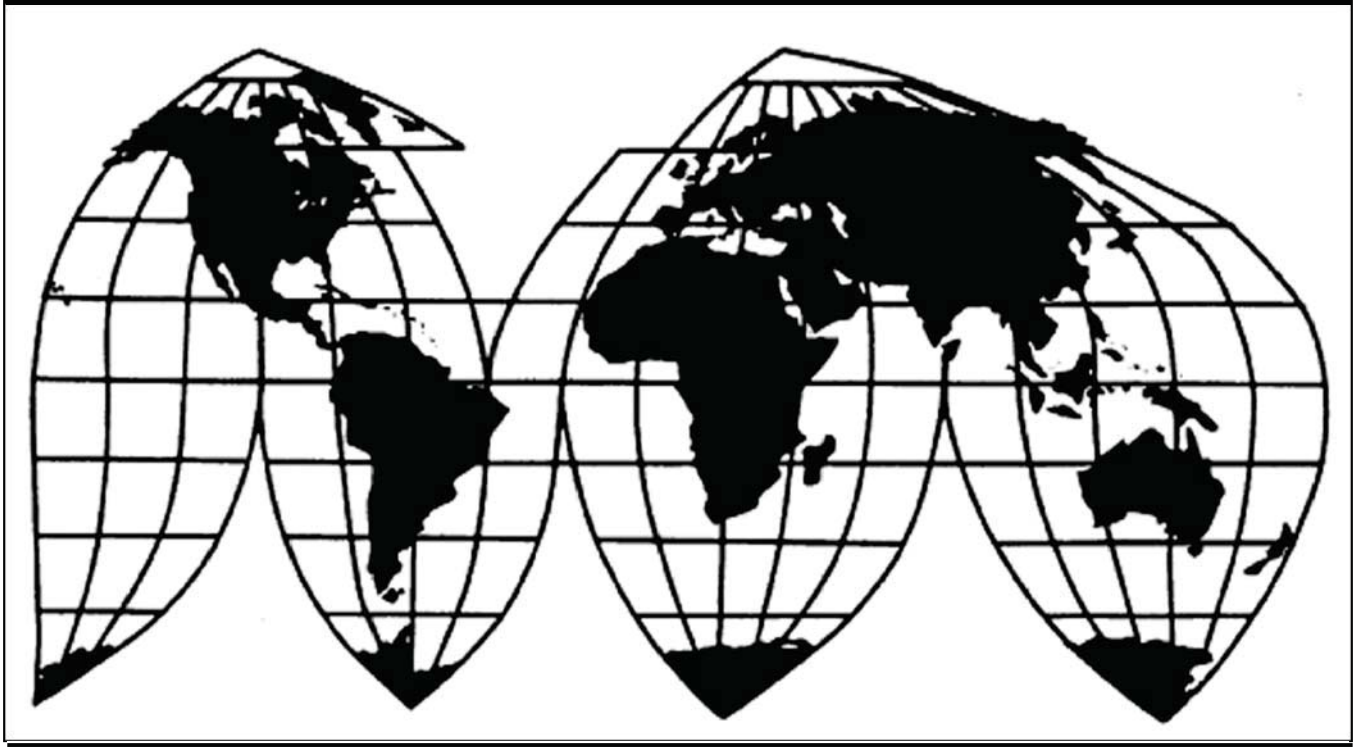
In the Matter of

Certain Optoelectronic Devices, Components Thereof, and Products Containing the Same

Investigation No. 337-TA-669

Publication 4284 **November 2011**

U.S. International Trade Commission



Washington, DC 20436

U.S. International Trade Commission

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U.S. International Trade Commission

Washington, DC 20436
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UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C. 20436

In the Matter of **CERTAIN OPTOELECTRONIC DEVICES, COMPONENTS THEREOF, AND PRODUCTS CONTAINING THE SAME**	**Investigation No. 337-TA-669**

ISSUANCE OF A LIMITED EXCLUSION ORDER AND CEASE AND DESIST ORDER; AND 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 terminated the above-captioned investigation with a finding of violation of section 337, and has issued a limited exclusion order and cease and desist order directed against respondent Emcore Corporation ("Emcore") of Albuquerque, New Mexico.

FOR FURTHER INFORMATION CONTACT: Clint Gerdine, Esq., Office of the General Counsel, U.S. International Trade Commission, 500 E Street, S.W., Washington, D.C. 20436, telephone (202) 708-2310. 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 at *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 this investigation on March 10, 2009 based on a complaint filed on February 3, 2009, by Avago Technologies Fiber IP (Singapore) Pte. Ltd. of Singapore; Avago Technologies General IP (Singapore) Pte. Ltd. of Singapore; and Avago Technologies Ltd. of San Jose, California (collectively, "Avago"). 74 *Fed. Reg.* 10278-79 (March 10, 2009). The complaint, as supplemented, 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 optoelectronic devices, components thereof, or products containing the same by reason of

infringement of certain claims of U.S. Patent Nos. 5,359,447 ("the '447 patent") and 5,761,229 ("the '229 patent"). The complaint further alleges that an industry in the United States exists as required by subsection (a)(2) of section 337. The complaint names a single respondent, Emcore Corporation ("Emcore") of Albuquerque, New Mexico.

On December 7, 2009, the Commission issued notice of its determination not to review the presiding administrative law judge's ("ALJ's") initial determination ("ID") granting Avago's motion for summary determination on ownership of the asserted patents.

On March 12, 2010, the ALJ issued his final ID finding a violation of section 337 by Emcore by reason of infringement of one or more of claims 1, 2, 3, and 5 of the '447 patent. The ALJ found no violation of section 337 with respect to the '229 patent. He also issued his recommendation on remedy and bonding during the period of Presidential review. On March 29, 2010, Emcore filed a petition for review of the final ID. The Commission investigative attorney ("IA") and Avago filed responses to the petition on April 6, 2010. On May 13, 2010, the Commission issued notice of its determination not to review the ALJ's final ID finding a violation of section 337, and requested written submissions on the issues of remedy, the public interest, and bonding from the parties and interested non-parties. 75 *Fed. Reg.* 28060-61 (May 19, 2010).

On May 24 and June 1, 2010, respectively, complainant Avago, respondent Emcore, and the IA filed briefs and reply briefs on the issues for which the Commission requested written submissions.

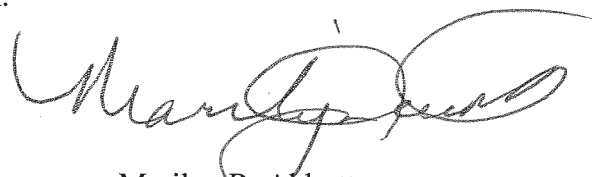
The Commission has made its determination on the issues of remedy, the public interest, and bonding. The Commission has determined that the appropriate form of relief is both: 1) a limited exclusion order prohibiting the unlicensed entry of optoelectronic devices, components thereof, and products containing the same that are covered by one or more of claims 1, 2, 3 and 5 of the '447 patent, where the infringing optoelectronic devices, components thereof, and products containing the same are manufactured abroad by or on behalf of, or are imported by or on behalf of, Emcore, or any of its affiliated companies, parents, subsidiaries, licensees, contractors, or other related business entities, or successors or assigns; and 2) a cease and desist order prohibiting Emcore from conducting any of the following activities in the United States: importing, selling, marketing, advertising, distributing, offering for sale, transferring (except for exportation), and soliciting U.S. agents or distributors for, optoelectronic devices, components thereof, and products containing the same that are covered by one or more of claims 1, 2, 3, and 5 of the '447 patent.

The Commission further determined that the public interest factors enumerated in section 337(d)(1) (19 U.S.C. § 1337(d)(1)) do not preclude issuance of the limited exclusion order or the cease and desist order. Finally, the Commission determined that a three (3) percent bond of the entered value of the covered products is required to permit temporary importation during the period of Presidential review (19 U.S.C. § 1337(j)). 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 Commission has terminated this investigation. 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 section 210.50 of the Commission's Rules of Practice and Procedure (19 C.F.R.§ 210.50).

By order of the Commission.



Marilyn R. Abbott
Secretary to the Commission

Issued: July 12, 2010

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.

In the Matter of **CERTAIN OPTOELECTRONIC DEVICES, COMPONENTS THEREOF, AND PRODUCTS CONTAINING THE SAME**	**Inv. No. 337-TA-669**

LIMITED EXCLUSION ORDER

The Commission has determined that there is a violation of section 337 of the Tariff Act of 1930 (19 U.S.C. § 1337) in the unlawful importation and sale by Respondent Emcore Corporation ("Respondent") of optoelectronic devices, components thereof, and products containing the same that are covered by one or more of claims 1, 2, 3, and 5 of U.S. Patent No. 5,359,447.

Having reviewed the record in this investigation, including the written submissions of the parties, the Commission has made its determination on the issues of remedy, the public interest, and bonding. The Commission has determined that the appropriate form of relief is a limited exclusion order prohibiting the unlicensed entry of infringing optoelectronic devices, components thereof, or products containing the same manufactured by or on behalf of, or imported by or on behalf of, Respondent. The Commission has also determined that the appropriate form of relief includes a cease and desist order against Respondent.

The Commission has determined that the public interest factors enumerated in 19 U.S.C. § 1337(d) do not preclude issuance of the limited exclusion order or cease and desist order, and that the bond during the Presidential review period shall be in the amount of three (3) percent of the entered value of the optoelectronic devices, components thereof, or products containing the same that are subject to this order.

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

1. Optoelectronic devices, components thereof, and products containing same that are covered by one or more of claims 1, 2, 3, and 5 of U.S. Patent No. 5,359,447 and that are manufactured abroad by or on behalf of, or are imported by or on behalf of Emcore Corporation or any of its affiliated companies, parents, subsidiaries, or other related business entities, or its 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. Products that are excluded by paragraph 1 of this Order are entitled to entry for consumption into the United States, entry for consumption from a foreign-trade zone, or withdrawal from a warehouse for consumption, under bond in the amount of three (3) percent of the entered value 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.* 43251), 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 date of receipt of this action.

3. At the discretion of U.S. Customs and Border Protection ("CBP") and pursuant to procedures it establishes, persons seeking to import optoelectronic devices, components thereof, or 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 paragraphs 1 through 7 of this Order. At its discretion, CBP may also require persons who have provided the certification described in this paragraph to furnish such records or analyses as it deems necessary to substantiate the certification.

4. In accordance with 19 U.S.C. § 1337(l), the provisions of this Order shall not apply to optoelectronic devices, components thereof, or products containing same that are 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.

5. The Commission may modify this Order in accordance with the procedures described in Rule 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 the Department of Health and Human Services, the Department of Justice, the Federal Trade Commission, and U.S. Customs and Border Protection.

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

By Order of the Commission.

Marilyn R. Abbott
Secretary to the Commission

Issued: July 12, 2010

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C. 20436

In the Matter of	
CERTAIN OPTOELECTRONIC DEVICES, COMPONENTS THEREOF, AND PRODUCTS CONTAINING THE SAME	**Inv. No. 337-TA-669**

CEASE AND DESIST ORDER

IT IS HEREBY ORDERED THAT Emcore Corporation of Albuquerque, New Mexico cease and desist from conducting any of the following activities in the United States: importing, selling, marketing, advertising, distributing, offering for sale, transferring (except for exportation), and soliciting U.S. agents or distributors for, optoelectronic devices, components thereof, or products containing the same that are covered by one or more of claims 1, 2, 3, and 5 of U.S. Patent No. 5,359,447, in violation of section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. § 1337.

I.

Definitions

As used in this Order:

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

(B) "Complainants" shall mean Avago Technology Fiber IP Pte., Ltd., Avago Technologies General IP Pte., Ltd., and Avago Technologies, Ltd. of Singapore.

(C) "Respondent" shall mean Emcore Corporation of 10420 Research Road SE,

Albuquerque, New Mexico 87123.

(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 optoelectronic devices, components thereof, and products containing the same that are covered by one or more of claims 1, 2, 3, and 5 of U.S. Patent No. 5,359,447.

II.

Applicability

The provisions of this Cease and Desist Order shall apply to Respondent and to any of its principals, stockholders, officers, directors, employees, agents, licensees, 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 by Respondent in the United States is prohibited by the Order. For the remaining term of the patent, Respondent shall not:

(A) import or sell for importation into the United States covered products;

(B) market, distribute, offer for sale, sell, or otherwise transfer (except for exportation), in the United States imported covered products;

(C) advertise imported covered products;

(D) solicit U.S. agents or distributors for imported covered products; or

(E) aid or abet other entities in the importation, sale for importation, sale after importation, transfer, or distribution of covered products.

IV.

Conduct Permitted

Notwithstanding any other provision of this Order, specific conduct otherwise prohibited by the terms of this Order shall be permitted if, in a written instrument, the owner of U.S. Patent No. 5,359,447 licenses or authorizes such specific conduct, or such specific conduct is related to the importation or sale of covered products by or for the United States.

V.

Reporting

For purposes of this reporting requirement, the reporting periods shall commence on January 1 of each year and shall end on the subsequent December 31. However, the first report required under this section shall cover the period from the date of issuance of this Order through

December 31, 2010. This reporting requirement shall continue in force until such time as Respondent will have 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 (i) covered products that the Respondent has imported and/or (ii) covered products that the Respondent has 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. A Respondent filing written submissions must file the original document and two copies with the Office of the Secretary. Any Respondent desiring to submit a document to the Commission in confidence must file the original and a public version of the original with the Office of the Secretary and serve a copy of the confidential version on Complainant's counsel.[1]

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

VI.

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

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[1] Complainant must file a letter with the Secretary identifying the attorney to receive the reports or bond information. The designated attorney must be on the protective order entered in the investigation.

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

VII.

Service of Cease and Desist Order

Respondent is ordered and directed to:

(A) Serve, within fifteen (15) 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 (15) 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 date of expiration of U.S. Patent No. 5,359,447.

VIII.

Confidentiality

Any request for confidential treatment of information obtained by the Commission pursuant to Sections V and VI of this Order should be in accordance with Commission Rule 201.6, 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 in accordance with section 337(f) of the Tariff Act of 1930,19 U.S.C. § 1337(f), and any other action as the Commission may deem appropriate. In determining whether Respondent is in violation of this Order, the Commission may infer facts adverse to Respondent if Respondent 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* 43251 (July 21,2005), subject to Respondent posting a bond of in the amount of three (3) percent of the entered value of the covered products. This bond provision does not apply to conduct that is otherwise permitted by Section IV of this Order. Covered products imported during the review period are subject to the entry bond as set forth in the limited 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* Commission Rule 210.68, 19 C.F.R. § 210.68. The bond and any accompanying documentation is to be provided to and approved by the Commission prior to the commencement of conduct which is otherwise prohibited by Section III of this Order. Upon acceptance of the bond by the Secretary: (a) the Secretary will serve an acceptance letter on all parties; and (b) the Respondent must serve a copy of the bond and any accompanying documentation on Complainant's counsel.[2]

The bond is to be forfeited in the event that the United States Trade Representative approves, or does not disapprove within the review period, this Order, unless 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 unless Respondent exports the products

[2] *See* fn. 1.

subject to this bond or destroys them and provides certification to that effect satisfactory to the Commission.

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

By Order of the Commission.

