motiva’s technology to being commercialized and/or production ready?” (*Id.* at *85);
- “Was Motiva taking the ‘necessary tangible steps to establish’ a domestic industry? *See Stringed Instruments*, at 13 (quoting S. Rep. 100-71 at 130).” (*Id.* at *86); and
- “Do the steps ‘taken [by Motiva] indicate a significant likelihood that the industry requirement will be satisfied in the future?’ *See Stringed Instruments*, at 13 (quoting H. Rep. 100-40 at 157).” (*Id.* at *88).

Toshiba argues that in *Video Game Systems*, the “ID considered Motiva’s evidence that

‘its fully-functional prototype was ‘ready for commercialization’” and was being shown to actual customers, but ultimately the ID found that Motiva’s technology was “not close to being incorporated into a commercial or production-ready product.” *Id.* at 19 (citing *Video Game Systems* at *85). Toshiba states that “even though the ID separately found that the prototype practiced the asserted patents and satisfied the technical prong,” it followed the Commission’s instructions and determined that “Motiva has failed to demonstrate that a domestic industry ‘is in the process of being established,’ pursuant to Section 337(a)(2).” *Id.* (citing *Video Game Systems* at *95; *Motiva, LLC v. International Trade Commission*, 716 F.3d 596, 601 (Fed. Cir. 2013) (noting “Motiva’s only remaining prototype was a product far from completion, and a multitude of development and testing steps remained prior to finalizing a product for production.”)).

Toshiba states that “the ID’s determination that the [[]] is not an ‘article’ within the meaning of Section 337(a)(2) should be viewed in light of the entire statutory framework” and that “a key consideration in the ID’s analysis is the lack of evidence linking the patent-practicing aspects of the [[]] chip that Macronix alleges will establish a future domestic industry.” *Id.* at 21-22. Toshiba argues that “[t]he lack of any genuine commercial prospects for what the evidence showed was merely an [[]] research tool whose purpose was to conduct further research obviously undermines any claim that a future PCM industry would ever materialize (let alone within a reasonable time)” and that “the significant technological obstacles confronting [[]] when measured at the time of the [[]] fabrication makes it impossible to conclude that at the time the complaint was filed (*i.e.*, before the first [[]]) there was a ‘significant likelihood’ that a domestic industry would be established

in the future. *Id.*

Thus, Toshiba contends that “the ID applied the proper two-part test for evaluating an industry ‘in the process of being established’ and considered substantial documentary evidence and fact and expert testimony before concluding that Macronix had failed to establish such an industry with respect to the [[]].” *Id.* Toshiba asserts that “the evidence confirms [that] Macronix failed to prove the necessary tangible steps to establish an industry in the United States, or a ‘significant likelihood’ that the industry requirement will be satisfied in the future.” *Id.* at 22-25.

c) **Macronix’s Submission**

Macronix observes that “Toshiba only cites ALJ Rogers’ remand determination in [*Video Game Systems*] to suggest that an emerging industry requires a commercial product.” Macronix Reply Sub. at 21. But according to Macronix, “*Video Game Systems* never addressed what an ‘article’ means in Section 337, nor did it hold that the lack of a commercial product precludes a finding of DI in the process of being established.” *Id.* As Macronix explains, “the complainant in *Video Game Systems* had, by the time of its complaint, **ceased all investment** under subsection (C) relating to the asserted patents.” *Id.* (citing *Video Game Systems* at *92-95; *see also Motiva*, 716 F.3d at 598-601. Specifically, Macronix notes that “Complainant Motiva ceased its investments in the development of its patented article about **3.5 years before filing its complaint** (*Id.* at *89)” and “[t]hus, the **only investments** on which Motiva could rely were litigation expenses.” *Id.* (emphasis supplied by Macronix). Macronix further explains that “Motiva proposed that its litigation campaign would encourage commercial manufacturers to license Motiva’s technology, such that an emerging industry existed in the promise of future licensing (*Id.* at *92-95) and that “[i]t was within this context that ALJ Rogers discussed Motiva’s efforts

to encourage adoption of its technology via litigation, and concluded that the complainant's speculative future licensing program could not satisfy the emerging DI test." *Id.* (citing *Video Game System* at *94-95; *Motiva*, 716 F.3d at 598-601). Macronix argues that "*Video Game Systems* focused on Motiva's lack of timely investments and lack of commercial licensing interest in its technology, a fact which was only relevant because Motiva's DI contention depended on increased marketplace licensing." *Id.* Macronix states that "*Video Game Systems* in no way reinterpreted Section 337 to require commercialization or an article "sold in the marketplace.""

Macronix further argues that in contrast to *Video Game Systems*, it is not relying on litigation expenditures or licensing campaigns, but has instead made significant investments and efforts in the U.S. to develop a new technology embodied in an article manufactured in this country: [[]]. *Id.* Macronix adds that "[t]hese investments, together with [[]] on the technical development, design, and manufacture of the innovative [[]]" and that "[t]hese investments in labor and capital, plant and equipment, and/or exploitation of the asserted patents through R&D and engineering, occurred in [[]], and are part of a long partnership between [[]] to create the next technological revolution in NVM." *Id.* Thus, Macronix argues that *Video Game Systems* has no bearing on this investigation.

iii. Analysis

The Commission finds that the ID's misinterpretation of the statute to require "an article of commerce, *i.e.*, a product for sale in the marketplace" (ID at 146) led to the erroneous

conclusion that Macronix failed to show a domestic industry in the process of being established. Thus, the Commission has determined to reverse the ID.

In the present investigation, Macronix relies on investments under prongs (A), (B), and (C). No dispute exists that Macronix and [[]] have “devoted significant resources— [[]], a large research team, and dedicated New York and Vermont facilities—to researching and developing PCM technology in the United States.” ID at 142-143; CDX-2506C (detailing the history of the Macronix [[]]); CX-3842C (Lung DWS) at Q/A8-Q/A9; CX-2176C (Macronix[[] License)).

The undisputed evidence shows that the [[]] has invested over “[[]] in domestic plant and equipment, domestic employment of labor and capital, and domestic exploitation of the Asserted Patents, all of which occurred in connection with the design and manufacture of the [[]].” ID at 142-144; CX-3837C at Q/A23-Q/A64; CX-3841C (Yang DWS) at Q/A60-Q/A66; CX-3842C at Q/A17; Tr. (Lung) at 129:16-136:1; JX-0010C at 28:1-30:10, 42:2-44:1; Tr. (Bakewell) at 632:1-640:19, 650:20-652:11). There is also no dispute that hundreds of the [[]] have been manufactured by the [[]] in Vermont and New York. ID at 144 (“[[]] occurred six weeks after the complaint was filed.”); CX-3842C (Lung DWS) at Q/A2- Q/A4, Q/A10-Q/A20; JX-0010C at 32:12-19, 33:19-35:14; CX-3837C (Bakewell DWS) at Q/A61, Q/A147-Q/A150; Tr. (Lung) at 129:16-136:1 (confirming all [[]] work occurs in the U.S.); Tr. (Bakewell) at 648:20-22); *see also* CX-3842C at Q/A 18).

Despite this significant domestic investment in the [[]], the article protected by the asserted patents, the ID finds that Macronix failed to establish the

economic prong of the domestic industry requirement. The ID reaches that conclusion because, “the [[]] is not a product that is ready for the marketplace and is not likely ever to be sold as a commercial product.” ID at 148. We disagree with the ID’s interpretation of “articles” under section 337(a)(2). We are not aware of any authority that would compel the Commission to find that “articles” is limited to commercial goods. Indeed, neither the statutory text nor the legislative history of this provision mandates the ID’s conclusion that Section 337(a)(2) requires industries in the process of being established to prove commercial production. Section 337(a)(2) only requires that there is an industry in the United States “relating to articles protected by the patent” that is “in the process of being established.” Moreover, that emergent industry must prove that it has significant or substantial investments or employment in the United States “with respect to articles protected by the patent” as recited in the statute. *See* 19 U.S.C. § 1337(a)(2); 1337(a)(3)(A)-(C).¹¹ The statutory language of section 337(a)(2) on its face does not require commercial production for a domestic industry in the process of being established. The term “article” on its own is sufficiently capacious to embrace pre-commercial or non-commercial items. And the fact that section 337 allows a complainant to establish a domestic industry based on an industry “in the process of being established” strongly suggests that Congress did not envision commercialization as a prerequisite.

The Commission has previously considered and rejected the notion that the “article protected by the patent” “must be a product that came to market, or is expected to come to market, under the protective umbrella of the asserted patent that the product commercializes.”

¹¹ Subprong (C) requires “substantial” domestic investments in the exploitation of the patent, which must be supported by a demonstration of “nexus” between the investments and the patent right. 19 U.S.C. § 1337(a)(3)(C); *Certain Integrated Circuit Chips*, Inv. No. 337-TA-859, Comm’n Op., 2014 WL 12796437, at *21 (Aug. 22, 2014). Here, the nexus requirement of subsection (C) can be presumed because the research investment is in the article protected by the patent. *See id.*

Computers, Inv. No. 337-TA-841, Comm'n Op. at 37. In *Computers*, the Commission, relying on the plain meaning of the statute and its legislative history, determined that neither provides support for adopting that understanding, which "would offer no relief to an inventor-complainant in certain circumstances, such as when an industry copies her invention -- maybe verbatim from the published patent -- before the complainant has had an opportunity to engage in production-oriented efforts of her own." *Computers*, Comm'n Op. at 39.

Consideration of the legislative history does not show any intent to limit articles to commercial goods. For example, when Congress amended section 337 in 1988 to add section 337(a)(3)(C), it made clear its intent was to enable certain specific categories of IP rights holders to pursue claims under the statute. These entities included universities and inventors who engage in licensing activities with manufacturers. *See* S. Rep. No. 100-71, at 129 (1987); H. R. Rep. No.100-40, at 157 (1987). Licensing activities are often crucial for inventors, start-ups, and other businesses to raise the funds needed to develop a product that practices the invention and bring that product to market. During this development time, which can vary depending on the technology and other circumstances, those entities would not be able to satisfy the domestic industry requirement under a statutory construction that mandates a commercialization requirement. The effect of this construction would be to advantage speedy infringers at the expense of entities such as inventors, small businesses, and start-ups. This view is reflected in statements made by Senator Lautenberg in support of the 1988 amendments to the domestic industry requirement:

The so-called industry requirement is also too broad. Today, in order to get relief, inventors must exploit their invention by production in the United States. For better or worse, we are more and more an information based economy, for those who make substantial investments in research, there should be a remedy. For those who make substantial investments in the creation of

intellectual property and then license creations, there should be a remedy.

Let me give one example. There is a startup biotech firm in my state. Its product is its patents. It hasn't reached the stage to manufacture. It doesn't have the money. But it will reach that point, by licensing its patents to others. Should we deny that firm the right to exclude the works of pirates? Our legislation would say no. A party could get relief if it has made significant investment in R&D, engineering or licensing.

133 Cong. Rec. S. 1794 (Feb. 4, 1987).

Toshiba attempts to gloss over the ID's requirement of commercial production by arguing that the ID's finding is based upon Macronix's failure to satisfy the two prong test for an industry in the process of being established. To be sure, the ID purports to apply the two part test, *i.e.*, considers whether Macronix has taken "the necessary tangible steps to establish an industry in the United States" and whether there is a "significant likelihood that the industry requirement will be satisfied in the future." *See Stringed Instruments*, Inv. No. 337-TA-586, Comm'n Op. at 13, 2008 WL 2139143, at *7). But underpinning the ID's application of the two prong test is the erroneous requirement of commercial production. In particular, the ID found that "[t]he evidence shows that the [[]] is not a product that is *ready for the marketplace* and is not likely ever to be sold as a *commercial product*" and that "[[]] research project, which has been in process since [[]] before it results in a *product for sale*, if it ever does." ID at 150 (emphasis added).

Having rejected the ID's interpretation that the statutory term "article" requires commercial production, we find the record evidence supports Macronix's claim of an industry in the process of being established. The undisputed evidence shows that Macronix has substantial investments in research, development, and engineering of the article [[]]

]] protected by the asserted patents. Macronix amply demonstrated its activities and investments of at least[[]]] toward the establishment of a PCM manufacturing industry in the United States, including the detailed tangible steps it has already taken and its further planned work to be undertaken in order to bring this industry to fruition within the foreseeable future. *See, e.g.*, CX-3837C at A23-A64; CX-3841C (Yang DWS) at A60-A66; CX-3842C at A17; Tr. (Lung) at 129:16-136:1; JX-0010C at 28:1-30:10, 42:2-44:1; Tr. (Bakewell) at 632:1-640:19, 650:20-652:11; . Simply because Macronix has not yet arrived at the final stages of commercializing the [[]]] does not mean that Macronix does not have a domestic industry in the process of being established with respect to [[]]] protected by the asserted patents.

Based on the foregoing reasons, the Commission has determined to reverse the ID's findings. The Commission therefore finds that Macronix has established a domestic industry in the process of being established relating to the [[]]] protected by the asserted patents under Section 337(a)(2).¹²

The Commission has determined to affirm the ID's determination that Macronix failed to establish a domestic industry based on investments in "customer facing" engineering for the reasons provided in the ID. See ID at 154-186.

¹² The Commission notes that Macronix previously asserted a domestic industry that "exists" in [[]]], but this contention was precluded pursuant to Order No. 26 (Jan. 8, 2018). ID at 142 n.24. The Commission thus addresses the issue of domestic industry in this investigation under the theory of whether it is "in the process of being established" since that is the theory advanced by Macronix that the ID considers. In so doing, we do not intend to imply that the investments present here are not substantial or could not be used to show the actual existence of a domestic industry under section 337(a)(3).

III. REMEDY

A. Limited Exclusion Order

1. Summary of the Issue and Parties' Arguments

Where a violation of section 337 has been found, the Commission must consider the issues of remedy, the public interest, and bonding. Section 337(d)(1) provides 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 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.”). The Commission has “broad discretion in selecting the form, scope, and extent of the remedy.” *Viscofan, S.A. v. U.S. Int’l Trade Comm’n*, 787 F.2d 544, 548 (Fed. Cir. 1986). The Commission may issue an exclusion order excluding the goods of the person(s) found in violation (a limited exclusion order) or, if certain criteria are met, against all infringing goods regardless of the source (a general exclusion order). The Commission also has authority to issue cease and desist orders in addition to or in lieu of exclusion orders. *See* 19 U.S.C. § 1337(f). The Commission generally issues cease and desist orders to respondents who maintain commercially significant inventories of infringing products in the United States. *See, e.g., 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).

As noted above, on May 10, 2018, the ALJ issued her recommended determination on remedy and bonding. Recommended Determination on Remedy and Bonding (“RD”). The RD recommends that in the event the Commission finds a violation of section 337, the Commission

should issue a limited exclusion order (“LEO”) prohibiting the importation of Toshiba’s accused products that infringe the asserted claims of the asserted patents. RD at 1-5. The RD notes that no one disputes that for certain Toshiba downstream products, such as Toshiba PCs, it is difficult to distinguish between [[]]

and thus recommends that the LEO include the standard Commission certification provision that “allows the respondents to certify, pursuant to procedures to be specified by U.S. Customs and Border Protection, that they are familiar with the terms of the order, that they have made appropriate inquiry, and that, to the best of their knowledge and belief, the products being imported are not excluded from entry under the order.” *Id.* at 3-4 (citing *Certain Marine Sonar Imaging Devices, including Downscan and Sidescan Devices*, Inv. No. 337-TA-921, Initial Determination at 297 (July 2, 2015), *aff’d* by Comm’n Op. at 80 (Jan. 6, 2016).

The RD does not recommend a service and repair exception as requested by Toshiba, finding that Toshiba “does not identify any specific replacement parts and does not explain what repairs are provided to consumers.” *Id.* at 4 (citing *Certain Biometric Scanning Devices, Inc.* No. 337-TA-720, Comm’n Op. at 26 (Nov. 10, 2011) (declining to issue “repair parts” exemption where “respondents have not made clear exactly what ‘replacement parts’ are necessary to import here”). The RD also recommends that the LEO include a provision requiring Macronix to provide regular updates to the Commission regarding the status of its domestic industry in the process of being established. *Id.* (citing *Certain Biometric Scanning Devices, Components Thereof Associated Software, and Prods. Containing the Same*, Inv. No. 337-TA-720, Comm’n Op. at 26, Limited Exclusion Order at 5 (Oct. 24, 2011) (requiring complainant to file an annual report identifying the number of domestic industry products produced in the United States).

Toshiba, relying on the factors the Commission outlined in *Certain Erasable Programmable Read-Only Memories, Components Thereof, Products Containing Such Memories, and Processes for Making Such Memories*, Inv. No. 337-TA-276, Comm'n Op. at 123-26, USITC Pub. 2196 (May 1989) (“*EPROMs*”),¹³ argued that an exclusion order should not extend to downstream PC products because the value of the infringing flash memory products is small in comparison to the value of a PC, which includes numerous additional features and technologies. The RD disagreed stating that “[t]he *EPROMs* factors are not relevant to my recommendation for a remedy in this investigation” and that “Toshiba does not cite any recent investigation where the *EPROMs* factors were applied to a respondent’s own downstream products.” *Id.* at 3. The RD observes that, rather, the Commission has held that “[i]n investigations involving respondents that have participated in an investigation, the Commission is required to provide some form of relief under Section 337(d) and/or (f)(1) unless such relief is contrary to the public interest.” *Id.* (citing *Certain Electric Skin Care Devices, Brushes and Chargers Therefor, and Kits Containing The Same*, Inv. No. 337-TA-959, Comm'n Op. at 21-22 (Feb. 6, 2017)).

Macronix agrees with the RD that the Commission should issue an LEO directed to Toshiba’s infringing products. Macronix Sub. at 55. Macronix explains that “[t]he requested

¹³ The *EPROMs* factors include: (1) the value of the infringing articles compared to the value of the downstream products in which they are incorporated; (2) the identity of the manufacturer of the downstream products, *i.e.*, whether it can be determined that the downstream products are manufactured by the respondent or by a third party; (3) the incremental value to the complainant of the exclusion of downstream products; (4) the incremental detriment to respondents of exclusion of such products; (5) the burdens imposed on third parties resulting from exclusion of downstream products; (6) the availability of alternative downstream products that do not contain the infringing articles; (7) the likelihood that the downstream products actually contain the infringing articles and are thereby subject to exclusion; (8) the opportunity for evasion of an exclusion order that does not include downstream products; and (9) the enforceability of an order by Customs. *See EPROMs*, Comm'n Op. at 125.

LEO provides appropriate and tailored relief against *only Toshiba's products*, thus avoiding any impact on the downstream products of non-parties (e.g., Dell) who incorporate Toshiba's products overseas and then import assembled articles containing those products." *Id.* at 56 (emphasis in original). Macronix contends that the LEO should extend to each Toshiba downstream product incorporating infringing NVM devices. *Id.* (citing RD at 1-3; CX-3837C at Q/A154). Macronix explains that the "Toshiba downstream products identified in this Investigation fall into [[]] categories: [[

]]." *Id.* (citing CX-0002C (Stip.); CX-0050C-CX-0052C (Toshiba Supp. Interrog. Resp.); CX-5430C (Suppl. Stip.)). According to Macronix, "Toshiba has *stipulated* and *does not dispute* that a LEO should cover the downstream products in categories 2-6." *Id.* (citing CX-0002C at ¶ 9; CX-5430C at ¶ 13; RD at 2).

Macronix does not object to a certification provision, and agrees with the ALJ that the LEO should not include an exception for service and repair. *Id.* at 59-60. Macronix, however, takes issue with the LEO including a reporting requirement for its domestic industry. Macronix Sub. at 58-59. Macronix contends that "imposing a reporting requirement on Macronix, as complainant, would depart from established Commission practice where only rare and exceptional circumstances merited such reports." Macronix states that "in *Certain Variable Speed Wind Turbines*, the Commission imposed a reporting requirement because the complainants filed for bankruptcy at about the same time the ALJ issued his initial determination, which put into question the complainant's continued manufacture and maintenance activities with respect to the domestic industry products." *Id.* at 58-59 (citing 337-

TA-376, Comm'n Op., 1996 WL 1056209 at *11-12 (Sept. 23, 1996)). Macronix argues that here, in contrast, “[it] and [[]] face no such bankruptcy, and the evidence shows an ongoing effort to develop and grow the domestic industry.” *Id.* at 59.

Regarding *Certain Biometric Scanning Devices*, Macronix states that “it is unclear why the Commission imposed a reporting requirement because the redactions in the opinion leave no adequate fact to assess any similarity to the present situation.” *Id.* (citing Inv. No. 337-TA-720, Comm'n Op., 2011 WL 8883591 at *12 (Nov. 10, 2011)). Yet, Macronix argues that “[t]o the extent that the reporting requirement generally arose from some doubt about the complainant’s continued exploitation of its patent, such concerns would be true in any investigation where product features regularly change and evolve” but that “the Commission does not routinely impose a reporting requirement in such situations.” *Id.* Macronix adds that “the undisputed evidence shows that Macronix [[]] are continuing their work on developing and commercializing PCM technology based on the technology embodied in the patent-practicing [[]].” *Id.* (citing CX-3842C at Q/A19; *see also* Tr. (Lung) at 134:2-135:9; Tr. (Bakewell) at 627:23-629:11).

The IA agrees with the RD’s recommendation that issuance of a limited exclusion order directed to the infringing products of Toshiba is an appropriate remedy. IA Sub. at 27 (citing RD at 5). The IA further agrees with the RD’s recommendation that the limited exclusion order include a standard certification provision. *Id.* The IA also agrees with the RD that Macronix be required to submit regular reports regarding the status of the domestic industry if the Commission finds a domestic industry that is in the process of being established. *Id.* at 27-28.

Toshiba argues that no remedial orders should issue because of the impact such orders will have on the public interest. Toshiba Sub. at 61. Toshiba further argues that “any LEO that

issues should include an adjustment period of 12 months to mitigate the harm that would result from exclusion of Toshiba's accused NAND flash memory products." *Id.*

2. Analysis

Having found a violation of section 337, the Commission has determined to issue an LEO directed to Respondents' infringing products.

The LEO provides that:

Non-volatile memory devices and products containing same that infringe claim 6 of the '602 that are 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, 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.

The LEO includes the standard certification provision that allows Respondents to certify that under procedures to be specified by U.S. Customs and Border Protection, they are familiar with the terms of the exclusion order, that they have made appropriate inquiry, and that, to the best of their knowledge and belief, the products being imported are not subject to the exclusion order.¹⁴

The Commission agrees with the RD that inclusion of a service and repair exemption is not warranted because Toshiba "does not identify any specific replacement parts and does not explain what repairs are provided to consumers." RD at 4. Given the substantial efforts and expenditure so far expended by Macronix in establishing a domestic industry in articles that practice the '602 patent, the Commission declines to include a reporting requirement as to the

¹⁴ The Commission asked Macronix to supply the names of known importers of the Respondents' products at issue in this investigation. *See* 83 *Fed. Reg.* 31416-18 (July 5, 2018). In response, Macronix identifies only the Toshiba Respondents. Macronix Sub. at 75.

status of Macronix's domestic industry in the process of being developed.¹⁵ See CX-3842C at Q/A19; Tr. (Lung) at 134:2-135:9; Tr. (Bakewell) at 627:23-629:11.

With respect to *EPROMs*, similar to the RD, the Commission does not find the *EPROMs* balancing test to be relevant in the current Investigation. As the Commission has explained, the factors set forth in *EPROMs* were conceived for the following purpose:

[T]he Commission may, in issuing exclusion orders, whether general or limited, balance the complainant's interest in obtaining complete protection from all infringing imports by means of exclusion of downstream products against the inherent potential of even a limited exclusion order, when extended to downstream products, to disrupt legitimate trade in products *which were not themselves the subject of a finding of violation of section 337*.

In performing this balancing, the Commission may consider such matters as [the *EPROMs* factors].

EPROMs, Comm'n Op. at 125 (emphasis added).

Contrary to the concern articulated in *EPROMs* having to do with "products which were not themselves the subject of a finding of violation of section 337," the LEO that Complainants seek is directed to Toshiba's products that are accused in this Investigation, and are imported and sold in violation of Section 337 by Toshiba, a respondent named in this Investigation. See Macronix Sub. at 55 ("The requested LEO provides appropriate and tailored relief against *only Toshiba's products*, thus avoiding any impact on the downstream products of non-parties (e.g., Dell) who incorporate Toshiba's products overseas and then import assembled articles containing those products.). Accordingly, the Commission finds that the *EPROMs* factors are not relevant in this situation. See *Certain Graphics Systems, Components Thereof, and*

¹⁵ The Commission notes that should there be changed circumstances as to the status of Macronix's domestic industry in the process of being established, for example, should Macronix cease its efforts to establish such an industry, Toshiba can petition the Commission to modify the remedial orders under 19 C.F.R. § 210.76.

Consumer Products Containing the Same, Inv. No. 337-TA-1044, Comm'n Op. at 65-66 (Aug. 22, 2018).

B. Cease and Desist Orders

1. Summary of the Issue and Parties' Arguments

The RD also recommends issuance of cease and desist orders against the domestic respondents Toshiba America, Inc. and its subsidiaries, Toshiba America Electronic Components, Inc. ("TAEC") and Toshiba America Information Systems, Inc. ("TAIS"). RD at 5-6.

Specifically, the RD finds that TAEC and TAIS maintain commercially significant inventories [[]]. *Id.* at 6.

Macronix and the IA agree with the RD's recommendation. Macronix Sub. at 60-61; IA Sub. at 28. Toshiba argues that CDOs should not issue due to public interest concerns. Toshiba Sub. at 62-63. Toshiba, however, states that "[t]o the extent the Commission believes a CDO is warranted, such an order should carve-out TMA's activities with respect to the NAND flash products that are delivered outside the U.S.

2. Analysis

The Commission has determined to accept the ALJ's recommendation and issues herewith cease and desist orders under 19 U.S.C. §1337(f) directed to Toshiba America, Inc., TAEC, and TAIS.

Cease and desist orders "are generally issued when there is a 'commercially significant' amount of infringing, imported product in the United States that could be sold by an infringing respondent thereby resulting in evasion of the remedy provided by the exclusion order." *Certain Optoelectronic Devices, Components Thereof & Prod. Containing Same*, Inv. No. 337-TA-860, Comm'n Op. at 36 (May 9, 2014). The evidence shows that Toshiba America, TAEC, and

TAIS maintain commercially significant inventories [[

]].¹⁶

CX-3837C at Q/A 171-75. CDOs do not preclude exportation of covered products so Toshiba's concerns as to its exportation of infringing goods are unfounded. The cease and desist orders prohibit the domestic respondents 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, non-volatile memory devices and products containing the same covered by covered by claim 6 of U.S. Patent No. 6,788,602 ("the '602 patent") in violation of Section 337 of the Tariff Act of 1930 as amended (19 U.S.C. §1337).

The cease and desist orders include the following standard exemption: if in a written instrument, the owner of the patent authorizes or licenses such specific conduct, or such specific conduct is related to the importation or sale of covered products by or for the United States.

IV. 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). In connection with

¹⁶ Commissioner Schmidlein supports issuance of the CDOs in this investigation for reasons similar to those offered by her in previous investigations. *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) (public version); *Certain Network Devices, Related Software and Components Thereof (I)*, Inv. No. 337-TA-944, Comm'n Op. at 56, n.20 (July 26, 2016) (public version). Specifically, she finds that the presence of some infringing domestic inventory, regardless of the commercial significance, provides a basis to issue CDOs in this investigation.

that, the Commission noted in its notice of review that if it contemplates some form of remedy, it must consider the effects of that remedy upon the public interest and posed the following questions:

1. If an exclusion order issues against Toshiba's accused products, can Dell's other SSD suppliers or other SSD suppliers in general fill any void that may be created?
2. What domestic Dell products will be impacted by an exclusion order?
3. Toshiba and Dell request a delay in implementing any exclusion order. If an exclusion order issues, what specific product(s) should a delay apply to? What should be the duration of the delay?
4. Macronix and Toshiba present vastly different views about the ability of suppliers to satisfy domestic demand if an exclusion order issues. Please discuss the ability of suppliers other than Toshiba to satisfy domestic demand for each and every product that may be affected by an exclusion order.

We summarize the responses below:

1. If an exclusion order issues against Toshiba's accused products, can Dell's other SSD suppliers or other SSD suppliers in general fill any void that may be created?

Toshiba Submission

Toshiba states that it [[

]] Toshiba Sub. at 29.

Toshiba further states that "[[

]], the market

conditions and commitments made to customers via long term contracts and shipment plans

combined with additional qualification time of generally [[]] mean that no other supplier could fill a void created by an exclusion order in a commercially reasonable time.” *Id.*

Macronix Submission

Macronix contends that “[a]ny exclusion order against Toshiba would not affect Dell because it is a third party and public information indicates that most, if not all, of Dell’s manufacturing occurs overseas.” Macronix Sub. at 65 (citing *Kyocera Wireless Corp. v. ITC*, 545 F.3d 1340, 1355-58 (Fed. Cir. 2008)). Macronix explains that “remedial orders would have no effect on Dell’s manufacturing operations outside of the U.S., because the orders would not block foreign shipments of Toshiba products to Dell’s overseas facilities, and would not block the importation of products of a third party like Dell.” *Id.* According to Macronix, “Dell’s own website indicates where its various products are manufactured, with this information showing that **all** of Dell’s laptop, notebook, tablet, desktop, embedded PC, All-in-One, Mobile Precision, IoT Gateway, and Poweredge server products are manufactured overseas in China, Taiwan, India, Brazil, Poland, Malaysia, and Mexico.” *Id.* at 65-66. Macronix acknowledges that the “list includes one location in the U.S. for data and software platforms from its 2016 acquisition of EMC,” but that “there is no indication that **any** Toshiba product is integrated into these platforms, and the evidence indicates these same Dell products are also manufactured at Dell’s Ireland location. *Id.* at 66.

Macronix also argues that Dell’s existing suppliers can supply any SSDs excluded under the requested remedial orders. *Id.* at 67. Specifically, Macronix notes that “The Dell Statement admits that Toshiba only provides [[]] of ‘Dell’s SSD supply’” and that “Dell’s other suppliers already supply the majority of Dell’s needs, and there is no indication they could not supply the remaining [[]].” *Id.* Macronix

explains that “Dell need not replace that entire [[]] – Dell only needs to replace the minimal amount, if any, of Toshiba accused products that are imported into the U.S. for assembly into Dell products in this country.” *Id.* Macronix further explains that “the overwhelming majority of Dell’s manufacturing facilities are outside the U.S., the volume of Toshiba products to be replaced as a result of an LEO is, at most, a mere fraction of [[]] of Dell’s total supply” and that “Dell could even re-allocate its supply so that Toshiba’s accused products are used in products assembled outside the United States and non-Toshiba products are used in products assembled in the United States (if any) – thus eliminating any theoretically possible impact on Dell’s current suppliers.” *Id.* Macronix adds that Dell has multiple SSD suppliers besides Toshiba, including [[]] and many others. *Id.* at 67-68.

IA Submission

The IA states that there is “a lack of information to detail the extent to which an exclusion order would affect the ability of Dell’s other SSD suppliers or other SSD suppliers in general to fill any void that may be created.” IA Sub. at 22. Specifically, the IA states that “basic questions remain, even with respect to this information that has been provided, including, for example, (i) the identities of SSD suppliers or potential SSD suppliers considered seriously by Dell; (ii) the number of SSD suppliers or potential SSD suppliers considered seriously by Dell; (iii) whether Dell has taken any steps to minimize the disruption from the void that may be created; and (iv) what steps Dell has taken to minimize the disruption from that void that may be created.” *Id.* at 23. In the IA’s view, given “(i) that Toshiba is Dell’s largest SSD supplier, accounting for [[]] of Dell’s SSD supply, (ii) that Toshiba’s worldwide market share of SSDs is less than [[]], with at least 13 leading competitors making up over [[]] of the worldwide SSD

market; and (iii) the limited number of domestic Dell products that will be impacted by an exclusion order,” other SSD suppliers can fill any void that may be created by issuance of an exclusion order against Toshiba’s accused products. *Id.*

Dell Submission

Dell argues that “[i]f an exclusion order issues against Toshiba’s accused products, it would be very difficult for Dell’s other SSD suppliers or other SSD suppliers in general to fill the void that would be created.” Dell Sub. at 2. Dell explains that “Toshiba supplies two categories of SSDs to Dell: (1) SSDs for which Toshiba is Dell’s sole supplier (‘sole-sourced SSDs’); and (2) SSDs for which Dell has suppliers in addition to Toshiba” and that “[a]n exclusion order would affect both categories.” *Id.* With respect to the sole-sourced SSDs, Dell states that “it would be extremely challenging for Dell to find a replacement SSD supplier.” *Id.* According to Dell, it “would first have to identify a supplier who could develop these sole-sourced SSDs, which are either new technology or non-mainstream drives with very specific uses” and that “[i]f the supplier does not currently offer an SSD design with the new technology or non-mainstream features, it could take the supplier [[]] to develop a replacement product.” *Id.* Dell states that if it “could find another supplier, it would take approximately [[]] for Dell to qualify the alternative supplier, and additional time for Dell’s customers to validate the use of the new components in their data storage infrastructure.” *Id.* (citing Declaration of Sumit Ray, Dell’s Senior Director of Solid State Drives Procurement, ¶¶ 6-10). Dell further states that [f]or the SSDs for which Toshiba is not the sole supplier, filling the void would still be challenging, given Toshiba’s large market share for these products and the large volume of the Toshiba SSDs used by Dell in its U.S. production of storage products.” *Id.* at 3. According to Dell, “[t]he standard industry practice of

entering long-term supply agreements for the provision of SSDs means that other SSD suppliers are unlikely to be able to supply the additional volumes required to fill the void” and “for current SSD suppliers to Dell, customer validation may be required before the customer could accept use of the alternative SSDs in its data storage infrastructure.” *Id.* For SSD suppliers not currently supplying SSDs to Dell, Dell contends that “the [[]] qualification process would be required before the alternative SSD products could be used. *Id.* (Ray Declaration, ¶¶ 4, 8, 10-11).

2. What domestic Dell products will be impacted by an exclusion order?

Toshiba Submission

Toshiba states that “[o]ver the past 10 months beginning in October 2017, [[

]]” Toshiba Sub. at 30. Toshiba adds that [[

]] *Id.*

Macronix Submission

Macronix asserts that “[t]he devices subject to an exclusion order are Toshiba’s NVM devices and Toshiba’s downstream products containing same” and “[t]hus, any LEO would only apply to memory devices and downstream products *made, sold for importation, imported, or sold after importation by or for Toshiba*, not those of non-respondent third parties such as Dell.” Macronix Sub. at 70 (emphasis in original). Macronix adds that “The Dell Statement could have easily identified any domestically assembled Dell products that might be impacted by the exclusion of Toshiba’s infringing SSDs” and that “Dell’s conspicuous silence strongly suggests

that no such domestic Dell product exists.” *Id.* According to Macronix, “the record contains no evidence of any Dell products impacted by the requested LEO.” *Id.*

IA Submission

The IA notes Dell’s statement that “the following domestic Dell product lines will be impacted by an exclusion order: [[
]] . Dell Submission.” IA Reply Sub. at 24. In the IA’s view, “[g]iven this limited number of products, the potential impact of an exclusion order does not appear to OUII to be as significant” and that “to the extent that all of these products, except for the Isilon products, may also be manufactured abroad at Dell’s facilities in Cork, Ireland, the potential impact of an exclusion order could be even less significant. *Id.*

Dell Submission

Dell states that “[a]n exclusion order against the accused Toshiba SSDs would impact Dell’s data storage products, which [it] produces in its facilities in Franklin, Massachusetts and Apex, North Carolina.” Dell Sub. at 3. According to Dell, “[t]he specific impacted product lines are: [[
]]” and that “[a]n exclusion order against Toshiba’s SSD products would affect most of the storage products produced by Dell in Massachusetts and North Carolina. *Id.* ¶13.

3. Toshiba and Dell request a delay in implementing any exclusion order. If an exclusion order issues, what specific product(s) should a delay apply to? What should be the duration of the delay?

Toshiba Submission

Toshiba states that “Dell is just one of approximately [[
]] customers who purchase and receive Toshiba NAND flash memory products [[
]]” and so “all of these customers would be directly harmed by an exclusion order.” Toshiba Sub. at 30.

Toshiba asserts that “[n]o exclusion order should issue in light of public interest considerations, but if the Commission is inclined to issue an exclusion order, a delay in implementation of the exclusion order should apply to all TMA NAND flash memory products because (1) [[

]]; (2) long-term contracts and shipment plans make it difficult for new suppliers to quickly shift significant shipments to new customers; and (3) the qualification time for each product group varies slightly but requires an average time of [[]]. *Id.*

Macronix Submission

Macronix states that “there is no need to modify the standard LEO to include a delay provision for Dell products because the requested remedial orders, which target Toshiba’s products, would not preclude the importation of Dell products into the U.S.” and that an LEO will not “affect Dell’s manufacturing operations because most, if not all, of its products are made overseas.” *Macronix Sub.* at 71. Macronix asserts that “even if a hypothetical supply gap in Dell’s domestic supply of SSDs somehow occurred, Dell’s other qualified SSD suppliers or the many competing participants in the SSD industry could and would easily fill such a gap.” *Id.* According to Macronix, “[b]ecause Dell already has a large roster of existing SSD suppliers (besides Toshiba) that already supply a majority of Dell’s SSD needs, it is unnecessary to delay the implementation of the LEO.” *Id.*

IA Submission

The IA notes Toshiba’s argument that “a delay of [[]] in implementing any exclusion order should apply to ‘all TMA [Toshiba Memory America, Inc.] NAND flash

memory products” because “(i) a Q3 2018 and Q4 2018 ‘undersupply’ in the NAND market; (ii) long-term contracts and shipment plans that make it difficult for new suppliers to quickly shift significant shipments to new customers; and (iii) qualification time for each product group that requires an average time of [[]].” IA Reply Sub. at 24. In the IA’s view, given “(i) that Toshiba’s worldwide market share of SSDs is less than [[]], with at least 13 leading competitors making up over [[]] of the worldwide SSD market; and (ii) that Toshiba’s competitors supply over [[]] of the world’s NAND flash memory devices, it is not clear to OUII that a delay in implementing an exclusion order is warranted, as asserted by Toshiba.” *Id.* at 24-25.

Dell Submission

Dell states that “[i]f an exclusion order issues, it could take as long as [[]] for [it] to identify alternative SSD suppliers and to onboard and qualify these alternative suppliers” and that “a minimum delay of [[]] would be necessary to allow for the transition.” Dell Sub at 4. Dell adds that “[t]he requested delay should apply to Toshiba SSDs imported for incorporation in the impacted Dell storage product lines: [[]].” *Id.*

4. Macronix and Toshiba present vastly different views about the ability of suppliers to satisfy domestic demand if an exclusion order issues. Please discuss the ability of suppliers other than Toshiba to satisfy domestic demand for each and every product that may be affected by an exclusion order.

Toshiba Submission

Toshiba states that “[t]he factors discussed in response to Question 3 (*i.e.*, undersupply, long term contracts and shipment plans, long qualification times) combined with the fact that Toshiba has such a significant market share means that suppliers other than Toshiba would not be able to satisfy domestic demand for the accused Toshiba NAND products in a commercially reasonable timeframe” and particularly for 3D NAND, where “Toshiba has been leading the market in transitioning to 3D NAND.” Toshiba Sub. at 30-31.

Macronix Submission

Macronix observes that “Toshiba’s products subject to an exclusion order include NVM devices and various downstream Toshiba products, most of which Toshiba has stipulated and does not dispute should be part of an exclusion order.” Macronix Sub. at 72. According to Macronix, “Toshiba has never alleged a worldwide shortage of [[

]] at issue in this Investigation” and that “[b]ecause of the many competitors in these markets and because of current market conditions, other suppliers will readily replace all Toshiba products subject to the requested remedial orders.” *Id.* Macronix states that regarding “the SSD market, many industry competitors besides Toshiba supply at least 90% of worldwide demand for SSDs.” *Id.*

IA Submission

The IA states that “[c]onsidering again, *inter alia*, (i) that Toshiba’s worldwide market share of SSDs is less than [[]], with at least 13 leading competitors making up over [[]] of the worldwide SSD market; and (ii) that Toshiba’s competitors supply over [[]] of the world’s NAND flash memory devices, OUII is of the view that suppliers other than Toshiba have the ability and the capacity to satisfy the domestic demand.” IA Reply Sub. at 25-26.

Dell Submission

Dell states that its partnership with “Toshiba consists of a highly intricate technological and commercial collaboration that could not be quickly replaced” and that “[e]ven if Dell were able to locate a viable alternative SSD supplier, integrating a new supplier would involve a cumbersome and time-consuming process.” Dell Sub at 4. For the sole-sourced SSDs, Dell states that “it would be extremely difficult to identify a new supplier, for the reasons explained above” and for the SSDs for which Dell has suppliers in addition to Toshiba, Dell states that “an exclusion order would create a supply gap that would be difficult to fill.” *Id.* Dell explains that “Toshiba accounts for [[]] of Dell’s SSD supply, including a significant volume of the SSDs used by Dell in its U.S. production of storage products” and that its “other SSD suppliers are unlikely to be able to supply the additional volumes to fill the void given Dell’s overall SSD demand.” *Id.* According to Dell, “[t]he standard practice in the industry is for SSD vendors to enter into long-term supply agreements with their large OEM/ODM customers” and that “[p]ursuant to these agreements, the SSD vendors pre-allocate most of their supply on an annual basis.” *Id.* Dell asserts that thus “increasing supply is a long-term process” and “[o]btaining additional supply in the middle of the year from other vendors in response to an exclusion order entered against Toshiba’s SSDs would be extremely difficult.” *Id.* (Ray Declaration, ¶¶ 8-12.)

Analysis

The public interest factors the Commission is required to consider 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 has determined that none of these public interest factors weighs against issuance of remedial orders in this investigation.

With respect to the first factor, the public health and welfare, as the IA observes, the infringing products are “not unique components of medical products, pharmaceuticals, or other products integral to the delivery of healthcare or the maintenance of public safety.” IA Sub at 31-32. Significantly, the evidence shows that there are alternative devices and alternative suppliers. *Id.* Participants in the worldwide market for non-volatile memory devices include large multinational companies such as Samsung, Micron, Intel, Kingston, Lite-On, SK Hynix, SanDisk/Western Digital, Seagate, Huawei, PNY Technologies, Phison, Marvell, SMI, VisionTek, Transcend, ADATA, and others. *See* Macronix Sub at 69 (and exhibits).

Regarding the second factor, competitive conditions in the United State economy, we agree with the IA that any effect on the competitive conditions in the United States economy is insufficient to bar entry of an exclusion order in this investigation because there are alternative suppliers. *See id.* The evidence shows that Toshiba’s worldwide SSD market share is less than [[]], with at least 13 leading competitors making up over [[]] of the worldwide SSD market. *Id.* The evidence further shows that Toshiba’s competitors supply over [[]] of the world’s NAND flash memory devices, and thus have the ability and capacity to replace the excluded devices. *Id.*; *see* Macronix Public Interest Submission (“Macronix PI Sub.”) at 2-3.

Concerning the third factor, the production of like or directly competitive articles in the United States, as noted above, Macronix, its licensees, and third parties can replace the excluded devices. *Id.* Macronix explains, there are over ten major memory manufacturers in the worldwide NAND flash marketplace, and together with Macronix, these Toshiba competitors collectively provide more than four times the amount of NAND flash devices to the worldwide market compared to Toshiba. *Id.*

Finally, as to the fourth factor, United States consumers, any market void that will be

created by excluding Toshiba's products can be adequately filled by Toshiba's competitors. Toshiba's main argument is that existing SSD suppliers will not be able to adequately supply the market if an exclusion order is issued against it. The evidence, however, does not substantiate Toshiba's position. As the IA observes, Toshiba's worldwide market share of SSDs is less than [[]], with at least 13 leading competitors making up over [[]] of the worldwide SSD market. IA Reply Sub at 24-25. In addition, Toshiba's competitors supply over [[]] of the world's NAND flash memory devices. *Id.* Thus, the evidence shows that existing SSD suppliers will be able to fill any void created as a result of an exclusion order. *See* StorageNewsletter; TrendFocus; Business Wire, attached as Exhibit W to Macronix Sub. (showing that by unit shipments, Toshiba's worldwide market share of SSDs was [[]] in the first quarter of 2018, Samsung [[]], SanDisk/Western Digital [[]], and Micron [[]].

With respect to Dell, the record shows that an exclusion order will have an impact on certain Dell products, and neither Macronix nor the IA dispute Dell's assertion. However, the record is not clear as to the magnitude or extent of the impact on Dell, its customers, and its employees; and its effect on the statutory public interest factors has not been established. 19 U.S.C. §§ 1337(d), (f). Specifically, Dell contends that "Toshiba supplies two categories of SSDs to Dell: (1) SSDs for which Toshiba is Dell's sole supplier and (2) SSDs for which Dell has suppliers in addition to Toshiba" and that "it would be extremely challenging for Dell to find a replacement SSD supplier." Dell Submission at 2. Dell's submission explains that the following domestic Dell product lines will be impacted by an exclusion order: [[]]. But the magnitude of that impact is unclear from Dell's submission. And Dell's submission provides no evidence as to how exclusion of these SSDs will impact one or more of the statutory public interest factors, for

example, “competitive conditions in the United States economy” or “United States consumers.” Based on the limited information available on the record, the IA observes that “[g]iven this limited number of products, the potential impact of an exclusion order does not appear to OUII to be as significant” and that “to the extent that all of these products, except for the Isilon products, may also be manufactured abroad at Dell’s facilities in Cork, Ireland, the potential impact of an exclusion order could be even less significant. IA Reply Sub. at 24. The IA also observes that “given (i) that Toshiba is Dell’s largest SSD supplier, accounting for [[]] of Dell’s SSD supply, (ii) that Toshiba’s worldwide market share of SSDs is less than [[]], with at least 13 leading competitors making up over [[]] of the worldwide SSD market; and (iii) the limited number of domestic Dell products that will be impacted by an exclusion order,” other SSD suppliers should be able to fill any void that may be created by issuance of an exclusion order against Toshiba’s accused products. *Id.* at 23. Therefore, even assuming the impact on Dell as articulated in its submissions, it has not been established on the record as to how the statutory public interest factors will be affected. Under these circumstances, we cannot conclude that a delay in the effective date of the remedy is warranted.

Toshiba asserts that “Dell is just one of approximately [[]] customers who purchase and receive Toshiba NAND flash memory products [[]]” and so “all of these customers would be directly harmed by an exclusion order.” Toshiba Sub. at 30. Yet Dell is the only Toshiba customer out of the [[]] customers that has expressed concern on the record of this investigation. Toshiba and Dell also contend that their products are used by government and “meet ardent security standards mandated by the Federal Government” and “are relied on by the U.S. government.” Toshiba’s Submission on the Public Interest under Commission Rule 210.50(a)(4) at 3 (Jun. 11, 2018); Statement on the Public Interest by Dell

Technologies and Dell Inc. at 2 (Jun. 5, 2018). But Section 337(l) exempts importations for or by the Federal Government from the scope of exclusion orders. 19 U.S.C. § 1337(l) (“Any exclusion from entry or order...shall not apply to any articles imported by and 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.”).

In sum, the Commission finds that none of the public interest factors weighs against the issuance of remedial orders in this investigation.

V. BOND

During the 60-day period of Presidential review, imported articles otherwise subject to remedial orders are entitled to conditional entry under bond. 19 U.S.C. § 1337(j)(3). The amount of the bond is specified by the Commission and must be an amount sufficient to protect the complainant from any injury. *Id.*; 19 C.F.R. § 210.50(a)(3). The purpose of the bond is to protect the complainant from any injury. 19 C.F.R. §§ 210.42(a)(1)(ii), 210.50(a)(3). The Commission frequently sets the bond by attempting to eliminate the difference in sales prices between the patented domestic product and the infringing product. *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 24, USITC Pub. No. 2949 (Jan. 1996). The Commission has set bond amounts based on the price difference between the infringing imports and the domestic industry products or on a reasonable royalty applicable to the infringing products. *See Certain Inject Ink Supplies And Components Thereof*, Inv. No. 337-TA-691, Comm’n Op. at 15-18 (Nov. 1, 2011). In cases where the calculation of a price differential is impractical and there is insufficient evidence in the record to determine a reasonable royalty, the Commission has set a 100 percent bond. *See 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 83-89 (Jan. 6, 2016); *Certain Sortation Systems, Parts Thereof, and Products Containing Same*, Inv. No. 337-TA-460, Comm'n Op. at 21 (Mar. 2003). Complainants bear the burden of establishing the need for a bond amount in the first place. *Certain Rubber Antidegradants, Components Thereof, and Prods. Containing Same*, Inv. No. 337-TA-533, Comm'n Op. at 39-40 (July 21, 2006).

The RD recommends that the Commission set a bond in the amount of a 100 percent of entered value for Toshiba flash memory devices and SSDs, and set a bond in the amount of [[]] of entered value for Toshiba PCs imported during the period of Presidential review. RD at 8-9. Specifically, the RD finds that based upon the evidence, it "is impractical to calculate a price differential and there is insufficient information in the record to determine a reasonable royalty," and thus "it is appropriate to set a bond in the amount of 100% of entered value." RD at 8. The RD further finds that "Toshiba's solid-state drives (SSDs) have a median relative value of about [[]] of the total value of the downstream Toshiba PC products" (RX-1249C (Kerr RWS) at Q/A 103-105), and that "if 100% of the value of Toshiba flash memory devices would be sufficient to protect Macronix from injury, then [[]] of the value of Toshiba PCs should also be sufficient." *Id.*

Macronix agrees with the RD's recommendation. Macronix Sub. at 62-63. Macronix, however, notes that "the RD did not address the bond amount for other Toshiba downstream products," and "requests that a 100% bond be imposed for smaller downstream products where the NVM device constitutes a substantial proportion of the product (such as USB drives or MCUs), and that a [[]] bond be adopted for larger downstream products where the value of the NVM device is proportionally less (such as air conditioners and MFPs)." *Id.* at 62.

Toshiba argues that “Macronix failed to provide reliable evidence regarding bond and its expert failed to perform a reasonable economic analysis based on the pricing and licensing information that was available.” Toshiba Sub. at 67. Thus, Toshiba asserts that “[a]s Macronix failed to meet its burdens at trial, no bond should be required.” *Id.*

The IA states that “[c]ontrary to the RD’s recommendation, a bond does not appear to OUII to be appropriate. IA Sub at 34. Specifically, the IA contends that “Complainant has not met its burden of proof, particularly when Dr. Kerr testified that, ‘[[

]],’ which supports a finding that no bond should be entered.” *Id.* at 34 (citing RX-1294C, Q/A 119).

Analysis

The Commission has determined that the RD’s recommendation is reasonable and consistent with the evidence of record, and to set a bond in the amount of 100 percent of entered value for Toshiba flash memory devices and SSDs, and to set a bond in the amount of six percent of entered value for Toshiba PCs imported during the period of Presidential review. RD at 8-9. As Macronix notes, “the RD did not address the bond amount for other Toshiba downstream products.” Macronix Sub. at 62. The Commission finds that consistent with the ALJ’s recommendation, a bond in the amount of 100 percent be imposed for smaller downstream products where the NVM device constitutes a substantial proportion of the product (such as USB drives or MCUs), and a bond in the amount of [[]] percent be imposed for larger downstream products where the value of the NVM device is proportionally less (such as air conditioners and MFPs).” *Id.*

Toshiba and the IA contend that Macronix failed to carry its burden of establishing a need for a bond. To the contrary, the evidence shows that the imposition of a bond is necessary because the continued importation of accused products would injure Macronix and its customers. RD at 7 (citing CX-3837C (Bakewell DWS) at Q/A 164, 178). As the RD found, “Toshiba’s expert, Dr. Kerr, [[

]].” *Id.* (citing RX-1249C at Q/A 118-119). The RD further observes that “Macronix’s expert, Mr. Bakewell, attempted to perform a price differential analysis, but he found [[

]].” *Id.* (citing CX-3837C at Q/A 178). As the RD observes, “Toshiba’s expert, Dr. Kerr, [[

]].” *Id.* (citing RX-1249C at Q/A 118-119). The RD thus concludes that “Dr. Kerr’s analysis supports Mr. Bakewell’s conclusion that a price differential analysis is impractical, because [[

]].” *Id.*

The RD also observes that Mr. Bakewell reviewed Macronix’s patent licenses to conclude that a reasonable royalty cannot be accurately determined and that “Dr. Kerr agrees that no royalty rate can be determined from Macronix’s license agreements.” *Id.* at 8 (citing CX-3837C at Q/A 180); RX-1249C at Q/A 120-22. Thus, the RD’s finding that “it is impractical to calculate a price differential and there is insufficient information in the record to determine a reasonable royalty” finds support in the record evidence.