Marilyn R. Abbott
Secretary to the Commission

Issued: July 12, 2010

CERTAIN OPTOELECTRONIC DEVICES, COMPONENTS THEREOF, AND PRODUCTS CONTAINING THE SAME **337-TA-669**

CERTIFICATE OF SERVICE

I, Marilyn R. Abbott, hereby certify that the attached **ISSUANCE OF A LIMITED EXCLUSION ORDER AND CEASE AND DESIST ORDER; AND TERMINATION OF THE INVESTIGATION** has been served by hand upon the Commission Investigative Attorney, Christopher G. Paulraj, Esq., and the following parties as indicated, on July 12, 2010.

Marilyn R. Abbott, Secretary
U.S. International Trade Commission
500 E Street, SW
Washington, DC 20436

On Behalf of Complainants Avago Technologies Fiber IP (Singapore) PTE. Ltd.; Avago Technologies General IP (SINGAPORE) PTE. Ltd.; and, Avago Technologies Ltd.:

Jerold I. Schneider, Esq.
NOVAK DRUCE & QUIGG LLP
525 Okeechobee Boulevard - 15th Floor
West Palm Beach, FL 33401

( ) Via Hand Delivery
(✓) Via Overnight Mail
( ) Via First Class Mail
( ) Other: _____

On Behalf of Respondent Emcore Corporation:

Louis S. Mastriani, Esq.
ADDUCI MASTRIANI & SCHAUMBERG LLP
1200 Seventeenth Street, NW - Fifth Floor
Washington, DC 20036

( ) Via Hand Delivery
(✓) Via Overnight Mail
( ) Via First Class Mail
( ) Other: _____

GOVERNMENT AGENCIES:

Edward T. Hand, Chief
Foreign Commerce Section
Antitrust Division
U.S. Department of Justice
450 5th Street NW – Room 11000
Washington, DC 20530

( ) Via Hand Delivery
( ) Via Overnight Mail
(✓) Via First Class Mail
( ) Other: _____

U.S. Bureau of Customs and Border Protection
Intellectual Property Rights Branch
Mint Annex Building
799 9th Street, NW -7th floor
Washington, DC 20229-1177

( ) Via Hand Delivery
( ) Via Overnight Mail
(✓) Via First Class Mail
( ) Other: _____

Elizabeth Kraus, Deputy Director
International Antitrust, Office of
International Affairs
Federal Trade Commission
600 Pennsylvania Avenue, Room 498
Washington, DC 20580

( ) Via Hand Delivery
( ) Via Overnight Mail
(✓) Via First Class Mail
( ) Other: _____

Richard Lambert, Esq.
Office of Technology Development Services
Dept. of Health & Human Services
National Institutes of Health
6610 Rockledge Drive - Room 2800, MSC 6606
Bethesda, MD 20892

( ) Via Hand Delivery
( ) Via Overnight Mail
(✓) Via First Class Mail
( ) Other: _____

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.

In the Matter of **CERTAIN OPTOELECTRONIC DEVICES, COMPONENTS THEREOF, AND PRODUCTS CONTAINING THE SAME**	**Investigation No. 337-TA-669**

COMMISSION OPINION

I. INTRODUCTION

On March 12, 2010, the presiding administrative law judge ("ALJ") issued his final initial determination ("ID") in the above-captioned investigation, finding a violation of section 337 of the Tariff Act of 1930, 19 U.S.C. § 1337, as amended ("section 337"). The ID included his recommended determination ("RD") on the issues of remedy and bonding during the period of Presidential review. The Commission determined not to review the ALJ's finding of violation on May 13, 2010. 75 *Fed. Reg.* 28060-61 (May 19, 2010). The investigation is now before the Commission to consider the issues of remedy, the public interest, and bonding.

II. BACKGROUND

The Commission instituted this investigation on March 10, 2009 based on a complaint filed on February 3, 2009, by Avago Technologies Fiber IP (Singapore) Pte. Ltd. of Singapore; Avago Technologies General IP (Singapore) Pte. Ltd. of Singapore; and Avago Technologies Ltd. of San Jose, California (collectively, "Avago"). 74 *Fed. Reg.* 10278-79 (March 10, 2009). The complaint, as supplemented, 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 optoelectronic devices, components thereof, or products containing the same by reason of infringement of one or more of claims 1-3 and 5 of U.S. Patent No. 5,359,447 ("the '447 patent") and claim 8 of U.S. Patent No. 5,761,229 ("the '229 patent"). The complaint further alleges that an industry in the United States exists as required by subsection (a)(2) of section 337. The complaint names a single respondent, Emcore Corporation ("Emcore") of Albuquerque, New Mexico.

On December 7, 2009, the Commission issued notice of its determination not to review the presiding administrative law judge's ("ALJ") (Judge Essex) initial determination ("ID") granting Avago's motion for summary determination on its ownership of the asserted patents.

On March 12, 2010, the ALJ issued his final ID finding a violation of section 337 by Emcore by reason of infringement of one or more of claims 1-3 and 5 of the '447 patent. He found no violation with respect to the '229 patent. He also issued his recommendation on remedy and the amount of bond to be set during the period of Presidential review. On March 29, 2010, Emcore filed a petition for review of the final ID. The Commission investigative attorney ("IA") and Avago filed responses to the petition on April 6, 2010.

On May 13, 2010, the Commission issued notice of its determination not to review the ALJ's final ID and requested written submissions on the issues of remedy, the public interest, and bonding from the parties and interested non-parties. 75 *Fed. Reg.* 28060-61 (May 19, 2010).

Complainant Avago, respondent Emcore, and the IA filed briefs and reply briefs on the issues for which the Commission requested written submissions on May 24 and June 1, 2010, respectively.

III. DISCUSSION

A. Remedy

The Commission is authorized to issue relief when it determines that there is a violation of section 337. 19 U.S.C. § 1337(d) and (f). The Commission has broad discretion in selecting the form, scope, and extent of the remedy in a section 337 proceeding. *See Fuji Photo Film v. United States Int'l Trade Comm'n*, 386 F.3d 1095, 1106-1107 (Fed. Cir. 2004). For the reasons set forth below, we have determined to adopt the ALJ's recommendations on remedy. *See* ID/ RD at 112-15.

The ALJ recommended that the Commission issue a limited exclusion order and cease and desist order that cover all accused products, *i.e.*, optoelectronic devices, components thereof, and products containing the same, that infringe one or more of claims 1, 2, 3, and 5 of the '447 patent, and are manufactured abroad or imported by or on behalf of Emcore, or any of their affiliated companies, parents, subsidiaries, or other related business entities, or their successors or assigns. *Id.* The ALJ recommended the cease and desist order in view of evidence demonstrating that Emcore maintains commercially significant inventories of the accused products in the United States. *Id.*; *citing Certain Crystalline Cefadroxil Monohydrate,* Inv. No. 337-TA-293, USITC Pub. 2391, Comm'n Op. on Remedy, the Public Interest and Bonding at 37-42 (June 1991).

Emcore argues that the limited exclusion order should cover only optical communication networks incorporating Emcore-manufactured optical transmitters because the ALJ's infringement finding was limited to systems with Emcore transmitters. Also, Emcore contends that no cease and desist order is warranted in this case because any final testing of its products within the United States occurs only after ordering and purchase by the customer.

The IA and Avago support the ALJ's recommendation that the remedial orders should extend to all of Emcore's accused products in this investigation which include, but are not limited to, vertical-cavity surface-emitting laser ("VCSEL") transmitters and optical networks, VCSEL transceivers, transmitter/receiver sets, transmitter/receiver optical subassemblies, VCSEL arrays and photodiode arrays, and other optoelectronic assemblies made by Emcore. They contend that Emcore's argument that only systems should be excluded ignores the fact that the Commission found that Emcore's products indirectly infringed the '447 patent by contributory and induced infringement, and that Emcore's customers directly infringed the patent. Regarding the recommended cease and desist order, Avago and the IA submit that the relevant fact is that Emcore possesses accused products in the United States which undermine the effectiveness of any exclusion order, regardless of whether these products have been pre-sold to U.S. customers. They also contend that the testimonial evidence refers to all 12-channel products and that other contrary evidence presented by Emcore was not before the ALJ and conflicts with the testimonial evidence.

The Commission adopts the ALJ's recommendation that the appropriate relief includes a limited exclusion order and a cease and desist order directed to all accused products, *i.e.*, infringing optoelectronic devices, components thereof, and products containing the same, that are manufactured abroad or imported by or on behalf of Emcore, or any of their affiliated companies, parents, subsidiaries, or other related business entities, or their successors or assigns. There is no distinction between direct or indirect infringement in Commission remedial orders and the language "covered by," found in the Commission's orders, applies to both types of infringement. Accordingly, any Emcore optoelectronic components, *e.g.*, transceivers, transmitter/receiver sets,

VCSEL transmitter/receiver optical subassemblies, VCSEL arrays and photodiode arrays, and other optoelectronic assemblies, that indirectly infringe one or more of claims 1, 2, 3, and 5 of the '447 patent are covered by the remedial orders.

A cease and desist order is appropriate because it is undisputed that Emcore is in possession of infringing products in the United States. *See* JX-32C at 2-3; Carson, Tr. at 855, 862-63. The evidence clearly establishes that Emcore conducts final testing of accused products in the United States. *Id.* Particularly, Emcore's own documentary evidence indicates that respondent conducts the final testing, [[

]]. *See* JX-32C at 2-3.

The Commission views this evidence of final testing of the accused products in the United States, just prior to delivery to U.S. customers, as equivalent to evidence of the quantity and value of accused products, and it therefore supports a finding of a "commercially significant" inventory of accused goods in the United States in accordance with Commission precedent. *See Certain Crystalline Cefadroxil Monohydrate*, Inv. No. 337-TA-293, USITC Pub. 2391, Comm'n Op. on Remedy, the Public Interest, and Bonding at 37-42 (June 1991); *citing Certain Erasable Programmable Read-Only Memories ("EPROMs")*, 337-TA-276, USITC Pub. 2196, Comm'n Op. on Violation, and Remedy, Bonding, and the Public Interest at 130-31 (May 1989). Specifically, the Commission in *EPROMs* issued cease and desist orders based on evidence of product testing as it stated that "the evidence concerning [respondents'] production processes, which involve testing in the United States prior to sale, suggest that there are inventories of work in progress. On the record of this investigation, we determine this is sufficient to justify cease and desist orders . . ." *See EPROMs*, USITC Pub. 2196 at 130-31. We also note that

Commission cease and desist orders prohibit a number of activities in the United States, including distribution and transfer of infringing devices. Thus, a cease and desist order is appropriate even if Emcore's products in the United States have been pre-sold.

B. Bonding

Section 337(j) provides for entry of infringing articles during the sixty (60) day period of Presidential review upon posting of a bond and states that the bond is to be set at a level "sufficient to protect the complainant from any injury." 19 U.S.C. § 1337(j)(3); *see also* 19 C.F.R. § 210.50(a)(3). The ALJ recommended a bond of three (3) percent of the entered value of the covered products based on a reasonable royalty rate for the '447 and '229 patents that he ascertained from a 2003 Patent Cross-License Agreement between Avago's predecessor, Agilent, and Emcore's customer, E2O Communications Incorporated. RD at 114-15; *citing Certain Integrated Circuit Telecommunication Chips and Products Containing Same, Including Dialing Apparatus*, Inv. No. 337-TA-337, USITC Pub. 2670, Comm'n Op. at 41 (Aug. 1993).

Avago argues that the bond amount should adjust upwardly to one hundred (100) percent if Emcore attempts to adversely impact Avago's market by: (1) suddenly increasing the quantities of imported components above the lowest quantity level at which it imported products during the pendency of this investigation; or (2) suddenly decreasing its prices below the highest price at which it sold products during this investigation. The IA and Emcore support the ALJ's recommended bond of three (3) percent.

We agree with the ALJ that a three (3) percent bond is appropriate here because the previous cross-license agreement between Avago's predecessor and Emcore's customer establishes this reasonable royalty rate for the bond amount. There is no Commission precedent

to support a contingent trigger that would upwardly adjust the bond amount in the event of price-fixing or increased importation by respondent, especially where no evidence of such conduct has been presented by complainants.

C. Public Interest

When issuing an exclusion order under section 337(d), the Commission must weigh the remedy sought against the effect such a remedy would have on the following public interest factors: (1) the public health and welfare; (2) the competitive conditions in the United States economy; (3) the production of articles in the United States that are like or directly competitive with those subject to the investigation; and (4) United States consumers. *See* 19 U.S.C. § 1337(d)(1).

We find that the issuance of a limited exclusion order and cease and desist order directed to infringing optoelectronic devices, components thereof, and products containing the same produced by Emcore, would not be contrary to the public interest. No evidence exists in the record that issuance of the Commission's orders would harm public health, welfare, or safety. Moreover, nothing in the evidentiary record indicates that Avago and others cannot meet the demand for the types of optoelectronic devices at issue.

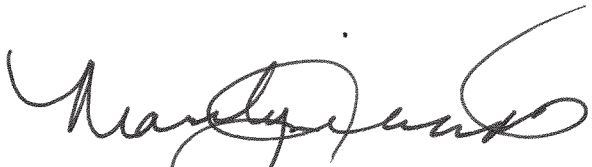
We have included a certification provision in the limited exclusion order allowing importation of those optoelectronic devices not produced by, or on behalf of, Emcore. This provision will ease the burden both on legitimate trade and on U.S. Customs' enforcement of the exclusion order.

IV. CONCLUSION

The Commission has determined that there has been a violation of section 337, and has further determined that the appropriate form of relief is: (1) a limited exclusion order prohibiting the unlicensed entry of optoelectronic devices, components thereof, and products containing the same that infringe one or more of claims 1, 2, 3, and 5 of the '447 patent, that are manufactured abroad by or on behalf of, or are imported by or on behalf of, Emcore, or any of its affiliated companies, parents, subsidiaries, licensees, contractors, or other related business entities, or successors or assigns; and (2) a cease and desist order prohibiting Emcore from conducting any of the following activities in the United States: importing, selling, marketing, advertising, distributing, offering for sale, transferring (except for exportation), and soliciting U.S. agents or distributors for, optoelectronic devices, components thereof, and products containing the same that infringe one or more of claims 1, 2, 3, and 5 of the '447 patent.

The Commission further has determined that the public interest factors enumerated in section 337(d)(1) (19 U.S.C. § 1337(d)(1)) do not preclude issuance of the limited exclusion order or the cease and desist orders. Finally, the Commission has determined that a bond of three (3) percent bond of the entered value of Emcore's products should be imposed during the period of Presidential review.

By order of the Commission.



Marilyn R. Abbott
Secretary to the Commission

Issued: July 26, 2010

CERTAIN OPTOELECTRONIC DEVICES, COMPONENTS THEREOF, AND PRODUCTS CONTAINING THE SAME **337-TA-669**

CERTIFICATE OF SERVICE

I, Marilyn R. Abbott, hereby certify that the attached **PUBLIC COMMISSION OPINION** has been served by hand upon the Commission Investigative Attorney, Christopher G. Paulraj, Esq., and the following parties as indicated, on July 26, 2010.

Marilyn R. Abbott, Secretary
U.S. International Trade Commission
500 E Street, SW
Washington, DC 20436

On Behalf of Complainants Avago Technologies Fiber IP (Singapore) PTE. Ltd.; Avago Technologies General IP (SINGAPORE) PTE. Ltd.; and, Avago Technologies Ltd.:

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On Behalf of Respondent Emcore Corporation:

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1200 Seventeenth Street, NW - Fifth Floor
Washington, DC 20036

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UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C. 20436

In the Matter of **CERTAIN OPTOELECTRONIC DEVICES, COMPONENTS THEREOF, AND PRODUCTS CONTAINING THE SAME**	**Investigation No. 337-TA-669**

NOTICE OF COMMISSION DECISION NOT TO REVIEW A FINAL INITIAL DETERMINATION FINDING A VIOLATION OF SECTION 337; REQUEST FOR WRITTEN SUBMISSIONS REGARDING REMEDY, BONDING, AND THE PUBLIC INTEREST

AGENCY: U.S. International Trade Commission.

ACTION: Notice.

SUMMARY: Notice is hereby given that the U.S. International Trade Commission has determined not to review a final initial determination ("ID") of the presiding administrative law judge ("ALJ") finding a violation of section 337 in the above-captioned investigation, and is requesting written submissions regarding remedy, bonding, and the public interest.

FOR FURTHER INFORMATION CONTACT: Clint Gerdine, Esq., Office of the General Counsel, U.S. International Trade Commission, 500 E Street, S.W., Washington, D.C. 20436, telephone (202) 708-2310. 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 at *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 this investigation on March 10, 2009 based on a complaint filed on February 3, 2009, by Avago Technologies Fiber IP (Singapore) Pte. Ltd. of Singapore; Avago Technologies General IP (Singapore) Pte. Ltd. of Singapore; and Avago Technologies Ltd. of San Jose, California. 74 *Fed. Reg.* 10278-79 (March 10, 2009). The complaint, as supplemented, 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 optoelectronic devices, components thereof, or products containing the same by reason of infringement of certain claims of U.S. Patent Nos. 5,359,447 ("the '447 patent") and 5,761,229 ("the '229

patent"). The complaint further alleges that an industry in the United States exists as required by subsection (a)(2) of section 337. The complaint names a single respondent, Emcore Corporation ("Emcore") of Albuquerque, New Mexico.

On December 7, 2009, the Commission issued notice of its determination not to review the ALJ's ID granting complainants' motion for summary determination on ownership of the asserted patents.

On March 12, 2010, the ALJ issued his final ID finding a violation of section 337 by Emcore by reason of infringement of one or more of claims 1, 2, 3, and 5 of the '447 patent. The ALJ found no violation of section 337 with respect to the '229 patent. He also issued his recommendation on remedy and bonding during the period of Presidential review. On March 29, 2010, Emcore and the Commission investigative attorney ("IA") filed petitions for review of the final ID. The IA and complainants filed responses to the petitions on April 6, 2010. The Commission has determined not to review the subject ID.

In connection with the final disposition of this investigation, the Commission may issue an order that results in the exclusion of the subject articles from entry into the United States. 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 In the Matter of Certain Devices for Connecting Computers via Telephone Lines*, Inv. No. 337-TA-360, USITC Pub. No. 2843 (December 1994) (Commission Opinion).

When 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.

When 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* section 337(j), 19 U.S.C. § 1337(j) and the 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. The Commission is therefore interested in receiving submissions concerning the amount of the bond that should be imposed if a remedy is ordered.

WRITTEN SUBMISSIONS: 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, and such submissions should address the recommended determination by the ALJ on remedy and bonding. The complainant and the IA are also requested to submit proposed remedial orders for the Commission's consideration. Complainant is also requested to state the dates that the patents at issue expire and the HTSUS numbers under which the accused articles are imported. The written submissions and proposed remedial orders must be filed no later than close of business on May 24, 2010. Reply submissions must be filed no later than the close of business on June 1, 2010. No further submissions on these issues will be permitted unless otherwise ordered by the Commission.

Persons filing written submissions must file the original document and 12 true copies thereof on or before the deadlines stated above with the Office of the Secretary. Any person desiring to submit a document to the Commission in confidence must request confidential treatment unless the information has already been granted such treatment during the proceedings. All such requests should be directed to the Secretary of the Commission and must include a full statement of the reasons why the Commission should grant such treatment. *See* 19 C.F.R. § 201.6. Documents for which confidential treatment by the Commission is sought will be treated accordingly. All nonconfidential written submissions will be available for public inspection at the Office of the Secretary.

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 sections 210.42-46 of the Commission's Rules of Practice and Procedure, 19 C.F.R. §§ 210.42-46.

By order of the Commission.

Marilyn R. Abbott
Secretary to the Commission

Issued: May 13, 2010

CERTAIN OPTOELECTRONIC DEVICES, COMPONENTS THEREOF, AND PRODUCTS CONTAINING THE SAME **337-TA-669**

CERTIFICATE OF SERVICE

I, Marilyn R. Abbott, hereby certify that the attached **NOTICE OF COMMISSION DECISION NOT TO REVIEW A FINAL INITIAL DETERMINATION FINDING A VIOLATION OF SECTION 337; REQUEST FOR WRITTEN SUBMISSIONS REGARDING REMEDY, BONDING, AND THE PUBLIC INTEREST** has been served by hand upon the Commission Investigative Attorney, Christopher G. Paulraj, Esq., and the following parties as indicated, on

May 13, 2010.

Marilyn R. Abbott, Secretary
U.S. International Trade Commission
500 E Street, SW
Washington, DC 20436

On Behalf of Complainants Avago Technologies Fiber IP (Singapore) PTE. Ltd.; Avago Technologies General IP (SINGAPORE) PTE. Ltd.; and, Avago Technologies Ltd.:

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UNITED STATES INTERNATIONAL TRADE COMMISSION

Washington, D.C.

In the Matter of **CERTAIN OPTOELECTRONIC DEVICES, COMPONENTS THEREOF,AND PRODUCTS CONTAINING THE SAME**	**Inv. No. 337-TA-669**

ERRATA REGARDING INITIAL DETERMINATION ON VIOLATION OF SECTION AND RECOMMENDED DETERMINATION ON REMEDY AND BOND

(March 29, 2010)

Please note that the Appearances for Complainant Avago Technologies Fiber IP (Singapore) Pte. Ltd.; Avago Technologies General IP, (Singapore) Pte. Ltd.; Avago Technologies Ltd. should include Katie Winstanley, Esq. of Novak Druce & Quigg LLP of San Francisco, California.

Theodore R. Essex
Administrative Law Judge

IN THE MATTER OF CERTAIN OPTOELECTRONIC DEVICES, COMPONENTS THEREOF AND PRODUCTS CONTAINING THE SAME **Inv. No. 337-TA-669**

CERTIFICATE OF SERVICE

I, Marilyn R. Abbott, hereby certify that the attached **ERRATA REGARDING INITIAL DETERMINATION ON VIOLATION OF SECTION 337 AND RECOMMENDED DETERMINATION ON REMEDY AND BOND** has been served by hand upon, the Commission Investigative Attorney, **Christopher G. Paulraj, Esq.** and the following parties as indicated on March 29, **2010**.

Marilyn R. Abbott

Marilyn R. Abbott, Secretary
U.S. International Trade Commission
500 E Street, SW, Room 112A
Washington, D.C. 20436

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IN THE MATTER OF CERTAIN OPTOELECTRONIC DEVICES, COMPONENTS THEREOF AND PRODUCTS CONTAINING THE SAME **Inv. No. 337-TA-669**

CERTIFICATE OF SERVICE - PAGE 2

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PUBLIC VERSION

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.

In the Matter of	
CERTAIN OPTOELECTRONIC DEVICES, COMPONENTS THEREOF, AND PRODUCTS CONTAINING SAME	**Investigation No. 337-TA-669**

INITIAL DETERMINATION ON VIOLATION OF SECTION 337 AND RECOMMENDED DETERMINATION ON REMEDY AND BOND

Administrative Law Judge Theodore R. Essex

(March 12, 2010)

Appearances:

For the Complainant Avago Technologies Fiber IP (Singapore) Pte. Ltd.; Avago Technologies General IP, (Singapore) Pte. Ltd.; Avago Technologies Ltd.:

Jerold I. Schneider, Esq.; John C. Vetter, Esq.; and Karen C. Kline, Esq. of Novak Druce & Quigg LLP of West Palm Beach, Florida

Tom E. Briones, Esq. and Aaron M. Levine, Esq. of Novak Druce & Quigg LLP of Houston, Texas

For the Respondent Emcore Corporation:

Frederick A. Lorig, Esq.; Harold A. Barza, Esq.; Sidford L. Brown, Esq.; Bruce Zisser, Esq.; and Erika Pennington, Esq. of Quinn Emanuel Urquhart Oliver & Hedges of Los Angeles, California

Louis S. Mastriani, Esq. and Ian A Tronji, Esq. of Adduci Mastriani & Schaumberg LLP of Washington, D.C.

For the Commission Investigative Staff:

Lynn I. Levine, Esq., Director; T. Spence Chubb, Esq., Supervising Attorney; Christopher G. Paulraj, Esq., Investigative Attorney of the Office of Unfair Import Investigations, U.S. International Trade Commission, of Washington, D.C.

Pursuant to the Notice of Investigation, 74 Fed. Reg. 10278 (2009), this is the Initial Determination of the in the matter of *Certain Optoelectronic Devices, Components Thereof, And Products Containing Same*, United States International Trade Commission Investigation No. 337-TA-669. *See* 19 C.F.R. § 210.42(a).

It is held that a violation of Section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. § 1337, has occurred in the importation into the United States, the sale for importation, or the sale within the United States after importation of certain optoelectronic devices, components thereof and products containing same that infringe one or more of claims 1, 2, 3 and 5 of U.S. Patent No. 5,359,447.[1] It is further held that no violation of Section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. § 1337, has occurred in the importation into the United States, the sale for importation, or the sale within the United States after importation of certain optoelectronic devices, components thereof and products containing same that infringe claim 6 of U.S. Patent No. 5,359,447 and one or more of claim 8 of U.S. Patent No. 5,761,229.

[1] In its post-hearing brief, Avago withdrew claim 4 from the investigation. (CIB at 5, note 2.)

TABLE OF CONTENTS

The following abbreviations may be used in this Initial Determination:

CDX	Complainants' demonstrative exhibit
CFF	Complainants' proposed findings of fact
CIB	Complainants' initial post-hearing brief
CORFF	Complainants' objections to Respondents' proposed findings of fact
COSFF	Complainants' objections to Staff's proposed findings of fact
CPX	Complainants' physical exhibit
CRB	Complainants' reply post-hearing brief
CX	Complainants' exhibit
Dep.	Deposition
JSUF	Joint Statement of Undisputed Facts
JX	Joint Exhibit
RDX	Respondents' demonstrative exhibit
RFF	Respondents' proposed findings of fact
RIB	Respondents' initial post-hearing brief
ROCFF	Respondents' objections to Complainants' proposed findings of fact
ROSFF	Respondents' objections to Staff's proposed findings of fact
RPX	Respondents' physical exhibit
RRB	Respondents' reply post-hearing brief
RRX	Respondents' rebuttal exhibit
RX	Respondents' exhibit
SFF	Staff's proposed findings of fact
SIB	Staff's initial post-hearing brief
SOCFF	Staff's objections to Complainants' proposed findings of fact
SORFF	Staff's objections to Respondents' proposed findings of fact
SRB	Staff's reply post-hearing brief
Tr.	Transcript

I. BACKGROUND

A. Institution and Procedural History of This Investigation

By publication of a notice in the *Federal Register* on March 10, 2009, pursuant to subsection (b) of section 337 of the Tariff Act of 1930, as amended, the Commission instituted Investigation No. 337-TA-669 with respect to U.S. Patent Nos. 5,359,447 and 5,761,229; to determine:

> [W]hether 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 optoelectronic devices, component thereof, and products containing same that infringe one or more of claims 1-6 of U.S. Patent No. 5,359,447 and claim 8 of U.S. Patent No.5,761,229, and whether an industry in the United States exists as required by subsection (a)(2) of section 337.

74 Fed. Reg. 10278 (2009).

Avago Technologies Fiber IP, (Singapore) Pte. Ltd. of Singapore; Avago Technologies General IP, (Singapore) Pte. Ltd. of Singapore; and Avago Technologies Ltd. of San Jose, California (collectively "Avago") are the complainants. (*Id.*) The respondent is Emcore Corporation ("Emcore") of Albuquerque, New Mexico. (*Id.*) The Commission Investigative Staff ("Staff") of the Commission's Office of Unfair Import Investigations is also a party in this investigation. (*Id.*)

On November 9, 2009, the ALJ granted in part Avago's motion for summary determination on ownership, but denied the remainder of Avago's motion for summary determination. (Order No. 11.) On December 7, 2009, the Commission determined not to review the order. (*See Notice of a Commission Determination Not to Review an Initial Determination Granting in Part Complainants' Motion for Summary Determination on Ownership of the Asserted Patents.*)

The evidentiary hearing on the question of violation of section 337 commenced on November 16, 2009, and concluded on November 20, 2009. Avago, Emcore, and Staff were represented at the hearing. (Tr., 81:1-82:25.)

B. The Parties

1. Avago

Complainants are Singapore corporations with a principal place of business at 1Yishun Avenue 7, Singapore 768923. (Complaint at ¶ 7.) Avago General IP and Avago Fiber IP are wholly owned subsidiaries of Avago Technologies. (Complaint at ¶ 7.) Collectively, Avago is involved in the research and development and manufacturing of optoelectronic products and components thereof. (Complaint at ¶ 8.)

2. Emcore

Emcore is a New Jersey corporation with its principal place of business in Albuquerque, New Mexico. (Complaint at ¶ 11; Response at ¶ 11.) Emcore also maintains facilities in China. (Complaint at ¶ 11; Response at ¶ 11.) Emcore manufactures abroad and offers for sale optoelectronic products and components thereof that are accused of infringing the U.S. Patent Nos. 5,359,447 and 5,761,229. (Complaint at ¶ 12; Response at ¶12.) Specifically, Emcore uses a contract manufacturer, Fabrinet Co., Ltd. ("Fabrinet") that manufactures the accused optoelectronic products on behalf of Emcore in Thailand. (JX-92; JX-93; Response at ¶13.) Emcore takes title to these products in Thailand and imports them into the United States for sale. (Response at ¶13.)

C. The Patents at Issue and Overview of the Technology

1. The '447 Patent

U.S. Patent No. 5,359,447 ("the '447 Patent"), entitled "Optical Communication With Vertical-Cavity Surface-Emitting Laser Operating In Multiple Transverse Modes," was filed on June 25, 1993, and issued on October 25, 1994. (*See* JX-1.) The '447 Patent relates to an optical communication system using a relatively large-area vertical-cavity surface-emitting laser ("VCSEL") where the laser has an opening larger than about eight micrometers and is coupled to a multimode optical medium, and the laser is driven into multiple transverse mode operation, which includes multiple filamentation as well as operation in a single cavity. (*Id.*) Kenneth H. Hahn, Michael R.T. Tan, and Shih-Yuan Wang are the named inventors of the '447 Patent. The '447 Patent was originally assigned to Hewlett-Packard Company, which subsequently assigned all rights under the patent to Agilent, which subsequently assigned all of its rights under the patent to Avago General IP. (*See* Order No. 11 at 3.)

The asserted claims of the '447 Patent are claims 1, 2, 3, 5 and 6. These claims read as follows (with the disputed claim terms in **bold**):

> 1. An **optical communication network** comprising:
>
> a vertical-cavity, surface-emitting semiconductor laser structure having an aperture larger than eight micrometers through which an optical signal may be emitted;
>
> a power supply that provides a bias current to drive the laser into a multiple transverse mode of operation in which the laser is responsive to a signal carrying data to provide an optical signal modulated with the data and to emit the optical signal through the aperture; and
>
> a **multimode optical medium optically coupled** to the laser to carry the optical signal from the laser to a remotely-located receiver.