VI. CONCLUSION

For the reasons set forth above, the Commission has determined to (1) reverse the ALJ's finding that the accused products do not directly infringe the asserted claims of the '602 patent; (2) affirm the ALJ's indirect infringement and invalidity findings as to the '602 patent; and (3) reverse the ALJ's finding that Macronix failed to establish a domestic industry in the process of being established. Accordingly the Commission finds a violation of section 337 as to claim 6 of the '602 patent.

Having found a violation of section 337, the Commission has determined that the appropriate remedy is a LEO and CDOs. The limited exclusion order prohibits entry of the respondents' infringing non-volatile memory devices and products containing the same for consumption in the United States. The cease and desist orders prohibit, among other things, the importation, sale, and distribution of infringing products by domestic respondents. The Commission has determined that the public interest factors set out in sections 337(d) and (f) do not preclude issuance of the remedial orders. The Commission has determined to set a bond in the amount of 100 percent of entered value for Toshiba flash memory devices, solid-state drives, USB flash drives, and microcontroller units, and set a bond in the amount of six percent of entered value for Toshiba personal computers, multi-function printers, and air conditioners imported during the period of Presidential review.

By order of the Commission.



Lisa R. Barton
Secretary to the Commission

Issued: October 26, 2018

CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **COMMISSION OPINION** has been served by hand upon the Commission Investigative Attorney, **Vu Bui, Esq.**, and the following parties as indicated, on 10/26/2018



Lisa R. Barton, Secretary
U.S. International Trade Commission
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UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.

In the Matter of

**CERTAIN NON-VOLATILE MEMORY
DEVICES AND PRODUCTS
CONTAINING SAME**

Investigation No. 337-TA-1046

**NOTICE OF COMMISSION DETERMINATION TO REVIEW IN PART A FINAL
INITIAL DETERMINATION FINDING NO VIOLATION OF SECTION 337;
SCHEDULE FOR FILING WRITTEN SUBMISSIONS ON THE ISSUES UNDER
REVIEW AND ON REMEDY, THE PUBLIC INTEREST AND BONDING; EXTENSION
OF 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 final initial determination (“ID”) issued by the presiding administrative law judge (“ALJ”) on April 27, 2018, finding no violation of section 337 of the Tariff Act of 1930, as amended (19 USC 1337), as to claims 1-8 of U.S. Patent No. 6,552,360 (“the ’360 patent”); claims 1-10 of U.S. Patent No. 6,788,602 (“the ’602 patent”); and claims 11-16 of U.S. Patent No. 8,035,417 (“the ’417 patent”). The Commission has also determined to extend the target date for completion of this investigation until September 4, 2018.

FOR FURTHER INFORMATION CONTACT: Panyin A. Hughes, Office of the General Counsel, U.S. International Trade Commission, 500 E Street, S.W., Washington, D.C. 20436, telephone 202-205-3042. 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, S.W., Washington, D.C. 20436, telephone 202-205-2000. General information concerning the Commission may also be obtained by accessing its Internet server (<http://www.usitc.gov>). The public record for this investigation may be viewed on the Commission’s electronic docket (EDIS) at <http://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 Inv. No. 337-TA-1046 on April 12, 2017, based on a complaint filed by Macronix International Co., Ltd. of Hsin-chu, Taiwan and Macronix America, Inc. of Milpitas, California (collectively, “Macronix”). 82 *Fed. Reg.* 17687-88 (Apr. 12, 2017). The complaint alleges 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 non-volatile memory devices and products containing the same that infringe one or more of claims 1-8 of the '360 patent; claims 1-12 and 16 of the '602 patent; and claims 1-7, 11-16, and 18 of the '417 patent. The notice of investigation named the following respondents: Toshiba Corporation of Tokyo, Japan; Toshiba America, Inc. of New York, New York; Toshiba America Electronic Components, Inc. of Irvine, California; Toshiba America Information Systems, Inc. of Irvine, California; and Toshiba Information Equipment (Philippines), Inc. of Binan, Philippines (collectively, "Toshiba"). The Office of Unfair Import Investigations is a party to the investigation.

On June 16, 2017, the Commission determined not to review the ALJ's order (Order No. 11) granting an unopposed motion to amend the Notice of investigation to add Toshiba Memory Corporation of Tokyo, Japan as a respondent. *See* Order No. 11, Comm'n Notice of Non-Review (June 16, 2017).

On October 17, 2017, the Commission determined not to review the ALJ's order (Order No. 20) granting an unopposed motion to terminate the investigation as to claims 11, 12, and 16 of the '602 patent. *See* Order No. 20, Comm'n Notice of Non-Review (Oct. 17, 2017).

On October 4, 2017, the ALJ held a *Markman* hearing to construe certain disputed claim terms. On December 5, 2017, the ALJ issued Order No. 23 (*Markman* Order), setting forth her construction of the disputed claim terms.

On January 18, 2018, the Commission determined not to review the ALJ's order (Order No. 24) granting an unopposed motion to terminate the investigation as to claims 1-7 and 18 of the '417 patent. Order No. 24; Comm'n Notice of Non-Review (Jan. 18, 2018).

The ALJ held an evidentiary hearing from February 8, 2018, through February 14, 2018, and thereafter received post-hearing briefs.

On April, 27 2018, the ALJ issued her final ID, finding no violation of section 337 by Toshiba in connection with the remaining claims, *i.e.*, claims 1-8 of the '360 patent; claims 1-10 of the '602 patent; and claims 11-16 of the '417 patent. Specifically, the ALJ found that the Commission has subject matter jurisdiction, *in rem* jurisdiction over the accused products, and *in personam* jurisdiction over Toshiba. ID at 15-17. The ALJ also found that Macronix satisfied the importation requirement of section 337 (19 U.S.C. § 1337(a)(1)(B)). *Id.* The ALJ, however, found that the accused products do not infringe the asserted claims of the '360 patent and '417 patent. *See* ID at 19-65, 118-130. The ALJ also found that Toshiba failed to establish that the asserted claims of the '417 patent are invalid for obviousness. ID at 132-141. Toshiba did not challenge the validity of the '360 patent. ID at 70. With respect to the '602 patent, the ALJ found that certain accused products infringe asserted claims 1-10, but that claims 1-5 and 7-10 are invalid for obviousness. ID at 71-88, 91-117. Finally, the ALJ found that Macronix failed to establish the existence of a domestic industry that practices the asserted patents under 19 U.S.C. § 1337(a)(2) and also failed to show a domestic industry in the process of being established. *See* ID at 257-261, 288-294.

On May 10, 2018, the ALJ issued her recommended determination on remedy and bonding. Recommended Determination on Remedy and Bonding (“RD”). The ALJ recommends that in the event the Commission finds a violation of section 337, the Commission should issue a limited exclusion order prohibiting the importation of Toshiba’s accused products that infringe the asserted claims of the asserted patents. RD at 1-5. The ALJ also recommends issuance of cease and desist orders against the domestic Toshiba respondents based on the presence of commercially significant inventory in the United States. RD at 5. With respect to the amount of bond that should be posted during the period of Presidential review, the ALJ recommends that the Commission set a bond in the amount of 100 percent of entered value for Toshiba flash memory devices and solid state drives, and a bond in the amount of six percent of entered value for Toshiba PCs imported during the period of Presidential review. RD at 6-9.

On May 14, 2018, Macronix filed a petition for review challenging the ID’s finding of no violation of section 337. The IA also filed a petition for review that day, challenging the ID’s finding that Macronix failed to establish a domestic industry in the process of being established and certain findings as to the ’602 patent. Also on May 14, 2018, Toshiba filed a contingent petition for review of the ID “in the event that the Commission decides to review the ID.” On May 22, 2018, Macronix and Toshiba filed their respective responses to the petitions for review. On May 23, 2018, the IA filed a response to the private parties’ petitions for review. The Chairman granted the IA’s motion for leave to file the response one day late.

Having examined the record of this investigation, including the ALJ’s final ID, the petitions for review, and the responses thereto, the Commission has determined to review the final ID in part. Specifically, the Commission has determined to review the following: (1) the finding that Macronix failed to satisfy the domestic industry requirement; and (2) the findings of infringement and invalidity as to the ’602 patent.

In connection with its review, the Commission is interested in responses to the following questions:

1. Would one of ordinary skill in the art understand that the claim term “coupled” in the asserted claims of the ’602 patent construed to mean “conductively connected” requires select transistors? If yes, how does it affect the ID’s infringement, domestic industry technical prong, and invalidity findings?
2. Would one of ordinary skill in the art understand that the claim term “memory array” in the asserted claims of the ’602 patent construed to mean “multiple memory cells coupled to a grid of word lines and bit lines” necessarily includes select transistors? If yes, how does it affect the ID’s infringement, domestic industry technical prong, and invalidity findings?
3. The ID states that under the adopted construction of “memory array” (set forth above), “a memory array consistent with the ’602 patent . . . could span an entire plane or only a subset of memory cells in a plane.” ID at 80. Is this additional language consistent with the ID’s construction? If that additional

language is omitted, how will the ID's infringement, domestic industry technical prong, and invalidity findings be affected?

4. Please discuss the showing necessary to meet the statutory requirement of "articles protected by the patent" for a domestic industry in the process of being established under section 337(a)(2).

The parties are requested to brief only the discrete issues above, with reference to the applicable law and evidentiary record. The parties are not to brief other issues on review, which are adequately presented in the parties' existing filings.

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 one or more cease and desist orders that could result in the respondent 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 (December 1994) (Commission 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 orders 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. In connection with this, the Commission is interested in responses to the following questions:

1. If an exclusion order issues against Toshiba's accused products, can Dell's other SSD suppliers or other SSD suppliers in general fill any void that may be created?
2. What domestic Dell products will be impacted by an exclusion order?
3. Toshiba and Dell request a delay in implementing any exclusion order. If an exclusion order issues, what specific product(s) should a delay apply to? What should be the duration of the delay?
4. Macronix and Toshiba present vastly different views about the ability of suppliers to satisfy domestic demand if an exclusion order issues. Please discuss the ability of suppliers other than Toshiba to satisfy domestic demand for each and every product that may be affected by an exclusion order.

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 *Fed. Reg.* 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.

The Commission has also determined to extend the target date for completion of this investigation until September 4, 2018.

WRITTEN SUBMISSIONS: The parties to the investigation are requested to file written submissions on 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. Complainants and the IA are requested to submit proposed remedial orders for the Commission's consideration. Complainants are also requested to state the date that the patents expire and the HTSUS numbers under which the accused products are imported. Complainants are further requested to supply the names of known importers of the Respondents' products at issue in this investigation. The written submissions and proposed remedial orders must be filed no later than close of business on July 12, 2018. Reply submissions must be filed no later than the close of business on July 19, 2018. Opening submissions are limited to 75 pages. Reply submissions are limited to 50 pages. Such submissions should address the ALJ's recommended determinations on remedy and bonding. No further submissions on any of 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 eight 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-1046") in a prominent place on the cover page 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).

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 CFR 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 USC 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', with a stylized flourish at the end.

Lisa R. Barton
Secretary to the Commission

Issued: June 28, 2018

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

PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **NOTICE** has been served by hand upon the Commission Investigative Attorney, **Vu Bui, Esq.**, and the following parties as indicated, on 6/28/2018



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

**On Behalf of Complainants Macronix International
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- Via First Class Mail
- Other: _____

**On Behalf of Respondents Toshiba Corporation, Toshiba
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- Via First Class Mail
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PUBLIC VERSION

UNITED STATES INTERNATIONAL TRADE COMMISSION

Washington, D.C.

In the Matter of

CERTAIN NON-VOLATILE MEMORY
DEVICES AND PRODUCTS
CONTAINING SAME

Inv. No. 337-TA-1046

INITIAL DETERMINATION ON VIOLATION OF SECTION 337

Administrative Law Judge Dee Lord

(April 27, 2018)

Appearances:

For Complainants Macronix International Co., Ltd. and Macronix America, Inc.:

Michael J. McKeon, Esq., Christian A. Chu, Esq., Thomas "Monty" Fusco, Esq., and Chris W. Dryer, Esq. of Fish & Richardson P.C. in Washington, DC; Leeron G. Kalay, Esq., David M. Barkan, Esq., and Bryan K. Basso, Esq. of Fish & Richardson P.C. in Redwood City, CA; Kevin Su, Esq. of Fish & Richardson P.C. in Boston, MA; Robert Courtney, Esq. and Will J. Orlady, Esq. of Fish & Richardson P.C. in Minneapolis, MN; and Christopher Winter, Esq. of Fish & Richardson P.C. in Wilmington, DE.

For Respondents Toshiba Corporation, Toshiba America, Inc., Toshiba America Electronic Components, Inc., Toshiba America Information Systems, Inc., and Toshiba Information Equipment (Philippines), Inc.:

Mark Fowler, Esq., Aaron Wainscoat, Esq., Saori Kaji, Esq., Brent K. Yamashita, Esq., Krista C. Grewal, Esq., and Alan A. Limbach, Esq. of DLA Piper LLP in East Palo Alto, CA; Gerald T. Sekimura, Esq. of DLA Piper LLP in San Francisco, CA; and Steven L. Park, Esq. of DLA Piper LLP in Atlanta, GA.

For the Commission Investigative Staff:

Vu Q. Bui, Esq. and Anne Goalwin, Esq., of the Office of Unfair Import Investigations, U.S. International Trade Commission of Washington, DC.

PUBLIC VERSION

Pursuant to the Notice of Investigation (Apr. 6, 2017) and Commission Rule 210.42, this is the administrative law judge's final initial determination in the matter of *Certain Non-Volatile Memory Devices and Products Containing Same*, Inv. No. 337-TA-1046. 19 C.F.R. § 210.42(a)(1)(i).

For the reasons discussed herein, it is my final initial determination that there is no 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, and/or the sale within the United States after importation of certain non-volatile memory devices and products containing same.

PUBLIC VERSION

TABLE OF CONTENTS

I.	BACKGROUND	1
A.	Procedural History	1
B.	The Private Parties	2
C.	Technology and Patent at Issue.....	3
D.	Products at Issue	12
E.	Witness Testimony.....	13
II.	JURISDICTION	15
A.	Subject Matter Jurisdiction	15
B.	Personal Jurisdiction	16
C.	In Rem Jurisdiction.....	17
D.	Standing	17
III.	U.S. PATENT NO. 6,552,360	17
A.	Level of Ordinary Skill in the Art.....	17
B.	Claim Construction	17
C.	Infringement.....	18
D.	Domestic Industry – Technical Prong.....	65
E.	Invalidity	70
IV.	U.S. PATENT NO. 6,788,602	70
A.	Level of Ordinary Skill in the Art.....	70
B.	Claim Construction	71
C.	Infringement.....	71
D.	Domestic Industry – Technical Prong.....	88
E.	Invalidity	91
V.	U.S. PATENT NO. 8,035,417	117
A.	Level of Ordinary Skill in the Art.....	117
B.	Claim Construction	117
C.	Infringement.....	118
D.	Domestic Industry – Technical Prong.....	130
E.	Invalidity	132
VI.	DOMESTIC INDUSTRY – ECONOMIC PRONG	142
A.	Industry in the Process of Being Established.....	142
B.	Technical Sales and Marketing.....	154
VII.	CONCLUSIONS OF LAW	186

PUBLIC VERSION

The following abbreviations may be used in this Initial Determination:

Tr.	Transcript
WS	Witness Statement
DWS	Direct Witness Statement
Supp. DWS	First Supplemental Direct Witness Statement
2nd Supp. DWS	Second Supplemental Direct Witness Statement
RWS	Rebuttal Witness Statement
JX	Joint Exhibit
CX	Complainant's exhibit
CPX	Complainant's physical exhibit
CDX	Complainant's demonstrative exhibit
RX	Respondent's exhibit
RPX	Respondent's physical exhibit
RDX	Respondent's demonstrative exhibit
CPHB	Complainant's pre-hearing brief
CIB	Complainant's initial post-hearing brief
CRB	Complainant's reply post-hearing brief
RPHB	Respondent's pre-hearing brief
RIB	Respondent's initial post-hearing brief
RRB	Respondent's reply post-hearing brief
SPHB	Staff pre-hearing brief
SIB	Staff initial post-hearing brief
SRB	Staff reply post-hearing brief

PUBLIC VERSION

I. BACKGROUND

A. Procedural History

The Commission instituted this investigation in response to a complaint alleging violations of section 337 of the Tariff Act of 1930, as amended, by reason of infringement of certain claims of U.S. Patent No. 6,552,360 (the “’360 patent”), U.S. Patent No. 6,788,602 (the “’602 patent”), and U.S. Patent No. 8,035,417 (the “’417 patent”). Notice of Investigation (Apr. 6, 2017). The Commission ordered that 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 non-volatile memory devices and products containing same by reason of infringement of one or more of claims 1-8 of the ’360 patent; claims 1-12 and 16 of the ’602 patent; and claims 1-7, 11-16, and 18 of the ’417 patent, and whether an industry in the United States exists as required by subsection (a)(2) of section 337;

Id. at 2. The Investigation was instituted upon publication of the Notice of Investigation in the *Federal Register* on April 12, 2017. 82 Fed. Reg. 17687-88 (2017); *see* 19 C.F.R. § 210.10(b). The complainants are Macronix International Co., Ltd. and Macronix America, Inc. Notice of Investigation at 2. The respondents are Toshiba Corporation, Toshiba Information Equipment, Toshiba America, Inc., Toshiba America Electronic Components, Inc., Toshiba America Information Systems, Inc., and Toshiba Memory Corporation. *Id.* at 2-3; Order No. 11 (June 1, 2017).

All of the respondents were named in the original complaint and notice of investigation except for Toshiba Memory Corporation, which was added pursuant to Order No. 11 (June 1, 2017). *See* Comm’n Notice (June 16, 2017). Claims 11, 12, and 16 of the ’602 patent were withdrawn pursuant to Order No. 20 (Oct. 5, 2017). *See* Comm’n Notice (Oct. 17, 2017).

PUBLIC VERSION

Claims 1-7 and 18 of the '417 patent were withdrawn pursuant to Order No. 24 (Dec. 21, 2017). *See* Comm'n Notice (Jan. 18, 2018).

A *Markman* hearing was held in this investigation on October 6, 2017, and a *Markman* order issued on December 5, 2017. Order No. 23. The evidentiary hearing began on Thursday, February 8, 2018 and concluded on Wednesday, February 14, 2018. *See* Order No. 32 (Jan. 25, 2018). As a result of the government shutdown, the target date for the investigation was extended to August 27, 2018. *Id.*; *see* Comm'n Notice (Feb. 16, 2018).

B. The Private Parties

1. Complainants

Macronix International Co., Ltd. and Macronix America, Inc. are the complainants in this investigation (collectively, "Macronix"). Macronix International Co., Ltd. is a corporation organized under the laws of Taiwan, having its principal place of business in Hsin-Chu, Taiwan. Amended Complaint (May 22, 2017), ¶ 9. Macronix America, Inc. is a wholly-owned subsidiary of Marconix International Co., Ltd., headquartered in Milpitas, California. *Id.*, ¶¶ 8, 10.

2. Respondents

Toshiba Corporation, Toshiba Memory Corporation, Toshiba America, Inc., Toshiba America Electronic Components, Inc., Toshiba America Information Systems, Inc., and Toshiba Information Equipment (Philippines), Inc. are the respondents in this investigation (collectively, "Toshiba"). Toshiba Corporation is a Japanese corporation with its place of business in Tokyo, Japan. Response to Complaint (May 9, 2017), ¶ 17. Toshiba Memory Corporation is a wholly-owned subsidiary of Toshiba Corporation that was established on April 1, 2017, with offices in Tokyo, Japan. Order No. 11. Toshiba America, Inc. is a wholly-owned subsidiary of Toshiba Corporation with offices in New York, New York. Response to Complaint, ¶ 20. Toshiba

PUBLIC VERSION

America Electronic Components, Inc. and Toshiba America Information Systems, Inc. are wholly-owned subsidiaries of Toshiba America, Inc., with offices in Irvine, California. *Id.*, ¶¶ 21-22. Toshiba Information Equipment (Philippines), Inc. is a wholly-owned subsidiary of Toshiba Corporation with offices in Laguna, Philippines. *Id.*, ¶ 19.

C. Technology and Patent at Issue

The technology at issue in this investigation relates to the structure and operation of non-volatile memory devices. The '360 patent relates to the fabrication of these devices, the '602 patent relates to an aspect of their circuit design, and the '417 patent relates to output buffer circuits that are used with memory devices.

1. '360 Patent

The '360 patent is entitled “Method and Circuit Layout for Reducing Post Chemical Mechanical Polishing Defect Count” and was issued on April 22, 2003, from an application filed on January 25, 2002. JX-0001. Chun-Lien Su, Chi-Yuan Chin, Ming-Shang Chen, Tsung-Hsien Wu, and Yih-Shi Lin are identified as the inventors of the '360 patent. *Id.*

a. Specification

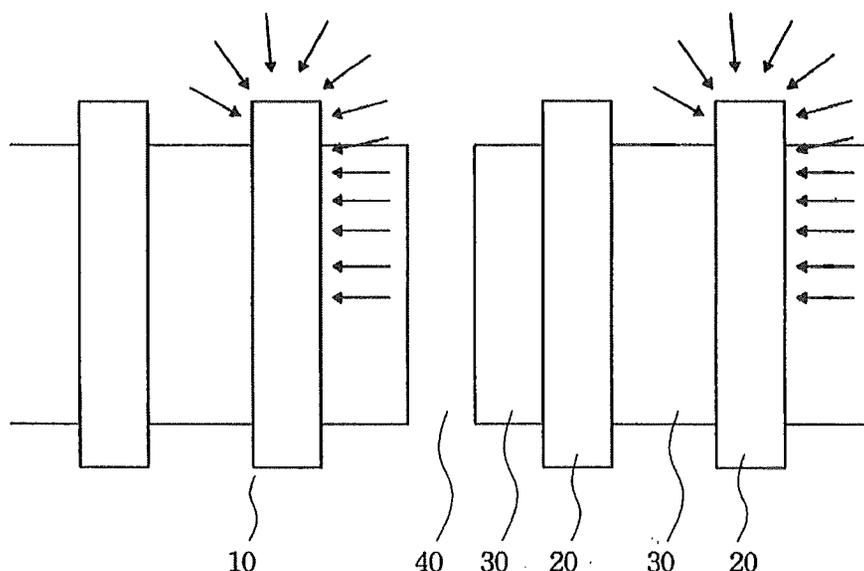
The '360 patent relates to a “circuit layout of a semiconductor memory and a method for reducing defects of chemical mechanical polishing process.” '360 patent, col. 1:7-10. Chemical mechanical processing (“CMP”) is used in semiconductor fabrication to planarize dielectric and metal layers of a semiconductor wafer. *Id.*, col. 1:13-17. A semiconductor wafer is fabricated by forming a stack of dielectric and metal layers on top of a substrate. *Id.*, col. 1:27-29. As the stack of layers is being formed it will be planarized periodically by a CMP process. *Id.*

As its name suggests, CMP uses mechanical pressure in combination with a chemical reaction to level the surface of the wafer. *Id.*, col. 1:31-34. During the CMP process, a polishing

PUBLIC VERSION

head presses the wafer against a polishing pad and drives the wafer to rotate in one direction while the polishing pad rotates in the opposite direction. *Id.*, col. 1:35-38. While the wafer is pressed against the polishing pad, polishing slurry is injected between the wafer and the polishing pad. *Id.*, col. 1:38-40. In addition to containing abrasive particles, the polishing slurry chemically reacts with the wafer's surface. *Id.*, col. 1:31-34, col. 1:41-45.

Figure 1 of the '360 patent depicts a prior-art circuit layout.

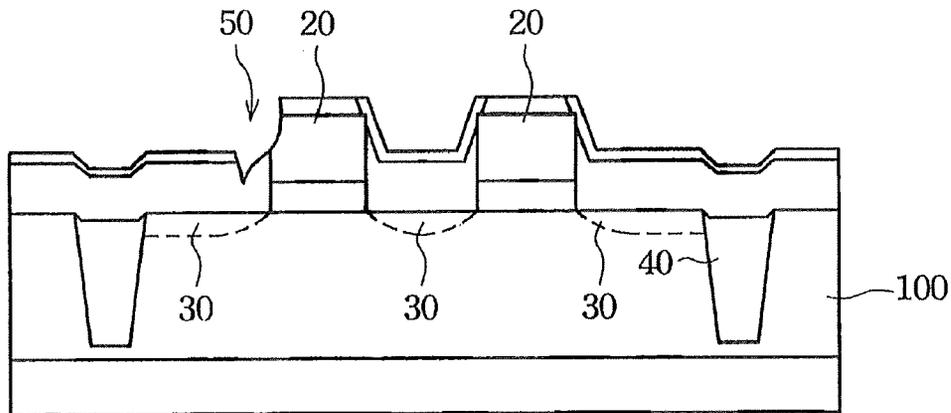


Parallel conductive strips 20 form a circuit structure on the surface of wafer 10. *Id.*, col. 1:48-54. "Diffusion areas 30" in the substrate's surface form the circuit's source and drain regions. *Id.*, col. 1:54-56. The circuit formed by strips 20 and diffusion regions 30 is separated from other circuits by isolating structure 40. *Id.*, col. 1:56-61.

The circuit layout shown in Figure 1 is susceptible to being damaged by the CMP process. As shown by the arrows in Figure 1, unlike the pressure exerted on the other portions of strips 20 by the CMP process, the pressure exerted on the ends of the strips comes from multiple directions and is not uniform. *Id.*, col. 1:66-col. 2:1. As a result, the stresses on the ends of the

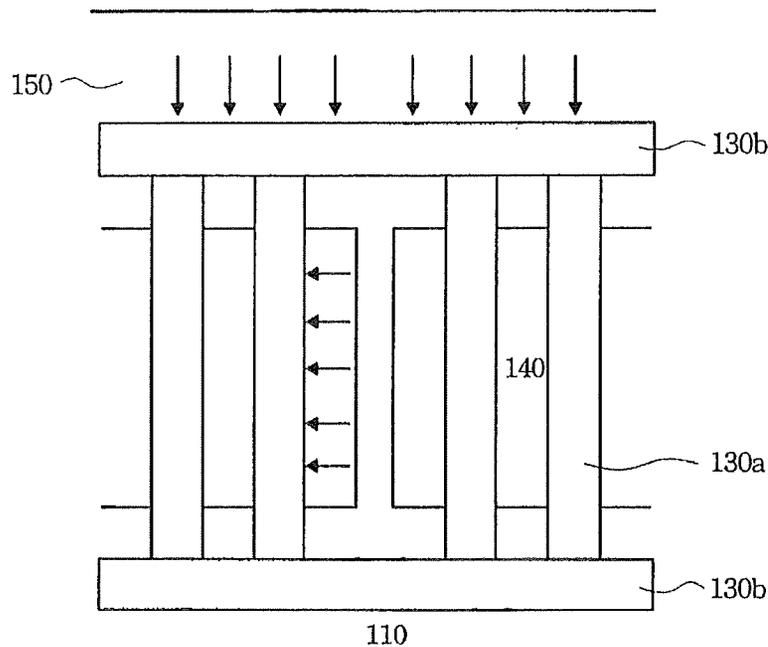
PUBLIC VERSION

strips are greater than those on the other portions of the strips and can result in the ends of the strips being damaged. *Id.*, col. 2:1-2. Figure 2A depicts damage that can occur in the prior-art circuit layouts during a CMP process.



As shown in Figure 2A, corner 50 of one of the strips 20 has been destroyed by the CMP process. *Id.*, col. 3:16-18.

The '360 patent discloses a circuit layout that “reduce[s] the possibility of generating defects in the CMP process.” *Id.*, col. 2:10-13. The improved structure is shown in Figure 4.



In the disclosed layout, the ends of the strips comprising the first circuit structure (130a) are linked to each other by strips comprising a second circuit structure (130b). *Id.*, col. 4:25-31. This layout enhances the structural strength of the ends of strips of the first circuit structure (130a) so that the polishing pressure from the CMP process is averaged. *Id.*, col. 4:31-37. As shown by the arrows in Figure 4, averaging the polishing pressure results in the polishing pressure being uniformly applied to strips 130a, thereby decreasing the likelihood of defects. *Id.*, col. 4:31-37, col. 4:63-65.

b. Claims

Macronix is asserting claims 1-8 of the '360 patent against Toshiba. Claim 1 is independent and the remaining claims depend directly or indirectly from claim 1. Claim 1 recites:

A circuit layout on a substrate of a semiconductor wafer, suitable for reducing defects during a chemical mechanical polishing process, said substrate comprising a plurality of strips of first circuit structure, said circuit layout comprising:

PUBLIC VERSION

at least two strips of second circuit structure located on said substrate of said semiconductor wafer, each of said two strips of second circuit structure respectively linking the front end and the rear end of said plurality of strips of said first circuit structure, utilizing to average polishing pressure performed upon the front end and the rear end of said plurality of strips of said first circuit structure during said chemical mechanical polishing process for reducing defects occurred.

'360 patent, col. 6:2-14.

Claims 2, 4, 6, and 7 depend directly from claim 1. Claim 2 requires that the first circuit structure be located on an active region of the semiconductor wafer. *Id.*, col. 6:15-17. Claim 4 requires that the second circuit structure be located on a boundary between active regions. *Id.*, col. 6:21-22. Claim 6 requires that the second circuit structure have a width of "about 0.3 μm ." *Id.*, col. 6:26-27. Claim 7 requires that the first circuit structure and the second circuit structure each "comprise[] a conductive layer and an insulating layer, located upon said conductive layer."

Claim 3 depends from claim 2 and requires that the substrate of the semiconductor wafer "among said first circuit structure" comprise diffusion regions. *Id.*, col. 6:18-20. Claim 5 depends from claim 4 and requires that the boundary have a width of "about 1.5 μm ." *Id.*, col. 6:24-25. Claim 8 depends from claim 7 and requires that the conductive layers be polysilicon. *Id.*, col. 6:32-33.

2. '602 Patent

The '602 patent is entitled "Memory Device and Operation Thereof" and issued on September 7, 2004, from an application filed on August 9, 2002. JX-0002. Jen-Ren Huang, Ming-Hung Chou, and Hsin-Chien Chen are identified as the inventors. *Id.*

a. Specification

The '602 patent is directed to a system and method to prevent dummy cells from over-erasing in a memory device. '602 patent, col. 1:7-9. In conventional memory devices, memory cells are arranged in an array of word and bit lines. *Id.*, col. 1:13-17. The word lines and bit

PUBLIC VERSION

lines at the edge of the device are often unusable because they are etched partially or completely. *Id.*, col. 1:17-21. The unused word line at the edge is called a “dummy” word line. *Id.*, col. 1:21-28. Conventionally, these dummy word lines are coupled to ground, and this leads to over-erasure of the dummy cells over time, which can cause current leakage during read operations of usable memory cells. *Id.*, col. 1:29-36. This leakage worsens over repeated use, which decreases the threshold voltage for the memory cells. *Id.*, col. 1:37-65.

To address this problem, the alleged invention of the '602 patent applies a positive bias to the dummy word lines during erase operations. '602 patent, col. 2:12-38. As depicted in Figure 2, dummy word lines 250 and 255 are coupled to positive biases 280 and 285, respectively. *Id.*, col. 3:4-13, Fig. 2.

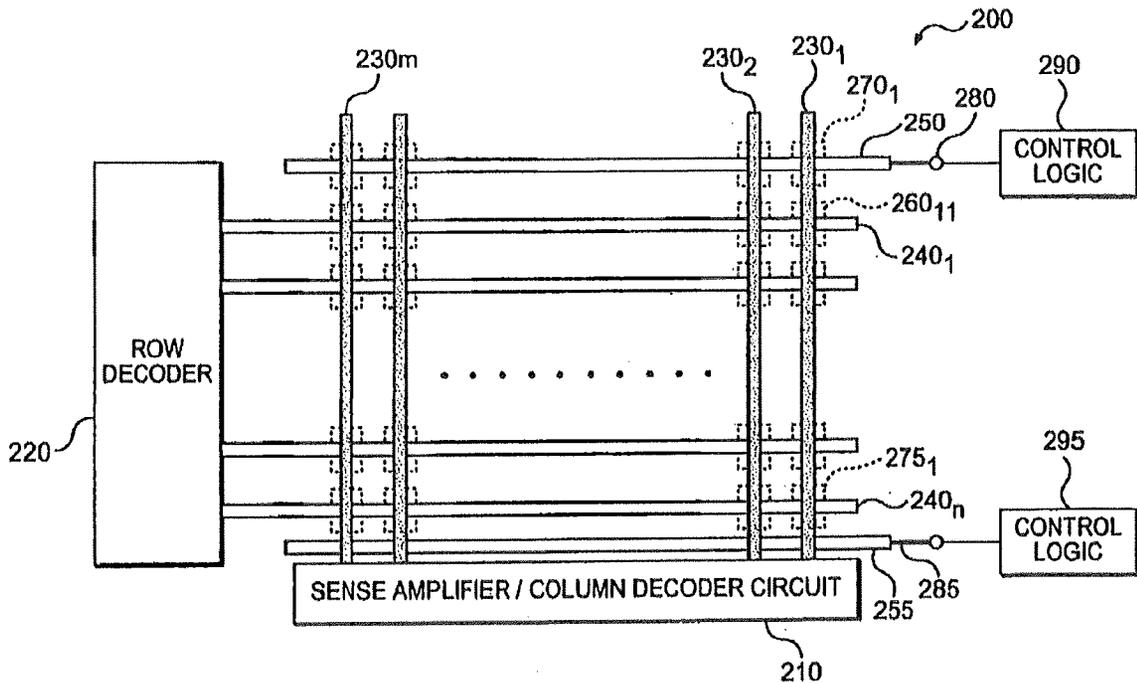


FIG. 2

PUBLIC VERSION

Control logics 290 and 295 control the bias applied to the dummy word lines. *Id.*, col. 3:29-33.

The control logics determine when the memory device is performing an erase operation. *Id.*, col. 4:8-13.

b. Claims

Macronix is asserting claims 1-10 of the '602 patent against Toshiba. Claim 1 is an independent claim, which recites:

A semiconductor memory device, comprising:

a memory cell;

a dummy word line arranged at an edge of a memory array coupled to the memory cell;

a control logic for supplying a positive bias to the dummy word line during an erase operation; and

at least one bit line coupled to the memory cell.

'602 patent, col. 5:59-6:3. Claim 2 adds "a column decoder coupled to drive the at least one bit line" to claim 1. *Id.*, col. 6:4-6. Claim 3 adds "a sense amplifier coupled to the at least one bit line" to claim 1. *Id.*, col. 6:7-9. Claim 4 adds an additional word line arranged perpendicular to the bit line of claim 1. *Id.*, col. 6:10-14. Claim 5 is dependent upon claim 4 and adds a row decoder. *Id.*, col. 6:15-17. Claim 6 adds a limitation to claim 1 requiring that the control logic "continuously supplies the positive bias to the dummy word line." *Id.*, col. 6:18-20. Claim 7 is another independent claim, which recites:

A semiconductor memory array, comprising:

a memory cell;

at least one bit line arranged in a first direction and coupled to the memory cell;
and

PUBLIC VERSION

at least one dummy word line arranged at an edge of a memory array arranged in a second direction perpendicular to the at least one bit line and coupled to the memory cell,

wherein a positive bias is selectively supplied to the at least one dummy word line at least during erase operation.

Id., col. 6:21-31. Claim 8 adds a column decoder to claim 7. *Id.*, col. 6:32-33. Claim 9 adds a word line arranged in the second direction to claim 7. *Id.*, col. 6:34-36. Claim 10 adds a row decoder to claim 9. *Id.*, col. 6:37-38

3. '417 Patent

The '417 patent is entitled "Output Buffer Circuit with Variable Drive Strength" and issued on October 11, 2011, from an application filed on July 26, 2010. JX-0003. Chun-Hsiung Hung and Chun-Yi Lee are identified as the inventors. *Id.*

a. Specification

The '417 patent describes conventional output buffer circuits in the prior art that would either be on or off, forcing a "one size fits all" design for output drive strength. *Id.*, col. 1:9-10. Customized output buffer circuits are an alternative, but "enormously complicate[] design." *Id.*, col. 1:11-15. The '417 patent thus discloses an arrangement of multiple output buffer circuits that "have a variable combined output drive strength, depending on a set of buffer enable signals." *Id.*, Abstract.

The specification of the '417 patent discloses an arrangement of multiple output buffer circuits coupled in parallel to provide a combined output drive strength. '417 patent, col. 1:23-25. Each output buffer circuit is enabled or disabled by receiving buffer enable input signals. *Id.*, col. 1:30-35. By enabling and disabling certain output buffer circuits, the output drive strength can be tuned to a desired level. *Id.*, col. 1:36-43. A block diagram of multiple output buffer circuits is depicted in Figure 6:

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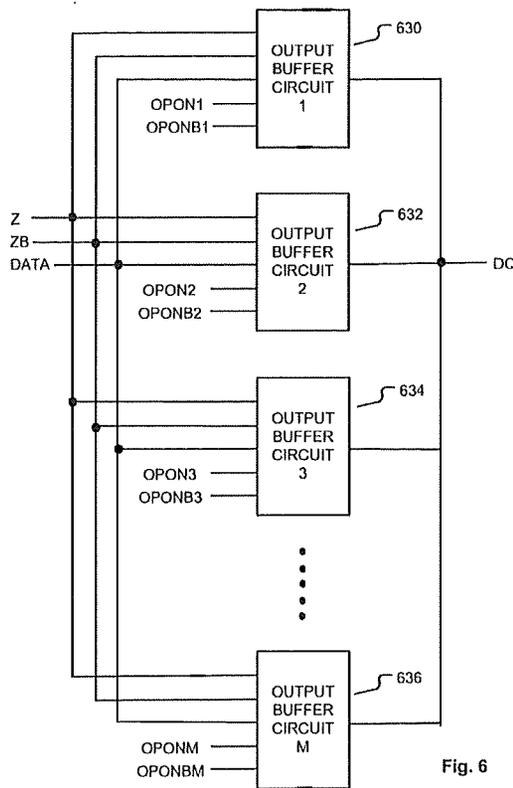


Fig. 6

The output buffer circuits 630, 632, 634, and 636 share common inputs Z, ZB, and DATA. *Id.*, col. 8:39-42. Each output buffer circuit receives a customized OPON buffer enable signal, enabling or disabling the circuit. *Id.*, col. 8:38-48. The enabled output buffer circuits combine their drive strengths, “such that the shared output signal DQ across the multiple output buffer circuits has a combined output drive strength equal to the sum of the drive strengths of the enabled output buffer circuits.” *Id.*, col. 8:49-53.

b. Claims

Macronix is asserting claims 11-16 of the '417 patent. Claim 1 is an independent claim, which recites:

An apparatus, comprising:

a plurality of output buffer circuits coupled in parallel to provide a combined output drive strength, each output buffer circuit of the plurality of output

PUBLIC VERSION

buffer circuits including a buffer data output providing a data output signal having a drive strength,

wherein the data output signal is combined across the plurality of output buffer circuits to provide a combined data output signal having the combined output drive strength, and the combined output drive strength is tuned by buffer enable signals customized across the plurality of output buffer circuits,

wherein the buffer enable signals are received together with complements of the buffer enable signals, and the buffer enable signals and the complements of the buffer enable signals control pairs of transistors having opposite conductivity types.

'417 patent, col. 11:54-12:3. Claim 12 requires that the data output signals have "a range of output values including logically high, logically low, and floating." *Id.*, col. 12:4-6. Claim 13 further requires that "the logically high and logically low output values have the combined output drive strength tuned by the buffer enable signals across the plurality of output buffer circuits." *Id.*, col. 12:7-12. Claim 14 specifies that the data input signal is logically high and the combined data output drive strength be "determined by a sum of drive strengths across the plurality of output buffer circuits, the sum excluding drive strengths of output buffer circuits . . . that receive . . . a disable value." *Id.*, col. 12:13-21. Claim 15 includes the same limitations as claim 14 but specifies that the data input signal is logically low. *Id.*, col. 12:22-30. Claim 16 specifies that "the plurality of output buffer circuits is configured to receive the buffer enable signal having a disable value, and provide an output signal having a floating value." *Id.*, col. 12:31-34.

D. Products at Issue

The products at issue are non-volatile memory, which is also known as flash memory. The accused Toshiba flash memory products are NAND memory, and the parties have stipulated that identified Toshiba designs are representative of all of the accused products in this

PUBLIC VERSION

investigation. RIB at 9-10; CX-0003C at ¶¶ 4-6, Appendix A. The domestic industry products are Macronix's [redacted] memory products. CIB at 7.

E. Witness Testimony

I received testimonial evidence in this investigation in the form of witness statements, live testimony, and deposition designations.

1. Fact Witnesses

Macronix submitted a witness statement for Arthur Yang (CX-3841C), the President of Macronix America, Inc., which was admitted pursuant to Order No. 33 (Feb. 2, 2018). A witness statement was also admitted for Ming-Shan Chen (CX-5416C), a Macronix project director. Order No. 33. At the hearing, Macronix presented the testimony of Dr. Hsiang-Lan Lung, the PCM Project Manager for Macronix in Yorktown, New York. CX-3842C (Lung WS); Tr. at 124-136.

Toshiba submitted a witness statement for Jun Takayasu (RX-1243C), a Toshiba engineer, which was admitted pursuant to Order No. 33. Toshiba also submitted witness statements for Toshiba engineers Yuji Takeuchi (RX-1242C) and Hiroshi Nakamura (RX-1244C), which were admitted pursuant to Order No. 34 (Feb. 7, 2018).

2. Expert Witnesses

The private parties also rely on several outside experts to render opinions on infringement, invalidity, domestic industry, and remedy. Dr. David Liu is a technical expert for Macronix who provided testimony regarding the '360 patent and the '602 patent, and his testimony was admitted as that of an expert in nonvolatile memory, including nonvolatile memory fabrication, structure and operation. CX-3840C (Liu DWS); CX-5426C (Liu Supp. WS); CX-5423C (Liu RWS); Tr. at 137-372, 1126-84; *see id.* at 140:12-22 (expert qualification).

PUBLIC VERSION

Dr. James Claude Dickens is a technical expert for Macronix who provided testimony regarding the '417 patent, and his testimony was admitted as that of an expert in electronic circuits and circuit design. CX-3839C (Dickens DWS); CX-5428C (Dickens Supp. WS); CX-5425C (Dickens RWS); Tr. at 374-411, 1186-1216 (Feb. 14, 2018); *see id.* at 375:6-15 (expert qualification). Dr. Abhijit Chandra is a technical expert for Macronix who provided testimony regarding the '360 patent, and his testimony was admitted as that of an expert in the area of CMP and finite element and boundary element models in semiconductor fabrication. CX-3838C (Chandra DWS); CX-5427C (Chandra Supp. WS); CX-5424C (Chandra 2nd Supp. WS); Tr. at 412-591; *see id.* at 414:4-13 (expert qualification). Christopher Bakewell is an economic expert for Macronix, who provided testimony regarding the economic prong of domestic industry and remedy and bonding. CX-3837C (Bakewell DWS); Tr. at 592-681; *id.* at 593:20-594:1 (expert qualification).

Dr. Hayden Kingsley Taylor is a technical expert for Toshiba who provided testimony regarding the '360 patent, and his testimony was admitted as that of an expert in the fields of contact mechanics, finite element modeling, the modeling of stresses and applications of the same to micro and nanoscale semiconductor device manufacturing. RX-1247C (Taylor RWS); Tr. at 683-749; *id.* at 685:17-686:5 (expert qualification). Dr. R. Jacob Baker is a technical expert for Toshiba who provided testimony regarding the '602 patent, and his testimony was admitted as that of an expert in the field of semiconductor design, including the design of output buffer circuits and semiconductor memory design. RX-1245C (Baker RWS); Tr. at 749-931; *id.* at 751:8-17 (expert qualification). Dr. Jeffery Bokor is a technical expert for Toshiba who provided testimony regarding the '360 patent, and his testimony was admitted as that of an expert in the fields of semiconductor circuit layouts, process and fabrication and the

PUBLIC VERSION

interpretation and evaluation of simulation data thereof. RX-1248C (Bokor RWS); Tr. at 932-1065; *id.* at 935:17-936:4 (expert qualification). Dr. V. Thomas Rhyne is a technical expert for Toshiba who provided testimony regarding the '417 patent, and his testimony was admitted as that of an expert in the field of semiconductor design including the design of output buffer circuits and semiconductor memory design. RX-0382C (Rhyne DWS); RX-1264 (Rhyne Supp. DWS); Tr. at 1065-1098. Dr. William Kerr is an economic expert for Toshiba. RX-1249C (Kerr RWS); Tr. at 1099-1123; *id.* at 1102:7-13 (expert qualification).

3. Deposition Designations

The private parties submitted additional testimony through deposition designations pursuant to Commission Rule 210.28(g). These include designations from deposition transcripts of Macronix witnesses Ming-Shang Chen (JX-0011C), Jen-Ren Huang (JX-0014C), Hsiang-Lan Lung (JX-0017C), and Arthur Yang (JX-0020C), and Toshiba witnesses Keiji Maruyama (JX-0024C), Hiroshi Nakamura (JX-0025C), Ikuko Shimogawara (JX-0028C), Jun Takayasu (JX-0029C), and Yuji Takeuchi (JX-0030C). In addition, the designated deposition transcript of third party Matthew BrightSky (JX-0010C) was admitted pursuant to Order No. 29 (Jan. 18, 2018).

II. JURISDICTION

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 (1981).

A. 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

PUBLIC VERSION

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) and (a)(2). Toshiba does not contest subject matter jurisdiction and has stipulated to importation for the accused products. *See* RIB at 5 (“Toshiba does not contest, solely for purposes of this Investigation, that the Commission has personal jurisdiction and has *in rem* jurisdiction over the Toshiba products that Macronix has specifically accused of infringement in this Investigation.”); CX-0002C (stipulation regarding importation and inventory) at ¶¶ 6-8, 11.

Thus, I find that the Commission has subject matter jurisdiction over the articles accused in this investigation under section 337 of the Tariff Act of 1930. *See Amgen Inc. v. Int’l Trade Comm’n*, 565 F.3d 846, 854 (Fed. Cir. 2009) (“In this case, the Commission had jurisdiction as a result of Amgen’s allegation that Roche imported an article . . . covered by the claims of a valid and enforceable United States patent.”).

B. Personal Jurisdiction

Toshiba does not contest the Commission’s personal jurisdiction. *See* RIB at 5 (“Toshiba does not contest, solely for purposes of this Investigation, that the Commission has personal jurisdiction and has *in rem* jurisdiction over the Toshiba products that Macronix has specifically accused of infringement in this Investigation.”). Toshiba responded to the Complaint and Notice of Investigation, participated in the investigation, appeared at hearings, and submitted pre- and post-hearing briefs. Thus, I find that Apple has submitted to the personal jurisdiction of the Commission. *See Certain Miniature Hacksaws*, Inv. No. 337-TA-237, USITC Pub. No. 1948, Initial Determination at 4, 1986 WL 379287, *1 (Oct. 15, 1986), *unreviewed in relevant part*, Comm’n Action and Order, 1987 WL 450871 (Jan. 15, 1987).

PUBLIC VERSION

C. In Rem Jurisdiction

The Commission has *in rem* jurisdiction over the accused products by virtue of Toshiba's concession that they have been imported into the United States. *See Sealed Air Corp. v. U.S. Int'l Trade Comm'n*, 645 F.2d 976, 985-86 (C.C.P.A. 1981) (holding that the ITC's jurisdiction over imported articles is sufficient to exclude such articles).

D. Standing

Macronix has standing to assert the patents in this investigation through its sole ownership of the patents by assignment from the named inventors. JX-0007; JX-0008; JX-0009; CX-3841C (Yang DWS) at Q/A10, Q/A13, Q/A16. Toshiba and Staff do not challenge Macronix's standing in this investigation.

III. U.S. PATENT NO. 6,552,360

A. Level of Ordinary Skill in the Art

In the *Markman* order, I adopted Macronix's proposal for the level of ordinary skill in the art for the '360 patent: a Bachelor of Science degree in electrical engineering or equivalent field and at least three years of relevant experience in circuits and/or fabrication. Order No. 23 at 10.

B. Claim Construction

The *Markman* order construed the term "performed upon" to mean "exerted on." Order No. 23 at 11-16. I further found that the polishing pressure of claim 1 does not have to be directly "performed upon" the first circuit structure, but can be indirectly "performed upon" the first circuit structure through an intervening layer or layers. *Id.* The term "utilizing to average" was construed to mean "providing an even distribution of." *Id.* at 16-23. The term "strips of second circuit structure" was construed to mean that the strips of the second circuit structure must be comprised of a stack of layers identical to the stack of layers composing the strips of the first circuit structure. *Id.* at 29-33.

PUBLIC VERSION

C. Infringement

Macronix is asserting claims 1-8 of the '360 patent against Toshiba.

1. Legal Standards

Section 337(a)(1)(B)(i) prohibits “the importation into the United States, the sale for importation, or the sale within the United States after importation by the owner, importer, or consignee, of articles that – (i) infringe a valid and enforceable United States patent or a valid and enforceable United States copyright registered under title 17.” 19 U.S.C. §1337(a)(1)(B)(i). The Commission has held that the word “infringe” in Section 337(a)(1)(B)(i) “derives its legal meaning from 35 U.S.C. § 271, the section of the Patent Act that defines patent infringement.” *Certain Electronic Devices with Image Processing Systems, Components Thereof, and Associated Software*, Inv. No. 337-TA-724, Comm’n Op. at 13-14 (December 21, 2011). Under 35 U.S.C. § 271(a), direct infringement of a patent consists of making, using, offering to sell, or selling the patented invention without consent of the patent owner.

“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 v. Westview Instruments, Inc.*, 52 F.3d 967, 976 (Fed. Cir. 1995) (*en banc*), *aff’d*, 517 U.S. 370 (1996) (citation omitted). 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 occurred.” *Warner-Lambert Co. v. Teva Pharm. USA, Inc.*, 418 F.3d 1326, 1341 n.15 (Fed. Cir. 2005).

PUBLIC VERSION

A complainant must prove either literal infringement or infringement under the doctrine of equivalents. Literal infringement requires the patentee to prove that the accused device contains each and every limitation of the asserted claim(s). *Frank's Casing Crew & Rental Tools, Inc. v. Weatherford Int'l, Inc.*, 389 F.3d 1370, 1378 (Fed. Cir. 2004). "If even one limitation is missing or not met as claimed, there is no literal infringement." *Elkay Mfg. Co. v. EBCO Mfg. Co.*, 192 F.3d 973, 980 (Fed. Cir. 1999). Literal infringement is a question of fact. *Finisar Corp. v. DirectTV Gr., Inc.*, 523 F.3d 1323, 1332 (Fed. Cir. 2008).

Where literal infringement is not found, infringement nevertheless can be found under the doctrine of equivalents. Determining infringement under the doctrine of equivalents "requires an intensely factual inquiry." *Vehicular Techs. Corp. v. Titan Wheel Int'l, Inc.*, 212 F.3d 1377, 1381 (Fed. Cir. 2000). According to the Federal Circuit:

Infringement under the doctrine of equivalents may be found when the accused device contains an "insubstantial" change from the claimed invention. Whether equivalency exists may be determined based on the "insubstantial differences" test or based on the "triple identity" test, namely, whether the element of the accused device "performs substantially the same function in substantially the same way to obtain the same result." The essential inquiry is whether "the accused product or process contains elements identical or equivalent to each claimed element of the patented invention[.]"