> 2. A network as in claim 1 and further comprising a receiver, optically coupled to the optical medium that receives the modulated optical signal and recovers the data therefrom.
>
> 3. A network as in claim 1 wherein the multiple transverse mode of operation comprises more than two distinct transverse modes.
>
> 5. A network as in claim 1 wherein the multi-mode optical medium comprises an optical fiber.
>
> 6. A network as in claim 1 wherein the multi-mode optical medium comprises an optical waveguide.

(JX-1 at claims 1, 2, 3, 5 and 6.)

2. The '229 Patent

U.S. Patent No. 5,761,229 ("the '229 Patent") is entitled, "Integrated Controlled Intensity Laser-Based Light Source." (*See* JX-3.) The '229 Patent relates to the particular methods and apparatuses by which the intensity of light emitted by laser-based light sources having lasers with only one light-emitting face is controlled. (*Id.*) The '229 Patent issued on June 2, 1998 to named inventors Richard R. Baldwin, Scott W. Corzine, John P. Ertel, William D. Holland, Leif Eric Larson, David M. Sears, Michael R. T. Tan, Shih-Yuan Wang, Albert Yuen, and Tao Zhang. (*Id.*) The '229 Patent was originally assigned to Hewlett-Packard Company, which subsequently assigned all rights under the patent to Agilent, which subsequently assigned all of its rights under the patent to Avago General IP. (*See* Order No. 11 at 3.) The '229 Patent has 10 claims. (*Id.* at 24:23-26:24.) Only independent claim 8 is at issue in this investigation and reads as follows (with the disputed claim terms in **bold**):

> 8. **An integrated laser-based light source generating an output light beam having a controlled intensity**, the light source comprising:
> a package;
>
> **a laser having one and only one light-emitting face from which a light beam is radiated as a radiated light beam**, the radiated light beam having an intensity

> and a signal-to-noise ratio, the signal-to-noise ratio being dependent on the intensity; **the intensity at which the laser generates the radiated light beam with a signal-to-noise ratio above a threshold level** being greater than **a predetermined maximum intensity**;
>
> light sensor means for generating an electrical signal representing an intensity of light energy falling thereon: and
>
> coupling means for coupling a fraction of the radiated light beam to the light sensor means, and for providing a remainder of the radiated light beam as the output light beam, the coupling means being mounted in the package, together with the laser and the light sensor means, the coupling means coupling such a fraction of the radiated light beam to the light sensor means that **the output light beam has a signal-to-noise ratio greater than the threshold level and an intensity less than the predetermined maximum intensity**.
>
> (*Id.* at 25:15-26:13.)

D. The Products At Issue

The products accused of infringing the asserted claims of the '447 Patent are broken down into six categories. (JX-06; Complaint at ¶¶ 21-25, 49-55.) Those product categories are:

Type A: 12-channel parallel transmitter and receiver sets

Type B: 4-channel parallel transceiver modules

Type C: VCSEL transmitter optical subassemblies ("TOSAs") and receiver optical subassemblies ("ROSAs")

Type D: 1x12 and 1x4 VCSEL arrays and photodiode arrays

Type E: Singlet VCSELs and singlet pin photodiodes

Type F: VCSELs in TO cans

Avago has also accused Emcore's VCSEL transmitter optical subassemblies ("TOSAs") ("Type C") and Emcore's VCSELs in "TO cans" ("Type F") of infringing claim 8 of the '229 patent. (JX-6; Complaint at ¶ 59.)

The evidence in this investigation establishes that the 1x12 and 1x4 VCSEL arrays identified as the accused Type D products are subcomponents of Emcore's 12-channel parallel transmitter and receiver sets ("Type A") or Emcore's 4-channel transceiver modules ("Type B"). (CX-231C at Q. 288, 291.) The evidence also establishes that the singlet VCSELs identified as the accused Type E products are used as subcomponents of the VCSELs in TO cans (Type F), which in turn are used as subcomponents of the TOSAs identified as the accused Type C products. (CX-231C at Q. 372, 376.) Each of the accused Emcore products includes either a VCSEL or a photodiode used to detect the light emitted by a VCSEL. (JX-6.)

II. IMPORTATION OR SALE

The importation or sale requirement of Section 337 has not been contested. (*See generally* RIB at 10; ROCPFF69, 72-79; RFF I.B.6 .) The evidence shows that Emcore imported and/or sold within the United States after importation certain of the accused products, including at least some of the 12 channel (MTR/MTX) products and all of the Emcore 4-channel (QTR) products. (*See* JX-32C; JX-92; JX-93; CX-121C.)

III. JURISDICTION

A. Personal and Subject Matter 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. *See Certain Steel Rod Treating Apparatus and Components Thereof*, Inv. No. 337-TA-97, Commission Memorandum Opinion, 215 U.S.P.Q. 229, 231 (1981). For the reasons discussed below, the ALJ finds the Commission has jurisdiction over this investigation.

Section 337 declares unlawful the importation, the sale for importation, or the sale after importation into the United States of articles that infringe a valid and enforceable United States patent by the owner, importer, or consignee of the articles, if an industry relating to the articles protected by the patent exists or is in the process of being established in the United States. *See* 19 U.S.C. §§ 1337(a)(1)(B)(I) and (a)(2). Pursuant to Section 337, the Commission shall investigate alleged violations of the Section and hear and decide actions involving those alleged violations.

As set forth *supra* in Section II, there is no dispute that Emcore has met the importation requirement. Furthermore, the parties do not dispute that the Commission has *in personam* and *in rem* jurisdiction. (CIB at 14; RIB at 10; SIB at 5-6.) Emcore has fully participated in the investigation, including participating in discovery, participating in the hearing, and filing pre-hearing and post-hearing briefs. Accordingly, the ALJ finds that Emcore has submitted to the jurisdiction of the Commission. *See Certain Miniature Hacksaws*, Inv. No. 337-TA-237, Pub. No. 1948, Initial Determination at 4, 1986 WL 379287 (U.S.I.T.C., October 15, 1986) (unreviewed by Commission in relevant part).

IV. CLAIM CONSTRUCTION

A. Applicable Law

Pursuant to the Commission's Notice of Investigation, this investigation is a patent-based investigation. *See* 73 Fed. Reg. 54617 (2008). Accordingly, all of the unfair acts alleged by Avago to have occurred are instances of alleged infringement of the '447 and '229 Patents. A finding of infringement or non-infringement requires a two-step analytical approach. First, the

asserted patent claims must be construed as a matter of law to determine their proper scope.[2] Claim interpretation is a question of law. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 979 (Fed. Cir. 1995) (*en banc*), *aff'd*, 517 U.S. 370 (1996); *Cybor Corp. v. FAS Techs., Inc.*, 138 F.3d 1448, 1455 (Fed. Cir. 1998). Second, a factual determination must be made as to whether the properly construed claims read on the accused devices. (*Id.* at 976).

In construing claims, the ALJ should first look to intrinsic evidence, which consists of the language of the claims, the patent's specification, and the prosecution history, as such evidence "is the most significant source of the legally operative meaning of disputed claim language." *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996); *see also Bell Atl. Network Servs., Inc. v. Covad Comm'n. Group, Inc.*, 262 F.3d 1258, 1267 (Fed. Cir. 2001). The words of the claims "define the scope of the patented invention." *Id.* And, the claims themselves "provide substantial guidance as to the meaning of particular claim terms." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1314 (Fed. Cir. 2005), *cert. denied*, 546 U.S. 1170 (2006). It is essential to consider a claim as a whole when construing each term, because the context in which a term is used in a claim "can be highly instructive." *Id.* Claim terms are presumed to be used consistently throughout the patent, such that the usage of the term in one claim can often illuminate the meaning of the same term in other claims. *Research Plastics, Inc. v. Federal Pkg. Corp.*, 421 F.3d 1290, 1295 (Fed. Cir. 2005). In addition:

> . . . in clarifying the meaning of claim terms, courts are free to use words that do not appear in the claim so long as the resulting claim interpretation . . . accord[s] with the words chosen by the patentee to stake out the boundary of the claimed property.

Pause Tech., Inc. v. TIVO, Inc., 419 F.3d 1326, 1333 (Fed. Cir. 2005).

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[2] Only claim terms in controversy need to be construed, and only to the extent necessary to resolve the controversy. *Vanderlande Indus. Nederland BV v. Int'l Trade Comm'n.*, 366 F.3d 1311, 1323 (Fed. Cir. 2004); *Vivid Tech., Inc. v. American Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999).

Some claim terms do not have particular meaning in a field of art, in which case claim construction involves little more than applying the widely accepted meaning of commonly understood words. *Phillips*, 415 F.3d at 1314. Under such circumstances, a general purpose dictionary may be of use.[3] The presumption of ordinary meaning, however, will be "rebutted if the inventor has disavowed or disclaimed scope of coverage, by using words or expressions of manifest exclusion or restriction, representing a clear disavowal of claim scope." *ACTV, Inc. v. Walt Disney Co.*, 346 F.3d 1082, 1091 (Fed. Cir. 2003).

Sometimes a claim term will have a specialized meaning in a field of art, in which case it is necessary to determine what a person of ordinary skill in that field of art would understand the disputed claim language to mean, viewing the claim terms in the context of the entire patent. *Phillips*, 415 F.3d at 1312-14; *Vitronics*, 90 F.3d at 1582. Under such circumstances, the ALJ must conduct an analysis of the words of the claims themselves, the patent specification, the prosecution history, and extrinsic evidence concerning relevant scientific principles, as well as the meaning of technical terms and the state of the art. *Id.*

A patentee may deviate from the conventional meaning of claim term by making his or her intended meaning clear (1) in the specification and/or (2) during the patent's prosecution history. *Lear Siegler, Inc. v. Aeroquip Corp.*, 733 F.2d 881, 889 (Fed. Cir. 1984). If a claim term is defined contrary to the meaning given to it by those of ordinary skill in the art, the specification must communicate a deliberate and clear preference for the alternate definition. *Kumar v. Ovonic Battery Co.*, 351 F.3d 1364, 1368 (Fed. Cir. 2003). In other words, the intrinsic evidence must "clearly set forth" or "clearly redefine" a claim term so as to put one

[3] Use of a dictionary, however, may extend patent protection beyond that to which a patent should properly be afforded. There is also no guarantee that a term is used the same way in a treatise as it would be by a patentee. *Id.* at 1322.

reasonably skilled in the art on notice that the patentee intended to so redefine the claim term. *Bell Atl.*, 262 F.3d at 1268.

When the meaning of a claim term is uncertain, the specification is usually the first and best place to look, aside from the claim itself, in order to find that meaning. *Phillips*, 415 F.3d at 1315. The specification of a patent "acts as a dictionary" both "when it expressly defines terms used in the claims" and "when it defines terms by implication." *Vitronics*, 90 F.3d at 1582. For example, the specification "may define claim terms by implication such that the meaning may be found in or ascertained by a reading of the patent documents." *Phillips*, 415 F.3d at 1323. "The construction that stays true to the claim language and most naturally aligns with the patent's description of the invention will be, in the end, the correct construction." *Id.* at 1316. However, as a general rule, particular examples or embodiments discussed in the specification are not to be read into the claims as limitations. *Markman*, 52 F.3d at 979.

The prosecution history "provides evidence of how the inventor and the PTO understood the patent." *Phillips*, 415 F.3d at 1317. For example, the prosecution history may inform the meaning of the claim language by demonstrating how an inventor understood the invention and whether the inventor limited the invention in the course of prosecution, making the claim scope narrower than it otherwise would be. *Vitronics*, 90 F.3d at 1582-83; *see also Chimie v. PPG Indus., Inc.*, 402 F.3d 1371, 1384 (Fed. Cir. 2005) (stating, "The purpose of consulting the prosecution history in construing a claim is to exclude any interpretation that was disclaimed during prosecution."); *Microsoft Corp. v. Multi-tech Sys., Inc.*, 357 F.3d 1340, 1350 (Fed. Cir. 2004) (stating, "We have held that a statement made by the patentee during prosecution history of a patent in the same family as the patent-in-suit can operate as a disclaimer."). The prosecution history includes the prior art cited, *Phillips*, 415 F.3d at 1317, as well as any

reexamination of the patent. *Intermatic Inc. v. Lamson & Sessions Co.*, 273 F.3d 1355, 1367 (Fed. Cir. 2001).

Differences between claims may be helpful in understanding the meaning of claim terms. *Phillips*, 415 F.3d at 1314. A claim construction that gives meaning to all the terms of a claim is preferred over one that does not do so. *Merck & Co. v. Teva Pharms. USA, Inc.*, 395 F.3d 1364, 1372 (Fed. Cir.), *cert. denied*, 546 U.S. 972 (2005); *Alza Corp. v. Mylan Labs. Inc.*, 391 F.3d 1365, 1370 (Fed. Cir. 2004). In addition, the presence of a specific limitation in a dependent claim raises a presumption that the limitation is not present in the independent claim. *Phillips*, 415 F.3d at 1315. This presumption of claim differentiation is especially strong when the only difference between the independent and dependent claim is the limitation in dispute. *SunRace Roots Enter. Co., v. SRAM Corp.*, 336 F.3d 1298, 1303 (Fed. Cir. 2003). "[C]laim differentiation takes on relevance in the context of a claim construction that would render additional, or different, language in another independent claim superfluous." *AllVoice Computing PLC v. Nuance Comm'ns, Inc.*, 504 F.3d 1236, 1247 (Fed. Cir. 2007).

The preamble of a claim may also be significant in interpreting that claim. The preamble is generally not construed to be a limitation on a claim. *Bell Commc'ns Research, Inc. v. Vitalink Commc'ns Corp.*, 55 F.3d 615, 620 (Fed. Cir. 1995). However, the Federal Circuit has stated that:

> [A] claim preamble has the import that the claim as a whole suggests for it. In other words, when the claim drafter chooses to use both the preamble and the body to define the subject matter of the claimed invention, the invention so defined, and not some other, is the one the patent protects.

Eaton Corp. v. Rockwell Int'l Corp., 323 F.3d 1332, 1339 (Fed. Cir. 2003). If said preamble, when read in the context of an entire claim, recites limitations of the claim, or if the claim preamble is "necessary to give life, meaning, and vitality" to the claim, then the claim preamble

should be construed as if in the balance of the claim. *Kropa v. Robie*, 187 F.2d 150, 152 (CCPA 1951); *see also Rowe v. Dror*, 112 F.3d 473, 478 (Fed. Cir. 1997); *Corning Glass Works v. Sumitomo Elec. U.S.A., Inc.*, 868 F.2d 1251, 1257 (Fed. Cir. 1989). In addition:

> [W]hen discussing the "claim" in such a circumstance, there is no meaningful distinction to be drawn between the claim preamble and the rest of the claim, for only together do they comprise the "claim." If, however, the body of the claim fully and intrinsically sets forth the complete invention, including all of its limitations, and the preamble offers no distinct definition of any of the claimed invention's limitations, but rather merely states the purpose or intended use of the invention, then the preamble may have no significance to claim construction because it cannot be said to constitute or explain a claim limitation.

Pitney Bowes, Inc. v. Hewlett-Packard Co., 182 F.3d 1298, 1305 (Fed. Cir. 1999).