TIP Sys., LLC v. Phillips & Brooks/Gladwin, Inc., 529 F.3d 1364, 1376-77 (Fed. Cir. 2008)

(citations omitted) (alteration in original). Thus, if an element is missing or not satisfied, infringement cannot be found under the doctrine of equivalents as a matter of law. *London v. Carson Pirie Scott & Co.*, 946 F.2d 1534, 1538-39 (Fed. Cir. 1991).

2. Accused Products

Macronix accuses [redacted] Toshiba designs of infringing the '360 patent. The accused designs are fabricated using a "process flow." CX-3840C (Liu DWS) at Q/A 102. Toshiba uses the term [redacted] internally to refer to the process flow used to manufacture

PUBLIC VERSION

the designs. *Id.* at Q/A 103. [REDACTED]

[REDACTED]

[REDACTED]

PUBLIC VERSION

[REDACTED]

PUBLIC VERSION

[REDACTED]

3. “strips of second circuit structure”

The asserted claims require a circuit layout having “a plurality of strips of first circuit structure” and “at least two strips of second circuit structure.” ’360 patent at col. 6:2-8. In the *Markman* order, I found that the stack of layers composing the strips of the second circuit structure must be identical to the stack of layers composing the strips of the first circuit structure. Order No. 23 (Dec. 5, 2017) at 33, 52. Macronix asserts that the accused products satisfy the “strips of second circuit structure” limitation literally, and Macronix does not contend that the limitation is met under the doctrine of equivalents.

PUBLIC VERSION

Toshiba and Staff argue that the accused products do not satisfy the “strips of second circuit structure” because the stack of layers composing the strips of the alleged second circuit structure is different than the stack of layers composing the strips of the alleged first circuit structure. According to Toshiba and Staff, the alleged first circuit structure strips include [REDACTED] [REDACTED] layers that are not present in the alleged second circuit structure strips. Toshiba and Staff also argue that [REDACTED] in the alleged first circuit structure strips is not [REDACTED] in the alleged second circuit structure strips. Macronix counters that [REDACTED] are not layers in the alleged first and second circuit structure strips, [REDACTED] [REDACTED].

For the reasons set forth below, I find that the [REDACTED] layers in the accused products are part of the alleged first circuit structure strips. There is no dispute that if the [REDACTED] layers are found to be layers in the first circuit structure strips that the accused products would not literally satisfy the “at least two strips of [the] second circuit structure” limitation. I further find that alleged first circuit structure and the alleged second circuit structure each include [REDACTED] and that Macronix has failed to show that [REDACTED] in the alleged first circuit structure is the same as [REDACTED] in the alleged second circuit structure.

Accordingly, I find that the accused products do not infringe the asserted claims because they do not have the claimed “strips of second circuit structure.”

PUBLIC VERSION

Dr. Chandra made the statements in his expert report and witness statement prior to the issuance of the *Markman* order, which issued on December 5, 2017, after the close of expert discovery (November 21, 2017) and service of direct witness statements (December 1, 2017). Order No. 8 (May 11, 2017) at 2. The *Markman* order addresses whether the strips of the first circuit structure and the strips of the second circuit structure must be composed of identical stacks of layers. *See generally*, Order No. 23 (Dec. 5, 2017) at 29-33. During claim construction proceedings, Macronix, along with Staff, took the position that the strips of the first and second circuit structures could be composed of different stacks of layers. *Id.* at 29. In the *Markman* order, I rejected Macronix's position in light of the specification's teaching that in order to average the polishing pressure on the ends of the first circuit strips as required by the claim language, the first and second circuit structure had to be composed of the same dielectric and conductive layers. '360 patent, col. 4:31-37.

When confronted about the statements in Dr. Chandra's expert report and witness report, Dr. Liu initially denied telling Dr. Chandra that the [REDACTED] layers were part of the alleged first circuit structure. Tr. at 153:23-154: 2, 155:9-14, 156:4-11, 156:21-157:2, 160:1-4. Eventually, however, Dr. Liu admitted that he had told Dr. Chandra that the layers were part of the stack of layers that composes the alleged first circuit structure:

Q Let me just follow that up with the sentence below it, where it says, "I also understand from Dr. Liu that the bottom layers of the first circuit structure that [REDACTED]."

Did you make that statement or something—a substantively similar statement to Dr. Chandra?

A Yes

Tr. 162:21-163:3.

PUBLIC VERSION

Q And you told him that the bottom layer of the first circuit structure ends and the second circuit structure is [REDACTED]. You told him that; right?

A That's correct, as shown here.

Id. at 160:15-18; *see also id.* at 160:21-162:16.

i. Dr. Liu's attempt to recant his admission is not credible.

In its reply brief, Macronix argues that Dr. Liu recanted his hearing testimony confirming that he had told Dr. Chandra that the layers of the first circuit structure include [REDACTED] [REDACTED]. CRB at 7-8. In support of this argument, Macronix points to Dr. Liu's testimony on redirect, in which Dr. Liu testifies that he had told Dr. Chandra that [REDACTED] [REDACTED] of the alleged first circuit structure. *Id.* (citing Tr. at 280:5-282:1 (Liu); CDX-5001C). This testimony, however, is not credible, as it stands in stark contrast to his unambiguous testimony on cross-examination admitting that he had told Dr. Chandra "[REDACTED] [REDACTED] [REDACTED]." Tr. at 162:21-163:3.

Macronix also points to the portion of Dr. Liu's testimony in which Dr. Liu is asked on redirect about paragraph 138 of Dr. Chandra's expert report. In that paragraph, Dr. Chandra states that he "understand[s] that Dr. Liu has opined that the claimed first and second circuit structures may include one or more of the following layers." Tr. at 282:14-16 (Liu, quoting Dr. Chandra's expert report, ¶ 138) (internal quotation marks omitted). The layers listed in this paragraph do not include [REDACTED]. *Id.* at 282:21-24. Dr. Liu testifies that the paragraph lists the "actual layers that [he] provided to Dr. Chandra." *Id.* at 282:4-11.

PUBLIC VERSION

This testimony, however, does not support Macronix's contention that Dr. Liu did not tell Dr. Chandra that the stack of layers composing the alleged first circuit structure includes [REDACTED] and that the stack of layers composing the alleged second circuit structure included [REDACTED]. Although the portions of paragraph 138 of Dr. Chandra's expert report that are in the record and Dr. Liu's testimony concerning the paragraph support finding that Dr. Liu told Dr. Chandra that the alleged first and second circuit structures "may include one or more" of the listed layers, they do not evidence that Dr. Liu had told Dr. Chandra that the stacks composing the first circuit structure were limited to the listed layers. *Id.* at 282:14-16 (quoting Dr. Chandra's expert report, ¶ 138); *see also id.* at 282:4-11. Moreover, even if Dr. Liu's testimony is interpreted as Macronix suggests, his testimony would not be credible as it would be irreconcilable with his admission that he had told Dr. Chandra that the alleged first circuit structure includes [REDACTED] and the alleged second circuit structure includes [REDACTED]. Tr. at 160:15-18, 162:21-163:3.

ii. Dr. Liu's analysis of the domestic industry products is consistent with his statements to Dr. Chandra.

Further undermining Dr. Liu's attempt to recant his admission is that his analysis of the domestic industry products is consistent with his pre-*Markman*-order statements captured in Dr. Chandra's expert report and witness statement. [REDACTED], the domestic industry products have [REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]. In his witness statement, Dr. Liu identifies [REDACTED] as one of the layers that compose the alleged first circuit structure of the domestic industry products: [REDACTED]

PUBLIC VERSION

[REDACTED]

Dr. Liu's testimony concerning the layers of the domestic industry products is fully consistent with his pre-*Markman*-order statements concerning the accused products.

b. [REDACTED] are layers in the circuit corresponding to the alleged first circuit structure.

It is undisputed that [REDACTED] are part of the circuit identified by Macronix as corresponding to the first circuit structure. For example, for the [REDACTED], Macronix's expert Dr. Liu prepared demonstrative CDX-0326C.5 "to illustrate the layer composition and the layer thicknesses from [REDACTED] [REDACTED]".

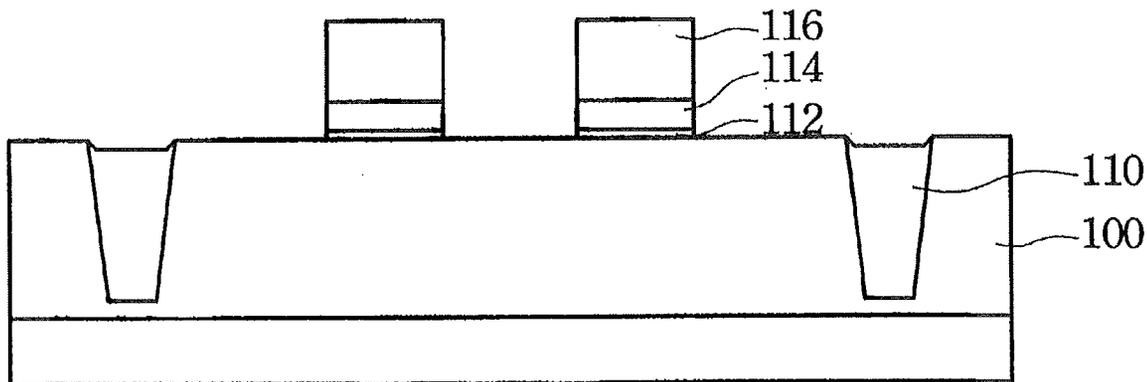
[REDACTED]

CDX-0326C.5; CX-3840C (Liu DWS) at Q/A 108. Dr. Liu identifies [REDACTED] [REDACTED] shown in the demonstrative. CX-

PUBLIC VERSION

3840C (Liu DWS) at Q/A 109-110] [REDACTED]

Macronix counters that the term “circuit structure” can refer to “just [] a portion of, rather than a complete functional device.” CIB at 24. In other words, according to Macronix, the [REDACTED] layers of the circuit corresponding to the first circuit structure can be ignored for the purposes of the infringement analysis. In support of its interpretation of the term “circuit structure,” Macronix points out that the first circuit structure of the preferred embodiment is not a complete memory cell. *Id.* at 24-25. This, however, is because the '360 patent describes a semiconductor in the process of being fabricated. '360 patent, col. 2:65-67 (“FIGS. 3A-3F schematically illustrates cross sectional views of fabricating a flash memory cell according to the application of the present invention . . .”). For instance, the first circuit structure in Figure 3A is described as having three layers: gate oxide layer 112, conductive layer 114, and dielectric layer 116.



Id., col. 3:38-39. One of these layers—dielectric layer 116—is a sacrificial layer that is completely removed in later processing steps. *Id.*, col. 4:44-48. If additional layers are

PUBLIC VERSION

deposited to complete the fabrication of the circuit, there is no suggestion in the '360 patent that gate oxide layer 112 and conductive layer 114 would no longer be considered to be layers in the first circuit structure. In contrast to the structures described in the specification, the accused products are not in the process of being fabricated, but have been fully manufactured. In such a case, the structure of the first circuit is the completed circuit, not an arbitrarily selected portion of the completed circuit.

c. [REDACTED] form part of the of the first circuit structure strips.

Macronix argues that even if [REDACTED] are part of the alleged first circuit structure, the layers are not part of the “strips” of the alleged first circuit structure. In support of this position, Macronix advances two arguments. First, Macronix argues that the layers [REDACTED] for the strips. Second, Macronix argues that [REDACTED] [REDACTED] are not part of the alleged first circuit strips because [REDACTED] [REDACTED]. For the reasons discussed below, Macronix’s arguments are unpersuasive.

i. [REDACTED] are part of the alleged first circuit structure strips, not [REDACTED] for the strips.

Macronix argues that [REDACTED] are not part of the first circuit structure strips because they are “[REDACTED]” CIB at 19. In support of this argument, Macronix points to the process flows used to fabricate the accused products. In the process flows, [REDACTED] [REDACTED]. See, e.g., Tr. (Liu) at 288:19-23, 290:16-20. According to Macronix, “a person of

PUBLIC VERSION

ordinary skill would know that [REDACTED]
[REDACTED]
[REDACTED].” CIB at 21.

In support of its position, Macronix relies on the patent’s description of the preferred embodiment, in which the layers composing the strips of the first circuit structure [REDACTED] after the formation of the STI trenches. *Id.* (citing ’360 patent, col. 3:32-36). The claims, however, do not place any requirement regarding the timing of the formation of the layers of the first circuit structure strips with respect to the formation of the STI trenches. Nor does the specification suggest any such timing requirement. Although the layers of the first circuit structure strips [REDACTED] after the formation of the STI regions in the preferred embodiment, it would be improper to read that limitation into the claims. *Hill-Rom Services, Inc. v. Stryker Corp.*, 755 F.3d 1367, 1371 (Fed. Cir. 2014) (“While we read claims in view of the specification, of which they are a part, we do not read limitations from the embodiments in the specification into the claims.”).

The specification can only limit claim scope through lexicography or disavowal and “[t]he standards for finding lexicography and disavowal are exacting.” *Id.* For lexicography, “a patentee must clearly set forth a definition of the disputed claim term other than its plain and ordinary meaning and must clearly express an intent to redefine the term.” *Id.* (quoting *Thorner v. Sony Computer Entm’t Am. LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012)) (internal quotation marks omitted). For disavowal, the patentees must clearly indicate “‘that the invention does not include a particular feature’ or is clearly limited to a particular form of the invention.” *Id.* at 1372 (quoting *SciMed Life Sys., Inc. v. Advanced Cardiovascular Sys., Inc.*, 242 F.3d 1337, 1341 (Fed.Cir.2001)).

PUBLIC VERSION

Nowhere in the specification is there any suggestion that the patentees intended to limit the claimed first circuit structure strips to stacks of layers, wherein each layer was deposited after the formation of the STI trenches. The specification does not attach any importance to the timing of the deposition of the layers forming the first circuit structure strips relative to the formation of STI trenches. Although the layers forming the first circuit structure strips are deposited after the formation of the STI trenches in the preferred embodiment, this is insufficient to constitute either lexicography or disavowal. *Id.* (“Even when the specification describes only a single embodiment, the claims of the patent will not be read restrictively unless the patentee has demonstrated a clear intention to limit the claim scope using words or expressions of manifest exclusion or restriction.”) (quoting *SciMed*, 242 F3d at 1341) (internal quotation marks omitted) (alteration in original omitted).

Macronix also cites the testimony of its expert Dr. Liu and Toshiba’s fact witness Mr. Takeuchi in support of its position that [REDACTED] [REDACTED] for the alleged first circuit structure strips. CIB at 20-21, 23-24. At the hearing, Dr. Liu testified that [REDACTED] [REDACTED] are not part of the alleged first circuit structure strips because the layers are “[REDACTED] [REDACTED] [REDACTED] the layers in the first circuit structure and the second circuit structure.” Tr. (Liu) at 290:16-20; *see also id.* at 288:19-23. Dr. Liu acknowledges, however, that there is nothing in the claims or specification of the ’360 patent that indicates that the timing between process steps plays any part in determining whether a layer is part of the first circuit structure strips:

Q Does the patent speak at all in terms of timing of laying down layers and determining whether that layer is part of the first or second circuit structure?

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ii. **Layers do not have to extend from one second circuit structure strip to the other.**

In support of its contention that the layers of the first circuit strip must extend from one strip of the second circuit structure to the other, Macronix points to language in claim 1 requiring that “each of said two strips of second circuit structure respectively linking the front end and the rear end of said plurality of strips of said first circuit structure.” ’360 patent, col. 6:9-11.

According to Macronix, this language means that the first circuit “strips—and the layers of materials composing these strips— must run the entire length from one end to another.” CIB at 21. Macronix’s interpretation of the claim language is flawed.

While the claim language requires that the “strips” of the first circuit structure extend from one strip of the second circuit structure to the other, the claim language does not require that all of the layers composing the strips do so. Macronix is not asserting that the patentees acted as their own lexicographers and defined “strip” of the first circuit structure to require a strip that extends from one strip of the second circuit structure to the other. Macronix acknowledges that the term “strip” only requires a rectangular shape: “By using the term ‘strip,’ claim 1 indicates to a person of ordinary skill in the art that the first circuit structure’s shape is rectangular, with one dimension being longer than the other.” CIB at 21 (citing Tr. (Bokor) at 977:3-9). Macronix’s contention that a layer must extend from one strip of the second circuit structure to the other is not based on the term “strip,” but on surrounding claim language: “Of course, the shape alone is not enough, *because claim 1 further requires* that the ends of the strips of first circuit structure must be linked by the strips of second circuit structure: ‘each of said two strips of second circuit structure respectively linking the front end and the rear end of said plurality of strips of said first circuit structure first circuit.’” CIB at 21 (quoting ’360 patent, col. 6:9-11) (emphasis in original removed) (emphasis added). Therefore, a rectangular-shaped

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layer is a strip irrespective of whether the layer extends from one strip of the second circuit structure to the other. There is no dispute that [REDACTED]

In support of its contention that the claim language requires each layer of the first circuit structure strips to extend from one second circuit structure strip to the other, Macronix cites the testimony of its expert Dr. Liu and that of Toshiba's expert Dr. Bokor. Dr. Liu's testimony that in order to be a part of the first circuit structure strip a layer has to extend from one second circuit structure strip to the other is not only unsupported by the patent, it is contradicted by his prior statements to Dr. Chandra and his testimony [REDACTED]

As discussed above, in statements to Dr. Chandra concerning the accused products and in [REDACTED] his witness statement, Dr. Liu placed [REDACTED] in the stack of layers composing the alleged first circuit structure strips, [REDACTED]. See Section III(C)(3)(a), *supra*.

Macronix's argument that Dr. Bokor's testimony supports its position is based on Dr. Bokor's testimony that [REDACTED] the alleged first circuit structure is not part of the alleged first circuit structure strips. At his deposition, Dr. Bokor testified that [REDACTED] was not part of the strips because [REDACTED] Tr. at 989:25-990:17 (Bokor). When asked about his deposition testimony, Dr. Bokor sought to "clarify" his deposition testimony by noting that [REDACTED] Id. at 990:19-22; see also *id.* at 990:23-991:5 ("[REDACTED]

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[REDACTED]
[REDACTED].”).

Although Dr. Bokor expanded on his deposition testimony in an effort to “clarify” it, he confirmed that one of the reasons he believes that [REDACTED] is not part of the first circuit structure is because [REDACTED]

[REDACTED] *Id.* at 990:19-22. This testimony, however, is not entitled to significant weight. The testimony is inconsistent with Dr. Bokor’s testimony that [REDACTED]

[REDACTED] are part of the first circuit structure strip, [REDACTED]
[REDACTED]. RX-1248C (Bokor RWS) at Q/A 48, 50.

Additionally, as discussed above, there is no support in the intrinsic record for limiting the stack of layers comprising the first circuit structure’s strips to layers that extend from one second circuit structure strip to the other. As such, Dr. Bokor’s testimony on this point—like that of Dr. Liu—is unsupported, conclusory expert opinion. As noted by the Federal Circuit in *Phillips v. AWH Corp.*, such testimony is “not useful to a court.” 415 F.3d 1303, 1318 (Fed. Cir. 2005).

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

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[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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[REDACTED]

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4. “utilizing to average”

The asserted claims of the '360 patent require that the claimed second circuit structure be “utiliz[ed] to average [the] polishing pressure performed upon” the ends of the first circuit structure. '360 patent at col. 6:11-14. “[U]tilizing to average” means “providing an even distribution of” polishing pressure and “performed upon” means “exerted on” Order No. 23 (Dec. 5, 2017) at 16, 23. Additionally, the *Markman* order acknowledges that the polishing pressure can be indirectly “performed upon” the ends of the first circuit structure through an intervening layer or layers. *Id.* at 11.

Macronix contends that the accused products satisfy the “utilized to average” limitation either literally or under the doctrine of equivalents. In support of its contention, Macronix cites “basic physics” and the simulations performed by its expert Dr. Chandra and Toshiba’s expert Dr. Taylor. As explained below, however, Macronix’s reliance on this evidence is misplaced.

a. **“Basic physics” does not show that the alleged second circuit structure averages the polishing pressure.**

Macronix argues that “an understanding of physics suggests an intuitive answer” to the question of whether the accused products satisfy the “utilizing to average” limitation. CIB at 28. According to this argument, the addition of a second circuit structure results in a “reduction and averaging of pressure” on the alleged first circuit structure ends by “expand[ing] the [surface] area considerably” and “remov[ing] the interface at the first circuit structure ends.” *Id.* at 27 (quoting Tr. at 553:4-11 (Chandra)) (internal quotation marks omitted) (second alteration in original). According to Macronix, the expansion of the surface area coupled with the elimination of the interfaces at the ends of the alleged first circuit structure means that “[t]he force can spread over that available area, providing even pressure distribution.” *Id.* (quoting Tr. at 553:9-11 (Chandra)) (alteration in original). Macronix’s argument is flawed.

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Although it can cause the polishing pressure to become evenly distributed, the addition of a second circuit structure having the same layers as the first circuit structure does not necessarily result in an even distribution of the polishing pressure. This is acknowledged by Macronix and its experts. In its initial brief, Macronix admits the alleged second circuit structure's presence in the layout is an insufficient basis on which "to make a conclusive determination regarding beneficial pressure redistribution." CIB at 28. This admission is consistent with the testimony of its experts Dr. Chandra and Dr. Liu, both of whom acknowledge that the presence of a second circuit structure "does not necessarily result in the averaging of polishing pressure on the front and rear ends of the first circuit structures during CMP." Tr at 147:13-18 (Liu); *see also, id.* at 148:1-5 (Liu) (agreeing that "[t]he use of the claimed second circuit structure together with the first circuit structure does not inherently mean that utilizing to average polishing pressure limitation will be met"); 455:21-456:2 (Chandra) (testifying that he "cannot make a blanket statement" that adding a second circuit structure that is identical in material and dimension to the ends of the first circuit structure would result in the polishing pressure being averaged), 567:6-15 (Chandra) (same admission), 456:16-22 (Chandra) (agreeing that "even if you add a second circuit structure that is identical in material and dimensions to the first circuit structure, you would do a simulation to verify if they would average polishing pressure."). As Dr. Chandra confirmed, in some circumstances, adding a second circuit structure can result in the first circuit structure being "stiffen[ed] too much," which results in stress concentrations. Tr. at 456:3-15.

Accordingly, the presence of the alleged second circuit structure by itself does not establish by a preponderance of the evidence that the accused designs satisfy the "utilizing to average" limitation. As acknowledged by Macronix and its experts, simulations are necessary to confirm whether the addition of the alleged second circuit structure results in the polishing

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pressure exerted on the ends the alleged first circuit structure being averaged. CIB at 28 (“While an understanding of physics suggests an intuitive answer, it is not sufficient to make a conclusive determination regarding beneficial pressure redistribution. That is why Dr. Chandra created simulations of stress patterns at the first circuit structure’s ends as indirect evidence of the averaging of polishing pressure.”) (internal citations omitted); Tr. at 145:9-9 (Liu) (confirming that “one cannot determine whether [the] utilizing [to] average limitation is met without seeing the stress patterns”), 145:25-146:4 (Liu) (confirming that “[o]ne skilled in the art would insist on a detailed simulation of stress patterns in order to determine whether this claim limitation is met”), 146:19-24 (Liu) (confirming that “[w]ithout any information about CMP-related stress patterns, it is impossible to assess the effect of the addition of a second circuit structure on polishing pressure during the CMP process”), 456:16-22 (Chandra) (confirming that “even if you add a second circuit structure that is identical in material and dimensions to the first circuit structure, you would do a simulation to verify if they would average polishing pressure”).

For the reasons discussed below, the simulations fail to show that the alleged second circuit structure averages the polishing pressure on the ends of the alleged first circuit structure.

b. The simulations show that the ends of the alleged first circuit structure are subjected to a wide range of stresses.

Both Macronix’s expert Dr. Chandra and Toshiba’s expert Dr. Taylor performed simulations to determine whether the alleged second circuit structure in the accused products averages the polishing pressure on the ends of the alleged first circuit structure. Each set of simulations determined the stresses exerted on the ends of the alleged first circuit structure with and without the alleged second circuit structure in the circuit layout.

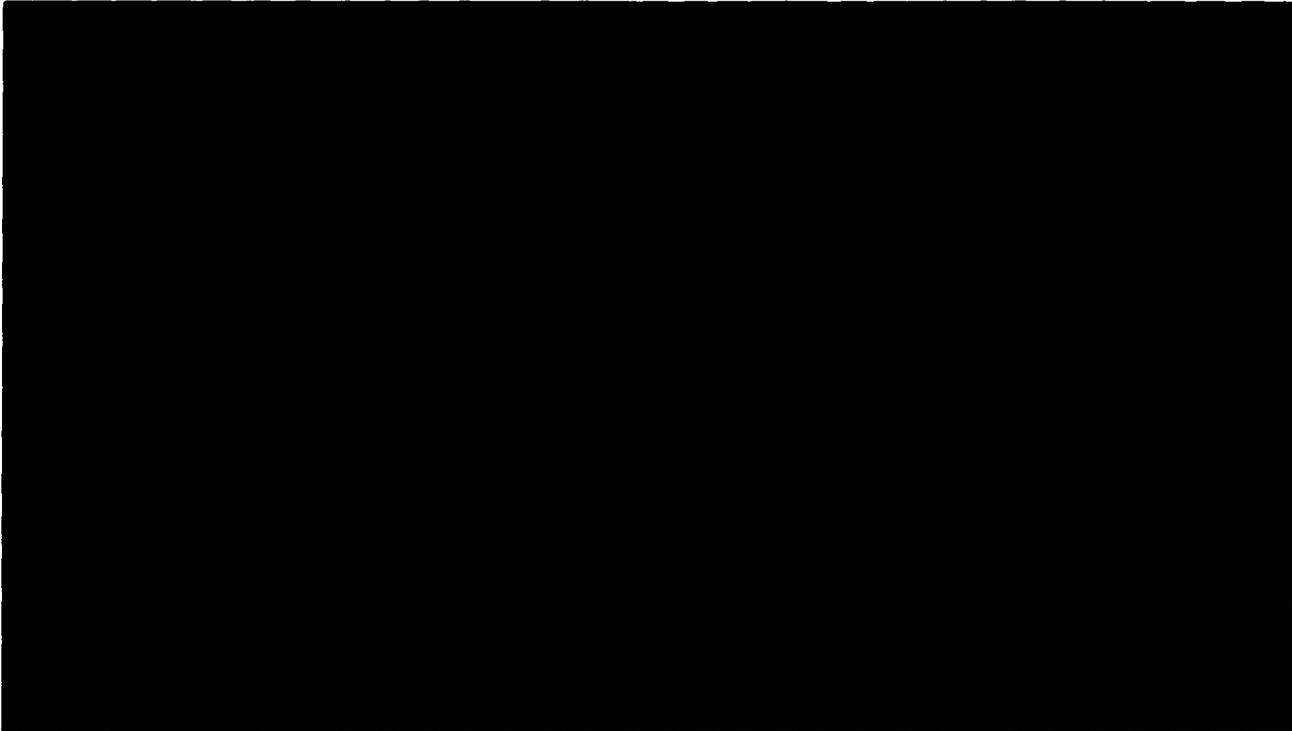
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(i) Dr. Chandra's simulations

The simulations conducted by Dr. Chandra analyzed von Mises Stress and the Maximum Principal Stress ("MPS"). Von Mises stress "is a representation of the 'distortion energy' in the material and represents the stimulus for dislocation motion and glide, and thus relates to the creation, movement, and coalescence of defects." CX-3838C (Chandra DWS) at Q/A 55. MPS "represents the stimulus for dislocation nucleation in a material." *Id.* Dr. Chandra generated stress contour maps to visually represent the stresses on the ends of the alleged first circuit structure. Stress contour maps use colors to represent different levels of stress. The stress contour maps for Dr. Chandra's simulations of [REDACTED] are shown below. The "Circuit 1" images show the stresses measured in the simulations conducted without the alleged second circuit structure and the "Circuit 1+2" images show the stresses measured in the simulations conducted with the alleged second circuit structure.



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As shown in the stress contour maps above, Dr. Chandra's simulations show that inclusion of the alleged second circuit structure to the layout [REDACTED] [REDACTED] along the ends of the alleged first circuit structure. According to Dr. Chandra's simulations, [REDACTED] attributable to the alleged second circuit structure in the accused designs ranges [REDACTED] [REDACTED]. CX-3838C (Chandra DWS) at Q/A 94; CDX-2071C.0003; CDX-2071C.0005. Dr. Chandra's simulations also [REDACTED] [REDACTED] attributable to the presence of the alleged second circuit structures ranging from [REDACTED] [REDACTED]. CX-3838C (Chandra DWS) at Q/A 94; CDX-2071C.0002; CDX-2071C.0005.

(ii) Dr. Taylor's simulations

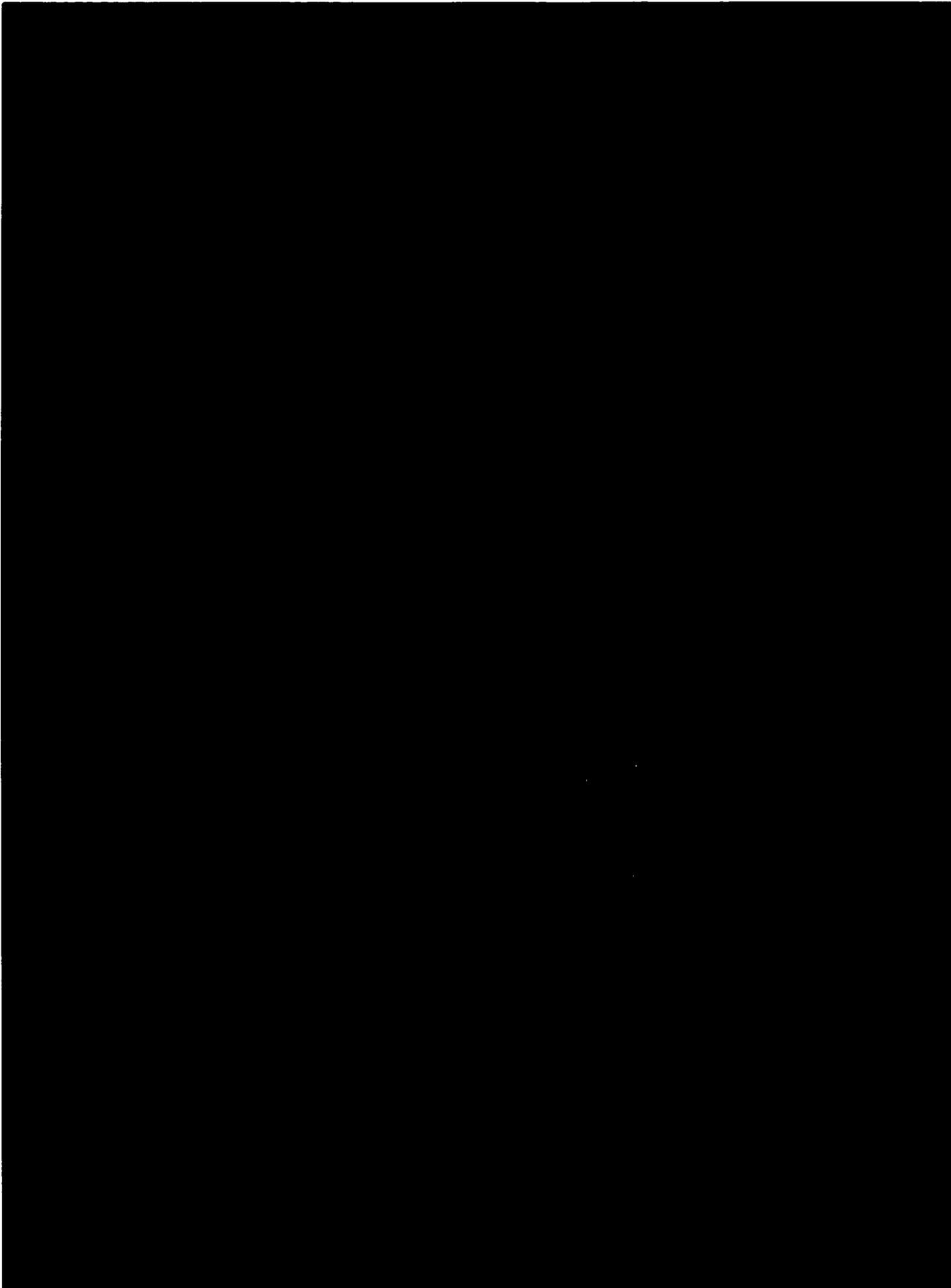
Dr. Taylor's simulations measure the stresses on the alleged first circuit structure under three different load conditions: a downward force, a shear force parallel to the alleged first

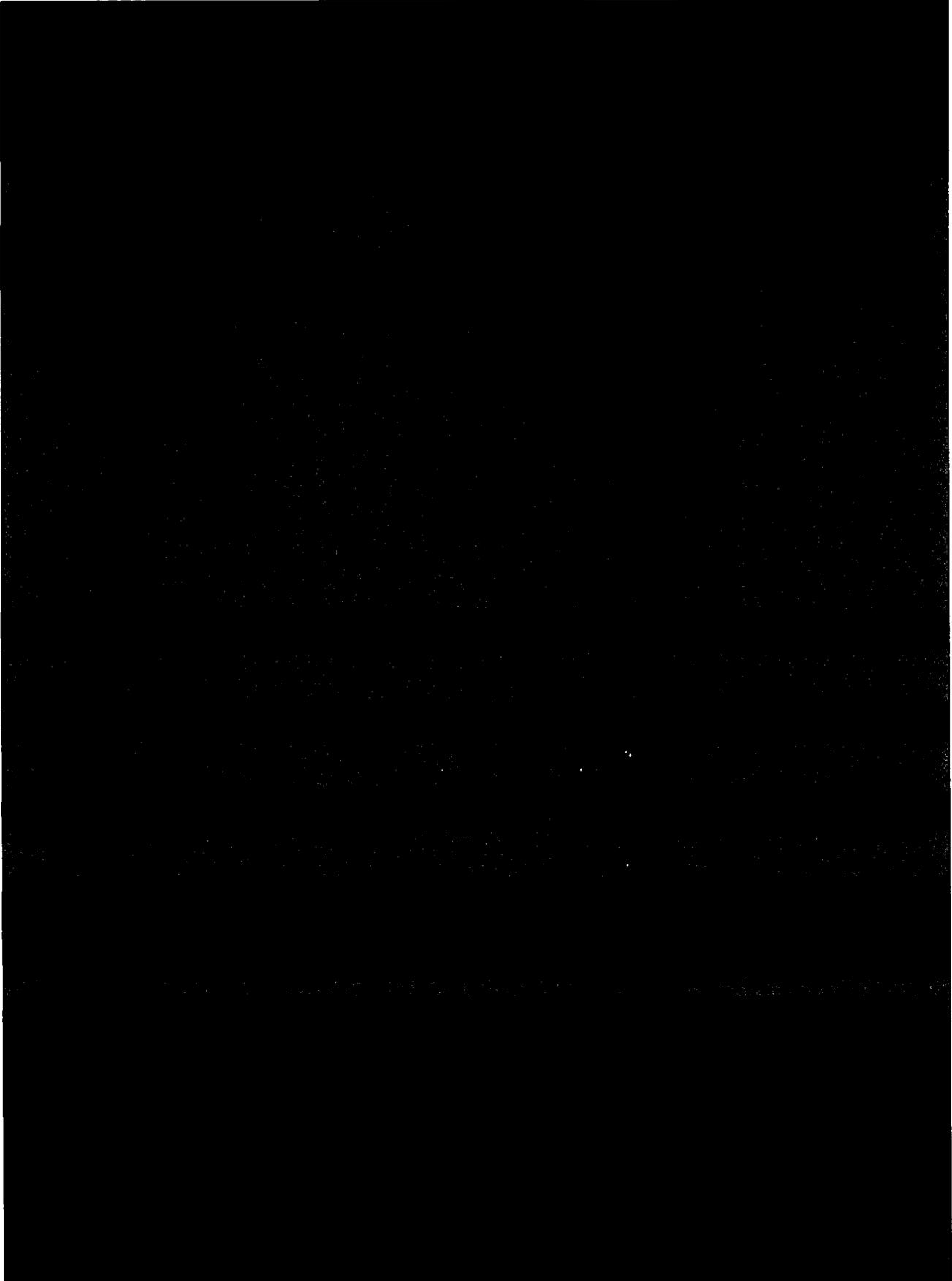
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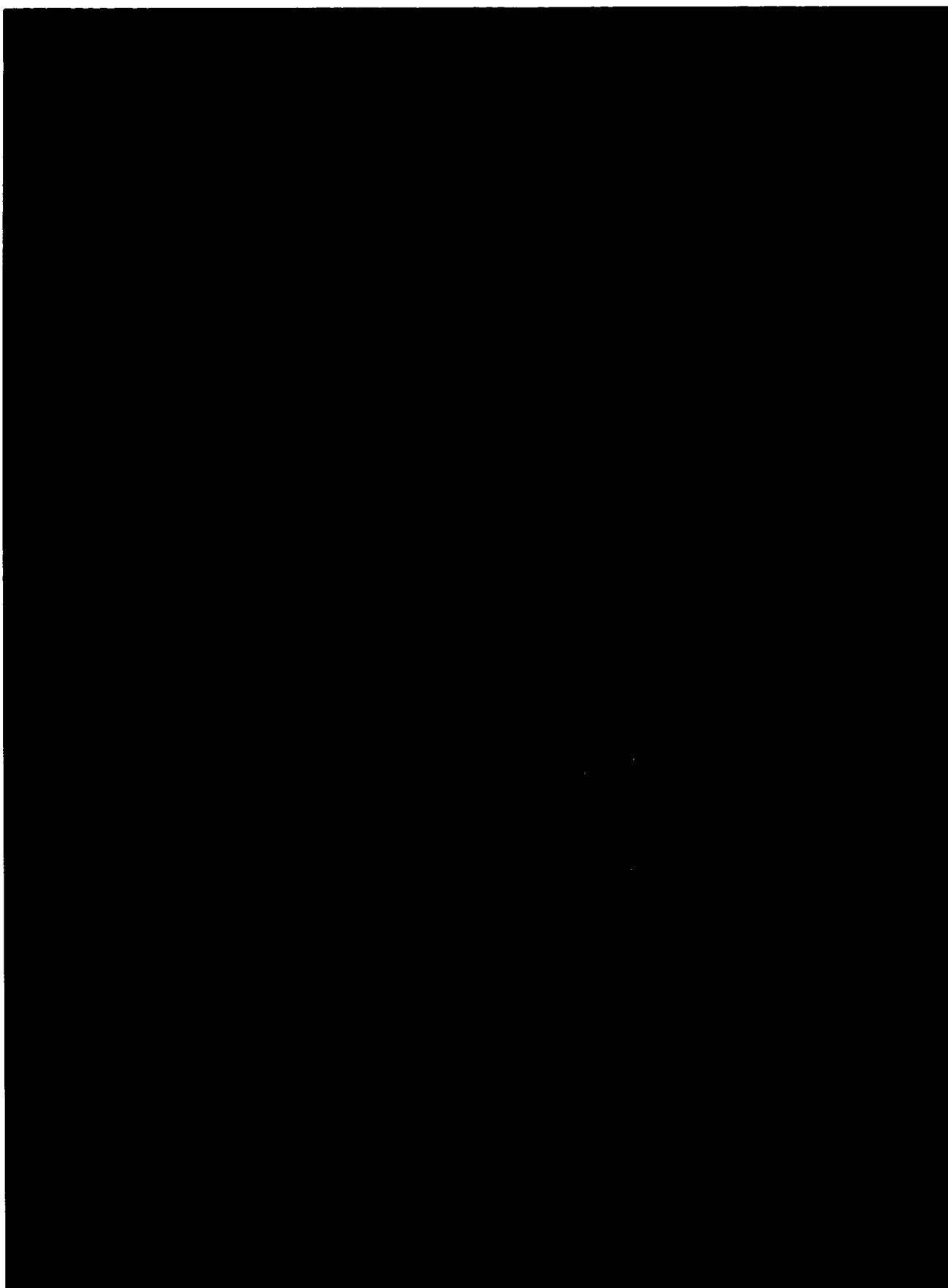
circuit structure, and a shear force perpendicular to the alleged first circuit structure. For each of the load conditions, Dr. Taylor determined the von Mises stress, MPS, and one of three different stress components (σ_{zz} , σ_{xz} , and σ_{yz}). RX-1248C (Bokor RWS) at Q/A 160. The stress component analyzed for a particular load condition is the one that is most responsive for that load condition. The stress component σ_{zz} is most responsive to a downward force, the stress component σ_{xz} is most responsive to a shear force along the x-axis, and the stress component σ_{yz} is most responsive to a shear force along the y-axis. *Id.* at Q/A 160-61.

For each of his simulations, Dr. Taylor used two-dimensional plots called histograms to represent the distribution of stress along the ends of the alleged first circuit structure. *Id.* at Q/A 150. In the histograms, the horizontal axis is divided into bins, each of which represents a particular stress level, and the vertical axis is divided into units of volume. *Id.* at 150-52. Vertical bars on the histogram represent the volume of the first circuit structure's ends that is subjected to a particular stress level. *Id.* For example, if only two stress levels, 10 MPa and 15 MPa, are exerted on the ends of the first circuit structure, the resulting histogram would have two vertical lines, one in each of the two bins. If three quarters of the measured stress is at 10 MPa, the vertical line in the 10 MPa bin would be three times as long as the one in the 15 MPa bin.

Dr. Taylor's histograms show that a wide range of stresses occurs along the ends of the alleged first circuit structure. The histograms for the narrowest ranges for the σ_{zz} , σ_{xz} and σ_{yz} stress components, MPS, and von Mises stress observed in Dr. Taylor's modeling are shown below.









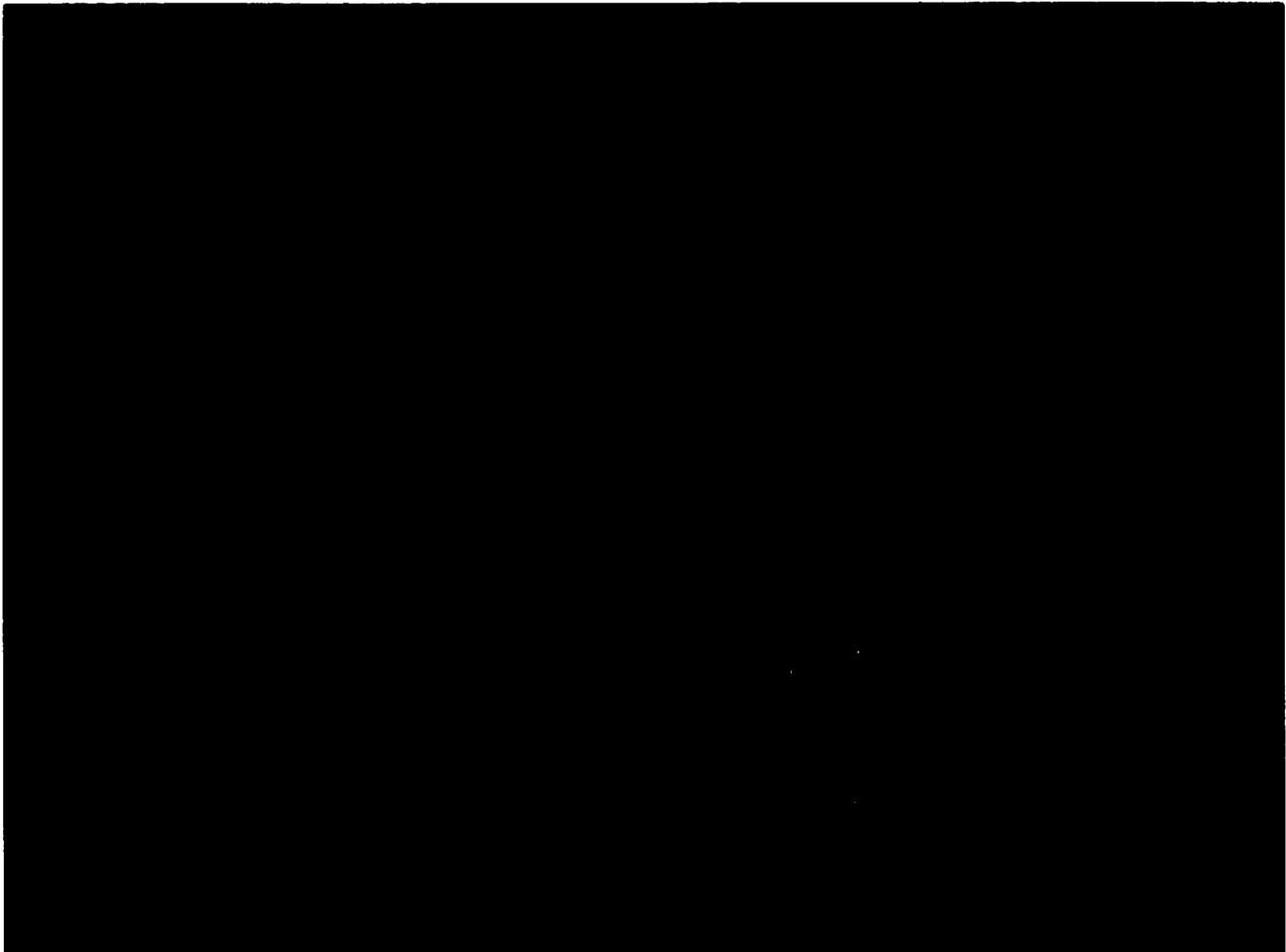
See, e.g., RX-1248C (Bokor RWS) at Q/A 172, 176, 180, 185, 189, 193, 197, 201, 205, 206, 210, 214, 218, 222, 226, 230, 234, 238, 242, 246, 250, 254, 258, 262, 266, 270, 274, 278, 282, 286, 290, 294, 298, 302.

- a) **The three-dimensional stress contour maps from Dr. Taylor's modelling do not show a uniformity of stress on the ends of the first circuit structure.**

To visually represent the results from his simulations, Dr. Taylor generated two-dimensional and three-dimensional stress contour maps showing the distribution of stresses on

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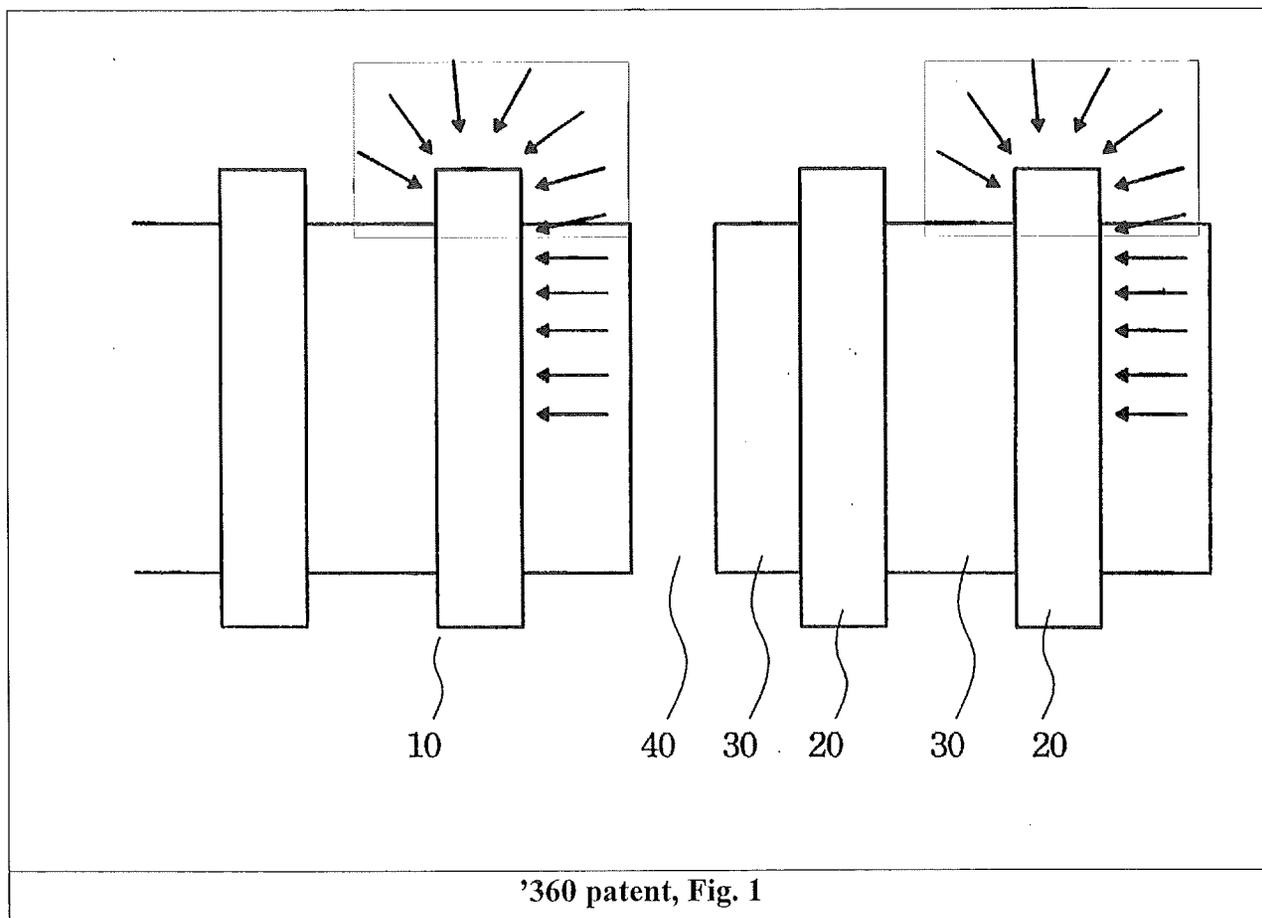
the ends of the alleged first circuit structure. According to Macronix, Dr. Taylor's three-dimensional stress contour maps show that the stress on the ends of the alleged first circuit structure is uniform. By way of example, the three-dimensional stress contour map of the σ_{zz} stress component from Dr. Taylor's modeling of [REDACTED] under a downward compressive load is shown below:



Macronix's argument that Dr. Taylor's three-dimensional stress contour maps show that the stress on the ends of the alleged first circuit structure is uniform is flawed. Macronix's argument is based on a constrained interpretation of the term "end," which is inconsistent with the term's plain meaning and the specification of the '360 patent. Under Macronix's interpretation, "end" is "where the first and second circuit structures intersect," *i.e.*, the two-

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dimensional “end face” of the alleged first circuit structure. CIB at 36. “End” is an ordinary word and no party argues that it is a term of art with a specialized meaning. The plain and ordinary meaning of “end” encompasses more of the first circuit structure than the end faces. Consistent with its plain and ordinary meaning, the '360 patent indicates that the “ends” of the first circuit structure are three-dimensional by depicting them extending from the isolation region to the active region. As described in the '360 patent, the “ends” in prior art layouts are subjected to pressure that is not “uniform and come from many directions.” '360 patent, col. 2:63-col. 3:2. The portion of the strip in the prior art layouts depicted as being subjected to non-uniform pressures coming from many directions, extends from the isolation region to the active region 30.



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Moreover, even under its interpretation of the term “end,” Macronix’s reliance on Dr. Taylor’s three-dimensional stress contour maps is misplaced. In addition to the three-dimensional stress contour maps, Dr. Taylor prepared two-dimensional stress contour maps of end faces. These two-dimensional stress contour maps clearly show that [REDACTED] [REDACTED]. For instance, the two-dimensional stress contour map corresponding to the three-dimensional stress contour map shown above is shown below.



Dr. Taylor’s two-dimensional stress contour maps of the face ends are consistent with Dr. Chandra’s stress contour maps. For instance, Dr. Chandra’s stress contour maps for MPS and von Mises stress for [REDACTED] show that the [REDACTED] [REDACTED].