In *Pitney Bowes*, the claim preamble stated that the patent claimed a method of, or apparatus for, "producing on a photoreceptor an image of generated shapes made up of spots." *Id.* at 1306. The Federal Circuit found that this was not merely a statement describing the invention's intended field of use, but rather that said statement was intimately meshed with the ensuing language in the claim. *Id.* For example, both of the patent's independent claims concluded with the clause, "whereby the appearance of smoothed edges are given to the generated shapes." *Id.* Because this was the first appearance in the claim body of the term "generated shapes," the Court found that it could only be understood in the context of the preamble statement "producing on a photoreceptor an image of generated shapes made up of spots." *Id.* The Court concluded that it was essential that the preamble and the remainder of the claim be construed as one unified and internally consistent recitation of the claimed invention. *Id.*

Finally, when the intrinsic evidence does not establish the meaning of a claim, the ALJ may consider extrinsic evidence, *i.e.*, all evidence external to the patent and the prosecution history, including inventor testimony, expert testimony and learned treatises. *Phillips*, 415 F.3d

at 1317. Extrinsic evidence may be helpful in explaining scientific principles, the meaning of technical terms, and terms of art. *Vitronics*, 90 F.3d at 1583; *Markman*, 52 F.3d at 980. However, the Federal Circuit has generally viewed extrinsic evidence as less reliable than the patent itself and its prosecution history in determining how to define claim terms. *Phillips*, 415 F.3d at 1318. With respect to expert witnesses, any testimony that is clearly at odds with the claim construction mandated by the claims themselves, the patent specification, and the prosecution history should be discounted. *Id.* at 1318.

If the meaning of a claim term remains ambiguous after a review of the intrinsic and extrinsic evidence, then the patent claims should be construed so as to maintain their validity. *Id.* at 1327. However, if the only reasonable interpretation renders a claim invalid, then the claim should be found invalid. *See Rhine v. Casio, Inc.*, 183 F.3d 1342, 1345 (Fed. Cir. 1999).

B. The '447 Patent

1. Level of Ordinary Skill in the Art

Avago has proposed that the person of ordinary skill in the art is as follows: "[t]he level of ordinary skill in the art is that of 'the average person working in the field of the subject matter of the claims of the '447 patent as of 1993, i.e., a person with a Ph.D. and several years of experience, or the equivalent in total years of experience.'" (CIB at 15.)

Emcore in their post hearing brief seem to agree: "[a] person of ordinary skill in the art would be the average person working in the field of the subject matter of the claims of the '447 patent as of 1993 had a Ph.D. and several years of experience, or the equivalent in total years of experience." (RIB at 22.)

The Staff also agrees: "[t]he Staff agrees with Avago's proposed level of ordinary skill in the art, but submits that there is not a significant dispute over the requisite level of ordinary skill relevant to the '447 patent." (SIB at 6.)

The parties have very similar definitions of the person of ordinary skill in the art. The ALJ finds that a person of ordinary skill in the art is a person working in the field of the subject matter of the claims of the '447 Patent as of 1993, *i.e.*, a person with a Ph.D. and several years of experience, or the equivalent in total years of experience in the field.

2. Disputed Claim Terms

a) "optical communication network"

There has been some dispute based on the briefs as to what the disputed claims terms are in this matter. Avago, in its post hearing brief, began its discussion of the disputed claim terms by citing the first disputed term as "optical communication network." In a footnote to the term however, they stated, "Avago agrees with the statement in Emcore's Pre-Hearing Brief, at 11 that any dispute involving this term should not impact any issue in this investigation." (CIB at 17, note 4.) In Emcore's post hearing brief, Emcore stated "[t]he '447 patent contains one independent and five dependent claims. Avago has asserted claims 1-3 and 5-6. The asserted claims of the '447 patent are reproduced below, with the disputed claim terms bolded." (RIB at 23-24.) They then, in listing the disputed claims terms, did not list optical communication network in bold. (*Id.*) The Staff listed the term as disputed, but also iterated its belief that the term did not impact any issue in this case. (SIB at 7-9.) Because the term is no longer disputed by the respondents, the ALJ finds that it is not necessary to construe the meaning of "optical communication network." *See Vanderlande Indus. Nederland BV v. Int'l Trade Comm.*, 366 F.3d 1311, 1323 (Fed. Cir. 2004) (only claim terms in controversy need to be construed, and

only to the extent necessary to resolve the controversy); *Vivid Tech., Inc. v. American Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999).

b) "Multimode optical medium"

The primary claim construction dispute with regard to the '447 Patent is over the term "multimode optical medium" as it is recited in claim 1. Avago's proposed construction requires a multimode optical fiber or multimode waveguide, but Emcore's proposed construction includes the atmosphere, *i.e.,* free space.

Avago's Proposed Construction	Emcore's Proposed Construction	Staff's Proposed Construction
A person of ordinary skill in the art would construe this phrase to mean a guided wave medium having width that allows for total internal reflection such that that wave is confined therein, *e.g.*, a silica multimode fiber having an opening and cladding, or a polymer wave guide. A person of ordinary skill in the art would recognize that a given optical medium may be capable of supporting many modes or only a single mode. This is determined by physical parameters such as – in the case of an optical fiber – the diameter of the fiber and the difference between the indices of refraction of the core and cladding	Any medium through which multiple modes of an optical signal can propagate.	A guided wave medium (*e.g.*, an optical fiber or a waveguide) through which multiple modes of an optical signal can propagate.

Emcore argues that the construction should include free space, *i.e.*, air, as a multimode medium. Their argument is not supported by either the patent claims or the specification and is solely an attempt to bring the patent within the scope of a prior art reference:

> Whether free space constitutes a "multimode optical medium" is an issue in determining whether the Von Lehmen reference anticipates the claims of the '447 patent. As already noted, that reference discloses a 20 micron VCSEL, biased into multiple mode operation, used in an optical link, but the experiments reported there did not use a MMF or other waveguide as an optical medium to convey the signal from the VCSEL transmitter to the receiver. Instead, the signal was transmitted through free space to the receiver.

(RIB at 26.) Emcore fails to reference any support for their argument in the claims or the specification. The Federal Circuit has emphasized that the specification "is *always highly relevant* to the claim construction analysis. Usually, it is *dispositive*; it is the *single best guide* to the meaning of a disputed term." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1315 (Fed. Cir. 2005) (*en banc*) (emphasis added). The specification consistently describes the optical medium as either an optical fiber or an optical waveguide. Indeed, the very first sentence in the "Background of the Invention" section of the patent states:

> The present invention relates generally to optical transmission of signals and more particularly to an optical communication network *of the kind having a multi-mode optical fiber* that receives a multiple mode beam of light from a vertical-cavity, surface-emitting laser being operated in multiple modes or multiple filamentation.

(JX-1 at 1:8-14) (emphasis added). The patent goes on to state that "[t]he optical medium carries the modulated beam of light from the SEL to a receiver at a remote location." (*Id.* at 3:59-60.) The specification goes on to explain that "[e]very optical communication system includes, at a minimum, three elements," which includes "a medium *such as an optical fiber* that carries the beam of light from the transmitter to the receiver." (*Id.* at 1:28-34) (emphasis added). It further states that "[t]he medium may be *an optical waveguide or the like instead of an optical fiber*."

(*Id.* at 1:37-38) (emphasis added). The patent further references the use of fiber, or a physical medium in several other places in the specification:

> Interference between different modes in a multimode medium carrying a coherent light beam produces a speckle pattern. Ideally this speckle pattern would remain stationary, but in practice it moves about within the medium. Speckle pattern movement may be caused by physical jostling or other movement of *the fiber itself* (relatively slow movement) or by laser mode partitioning and the like (relatively fast movement).

(*Id.* at 2:54-61) (emphasis added). All of the references provided in the patent refer to a physical medium that the light beams travel over, not air. (*Id.* at 3:1-35.) The summary of the invention states:

> Briefly and in general terms, the invention is embodied in an optical communication system having a vertical-cavity, surface-emitting laser ("SEL"). A multimode optical medium *such as an optical fiber* is coupled to the SEL.

(*Id.* at 3: 47-50) (emphasis added).

Emcore asserts that these statements in the specification are not intended to limit the invention to the particular examples where an optical fiber or waveguide is used. (RIB at 17.) As noted above, however, the references to an optical fiber or waveguide as the multimode optical medium are not merely confined to the preferred embodiment described in the specification. Rather, the statements describing the multimode optical medium as either an optical fiber or waveguide appear to be *definitional*. Although the use of the phrases "such as" and "or the like" in these statements may indicate that another similar type of guided wave medium could also be used as the multimode optical medium, the evidence fails to establish that a person of ordinary skill in the art would have considered free space to be analogous or equivalent to a multimode optical fiber or waveguide. A person of ordinary skill in the art would have known that the use of free space as an optical medium required certain additional

considerations that would not be applicable to the types of guided wave media described in the '447 Patent. For example, as Dr. Chang-Hasnain testified, the use of free space, but not optical fibers, requires a "line of sight." (Chang-Hasnain, Tr. 1319:13-24.)

Moreover, the invention described in the '447 Patent specifically addresses the problems of "mode selective losses" and "modal noise" that are associated with the use of multimode optical media such as multimode fibers and multimode waveguides. For example, the specification states that "[a] drawback of multimode optical media has been that these media are subject to mode selective losses." (JX-1 at 2:38-39.) The specification states that "[t]hese losses may be, for example, splices in the medium, power splitters and other devices that are connected to the medium, and physical defects such as poor quality connections and misalignment of components." (*Id.* at 2:42-46.) The specification also describes the occurrence of "speckle pattern movement," which "may be caused by physical jostling or other movement of the fiber itself (relatively slow movement) or by laser mode partitioning and the like (relatively fast movement)." (*Id.* at 2:58-61.) The specification further cites to two references that specifically describe the problem of "modal noise" in fiber optic systems. (*Id.* at 3:1-8.) Although Dr. Deppe acknowledged during cross-examination that modal noise may also occur in free space, he further testified that the issue of "mode mixing" is not an issue in free space, and that in free space "you don't have the type of modal interference that leads to the noise that we see in multi-mode fibers." (Deppe, Tr. 978:8-979:9.)

Therefore the ALJ finds that the phrase "multimode optical medium" means: a guided wave medium (*e.g.*, an optical fiber or a waveguide) through which multiple modes of an optical signal can propagate.

c) "Optically Coupled"

Avago's Proposed Construction	Emcore's Proposed Construction	Staff's Proposed Construction
A person of ordinary skill in the art would construe this phrase to mean acceptance of light into the multimode optical medium in [an] amount sufficient for the purpose of the application. (Avago Br. at 23)	In the context of this claim, the multimode optical medium is "optically coupled" to the laser to carry the optical signal from the laser to a remotely located receiver if the signal from the laser propagates through said optical medium from the laser to the receiver (Emcore Br. at 19)	Acceptance of light into the multimode optical medium in an amount sufficient for the purposes of the application

While Emcore did not address this claim term in its post hearing brief, they did mention the term in their reply brief, stating that light emitted into free space is automatically coupled into the free space medium. (RRB at 9.) Their brief asserts that there is no requirement that the "step" of optically coupling be taken, so that free space can be included as a multimode optical medium, and therefore "optically coupled' to the laser. As the ALJ has determined the phrase "multimode optical medium" means: "[a] guided wave medium (*e.g.*, an optical fiber or a waveguide) through which multiple modes of an optical signal can propagate," the term "optically coupled" means "acceptance of light into the multimode optical medium in an amount sufficient for the purposes of the application."

d) "aperture"

Emcore has never identified a dispute as to the meaning of the term "aperture." Pursuant to Order No. 4, the Procedural Schedule, Emcore should have identified and proposed a construction for "aperture" long ago. "Aperture" was not identified by Emcore on its July 1, 2009, list of disputed claim terms, nor did Emcore provide a construction of "aperture" in its July 10, 2009, proposed construction of disputed claim terms. (CRRFF III.C.1-d & -e) The ALJ finds

that as this term is first raised as a disputed term in the post hearing briefs, that it does not need to be construed, and shall not be.

C. The '229 Patent

1. Level of Ordinary Skill in the Art

Avago argues that "the average person working in the field of the subject matter of the claims of the '229 Patent as of 1996 had a Ph.D. and several years of experience, or the equivalent in total years of experience." (CX-231C at Q. 532.) Emcore argues that the level of ordinary skill in the art relevant to the '229 Patent as of its January 25, 1996 filing date would be a person having at least a Bachelor's degree in physics or electrical engineering, along with a substantial combination of education at a graduate level and experience in the field of photonics, solid state lasers, and their applications. (RIB at 108.) The Staff adopts Emcore's proposal, but argues that there is not a significant dispute over the requisite level of ordinary skill in the art relevant to the '229 Patent. (SIB at 80.) The Staff further argues that any differences between the private parties' proposed skill levels do not affect the outcome of any issues to be decided in this investigation. (*Id.*)

There is little practical difference in Emcore's and Avago's proposed levels of skill in the art. The ALJ finds that a person of ordinary skill in the art at the time of the '229 Patent would at least have a Master's degree in physics or electrical engineering, with experience in either the fields of photonics or solid state lasers, or their applications.

2. Disputed Claim Terms

The following claim terms are in dispute: (1) "[a]n integrated laser-based light source generating an output light having a controlled intensity"; (2) "a laser having one and only one

light-emitting face from which a light beam is radiated as a radiated light beam"; (3) "the intensity at which the laser generates the radiated light beam with a signal-to-noise ratio above a threshold level"; (4) "predetermined maximum intensity"; and (5) "the output light beam has a signal-to-noise ratio greater than the threshold level and an intensity less than the predetermined maximum intensity."

a) "An integrated laser-based light source generating an output light having a controlled intensity"

Avago's Proposed Construction	Emcore's Proposed Construction	Staff's Proposed Construction
No special construction needed.	A light source that comprises both a laser and a feedback mechanism in which the intensity of the beam is monitored by a detector and the detected intensity is used to control the current supplied to the laser so as to control the intensity of the output of the laser.	No special construction needed.

In general, a preamble limits the claimed invention if it "recites essential structure or steps, or if it is necessary to give life, meaning, and vitality to the claim." *Catalina Mktg. Int'l, Inc. v. Coolsavings.com, Inc.*, 289 F.3d 801, 808 (Fed. Cir. 2002) (internal quotation marks omitted). Thus, if the preamble helps to determine the scope of the patent claim, then it is construed as part of the claimed invention. *Bell Communications Research, Inc. v. Vitalink Communications Corp.*, 55 F.3d 615, 620 (Fed. Cir. 1995) ("[W]hen the claim drafter chooses to use both the preamble and the body to define the subject matter of the claimed invention, the invention so defined, and not some other, is the one the patent protects."). "When limitations in the body of the claim rely upon and derive antecedent basis from the preamble, then the

preamble may act as a necessary component of the claimed invention." *Eaton Corp. v. Rockwell Int'l Corp.*, 323 F.3d 1332, 1339 (Fed. Cir. 2003); *see also C.R. Bard, Inc. v. M3 Sys., Inc.*, 157 F.3d 1340, 1350 (Fed. Cir. 1998) ("[A] preamble usually does not limit the scope of the claim unless the preamble provides antecedents for ensuing claim terms and limits the claim accordingly."). Additionally, a preamble is not limiting "where a patentee defines a structurally complete invention in the claim body and uses the preamble only to state a purpose or intended use for the invention." *Rowe v. Dror*, 112 F.3d 473, 478 (Fed. Cir.1997); *Catalina Mktg. Int'l, Inc. v. Coolsavings.com, Inc.*, 289 F.3d 801 (Fed. Cir. 2002). Moreover, absent clear reliance on the preamble in the prosecution history, or in situations where it is necessary to provide antecedent basis for the body of the claim (as mentioned above), the preamble generally is not limiting. *Symantec Corp. v. Computer Assocs. Int'l, Inc.*, 522 F.3d 1279, 1288 (Fed. Cir. 2008).