- c. **The ranges of stresses shown in the simulations are not indirect evidence that the alleged second circuit is “utiliz[ed] to average” the polishing pressure on the alleged first circuit structure ends.**

The simulations measure stress exerted on the alleged first circuit structure, while the claims are directed to “pressure” exerted on the first circuit structure ’360 patent at col. 6:11-14; *see also* CRB at 9 (“The claims do not recite the word ‘stress;’ they instead focus on ‘pressure.’”). Although “pressure” and “stress” are different, they are related concepts. CX-3838C (Chandra DWS) at Q/A 56; CX-5424C (Chandra 2nd Supp. DWS) at Q/A 30; RX-1248C

PUBLIC VERSION

(Bokor RWS) at Q/A 158-159. According to Macronix, the stress ranges shown in the simulations are indirect evidence that the polishing pressure on the surface of the wafer has been averaged.⁵ Specifically, Macronix argues that “the simulations of stress beneath the surface serve as indirect evidence of polishing pressure at the *surface*” of the wafer. CIB at 29 (emphasis added); *see also, id.* at 29-30 (“However, stress distribution beneath the surface can serve as a proxy for pressure distribution at the *surface*, because a strong reduction in the stress measures below the surface provides evidence of even pressure at the *surface*.”) (emphasis added).

The claims, however, require that the polishing pressure on the ends of the first circuit structure—not the surface of the wafer—be averaged. In the Toshiba process flows, [REDACTED] [REDACTED] over the alleged first and second circuit structures. CX-3838C (Chandra DWS) at Q/A 46-47; Tr. at 480:12-20 (Chandra). The [REDACTED] is not part of the first circuit structure. Tr. at 481:6-9 (Chandra: “Q This [REDACTED] is not part of the first circuit structure; isn’t that right? A That’s correct, yes.”). Showing that the polishing pressure is evenly distributed on the “surface” of the wafer, *i.e.*, [REDACTED], is not the same as showing that the polishing pressure on the ends of the first circuit structure is evenly distributed.

Macronix’s reliance on the polishing pressure on the wafer’s surface is inconsistent with its position during claim construction proceedings with regard to the term “performed upon.”

⁵ Toshiba argues that Macronix waived the argument that the stress distributions measured in the simulations are indirect evidence that the polishing pressure on the wafer’s surface is uniform because it did not raise the argument in its prehearing brief. RRB at 16-17. Macronix, however, raised the argument in its prehearing brief. CPHB at 116 (“The reduction in stress that Dr. Chandra observed serves as indirect evidence, and confirmation, of the evenness in polishing pressure . . .”).

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During claim construction proceedings, Toshiba argued that the polishing pressure had to be directly “performed upon” the first circuit structure. Order No. 23 (Dec. 5, 2017) at 11.

Macronix and Staff successfully countered that the polishing pressure could be “performed upon” the strips of the first circuit structure indirectly through an intervening layer or layers, as well as directly. *Id.* at 11, 16, 23. Consistent with its claim construction position, during the *Markman* hearing counsel for Macronix argued that the pressure from the CMP process “is felt through the entire thickness of the wafer” and that the claimed invention was directed to “tak[ing] the pressure forces and redistribut[ing] them,” so that “you don’t have these focused forces on the” ends of the first circuit structure. *Markman* Hearing Tr. (Oct. 6, 2017) at 13:2-14:12.⁶

Accordingly, even if the stresses shown in the simulations indicate that the polishing pressure on the surface of the wafer is evenly distributed, there is no evidence that the polishing pressure on the ends of the alleged first circuit structure is evenly distributed. Moreover, the premise underlying Macronix’s argument—that the simulations show that the alleged second circuit structure averages the polishing pressure on the surface of the wafer—is incorrect. As explained below, in the simulations, the presence or absence of the alleged second circuit structure had no effect on the “polishing pressure” on the surface of the wafer.

⁶ In its post-hearing briefs, Macronix now appears to take the position that “pressure” is not “felt through the entire thickness of the wafer,” but is felt only on the surface of the wafer. CRB at 9 “Toshiba even admits that ‘pressure is (strictly speaking) a term that is applicable at a surface, while stress is what develops within a material below a surface as a result of applied pressure at the surface.’”) (quoting RIB at 25).

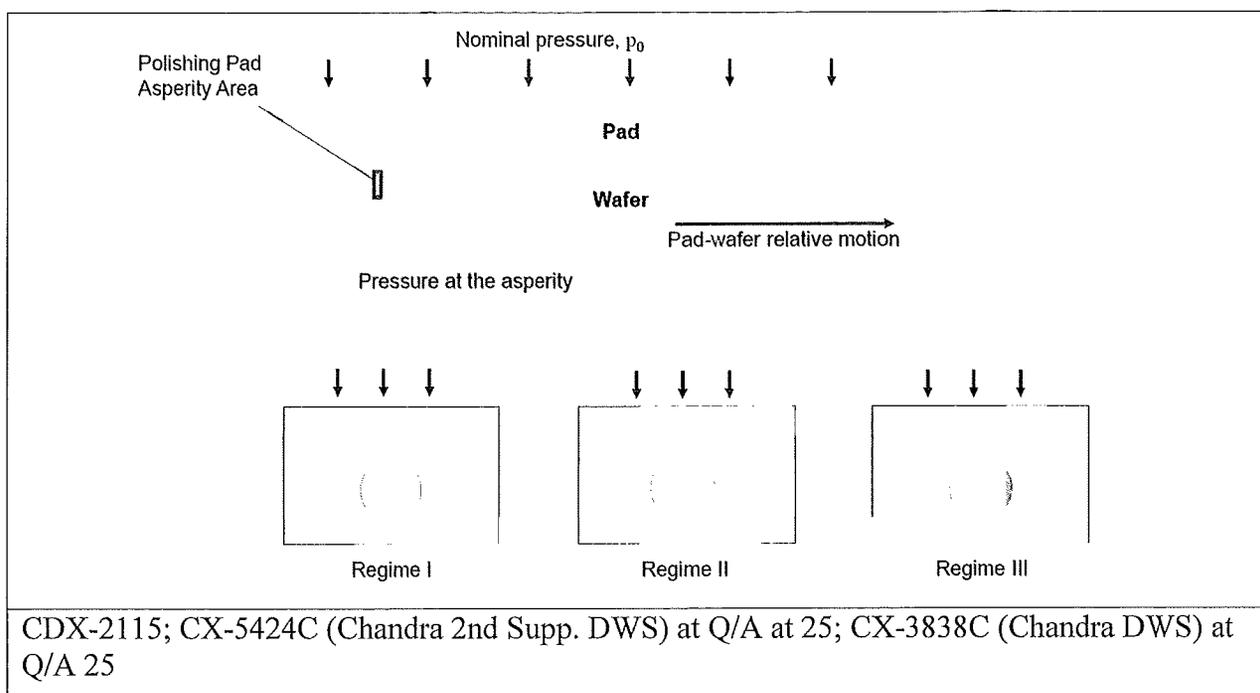
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- (i) **In the simulations, the alleged second circuit structure has no effect on the “polishing pressure” on the wafer’s surface.**

The claims require that the second circuit structure be “utiliz[ed] to average [the] polishing pressure” on the ends of the first circuit structure. ’360 patent, col. 6:10-14; *see also* CIB at 29 (“[T]he claim requires ‘utilizing’ the second circuit structure to average the polishing pressure on the ends of the first circuit structures.”). Both Dr. Chandra and Dr. Taylor conducted simulations of the accused designs with and without the alleged second circuit structure. While their simulations show that the presence of the alleged second circuit structure results in a [REDACTED] of the first circuit structure, the alleged second circuit structure had no effect on the polishing pressure on the wafer’s surface. In the simulations, the polishing pressure exerted on the wafer’s surface was a variable defined by the experts, so that they could analyze the stresses on the alleged first circuit structure.

As explained by Dr. Chandra, the “actual pressure” exerted onto the surface of the wafer arises from a combination of the nominal pressure, *i.e.*, the downward force on the pad, the pad’s asperity, and the velocity and physical characteristics of the polishing particles.

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If the nominal pressure is very light, the polishing process will be in “regime I” in which the polishing particles come into contact with the wafer’s surface, but the pad does not. CX-5424C (Chandra 2nd Supp. DWS) at Q/A at 25. If the nominal pressure increases, the polishing process will enter “regime II” in which there is some contact between the pad and wafer. *Id.* If the nominal pressure increases even further, the process will enter “regime III,” which is marked by significant contact between the polishing pad and the wafer. *Id.*

According to Dr. Chandra, the primary load transfer path to the wafer is through the polishing particles, which are stiffer than the polishing pad. *Id.* For his simulations, Dr. Chandra “assumed the position of any polishing particles and the number of polishing particles to include in each unit cell” and “appl[ied] appropriate input conditions to simulate the CMP process.” CX-3838C (Chandra DWS) at Q/A 37, 39. After determining the “input conditions,” Dr. Chandra used commercial software to model “the CMP particle[s] indenting and sliding across the wafer surface, including measurements of stress, strain, displacement, and force.” *Id.* at Q/A 39. In

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Dr. Liu's simulations, "the energy and stress imparted from the CMP particles' impact are identical in the simulation with the second circuit structure, as they are in the simulation without the second circuit structure. The only difference between the two simulations is the addition of the second circuit structure." CX-3838C (Chandra DWS) at Q/A 94.

For his simulations, Dr. Taylor modeled the polishing pressure on the wafer's surface "as a uniformly distributed normal load acting downwards as a result of the downward applied force transmitted from the pad/wafer contact, and [] the shear component as two additional orthogonal traction forces acting in the x- and y- directions arising from frictional forces and/or hydrodynamic stresses between the pad/slurry and the wafer surface." RX-1247C (Taylor RWS) at Q/A 38. Macronix misapprehends Dr. Taylor's testimony and argues that the use of a "uniformly distributed pressure" in Dr. Taylor's simulations "provides separate and independent evidence of an even distribution of pressure." CIB at 31-32.

In Dr. Taylor's simulations, the distribution of the polishing pressure on the wafer's surface is not affected by the presence or absence of the alleged second circuit structure. The uniform pressure on the wafer was a variable set by Dr. Taylor in order to conduct the simulations. *See, e.g.*, CX-5424C (Chandra 2nd Supp. DWS) at Q/A 27 ("Dr. Taylor assumes that the force applied during CMP is both uniformly-applied and static across the wafer surface."). Explaining why the pressure on the wafer's surface should be modeled as being evenly distributed, Dr. Taylor identified several factors including the nominal pressure, the asperities of the polishing pad, the deformation of the polishing pad, and the densities, diameters, and velocities of the polishing particles. RX-1247C (Taylor RWS) at Q/A 41-57. Notably absent from his explanation is any mention of the alleged second circuit structure's presence or absence having any effect on the distribution of the polishing pressure on the wafer's surface.

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d. The accused Toshiba designs do not satisfy the “utilizing to average” limitation under the doctrine of equivalents.

Macronix asserts that if the “utilizing to average” limitation is not literally satisfied by the accused products, it is satisfied under the doctrine of equivalents. CIB at 34. Under the doctrine of equivalents, “a product or process that does not literally infringe upon the express terms of a patent claim may nonetheless be found to infringe if there is ‘equivalence’ between the elements of the accused product or process and the claimed elements of the patented invention.” *Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 21 (1997) (quoting *Graver Tank & Mfg. Co. v. Linde Air Prods. Co.*, 339 U.S. 605, 609 S (1950)). One way to show equivalence is through the so-called “function-way-result test.” *Intendis GMBH v. Glenmark Pharm. Inc.*, 822 F.3d 1355, 1360-61 (Fed. Cir. 2016). Under the function-way-result test, Macronix must show that the alleged second circuit structure “performs substantially the same function in substantially the same way with substantially the same result as” the claimed second circuit structure. *Id.* (quoting *Crown Packaging Tech., Inc. v. Rexam Beverage Can Co.*, 559 F.3d 1308, 1312 (Fed. Cir. 2009)).

Macronix’s doctrine-of-equivalents analysis is flawed because Macronix misidentifies the claimed second circuit structure’s function, way and result. Macronix identifies “providing an even distribution of polishing pressure upon the front end and the rear end of the first circuit structures” as the “function” of the claimed second circuit structure. CIB at 34. According to Macronix, “the ‘way’ that the second circuit structure provides an even distribution of polishing pressure upon the front end and the rear end of the first circuit structures is by redistributing pressure away from the first circuit structure’s ends.” *Id.* at 35. Macronix identifies a reduction of defects as the “result” of the polishing pressure being evenly distributed on the ends of the first circuit structure. *Id.* at 36.

PUBLIC VERSION

The “function” of the claimed second circuit, however, is enhancing the structural strength of the ends of the first circuit structure. ’360 patent, col. 3:8-11 (“The present invention provides a circuit layout of a semiconductor device to enhance the structure strength thereof”). The “way” that the second circuit structure performs its function is by linking the ends of the first circuit structure strips and by having “the same dielectric and conductive layers” as the first circuit structure. *Id.* at col. 4:31-37 (“Because the first circuit structure 130a has the same dielectric and conductive layers with the second circuit structure 130b, the structure strength or the rigidity of both front and rear ends of the first circuit structure 130a can be effectively enhanced”), col. 6:8-11 (“each of said two strips of second circuit structure respectively linking the front end and the rear end of said plurality of strips of said first circuit structure”). The “result” of the second circuit structure’s function is an averaging of the “polishing pressure” exerted on the ends of the first circuit structure. *Id.* at 4:31-37 (“[T]he structure strength or the rigidity of both front and rear ends of the first circuit structure 130 a can be effectively enhanced, and thus the polishing pressure can be sufficiently averaged in the CMP process”), col. 6:11-13 (“utilizing to average polishing pressure performed upon the front end and the rear end of said plurality of strips of said first circuit structure”).

Using the correct “function,” “way,” and “result,” Macronix’s doctrine-of-equivalents argument fails. The “way” that the claimed second circuit structure performs its function is by having “the same dielectric and conductive layers” as the first circuit structure. ’360 patent, col. 4:31-37. As discussed above, the alleged second circuit structure does not have the same layers as the alleged first circuit structure. *See* Section III(C)(3), *supra*. Macronix has not asserted that the stack of layers composing the alleged second circuit structure is substantially the same as the

PUBLIC VERSION

stack of layers composing the alleged first circuit structure.⁷ With regard to “result,” as discussed above, Macronix has not pointed to any evidence showing that the polishing pressure on the ends of the alleged first circuit structure is affected by the alleged second circuit structure. *See* Section III(C)(4)(a)-(c), *supra*. Therefore, there is no basis on which to conclude that the alleged second circuit structure achieves an averaging of the polishing pressure on the ends of the alleged first circuit structure that is substantially the same as the averaging achieved by the claimed second circuit structure.

Even under its flawed formulations of “function,” “way,” and “result” Macronix’s doctrine-of-equivalents analysis fails. According to Macronix, the “way” that the alleged second circuit structure performs its “function” is by redistributing pressure away from the first circuit structure’s ends.” *Id.* at 35. As noted above, there is no evidence that the alleged second circuit structure affects the polishing pressure exerted on the ends of the alleged first circuit structure.

5. “substrate of a semiconductor wafer”/“said substrate of said semiconductor wafer”

The preamble of claim 1 requires a “circuit layout on a substrate of a semiconductor wafer” and “at least two strips of second circuit structure located on said substrate of said semiconductor wafer.” ’360 patent, col. 6:2-7. Toshiba argues that this requirement is not satisfied by the subset of accused products imported into the U.S. as chips. RIB at 42-43. Toshiba’s argument is unpersuasive.

Chips are packaged semiconductor die, which are fabricated from a semiconductor wafer. Tr. at 993:25-994:2 (Bokor). During fabrication, the circuit layouts for a number of chips are

⁷ Notably, Macronix did not assert that the accused products satisfy the “strips of second circuit structure” limitation under the doctrine of equivalents.

PUBLIC VERSION

formed on a semiconductor wafer, which is eventually cut into individual dies. *Id.* at 994:3-14 (Bokor). Each die is a piece or portion of the wafer. *Id.* at 994:15-16, 995:4-8 (Bokor). Contrary to Toshiba’s arguments, claim 1 does not require a layout on a semiconductor wafer, but requires a layout on a substrate of a semiconductor wafer. The substrate of each accused chip is from a semiconductor wafer, albeit one that is no longer intact. *Id.* Accordingly, I find that the accused products imported into the U.S. as chips have the requisite “substrate of a semiconductor wafer.”

D. Domestic Industry – Technical Prong

1. Legal Standards

To meet the technical prong, the complainant must establish that it practices at least one claim of the asserted patent. *Certain Point of Sale Terminals and Components Thereof*, Inv. No. 337-TA-524, Order No. 40 at 17-18 (April 11, 2005). “The test for satisfying the ‘technical prong’ of the industry requirement is essentially [the] same as that for infringement, *i.e.*, a comparison of domestic products to the asserted claims.” *Alloc v. U.S. Int’l Trade Comm’n*, 342 F.3d 1361, 1375 (Fed. Cir. 2003).

2. Domestic Industry Products

Macronix’s domestic industry products can be divided [REDACTED]
[REDACTED] [REDACTED]
[REDACTED]. CX-3840C (Liu DWS) at Q/A 39-40. The [REDACTED]
[REDACTED] groupings are each comprised of a single product, while each of the remaining
groupings includes multiple products. *Id.* at Q/A 41-53. [REDACTED]
[REDACTED] [REDACTED]
[REDACTED] [REDACTED]

PUBLIC VERSION

[REDACTED]

- a. **Macronix has not shown that the domestic industry products analyzed by its experts are representative of other domestic industry products.**

Each of the [REDACTED]

groupings include multiple products. CX-3840C (Liu DWS) at Q/A 41-51. For each of these groupings, Macronix’s experts analyzed a single product as a representative product. *Id.* at Q/A 40. While Macronix may rely on representative products in order to show that its domestic industry products practice the ’360 patent, it cannot “simply assume” that the tested domestic industry products are representative of the untested domestic industry products. *L&W, Inc. v. Shertech, Inc.*, 471 F.3d 1311, 1318 (Fed. Cir. 2008) (quotation marks omitted). It is Macronix’s burden to show that each domestic industry product is protected by the asserted claims. *Id.* In order to meet its burden, Macronix “must show by a preponderance of the evidence that the products its expert[] analyzed are indeed ‘representative’ of unanalyzed products.” *Certain Electronic Imaging Devices*, Inv. No. 337-TA-850, 2013 WL 5956227, *58 (Sept. 30, 2013) (“*Imaging Devices*”), *rev’d in part on other grounds*, Comm’n Op. (Apr. 21, 2014); *see also*, *Certain Reduced Ignition Proclivity Cigarette Paper Wrappers and Products Containing Same*, Inv. No. 337-TA-756, Comm’n Op., 2012 WL 2929414, at *11 (Jul. 13, 2012) (“Schweitzer had the burden of proving that the samples it tested were representative. . . .”). As explained below, Macronix has failed to make this showing.

The products selected as being representative were selected by Dr. Liu, who based his decision on the process technology used to fabricate the products and the relevant circuitry in the

PUBLIC VERSION

products. *Id.* Dr. Liu, however, did not analyze the domestic industry products with respect to the “utilizing to average” limitation. In the division of labor between Macronix’s two experts, it was Dr. Chandra’s responsibility to analyze domestic industry products with respect to the “utilizing to average” limitation:

Q But when it came time to rendering an opinion as to whether the accused Toshiba products practice the utilizing to average polishing pressure claim limitation, you did not form your own independent opinion on this issue but instead deferred to Dr. Chandra; correct?

A That’s correct.

Q Specifically, Dr. Chandra formed an opinion on this issue after running simulations, and you simply adopted his opinion as your own; correct?

A That’s correct.

Tr. at 143:14-23 (Liu). Although Dr. Chandra analyzed the “utilizing to average” limitation with respect to the products that Dr. Liu selected as being representative, he did not analyze whether the selected products were representative of their groupings with respect to the “utilizing to average” limitation. CX-3838C (Chandra DWS) at Q/A at 106 (“For my analysis, I have adopted Dr. Liu’s conclusions on representativeness . . .”).

Macronix argues that in determining whether the selected products were representative of the “utilizing to average” limitation, Dr. Liu relied on “Dr. Chandra’s guidance regarding the impact of various parameters on simulation results” and “grouped products based on their [REDACTED] [REDACTED] [REDACTED].” CRB at 17 (citing Tr. at 293:12-294:15(Liu)). There is no evidence, however, that in selecting representative products that Dr. Liu took into account the [REDACTED] of the relevant circuit structures. On the basis of a prior conversation he had with Dr. Chandra, Dr. Liu appears to have disregarded the alleged second circuit structure’s [REDACTED] and considered only “[REDACTED]” of the

PUBLIC VERSION

alleged second circuit structure. Tr. at 171:7-13 (Liu). At the hearing, however, Dr. Chandra acknowledged that the [redacted] of the alleged second circuit structure affects the distribution of stresses on the alleged first circuit structure:

Q One of the reasons you need detailed simulations is because as you vary the [redacted] of the second circuit structure, it would affect the polishing pressure; correct?

A It would affect the—it will affect the polish it would affect the redistribution, and that would affect the polishing pressure.

Q So you agree, it would affect the polishing pressure; correct?

A It will affect, yes. It will affect the pressure.

Tr. at 454:13-18 (Chandra).

Accordingly, for the foregoing reasons, I find that the Macronix has failed to establish by a preponderance of the evidence that the products selected by Dr. Liu for analysis are representative of the unanalyzed [redacted] products.

1. “strips of second circuit structure”

[redacted], the domestic industry products have [redacted] [redacted], the arguments relating to whether the domestic industry products have the claimed second circuit structure [redacted]. Specifically, pointing to [redacted] [redacted], Toshiba and Staff argue that the stack of layers comprising the alleged second circuit structure is not identical to the stack of layers comprising the alleged first circuit structure. Macronix takes the position that [redacted] the stack of layers composing the alleged first circuit structure.

PUBLIC VERSION

Toshiba's and Staff's position is supported by the testimony of Macronix's own witness Dr. Liu. In his witness statement, Dr. Liu identifies [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

The only argument that Macronix advances in support of its position that [REDACTED] is not part of the alleged first circuit structure is that [REDACTED]. CIB at 44. This argument is addressed in the context of [REDACTED] and is rejected [REDACTED]. See Section III(C)(3)(c)(i), *supra*.

On the basis of the foregoing, I find that the alleged first and second circuit structures are not composed of identical layers as required by the '360 patent.

2. "utilizing to average"

As with the accused products, Macronix relies on "basic physics" and simulations conducted by Drs. Chandra and Taylor to show that the domestic industry products satisfy the "utilizing to average" limitation. Macronix's "basic physics" argument fails for the same reasons that it failed with respect to the accused products. See Section III(C)(4)(a), *supra*. The results obtained from the simulations of the domestic industry products are similar to those obtained from the simulations of the accused products: the inclusion of the alleged second circuit

PUBLIC VERSION

structure in the layout reduces, but does not eliminate, the differences in stress along the ends of the alleged first circuit structure. CDX-2088C–CDX-2101C; CDX-2102C.0001-7; CDX-2103C.0001-7; RX-0351C at 1046TOSHIBA_0032571; RX-0352C at 1046TOSHIBA_0032691. The simulations fail to show that the alleged second circuit structures in the domestic industry products are “utiliz[ed] to average the polishing pressure” on the ends of the first circuit structures for the same reasons that the simulations of the accused products fail to show that the “utilizing to average” limitation is met in the accused products. *See* Section III(C)(4)(c), *supra*. Macronix’s doctrine-of-equivalents argument fails for the reasons that its doctrine-of-equivalents argument fails with respect to the accused products. *See* Section III(C)(4)(d), *supra*.

E. Invalidity

Toshiba does not challenge the validity of the asserted claims of the ’360 patent.

IV. U.S. PATENT NO. 6,788,602

A. Level of Ordinary Skill in the Art

Macronix proposes that a person of ordinary skill in the art for the ’602 patent would have a Bachelor’s of Science in Electrical Engineering or equivalent, such as materials science of physics, and at least two years of experience in semiconductor process and fabrication technologies or semiconductor device and circuit design. CIB at 48; CX-3840C (Liu DWS) at Q/A33. Toshiba concedes that there is no significant difference between Macronix’s proposal and the alternative proposed by Toshiba. RIB at 50; *see* Order No. 23 at 37. Staff supports Macronix’s proposal. SIB at 79-80. Accordingly, I adopt Macronix’s proposal for the level or ordinary skill in the art.

PUBLIC VERSION

B. Claim Construction

The *Markman* order construed the term “coupled” to mean conductively connected. Order No. 23 at 37-40. The term “positive bias” was construed to mean a voltage greater than zero volts. *Id.* at 41-44.

C. Infringement

Macronix is asserting claims 1-10 of the '602 patent against Toshiba. The legal standards for infringement are set forth above in the context of the '360 patent.

1. Accused Products

Macronix accuses [REDACTED] Toshiba designs of infringing the '602 patent, relying on the testimony of Dr. Liu. CIB at 48-49; CX-3840C (Liu DWS) at Q/A 293-404. There is no dispute regarding the structure of the accused products, and no difference between the accused Toshiba designs that is relevant to infringement. CIB at 49; RIB at 5 n.55. The relevant structures in the accused products are [REDACTED]

[REDACTED]:

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

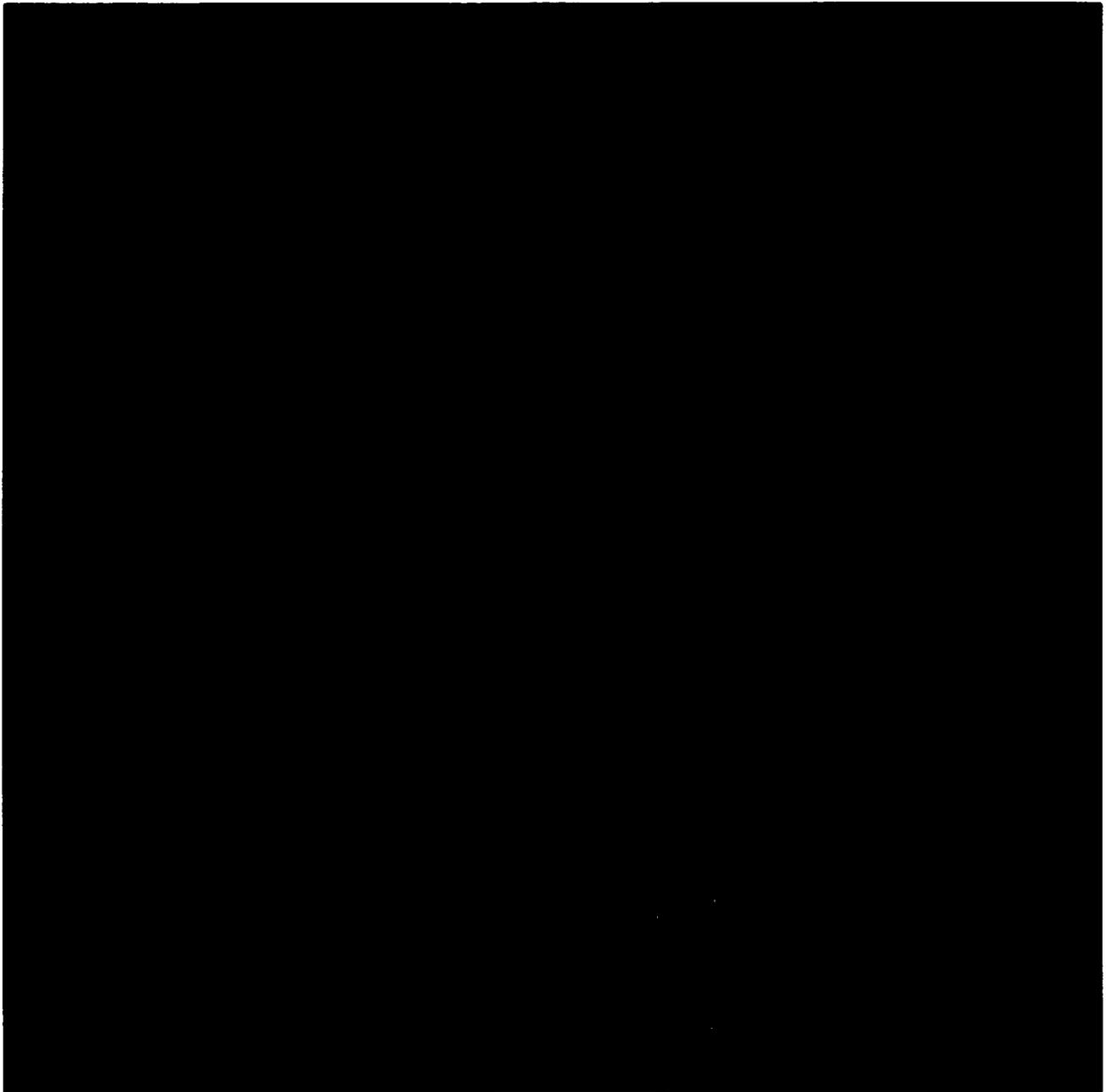
[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]



[Redacted line of text]

PUBLIC VERSION

2. Undisputed Claim Limitations (Claims 1 and 7)

Toshiba's infringement is undisputed for a majority of the limitations in the asserted independent claims of the '602 patent. Dr. Liu identified evidence that the accused products infringe each of these limitations:

a. Preamble

The preamble of claim 1 describes a "semiconductor memory device," and the preamble of claim 7 requires a "semiconductor memory array." '602 patent, col. 5:59, col. 6:21. Dr. Liu identified evidence that the accused products are semiconductor memory devices [REDACTED] [REDACTED], meeting these limitations. CX-3840C (Liu DWS) at Q/A 299-334, 339-40, 393.

b. "a memory cell"

The first limitation in both claim 1 and claim 7 requires "a memory cell." '602 patent, col. 5:60, col. 6:22. Dr. Liu identified [REDACTED] memory cells meeting this limitation. CX-3840C (Liu DWS) at Q/A 341-42, 394.

c. "dummy word line . . . coupled to the memory cell"

Both claim 1 and claim 7 require a "dummy word line . . . coupled to the memory cell." '602 patent, col. 5:61-62, col. 6:26-29. Dr. Liu identified [REDACTED] dummy word lines in each accused Toshiba design meeting this limitation. CX-3840C (Liu DWS) at Q/A 300, 303, 306, 309, 312, 315, 318, 321, 324, 328, 331, 334, 343-45. There is no dispute that these dummy word lines are coupled to memory cells, but as discussed below, Toshiba disputes whether the dummy word lines are "arranged at an edge of a memory array."

d. "control logic" for supplying "a positive bias . . . during [an] erase operation"

Claim 1 requires "a control logic for supplying a positive bias to the dummy word line

PUBLIC VERSION

during an erase operation” ’602 patent, col. 6:1-2. Claim 7 similarly requires that “a positive bias is selectively supplied to the at least one dummy word line at least during erase operation.” *Id.*, col. 6:30-32. In the *Markman* order, the term “positive bias” was construed to mean a voltage greater than zero volts. Order No. 23 at 41-44. Dr. Liu reviewed [REDACTED] [REDACTED] to determine that a positive bias is supplied to the dummy word line during an erase operation in each of the accused products. CX-3840C at Q/A 301, 304, 307, 310, 313, 316, 319, 322, 325, 329, 332, 335, 353-59, 360-61, 399-400. He also identified the relevant “control logic” supplying the positive bias. *Id.* at Q/A 362-74.

e. “bit line”

Both claim 1 and claim 7 require a “bit line,” and claim 7 describes the “bit line arranged in a first direction.” ’602 patent, col. 6:3, col. 6:23-24. Dr. Liu identified such bit lines in each of the accused products. CX-3840C at Q/A 299-335, 376. There is no dispute that these bit lines are present in the accused products, but as discussed below, Toshiba disputes whether these bit lines are “coupled to the memory cell.”

f. “dummy word line . . . arranged . . . perpendicular to the at least one bit line”

Claim 7 requires that the “dummy word line” be arranged “perpendicular to the at least one bit line.” ’602 patent, col. 6:26-29. Dr. Liu identified this arrangement in each of the accused products. CX-3840C at Q/A 397-98.

3. Disputed Claim Limitations

The parties dispute Toshiba’s infringement of two claim limitations: (a) whether the accused “dummy word line” is “arranged at an edge of a memory array; and (b) whether the accused “bit line” is “coupled to the memory cell.”

PUBLIC VERSION

a. “dummy word line arranged at an edge of a memory array”

Macronix contends that the accused products infringe the limitation “dummy word line arranged at an edge of a memory array,” relying on Dr. Liu’s identification of a “memory array” in each of the accused products with dummy word lines arranged at the edges of the array. CX-3840C at Q/A 343-52. Toshiba and Staff dispute Dr. Liu’s identification of a “memory array,” arguing that the ’602 patent requires that additional components be included in the array, moving the edge away from the dummy word lines identified in the accused products. RIB at 55-70; SIB at 82-96; RX-1245C (Baker RWS) at Q/A 47-155. The central dispute between the parties is the proper construction for the term “memory array.”

i. Claim Construction: “memory array”

All of the parties point to a statement in the specification of the ’602 patent defining a memory array: “Multiple memory cells may form a memory array, which generally includes the memory cells coupled to a grid of word lines and bit lines.” ’602 patent, col. 1:15-17; *see* CX-3840C (Liu DWS) at Q/A 346; RX-1245C (Baker RWS) at Q/A 52; SIB at 82-83. The parties also point to claim 7 of the ’602 patent, where the preamble recites a “semiconductor memory array, comprising,” and the body of the claim identifies three elements: a memory cell, a bit line, and a word line. *Id.*, col. 6:21-29. The “memory array” limitation was also the subject of an amendment during the prosecution of the ’602 patent.⁸ The parties generally agree that a memory array in the ’602 patent includes a memory cell, a bit line, and a word line, but they each attempt to import additional limitations into this term. As discussed below, none of these

⁸ In the only office action during prosecution, the examiner rejected all three independent claims but allowed dependent claims including the “arranged at an edge of a memory array” limitation. JX-0005.0063-66. The applicant rewrote the independent claims to incorporate the “arranged at an edge of a memory array” limitation, but this amendment did not include any discussion of how the applicant or examiner interpreted the “memory array” limitation. *Id.* at .0067-72.

PUBLIC VERSION

additional limitations are supported by the intrinsic evidence.

Macronix argues that the memory array should exclude non-memory components, such as the select transistors in the accused products. CIB at 59-64. According to Dr. Liu, a memory array in the context of the '602 patent "is a group of memory cells that are coupled to bit lines and word lines and are demarcated by non-memory elements, such as select gate transistors." CX-3840C at Q/A 346. Dr. Liu cites a few prior art references that use the term "memory array" in a way that is consistent with his definition, and he also cites certain Toshiba documents and testimony. *Id.* at Q/A 347-49. Although this evidence shows that the term "memory array" is used to describe memory cells arranged in a grid, nothing cited by Dr. Liu supports the adoption of a negative limitation excluding non-memory elements. In its reply brief, Macronix offers an alternative argument for excluding the select gate transistors, arguing that a memory array must be a continuous grid of memory cells, without other intervening components. CRB at 23-24. There is no support, intrinsic or extrinsic, however, for importing a "continuous" limitation into the claim. The language in the claims and specification of the '602 patent do not impose such limitations on the memory array. The relevant specification language is not restrictive, stating that the memory array "generally includes the memory cells coupled to a grid of word lines and bit lines." '602 patent, col. 1:15-17. Claim 7 describes a memory array "comprising" memory cells, bit lines, and word lines, without excluding additional components. Other than Dr. Liu's unsupported opinion, Macronix has not identified any reason for importing a "non-memory" restriction or a "continuous" limitation into the construction for "memory array."

Toshiba argues for a different interpretation of "memory array," which would require the memory array to include the full extent of the word lines and bit lines in an accused product. RIB at 56-59; *see* RX-1245C (Baker RWS) at Q/A 51-64. To support this position, Toshiba

PUBLIC VERSION

claims and specification are not the same, however: the claim language describes the “edge of a memory array,” while the specification describes the “edges of the device.” *Compare id.*, col. 1:17-21 (“the edges of the device”), 1:21-23 (“the memory device may include, at an edge”) with col. 5:62-63 (claim 1: “edge of a memory array”), col. 6:26-29 (claim 7: “edge of a memory array”). The ’602 patent uses the term “memory device” separate from “memory array,” and these terms are presumed to have different meanings. *See CAE Screenplates Inc. v. Heinrich Fiedler GmbH & Co. Kg.*, 224 F.3d 1308, 1317 (Fed. Cir. 2000) (“In the absence of any evidence to the contrary, we must presume that the use of these different terms in the claims connotes different meanings.”). Accordingly, the “edge of a memory array” in the claims cannot be restricted to the edge of a memory device.

Staff advocates for a position that is different from both Macronix’s and Toshiba’s, arguing that that the memory array in the accused products should comprise the entire NAND string, including the select transistors. SIB at 82-96. Staff relies on Dr. Baker’s analysis of the accused products, emphasizing that [REDACTED]

[REDACTED]. *See* RX-1245C (Baker RWS) at Q/A 58-59. Staff cites the specification’s recitation of “memory cells coupled to a grid of word lines and bit lines,” ’602 patent, col. 1:15-17, focusing on the “coupled” limitation and arguing that because the select transistors in the accused products provide the necessary coupling, these components should therefore be part of the claimed memory array. SRB at 26-31. But Staff’s argument is inconsistent with the construction of “coupled” adopted in this investigation, which does not require a direct connection. Order No. 23 at 37-40. In the context of the ’602 patent, a bit line can be coupled to a memory cell without being directly connected, and it thus follows that a memory array can contain memory cells coupled to bit lines without necessarily including the

PUBLIC VERSION

components that are directly connected to the memory cell or the bit line.⁹ The record does not support Staff's argument that the memory array must include the select transistors in the accused products.

For the reasons discussed above, none of the additional limitations proposed by the parties shall be adopted. The intrinsic evidence does not support any of these restrictions on the claimed memory array. Moreover, the extrinsic evidence is inconsistent, showing that people of skill in the art use the term array to describe many different memory architectures. Accordingly, a "memory array" in the context of the '602 patent shall be construed to mean multiple memory cells coupled to a grid of word lines and bit lines. Under this construction, a memory array consistent with the '602 patent does not have to include or exclude select transistors, and it could span an entire plane or only a subset of memory cells in a plane.

ii. Infringement

As discussed above, Macronix accuses the dummy word lines  of infringing the limitation "dummy word lines arranged at an edge of a memory array." CIB at 54-69. The memory array identified by Dr. Liu includes these dummy word lines and the memory cells within. CX-3840C at Q/A 343-44. Although this is not the only "memory array" that could be identified in the accused products, Dr. Liu's analysis is consistent with the claim construction discussed above, which allows for a subset of memory cells in a block or plane to form a memory array. Toshiba's and Staff's non-infringement

⁹ Staff also relies on extrinsic evidence from two patents: U.S. Patent No. 5,751,631 (RX-0317), naming Dr. Liu as an inventor; and U.S. Patent No. 5,818,756 (RX-0177), naming Mr. Nakamura as an inventor. These two patents reference arrays in the context of NAND strings, but neither patent uses the claim term "memory array." Moreover, Macronix points to a portion of Mr. Nakamura's patent that appears to define a "memory cell array" consisting of only memory cells. RX-0177 at 1:24-29.

PUBLIC VERSION

arguments rely on more restrictive constructions which, as discussed above, are not supported by the intrinsic and extrinsic evidence. Accordingly, the memory array identified by Macronix in each of the accused products meets the limitations of claims 1 and 7 and includes the infringing “dummy word lines arranged at an edge of a memory array.”

b. “bit line . . . coupled to the memory cell”

Relying on the testimony of Dr. Baker, Toshiba disputes Macronix’s infringement allegations with respect to the limitation in claims 1 and 7 requiring that the “at least one bit line” be “coupled to the memory cell.” RIB at 70-71; RX-1245C (Baker RWS) at Q/A 65, 156-168. Dr. Baker explains that the accused products are [REDACTED], and [REDACTED] [REDACTED]. RX-1245C at Q/A 156. Macronix and Staff do not dispute this fact, but they do not agree that [REDACTED] [REDACTED]. CIB at 74-79; CRB at 35; SIB at 96-98. Macronix further argues that even if this limitation is not directly infringed, Toshiba has induced infringement. CIB at 81-82.

i. Direct Infringement

In the *Markman* order, “coupled” was construed to mean conductively connected. Order No. 23 at 37-40. Macronix asserts that the accused products infringe this limitation because [REDACTED] [REDACTED] provide a conductive connection between the bit lines and the memory cells. CIB at 74-75. Dr. Liu testified that in the accused products, “voltages supplied on the bit line are capable of reaching the memory cell.” CX-3840C at Q/A 378. Staff agrees with Macronix that showing capability for conduction is enough to infringe the “coupled” limitation. SIB at 96-98. But neither Dr. Liu nor any of the parties cites any support for interpreting this claim limitation

PUBLIC VERSION

to only require capability for conduction. Moreover, it is not clear that [REDACTED] [REDACTED]
[REDACTED]—as Dr. Baker explains, [REDACTED]
[REDACTED]
[REDACTED]. RX-1245C at Q/A 65, 156-168.

Whether the claims require capability for conduction or actual conduction, the “coupled” limitation is not infringed when [REDACTED].

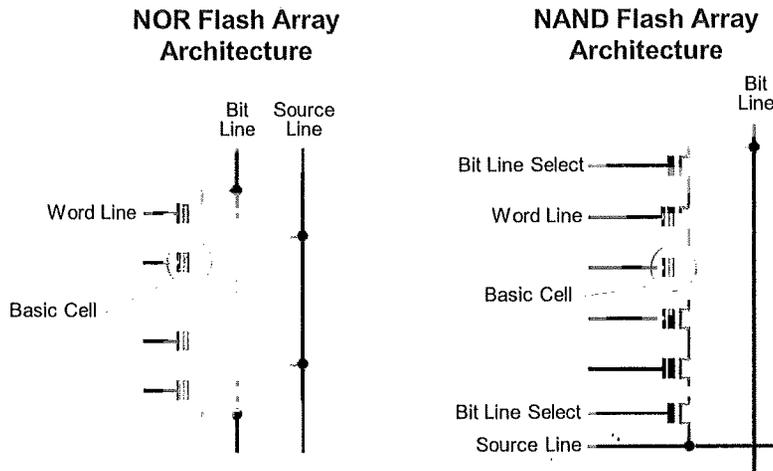
Toshiba argues that because the accused products are powered off at the time of importation, there is no infringement of the “coupled” limitation under section 337. The Commission has held that “infringement, direct or indirect, must be based on the articles as imported to satisfy the requirements of section 337.” *Certain Electronic Devices with Image Processing Systems, Components Thereof, and Associated Software*, Inv. No. 337-TA-724, Comm’n Op. at 14 (Dec. 2, 2011). Macronix argues that it would be improper to require that accused products be powered on at the time of importation, because an apparatus claim is infringed based on the structure of the accused product, not its operation. CIB at 75-79 (citing *Hewlett-Packard Co. v. Bausch & Lomb Inc.*, 909 F.2d 1464, 1468 (Fed. Cir. 1990) (“[A]pparatus claims cover what a device is, not what a device does.”)). In addition, Macronix cites *Certain Ink Cartridges and Components Thereof*, where products were found to infringe an “electrically coupled” limitation even though there was no evidence that the products were powered on at the time of importation. Inv. No. 337-TA-946, Order No. 12 at 18-35, 43-62 (Oct. 28, 2015), *reviewed and aff’d* by Comm’n Notice (Dec. 14, 2015). Staff argues that requiring the actual flow of electrons would not be consistent with the claim language of the ’602 patent. SIB at 97-98.

Both Macronix and Staff misconstrue Toshiba’s argument and misread the claim

PUBLIC VERSION

language. Dr. Baker is not importing a “powered on” requirement into this limitation – the “coupled” limitation does not require electricity to flow but in accordance with the *Markman* order, it does require a conductive connection. This limitation would be infringed whether the power was on or off in the memory device described in the specification, where the bit line is directly connected to the memory cells. *See* '602 patent, Fig. 2. [REDACTED]

[REDACTED] Dr. Liu recognized the differences between the NOR memory architecture depicted in the '602 patent and the NAND memory architecture of the accused products:



CX-3840C (Liu DWS) at Q/A 14-15 (referencing CDX-0004). In a NOR architecture, the bit line is conductively connected to the memory cell at all times, and these products would infringe the “coupled” limitation regardless of whether power is supplied. But in the NAND architecture [REDACTED], a select transistor must be powered on to make a conductive connection. Accordingly, the bit line is “coupled” to the memory cell only when the select gate is closed.

Macronix and Staff argue that infringement only requires the capability for a conductive connection, but this is not consistent with the claim language. There is no reference to capability or any conditional language in the “bit line” limitations of claims 1 and 7. '602 patent, col. 6:3,

PUBLIC VERSION

23-24. In contrast, there is conditional language in the “positive bias” limitations, as discussed above, which only requires a positive bias “during an erase operation.” *Id.*, col. 6:1-2, 29-31. There is no question that the “positive bias” limitation is infringed despite the accused products being powered off at the time of importation, because the claims only require the positive bias to be supplied during an erase operation. But the claims do not specify that the bit line is coupled to the memory cell only when power is supplied; the limitation plainly requires “a bit line coupled to the memory cell,” and this structure must be present in any infringing product. [redacted] and therefore Toshiba does not directly infringe this limitation with respect to the accused products as imported, [redacted].

ii. Induced Infringement

Macronix further contends that Toshiba induces infringement of the “coupled” limitation. CIB at 81-82. In *Suprema, Inc. v. Int’l Trade Comm’n*, the Federal Circuit upheld the application of induced infringement to section 337, affirming the Commission’s finding of a violation where goods “were used by an importer to directly infringe post-importation as a result of the seller’s inducement.” 796 F.3d 1338, 1352-53 (Fed. Cir. 2015). For induced infringement, a complainant is “required to prove that: (1) a third party directly infringed the asserted claims of the [asserted] patents; (2) [the respondent] induced those infringing acts; and (3) [the respondent] knew the acts it induced constituted infringement.” *Power Integrations, Inc. v. Fairchild Semiconductor Int’l, Inc.*, 843 F.3d 1315, 1332 (Fed. Cir. 2016). Proving inducement “requires more than just intent to cause the acts that produce direct infringement. Beyond that threshold knowledge, the inducer must have an affirmative intent to cause direct infringement.” *DSU Med. Corp. v. JMS Co.*, 471 F.3d 1293, 1306 (Fed. Cir. 2006). Inducement

PUBLIC VERSION

requires “an affirmative act to encourage infringement with the knowledge that the induced acts constitute patent infringement.” *Info-Hold, Inc. v. Muzak LLC*, 783 F.3d 1365, 1372 (Fed. Cir. 2015).

Macronix did not identify any single instance of direct infringement, but a complainant may prove the direct infringement necessary for inducement with evidence that the accused product “necessarily infringes the patent in suit.” *ACCO Brands, Inc. v. ABA Locks Mfr. Co.*, 501 F.3d 1307, 1313 (Fed. Cir. 2007). There is no dispute that the “coupled” limitation is infringed when select transistors are turned on in the accused products, creating a conductive connection between the bit lines and the memory cells. Tr. at 772:15-773:2 (Baker). Select transistors must turn on to read, write, or erase data from the memory cells. *Id.* at 767:21-768:16. Toshiba does not identify any non-infringing use for the accused products, and Macronix cites Toshiba deposition testimony showing [REDACTED] [REDACTED]. JX-0028C (Shimogawara Deposition) at 46-48. Accordingly, Macronix has met its burden to show that Toshiba’s customers necessarily infringe this limitation.

Macronix alleges that the required affirmative act of inducement is committed by Toshiba’s act of selling the accused products to United States customers with the intent that its customers use them. CIB at 82.¹⁰ Toshiba does not dispute this allegation, and Dr. Baker agreed

¹⁰ Macronix does not identify any communications between Toshiba and its customers, documentation related to the use of the accused products, or any similar evidence, which the Commission has relied upon in other investigations to support findings of inducement. *See, e.g., Certain Biometric Scanning Devices, Components Thereof, Associated Software, and Products Containing the Same*, Inv. No. 337-TA-720, Comm’n Op. at 16 (Nov. 10, 2011) (citing respondents’ collaboration efforts to adapt and integrate software with the imported products to support a finding of induced infringement); *see also Certain Automated Teller Machines, ATM Modules, Components Thereof, and Products Containing the Same*, Inv. No. 337-TA-972, Initial

PUBLIC VERSION

_____, and Toshiba's answer to the complaint only sets forth a boilerplate contention of non-infringement. *Id.* ¶ 67. The Federal Circuit has affirmed findings of induced infringement in similar circumstances. *See Broadcom Corp. v. Qualcomm Inc.*, 543 F.3d 683, 700 (Fed. Cir. 2008) (upholding a jury verdict of induced infringement where “the totality of the circumstances presented in the evidence supports the jury’s findings: a failure to investigate, a failure to explore design around approaches, a failure to take remedial steps—and, of course, a failure to seek legal advice”).¹²

Accordingly, a preponderance of evidence in the record supports a finding that Toshiba has induced infringement of the “coupled” limitation by selling accused products for use in the United States.

For the reasons discussed above, the accused Toshiba products infringe all of the limitations of independent claims 1 and 7 of the '602 patent.

4. Dependent Claims

Toshiba does not raise any non-infringement arguments based on limitations set forth in the asserted dependent claims. Dr. Liu identified evidence that the accused products infringe

¹² Pursuant to the America Invents Act (AIA), the Patent Act was revised to abrogate the decision in *Broadcom v. Qualcomm* and preclude the consideration of a defendant's failure to seek legal advice to prove intent to induce infringement. 35 U.S.C. § 298, Pub. L. No. 112-29 (2011). There is conflicting precedent on the question of whether this new statute applies to patents issued before the effective date of the AIA (the '602 patent was issued in 2004), but the finding of induced infringement here would be the same regardless of whether Toshiba's failure to obtain an opinion of counsel were considered. *See Suprema, Inc. v. Int'l Trade Comm'n*, 626 Fed.Appx. 273, 282 (Fed.Cir.2015) (“Because the AIA only applies to patents issued on or after September 16, 2012, and the '344 and '562 patents issued in 2007, [§ 298] does not control here.”) (unpublished); *but see Carson Optical Inc. v. eBay Inc.*, 202 F.Supp.3d 247, 259-61 (E.D.N.Y. Aug. 17, 2016) (noting that while Congress amended the AIA to apply § 298 to “any civil action commenced on or after the date of the enactment” of the amendment, the investigation in *Suprema* was commenced before the amendment took effect and that the amendment is not applicable to *Suprema* because a section 337 proceeding is not a “civil action” within the meaning of the amendment).

PUBLIC VERSION

each of the limitations in the dependent claims:

a. “column decoder” (Claims 2 and 8)

Claims 2 and 8 require a “column decoder,” ’602 patent, col. 6:4-6, 33-34, which was identified in each of the accused Toshiba designs by Dr. Liu. CX-3840C at Q/A 384-85, 401.

b. “sense amplifier” (Claim 3)

Claim 3 requires a “sense decoder,” ’602 patent, col. 6:7-9, which was identified in each of the accused Toshiba designs by Dr. Liu. CX-3840C at Q/A 386-87.

c. word line “arranged perpendicular to” bit line and “arranged the second direction” (Claims 4 and 9)

Claim 4 requires “at least one word line is arranged perpendicular to the at least one bit line.” ’602 patent, col. 6:10-13. Claim 9 requires “at least one word line arranged the second direction.” ’602 patent, col. 6:34-37. This arrangement was identified in each of the accused Toshiba designs by Dr. Liu. CX-3840C at Q/A 388, 402.

d. “row decoder” (Claims 5 and 10)

Claim 5 requires a “row decoder coupled to the at least one word for driving the at least one word line,” and claim 10 requires that “the at least one word line is coupled to a row decoder.” ’602 patent, col. 6:14-16, 6:38-39. Dr. Liu identified an infringing row decoder in each of the accused Toshiba designs. CX-3840C at Q/A 389-90, 403.

e. “continuously supplies the positive bias” (Claim 6)

Claim 6 requires that “the control logic continuously supplies the positive bias.” ’602 patent, col. 6:17-19. Dr. Liu analyzed the control logic in each of the accused Toshiba designs, finding that they infringe this limitation. CX-3840C at Q/A 391.

D. Domestic Industry – Technical Prong

Macronix asserts that several of its products practice claims 1-10 of the ’602 patent. CIB

PUBLIC VERSION

at 82-88. For the majority of these products, the technical prong of domestic industry is undisputed. *See* RIB at 71-73; SIB at 100-101.