The ALJ finds that the preamble of claim 8 does not limit the claim because claim 8 recites a complete invention and the preamble neither provides needed structure nor antecedent basis for any of the limitations in the body of the claim. Accordingly, the ALJ finds that this claim term need not be construed. With regard to Emcore's proposed construction, the ALJ finds it unpersuasive for the reasons discussed above and because it would impermissibly incorporate additional limitations that are not found in the language of claim 8. In particular, the ALJ notes that Emcore's proposed construction requires a "feedback mechanism," which is recited in dependent claim 9. *Philips*, 415 F.3d at 1315 ("the presence of a dependent claim that adds a particular limitation gives rise to a presumption that the limitation in question is not present in the independent claim.")

b) "a laser having one and only one light-emitting face from which a light beam is radiated as a radiated light beam"

Avago's Proposed Construction	Emcore's Proposed Construction	Staff's Proposed Construction
A vertical-cavity surface-emitting laser.	A laser that radiates a light beam from one end of its cavity and does not radiate a light beam from both ends of its cavity.	A laser that radiates a light beam from one end of its cavity and does not radiate a light beam from both ends of its cavity.

The primary dispute over the construction of this phrase is whether the claimed laser should be limited to a vertical-cavity surface-emitting laser ("VCSEL"), as proposed by Avago, or whether it can include any laser that radiates a light beam from only one end of its cavity, as proposed by Emcore and the Staff. Avago argues that the claim language supports its proposed construction because "[a] person of ordinary skill in the art would understand that only a VCSEL emits a radiated light beam from a single light-emitting face as limited by its fabrication using epitaxial crystal growth." (CIB at 101.) Contrary to Avago's argument, however, the evidence in this investigation establishes that a person of ordinary skill in the art would have known that other types of lasers, including "edge-emitting" lasers, also have only a single light-emitting face from which a light beam is radiated. In fact, the evidence establishes that most lasers at the time prior to the filing of the '229 Patent was configured to emit light from only one end. (*See* RX-455C at Q.35; *see also* CX-257C at Q. 426 (referring to "edge-emitting lasers" as falling within the category of "lasers emitting from more than one face").) Thus, the ALJ finds that the claim language does not support Avago's proposed construction.

The ALJ also finds that the specification does not support Avago's proposed construction. Although VCSELs are exclusively used as the laser in the preferred embodiments described in the '229 Patent, the Abstract, Background, and Summary of the Invention sections of the patent broadly and consistently refer to "a laser that has one and only one light-emitting face" when

describing the invention. (*See e.g.*, JX-3 at 3:65-67, Abstract.) Moreover, as Avago itself acknowledges, a person of ordinary skill would understand that even VCSELs could be manufactured so that they emit light from more than one face, thereby falling outside the scope of Emcore's proposed claim construction. (*See* CIB at 107 (describing overlap of "VCSELs" and "lasers emitting from more than one face" in Venn diagram).)

Accordingly, for the reasons discussed above, the ALJ finds that one of ordinary skill in the art at the time of the invention would construe the phrase "a laser having one and only one light-emitting face from which a light beam is radiated as a radiated light beam" as meaning "a laser that radiates a light beam from only one end of its cavity."

c) "the intensity at which the laser generates the radiated light beam with a signal-to-noise ratio above a threshold level"

Avago's Proposed Construction	Emcore's Proposed Construction	Staff's Proposed Construction
A person of ordinary skill in the art would construe this language to mean that: the light emitted by the VCSEL, when operated such that it has a signal to noise ratio above a threshold signal-to-noise ratio, is above a predetermined maximum intensity.	The minimum intensity at which the laser's signal-to-noise ratio (SNR) satisfies the specified SNR threshold requirement.	The light emitted by the VCSEL, when operated such that it has a signal-to-noise ratio above a threshold signal-to-noise ratio is above a predetermined maximum intensity.[4]

The phrase "the intensity at which the laser generates the radiated light beam with a signal-to-noise ratio above a threshold level" is a part of the larger phrase in claim 8 requiring "the intensity at which the laser generates the radiated light beam with a signal-to-noise ratio above a threshold level being greater than a predetermined maximum intensity." The ALJ finds

[4] It is confusing that the Staff should choose to limit its construction to "light emitted by the VCSEL" when the Staff argued with regard to the preamble that the invention was not limited to VCSEL.

that the limitation "the intensity at which the laser generates the radiated light beam with a signal-to-noise ratio above a threshold level" is more easily understood when construed as part of the entire phrase and therefore will construe the phrase in its entirety. Notably, Avago's and the Staff's proposed constructions are also directed to the entire phrase.

The ALJ finds little actual disagreement between the parties' proposed constructions.[5] In fact, Emcore has asserted that although it "believes that its proposed construction of this term is more consistent with the way one of ordinary skill in the art would have understood the term at the time of the application, it does not believe that the dispute regarding this claim construction impacts any issue in this case." (RIB at 111.) The Staff too asserts that there is no significant dispute over the construction of this phrase. (SIB at 84.) While Avago argues that Emcore's proposed construction is incorrect because it requires that the intensity of the light generated by the laser is the "minimum intensity" required to ensure that the laser's signal-to-noise ratio satisfies the specific signal-to-noise ratio threshold requirement, it is worth noting that Avago's own construction requires that the laser operate "above a threshold signal-to-noise ratio" and "above a predetermined maximum intensity."

Consistent with the plain language of the claim, the ALJ finds that one of ordinary skill in the art at the time of the invention would construe the phrase "the intensity at which the laser generates the radiated light beam with a signal-to-noise ratio above a threshold level being greater than a predetermined maximum intensity" as requiring that the laser operate such that the signal-to-noise ratio of the light generated by the laser is above some threshold signal-to-noise ratio and the intensity of the light generated by the laser is greater than a predetermined maximum intensity.

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[5] To the extent Avago's and the Staff's proposed construction limits the laser to a VCSEL, the ALJ rejects these proposed constructions for the reasons discussed *supra*, at IV.C.2.b.

d) "predetermined maximum intensity"

Avago's Proposed Construction	Emcore's Proposed Construction	Staff's Proposed Construction
The eye-safety level.	The targeted upper bound for the intensity of the signal.	The targeted upper bound for the intensity of the signal.

The dispute regarding the construction of this limitation is whether the term "predetermined maximum intensity" in the claim language refers to the "eye-safety" limit of the laser, as Avago contends, or whether it should be more broadly construed as any "targeted upper bound for the intensity of the signal," as Emcore and the Staff contends. Although an eye-safety limit is one type of predetermined maximum intensity discussed in the '229 Patent, the evidence of record establishes that those skilled in the art would understand that there could be other types of maximum intensity requirements depending on the particular application for the laser. For example, the evidence shows that certain laser applications may require a maximum saturation or damage level for sensors, or a maximum line-width application for printer applications. (*See* RX-455C at Q. 28.) In fact, the '229 Patent expressly discloses laser applications where these other types of predetermined maximum intensities might be required. (JX-3 at 1:10-14; *see also* Wang, Tr. 459:1-4 (testifying that the '229 patent "may be written also for printing applications").) Moreover, the specification explicitly states that "[i]n some applications, the maximum intensity of the output light beam 119 must be limited for eye safety reasons," which insinuates that there are other applications where the maximum intensity of the output laser beam may be limited for other reasons. (JX-3 at 10:41:43.)

For the reasons discussed above, the ALJ finds Avago's proposed construction to be overly restrictive and finds in keeping with the plain language of the claim as interpreted in light of the specification that one of ordinary skill in the art at the time of the invention would

construe the limitation "predetermined maximum intensity" to mean "the targeted upper bound for the intensity of the signal."

e) "the output light beam has a signal-to-noise ratio greater than the threshold level and an intensity less than the predetermined maximum intensity"

This limitation is no longer in dispute. (*See* CRB at 40; RIB at 78; SIB at 87.) The parties all agree that this limitation needs no special construction as long as it is interpreted consistently with the other limitations recited in the claims. (*Id.*)

V. INFRINGEMENT DETERMINATION

A. Applicable Law

In a Section 337 investigation, the complainant bears the burden of proving infringement of the asserted patent claims by a preponderance of the evidence. *Certain Flooring Products*, Inv. No. 337-TA-443, Commission Notice of Final Determination of No Violation of Section 337, 2002 WL 448690 at 59, (March 22, 2002); *Enercon GmbH v. Int'l Trade Comm'n,* 151 F.3d 1376 (Fed. Cir. 1998).

Each patent claim element or limitation is considered material and essential. *London v. Carson Pirie Scott & Co.*, 946 F.2d 1534, 1538 (Fed. Cir. 1991). Literal infringement of a claim occurs when every limitation recited in the claim appears in the accused device, *i.e.,* when the properly construed claim reads on the accused device exactly. *Amhil Enters., Ltd. v. Wawa, Inc.*, 81 F.3d 1554, 1562 (Fed. Cir. 1996); *Southwall Tech. v. Cardinal IG Co.*, 54 F.3d 1570, 1575 (Fed Cir. 1995).

If the accused product does not literally infringe the patent claim, infringement might be found under the doctrine of equivalents. The Supreme Court has described the essential inquiry

of the doctrine of equivalents analysis in terms of whether the accused product or process contains elements identical or equivalent to each claimed element of the patented invention. *Warner-Jenkinson Co., Inc. v. Hilton Davis Chemical Co.*, 520 U.S. 17, 40 (1997).

Under the doctrine of equivalents, infringement may be found if the accused product or process performs substantially the same function in substantially the same way to obtain substantially the same result. *Valmont Indus., Inc. v. Reinke Mfg. Co.*, 983 F.2d 1039, 1043 (Fed. Cir. 1993). The doctrine of equivalents does not allow claim limitations to be ignored. Evidence must be presented on a limitation-by-limitation basis, and not for the invention as a whole. *Warner-Jenkinson*, 520 U.S. at 29; *Hughes Aircraft Co. v. U.S.*, 86 F.3d 1566 (Fed. Cir. 1996). Thus, if an element is missing or not satisfied, infringement cannot be found under the doctrine of equivalents as a matter of law. *See, e.g., Wright Medical Tech., Inc. v. Osteonics Corp.*, 122 F.3d 1440, 1444 (Fed. Cir. 1997); *Dolly, Inc. v. Spalding & Evenflo Cos., Inc.*, 16 F.3d 394, 398 (Fed. Cir. 1994); *London v. Carson Pirie Scott & Co.*, 946 F.2d 1534, 1538-39 (Fed. Cir. 1991); *Becton Dickinson and Co. v. C.R. Bard, Inc.*, 922 F.2d 792, 798 (Fed. Cir. 1990).

The concept of equivalency cannot embrace a structure that is specifically excluded from the scope of the claims. *Athletic Alternatives v. Prince Mfg., Inc.*, 73 F.3d 1573, 1581 (Fed. Cir. 1996). In applying the doctrine of equivalents, the Commission must be informed by the fundamental principle that a patent's claims define the limits of its protection. *See Charles Greiner & Co. v. Mari-Med. Mfg., Inc.*, 92 F.2d 1031, 1036 (Fed. Cir. 1992). As the Supreme Court has affirmed:

> Each element contained in a patent claim is deemed material to defining the scope of the patented invention, and thus the doctrine of equivalents must be applied to individual elements of the claim, not to the invention as a whole. It is important to ensure that the application of the doctrine, even as to an individual element, is not allowed such broad play as to effectively eliminate that element in its entirety.

Warner-Jenkinson, 520 U.S. at 29.

Prosecution history estoppel may bar the patentee from asserting equivalents if the scope of the claims has been narrowed by amendment during prosecution. A narrowing amendment may occur when either a preexisting claim limitation is narrowed by amendment, or a new claim limitation is added by amendment. These decisions make no distinction between the narrowing of a preexisting limitation and the addition of a new limitation. Either amendment will give rise to a presumptive estoppel if made for a reason related to patentability. *Honeywell Int'l Inc. v. Hamilton Sundstrand Corp.*, 370 F.3d 1131, 1139-41 (Fed. Cir. 2004), *cert. denied*, 545 U.S. 1127 (2005)(citing *Warner-Jenkinson*, 520 U.S. at 22, 33-34; and *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 535 U.S. 722, 733-34, 741 (2002)). The presumption of estoppel may be rebutted if the patentee can demonstrate that: (1) the alleged equivalent would have been unforeseeable at the time the narrowing amendment was made; (2) the rationale underlying the narrowing amendment bore no more than a tangential relation to the equivalent at issue; or (3) there was some other reason suggesting that the patentee could not reasonably have been expected to have described the alleged equivalent. *Honeywell*, 370 F.3d at 1140 (citing, *inter alia*, *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 344 F.3d 1359 (Fed. Cir. 2003)(*en banc*)). "Generalized testimony as to the overall similarity between the claims and the accused infringer's product or process will not suffice [to prove infringement under the doctrine of equivalents]." *Tex. Instruments, Inc. v. Cypress Semiconductor Corp.*, 90 F.3d 1558, 1567 (Fed. Cir. 1996).

Section 271(b) of the Patent Act prohibits inducement: "[w]hoever actively induces infringement of a patent shall be liable as an infringer." 35 U.S.C. § 271(b) (2008). As the Federal Circuit stated:

> To establish liability under section 271(b), a patent holder must prove that once the defendants knew of the patent, they "actively and knowingly aid[ed] and abett[ed] another's direct infringement." However, "knowledge of the acts alleged to constitute infringement" is not enough. The "mere knowledge of possible infringement by others does not amount to inducement; specific intent and action to induce infringement must be proven."

DSU Med. Corp. v. JMS Co., 471 F.3d 1293, 1305 (Fed. Cir. 2006) (*en banc*) (citations omitted); *see also Cross Medical Products, Inc. v. Medtronic Sofamor Danek, Inc.*, 424 F.3d 1293, 1312 (Fed. Cir. 2005) ("In order to succeed on a claim inducement, the patentee must show, first that there has been direct infringement, and second, that the alleged infringer knowingly induced infringement and possessed specific intent to encourage another's infringement."). Mere knowledge of possible infringement by others does not amount to inducement. Specific intent and action to induce infringement must be proven. *Warner-Lambert Co. v. Apotex Corp.*, 316 F.3d 1348, 1363 (Fed. Cir. 2003). In *DSU*, the Federal Circuit clarified the intent requirement necessary to prove inducement. As the court recently explained:

> In *DSU Med. Corp. v. JMS Co.*, this court clarified en banc that the specific intent necessary to induce infringement "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."

Kyocera Wireless Corp. v. Int'l Trade Comm'n, 545 F.3d 1340, 1354, (Fed. Cir. 2008) (citation omitted). "Proof of inducing infringement requires the establishment of a high level of specific intent." *Lucent Techs. Inc. v. Gateway, Inc.*, 2007 WL 925510, at *2-3 (S.D. Cal. 2007).

Under 35 U.S.C. § 271(c), "[w]hoever offers to sell or sells within the United States or imports into the Unites States a component of a patented machine, manufacture, combination, or composition, or a material or apparatus for use in practicing a patented process, constituting a material part of the invention, knowing the same to be specifically made to or specially adapted

for use in the infringement of the patent, and not a staple article or commodity suitable for substantial non-infringing use, shall be liable as a contributory infringer."