1. Domestic Industry Products

For the domestic industry analysis, Dr. Liu grouped Macronix's products [REDACTED]

[REDACTED]

[REDACTED] CX-3840C at Q/A 201-239. In each of these categories, Dr. Liu analyzed one representative product in detail, relying on Macronix engineer Mr. Chun-Hsuing Hung to categorize the products and conclude that [REDACTED] [REDACTED] with regard to the asserted claims of the '602 patent. *Id.* at Q/A 201-205. Toshiba argues that Dr. Liu's representativeness analysis is conclusory, but Dr. Liu explains the basis for his opinion, and Toshiba offers no evidence to contradict Dr. Liu's selection of representative products. *See* CRB at 36-37; SIB at 100.

2. Independent Claims 1 and 7

Macronix's technical prong contentions are uncontested except for the "edge of a memory array" limitation for the [REDACTED] category of products. RIB at 72-73; SIB at 100-101. Dr. Liu analyzed evidence showing that one representative product from each group of Macronix

PUBLIC VERSION

products infringes each limitation of the asserted independent claims. CX-3840C at Q/A 240-65, 276-285.

There is no dispute that the Macronix domestic industry products are semiconductor memory devices containing semiconductor memory arrays, meeting the preambles of claims 1 and 7. *See Id.* at Q/A 242, 277. There is also no dispute that the Macronix domestic industry products contain memory cells. *See Id.* at Q/A 243-44, 278-79.

Toshiba and Staff dispute the “edge of a memory array” limitation for Macronix’s [REDACTED] products, but their arguments are based on the flawed claim constructions described above. *See* RIB at 72-73; SIB at 100-101. Based on the broad construction of “memory array” adopted above, the [REDACTED] products contain a dummy word line arranged at an edge of a memory array and coupled to the memory cell. There is no dispute that the Macronix’s other domestic industry products practice this limitation. CX-3840C (Liu DWS) at Q/A 245-249, 282-83.

There is no dispute that the Macronix domestic industry products contain a control logic for supplying a positive bias to the dummy word line during an erase operation. *See Id.* at Q/A 210, 217, 224, 231, 235-37, 251-55, 284-85. There is no dispute that the Macronix domestic industry products contain a bit line coupled to the memory cell. *See Id.* at Q/A 256-65, 280-81. There is no dispute that the dummy word line in the Macronix domestic industry products is perpendicular to the bit line. *See Id.* at Q/A 282-83.

Accordingly, the Macronix domestic industry products practice each of the limitations of claims 1 and 7 of the ’602 patent.

3. Dependent Claims

There is no dispute regarding any of the limitations of the asserted dependent claims. The Macronix domestic industry products contain a column decoder meeting the limitations of

PUBLIC VERSION

claims 2 and 8. CX-3840C (Liu DWS) at Q/A 211, 218, 225, 232, 238, 266-67, 286-87. The Macronix domestic industry products contain a column decoder meeting the limitations of claim 3. *Id.* at Q/A 212, 219, 226, 233, 239, 268-69. The word lines in the Macronix domestic industry products are arranged perpendicular to the bit line, meeting the limitations of claims 4 and 9. *Id.* at Q/A 270-71, 288-89. The Macronix domestic industry products contain a row decoder meeting the limitations of claims 5 and 10. *Id.* at Q/A 209, 216, 223, 230, 236, 272-73, 290-91. The control logic in the Macronix domestic industry products continuously supplies a positive bias, meeting the limitations of claim 6. *Id.* at Q/A 250-55, 274-75.

Accordingly, the Macronix domestic industry products practice each of claims 1-10 of the '602 patent.

E. Invalidity

Toshiba contends that the asserted claims of the '602 patent are invalid based on anticipation and obviousness in view of certain prior art. RIB at 73-111. To support its invalidity contentions, Toshiba relies on the testimony of Dr. Rhyne (RX-0382C). Macronix disputes Toshiba's invalidity arguments, relying on the testimony of Dr. Liu (CX-5423C).

1. Legal Standards

It is the respondent's burden to prove invalidity, and the burden of proof never shifts to the patentee to prove validity. *Scanner Techs. Corp. v. ICOS Vision Sys. Corp. N.V.*, 528 F.3d 1365, 1380 (Fed. Cir. 2008). "Under the patent statutes, a patent enjoys a presumption of validity, *see* 35 U.S.C. § 282, which can be overcome only through facts supported by clear and convincing evidence" *SRAM Corp. v. AD-II Eng'g, Inc.*, 465 F.3d 1351, 1357 (Fed. Cir. 2006); *see also Microsoft Corp. v. i4i Ltd. P'ship*, 131 S. Ct. 2238, 2242-2253 (2011) (upholding the "clear and convincing" standard for invalidity).

PUBLIC VERSION

The clear and convincing evidence standard placed on the party asserting an invalidity defense requires a level of proof beyond the preponderance of the evidence. Although not susceptible to precise definition, “clear and convincing” evidence has been described as evidence that produces in the mind of the trier of fact “an abiding conviction that the truth of a factual contention is ‘highly probable.’” *Price v. Symsek*, 988 F.2d 1187, 1191 (Fed. Cir. 1993) (quoting *Buildex, Inc. v. Kason Indus., Inc.*, 849 F.2d 1461, 1463 (Fed. Cir. 1988)).

a. Anticipation

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).¹³ “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).

¹³ As explained in the revision notes and legislative reports in 35 U.S.C.A. § 100 (May 13, 2015), the language of 35 U.S.C. § 102 that was effective prior to the America Invents Act controls in this Investigation.

PUBLIC VERSION

b. Obviousness

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).¹⁴

“Obviousness is a question of law based on underlying questions of fact.” *Scanner Techs.*, 528 F.3d at 1379. 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.*, 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

¹⁴ See *supra*, n.13.

PUBLIC VERSION

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 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).

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, 1373-1374 (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); *Velandar 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”).

2. Priority Date

The '602 patent issued on September 7, 2004 from an application filed on August 9, 2002. There is no dispute that the asserted prior art references are prior art.

PUBLIC VERSION

3. Anticipation

Toshiba contends that the asserted claims of the '602 patent are anticipated by Japanese Published Patent Application H10-275484, which names Hideaki Kurata of Hitachi, Ltd. as the lead inventor (RX-0174, "Kurata"). RIB at 77-90. Kurata was published on October 13, 1998, and therefore qualifies as prior art under pre-AIA 35 U.S.C. § 102 (a) and (b). In his witness statement, Dr. Rhyne identified disclosures in Kurata that anticipate each limitation of claims 1-10 of the '602 patent. RX-0382C at Q/A 145-207. Macronix and Staff dispute the anticipation of several limitations, as discussed below:

a. Preamble

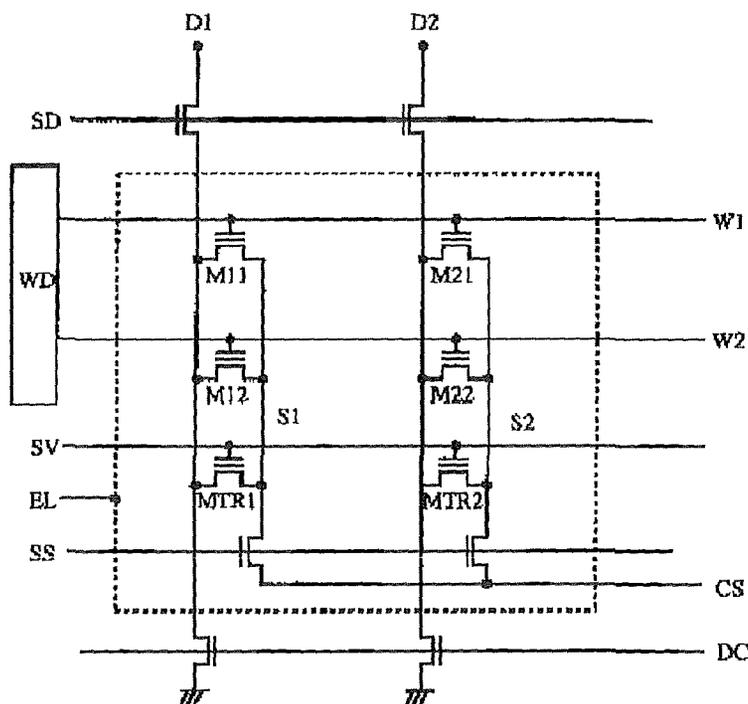
There is no dispute that Kurata discloses a semiconductor memory device and a semiconductor memory array described in the preambles of claims 1 and 7. Kurata is entitled "Non-Volatile Semiconductor Memory," and paragraph 0001 states: "The present invention pertains to a nonvolatile semiconductor memory device provided with an electrical rewriting function, and in particular, pertains to a nonvolatile semiconductor memory device having an AND-type memory array structure and that is suitable for miniaturization and in which memory cell deterioration due to oxidation film injection of electron holes does not occur." RX-0174 at ¶ 0001. Dr. Rhyne cites these disclosures to show that Kurata anticipates the preamble limitations, and there is no rebuttal from Macronix or Staff. RX-0382C at Q/A 149, 197.

b. "a memory cell"

The second embodiment in Kurata includes components identified as MTR1 and MTR2, which Dr. Rhyne identifies as the claimed memory cells. RX-0382C (Rhyne DWS) at Q/A 150-52. MTR1 and MTR2 appear on Figure 5 along with other features labeled M11, M12, M21, and M22:

【図 5】

本発明の第 2 の実施例を示す図



RX-0174, Fig. 5. Kurata states: “In this figure, MOS transistors MTR1 and MTR2 of a structure similar to memory cells M11 to M22 are used as source-drain equipotential MOS transistors.”

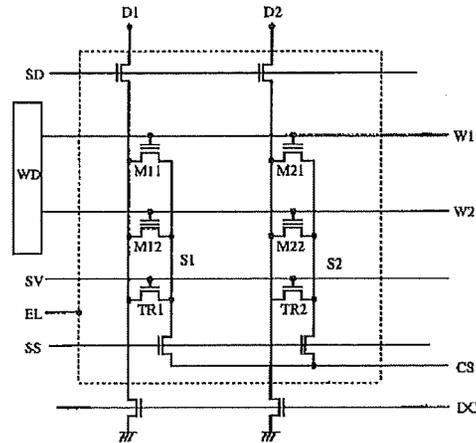
Id. at ¶ 0020. Dr. Rhyne relies on this disclosure to support his opinion that that MTR1 and MTR2 are memory cells, while Dr. Liu contends that having “a structure similar to memory cells” should be interpreted to mean that MTR1 and MTR2 are MOS transistors and not memory cells. RX-0382C (Rhyne DWS) at Q/A 152; CX-5423C (Liu RWS) at Q/A 41-48.

Dr. Rhyne explains Kurata’s references to MOS transistors by comparing the second embodiment shown in Figure 5 to the first embodiment shown in Figure 1, where MOS transistors are labeled TR1 and TR2:

PUBLIC VERSION

【図 1】

本発明の第1の実施例を示す図



RX-0174, Fig. 1. See RX-0382C (Rhyne DWS) at Q/A 161. In the second embodiment depicted in Figure 5, MTR1 and MTR2 replace TR1 and TR2, and Kurata explains: “The second embodiment of the present invention is configured so as to use MOS transistors of the same configuration as that of nonvolatile memory cells configuring a memory array in place of the ordinary MOS transistors TR1 and TR2 of the above-described first embodiment.” RX-0174 at ¶ 0020. Dr. Rhyne further notes that in Figure 5, the symbols for MTR1 and MTR2 are the same as the symbols for M11, M12, M21, and M22—double parallel lines over a stepped line—the well-known electronic symbol for memory cells. RX-0382C at Q/A 162. In Figure 1, the symbols for TR1 and TR2 are single lines over a stepped line – the well-known electronic symbol for transistors. *Id.* According to Dr. Rhyne, these two embodiments correspond to the MOS transistor and dummy memory cell embodiments described in Kurata’s Abstract: “Charging and discharging of a source terminal are performed through the MOS transistor and a dummy memory cell A dummy memory cell of the same configuration as a memory cell may be used in place of the MOS transistor.” RX-0174 at Abstract. And also in paragraph 11: “in particular, one or a plurality of MOS transistors or a dummy memory cell having the same

PUBLIC VERSION

configuration as that of the memory cell.” *Id.* at ¶ 0011.

Dr. Liu disagrees with Dr. Rhyne’s interpretation, reading Kurata’s references to a dummy memory cell to describe “an alternative configuration not shown in Kurata’s figures.” CX-5423C at Q/A 45-46. Dr. Liu contends that the singular in the phrase “a dummy memory cell” is not consistent with the Figure 5’s two components, MTR1 and MTR2, pointing to language in Kurata’s claims using “MOS transistors” in the plural but “dummy memory cell” in the singular. *Id.* at Q/A 47 (citing RX-0174 at Claim 1). Dr. Liu dismisses the significance of the electronic symbols in Figure 1 and Figure 5, finding this to be consistent with Kurata’s description of MTR1 and MTR2 as MOS transistors of a similar structure to memory cells. *Id.* at Q/A 48. In Dr. Liu’s opinion, MTR1 and MTR2 are MOS transistors with a similar structure to memory cells, but they are not memory cells in the context of the ’602 patent.

I find Dr. Rhyne’s opinion regarding MTR1 and MTR2 to be more consistent with the disclosure in Kurata. *See* SIB at 102-104. When the description of Kurata’s second embodiment is read in the context of the first embodiment, it is clear that MTR1 and MTR2 in Figure 5 are memory cells that are used in place of the MOS transistors TR1 and TR2 in Figure 1. *See* RX-0174 at ¶ 0020, Fig. 1, Fig. 5. This is confirmed by the depiction of MTR1 and MTR2 in Figure 5 using the symbol for memory cells. *Id.*, Fig. 5. Even if MTR1 and MTR2 were transistors, Dr. Liu has admitted that a transistor can be a memory cell. CX-5423C at Q/A 44. This is consistent with the ’602 patent specification, where the disclosed memory cells are transistors. *See, e.g.*, ’602 patent, col. 3:19-20 (“Memory cell 260 may be a transistor coupled to a word line 240 and bit line 230.”), 3:37-39 (“[D]ummy cells 270 and 275 may be transistors coupled to dummy word lines 250 and 255, respectively, and bit line 230.”).

Dr. Liu’s argument based on the singular and pluralized language in Kurata is

PUBLIC VERSION

unconvincing—to support this interpretation, Dr. Liu must imagine an undisclosed embodiment that is not depicted in any of Kurata’s figures or described in any detail. This is an implausible inference to draw based solely on the pluralization of certain words, particularly where the reference is translated from a foreign language. All of the other evidence in Kurata points towards Dr. Rhyne’s interpretation. The detailed description of the embodiments, the figures, the Abstract, and the claim language are all consistent with the disclosure of two alternative configurations: (1) a first embodiment using MOS transistors; and (2) a second embodiment replacing those transistors with dummy memory cells. RX-0174 at Abstract, Claim 1, ¶¶ 0011, 0020. This is clear and convincing evidence that Kurata’s second embodiment discloses dummy memory cells MTR1 and MTR2 that anticipate the “memory cell” limitations of claims 1 and 7 of the ’602 patent.

c. “dummy word line arranged at an edge of a memory array [and] coupled to the memory cell”

Toshiba identifies the SV line depicted in Figure 5 as the claimed “dummy word line.” RIB at 80-83. The SV line is first described in the context of the first embodiment as “a gate signal line for controlling source-drain equipotential MOS transistors.” RX-0174 at ¶ 0015. Dr. Liu cites this description to dispute Toshiba’s identification of the SV line as a word line, pointing out that Kurata describes W1 and W2 explicitly as “word lines” while SV is a “gate signal line.” CX-5423C at Q/A 50-51 (citing RX-0174 at ¶ 0015).¹⁵ As discussed above,

¹⁵ Macronix and Dr. Liu also seek to import additional limitations into the claimed “word line,” but none of these limitations are consistent with the ’602 patent. Dr. Liu suggests that “the purpose of the SV line is to control MTR1 and MTR2,” and this would be “totally different from the role of a word line,” CX-5423C at Q/A 55, but the specification and claims of the ’602 patent describe a dummy word line that is controlled by a control logic. ’602 patent, col. 3:42-48, 6:1-2. Macronix further argues that a word line must be connected a word decoder, CRB at 39, but

PUBLIC VERSION

however, memory cells MTR1 and MTR2 replace the MOS transistors TR1 and TR2 in the second embodiment. *See* RX-0382C (Rhyne DWS) at Q/A 159. Accordingly, although the SV line is not a word line in the first embodiment, it is a word line in the second embodiment, because it is coupled to these two memory cells. *Id.* Kurata's description of the second embodiment references a "word line" in its disclosure of "an ordinary memory cell connected to a single word line or a plurality of word lines in a memory array [] used as a source-drain equipotential MOS transistor for setting the data line and source line to the same potential." RX-0174 at ¶ 0020. Moreover, the SV line is a "dummy word line" within the meaning of the '602 patent because MTR1 and MTR2 are dummy memory cells. RX-0382C (Rhyne DWS) at Q/A 160-63.

The parties dispute whether the SV line in the second embodiment is located "at an edge of a memory array," raising arguments similar to those addressed above in the context of infringement. RIB at 82-83; CIB at 91; SIB at 107; RRB at 53-54; CRB at 39-40. As discussed above, a memory array in the context of the '602 patent simply means multiple memory cells coupled to a grid of word lines and bit lines. Under this construction, the memory cells M11, M21, M12, M22, MTR1, and MTR2, as depicted in Figure 5 of Kurata, form a "memory array" in the context of the '602 patent, and the SV line is a dummy word line at an edge of this array. RX-0174 at ¶ 0020, Fig. 5. Accordingly, Kurata's second embodiment anticipates the "dummy word line arranged at an edge of a memory array [and] coupled to the memory cell" limitation of claims 1 and 7.

Figure 2 of the '602 patent explicitly shows that the dummy word lines 250 and 255 are not connected to the row decoder 220. '602 patent, Fig. 2, col. 3:14-28.

PUBLIC VERSION

d. “control logic” for supplying “a positive bias . . . during [an] erase operation”

The parties dispute whether Kurata discloses a control logic that supplies the claimed positive bias to a dummy word line during an erase operation. Relying on the opinions of Dr. Rhyne, Toshiba argues that a control logic is inherent in Kurata and that the first and second embodiments in Kurata disclose the claimed positive bias supplied during an erase operation. RIB at 83-86, RRB at 52-53, 54-55. Macronix disagrees with Toshiba’s conclusions, relying on Dr. Liu to identify several flaws in Dr. Rhyne’s analysis. CIB at 91-93; CRB at 40-42. Staff agrees with Macronix that this limitation is not anticipated. SIB at 108.

Dr. Rhyne identifies a control circuit in Figure 22 of Kurata, which corresponds to an eleventh embodiment. RX-0382C at Q/A 173; RX-0174 at ¶¶ 0062-0063, Fig. 22. Dr. Rhyne explains that “one skilled in the art would understand that such a control circuit would inherently be used with Kurata’s first and second embodiments to supply the operational voltages referenced in Figures 3-4.” *Id.* at Q/A 174. Figures 3 and 4 of Kurata disclose operation voltages for the first embodiment for “Erasure,” “Writing,” and “Reading”:

[FIG. 3]

(a) Table showing the operation voltage conditions of the first embodiment of the present invention (Threshold after writing: positive; Threshold after erasure: positive)

Symbol	Wiring	Erasure	Writing	Reading
W1	Selected word line	-15 V	15 V	2 V
W2	Unselected word line	0 V	5 V	0 V
D1/D2	Data line	0 V / 0 V	0 V / 5 V	1 V
EL	Well wiring	0 V	0 V	0 V
CS	Common source line	0 V	0 V	0 V
SS	Source side switch MOS	5 V	0 V	3 V
SD	Drain side switch MOS	5 V	7 V	3 V
SV	Source-drain equipotential MOS	5 V	7 V	0 V

RX-0174 at Fig. 3; *see also* Fig. 4. Dr. Rhyne explains that this table shows 5 volts supplied to the SV line during an erase operation, which is consistent with the “positive bias” limitation of

PUBLIC VERSION

the '602 patent. RX-0382C at Q/A 176. Dr. Rhyne testifies that one of ordinary skill in the art would understand that a control logic would inherently be used to supply this voltage and the other different voltages in the tables of Figures 3 and 4. *Id.* at Q/A 174.

Dr. Liu disagrees with Dr. Rhyne's analysis of these tables. CX-5423C at Q/A 67-81. In particular, Dr. Liu does not agree that the voltages described in Figures 3 and 4 can be applied to Kurata's second embodiment, because if MTR1 and MTR2 are memory cells, the voltages disclosed in Figures 3 and 4 would not be compatible with write operations. *Id.* at Q/A 68-71. Dr. Liu finds no disclosure in Kurata that would support the use of the control circuit in Figure 22 in the first or second embodiment. *Id.* at Q/A 76-79. He suggests that the necessary voltages could be supplied by a hard-wired power source, rather than a control logic. *Id.* at Q/A 80.

I agree with Dr. Liu that Kurata's disclosure of a control circuit in Figure 22 is not relevant to the first or second embodiment. CX-5423C at Q/A 76-79. I agree with Toshiba, however, that a control logic is inherent in Kurata's first embodiment based on Dr. Rhyne's testimony pointing to the different voltages associated with erasure, writing, and reading operations in Figures 3 and 4. RX-0382C at Q/A 174. Dr. Liu admits that his suggestion of hard-wiring the SV line to a power source would render the device inoperative, and Macronix has offered no credible explanation for how the different voltages in Figures 3 and 4 could be supplied without a control logic. Tr. at 1147:20-1148:15.

Finding that a control logic is inherent in Kurata's first embodiment is not sufficient to prove anticipation, however, because Kurata's first embodiment is missing many of the other limitations of the '602 patent. RX-0174 at ¶¶ 0016-19, Figs. 3, 4. Dr. Rhyne admits that in the first embodiment, the SV line is not a dummy word line, RX-0382C at Q/A 157-58, so Toshiba cannot rely on the first embodiment to show anticipation of the limitation in claim 1 requiring "a

PUBLIC VERSION

control logic for supplying a positive bias to the dummy word line” or the limitation in claim 7 requiring that “a positive bias is selectively supplied to the at least one dummy word line.” ’602 patent, col. 6:1-2, 6:29-32. The Federal Circuit has held that for anticipation under § 102, “it is not enough that the prior art reference . . . includes multiple, distinct teachings that the artisan might somehow combine to achieve the claimed invention.” *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1371 (Fed. Cir. 2008).

Toshiba argues that the operations disclosed in Figures 3 and 4 for the first embodiment of Kurata can be applied to the dummy word line in the second embodiment, but Dr. Rhyne concedes that the second embodiment would not use the exact same voltages as those disclosed in Figures 3 and 4. RX-0382C at Q/A 177; *see also* CX-5423C (Liu RWS) at Q/A 68-72. Accordingly, although a control logic may be inherent in Kurata’s first embodiment, this cannot be extended to the dummy word line in Kurata’s second embodiment. Similarly, the positive bias during erasure that is disclosed in Figures 3 and 4 is not necessarily applied to the second embodiment. Toshiba has thus failed to carry its burden to show that the “control logic” and “positive bias” limitations of claims 1 and 7 are anticipated by Kurata’s second embodiment.

e. “bit line . . . coupled to the memory cell”

Toshiba identifies the data lines D1 and D2 in Figure 5 of Kurata as the claimed bit lines coupled to the memory cells MTR1 and MTR2. CIB at 86-87; RX-0382C (Rhyne DWS) at Q/A 178-79. There is no dispute that Kurata’s second embodiment discloses the “bit line” limitations of claims 1 and 7.

f. “dummy word line . . . arranged . . . perpendicular to the at least one bit line”

Claim 7 further requires that the dummy word line is perpendicular to the bit line, and this is explicitly depicted in Figure 5 of Kurata. CIB at 89. Dr. Rhyne explains that the dummy

PUBLIC VERSION

word line SV is arranged perpendicular to the bit lines D1 and D2. RX-0382C at Q/A 201-202. There is no dispute that Kurata's second embodiment discloses the "perpendicular" limitation of claim 7.

Accordingly, Kurata's second embodiment discloses most of the limitations of independent claims 1 and 7, but these claims are not anticipated because Kurata's second embodiment fails to disclose a "control logic" for supplying "a positive bias . . . during [an] erase operation." Because Kurata does not anticipate either of the independent claims, none of the dependent claims are anticipated.

4. Obviousness

Toshiba contends that the asserted claims of the '602 patent are rendered obvious pursuant to 35 U.S.C. § 103, citing Kurata, the admitted prior art described in the background section of the '602 patent specification, and a Toshiba patent, U.S. Patent No. 6,222,774 to Tanzawa (RX-0176, "Tanzawa"). CIB at 90-109.

a. Kurata

Toshiba contends that the asserted claims are rendered obvious by disclosures in Kurata, relying on the testimony of Dr. Rhyne. RIB at 90-91; RX-0382C at Q/A 145-207. Although Macronix argues that Toshiba cannot rely on Kurata as an obviousness reference because it is not analogous art, a prior art reference can be analogous when it "is from the same field of endeavor, regardless of the problem addressed." *Unwired Planet, LLC v. Google Inc.*, 841 F.3d 995, 1000 (Fed. Cir. 2016). Macronix cites some older precedents where the field of endeavor was narrowly construed, but the Federal Circuit has recognized that *KSR* directed courts "to construe the scope of analogous art broadly." *Wyers v. Master Lock Co.*, 616 F.3d 1231, 1238 (Fed. Cir. 2010) (citing *KSR v. Teleflex*, 550 U.S. at 402). Both Kurata and the '602 patent are in the field

PUBLIC VERSION

of semiconductor memory devices, and accordingly, Kurata is analogous art for the purpose of obviousness.

i. Independent Claims 1 and 7

As discussed above, Kurata's second embodiment discloses each limitation of independent claims 1 and 7 except for the "control logic" for supplying "a positive bias . . . during [an] erase operation." Kurata's first embodiment discloses this limitation, except that the positive bias is supplied to a gate signal line, rather than a dummy word line.¹⁶ In Dr. Rhyne's opinion, "one skilled in the art would understand that Kurata's second embodiment . . . would operate the same way as the first embodiment," and in particular that turning on memory cells MTR1 and MTR2 during an erase operation would require a positive voltage, "which would either be the same 5 volts disclosed in Figs. 3 and 4, or a similarly positive voltage, in order to set the data line and source line to the same potential." RX-0382C at Q/A 177.

Dr. Rhyne's combination of Kurata's first and second embodiments is supported by the disclosures in Kurata itself. When describing the second embodiment, Kurata explicitly states that it is a modification of the first embodiment: "The second embodiment of the present invention is configured so as to use MOS transistors of the same configuration as that of nonvolatile memory cells configuring a memory array in place of the ordinary MOS transistors TR1 and TR2 of the above-described first embodiment." RX-0174 at ¶ 0020. Kurata also describes explicit motivations for this modification: "[T]herefore, the manufacturing process can be more simplified than in a case in which these are manufactured separately, and the occupied

¹⁶ As discussed above in the context of anticipation, Figures 3 and 4 of Kurata are evidence that control logic is inherent in the first embodiment and that a positive bias is supplied during an erase operation.

PUBLIC VERSION

surface area can be further reduced in comparison with the configuration shown in FIG.1 in which MOS transistors TR1 and TR2 shown in FIG. 1 are provided separately from the memory cells for the memory array.” *Id.* As discussed above in the context of anticipation, Kurata discloses how the second embodiment meets the “memory cell,” “dummy word line,” and “bit line” limitations of claims 1 and 7 of the ’602 patent. The second embodiment does not anticipate the “control logic” and “positive bias” limitations because there is no explicit disclosure for how the erase operation is implemented in this embodiment, but Dr. Rhyne provides clear and convincing testimony that one of ordinary skill in the art would be able to adapt the teachings of the first embodiment to the second embodiment. RX-0382C at Q/A 175-77. In particular, the same control logic inherent in the first embodiment could be used in the second embodiment. *Id.* at Q/A 175. Kurata explains that the dummy memory cells MTR1 and MTR2 in the second embodiment perform the same function as the MOS transistors TR1 and TR2 in the first embodiment, and one of ordinary skill in the art would thus understand that the read, write, and erase functions could be implemented similarly. *Id.* at Q/A 177. In particular, the erase operation described in the first embodiment could be implemented in the second embodiment by applying a positive bias, “which would either be the same 5 volts disclosed in Figs. 3 and 4, or a similarly positive voltage.” *Id.*

Dr. Liu disagrees with Dr. Rhyne’s testimony, suggesting that MTR1 and MTR2 could be configured to turn on at zero volts, rather than applying a positive bias. *Id.* at Q/A 72. This does not refute Toshiba’s case for obviousness, however. Even if one of ordinary skill in the art could choose to implement the second embodiment by applying a zero voltage during an erase operation, using a positive bias would be among “a finite number of identified, predictable solutions.” *KSR v. Teleflex*, 550 U.S. at 421. Dr. Liu also points out that Kurata does not

PUBLIC VERSION

provide a detailed timing chart for erasure operations (Figure 2 is a timing chart for writing operations), and questions whether the voltages in Figures 3 and 4 would be applied “during an erase operation” as required by the ’602 patent. *Id.* at Q/A 73-74. But Dr. Liu does not set forth any other reasonable way to read these tables—Figures 3 and 4 have a column labeled “erasure” with a positive voltage listed in a row labeled SV. This is sufficient evidence that these voltages are applied during an erase operation in the first embodiment and that a similar voltage could be applied in the second embodiment.

Both Macronix and Staff criticize Dr. Rhyne’s opinions as conclusory, but the critical evidence for obviousness is disclosed in Kurata itself, without the need for exhaustive expert testimony. As the Federal Circuit has held, “[c]ombining two embodiments disclosed adjacent to each other in a prior art patent does not require a leap of inventiveness.” *Boston Sci. Scimed, Inc. v. Cordis Corp.*, 554 F.3d 982, 991 (Fed. Cir. 2009). Kurata’s disclosure invites one of ordinary skill in the art to implement the read, write, and erase functionality of its first embodiment in its second embodiment, and such a combination would meet all of the limitations of claims 1 and 7 of the ’602 patent. Accordingly, Toshiba has made a *prima facie* showing of obviousness for claims 1 and 7 in view of Kurata.

ii. “column decoder” (Claims 2 and 8)

With respect to claims 2 and 8, Dr. Rhyne testifies that column decoders were well known at the time, and it would have been obvious to use a column decoder to drive the bit lines D1 and D2 with the voltages disclosed in Figures 3 and 4. RX-0382C at Q/A 186. Dr. Rhyne also points to the disclosure of a column decoder in Figure 22. *Id.* at Q/A 186. Dr. Liu disagrees, explaining that because Kurata only discloses two columns, they could be addressed without a column decoder. CX-5423C at Q/A 85. Moreover, Dr. Rhyne does not identify any

PUBLIC VERSION

disclosure in Kurata that would explain how to incorporate the column decoder in Figure 22 into the first or second embodiments. *Id.* at Q/A 86-87. I agree with Dr. Liu that Dr. Rhyne has failed to support his opinion that the column decoder in Figure 22 could be incorporated into the first or second embodiments, and I agree that a column decoder is not inherent in Kurata. Nevertheless, there is no dispute that column decoders were well known circuits for addressing memory. Dr. Liu suggests that a decoder would not be necessary for only two columns, but Kurata depicts a row decoder for only two rows. *See* RX-0174 at Fig. 5. The evidence thus shows that a column decoder is one of a finite number of predictable solutions for addressing the bit lines D1 and D2 in Kurata, and accordingly, I find that claims 2 and 8 of the '602 patent are rendered obvious by Kurata.

iii. “sense amplifier” (Claim 3)

With respect to claim 3, Dr. Rhyne’s opinion is that the claimed sense amplifiers are inherent in Kurata’s first and second embodiments. RX-0382C at Q/A 187. Dr. Rhyne points to paragraph 46 of Kurata, which introduces additional embodiments “relating to circuit configurations compatible with miniaturization of memory cells.” RX-0174 at ¶ 0046. This paragraph also references “sense amps connected to the data lines,” and Dr. Rhyne explains that this references back to the data lines D1 and D2 in Kurata’s earlier disclosed embodiments. RX-0382C at Q/A 187. Macronix disagrees with Dr. Rhyne’s interpretation, arguing that it is improper to read these sense amps into the first and second embodiments. CIB at 95. Dr. Liu reads paragraph 46 to be limited to the seventh and eighth embodiments that are subsequently disclosed in Kurata. CX-5423C at Q/A 89. He criticizes Dr. Rhyne for “mixing and matching elements from different embodiments” because Kurata does not explicitly relate the seventh and eighth embodiments to the first and second embodiments. *Id.* I agree with Macronix that there

PUBLIC VERSION

is no evidence that the sense amps of Kurata's seventh and eighth embodiments could be combined with the devices disclosed in the first and second embodiments. But this is not what Dr. Rhyne's testimony says. Dr. Rhyne's witness statement does not rely on Kurata's seventh and eighth embodiments, which are described in paragraphs 47 through 52 and figures 16 and 17. RX-0174 at ¶¶ 0047-52, Figs. 16, 17. Instead, when Dr. Rhyne reads paragraph 46, he recognizes that the antecedent basis for the reference to "the data lines" in this paragraph refers back to the data lines D1 and D2 in Kurata's earlier disclosed embodiments. RX-0382C at Q/A 187. When Kurata describes "the layout of sense amps connected to the data lines and used to read the memory current," it confirms that these sense amps are inherent in the earlier embodiments, including the first and second embodiment. RX-0174 at ¶ 0046. Accordingly, I find that the claimed "sense amps" are inherent in Kurata, and accordingly, claim 3 of the '602 patent is also rendered obvious.

iv. word line "arranged perpendicular to" bit line and "arranged the second direction" (Claims 4 and 9)

There is no dispute with respect to the limitations of claims 4 and 9, which require word lines arranged perpendicular to bit lines. CIB at 87; RIB at 94-96. Figures 1 and 5 of Kurata explicitly depict word lines W1 and W2 perpendicular to bit lines D1 and D2. RX-0174 at Figs. 1, 5; *see* RX-0382C (Rhyne DWS) at Q/A 188-191, 205-206. Accordingly, I find that claims 4 and 9 of the '602 patent are rendered obvious by Kurata.

v. "row decoder" (Claims 5 and 10)

Claims 5 and 10 further require a row decoder, and Dr. Rhyne identifies the word decoder WD depicted in Figures 1 and 5 of Kurata. RX-0382C (Rhyne DWS) at Q/A 192-193, 207 (citing RX-0174 at Figs. 1, 5). Dr. Rhyne further points to the tables in Figures 3 and 4 of Kurata showing the various voltages that are driven onto the word lines by word decoder WD.

PUBLIC VERSION

Id. at Q/A 193 (citing RX-0174 at Figs. 2, 3). Macronix argues that Dr. Rhyne’s testimony is conclusory and fails to adequately explain why Kurata’s word decoder meets the limitations for a row decoder in the ’602 patent. Dr. Liu points out that Kurata describes a separate “row decoder” and “word driver” in its eleventh embodiment. CX-5423C at Q/A 93 (citing RX-0174 at Fig. 22). Neither Macronix nor Dr. Liu identify any meaningful difference between a “row decoder” and a “word decoder” in the context of the ’602 patent, however. Claim 5 describes “a row decoder coupled to the at least one word line for driving the at least one word line.” ’602 patent at 6:15-17. Claim 10 merely requires that “at least one word line is coupled to a row decoder.” *Id.* at 6:37-38. The “row decoder” claimed in the ’602 patent is thus a decoder for word lines, and the word decoder described in Kurata clearly meets this limitation. Accordingly, claims 5 and 10 of the ’602 patent are rendered obvious by Kurata.

vi. “continuously supplies the positive bias” (Claim 6)

Claim 6 requires that the control logic continuously supplies the positive bias to the dummy word line, and Toshiba relies on Dr. Rhyne’s testimony that Figures 3 and 4 of Kurata disclose positive voltages that are applied during an erase operation without any suggestion that these voltages are applied in a discontinuous or interrupted manner. RX-0382C at Q/A 195-196. Dr. Rhyne thus offers his opinion that “one skilled in the art would understand that the disclosed voltages for an erase operation of the first and second embodiments are applied continuously.” *Id.* at Q/A 196. Macronix argues that this conclusion is not supported by any evidence in Kurata—there are no timing charts for erasure in the first or second embodiments, and there is no discussion of whether the voltages supplied are continuous or discontinuous. CIB at 95-96. Moreover, Dr. Liu identifies disclosures in one of Kurata’s later embodiments where voltages are applied in a discontinuous pattern during an erase operation. CX-5423C at Q/A 34 (citing RX-

PUBLIC VERSION

at 35-36. This [REDACTED] is not relied upon by Toshiba as prior art to any limitation of the '602 patent, however, and it is thus irrelevant to the obviousness analysis. Macronix does not identify any testimony or other evidence that the admitted prior features relied upon by Toshiba reflect the work of Macronix's inventors. Mr. Huang admitted at his deposition that [REDACTED] [REDACTED]. See JX-0014C at 38-45.

The Background of the '602 patent admits that the prior art included semiconductor memory devices with memory cells arranged in a memory array with bit lines and word lines, with a dummy word line arranged at the edge of the memory array. '602 patent at 1:13-28; see RX-0382C (Rhyne DWS) at Q/A 211-217, 231-32; JX-0014C (Huang Depo. Tr.) at 38-45. The only limitation missing from independent claims 1 and 7 is the "control logic" for supplying "a positive bias . . . during [an] erase operation." This is consistent with [REDACTED] [REDACTED]. JX-0014C at 44-45.

ii. Tanzawa

Tanzawa is a U.S. patent that was issued to Toshiba in April 2001, disclosing a semiconductor memory device with a memory cell array, word lines, bit lines, a source line, a row decoder, column gate circuits, and a control gate driver. RX-0176 at Abstract. Toshiba contends that independent claims 1 and 7 of the '602 patent are rendered obvious by Tanzawa in combination with the admitted prior art. RIB at 91-100.

Dr. Rhyne identifies disclosures in Tanzawa describing an erase operation where a positive bias is applied to dummy cells during an erase operation. RX-0382C at Q/A 220-227. Specifically, Tanzawa states: "when erasing data in a memory cell MC, a positive voltage (+8V) is applied to the well region. However, this positive voltage is also applied to the control gate of the dummy cell since the control gate is connected to the well region. In this case, no voltage

PUBLIC VERSION

stress is applied to the dummy cells DC.” RX-0176, col. 8:62-67. Figure 4 of Tanzawa shows memory cells (MC) and dummy cells (DC):

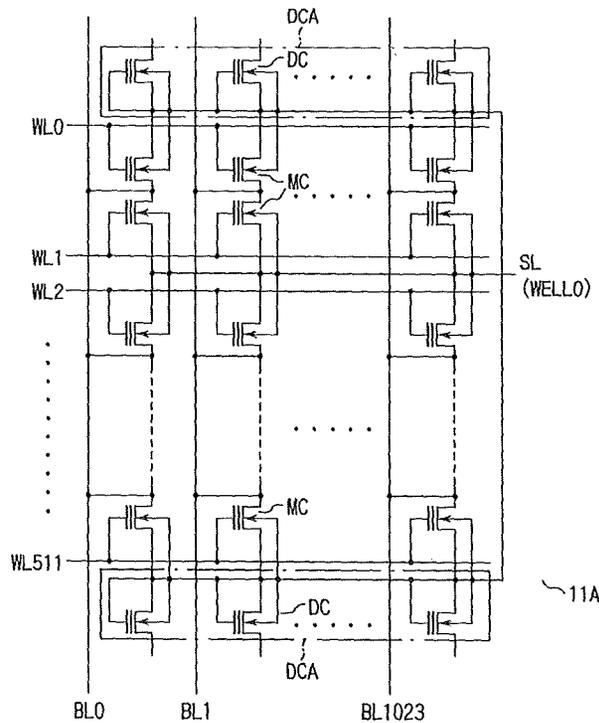


FIG. 4

Id., Fig. 4. The memory cells are connected word lines (WL) and bit lines (BL), while the dummy cells are arranged in dummy cell rows (DCA). *Id.*, col. 5:16-47. The dummy cells “are connected in common to the source lines SL.” *Id.*, col. 5:43-47.

Dr. Rhyne further points to descriptions in Tanzawa of well drivers WD 16A and 16B and control signal output circuit CSG20, as the relevant control logic for supplying a positive bias to the dummy cells via the source lines. RX-0382C at Q/A 226 (citing RX-0176, cols. 5:9-14, 6:26-29). Dr. Rhyne explains that when Tanzawa refers to “voltage stress,” it is describing the same problem encountered by the inventors of the ’602 patent, where applying voltage to only one side of the floating gate can cause over-erasure and a leaky dummy cell. *Id.* at Q/A 227. In Dr. Rhyne’s opinion, one of ordinary skill would have been motivated to combine the

PUBLIC VERSION

control logic of Tanzawa with the admitted prior art memory device described in the '602 patent to avoid these voltage stress problems. *Id.* at Q/A 229. Dr. Rhyne explains that modifying the admitted prior art to apply a positive bias to the dummy word line would be simple and straightforward, with predictable results. *Id.*

Dr. Liu does not agree that this proposed combination would be obvious—in his opinion, Tanzawa's use of separate dummy cells teaches away from the '602 patent's dummy row line. CX-5423C at Q/A 144-45. Dr. Liu highlights the fact that Tanzawa's dummy cells are not coupled to bit lines or to word lines. *Id.* at Q/A 129-133. Dr. Liu also suggests that Tanzawa teaches away from the use of a control logic. *Id.* at Q/A 134, 145-46, 151 (citing RX-0176, col. 9:1-7). Dr. Liu criticizes Dr. Rhyne's opinion for relying on hindsight analysis. *Id.* at Q/A 154-55. In Dr. Liu's opinion, combining Tanzawa with the admitted prior art in the '602 patent would not be predictable, because semiconductor memory device design is highly complex. *Id.* at Q/A 156-57.

Based on the opinions of Dr. Rhyne and Dr. Liu, and the disclosures in Tanzawa and the '602 patent, I find that Toshiba has failed to carry its burden to prove that the asserted claims are obvious in view of this combination. Dr. Rhyne's opinions are conclusory, and he does not convincingly explain why a combination of Tanzawa with the admitted prior art would render the claims of the '602 patent obvious. The structure of Tanzawa's dummy cells is incompatible with the dummy word lines described in the admitted prior art in the '602 patent—while the '602 patent's dummy cells are coupled to a word line and bit line as part of a memory array, Tanzawa's dummy cells are separated from the other memory cells in the array and connected to a source line, without any connection to the bit lines of the memory array. *See* RX-0176, col. 5:38-47. In Dr. Rhyne's opinion, one of ordinary skill in the art would keep the dummy word

PUBLIC VERSION

line connections described in the admitted prior art while implementing the erasure operation of Tanzawa, but this is contradicted by explicit teachings in Tanzawa referring to such connections as unnecessary. RX-0176, col. 9:1-7 (“[N]o wiring from the dummy cell DC to the word line is necessary . . . wiring areas and drive circuits necessary for the dummy cells can be eliminated, so the total area is not much increased.”). Tanzawa teaches away from the invention of the ’602 patent by touting the advantages of eliminating connections between the dummy cells and the rest of the memory array—the very connections to bit lines and word lines that are required by the claims of the ’602 patent. *See In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994) (“A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant”).¹⁸

Accordingly, Toshiba has not shown any claim of the ’602 patent to be obvious in view of Tanzawa in combination with the admitted prior art.

5. Secondary Considerations of Non-Obviousness

Macronix identifies several alleged secondary considerations of non-obviousness, which must be considered before any finding of obviousness. *Apple Inc. v. Int’l Trade Comm’n*, 725 F.3d 1356, 1365 (Fed. Cir. 2013). Macronix points to evidence of unexpected results, long-felt need, the failure of others, and commercial success, supported by the testimony of Dr. Liu. CIB at 100-102; CX-5423C (Liu RWS) at Q/A 193-202.

¹⁸ Macronix also argues that Tanzawa teaches away from the use of a control logic when it describes the elimination of “drive circuits,” RRB at 47-48, but the “control logic” identified by Dr. Rhyne comprises the circuits driving the source line, which supply the positive bias to the dummy cells in Tanzawa. *See* RX-0382C (Rhyne DWS) at Q/A 225-26 (citing RX-0176, col. 5:9-14, 6:26-2, Fig. 3).

PUBLIC VERSION

Macronix also relies on the fact that the accused Toshiba and Macronix products have achieved commercial success, but Dr. Liu only provides conclusory testimony relating this success to the claimed invention, asserting that “the ’602 patent’s invention is critical to the commercial success of those products because it is integral to their miniaturization, which is key to achieving high capacity at a low cost and thereby driving demand for the products.” CX-5423C at Q/A 199. This conclusory testimony is insufficient to link the commercial success to the merits of the claimed invention, however, rather than features known in the prior art. *Apple Inc. v. Samsung Electronics Co. Ltd.*, 816 F.3d 788, 810 (Fed. Cir. 2016) (“To be relevant, commercial success must be linked to the merits of the claimed invention, rather than features known in the prior art.”). Macronix’s evidence of secondary considerations is thus very weak, and does not meaningfully contribute to the obviousness analysis.

Accordingly, after considering the scope and content of the asserted prior art, the level of ordinary skill in the art, and Macronix’s alleged secondary considerations of non-obviousness, claims 1-5 and 7-10 of the ’602 patent are invalid as obvious in view of Kurata.

V. U.S. PATENT NO. 8,035,417

A. Level of Ordinary Skill in the Art

In the *Markman* order, I recognized that the parties agreed on a level of ordinary skill in the art for the ’417 patent: a bachelor’s degree in electrical engineering, and either two years of experience in transistor-level circuit design or a master’s degree in electrical engineering and one year of equivalent experience. Order No. 23 at 48.

B. Claim Construction

The *Markman* order construed the term “buffer enable signals customized across the plurality of output buffer circuits” to mean signals that enable or disable each of the output buffer

PUBLIC VERSION

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] For

illustrative purposes at the hearing, Dr. Baker combined these schematics into a single diagram

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

PUBLIC VERSION



[REDACTED]

[REDACTED] Macronix has agreed that Dr. Baker's diagram is representative for all of the accused products for the purposes of this investigation. CIB at 118.

[REDACTED]

PUBLIC VERSION

2. Undisputed Claim Limitations – Claim 11

Infringement of most of the limitations in independent claim 11 is undisputed, with Toshiba and Staff only contesting infringement of the limitation requiring “buffer enable circuits customized across the plurality of output buffer circuits.” *See* RIB at 113; SIB at 120. The parties do not dispute Dr. Dickens’s analysis of the accused products for the other limitations of claim 11.

a. “a plurality of output buffer circuits coupled in parallel to provide a combined output drive strength”

Dr. Dickens identified a plurality of output buffer circuits in each of the accused Toshiba designs that are coupled in parallel to provide a combined output drive strength. CX-3839C at Q/A 121-27. As discussed above, there are multiple buffer circuits in [REDACTED] whose outputs are coupled together. *See, e.g.*, RX-0492C.

b. “each output buffer circuit of the plurality of output buffer circuits including a buffer data output providing a data output signal having a drive strength”

Each of the output buffer circuits identified by Dr. Dickens has a buffer data output signal having a drive strength. CX-3839C at Q/A 128-29. As discussed above, the buffer circuits in [REDACTED] provide output signals [REDACTED]. *See, e.g.*, RX-0486C.

c. “wherein the data output signal is combined across the plurality of output buffer circuits to provide a combined data output signal having the combined output drive strength”

The data output signals identified by Dr. Dickens are combined across the plurality of output buffer circuits to provide a combined data output signal with a combined output drive strength. CX-3839C at Q/A 130-31. As discussed above, the output signals [REDACTED] [REDACTED] are coupled together to provide a combined output drive strength. *See, e.g.*, RX-0492C.

PUBLIC VERSION

d. “wherein the buffer enable signals are received together with complements of the buffer enable signals”

Dr. Dickens identifies buffer enable signals and the complements thereof that are received by the output buffer circuits in the accused Toshiba designs. CX-3839C at Q/A 137-38. As discussed above, the [REDACTED] buffer enable signals in [REDACTED] are received with their complements, [REDACTED]. *See, e.g.,* RX-0487C.

e. “the buffer enable signals and the complements of the buffer enable signals control pairs of transistors having opposite conductivity types”

The buffer enable signals and their complements identified by Dr. Dickens control pairs of transistors having opposite conductivity types. CX-3839C at Q/A 139-40. As discussed above, [REDACTED] are received by different buffer enable circuits, and these circuits contain transistors of opposite conductivity types. *See, e.g.,* RX-0487C.

3. Disputed Claim Limitation – “customized across”

The parties dispute whether the accused products infringe the limitation requiring that “the combined output drive strength is tuned by buffer enable signals customized across the plurality of output buffer circuits.” ’417 patent, col. 11:63-65. This term was addressed in the *Markman* order, where the term “buffer enable signals customized across the plurality of output buffer circuits” was construed to mean signals that enable or disable each of the output buffer circuits, where each signal is applied to a different output buffer circuit. Order No. 23 at 48-52. This construction recognized that the buffer enable signals should not be shared across the plurality of output buffer circuits, recognizing that the language of claim 11 was different from the language of claims 1 and 18. *Id.* at 49-50. Specifically, claims 1 and 18 describe two types of buffer enable signals—a “first buffer enable signal” that is “shared across the plurality of

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output buffer circuits, and a “second buffer enable signal” that is “customized across the plurality of output buffer circuits.” *Id.* (citing ’417 patent, col. 9:42-47, col. 12:53-57). Claim 11 only describes “buffer enable signals customized across the plurality of output buffer circuits,” which correspond to the second type of claimed buffer enable signal. *Id.* These two types of buffer enable signals are described in the specification, where buffer enable signals Z and ZB are shared across output buffer circuits, while buffer enable signals OPON1 and OPONB1, OPON2 and OPONB2, and OPON3 and OPONB3, up to OPONM and OPONBM, “are customized such that an adequate number of the output buffer circuits are enabled, and the remainder disabled.” ’417 patent, col. 8:41-48. As depicted in Figure 6, the shared signals Z and ZB are wired together, in contrast to the OPON and OPONB signals:

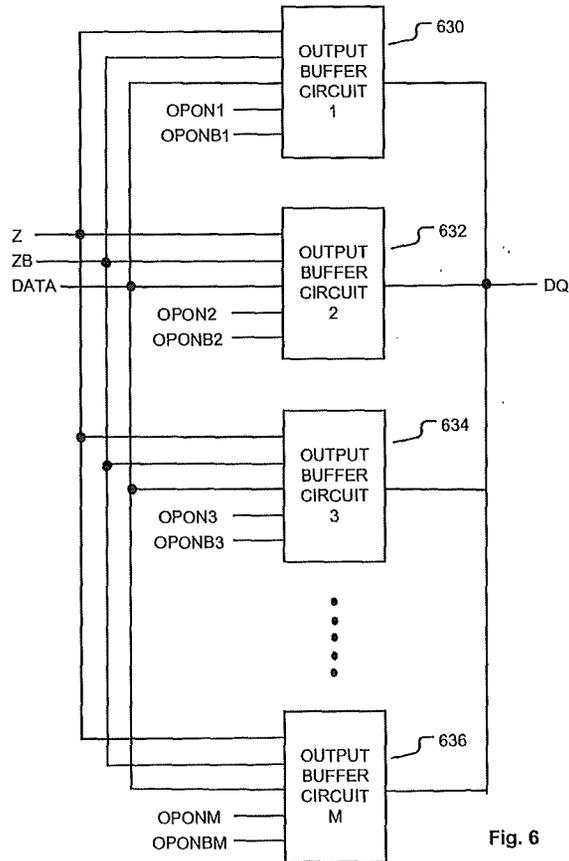


Fig. 6

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neither of these diagrams supports Macronix's theory for what is inside or outside the relevant output buffer circuitry. CIB at 125-130 (*comparing RDX-0105C.110 to '417 Patent, Fig. 6*). Notably, there is nothing in the '417 patent's description of Figure 6 that explains where the Z and ZB signals are wired together, and there is no boundary for the relevant circuitry depicted in Figure 6. *See '417 patent, col. 8:35-48, Fig. 6*. In Dr. Baker's demonstrative, [REDACTED]

[REDACTED]

[REDACTED]. *See RDX-0105C.110* (referenced in RX-1245C (Baker RWS) at Q/A 266-275; *see also id.* at Q/A 239-265 (citing RX-0486C, RX-0487C, RX-0490C, RX-0492C). Macronix offers no credible explanation for why the infringement analysis should be limited to [REDACTED].

There is nothing in the claim language that specifies the location of any claimed components or connections; the claims and specification of the '417 patent are instead concerned with whether the buffer enable signals are shared or customized across the plurality of output buffer circuits. In the accused products, [REDACTED] are shared across the output buffer circuits, enabling or disabling these circuits together, and this configuration does not infringe the "customized across" limitation.

The Federal Circuit case law cited by Macronix does not change this conclusion. CIB at 130-132. Macronix cites *Stiftung v. Renishaw PLC*, where the Federal Circuit held that "one cannot avoid infringement merely by adding elements if each element recited in the claims is found in the accused device." 945 F.2d 1173, 1178 (Fed. Cir. 1991). Macronix has not shown that each element of the recited claims is found in the accused products here. The claims require

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“buffer enable signals customized across the plurality of output buffer circuits,” and Macronix has not identified buffer enable signals meeting this limitation. The present facts are more similar to *High Tech Medical Instrumentation, Inc. v. New Image Industries, Inc.*, where the Federal Circuit reversed a district court’s finding that a “rotatably coupled” limitation was likely to be infringed where set screws in the accused device prevented rotation. 49 F.3d 1551, 1553 (Fed. Cir. 1995). Similarly, in *Outside the Box Innovations, LLC v. Travel Caddy, Inc.*, the addition of plywood to the fabric in an accused product meant that it could not infringe a “flexible fabric” limitation. 695 F.3d 1285, 1305 (Fed. Cir. 2012). Macronix argues that [REDACTED]

[REDACTED]

[REDACTED]

precluding infringement of this limitation. The undisputed evidence shows that the accused products share the same buffer enable signals across the plurality of output buffer circuits,²⁰ rather than using the customized signals required by claim 11.

None of Macronix’s other arguments overcome its lack of evidence of infringement for this limitation,²¹ and accordingly, none of the accused products infringe claim 11 of the ’417 patent.

4. Dependent Claim Limitations

There are no separate disputes regarding Toshiba’s infringement of the limitations in the

²⁰ Macronix criticizes Toshiba for conflating “signals” and “values,” but it is Macronix that introduces this confusion. CIB at 133-135. The buffer enable signals in the accused products do not infringe, regardless of how the values of those signals are characterized.

²¹ Macronix argues that Toshiba has “tuned” the output drive strength by using a shared buffer enable signal, but even if this were correct, the tuning is not “by buffer enable signals customized across the plurality of output buffer circuits,” and Toshiba’s products do not infringe the claim. See CIB at 136-38; CRB at 63-65; RRB at 71-72.

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dependent claims. Dr. Dickens identified evidence that the output signals for the [REDACTED] [REDACTED] have “a range of output values including logically high, logically low, and floating,” meeting the limitation in claim 12. CX-3839C at Q/A 141-42. Dr. Dickens further identified evidence that “the logically high and logically low output values have the combined output drive strength tuned by the buffer enable signals across the plurality of output buffer circuits,” meeting the additional limitation in claim 13. *Id.* at Q/A 143-46. Dr. Dickens further identified evidence that [REDACTED] [REDACTED] can “receive a data input signal being logically high,” and the output has a “combined output drive strength determined by a sum of drive strengths across the plurality of output buffer circuits,” meeting the additional limitations of claim 14. *Id.* at Q/A 147-50. Dr. Dickens also identified evidence that [REDACTED] can “receive a data input signal being logically low,” and the output has a “combined output drive strength determined by a sum of drive strengths across the plurality of output buffer circuits,” meeting the additional limitations of claim 15. *Id.* at Q/A 151-54. And Dr. Dickens identified evidence that accused output buffer circuits can “receive the buffer enable having a disable value, and provide an output signal having a floating value,” consistent with claim 16. *Id.* at Q/A 155-56. Because the accused products do not infringe claim 11, however, they also do not infringe any of the dependent claims.

5. Capability of Infringing

Toshiba further argues that none of the accused products infringe the '417 patent because [REDACTED] [REDACTED]. RIB at 124-37. The Commission has held that “infringement, direct or indirect, must be based on the articles as imported to satisfy the requirements of section 337.” *Certain Electronic Devices with Image*

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Processing Systems, Components Thereof, and Associated Software, Inv. No. 337-TA-724, Comm'n Op. at 14 (Dec. 2, 2011). Macronix argues that it is legally irrelevant whether [REDACTED], because an apparatus claim is infringed based on the structure of the accused product, not its operation. CIB at 75-79 (citing *Hewlett-Packard Co. v. Bausch & Lomb Inc.*, 909 F.2d 1464, 1468 (Fed. Cir. 1990) (“[A]pparatus claims cover what a device is, not what a device does.”)).

Although it is undisputed that [REDACTED], Toshiba fails to explain how this impacts the infringement of any limitation of the asserted claims. Claim 11 requires that the claimed output buffer circuits are “coupled in parallel to provide a combined output strength,” and this only requires that the circuits are structured in a way that would provide data output meeting the claimed limitations. See '417 patent, col. 11:55-59. It does not matter whether Toshiba intends for its customers to use [REDACTED], and there is no requirement that Toshiba's customers actually use the circuitry to generate the claimed outputs. See *Intel Corp. v. Int'l Trade Comm'n*, 946 F.2d 821, 832 (Fed. Cir. 1991) (recognizing that “there is no intent element to direct infringement,” and holding that “actual [] operation in the accused device is not required.”). Accordingly, Toshiba's [REDACTED] does not affect the infringement analysis for any limitation.

D. Domestic Industry – Technical Prong

Macronix asserts that the output buffer circuitry in several of its products practice claims 11-16 of the '417 patent. CIB at 142-45. There is no dispute regarding the technical prong of domestic industry for the '417 patent. See SIB at 131; RRB at 75.

1. Domestic Industry Products

Macronix groups its domestic industry products [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]. CIB at 142. In each of these groups, Dr. Dickens analyzed one representative product in detail, understanding that [REDACTED]

[REDACTED]. CX-3839C at Q/A 39-43.

2. Independent Claim 11

Dr. Dickens analyzed Macronix's domestic industry products and found that each of these products contained a plurality of output buffer circuits meeting the limitations of claim 11 of the '417 patent. CX-3839C at Q/A 44-51, 60-67, 76-84, 93-100. He found that the output buffer circuits are coupled in parallel to provide a data output signal having a combined output drive strength. *Id.* at Q/A 45-47, 61-63, 77-80, 94-96. He found buffer enable signals customized across the plurality of output buffer circuits. *Id.* at Q/A 48-49, 64-65, 81-82, 97-98. He also found that the buffer enable signals are received together with their complements, and that these signals and their complements control pairs of transistors having opposite conductivity types. *Id.* at Q/A 50-51, 66-67, 83-84, 99-100.

3. Dependent Claims

Dr. Dickens analyzed Macronix's domestic industry products and found that each of these products practice dependent claims 12-16 of the '417 patent, identifying the logically high, logically low, and floating signal values meeting the limitations of these claims. CX-3839C at Q/A 52-59, 68-75, 85-92, 101-108.

PUBLIC VERSION

No party offered any rebuttal to Dr. Dickens's domestic industry analysis, and accordingly, Macronix has carried its burden to show that its domestic industry products practice the asserted claims of the '417 patent.

E. Invalidity

Toshiba contends that the asserted claims of the '417 patent are invalid based on anticipation and obviousness in view of certain asserted prior art patents and applications. RIB at 139-58. The legal standards for invalidity are set forth above in the context of the '602 patent.

1. Priority Date

The '417 patent issued on October 11, 2011, from an application filed on July 26, 2010. There is no dispute that the asserted prior art references are prior art.

2. Anticipation

Toshiba contends that asserted claims 11-16 of the '417 patent are anticipated by U.S. Patent No. 6,114,895, which issued in September 2000, naming inventor Charles S. Stephens and Assignee Agilent Technologies (RX-0182, "Stephens"). There is no dispute that Stephens is prior art to the '417 patent.

Toshiba relies on Dr. Rhyne's identification of disclosures in Stephens corresponding to the asserted claim limitations. RX-0382C at Q/A 65-132. Macronix disputes certain of Dr. Rhyne's opinions, relying on the testimony of Dr. Dickens. CX-5425C at Q/A 20-85.

a. "plurality of output buffer circuits coupled in parallel to provide a combined output drive strength"

Dr. Rhyne identifies three output buffer circuits disclosed in Stephens, which are labeled 34, 36, and 38 in Stephens's Figure 1:

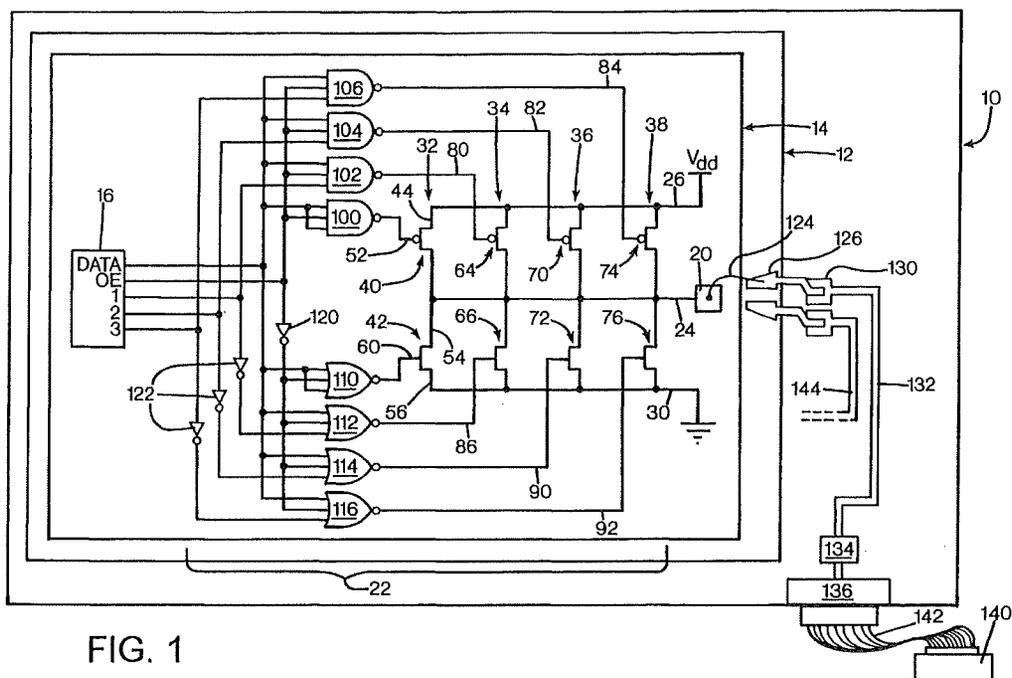


FIG. 1

RX-0182, Fig. 1. There is no dispute that these three output buffer circuits are coupled in parallel, and Dr. Rhyne identifies a combined output drive strength on output line 24. RX-0382C at Q/A 74-75.

Dr. Dickens criticizes Dr. Rhyne for excluding a fourth output buffer circuit in Stephens, which is labeled 32. CX-5425C (Dickens RWS) at Q/A 33-36. As described in Stephens, this output buffer circuit 32 is wired in such a way that “ensures that these gates will always be on, while the others may be selectively utilized based on the processor’s control bit output.” RX-0182, col. 3:35-40. Dr. Rhyne and Dr. Dickens agree that this output buffer circuit 32 cannot be one of the “plurality of output buffer circuits” claimed in the ’417 patent because it is always on and thus cannot be customized. RX-0382C (Rhyne DWS) at Q/A 76; CX-5425C (Dickens RWS) at Q/A 28-32. The presence of this additional output buffer circuit 32 does not affect the invalidity analysis for the first limitation of claim 11, but it does affect the second limitation, as discussed below.

PUBLIC VERSION

- b. **“wherein the data output signal is combined across the plurality of output buffer circuits to provide a combined data output signal having the combined output drive strength”**

As discussed above, Dr. Rhyne identifies the claimed “combined output drive strength” on output line 24 of Stephens. RX-0382C at Q/A 75. Dr. Dickens, however, points out that the output signal on output line 24 does not have the combined output drive strength of the three output buffer circuits identified by Dr. Rhyne; the drive strength on output line 24 is the sum of all four output buffer circuits in Stephens, including output buffer circuit 32. CX-5425C (Dickens RWS) at Q/A 34. Toshiba argues that the presence of output buffer circuit 32 is irrelevant because this limitation is met when the output strengths of the three output buffer circuits 34, 36, and 38, are combined, but all four output buffer circuits are connected to output line 24. *See* RX-0182, Fig. 1. There is no “data output signal” in Stephens having the combined output drive strength of only the three output buffer circuits 34, 36, and 38—the drive strength on output line 24 will always be the combination of all four output buffer circuits, including output buffer circuit 32. *See* CX-5425C (Dickens RWS) at Q/A 34. Accordingly, this limitation is not anticipated by the primary embodiment of Stephens depicted in Figure 1.

As an alternative, Dr. Rhyne identifies another embodiment described in Stephens: “In the preferred embodiment with FET 40 permanently wired to be on when enabled and data high, the possible aggregate sizes are 1x, 3x, 5x . . . 15x. Where finer increments are desired, the first transistor may be wired with a switchable control bit.” RX-0382C at Q/A 79 (citing RX-0182, col. 4:6-19). Dr. Rhyne explains that in this alternative embodiment, output buffer circuit 32 would receive its own customized buffer signal. *Id.* Toshiba thus contends that in this embodiment, all four output buffer circuits would receive customized buffer enable signals and their outputs would all be combined in a data output signal having a combined output drive

PUBLIC VERSION

strength meeting the limitations of claim 11. RIB at 145-47. Dr. Dickens finds the description of this alternative embodiment to be vague, and Macronix argues that Dr. Rhyne's conclusory opinions are insufficient to carry Toshiba's burden on anticipation. CIB at 150-52. In particular, Macronix argues that there is no explanation for how the "switchable control bit" would be wired, and there is no disclosure of a complementary signal for the corresponding transistor 42, which is discussed in the final limitation of claim 11 below. *Id.* These arguments address other limitations, which are discussed below, but there is no dispute that when output buffer circuit 32 is considered one of the plurality of output buffer circuits, the data output signal on output line 24 has the combined output drive strength of the four output buffer circuits, and this limitation is thus anticipated.

c. "the combined output drive strength is tuned by buffer enable signals customized across the plurality of output buffer circuits"

For the three output buffer circuits 34, 36, and 38, Dr. Rhyne identifies control lines 1, 2, and 3 providing customized buffer enable signals that enable or disable these circuits. RX-0382C at Q/A 100-101. Stephens states that these gates "may be selectively utilized based on the process's control bit output." RX-0182, col. 3:38-41. It further states that "[t]he selectable controls on the effective size of the pad drivers is used to optimize the driver strength for a specific application of the chip," and "the combination of transistors may be selected to provide adequate switching speed." *Id.*, col. 4:35-37, 54-55.

Macronix does not dispute Stephens's disclosure of this limitation with respect to the three output buffer circuits 34, 36, and 38 in the primary embodiment, but argues that the evidence for a customized buffer enable signal is unclear for output buffer circuit 32 in the alternative embodiment. CIB at 151. Dr. Dickens finds the disclosure in Stephens to be

PUBLIC VERSION

inadequate for showing “how this transistor would be ‘wired’ with this ‘switchable control bit.’” CX-5425C at Q/A 38. At the hearing, Dr. Dickens admitted, however, that he could understand from Stephens that the alternative embodiment refers to a signal from line 52 that would switch transistor 40. Tr. at 1212-15. The description of the alternative embodiment in Stephens is clear that the output buffer circuit 32 would be modified to be “wired with a switchable control bit” so that it would no longer be “permanently wired on.” RX-0182, col. 4:6-19. When considered in the context of the control signals for the other three output buffer circuits, this description is sufficiently clear for the alternative embodiment to anticipate the “customized across the plurality of output buffer circuits” limitation.

d. “wherein the buffer enable signals are received together with complements of the buffer enable signals”

As discussed above, Stephens discloses buffer enable signals 1, 2, and 3. Dr. Rhyne identifies inverters 122 that generate complements of these signals, which are input to NOR gates and then to the output buffer circuits 34, 36, and 38. RX-0382C at Q/A 109. There is no dispute that Stephens discloses these complements in the primary embodiment, but Macronix argues that Stephens’s disclosure falls short for the alternative embodiment. CIB at 151-52. There is no disclosure in Stephens describing a complement for the buffer enable signal corresponding to output buffer circuit 32 in the alternative embodiment, and Dr. Rhyne did not offer any expert testimony on this limitation with respect to the alternative embodiment. *See* Order No. 27 at 2 (Jan. 17, 2018) (excluding Dr. Rhyne’s testimony that was not previously disclosed in expert reports). Toshiba has thus failed to carry its burden to show anticipation of this element in Stephens’s alternative embodiment.

PUBLIC VERSION

- e. **“the buffer enable signals and the complements of the buffer enable signals control pairs of transistors having opposite conductivity types”**

Dr. Rhyne explains that the output buffer circuits 34, 36, and 38 are comprised of pairs of transistors having opposite conductivity types: circuit 34 includes p-FET 64 and n-FET 66, circuit 36 includes p-FET 70 and n-FET 72, and circuit 38 includes p-FET 74 and n-FET 76. RX-0382C at Q/A 109 (citing RX-0182, col. 2:65-4:5). As depicted in Figure 1 of Stephens, each of these pairs of transistors receives a buffer enable signal and its complement, with signal 1 corresponding to the transistors of circuit 34, signal 2 corresponding to the transistors of circuit 36, and signal 3 corresponding to the transistors of circuit 38. *Id.* Stephens explicitly describes how these signals control the transistors in the buffer enable circuits. *Id.*

Macronix does not dispute that these transistors are disclosed in Stephens but argues that the claim language requires that each buffer enable signal control multiple pairs of transistors. CIB at 152-53. To support this interpretation of the claims, Dr. Dickens points to Figure 2 of the '417 patent, and he says that in this embodiment, the OPON/OPONB buffer enable signals control more than one pair of transistors. CX-5425C at Q/A 61. Macronix identifies the two pairs of transistors as the components labeled 202, 204, 218, and 220. CIB at 152. There is no direct connection between the OPON/OPONB inputs and transistors 202 and 204 in Figure 2, however; OPON and OPONB are only connected to one pair of transistors: 218 and 220. *See* '417 patent, Fig. 2. Macronix does not explain how these signals purportedly control a second pair of transistors in Figure 2.²² Dr. Dickens's opinion on this “pairs” limitation is vague and conclusory, and notably, he did not explicitly identify multiple buffer enable signals or multiple

²² Macronix's brief also refers to Figure 4 of the '417 patent, but Dr. Dickens offers no testimony referencing Figure 4. CIB at 152; *see* CX-5425C (Dickens RWS) at Q/A 61, 67.

PUBLIC VERSION

pairs of transistors in his infringement analysis or his domestic industry analysis. *See, e.g.*, CX-3839C at Q/A 51, 139.

Macronix argues that the pluralized language “pairs” requires multiple pairs, but this language must be read in the context of the entire claim. Claim 11 describes “a plurality of buffer enable circuits,” and it then pluralizes the signals associated with each of these circuits, describing “buffer enable signals” and “complements of the buffer enable signals.” ’417 patent, col. 11:55-12:3. This plural language does not necessarily require that each buffer enable circuit receive multiple buffer enable signals and complements; it merely recognizes that the invention requires a plurality of buffer enable circuits, which means that there will be multiple buffer enable signals—one for each circuit. Similarly, the pluralization of “pairs of transistors” merely recognizes that if each buffer enable circuit contains a pair of transistors, then there will be multiple pairs of transistors. This was confirmed by Dr. Baker during his cross examination, where he recognized that multiple output buffer circuits would result in multiple pairs of transistors. Tr. at 883-85. Macronix has not identified anything in the ’417 patent to contradict this plain reading of the claim language. Accordingly, this limitation is anticipated by the disclosure of pairs of transistors in each output buffer circuit 34, 36, and 38 in Stephens’s primary embodiment.

As discussed above, however, Stephens does not disclose a complementary signal for output buffer circuit 32 and there is no explanation for how the transistors in this buffer circuit would be controlled. Accordingly, Toshiba has failed to carry its burden to show anticipation of this element in Stephens’s alternative embodiment.

PUBLIC VERSION

f. Dependent Claims

Because Stephens does not anticipate independent claim 11, it also does not anticipate dependent claims 12-16. This is the case for both the primary embodiment of Stephens and the alternative embodiment. As discussed above, the primary embodiment of Stephens does not anticipate claim 11 because it does not meet the limitation “wherein the data output signal is combined across the plurality of output buffer circuits to provide a combined data output signal having the combined output drive strength.” The alternative embodiment does not anticipate claim 11 because there is no disclosure in Stephens regarding the limitation “wherein the buffer enable signals are received together with complements of the buffer enable signals, and the buffer enable signals and the complements of the buffer enable signals control pairs of transistors having opposite conductivity types.”

3. Obviousness

Toshiba contends that the asserted claims of the '417 patent are rendered obvious by Stephens in view of U.S. Patent Application No. 11/410,680, filed on April 24, 2006 and published on October 25, 2007, naming inventor Dhruv Jain (RX-0180, “Jain”). RIB at 147-49.

As discussed above, the primary embodiment of Stephens discloses every limitation of claim 11 except for the limitation “wherein the data output signal is combined across the plurality of output buffer circuits to provide a combined data output signal having the combined output drive strength.” Toshiba argues that this limitation is disclosed in Jain, and Dr. Rhyne explains how one of ordinary skill in the art would combine Jain with Stephens to render the entire claim obvious. RX-0382C at Q/A 85-88, 91-93. Macronix argues that this combination would not render this limitation obvious, relying on the testimony of Dr. Dickens. CIB at 156-66; CRB at 78-80; CV-5425C (Dickens RWS) at Q/A 45-59.

PUBLIC VERSION

Jain discloses a driver circuit 30 for an output buffer 20 that contains drivers 60, 62, and 68 with associated AND gates 64, 66, and 70.

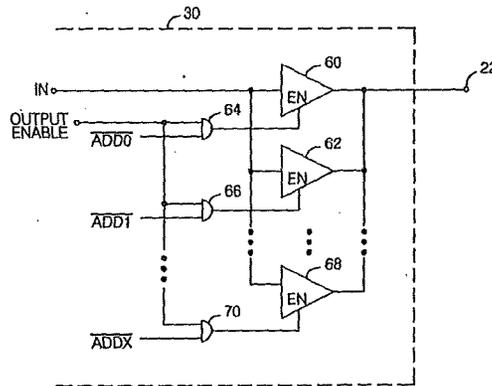


FIG.6

RX-0180, ¶ 38, Fig. 6. In Dr. Rhyne’s opinion, “each of drivers 60, 62, and 68 and its associated AND gates 64, 66, and 70, respectively, is an output buffer circuit, and that coupling the outputs of the output buffer circuits together in parallel, as shown in Figure 6, provides a combined output drive strength.” RX-0382C at Q/A 84. The control signals ADD0, ADD1, and ADDX enable and disable these circuits. *Id.* (citing RX-0180, ¶ 39). Dr. Rhyne suggests that Jain would teach one of ordinary skill in the art to use a customized buffer enable signal for Stephens’s output buffer circuit 32. *Id.* at Q/A 87.²³ He further observes that output buffers 34, 36, and 38 in Stephens already receive customized buffer enable signals and their complements, and he opines that one of ordinary skill in the art would recognize that “NAND gate 100 and NOR gate 110 are already provided in Figure 1 of Stephens, each including a spare input ready for use with an additional customized enable signal and its complement.” *Id.* Dr. Rhyne explains that one of ordinary skill in the art would have been motivated to modify Stephens in

²³ Dr. Rhyne also offers the opinion that Jain would teach one of ordinary skill in the art to remove output buffer circuit 32 from Stephens, but Toshiba appears to have abandoned this obviousness argument in its post-hearing brief. *See* CRB at 78 n.24; RX-0382C (Rhyne RWS) at Q/A 86.

PUBLIC VERSION

this way to increase the flexibility of the system and that it would have been as simple design choice. *Id.* at Q/A 88.

As discussed above in the context of anticipation, a modification of Stephens to provide a customized buffer enable signal for transistor 40 is explicitly disclosed in an alternative embodiment. *See* RX-0182, col. 4:6-19. What is missing from the alternative embodiment, however, is any disclosure of a complementary signal for output buffer circuit 32. Dr. Rhyne identifies components in Stephens (NAND gate 100 and NOR gate 110) that could be modified to supply a buffer enable signal and its complement to output buffer circuit 32, but Toshiba fails to point to any teaching in Stephens or Jain that would support this modification. Jain does not disclose the use of complementary signals, and Stephens explicitly describes a “switchable control bit” for its “first transistor” (p-FET 40), without suggesting any modification of the other transistor (n-FET 42) in output buffer circuit 32. *See* RX-0182, col. 4:6-19. Although it is not necessary to identify an explicit teaching or suggestion in the prior art, the Federal Circuit has cautioned against making findings of obviousness without at least “a reasoned explanation” that goes beyond “conclusory statements and unspecific expert testimony.” *Arendi S.A.R.L. v. Apple Inc.*, 832 F.3d 1355, 1366 (Fed. Cir. 2016) (*citing Perfect Web Technologies, Inc. v. InfoUSA, Inc.*, 587 F.3d 1324, 1329 (Fed. Cir. 2009); *see also KSR Int’l Co. v. Teleflex*, 550 U.S. at 418 (“[I]t can be important to identify a reason that would have prompted a person of ordinary skill in the art to combine the elements as the new invention does.”)). Dr. Rhyne explains how the complementary buffer enable signal for output buffer circuit 32 could be modified in Stephens, but he does not explain why such a modification would be useful or beneficial.

Accordingly, Toshiba has not shown that any asserted claim of the ’417 patent is rendered obvious by Stephens in view of Jain.

PUBLIC VERSION

VI. DOMESTIC INDUSTRY – ECONOMIC PRONG

In patent-based 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). Subsection (3) of Section 337(a) provides:

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, 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.

19 U.S.C. § 1337(a)(3).

Macronix claims to satisfy the domestic industry requirement of section 337 in two distinct ways: (1) based on investments related to a semiconductor [REDACTED]; and (2) based on investments in “customer facing” engineering at its California subsidiary, MXA. CIB at 166-94.

A. Industry in the Process of Being Established

1. Background

With respect to the [REDACTED], Macronix claims a domestic industry “in the process of being established” at the time the complaint was filed.²⁴ The [REDACTED] was developed in connection with a joint venture [REDACTED]. CX-0435C.

²⁴ Macronix previously asserted a domestic industry that “exists” in the [REDACTED], but this contention was precluded pursuant to Order No. 26 (Jan. 8, 2018).

PUBLIC VERSION

The project refers to [REDACTED]
Macronix maintains that (1) tangible steps towards establishment of a domestic industry are “shown here by ample investments from [REDACTED] to [REDACTED] research, development, and manufacture,” and (2) there is a significant likelihood of the domestic industry requirement being satisfied in the future based on “manufacture of the [REDACTED] [REDACTED].” CIB at 171.

With respect to investments in [REDACTED] research, development, and manufacture, Macronix points to [REDACTED] in plant and equipment expenditures, including procurement of materials, material processing, and facilities from 2015-2017. *Id.* at 169, Table 3. Macronix alleges a total of [REDACTED] in expenditures for labor and capital investments by Macronix and its joint venture partner [REDACTED] during the same time period. *Id.* at 168, Table 2. Macronix also asserts that the sum of these amounts, [REDACTED], qualifies as research, development, and engineering. *Id.* at 166, Table 1.²⁶

25

[REDACTED]
[REDACTED] According to Macronix’s Project
Manager Hsiang-Lan Lung,
[REDACTED]

[REDACTED] has taken a license to practice each of the patents asserted in this investigation. *Id.* at Q/A 9; CX-2176C.

²⁶ Macronix alleges that the nexus requirement of subsection (C) can be presumed because “the research investment is in an article embodying the asserted claims.” RIB at 184-86.

PUBLIC VERSION

Work on [REDACTED] began [REDACTED]. Tr. at 633:18-20 (Bakewell).²⁷ According to Macronix and its economic expert, [REDACTED] [REDACTED] *Id.* at 647:25-648:5 (Bakewell). [REDACTED] [REDACTED] *Id.* at 648:3. In the following weeks, “[REDACTED],” according to Macronix. *Id.* at 648:20-22.

Macronix does not dispute that the [REDACTED] is not a commercial product. Macronix’s theory is that “mass production and commercialization are not requirements of the domestic industry requirement generally, of the economic prong specifically, or of proof regarding an industry ‘in the process of being established.’” CIB at 170-171. Macronix argues that as long as “the patented article” physically exists on or near the date the complaint is filed, there is a domestic industry in process. *See* Tr. at 651:9-652:11 (Bakewell). If mass production is required, and the “[REDACTED]” are not “mass production,” Macronix relies on a “[REDACTED].” *Id.* at 654:1-7.

2. Discussion

“For nascent industries that cannot yet show investments and activities sufficient to establish a domestic industry within the meaning of section 337(a)(3), the language of section 337(a)(2) permits such industries to make a showing that a domestic industry is “in the process

²⁷ [REDACTED]

[REDACTED]. According to W. Christopher Bakewell, Macronix’s economic expert, [REDACTED]

PUBLIC VERSION

of being established.” *Certain Video Game Sys. & Controllers*, Comm’n Op., Inv. No. 337-TA-743, 2011 WL 1523774 at *4 (Apr. 14, 2011). An industry is “‘in the process of being established’ if the patent owner ‘‘can demonstrate that he is taking the necessary tangible steps to establish such an industry in the United States,’’ S. Rep. 100-71 (1987) at 130, and there is a “‘significant likelihood that the industry requirement will be satisfied in the future.’ H. Rep. 100-40 (1987) at 157.” *Id.* “‘The owner of the intellectual property right must be actively engaged in steps leading to the exploitation of the intellectual property, including application engineering, design work, or other such activities.’” *Certain Stringed Instruments and Components Thereof, Inc.*, No. 337-TA-586, Comm’n Op. at 16 (May 16, 2008) (quoting S. Rep. 100-71 at 130).

The legislative history of section 337(a)(2) also indicates that the nascent domestic industry must be likely to exist “‘within a *reasonable* period of time.” H. Rep. 100-40, Pt.1 at 157-8 (emphasis added). The House Committee explained that “‘there may be situations where, under the [‘‘in the process of being established’’] definition an industry does not ‘exist’ but a party should be entitled to bring a 337 action. For example, if a *new product* is developed in the United States and is protected by a U.S. intellectual property right, the owner of the intellectual property right would not have to wait to bring an action under section 337 until he can satisfy the definition of industry if he can demonstrate that he is taking the necessary steps to establish such an industry in the United States.” H.R. Rep. 100-40, Pt. 1 at 157 (emphasis added).²⁸

²⁸ In *Certain Integrated Circuit Chips and Products Containing the Same*, Inv. No. 337-TA-859, Comm’n Op. at 47 n.22 (Aug. 22, 2014), the Commission stated *in obiter dictum* that “[i]f a complainant cannot demonstrate the existence of articles protected by the patent, the complainant must instead show a domestic industry “‘is in the process of being established.’” 19 U.S.C. § 1337(a)(2).” This was a footnote to text opining that the “‘prefatory language of section 337(a)(3)” requires a domestic industry “‘with respect to the articles protected by the patent.” *Id.*

PUBLIC VERSION

According to the clear and unambiguous language of the statute, a complainant must demonstrate that “an industry in the United States, relating to the articles protected by the patent . . . exists or is in the process of being established.” 19 U.S.C. § 1337(a)(2). The word “article” in section (a)(2) is the same word that is used repeatedly in the statute to refer to an article of commerce, *i.e.*, a product for sale in the marketplace. *See* 19 U.S.C. § 1337 (a)(1) (A), (B), (C), (E), (2), (3), (d)(1) (exclusion of articles from entry), (2) (exclusion of articles from entry), (e)(1) (exclusion of articles from entry), (f) (cease and desist from the production of like or directly competitive articles), (g)(2) (civil penalty for importation of articles), (h)(1) (forfeiture of any article) (3) (articles entitled to entry), (4)(A) (any article that is denied entry), (j)(3) (articles directed to be excluded from entry), and (l) (any article imported).²⁹ “The Supreme Court has consistently held that ‘identical words used in different parts of the same act are intended to have the same meaning.’” *ClearCorrect LLC v. Int’l Trade Comm’n*, 810 F.3d 1283, 1294 (Fed. Cir. 2015) (quoting *Sullivan v. Stroop*, 496 U.S. 478 (1990)). Under sections 337(a)(3) (A), (B), and (C), the Federal Circuit has construed the term “articles protected by the patent” to mean “products that are covered by the patent.” *InterDigital Commc’ns, LLC v. Int’l Trade Comm’n*,

at 47. The Commission’s statement cannot be read to eliminate the “articles” requirement for a domestic industry “in the process of being established,” however, because section 337(a)(2) contains virtually the same prefatory language requiring “an industry in the United States, relating to the articles protected by the patent . . .” 19 U.S.C. § 1337(a)(2). This *dictum* can be reconciled with the statutory language and the legislative history by recognizing that a complainant without an existing article of commerce could satisfy the domestic industry requirement with a prototype or other precursor that will be developed into a commercial product within a reasonable period of time. As discussed herein, the [REDACTED] is not such a prototype.

²⁹ Subsection (1)(D) deviates from this pattern by using the term “a semiconductor chip product” instead of the word “article.” 19 U.S.C. § 1337 (1)(D). Use of the word “product” in this context strengthens the argument that an article is an item that has been made and is ready to be sold.

PUBLIC VERSION

707 F.3d 1295, 1298 (Fed. Cir. 2013). “Articles” as used in section 337 are “goods” that are produced; articles are “products” that can be licensed. *Id.*; *see also ClearCorrect*, 810 F.3d at 1292 (“the word “article” as ordinarily used in tariff acts embraces commodities generally, whether manufactured wholly or in part or not at all. . . .”) (quoting *Articles*, Dictionary of Tariff Information (1924)).

Indeed, the whole purpose of section 337 is to prevent importation of articles of commerce that compete unfairly in the American marketplace and to stop such articles from being sold, if they are here. “As a trade statute, the purpose of Section 337 is to regulate international commerce. Section 337 necessarily focuses on commercial activity related to cross-border movement of goods.” *ClearCorrect*, 810 F.3d at 1289 (citing *Suprema, Inc. v. Int’l Trade Comm’n*, 796 F.3d 1338, 1345 (Fed. Cir. 2015)). As stated by the Federal Circuit, “Congress established section 337 to ‘curb[] unfair trade practices that involve the entry of goods into the U.S. market via importation. In sum, Section 337 is an enforcement statute enacted by Congress to stop at the border the entry of goods, *i.e.*, articles, that are involved in unfair trade practices.” *Id.* *See InterDigital*, 707 F.3d at 1295 (holding requirement to demonstrate exploitation of intellectual property “with respect to the articles protected by the patent” satisfied “because the patents in suit protect the technology that is . . . found in the products that [InterDigital] has licensed and that it is attempting to exclude”).

Consistent with the provisions and purpose of section 337, the word “articles” in section (a)(2) means products or other commodities that are sold in the marketplace. Section (a)(2) protects a complainant who has a product to be sold in the marketplace but does not yet have the resources to sell it. Such a complainant will be protected as long as there is tangible evidence that the product will be sold in the marketplace within a reasonable time. *Stringed Instruments*,

PUBLIC VERSION

supra. Section 337(a)(2), properly construed, thus provides protection in a fairly limited set of circumstances and does not, as Macronix suggests, create a loophole in the domestic industry requirement by permitting a company to establish a domestic industry based only on research expenditures, without relating those expenditures to an actual article of commerce.

Macronix argues that the latest result of its research, the [REDACTED], must be protected under section 337(a)(2) notwithstanding that its joint venture [REDACTED] has so far failed to produce “articles protected by the patent, copyright, trademark, mask work, or design concerned,” 19 U.S.C. 337(a)(2), and is unlikely to do so in the foreseeable future. *See infra*. Macronix’s arguments conflict with the principle of statutory construction that identical words used in the same statute must be accorded the same meaning. Section 337 (a)(2) cannot be read to protect research that is not embodied in an article of commerce.³⁰

Macronix’s cited authorities do not support its arguments. To begin with, none of the cases Macronix cites adjudicates a claim of a domestic industry in the process of being established under 337(a)(2). Further, *ClearCorrect*, on which Macronix erroneously relies, addresses the question of whether an article under section 337 is required to be a physical object as opposed to a digital signal. Nothing in *ClearCorrect* supports the argument that an article for purposes of section 337(a)(2) need not be an article of commerce. On the contrary, as discussed herein, *ClearCorrect* and the authorities it discusses strongly suggests the opposite. *Certain Optoelectronic Devices for Fiber Optic Commc’ns*, Inv. No. 337-TA-860, Comm’n Op. at 29-30 (May 9, 2014) finds a domestic industry where “the Complainants’ claimed research and

³⁰ On the facts in the record, the [REDACTED] cannot be considered a prototype of an article of commerce. *See infra*. It is at most a precursor of what may someday be a prototype or an actual article.

PUBLIC VERSION

development expenditures were appropriately limited to those investments related to Avago's VCSEL driver *products* that exploit the '456 patent") (emphasis added). The Commission in *Optoelectronic Devices* does no more than recognize the distinction between subsections (A) and (B) of section 337(a)(3), which pertain to "the production of articles protected by a patent," and subsection (C), which pertains to "non-production related expenditures" on domestic industry products. *Id.* at 13-14, 20 ("The record shows that Avago's domestic R&D investments are connected to aspects of the domestic industry products that practice the claimed elements of the asserted patents, including the "'595 patent.>"). *Certain Marine Sonar Imaging Devices, Including Downscan and Sidescan Devices, Prods. Containing the Same, and Components Thereof*, Inv. No. 337-TA-921, Comm'n Op. at 54, 64 (Jan. 6, 2016), similarly holds that a domestic industry exists where research and development is related to commercial products. Macronix's citation to *Certain Wireless Comm'n Devices*, Inv. No. 337-TA-745, Comm'n Op., 2012 WL 4174869, at *53-*55 (Sept. 17, 2012), is similarly unavailing. In that case, the Commission approves inclusion of expenditures related to production of prototypes for two commercial products, the CliqXT and Droid 2.

In sum, section 337(a)(3) requires the existence of a domestic industry article under subsections (A), (B), or (C). "[J]ust as the "plant or equipment" referred to in subparagraph (A) must exist with respect to articles protected by the patent, such as by producing protected goods, the research and development or licensing activities referred to in subparagraph (C) must also exist with respect to articles protected by the patent, such as by licensing protected products." *InterDigital*, 707 F.3d at 1298 (Fed. Cir. 2013). *Accord*, *Microsoft Corp. v. Int'l Trade Comm'n*, 731 F.3d 1354, 1362 (Fed. Cir. 2013) (citing *InterDigital*, 707 F.3d at 1299). Congress used the same term—"article"—in section 337(a)(2) as in section 337(a)(3); accordingly, the same

PUBLIC VERSION

requirement set forth in *InterDigital* and *Microsoft* applies to a complainant seeking to demonstrate an industry in the process of being established.

The evidence shows that the [REDACTED] is not a product that is ready for the marketplace and is not likely ever to be sold as a commercial product. [REDACTED] represents an [REDACTED] in the [REDACTED] research project, which has been in process since [REDACTED] and is [REDACTED] before it results in a product for sale, if it ever does.

It is undisputed that the [REDACTED] project between [REDACTED] has produced [REDACTED]. There is no evidence in the record that any of these [REDACTED] has been sold. The evidence shows, on the contrary, that these [REDACTED] were used to conduct further research.

“ [REDACTED]
[REDACTED]
[REDACTED],” Macronix’s Dr. Lung testifies. CX-3842C
(Lung WS) at Q/A 4. “ [REDACTED]

[REDACTED]
[REDACTED].” Tr. at 621:13-19. CX-3842C (Lung WS) at Q/A 10 (“ [REDACTED]

[REDACTED]
[REDACTED]
[REDACTED].”) Dr. Lung testifies

specifically that the [REDACTED]
[REDACTED]

PUBLIC VERSION

[REDACTED]

[REDACTED] *Id.* He

expatiates on the use of “[REDACTED]

[REDACTED]

[REDACTED].” *Id.*

Dr. Lung’s testimony points to the conclusion that [REDACTED] is another of these

[REDACTED] rather than a product ready to be placed into the stream of commerce.

Dr. Lung’s testimony makes it clear that the [REDACTED], like its predecessors, is not a commercially viable article.

As described by Dr. Lung, the [REDACTED]

[REDACTED]

[REDACTED]. *Id.*

at Q/A 11. Dr. Lung describes the [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] *Id.* (emphasis

added). There is no suggestion in Dr. Lung’s testimony that the [REDACTED] itself is a

commercial product or ever will be. Rather, [REDACTED], like the other [REDACTED]

[REDACTED], represents another [REDACTED] on the way to an

ultimate goal. *See id.* (“[REDACTED]

[REDACTED].”).

PUBLIC VERSION

It also is clear from Dr. Lung's testimony that the [REDACTED], *id.* at Q/A 15,

[REDACTED]

[REDACTED]. According to Dr.

Lung, [REDACTED]

[REDACTED] *Id.* at Q/A 19. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] according to Dr. Lung. [REDACTED] itself is not a commercial product; it is a

[REDACTED]. "Fabrication" is this instance, as described by Dr. Lung,

does not mean mass production for sale but limited manufacture for further research and

refinement. *Id.* He states, "[REDACTED]

[REDACTED]

[REDACTED]." *Id.*³¹

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

³¹ The opinion of Macronix's economic expert, Mr. Bakewell, is self-contradictory and inconsistent with the facts as set forth by [REDACTED]. Mr. Bakewell claims that [REDACTED]

[REDACTED] Tr. at 648:3-649:15,

[REDACTED] Tr. at 658:13-14.

PUBLIC VERSION

[REDACTED]

Even if the [REDACTED] were deemed to represent a tangible step toward establishment of a domestic industry, Macronix would fail the requirement to show that a domestic industry will be established within a reasonable time. [REDACTED]

[REDACTED]

[REDACTED] Toshiba's technical expert, Dr. Baker, also opines that Macronix will not commercialize [REDACTED] in the foreseeable future. RX-1245C (Baker RWS) at Q/A

PUBLIC VERSION

Q/A 3. Macronix asserts that technical activities by engineers count toward satisfaction of the domestic industry prong even if those activities are directed to sales and marketing.

Macronix's economic prong calculations depend on the allocations made by the president of MXA, Arthur Yang. CX-3841C (Yang WS); Tr. at 606:3-4 (Bakewell). The premise underlying Mr. Yang's allocations is that [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] CX-3841C (Yang WS) at Q/A 3. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Under Macronix's analysis, investments in "technical activities" [REDACTED]

[REDACTED] count as domestic industry expenditures under

subsections (A), (B), and (C). For the period from 2015 to mid-2017, such technical activities

result in a total investment, as alleged by Macronix, of [REDACTED] under (A), CX-3837C

(Bakewell WS) at Q/A 103; [REDACTED] under (B), *id.* at Q/A 68; and [REDACTED] under

subsection (C), *id.* at Q/A 110. CIB at 172, Tables 4, 5. The amounts asserted under subsection

(C) appear to consist of the sum of the amounts alleged under subsections (A) and (B).

PUBLIC VERSION

[REDACTED]

[REDACTED] Mr. Yang describes the job duties
of each type of employee [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Mr. Yang next describes the activities of employees [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Mr. Yang next describes the work of the individuals [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

To allocate MXA's domestic industry investment among these employees, [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

PUBLIC VERSION

2. Discussion

It is a cornerstone of domestic industry law under section 337 that sales and marketing activities alone are insufficient to satisfy the economic prong. *See, e.g., Certain Kinesiotherapy Devices and Components Thereof*, Inv. No. 337-TA-823, Comm'n Op. at 29 note 8 (June 17, 2013), *rev'd on other grounds sub nom., Lelo Inc. v. Int'l Trade Comm'n*, 786 F.3d 879 (Fed. Cir. 2015) ("These expenses primarily relate to sales and marketing and are not the sort of expenditures that the Commission has considered sufficiently related to the claims of the patent. The Commission and the Federal Circuit have generally treated these activities as no different from those of an importer.") (citing *Schaper Mfg. Co. v. U.S. Int'l Trade Comm'n*, 717 F.2d 1368, 1373 (Fed. Cir. 1983)); *see also Certain Male Prophylactic Devices*, Inv. No. 337-TA-546, Comm'n Op. at 39 (Aug. 1, 2007) ("The economic prong requirement exists to assure that domestic production-related activities, as opposed to those of a mere importer, are protected by the statute.") (citing *Certain Products with Gremlin Character Depictions*, Inv. No. 337-TA-201, USITC Pub. 1815 (Mar. 1986), Comm'n Op. at 6). The Commission also makes clear in *Kinesiotherapy* that sales and marketing expenditures are to be excluded under subsection (C), as under (A) and (B). *Kinesiotherapy*, Comm'n Op. at 29 n.8 (discussing unallowability of sales and marketing expenses "under prong C").

The legislative history is consistent with this precedent. Section 337(a)(2) and (a)(3) were added to section 337 in the Omnibus Trade and Competitiveness Act of 1988, 102 Stat. 1107, Pub. L. 100-418 (Aug. 23, 1988) (the "OTCA"). *Stringed Instruments*, Comm'n Op. at 14. The 1988 amendments allowed "licensing and other non-manufacturing activities, such as research and development, to qualify as a domestic industry. The legislative history of the

PUBLIC VERSION

OTCA indicates states that “[m]arketing and sales in the United States alone would not . . . be sufficient to meet this test.” *Id.* at 16 (quoting S. Rep. 100-71 at 129 (1987)).³⁶

Macronix concedes that the MXA employees whose activities are in question perform “customer facing technical work,” including sales and marketing activities. Macronix argues that the technical nature of these sales and marketing activities should qualify them as domestic industry expenditures, but this distinction is not supported by Commission precedent.³⁷ The

³⁶ The legislation that ultimately led to the 1988 amendment apparently originally included sales and marketing as elements of a domestic industry. *See InterDigital Commc'ns, LLC v. Int'l Trade Comm'n*, 707 F.3d 1295, 1301 (Fed. Cir. 2013) (quoting remarks of Representative Kastenmeier noting expansion of § 337 to include “research and development, licensing, sales, and marketing.”) (132 Cong. Rec. 7119 (1986).) Sales and marketing were not included in subsection (C) as it was ultimately enacted.

³⁷ I am unpersuaded that any of the decisions cited by Macronix overrules the authority discussed above. *See* CIB at 174 (“Under similar circumstances, the Commission and its Judges have repeatedly held that customer-facing technical work, though connected to supporting product demand, may contribute to a domestic industry proof.”). *Certain Table Saws Incorporating Active Injury Mitigation Tech*, Inv. No. 337-TA-965, ID, 2016 WL 2770229, at *11-12 (Mar. 22, 2016) is an order by an ALJ granting summary determination for the complainant under the domestic industry prong. The ALJ’s order includes, without discussion, engineering, technical service, sales and marketing, logistics, and administration as part of the complainant’s domestic industry. Review was not sought by any party and the Commission declined review without opinion. Comm’n Notice, 2016 WL 10689560 (Apr. 21, 2016). In *Certain Automated Media Library Devices*, Inv. No. 337-TA-746, Initial Determination, 2012 WL 3058165 (June 20, 2012), the ALJ found a domestic industry based on labor and capital investments “related to hardware and software engineering, technical support, sales and marketing, service and warranty, and other activities.” *Id.* at *77. Again, no reasoning accompanies the decision to include sales and marketing activities in the economic prong calculation. The Commission granted partial review, but not of the finding of a domestic industry at issue here. Comm’n Notice at *3, 2012 WL 13046715 (Aug. 20, 2012). *Certain HSP Modems*, Inv. No. 337-TA-439, Initial Determination, 2001 WL 357346, at *2-3 (Mar. 21, 2001) is an initial determination granting summary determination on the economic prong in response to a motion that was unopposed by any respondent. *Id.* at *1. The decision includes as domestic industry amounts for activities of the “technical marketing group.” *Id.* at *2. Again, the decision sets forth no rationale for ignoring the law that sales and marketing expenditures are not to be included under the economic prong. Further, in each of these decisions, the ancillary activities included as part of domestic industry accompanied actual domestic manufacturing, which does not exist and never has existed with respect to the domestic industry articles alleged in this case.

PUBLIC VERSION

Commission has not heretofore distinguished between technical sales and marketing and other types of sales and marketing, nor would it make sense to do so. If a company is importing products from abroad, it needs a sales force in the United States to sell the products. If the company's products are highly technical, the company needs a technically sophisticated cadre of marketers to sell them. When considered in the context of the marketplace or industry in question, the nature of the sales and marketing activities is no different than sales and marketing of products that are not technologically sophisticated. The Commission and Circuit precedent as well as the legislative history make it clear that the 1988 amendment did not change the law on the exclusion of sales and marketing from domestic industry calculations. I have been directed to no authority that purports to establish technical sales and marketing, *per se*, as a domestic industry.

Macronix has pointed to some evidence of service and engineering expenditures that may be separate from sales and marketing, but the allocation of these expenditures is unreliable. It is the complainant's burden to establish qualifying domestic industry expenditures. *Lelo Inc. v. Int'l Trade Comm'n*, 786 F.3d 879, 883 (Fed. Cir. 2015) ("A claimant asserting patent rights under § 337 must satisfy the "domestic industry" requirement set out in the statute . . .").