A seller of a component of an infringing product can also be held liable for contributory infringement if: (1) there is an act of direct infringement by another person; (2) the accused contributory infringer knows its component is included in a combination that is both patented and infringing; and (3) there are no substantial non-infringing uses for the accused component, *i.e.*, the component is not a staple article of commerce. *Carborundum Co. v. Molten Equip. Innovations, Inc.*, 72 F.3d 872, 876 (Fed. Cir. 1995).

To prove direct infringement, Avago must prove by a preponderance of the evidence that the accused products either literally infringe or infringe under the doctrine of equivalents the method of asserted claims of the '447 and the '229 Patents. *Advanced Cardiovascular Sys., Inc. v. Scimed Life Sys., Inc.*, 261 F.3d 1329, 1336 (Fed. Cir. 2001). Notably, method claims are only infringed when the claimed process is performed. *Ormco Corp. v. Align Tech., Inc.*, 463 F.3d 1299, 1311 (Fed. Cir. 2006).

B. The '447 Patent

Emcore makes numerous products that incorporate laser transmitters and receivers, which are used for optical communication when assembled with an optical medium. The products fall into two broad categories, transmitters and receivers, and vary in the number of channels an assembly has, ranging from 12 channel and 4 channel assemblies to individual laser transmitters and receivers. The list of accused products is contained in JX-06. Emcore's product description pages that are part of JX-06 establish that the products are intended to be used in light to logic and logic to light communication systems, using multi-mode fiber ribbon cable. In Supplemental Exhibit 7 to Avago's Complaint is a document entitled "Summary of Infringing

Emcore Products" and it comprises a list of Emcore products accused of infringing the claims of the '447 and '229 Patents, together with the Emcore data sheets describing the products. The products are listed as falling into six types:

> **Type A:** 12-channel parallel optical transmitter and receiver sets, all identified with the MTX/MRX prefixes;
> **Type B:** 4-channel parallel optical transceiver modules, all identified with the QTR prefix;
> **Type C:** VCSEL transmitter optical subassemblies ("TOSAs") and receiver optical subassemblies ("ROSAs");
> **Type D**: 1 x 4 and 1 x 12 VCSEL arrays and 1 x 4 and 1 x 12 photodiode arrays;
> **Type E**: Singlet (individual) VCSELs and singlet (individual) pin photodiodes; and
> **Type F:** VCSELs prepackaged in TO Cans.

(CPFF54; CPFF57; CPFF59; CPFF62-63; CPFF65.) All products listed above are accused of infringing claims 1-3, 5, and 6 of the '447 Patent.

It is undisputed that none of Emcore's accused products *directly* infringe any claims of the '447 Patent by themselves. Avago acknowledges that "Respondent Emcore does not directly infringe the '447 Patent because Emcore does not connect the parts together." (CIB at 23; SIB at 19.) Nonetheless, a preponderance of the evidence establishes that Emcore's customers, including [redacted] or end users configure at least some of the accused products into an optical communication network that infringes certain claims of the '447 Patent. This direct infringement by Emcore's customers or end users forms the basis for Avago's allegations of indirect infringement by Emcore. *See Vita-Mix Corp. v. Basic Holding, Inc.*, 581 F.3d 1317, 1327-28 (Fed. Cir. 2009) (holding that a defendant can be held liable for contributory or induced infringement if its customers directly infringe).

1. Claim 1

Claim 1 of the '447 Patent reads as follows:

1. An optical communication network comprising:

> a vertical-cavity, surface-emitting semiconductor laser structure having an aperture larger than eight micrometers through which an optical signal may be emitted;
>
> a power supply that provides a bias current to drive the laser into a multiple transverse mode of operation in which the laser is responsive to a signal carrying data to provide an optical signal modulated with the data and to emit the optical signal through the aperture; and
>
> a multimode optical medium optically coupled to the laser to carry the optical signal from the laser to a remotely-located receiver.

The evidence further established that some, but not all, of the accused Emcore products include a VCSEL having an aperture larger than eight micrometers ("8 microns" or "8 μm").[6] (JX-06.) Emcore has not disputed the allegation that its accused products satisfy this first limitation. (RIB at 24-26.) Exhibit JX-06 establishes that the VCSELs in the accused products are designed to be optically coupled to a multimode fiber, *i.e.*, a multimode optical medium, in order to carry the optical signal from the laser to a remotely located receiver. The data sheets also state that the Emcore products operate at 850 nm. (JX-06.) Emcore data sheets state that each of its products is to be used in communication systems with multimode fiber cables, and none of the sheets suggest that the products have any other use. (JX-06.)

The evidence establishes that the only use for the Emcore products, based on the testimonies of [redacted], Dr. Deppe and the Emcore data sheets, is in optical communication systems, using multimode fiber connectors. [redacted], Deppe, Tr. 986; JX-6.) The 12 and 4 channel products were used by [redacted] and tested by Dr. Deppe to confirm that they functioned in a multimode manner. (RX-454C; RX-455C; CX-231C, Q&A 313, 322.)

[6] Emcore's TOSA products that have a data speed of 10 gigabits per second, the fast rate in the VSCEL lasers, have an aperture of less than 8 microns and do not infringe claim 1. (Tr. 811:25- 812:12; 833:3-6.)

2. Claim 2

Claim 2 of the '447 Patent reads as follows:

> A network as in claim 1 and further comprising a receiver, optically coupled to the optical medium that receives the modulated optical signal and recovers the data therefrom.

The evidence establishes that the only use for the Emcore products, based the testimony of [redacted] Dr. Deppe and the Emcore data sheets, is in optical communication systems, using multimode fiber connectors. (Tr., 983-691, 986; JX-6.) The 12 and 4 channel products were used by [redacted] and tested by Dr. Deppe to confirm that they functioned in a multimode manner. The Emcore data sheets for Emcore products all state that the products are for performing light to logic and logic to light conversions for data transmission over multi-mode fiber ribbon cable. (JX-06 at AV10210672, AV10210680, AV10210682 and AV10210687.)

The evidence establishes that [redacted] purchased both Emcore transmitters (MTX9514) and Emcore receivers (MRX9514) in the same purchase order on several occasions. (CX-34C; [redacted], Tr. 686:18-691:2.) At least some of the purchase orders from [redacted] indicate that "[a]ll VCSEL shipments . . . shall be made in matched pairs," and that [redacted] will refuse any and all shipments which are not received as matched pairs." (CX-34C at AV1020915-917.) [redacted] testified for [redacted] that the "matched pair" refers to one transmitter and one receiver module. [redacted], Tr. 689:25-690:14.) The fact that an Emcore customer purchased both transmitters and receivers from Emcore simultaneously is strong circumstantial evidence that they were connected together.

3. Claim 3

Claim 3 of the '447 patent reads as follows:

> A network as in claim 1 wherein the multiple transverse mode of operation comprises more than two distinct transverse modes.

[redacted] testified that the Emcore products at issue in this case function in multiple transverse mode of operation. (Tr., 833:10- 834:15.) The evidence establishes that the accused 12-Channel and 4-Channel products are used by Emcore's customers or end users in a manner such that the multiple transverse mode of operation comprises more than two distinct transverse modes as required by dependent claim 3. (CX-231C.) Emcore controls the bias current supplied to the VCSELs in its 12-channel and 4-channel products so that they operate in multiple transverse modes at least some of the time. ([redacted] Tr. 758:18-24, 833:10-25, 886:1-10; CX-147C at 27:20-28:11.) Dr. Jackson, Emcore's expert, also testified that the Emcore products operated in multiple transverse mode. (Tr. 919:15-920:11, 921:4-12.) Dr. Jackson also believed and testified that where the Emcore VCSELs had an aperture of greater than 8 microns, the devices would operate in multi-transverse mode. (Tr. 925:7-926:4.)

4. Claim 5

Claim 5 reads as follows:

> 5. A network as in claim 1 wherein the multi-mode optical medium comprises an optical fiber.

The evidence establishes that all the accused products are optically coupled by Emcore's customers or end users to a multi-mode optical fiber as required by dependent claim 5. (JX-06.) Specifically, Dr. Jackson testified that the Emcore products at issue in this case are all designed to function in a system with multi-mode optical fiber:

> Q. I appreciate that. Let me try and get this line of questioning done, and I'll get back to the low coherence issue. The third limitation in the '447 patent, at least the third major one, is the requirement that the VCSEL be coupled to some type of optical medium such as multi-mode fiber; is that right?
>
> A. Yes.

Q. And it has to be a multi-mode optical medium?

A. Yes. We can think of pathological examples, but that's not the intended. It is intended for multi-mode fiber.

Q. And you're also aware that the accused products that are at issue in this specification, they're intended to be coupled to some type of multi-mode fiber?

A. Yes.

Q. And since you became aware of these infringement allegations, has Emcore changed the design of its -- the accused products?

A. No.

(Tr. 922:6-923:3.)

5. Claim 6

Claim 6 reads as follows:

6. A network as in claim 1 wherein the multi-mode optical medium comprises an optical waveguide

There was no evidence presented that any of the Emcore products are optically coupled to an "optical waveguide" as required by dependent claim 6. There is no evidence in this case that any coupling other than optic fibers has been used with Emcore products.

Therefore, the ALJ finds that Avago has shown by a preponderance of the evidence that the accused products infringe claims 1, 2, 3, and 5.

C. The '229 Patent

Avago argues that Emcore's TOSAs and Emcore's VCSELs in TO cans ("the Accused '229 Products") infringe claim 8 of the '229 Patent. (CIB at 81; JX-6.) Avago also argues that Emcore induces infringement of claim 8 of the '229 Patent. (CIB at 90-91.) Avago argues the Accused '229 Products meet each and every limitation of claim 8. (CIB at 80-91.)

Emcore argues that Avago has failed to present evidence that the Accused '229 Products meet "the intensity at which the laser generates the radiated light beam with a signal-to-noise ratio above a threshold level being greater than a predetermined maximum intensity" and "the coupling means to coupling such fraction of the radiated light beam to the light sensor means that the output light beam has a signal-to-noise ratio greater than the threshold level and an intensity less than the predetermined maximum intensity" limitations. (RIB at 79-81; RRB at 37-39.) Emcore does not dispute that the Accused '229 Products meet the remaining limitations of claim 8. (*See* RIB at 79-81; RRB at 37-39.) Staff agrees. (SIB at 87-90.) Emcore further argues that Avago has failed to show indirect infringement because it has failed to show that the Accused '229 Products infringe claim 8 and further notes that Avago asserted indirect infringement of the '229 Patent for the first time in its post-hearing brief. (RRB at 39.)

Staff further argues that Avago's arguments regarding the formulaic relationship between the signal-to-noise ratio and the relative intensity noise should be deemed waived pursuant to Ground Rule 11.1 since Avago did not raise this in its pre-hearing brief and did not provide a reason as to why it was not raised at an earlier time. (SRB at 26.)

The ALJ finds that Avago has failed to show by a preponderance of the evidence that the Accused '229 Products meet each and every limitation of claim 8. Specifically, the ALJ finds that Avago has failed to show that the Accused '229 Products meet the "the intensity at which the laser generates the radiated light beam with a signal-to-noise ratio above a threshold level being greater than a predetermined maximum intensity" and "the coupling means to coupling such fraction of the radiated light beam to the light sensor means that the output light beam has a signal-to-noise ratio greater than the threshold level and an intensity less than the predetermined maximum intensity" limitations.

As set forth *supra* in Section IV.C, the ALJ construed "the intensity at which the laser generates the radiated light beam with a signal-to-noise ratio above a threshold level being greater than a predetermined maximum intensity" to mean that the laser operates such that the signal-to-noise ratio of the light generated by the laser is above some threshold signal-to-noise ratio and the intensity of the light generated by the laser is greater than a predetermined maximum intensity. The evidence shows that Avago and its expert never actually measured signal-to-noise ratio in the Accused '229 Products. (Deppe, Tr. 1160:15-17 ("Q. Professor Deppe, did you measure the signal to noise ratio on any Emcore VCSELs? A. No, I did not.").) Furthermore, Avago did not identify a SNR "threshold level," but rather conclusorily stated that:

> [Emcore's] VCSEL [] emits light when operated such that it has a signal to noise ratio above a threshold signal-to-noise ratio and has an intensity above a predetermined maximum intensity…[a]ccording to my test results, an Emcore 10Gb/s single channel transceiver operates below the eye safety limit up until about 8mA of applied current.

(CX-531C at Q&A 584.) To the extent that Avago failed to identify a threshold SNR, it is not possible for Avago to show that the Emcore laser operates such that the signal-to-noise ratio of the light generated by that laser is above an unknown and unidentified threshold. Furthermore, the test results that Dr. Deppe and Avago cite in support of its argument are inapposite as they merely show the light intensity emitted by Emcore's VCSELs with and without the can, but fail to actually show that the VCSEL has an SNR that surpasses any specific threshold SNR or are above a predetermined maximum intensity requirement. (*See generally* CX-111.)

Emcore's datasheets also fail to provide any information on the SNR of any of the Accused '229 Products because they merely disclose a relative intensity noise (RIN). (*See* JX-6; RX-455C at Q&A 107.) In its initial post-hearing brief, Avago argues that SNR can be calculated through a formula that relates RIN to SNR through the data modulation rate. (CIB at

80.) Thus, since Emcore's data sheets include the RIN value and modulation rate, the SNR of the Accused '229 Products can be calculated and shows that they satisfy the SNR requirement. (CIB at 80.) As an initial matter, the ALJ notes that Avago did not raise this argument in its pre-hearing brief, *i.e.* that the threshold SNR requirement is satisfied as based on a formulaic calculation relating RIN and modulation rate to SNR, and pursuant to Ground Rule 8(f), such an argument is deemed waived as Avago has failed to show good cause as to why it did not raise this argument in its pre-hearing brief.[7] (*See generally* Avago's Pre-hearing Brief at 120-121.)

Nevertheless, even if the argument was not deemed waived, the ALJ finds that Avago's arguments still fails. The evidence shows that the RIN and SNR are different measurements and are not interchangeable. (RX-455C at Q&A 44.) Furthermore, the evidence shows that RIN is not an alternative measurement of SNR and that a threshold SNR cannot be implied by a specified RIN level. (RX-455C at Q&A at 107.) Indeed, aside from Avago's arguments in its initial post-hearing brief, Avago cites to no other evidence supporting its argument, including any actual calculations by Dr. Deppe. Thus, Avago has failed to show by a preponderance of the evidence that the Accused '229 Products meet the "the intensity at which the laser generates the radiated light beam with a signal-to-noise ratio above a threshold level being greater than a predetermined maximum intensity" limitation.

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[7] Ground Rule 8(f) states:

> A statement of the issues to be considered at the hearing that sets forth with particularity a party's contentions on each of the proposed issues, including citations to legal authorities in support thereof. **Any contentions not set forth in detail as required herein shall be deemed abandoned, or withdrawn, except for contentions of which a party is not aware and could not be aware in the exercise of reasonable diligence at the time of filing the pre-hearing statements.** Pursuant to this requirement, each of the parties and the Staff shall take a position on the issues it is asserting no later than the filing of its pre-hearing statement. **With respect to alleged infringement of every asserted claim of a U.S. patent – including, if applicable, any allegations of direct infringement, contributory infringement, active inducement of infringement, literal infringement and infringement through equivalents (if applicable) – the party should take a position as to each claim in issue with respect to why each accused product does or does not so infringe and state in detail its basis.**

(emphasis added).