Accordingly, Macronix must support its allegations of domestic industry investment with reliable evidence of qualifying expenditures. Macronix's domestic industry presentation rests on the

allocations made by Mr. Yang [REDACTED]. But the supporting documentation presented by Macronix, [REDACTED]

[REDACTED], is unreliable. [REDACTED]

PUBLIC VERSION

[REDACTED]

[REDACTED]

Digging into the exhibits that Macronix cites in support of its [REDACTED]

[REDACTED] qualifying domestic industry activities, *see* CIB at 182 [REDACTED]

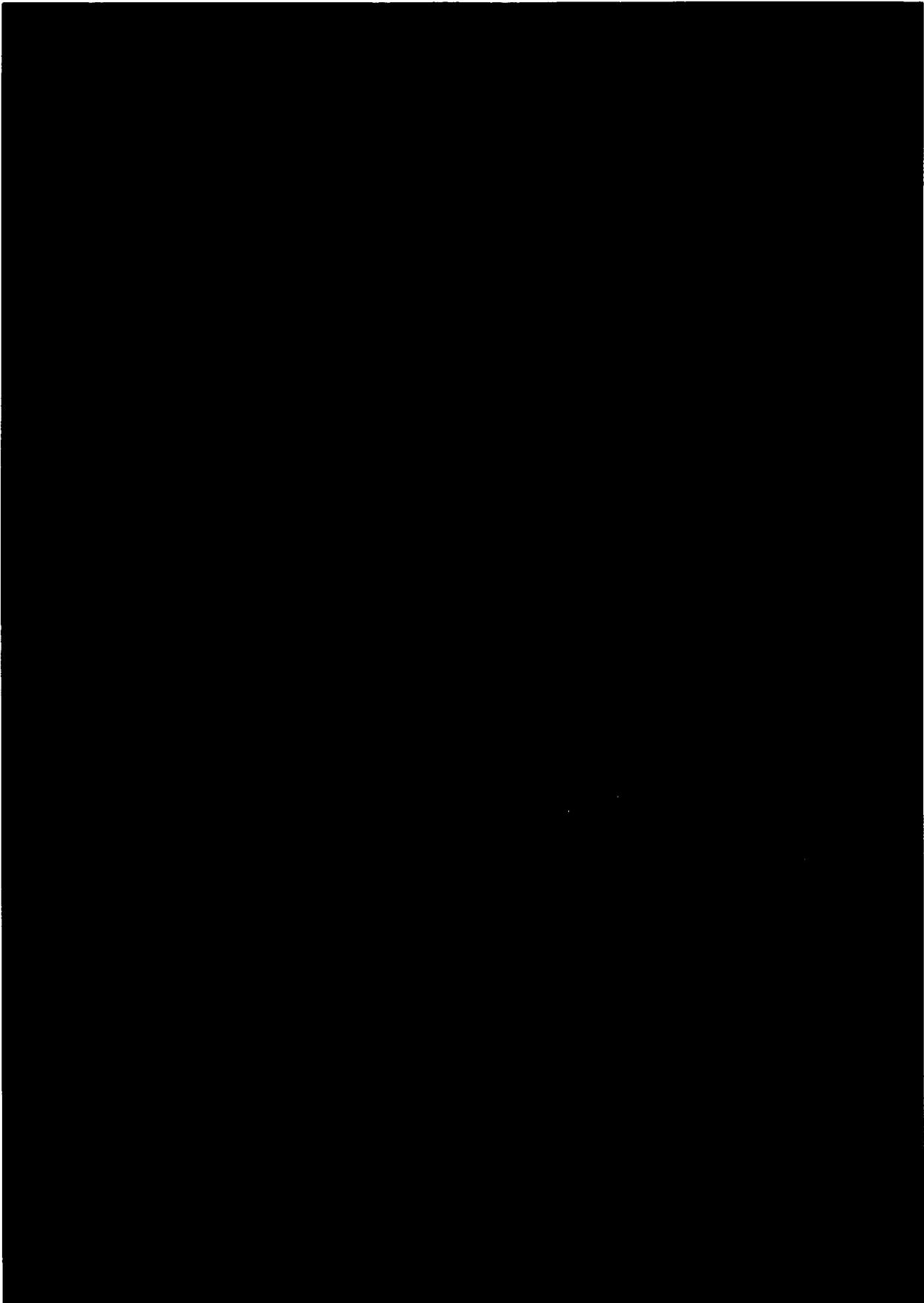
[REDACTED]

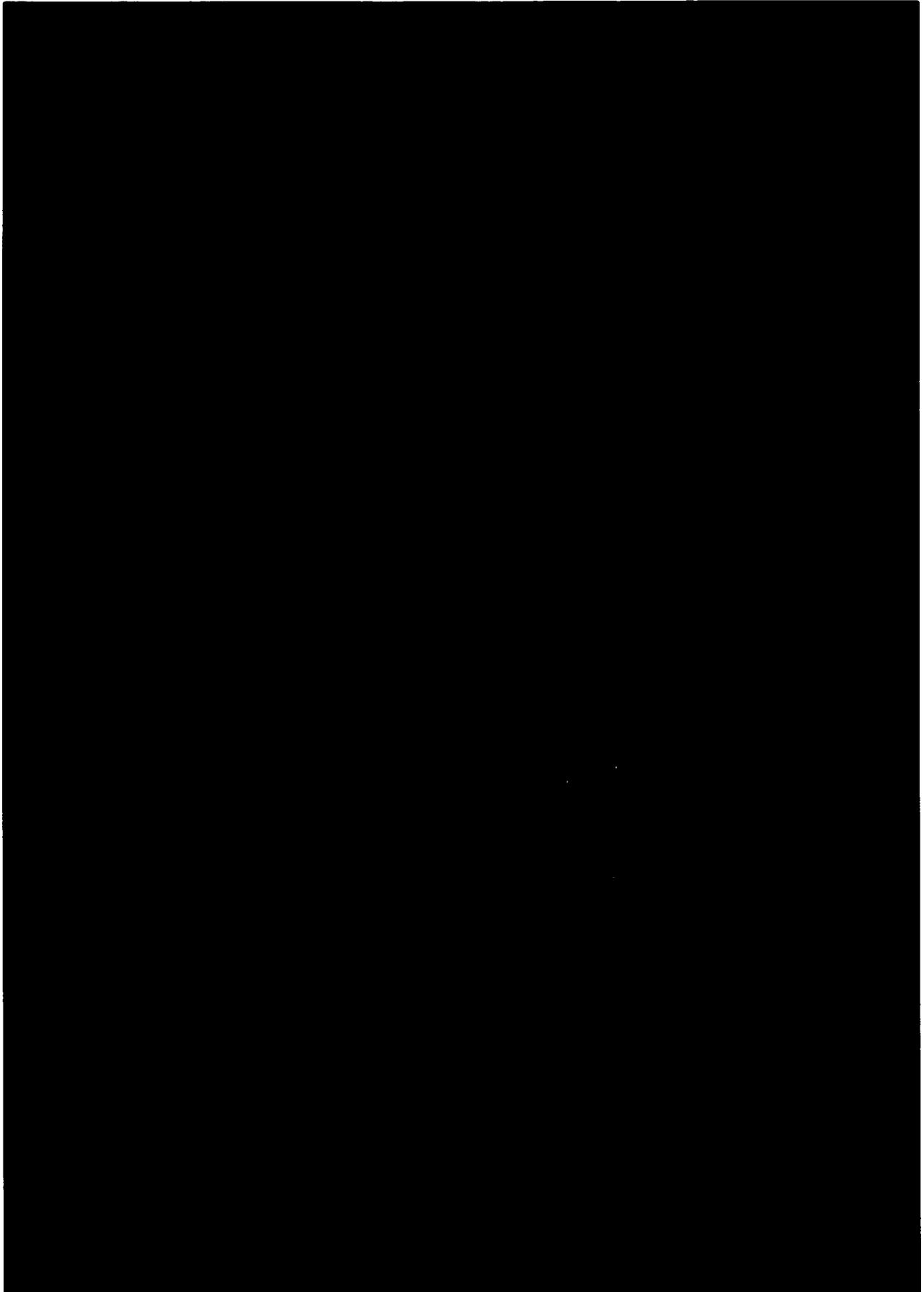
[REDACTED], confirms that they do not reliably support [REDACTED]. The excerpts reproduced below are in every case a sample from a larger file of reports, but the entries illustrated here are not atypical. The anomalies found (only a sampling of which are reproduced below) undermine the overall reliability of the exhibits and refute [REDACTED] contention that [REDACTED] should be allocated to qualifying engineering as opposed to sales and marketing.³⁸ For example:

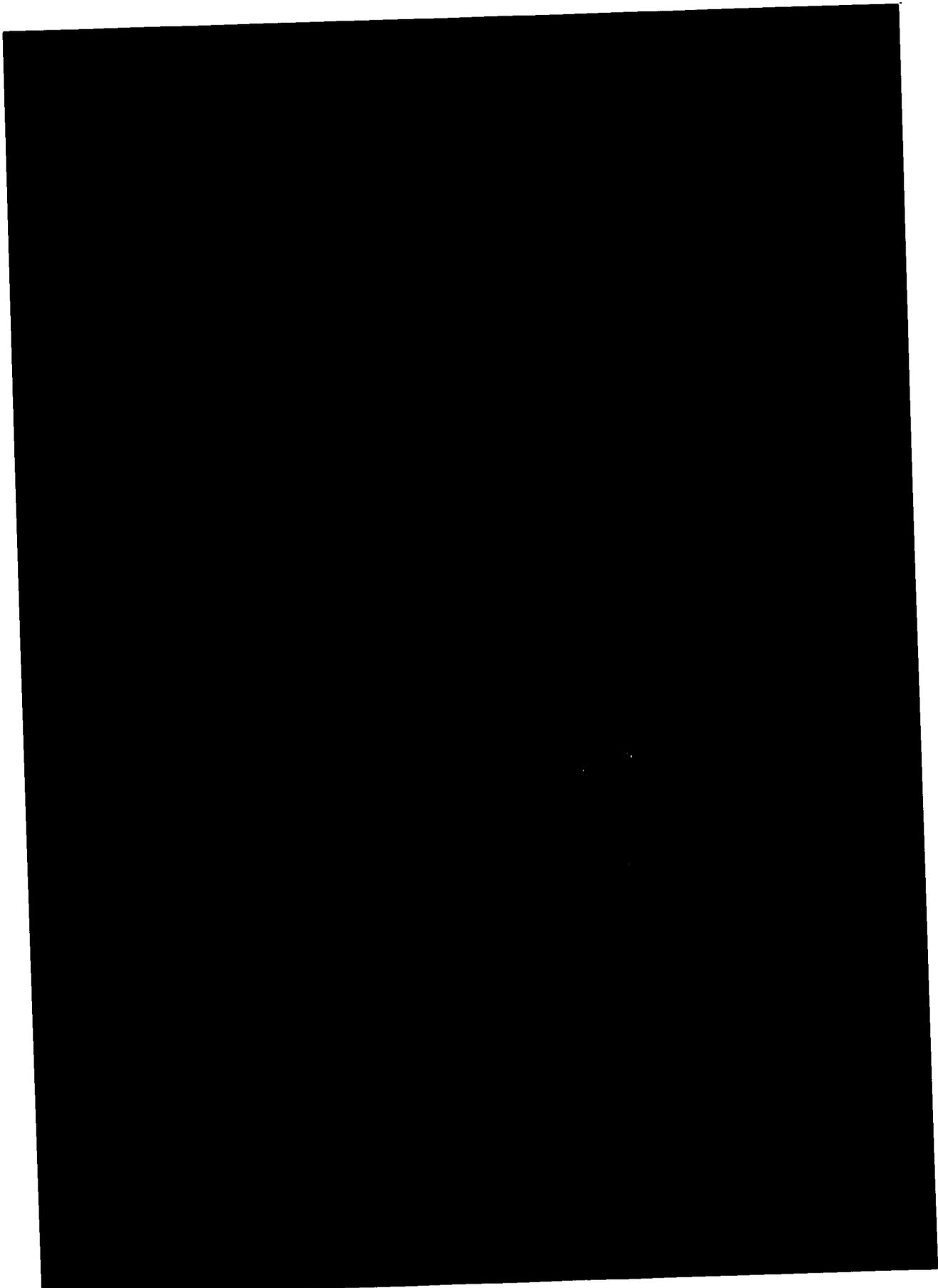
[REDACTED]

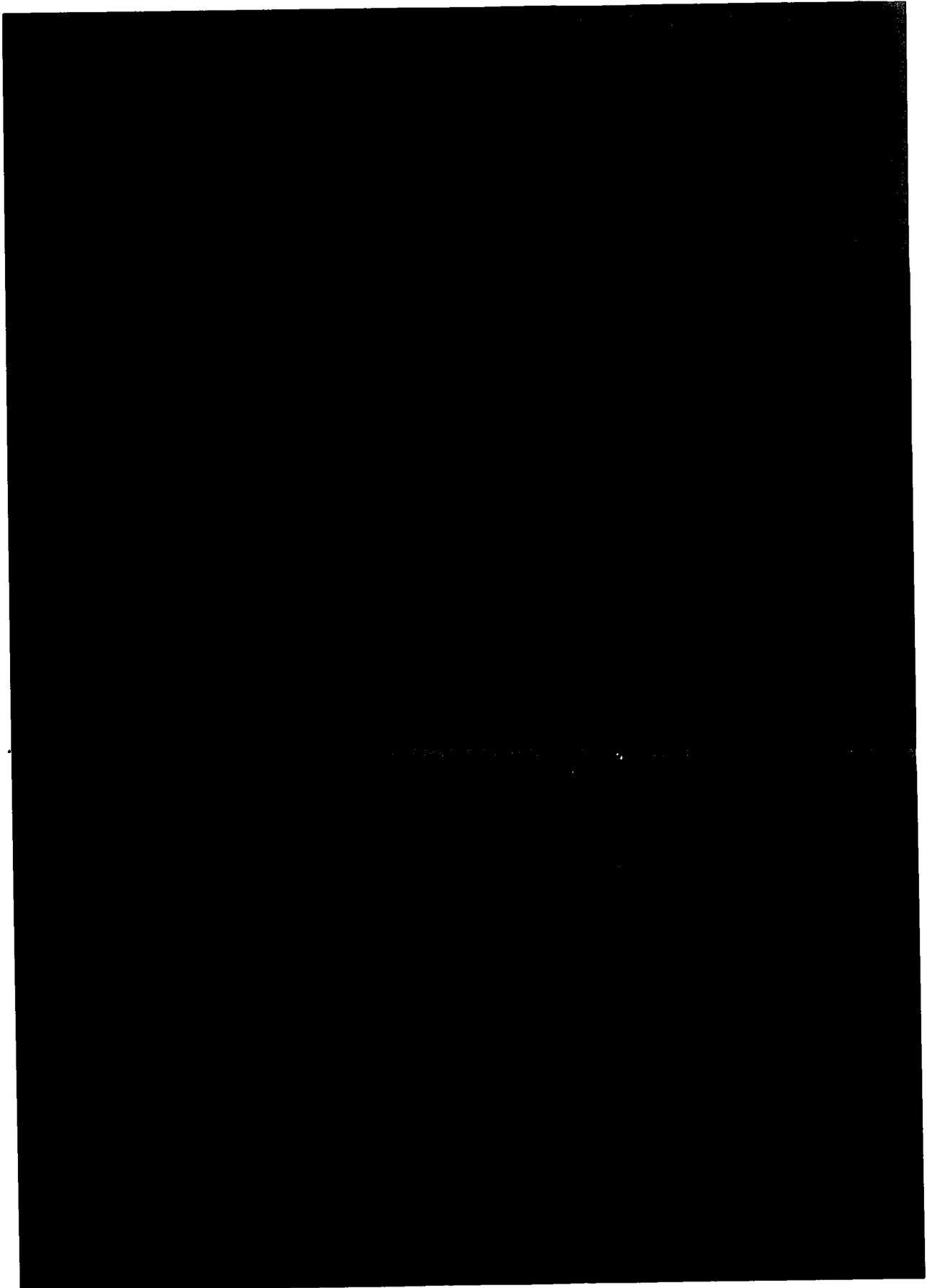
[REDACTED]

³⁸ I leave for another day the question of what “engineering” means in section 337(a)(3)(C). Industrial engineering is and always has been an aspect of manufacturing. Such engineering expenditures presumably should be counted under subsections (A) and (B). Engineering in the context of subsection (C) must therefore mean something else – given the context in which the word appears, it likely means engineering in aid of research and development of patented technology, rather than in aid of manufacturing.

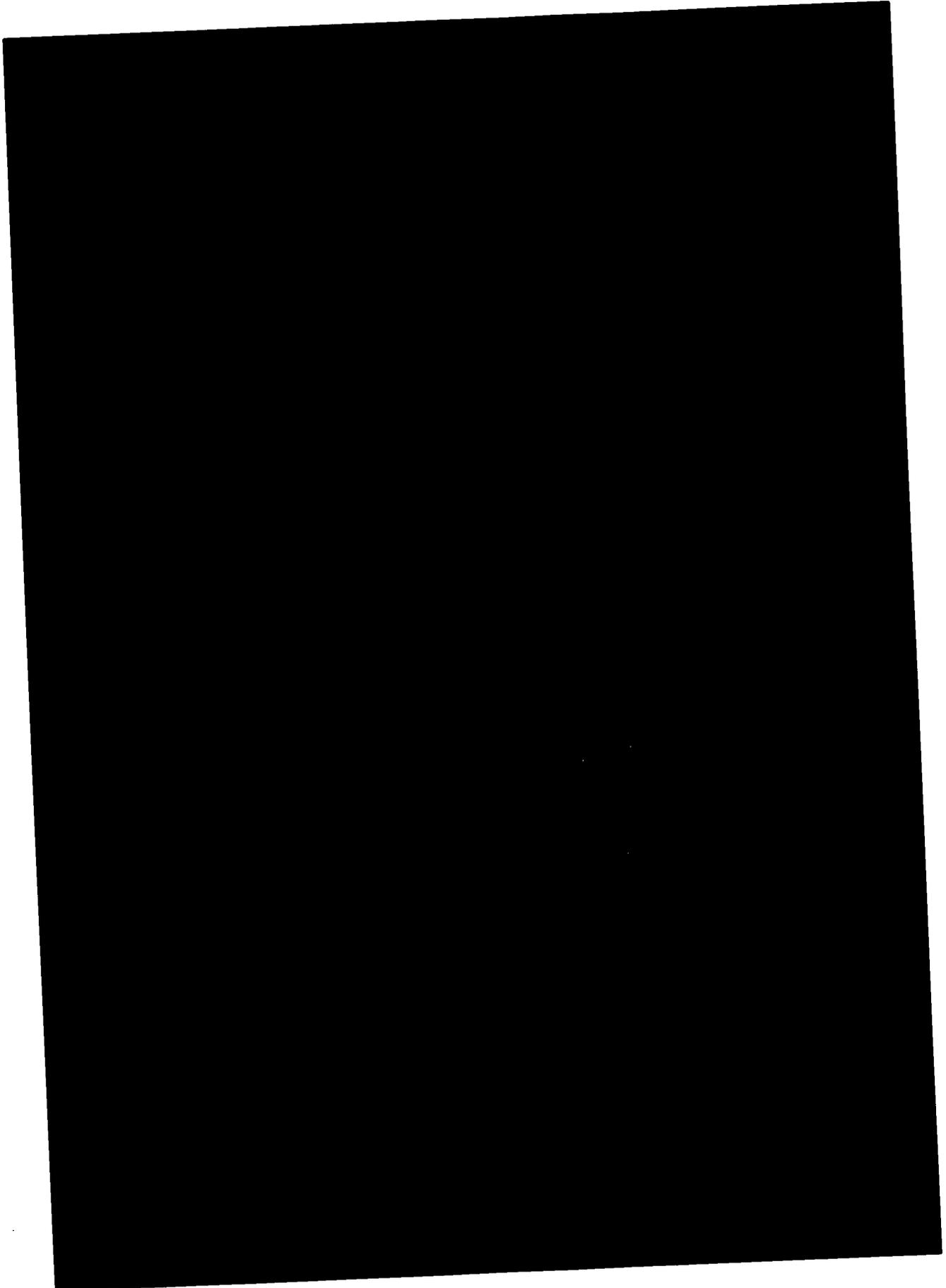


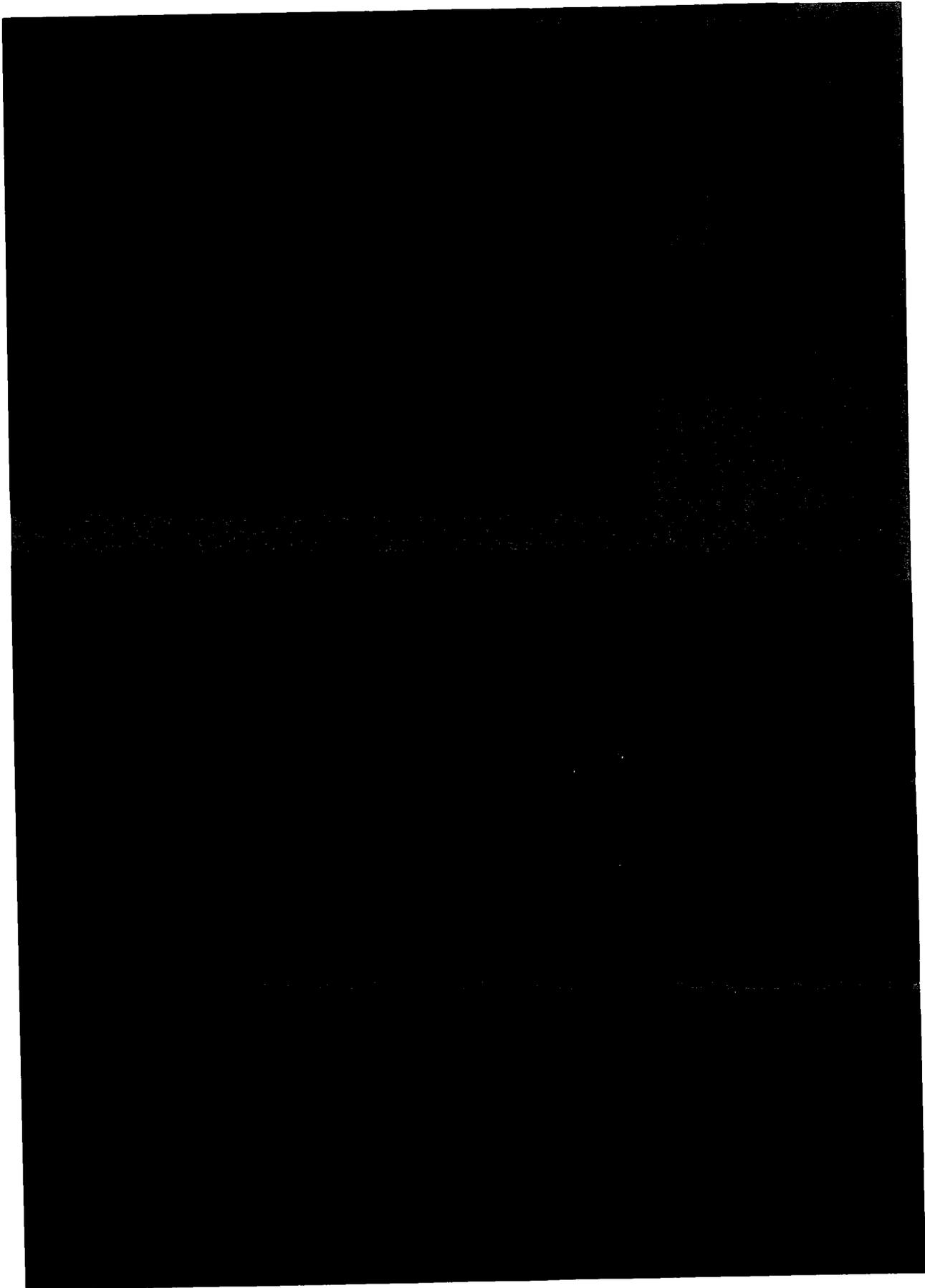


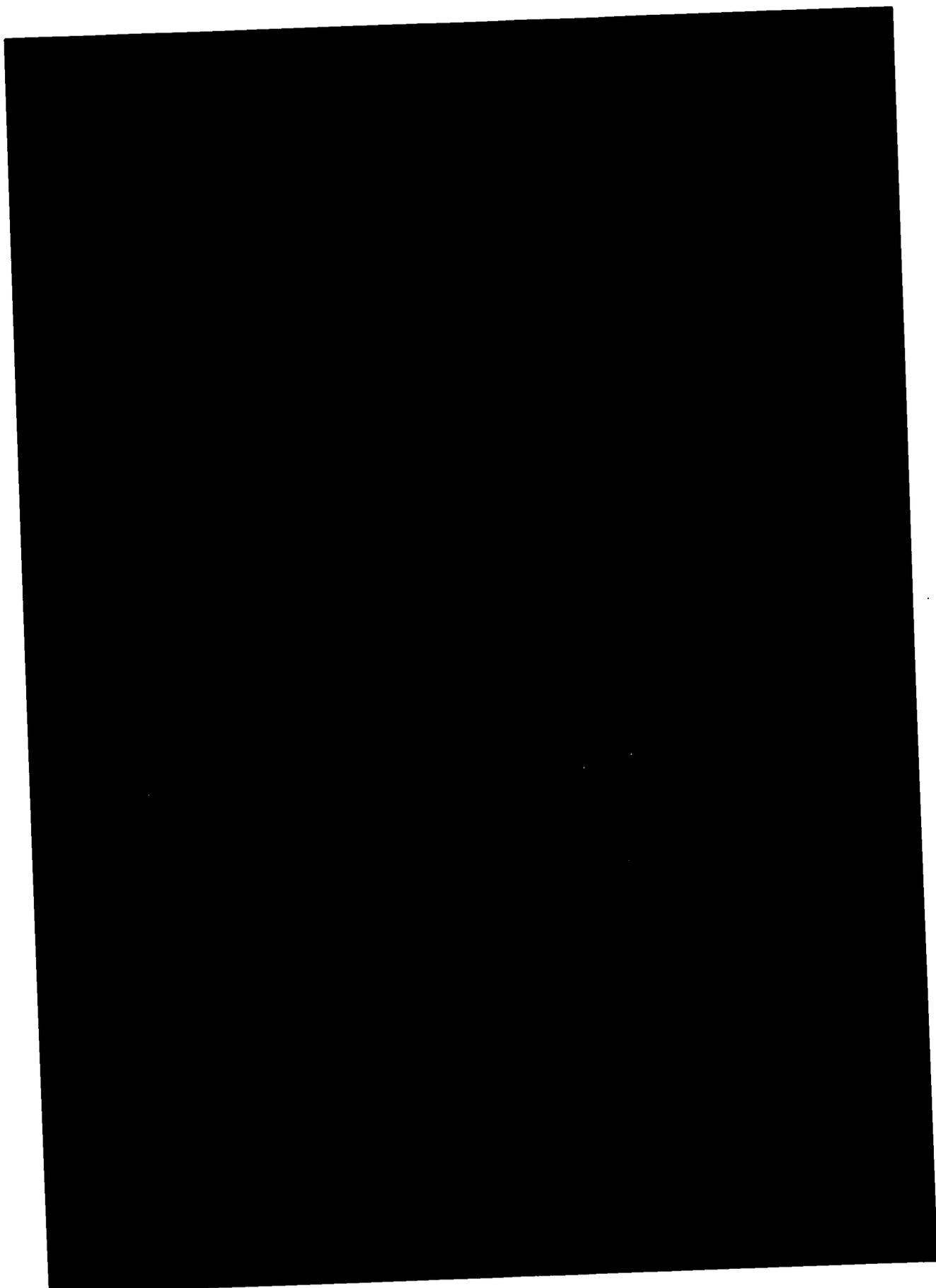


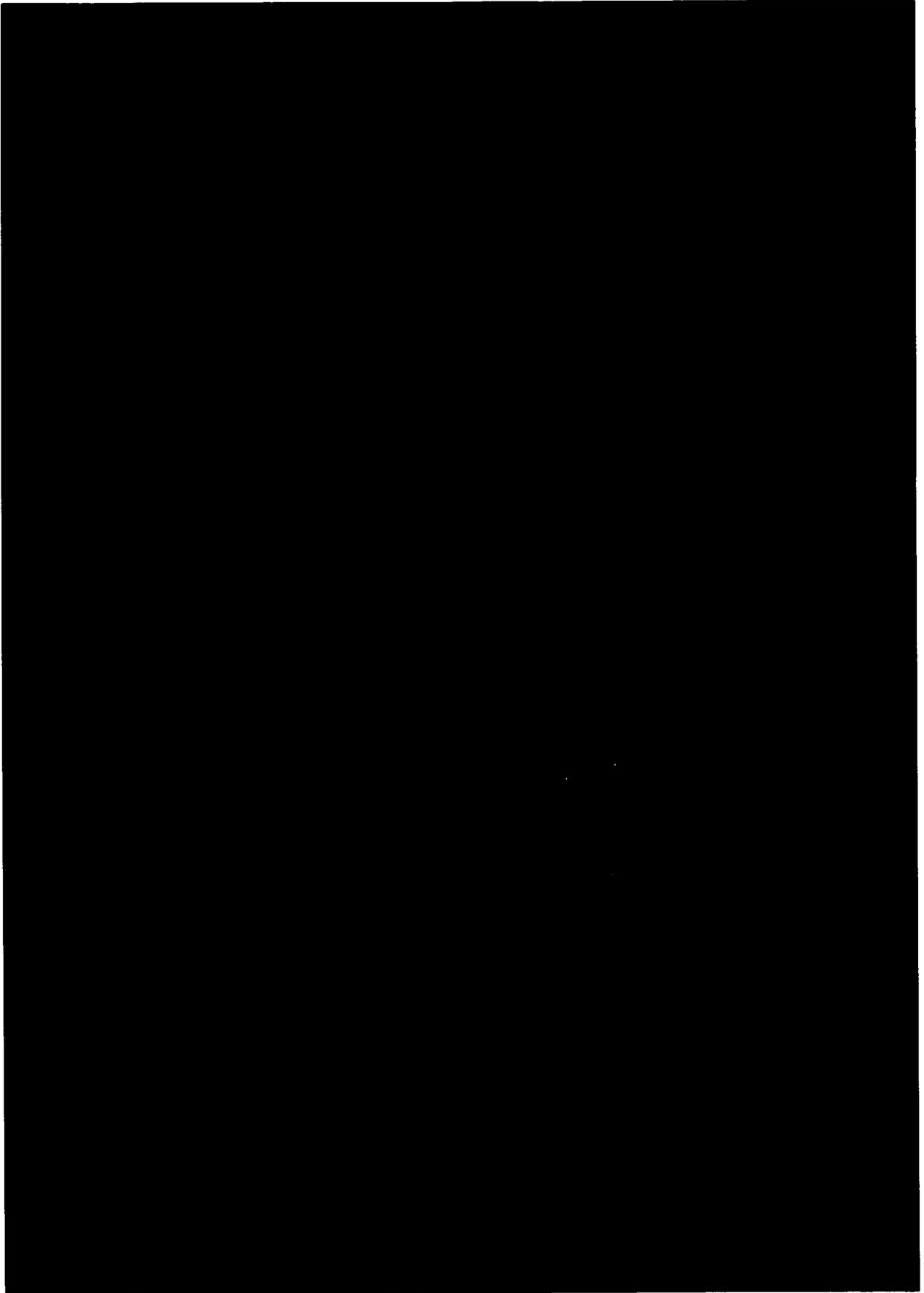


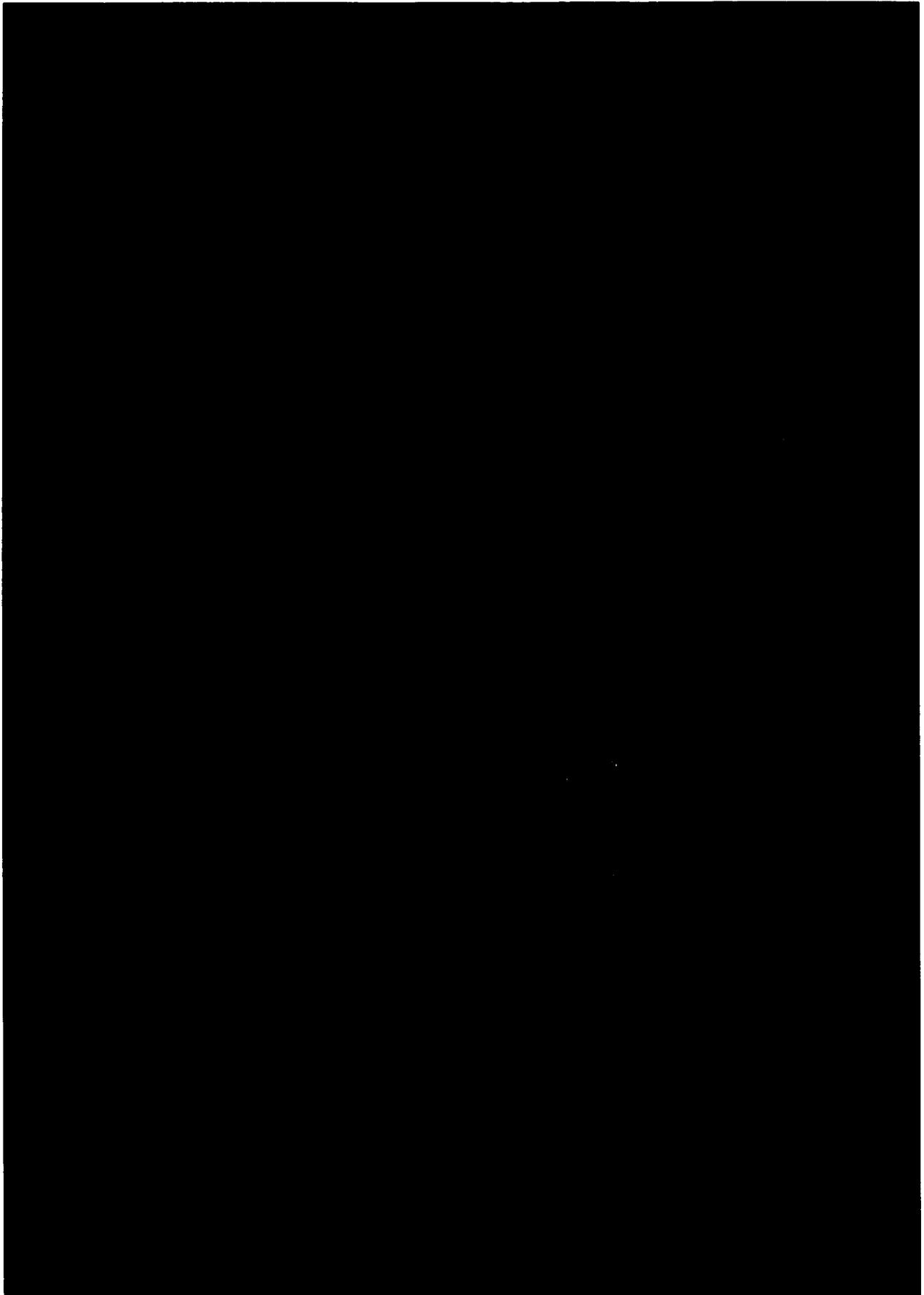
PUBLIC VERSION

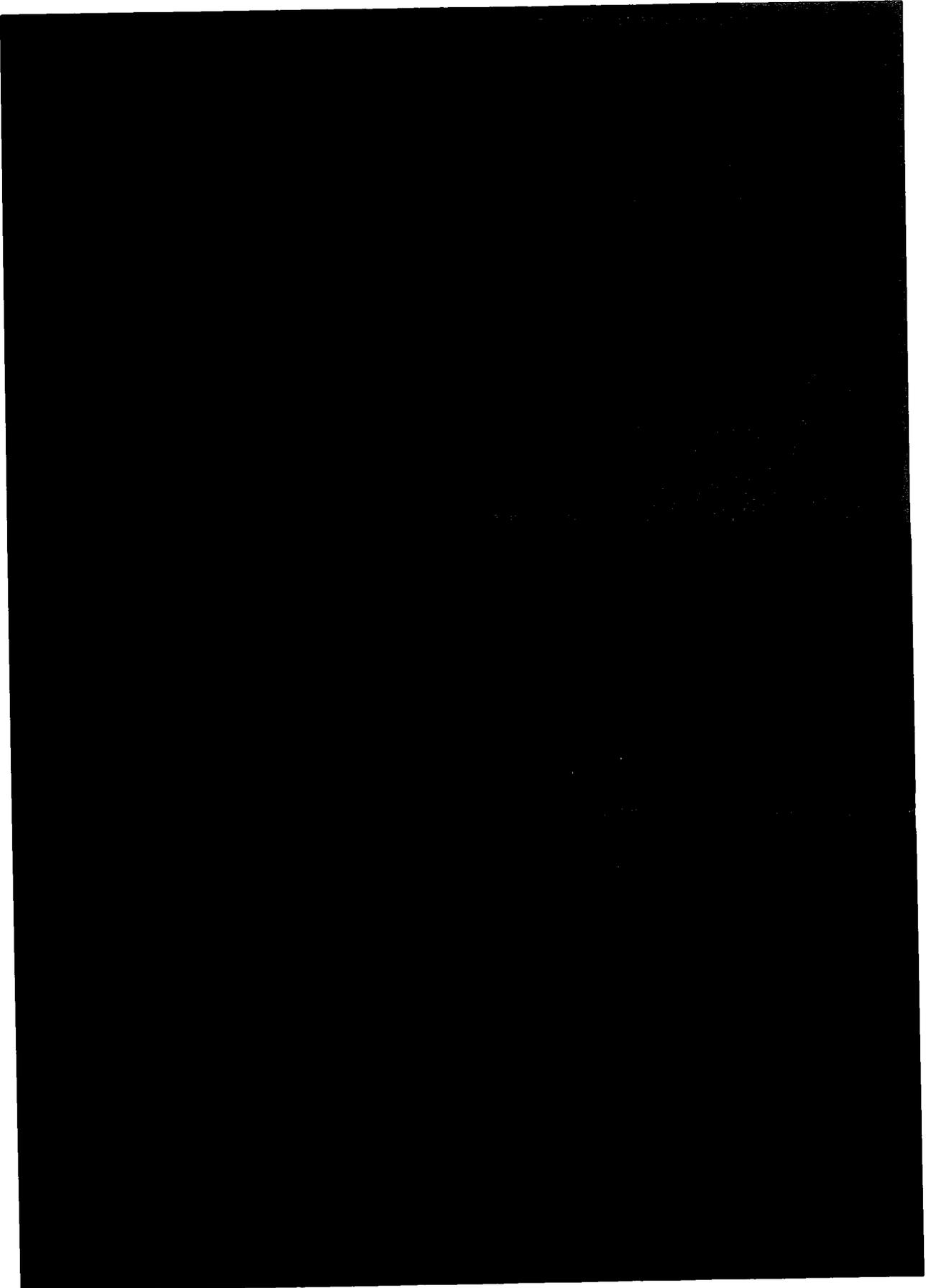


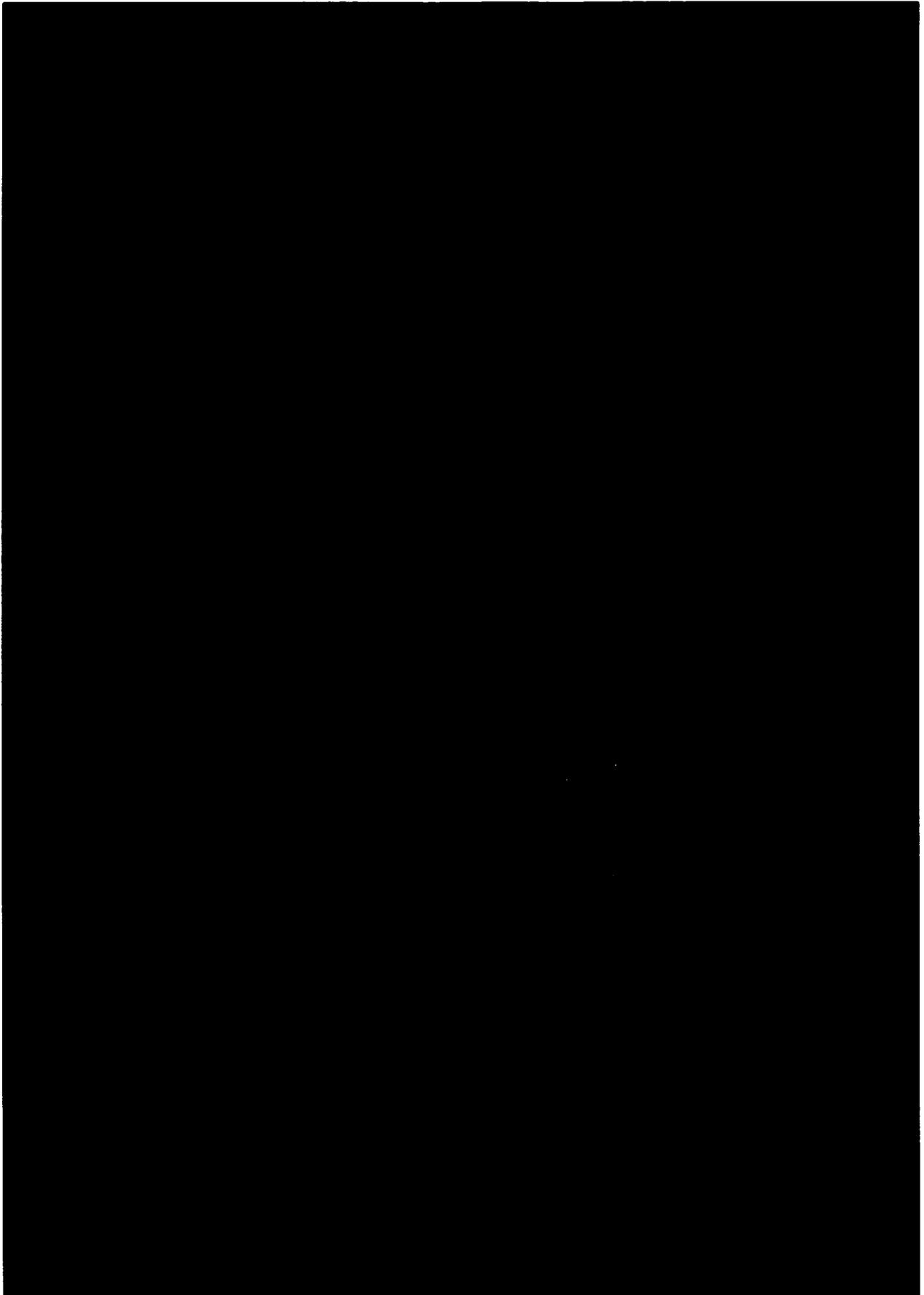


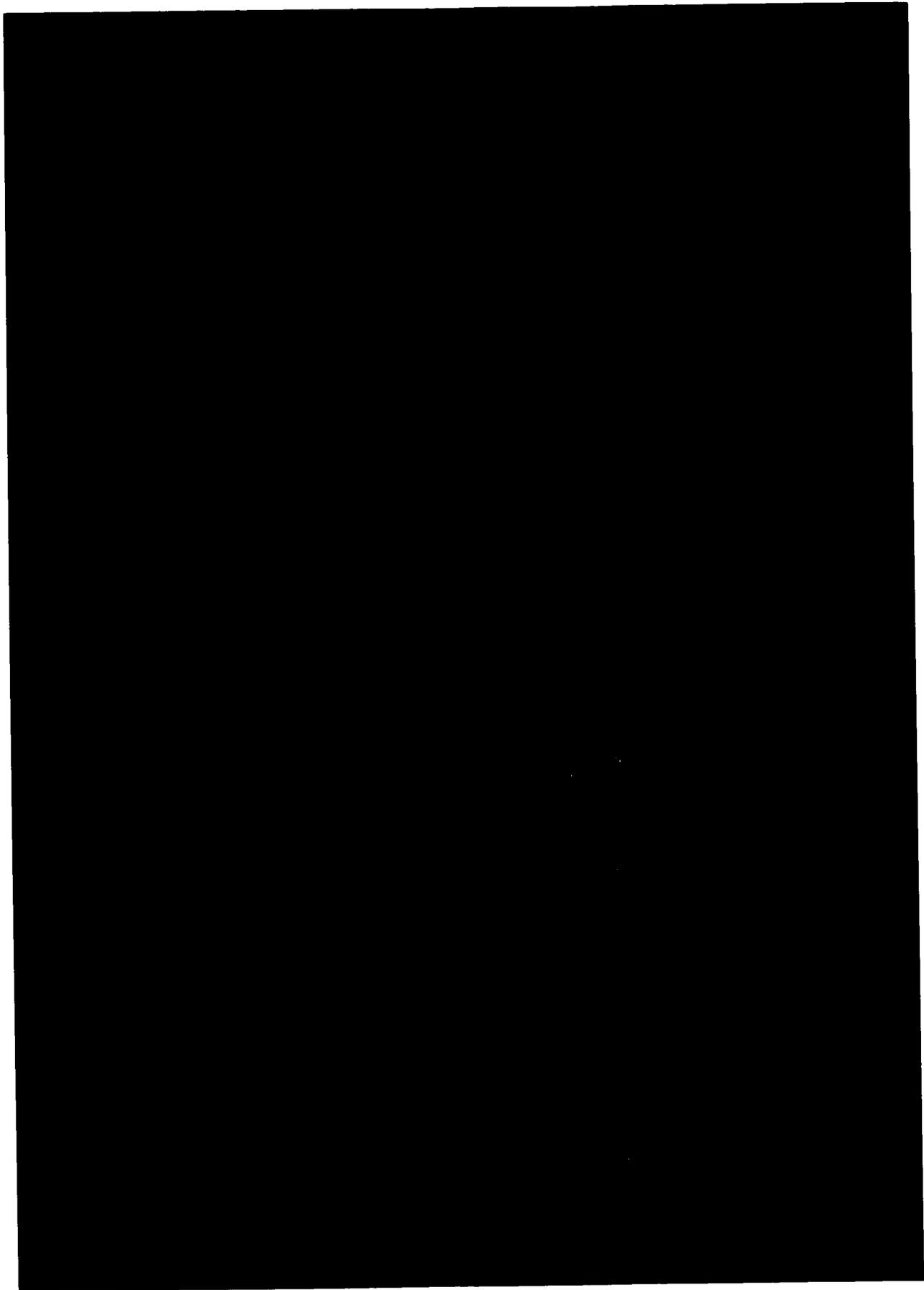


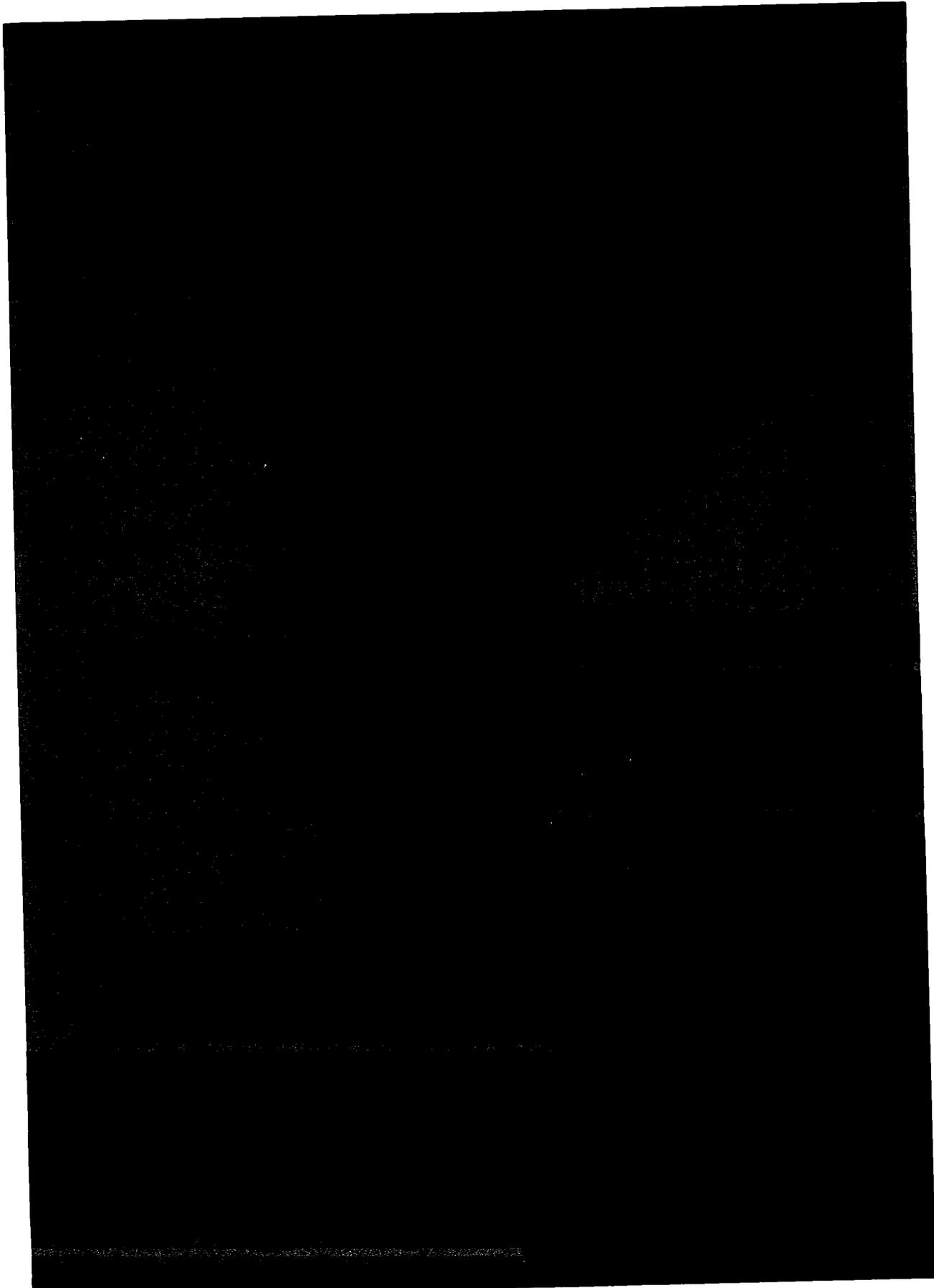


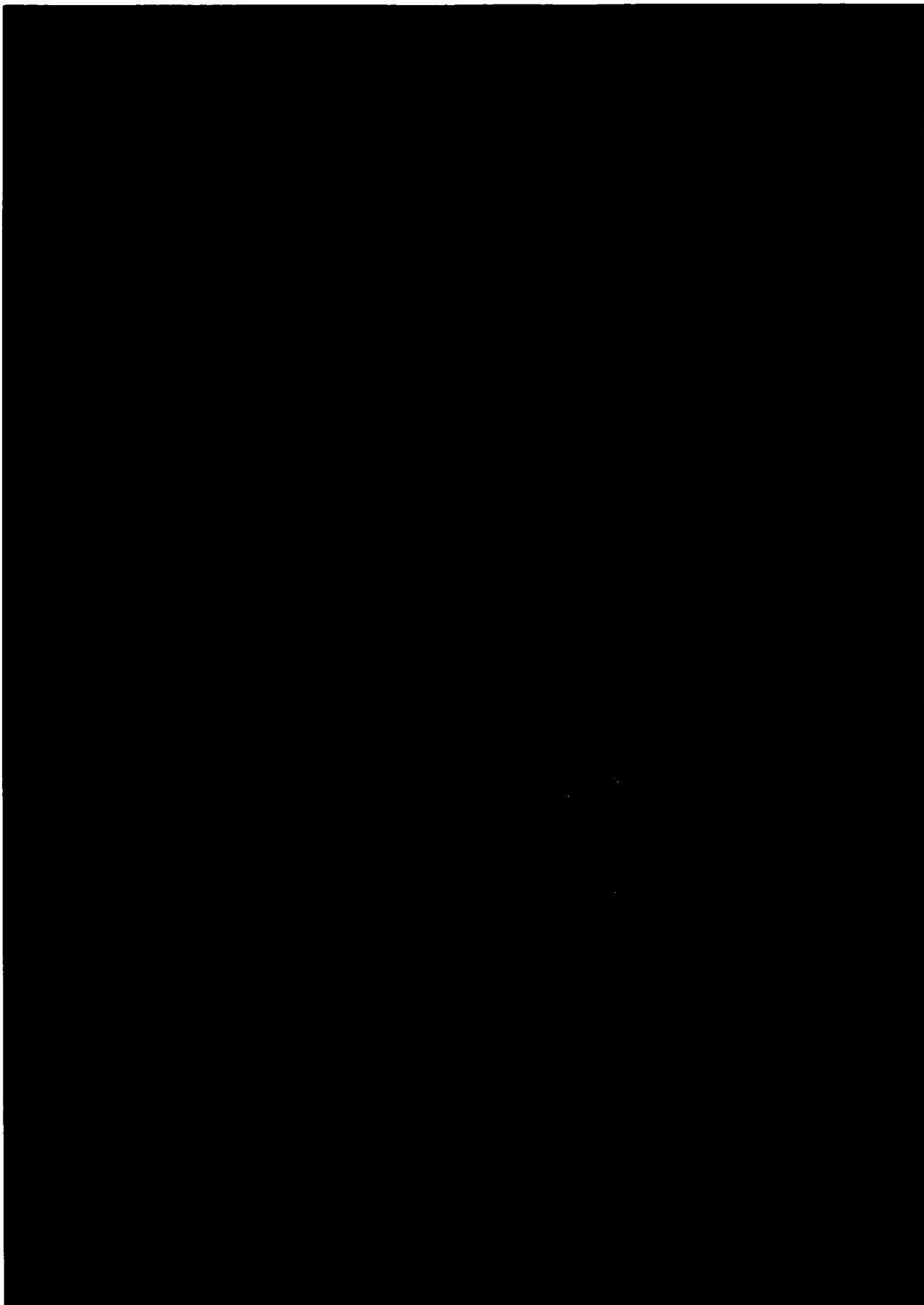


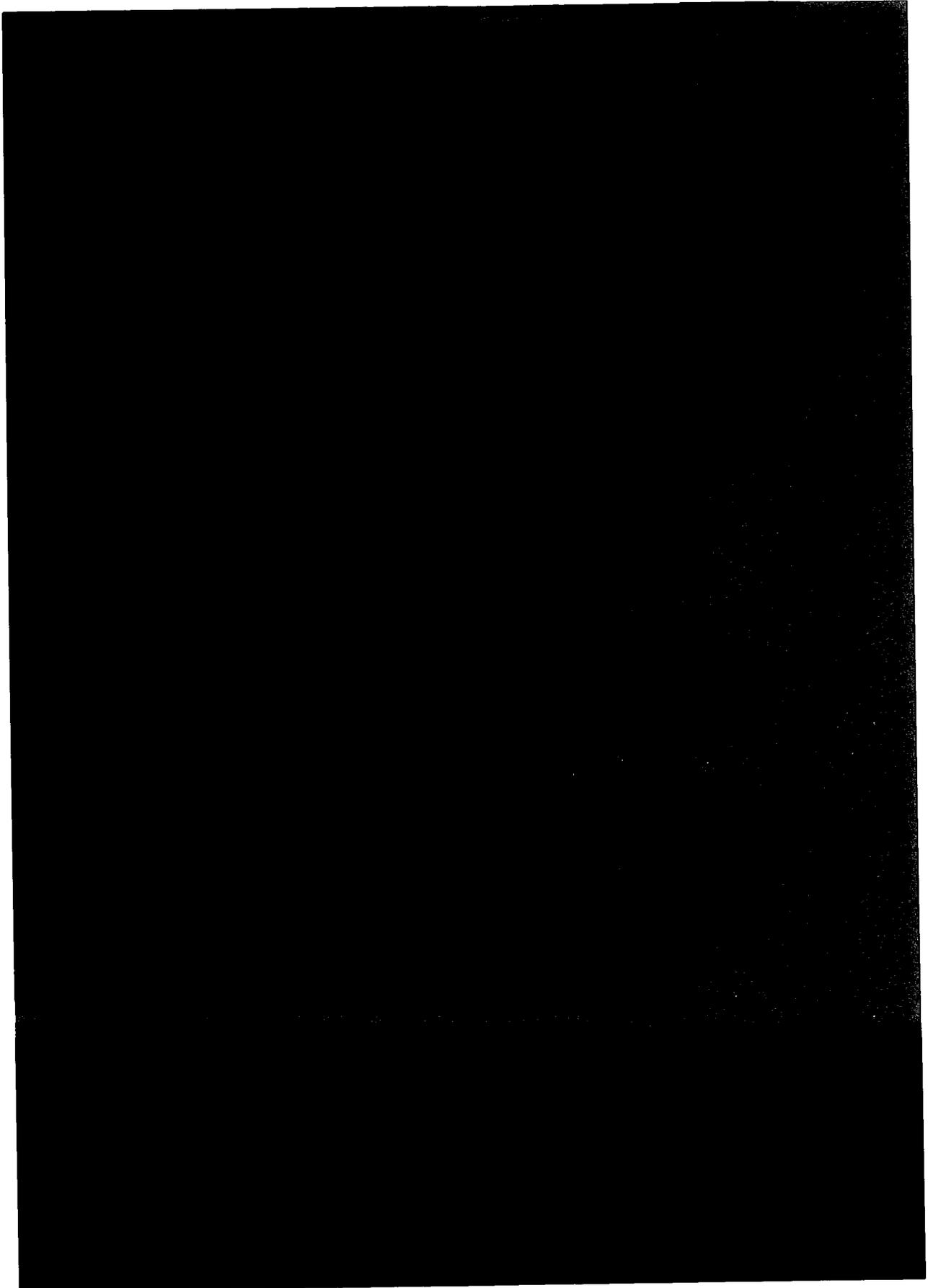


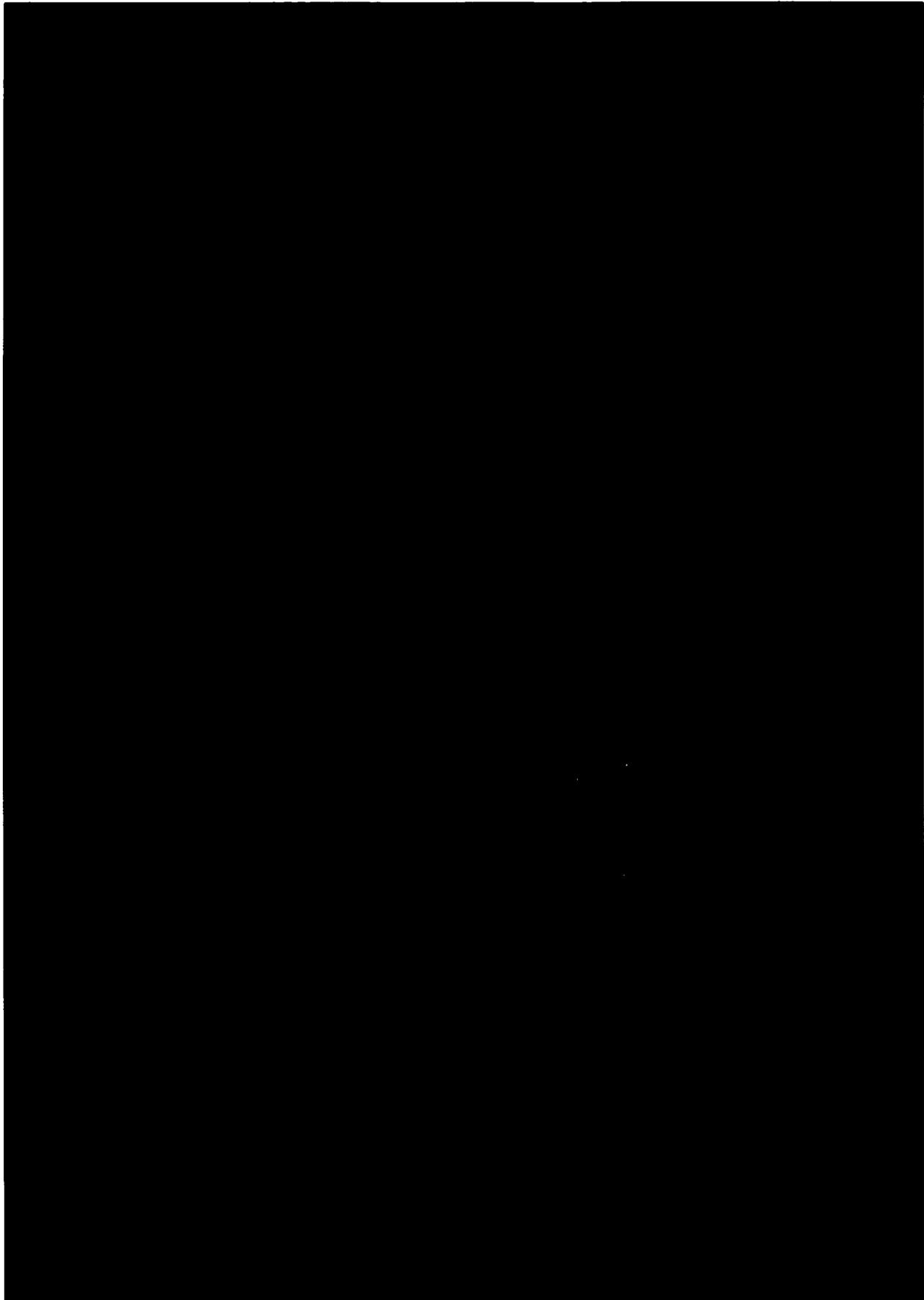


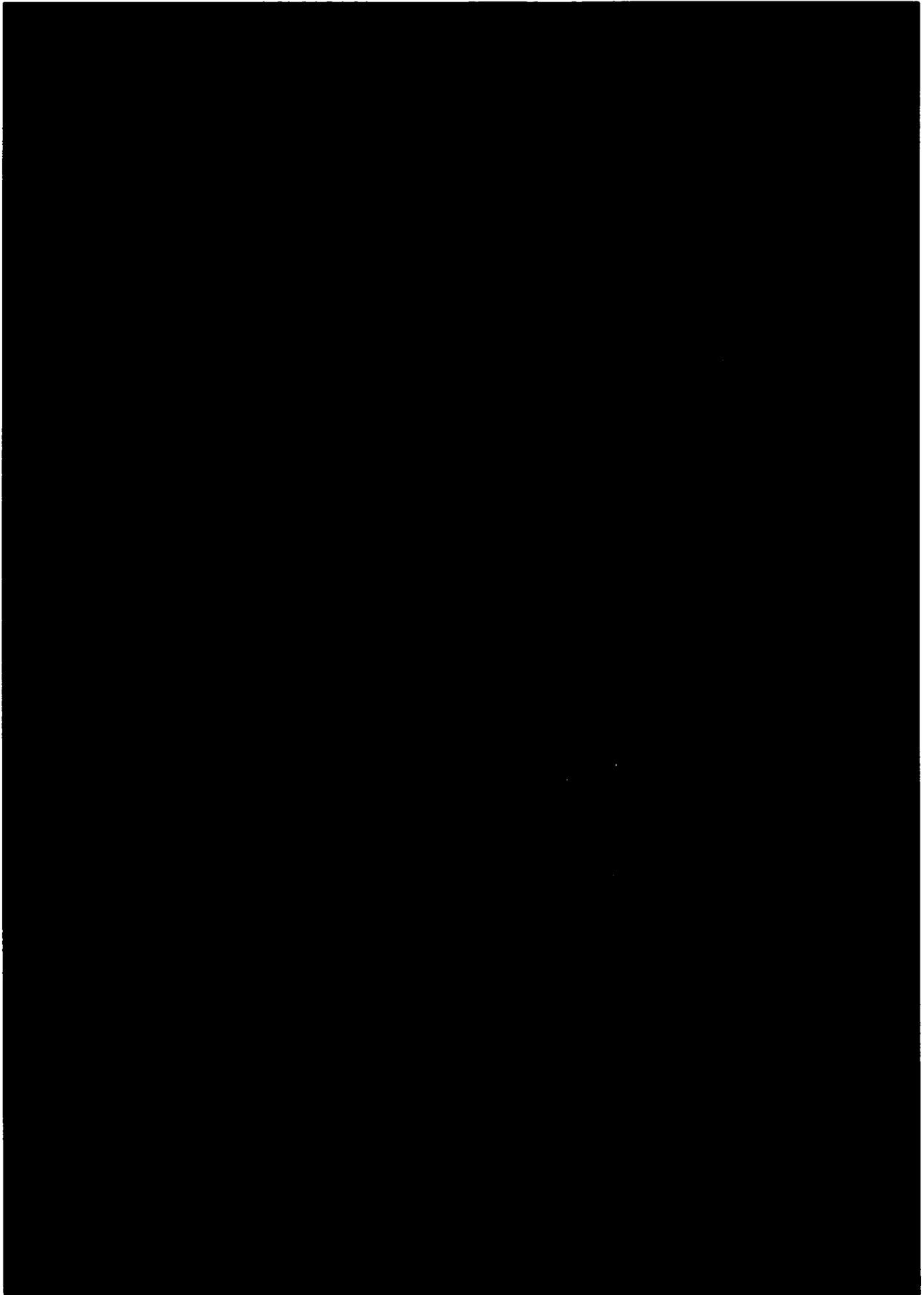


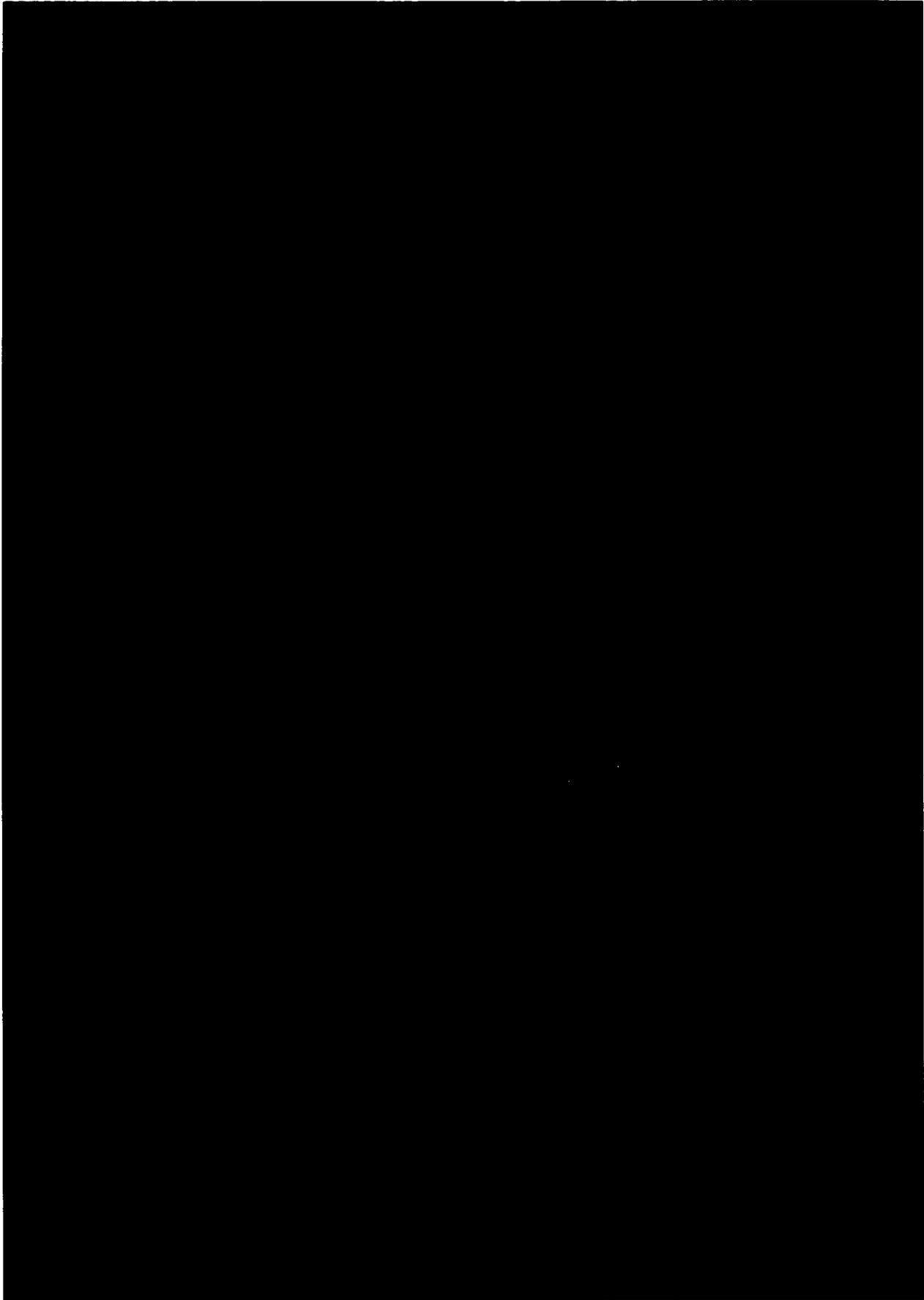


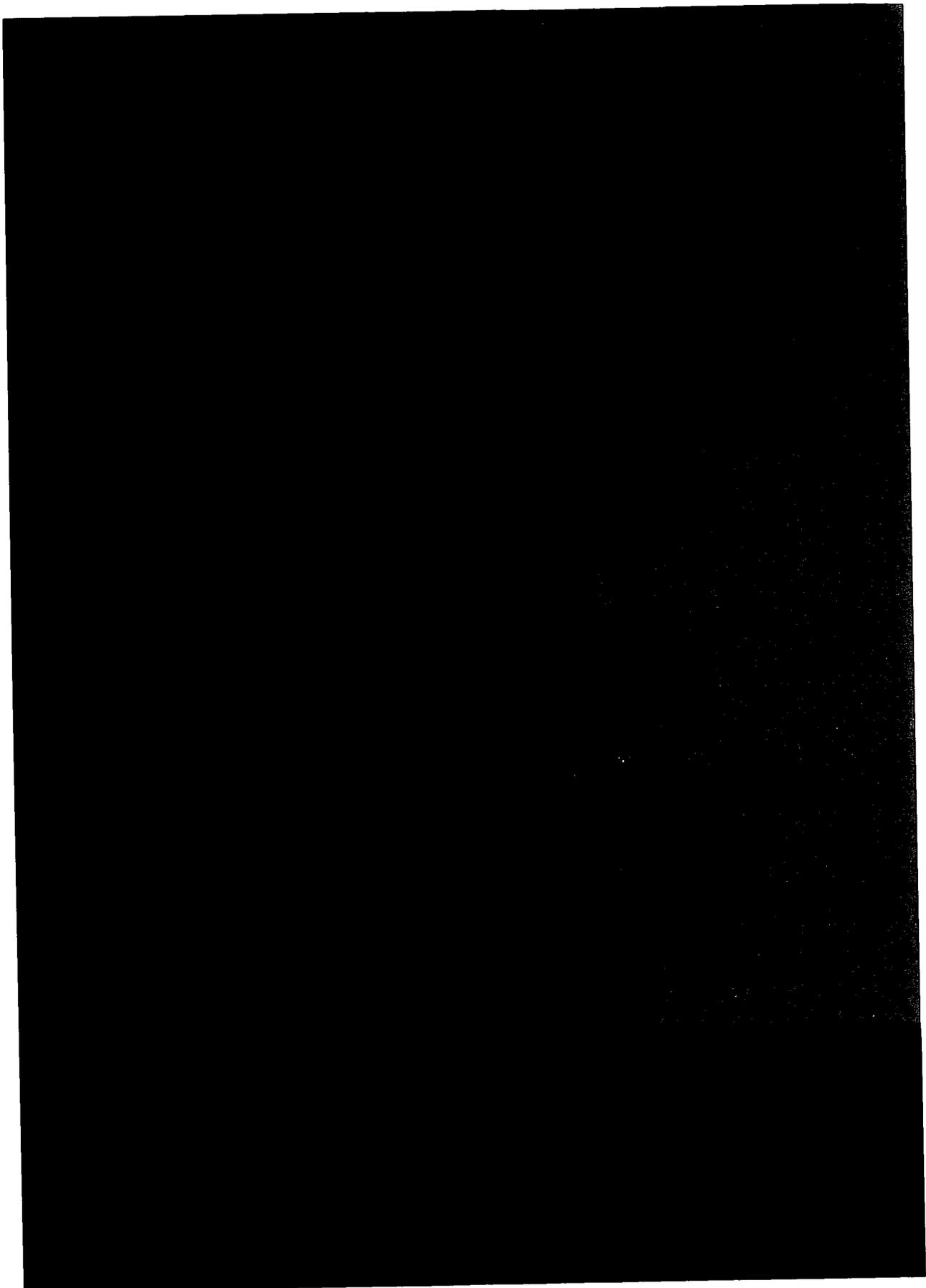


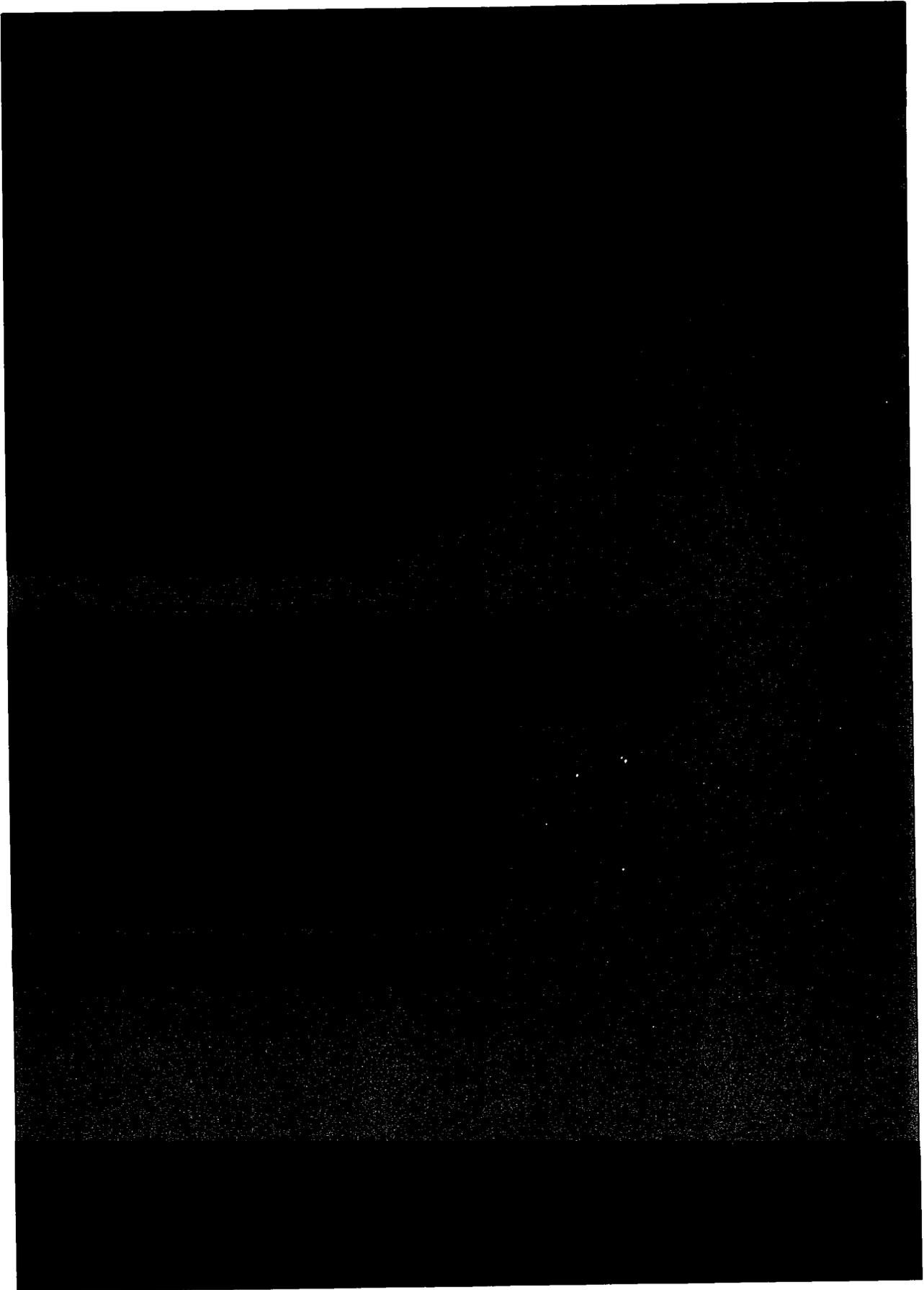


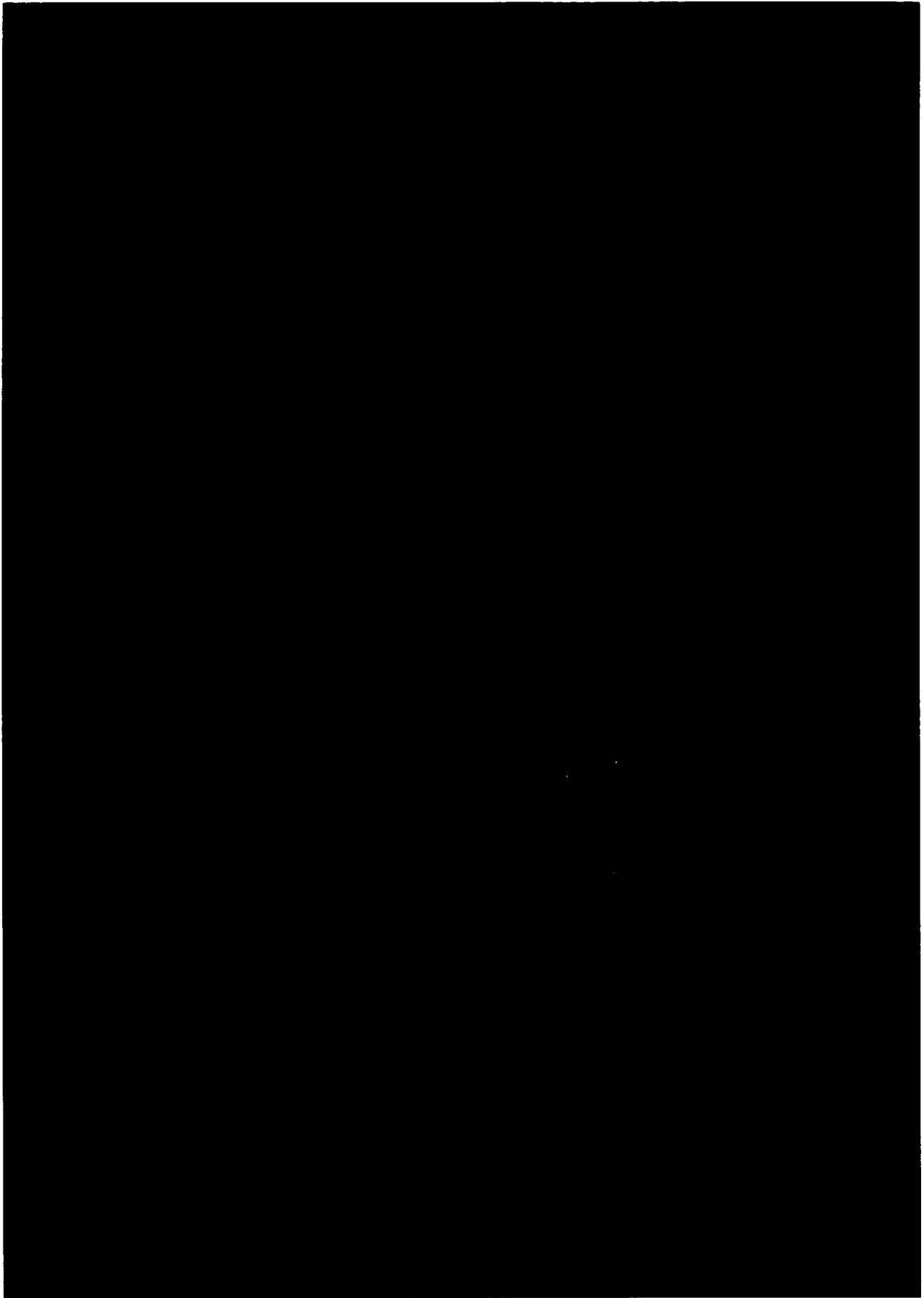


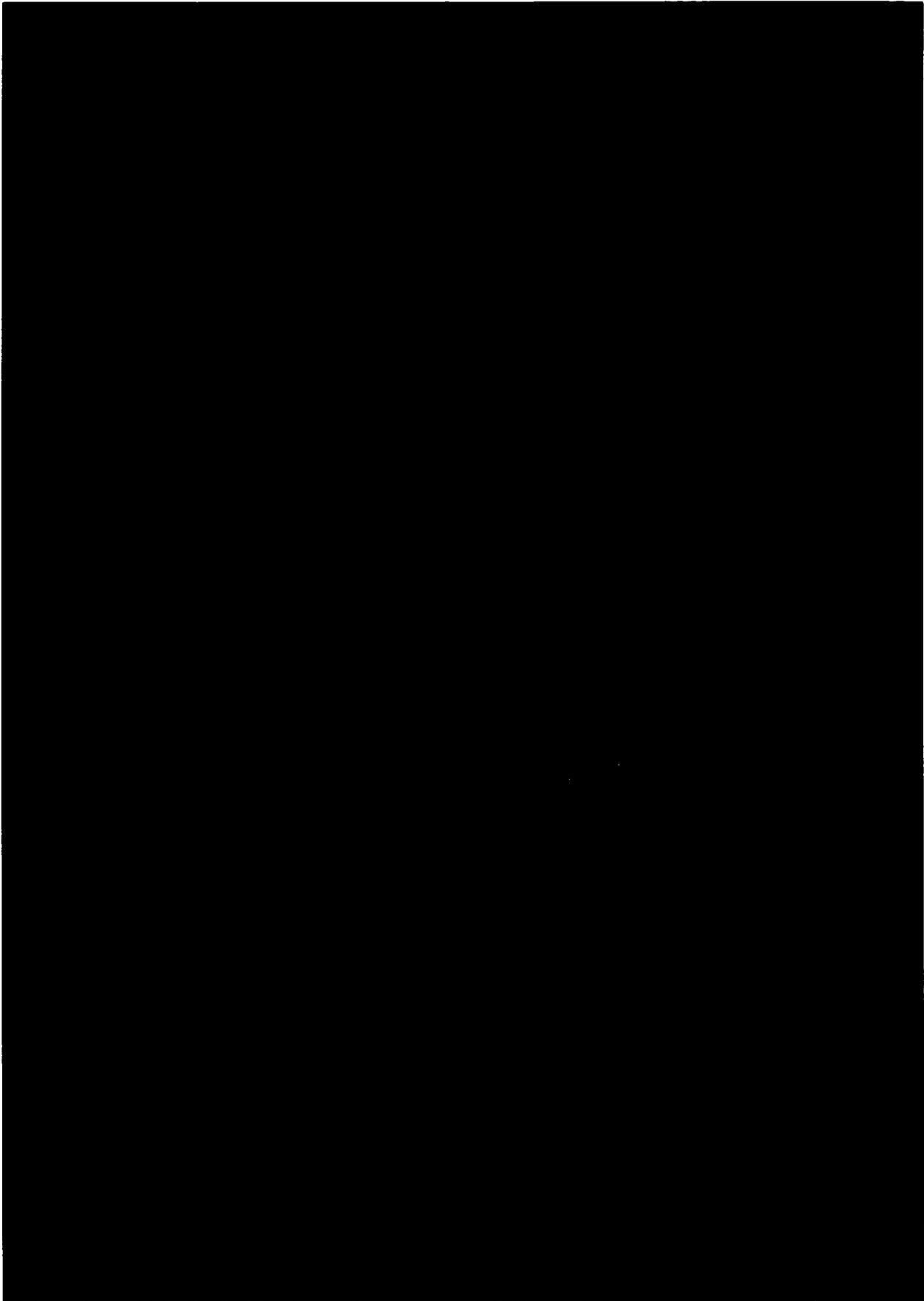












PUBLIC VERSION

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]³⁹

These excerpts indicate the pervasive nature of the marketing activities that are presented as part of Macronix's domestic industry. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

³⁹ I have omitted from this discussion many other documents included in the exhibits cited by Macronix at page 182 of its initial post-hearing brief and discussed by Toshiba. See RIB at 168 n.14. There is no apparent organization of the documents exhibited by Macronix. [REDACTED]

[REDACTED]

In an effort to confirm "what the people actually do," I examined every document that was referenced by Macronix at page 182 of its initial brief, and I include the sampling of documents herein to illustrate vividly the grounds for my conclusion that 100% of the activities included in the calculations of Messrs. Yang and Bakewell cannot possibly be counted toward domestic industry investments.

PUBLIC VERSION

In essence, Macronix and its witnesses make a legal not a factual argument. Tr. at 665:15-18 (Bakewell: “And it’s up to the Commission, not me, I’m not a lawyer, to determine whether or not [REDACTED] [REDACTED].”) They do not dispute that substantial amounts of the work performed by the MXA employees is sales and marketing; they include such work as domestic industry investment because it involves technical expertise.⁴⁰

In *Certain Marine Sonar*, the Commission held that “warranty” and “software development” as well as “technical customer service, consumer support, distribution and logistics, and research and development,” are activities that count toward domestic industry expenditures. Comm’n Op. at 57, 58. See also, e.g., *Certain Devices for Improving Uniformity Used in A Backlight Module and Components Thereof and Prods. Containing Same*, Inv. No. 337-TA-805, Initial Determination (Oct. 22, 2012) at 57, *aff’d in pertinent part*, Comm’n Op. at 26-27 (May 17, 2013). Sales and marketing activities, however, are not among those counted as domestic industry investment in *Marine Sonar*. Presumably, technical activities that are solely directed to sales and marketing still do not qualify under the economic prong as domestic industry. Mr. Bakewell, however, does not quantify separately activities performed by MXA

⁴⁰ A number of the employees have business cards and LinkedIn profiles that identify them as marketing personnel, e.g., [REDACTED]; Fazail Khan (Senior Marketing Manager) (RX-0098); [REDACTED]; Stephanie Teng (Senior Marketing Manager) (RX-0096); Anup Sidhu (Technical Marketing Director) (RX-0100); [REDACTED]. In addition, as noted above, the job titles [REDACTED] are indicative of the sales and marketing duties carried out by the employees who fill these positions. The titles themselves are not determinative; the employees’ actual job duties are significant, and those activities include to a substantial extent sales and marketing, as illustrated above.

PUBLIC VERSION

employees that might be counted under the *Marine Sonar* criteria. Instead, he lumps all of the MXA engineers' activities together as "technical." This precludes reliance on his calculations.⁴¹

On the evidence presented, there is no accurate way to quantify Macronix's investments in the alleged domestic industry. How much Mr. Yang and Mr. Bakewell's estimate of domestic industry expenditures is inflated due to inclusion of sales and marketing expenditures is unknown and, at this stage of the proceedings, unknowable. Without an accurate assessment of the amount of economic activity properly allocated to activities covered under section 337, a determination that a significant domestic industry exists is impossible.

VII. CONCLUSIONS OF LAW

Based on the foregoing, and the record as a whole, it is my final initial determination that there is no 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, and/or the sale within the United States after importation of certain non-volatile memory devices and products containing same.

This determination is based on the following conclusions of law:

1. The Commission has subject matter jurisdiction over this investigation, *in personam* jurisdiction over Toshiba, and *in rem* jurisdiction over the accused Toshiba non-volatile memory devices and products containing same.
2. There has been an importation into the United States, sale for importation, or sale within the United States after importation of the accused Toshiba non-volatile memory devices and products containing same.

⁴¹ The cases cited by Macronix involve domestic manufacturing as well as ancillary activities like technical marketing. *See Table Saws*, 2016 WL 2770229 at *2 ("After it became clear to Complainants' that existing manufacturers were not going to license their inventions, they decided to exploit SD3's intellectual property by developing, building and selling table saws under the SawStop brand."); *Automated Media Library Devices*, 2012 WL 3058165 at *7 ("Overland develops and delivers products and services for moving and storing data throughout an organization."); *HSP Modems*, 2001 WL 357346 at *1 (domestic expenditures from manufacturing of software and hardware components).

PUBLIC VERSION

3. No accused Toshiba products infringe any asserted claim of the '360 patent.
4. Certain accused Toshiba products infringe claims 1-10 of the '602 patent.
5. No accused Toshiba products infringe any asserted claim of the '417 patent.
6. Claims 1-5 and 7-10 of the '602 patent are invalid as obvious.
7. No claims of the '417 patent have been shown to be invalid.
8. A domestic industry has not been shown to exist in the United States as required by subsection (a)(2) of section 337.
9. A domestic industry has not been shown to be in the process of being established in the United States as required by subsection (a)(2) of section 337.

I hereby certify the record in this investigation to the Commission with my final initial determination. Pursuant to Commission Rule 210.38, the record further comprises the Complaint and exhibits thereto filed with the Secretary, the *Markman* order, and the exhibits attached to the parties' summary determination motions and the responses thereto. 19 C.F.R. § 210.38(a).

Pursuant to Commission Rule 210.42(a)(1)(ii), a recommended determination on remedy and bonding will issue within 14 days after the issuance of this initial determination. 19 C.F.R. § 210.42(a)(1)(ii).

Pursuant to Commission Rule 210.42(c), this initial determination shall become the determination of the Commission 45 days after the service thereof, unless a party files a petition for review pursuant to Commission Rule 210.43(a), the Commission orders its own review pursuant to Commission Rule 210.44, or the Commission changes the effective date of the initial determination. 19 C.F.R. § 210.42(h)(6).

Within ten (10) days of the date of this Initial Determination, each party shall submit to the Administrative Law Judge a statement as to whether or not it seeks to have any portion of this document deleted from the public version. *See* 19 C.F.R. § 210.5(f). A party seeking to

PUBLIC VERSION

have a portion of the order deleted from the public version thereof must attach to its submission a copy of the order with red brackets indicating the portion(s) asserted to contain confidential business information.⁴² The parties' submissions under this subsection need not be filed with the Commission Secretary but shall be submitted by paper copy to the Administrative Law Judge and by e-mail to the Administrative Law Judge's attorney advisor.

SO ORDERED.



Dee Lord
Administrative Law Judge

⁴² To avoid depriving the public of the basis for understanding the result and reasoning underlying the decision, redactions should be limited. Parties who submit excessive redactions may be required to provide an additional written statement, supported by declarations from individuals with personal knowledge, justifying each proposed redaction and specifically explaining why the information sought to be redacted meets the definition for confidential business information set forth in Commission Rule 201.6(a). 19 C.F.R. § 201.6(a).

PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **INITIAL DETERMINATION** has been served by hand upon the Commission Investigative Attorney, **Vu Bui, Esq.**, and the following parties as indicated, on 5/29/2018



Lisa R. Barton, Secretary
U.S. International Trade Commission
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Washington, DC 20436

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- Via Hand Delivery
- Via Express Delivery
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- Other: _____

**On Behalf of Respondents Toshiba Corporation, Toshiba
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PUBLIC VERSION

UNITED STATES INTERNATIONAL TRADE COMMISSION

Washington, D.C.

In the Matter of

**CERTAIN NON-VOLATILE MEMORY
DEVICES AND PRODUCTS CONTAINING
SAME**

Inv. No. 337-TA-1046

RECOMMENDED DETERMINATION ON REMEDY AND BONDING

(May 10, 2018)

Pursuant to Commission Rule 210.42(a)(1)(ii), this is the Administrative Law Judge's recommended determination on remedy and bonding. 19 C.F.R. § 210.42(a)(1)(ii).¹

A. Exclusion Order

Complainants Macronix International Co., Ltd. and Macronix America, Inc. ("Macronix") seek a limited exclusion order covering all infringing and unlicensed products of Respondents Toshiba Corporation, Toshiba Memory Corporation, Toshiba America, Inc., Toshiba America Electronic Components, Inc., Toshiba America Information Systems, Inc., and Toshiba Information Equipment (Philippines), Inc. ("Toshiba"). CIB at 195-98. The Commission Investigative Staff ("Staff") agrees that a limited exclusion order is the appropriate remedy in this investigation. SIB at 151. Toshiba also agrees that a limited exclusion order is the proper remedy for a violation, but it seeks an exemption for its downstream personal computer (PC) products. RIB at 186-91.

The accused products in this investigation include NAND flash memory, solid state drives (SSDs) containing such NAND flash memory, and PC products containing those SSDs.

¹ On April 27, 2018, I issued the final initial determination in this investigation, finding no violation of section 337.

PUBLIC VERSION

See CX-0002C at ¶¶ 6-8. Citing the *EPROMs* factors,² Toshiba contends that an exclusion order should not extend to downstream PC products because the value of the infringing flash memory products is small in comparison to the value of a PC, which includes numerous additional features and technologies. RIB at 187-88 (citing RX-1249C (Kerr RWS) at Q/A 100-102). Toshiba's SSDs have a median relative value of about [] of the total value of the Toshiba PCs. RX-1249C (Kerr RWS) at Q/A 103-105. Toshiba argues that the harm to Macronix would be negligible if PCs were exempt from the exclusion order because Macronix does not compete with Toshiba in the PC industry. RIB at 189-90. Toshiba further submits that certain Toshiba PCs [] could be mistakenly excluded. *Id.* at 190-91.

The *EPROMs* factors are not relevant to my recommendation for a remedy in this investigation. See *Certain Semiconductor Devices, Semiconductor Device Packages, and Products Containing Same*, Inv. No. 337-TA-1010, Initial Determination at 256-57 (Jun. 30, 2017) (finding the *EPROMs* analysis inapplicable to limited exclusion orders after *Kyocera*), rendered moot by Comm'n Notice (Dec. 19, 2017) (terminating investigation based on settlement).³ Toshiba does not cite any recent investigation where the *EPROMs* factors were

² The *EPROMs* factors were enumerated in *Certain Erasable Programmable Read Only Memories, Components Thereof, Prods. Containing Such Memories, & Processes for Making Such Memories* ("*EPROMs*"), 337-TA-276, Comm'n Op., 1989 WL 1716252 (May 1989) affirmed in part, vacated in part and reversed in part on other grounds, *Intel Corp. v. U.S. Intern. Trade Comm'n*, 946 F.2d 821 (Fed. Cir. 1991). The Commission regularly considered these factors when excluding the downstream products of unnamed respondents, before this practice was found to be inconsistent with limited exclusion orders under section 337. See *Certain Baseband Processor Chips and Chipsets, Transmitter and Receiver (Radio) Chips, Power Control chips, and Products Containing Same, including Cellular Telephone Handsets*, Inv. No. 337-TA-543, Comm'n Op. at 25-130 (Jun. 19, 2007), vacated in relevant part by *Kyocera Wireless Corp. v. Int'l Trade Comm'n*, 545 F.3d 1340, 1357-58 (Fed. Cir. 2008) (holding that limited exclusion orders can only apply to the products of named respondents).

³ See also *Certain Wireless Consumer Electronics Devices and Components Thereof*, Inv. No. 337-TA-853, Recommended Determination at 7 (Sept. 6, 2013) (finding that respondents' own products are not "downstream" products in the context of *EPROMs*), rendered moot by Comm'n

PUBLIC VERSION

applied to a respondent's own downstream products, and the Commission has held that "[i]n investigations involving respondents that have participated in an investigation, the Commission is required to provide some form of relief under Section 337(d) and/or (f)(1) unless such relief is contrary to the public interest." *Certain Electric Skin Care Devices, Brushes and Chargers Therefor, and Kits Containing The Same*, Inv. No. 337-TA-959, Comm'n Op. at 21-22 (Feb. 6, 2017).⁴ Consideration of the public interest has not been delegated to the administrative law judge in this investigation, and accordingly, there is no basis for me to recommend any exemption from a limited exclusion order for Toshiba's PC products.

Toshiba further requests that any exclusion order include a certification provision. CIB at 192. The Commission has explained that "[c]ertification provisions are generally included in exclusion orders where Customs and Border Patrol ("CBP") is unable to easily determine by inspection whether an imported product violates a particular exclusion order." *Certain Semiconductor Chips With Minimized Chip Package Size & Products Containing Same*, Inv. No. 337-TA-605, Comm'n Op. at 72-73 (June 3, 2009). Macronix does not oppose a certification provision but submits that "[t]he standard LEO with the Customs-approved certification provision is sufficient." CRB at 103. There is no dispute that for certain Toshiba downstream products, [REDACTED], it is difficult to distinguish between products [REDACTED] [REDACTED]. Accordingly, a certification provision is

Notice (Feb. 19, 2014) (finding no violation); *Certain Computers and Computer Peripheral Devices, and Components Thereof, and Products Containing Same*, Inv. No. 337-TA-841, Initial Determination at 162 ("[T]he ALJ finds that the Commission no longer finds an *EPRoMs* analysis necessary to include downstream products within the scope of any limited exclusion order."), *rendered moot by* Comm'n Notice (Dec. 19, 2013).

⁴ See 19 U.S.C. § 1337(d) ("If the Commission determines . . . 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, unless, after considering the effect of such exclusion upon the public health and welfare . . . it finds that such articles should not be excluded from entry.").

PUBLIC VERSION

consistent with standard Commission practice, “that allows the respondents to certify, pursuant to procedures to be specified by U.S. Customs and Border Protection, that they are familiar with the terms of the order, that they have made appropriate inquiry, and that, to the best of their knowledge and belief, the products being imported are not excluded from entry under the order.” *Certain Marine Sonar Imaging Devices, including Downscan and Sidescan Devices*, Inv. No. 337-TA-921, Initial Determination at 297 (July 2, 2015), *aff’d by* Comm’n Op. at 80 (Jan. 6, 2016) (“[T]he language in the RD is standard and consistent with Commission practice.”).

Toshiba also requests a service and repair exception, but it does not identify any specific replacement parts and does not explain what repairs are provided to consumers. RIB at 193. Toshiba’s conclusory arguments do not support any service and repair exception. *See Certain Biometric Scanning Devices*, Inc. No. 337-TA-720, Comm’n Op. at 26 (Nov. 10, 2011) (declining to issue “repair parts” exemption where “respondents have not made clear exactly what ‘replacement parts’ are necessary to import here”); *see also Certain Optoelectronic Devices, Components Thereof & Prod. Containing Same*, Inv. No. 337-TA-860, Comm’n Op. at 31 (May 9, 2014) (declining to narrow remedy where there was no evidence in the record that “Respondents’ customers expect any replacement or warranty parts be the same part and not just a comparable part.”).

Toshiba further requests that if the Commission finds a violation based on a domestic industry “in the process of being established,” then Macronix should be required to provide quarterly reports on the status of its commercialization efforts. RIB at 193. As discussed in the initial determination, I do not find that Macronix has demonstrated that there is a domestic industry “in the process of being established,” pursuant to subsection (a)(2) of section 337. *See* Final Initial Determination at 142-54. If the Commission finds such a domestic industry,

PUBLIC VERSION

however, I agree with Toshiba that Macronix should be required to provide regular updates to the Commission regarding the status of the domestic industry. *See, e.g., Certain Biometric Scanning Devices, Components Thereof, Associated Software, and Prods. Containing the Same*, Inv. No. 337-TA-720, Comm'n Op. at 26, Limited Exclusion Order at ¶ 5 (Oct. 24, 2011) (requiring complainant to file an annual report identifying the number of domestic industry products produced in the United States).

Toshiba further argues for a delay in the imposition of any exclusion order because of a worldwide shortage in NAND flash memory. RIB at 193-94; *see* RX-0287, RX-0288, RX-0289 (articles describing worldwide shortage of NAND memory). I agree with Macronix, however, that these are public interest issues, which are outside the scope of this recommended determination. CRB at 104.

Accordingly, it is my recommended determination that a limited exclusion order is an appropriate remedy in this investigation. I further recommend that any exclusion order include a standard certification provision and that Macronix be required to submit regular reports regarding the status of the domestic industry if the Commission finds a domestic industry that is in the process of being established.

B. Cease and Desist Order

Macronix seeks a cease and desist order against the domestic respondents in this investigation: Toshiba America, Inc. and its subsidiaries, Toshiba America Electronic Components, Inc. ("TAEC") and Toshiba America Information Systems, Inc. ("TAIS"). CIB at 198-99. Cease and desist orders "are generally issued when there is a 'commercially significant' amount of infringing, imported product in the United States that could be sold by an infringing respondent thereby resulting in evasion of the remedy provided by the exclusion order." *Certain*

PUBLIC VERSION

Optoelectronic Devices, Components Thereof & Prod. Containing Same, Inv. No. 337-TA-860, Comm'n Op. at 36 (May 9, 2014). Macronix's expert, Mr. Bakewell, identified evidence that [REDACTED]. CX-3837C at Q/A 171-75. The parties dispute the precise quantities and valuation of Toshiba's inventories, but the Commission "does not require a precise accounting of inventories." *Certain Electronic Digital Media Devices and Components Thereof*, Inv. No. 337-TA-796, Comm'n Op. at 108 (Sept. 6, 2013). The evidence identified by Mr. Bakewell demonstrates the existence of commercially significant inventories [REDACTED], and accordingly, I recommend that a cease and desist order be issued against these respondents.

C. Bonding

Macronix seeks a bond of 100% of entered value during the 60-day Presidential review period. CIB at 199-200. Toshiba and Staff contend that Macronix has failed to show that any bond is necessary in this investigation. RIB at 195-99; SIB at 151-52.

Commission Rule 210.50(a)(3) specifies that the amount of a bond must be "sufficient to protect the complainant from any injury." 19 C.F.R. § 210.50(a)(3); *see* 19 U.S.C. § 1337(j) ("[A]rticles directed to be excluded from entry under subsection (d) of this section or subject to a cease and desist order under subsection (f) of this section shall, until such determination becomes final, be entitled to entry under bond prescribed by the Secretary in an amount determined by the Commission to be sufficient to protect the complainant from any injury."). The Commission has set bond amounts based on the price difference between the infringing imports and the domestic industry products or on a reasonable royalty the respondent would otherwise pay to the complainant. *See Certain Inject Ink Supplies And Components Thereof*, Inv. No. 337-TA-691, Comm'n Op. at 15-18 (Nov. 1, 2011). Where the calculation of a price differential is impractical

PUBLIC VERSION

and there is insufficient evidence in the record to determine a reasonable royalty, the Commission has set a bond in the amount of 100% of the entered value of the infringing products. *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 83-89 (Jan. 6, 2016). The Complainant bears the burden of establishing the need for a bond. *Certain Rubber Antidegradants, Components Thereof, and Products Containing Same*, Inv. No. 337-TA-533, Comm'n Op. at 40 (July 21, 2006).

Macronix submits that the imposition of a bond is necessary because the continued importation of accused products would injure Macronix and its customers. *See CX-3837C (Bakewell DWS)* at Q/A 164, 178. [REDACTED]

[REDACTED] RX-1249C at Q/A 118-119. I find that this evidence is sufficient to establish the need for a bond to protect Macronix from injury.

To determine the proper amount of a bond, Macronix's expert, Mr. Bakewell, attempted to perform a price differential analysis, but he found [REDACTED]

[REDACTED] make such an analysis impractical. *CX-3837C* at Q/A 178. Toshiba's expert, Dr. Kerr, [REDACTED]

[REDACTED] [REDACTED] RX-1249C at

Q/A 118-119. I find that Dr. Kerr's analysis supports Mr. Bakewell's conclusion that a price differential analysis is impractical, [REDACTED]

[REDACTED]

PUBLIC VERSION

Mr. Bakewell also reviewed [REDACTED] to conclude that a reasonable royalty cannot be accurately determined. CX-3837C at Q/A 180. Dr. Kerr agrees that no royalty rate can be determined from [REDACTED], but he collected comparable licenses in the semiconductor industry with a median royalty rate of 4.0%. RX-1249C at Q/A 120-22. Toshiba cites no precedent for setting a bond based on an average royalty rate in the industry, however, and there is no practical way to apply such an analysis to the present investigation, where a violation may be found based on only one patent. Accordingly, because it is impractical to calculate a price differential and there is insufficient information in the record to determine a reasonable royalty, it is appropriate to set a bond in the amount of 100% of entered value.

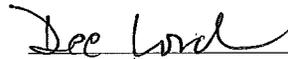
Dr. Kerr further submits that any bond amount should be applied to the value of the infringing NAND flash memory, rather than the full value of downstream products, such as the Toshiba PCs accused in this investigation. RX-1239C at Q/A 123; *see* RIB at 199. Macronix does not address this contention, and the Commission has previously imposed different bond rates in similar circumstances where the infringing product is an electronic component used in a downstream product. *See Certain Baseband Processor Chips and Chipsets, Transmitter and Receiver (Radio) Chips, Power Control Chips, and Products Containing Same, Including Cellular Telephone Handsets*, Inv. No. 337-TA-543, Comm'n Op. at 159-60 (Jun. 19, 2007) (setting bond at 100 percent of entered value of chips and 5 percent of entered value of handheld devices incorporating chips). As discussed above, Toshiba's solid-state drives (SSDs) have a median relative value of about [REDACTED] of the total value of the downstream Toshiba PC products. RX-1249C (Kerr RWS) at Q/A 103-105. Accordingly, if 100% of the value of Toshiba flash memory devices would be sufficient to protect Macronix from injury, then [REDACTED] of

PUBLIC VERSION

the value of Toshiba PCs should also be sufficient. Accordingly, my recommendation is that a bond should be set at 100% of entered value for Toshiba flash memory devices and SSDs, and it should be set at [] of entered value for Toshiba PCs.

This recommended determination is being issued with a confidential designation, and pursuant to Ground Rule 1.10, each party shall submit to the Administrative Law Judge a statement as to whether or not it seeks to have any portion of this determination deleted from the public version within seven (7) days. *See* 19 C.F.R. § 210.5(f). A party seeking to have a portion of the determination deleted from the public version thereof must attach to its submission a copy of the determination with red brackets indicating the portion(s) asserted to contain confidential business information.⁵ The parties' submissions under this subsection need not be filed with the Commission Secretary but shall be submitted by paper copy to the Administrative Law Judge and by e-mail to the Administrative Law Judge's attorney advisor.

SO ORDERED.



Dee Lord
Administrative Law Judge

⁵ Redactions should be limited to avoid depriving the public of the basis for understanding the result and reasoning underlying the decision. Parties who submit excessive redactions may be required to provide an additional written statement, supported by declarations from individuals with personal knowledge, justifying each proposed redaction and specifically explaining why the information sought to be redacted meets the definition for confidential business information set forth in Commission Rule 201.6(a). 19 C.F.R. § 201.6(a).

PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **INITIAL DETERMINATION** has been served by hand upon the Commission Investigative Attorney, **Vu Bui, Esq.**, and the following parties as indicated, on 5/29/2018



Lisa R. Barton, Secretary
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**On Behalf of Respondents Toshiba Corporation, Toshiba
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- Other: _____