Similarly, Avago has failed to show by a preponderance of the evidence that the Accused '229 Products meet the "the coupling means to coupling such fraction of the radiated light beam to the light sensor means that the output light beam has a signal-to-noise ratio greater than the threshold level and an intensity less than the predetermined maximum intensity" limitation. As set forth *supra*, Avago failed to measure any SNR in the Accused '229 Products and failed to identify a SNR "threshold level." Dr. Deppe simply testified that his test results showed that "60 to 70% of the light emitted by the VCSEL is not emitted out of the TO Can." (C231C at Q&A593.) However, this value by itself fails to show whether the SNR is greater than a threshold level or that the Accused '229 Products have an intensity that is less than the predetermined intensity. Thus, the ALJ finds that Avago has failed to show that the Accused '229 Products meet this limitation.

Therefore, the ALJ finds that Avago has failed to show by a preponderance of the evidence that the Accused '229 Products infringe claim 8 of the '229 Patent.

D. Induced or Contributory Infringement

1. The '447 Patent

a) Induced Infringement

To support its infringement allegations against Emcore, Avago presented evidence of direct infringement by Emcore customer [redacted] who configured an accused 12-Channel product that it purchased from Emcore into an optical communication network. Additionally, Avago presented circumstantial evidence of direct infringement by Emcore's customers or end users based on the ordinary use that Emcore intends for its accused products. (Tr. at 678-689.) The senior director of engineering for [redacted] testified that [redacted] incorporated Emcore MTX-9514 and the MRX-9514 in

ooptical backplanes, ganged serial links, [redacted], very short reach [redacted], logic-logic data links, board-to-board, and shelf-to-shelf applications. (Tr. at 681.) He further testified:

> The MTX-9514 and MRX-9514 are cost-effective high speed transmitter (TX) and receiver (RX) modules for use as parallel optical data communication links. The modules perform logic to light and light to logic conversions for data transmission over multi-mode fiber ribbon cable at a wavelength of 850 nanometers.

(Tr. at 683.)

Emcore briefed that Avago did not prove direct infringement because it did not obtain discovery from any customer other than [redacted] or from the ultimate end-users of the accused products. That a complainant must produce such direct evidence is contradicted by the Federal Circuit's repeated holdings that third-party infringement can be inferred from circumstantial evidence. *See, e.g.*, *Lucent Techs. v. Gateway, Inc.*, 580 F.3d 1301, 1318 (Fed. Cir. 2009) (holding that a jury could have inferred that "more likely than not one person somewhere in the United States had performed the claimed method" based on the extensive sales and dissemination of instruction manuals for the accused products); *Golden Blount, Inc. v. Robert H. Peterson Co.*, 438 F.3d 1354, 1363 (Fed. Cir. 2006) (holding that district court did not err in finding that customers assembled accused products in an infringing configuration based on instruction sheets disseminated by the accused indirect infringer); *Moleculon Research Corp. v. CBS, Inc.*, 793 F.2d 1261, 1272 (Fed. Cir. 1986) (holding that circumstantial evidence of extensive sales and dissemination of an instruction sheet can support a finding of direct infringement by the customer). As explained in further detail below, both circumstantial and direct evidence in this investigation establishes that customers or end users who purchase and use Emcore's accused products in their intended manner directly infringe claims 1-3 and 5 of the '447 Patent. These are not merely "[h]ypothetical instances of direct infringement," which are

insufficient to establish indirect infringement. *ACCO Brands, Inc. v. ABA Locks Mfr. Co.*, 501 F.3d 1307, 1314 (Fed. Cir. 2007).

There is ample evidence in the record that the Emcore products infringe, and must infringe if used in the manner Emcore advises. [redacted], an Emcore engineer, testified that the products in question operate in multimode function:

> Q. Do you ever have to get beyond point A in order to first start multiple transverse mode operation of the Emcore VCSELs?
>
> A. Again, if point A is right down half the threshold, which is often set that way because you want what is known as a high extinction ratio of your output, you often set right down at the threshold level, and in that instance, it could be single transverse mode when it is at the 0 level.
>
> Q. Now, when you reach the optical output for 1, the high level with respect to the Emcore VCSELs, at that point, is it always in multiple transverse mode?
>
> A. I would say, generally, yes.
>
> Q. You say generally, and I'd like to know what the exceptions are?
>
> A. The exceptions would be VCSELs that we have built for single mode applications, specifically sensor applications.
>
> Q. Are any of those involved in this dispute?
>
> A. No. They are not.

([redacted], Tr. at 760:14-15, 761:1-11.) [redacted] also testified that the Emcore products are designed to be connected by a multi-mode fiber ribbon cable, according to the Emcore data sheet. (Carson, Tr. at 765:1-16.) He also testified that the same data sheet demonstrates connecting two or more computer devises together for communications. ([redacted], Tr. at 765:15-25, 766:1-25.) He has also testified that for certain models, the aperture has always been larger than 8 microns:

> THE WITNESS [[redacted]]: So for the SNAP 12 products, we have not built them with aperatures [sic] less than eight microns. For the DDR products, we have not built them with aperatures [sic] less than eight microns, and for the QTR, at least the lower data rate, QTR 3400 product, that has not been built with an aperture of less than eight microns.

([redacted], Tr. at 811:6-14.) In addition, [redacted] indicated that the VCSELs made by Emcore operate in multiple transverse and single longitudinal modes. ([redacted], Tr. 832-833.) During cross-examination by Mr. Paulraj, [redacted] testified that Emcore documentation for the accused products stated the products operated in multi-transverse mode, and did not state they operated in single transverse mode:

> Q. Right. So at least on this page, you don't indicate that these VCSELs operate in single transverse mode; is that right?
>
> A. That's correct.
>
> Q. Are you aware of any documentation where Emcore states that its VCSELs operate in single transverse mode?
>
> A. Only that documentation associated with our small aperture VCSELs that are designed for use in optical sensor applications, specifically for laser mouse type applications.

([redacted], Tr. at 834:1-12.)

Emcore argued in its post hearing reply brief that the evidence shows Emcore's 12 channel parallel products, TOSAs, TO-Cans, VCSEL arrays, and VCSEL singlets can be used without infringing. They also argued that there is no evidence that any component of the products can only infringe, rather only that the products are used in communication networks. (RIB at 13.) This does not address the issue before the ALJ. The evidence as presented before the ALJ demonstrates that the products can be used in an infringing manner, are designed to be used in an infringing manner, and the instructions that Emcore prints in its data sheets directing customers how to use the products will result in the products being used in an infringing manner. While Emcore did present some evidence that depending on the amount of electrical current that was used with the products, the products might not reach a state where they infringe, there is no

evidence that if that electric supply is provided in that manner, the products are of any use whatsoever.

Given the evidence in this case, the ALJ finds that Emcore supports, encourages and instructs parties in infringing the '447 Patent. Emcore has stated that the statements from the data sheets their company supplies with the products are not sufficient to demonstrate that they have intent to induce infringement:

> Emcore's product data sheets do not evidence an intent to induce infringement. The statements "[t]he modules perform logic-to-light and light-to-logic conversions for data transmission over multi-mode fiber ribbon cable, at a wavelength of 850 nm," and "[t]he devices operate in multiple transverse and single longitudinal modes, ensuring stable coupling of power and low noise when used with multimode fiber" come from separate documents and do not show "intent" to induce infringement. [RFF III.D.15 -17]. These documents do not show that (1) infringement would follow logically from these statements, or (2) that Emcore knew that infringement would necessarily follow. The fact that the units perform logic to light and light to logic conversions or use MMF does not imply infringement, insofar as these facts do not require biasing the laser as required by the '447 patent, nor do they advertise such a biasing strategy. [RFF III.D.16, RFF III.D.3-4]. The statement that certain VCSELs can operate in multiple transverse modes does not imply that they are biased to do so in the accused products.

(RIB at 30.) Emcore has also suggested that the evidence did not prove that Emcore knew the '447 Patent existed. This is contradicted by the action itself (this complaint), and the testimony of Emcore's employee Dr. Jackson:

> Q."Was Emcore surprised that it was sued for patent infringement by Avago?" And the answer is, "Absolutely, we were unaware of these patents."
>
> A. Correct.
>
> Q. And that was your testimony under oath in your witness statement?
>
> A. Yes.
>
> Q. Would you look, please, at Exhibit CX-179C.
>
> A. Yes.

Q. Would you turn to the second page in the binder?

A. Okay.

Q. And that's a document, January 15th, 2003, between Avago's predecessor Agilent and Emcore; do you see that?

A. Yes.

Q. And if you would turn to page 5, section 3, the last sentence of 3.1.

A. Okay.

Q. "In no event shall this paragraph or agreement be construed to be a release under U.S. patent numbers," and those are the two patents involved in our dispute?

A. I see.

Q. So, in fact, as early as January 2003, Avago or its predecessors did at least tell Emcore that these patents existed?

A. Apparently.

(Jackson, Tr. at 914:13-25, 915:1-17.)

Dr. Jackson further testified that the electric power provided to the Emcore lasers ensured that at least for part of the time, the lasers operated in multi-mode fashion:

Q. So let me try and get this understanding as a layperson here.

A. Sure.

Q. You definitely know that Emcore's products, the MTX and QTR products that are at issue, that they are biased so that at least in certain instances they operate in multiple transverse modes?

A. Yes, that's a fair statement.

(Jackson, Tr. at 921:4-15.) The data sheets, coupled with the statements of Dr. Jackson clearly show that Emcore had the intent to induce infringement. CX-179C, a license agreement between Agilent Technologies (the predecessor to Avago) and Emcore, specifically cites the '447 Patent

as existing and states that Emcore does not obtain any rights under the patent, demonstrates that Emcore had knowledge of the patent as early as February 2003. (*See* CX-179C at ¶ 3.1.)

Therefore, the ALJ finds that Emcore induces infringement of claims 1, 2, 3, and 5 of the '447 Patent. There is no evidence that Emcore induced infringement of claim 6.

b) Contributory Infringement

In this case, the data sheets included in JX-06 contain all the elements necessary to demonstrate that Emcore has the requisite knowledge that its products, if used in the manner and with the equipment that Emcore recommends in the data sheets, will result in a optical communication system that violates the '447 Patent. There is no evidence presented in this case that demonstrates that there is any non-infringing use for the Emcore products. In its Response to Complaint, Emcore admits that the products at issue in this Investigation can be used in optical communications networks, including conveying information on optical fibers. (Response to Complaint ¶¶ 5, 14, at 4-6). Emcore data sheets also indicate that each of its products can operate in an infringing manner. Emcore data sheets among those in the document entitled "Summary of Infringing Emcore Products" recite that Emcore 1 x 12 VCSEL arrays, 1 x 4 VCSEL arrays, and VCSEL singlets "operate in multiple transverse and single longitudinal modes, ensuring stable coupling of power and low noise when used with multimode fiber." (JX-06; CX-231C, Q&A 332, 157; JX-01; JX-32C; CX-147C; CX-231C; and CX-157.) The license agreement between Avago and Emcore and Dr. Jackson's testimony demonstrate Emcore knew the patent existed. (CX-179C.)

Emcore argues that there are at least two non-infringing uses for Emcore components:

> There are at least two substantial non-infringing uses of Emcore components. First, Emcore components can be biased and modulated in ways that do not meet

> the requirements of the claim limitation requiring "a power supply that provides a bias current to drive the laser into a multiple transverse mode of operation in which the laser is responsive to a signal carrying data to provide an optical signal modulated with data," as discussed above in Section III.D.1.

(RIB at 32.) Second, those Emcore customers who form optical communication networks by combining Avago and Emcore components together in one system have an implied license from Avago to use that system, and their use of the Emcore components in such a system is a substantial non-infringing use. (RIB at 32.)

Emcore did not present any evidence, nor is there evidence from any other source, that if an Emcore component is biased in ways that do not meet the requirement of the claim limitation requiring "a power supply that provides a bias current to drive the laser into a multiple transverse mode of operation in which the laser is responsive to a signal carrying data to provide an optical signal modulated with data," that the components will function in a way that is useful. In short, there is no evidence in the case that would support a non-infringing use. As to Emcore's second statement, the evidence does not support that Emcore has an implied license from Avago, and there was evidence from Dr. Jackson's testimony and CX-179C, that there is no implied license. (*See infra*, Section VII.)

2. The '229 Patent

Avago argues that Emcore induces infringement of the '229 Patent. (CIB at 90-91.) However, Avago did not assert this argument in relation to the '229 Patent in its pre-hearing brief. (*Compare* Avago's Pre-hearing Statement at 42-43 (discussing indirect infringement of the '447 Patent) to 117-122 (discussing infringement of the '229 Patent with no discussion of indirect infringement).) Therefore, pursuant to Ground Rule 8(f), this argument is deemed waived as Avago has failed to show good cause as to why it did not raise this argument in its pre-hearing brief.

Nevertheless, even if the argument had not been deemed waived, as set forth *supra* in Section V.C, the ALJ found that the Accused '229 Products do not infringe claim 8 of the '229 Patent. Consequently, as a matter of law, Emcore cannot indirectly infringe the '229 Patent without a finding of direct infringement. *See Broadcom Corp. v. Qualcomm, Inc.*, 543 F.3d 683, 697 (Fed. Cir. 2008) ("In order to prevail on an inducement claim, the patentee must establish 'first that there has been direct infringement, and second that the alleged infringer knowingly induced infringement and possessed specific intent to encourage another's infringement.'" (citing *ACCO Brands, Inc. v. ABA Locks Mfr. Co.*, 501 F.3d 1307, 1312 (Fed. Cir. 2007) (quoting *Minn. Mining & Mfg. Co. v. Chemque, Inc.*, 303 F.3d 1294, 1304-05 (Fed. Cir. 2002)))); *see also Dynacore Holdings Corp. v. U.S. Philips Corp.*, 363 F.3d 1263, 1272 (Fed.Cir.2004) ("Indirect infringement, whether inducement to infringe or contributory infringement, can only arise in the presence of direct infringement."). Therefore, the ALJ finds that Avago has failed to show by a preponderance of the evidence that the Accused '229 Products infringe claim 8 of the '229 Patent.

VI. VALIDITY

A. Background

One cannot be held liable for practicing an invalid patent claim. *See Pandrol USA, LP v. AirBoss Railway Prods., Inc.*, 320 F.3d 1354, 1365 (Fed. Cir. 2003). However, the claims of a patent are presumed to be valid. 35 U.S.C. § 282; *DMI Inc. v. Deere & Co.*, 802 F.2d 421 (Fed. Cir. 1986). Although a complainant has the burden of proving a violation of section 337, it can rely on this presumption of validity.

Emcore has the burden of overcoming the presumption that the asserted patents are valid and must prove invalidity by clear and convincing evidence in order to do so. *Technology*

Licensing Corp. v. Videotek, Inc., 545 F.3d 1316, 1327 (Fed. Cir. 2008) (stating, "When an alleged infringer attacks the validity of an issued patent, [the] well-established law places the burden of persuasion on the attacker to *prove invalidity by clear and convincing evidence*." (emphasis added)); *see also Checkpoint Systems, Inc. v. United States Int'l Trade Comm'n*, 54 F.3d 756, 761 (Fed. Cir. 1995). Emcore's burden of persuasion *never shifts* to Avago; the risk of "decisional uncertainty" remains on the respondent. *Id.*; *see also PowerOasis, Inc. v. T-Mobile USA, Inc.*, 522 F.3d 1299, 1303, 1305 (Fed. Cir. 2008); *Pfizer, Inc. v. Apotex, Inc.*, 480 F.3d 1348, 1360 (Fed. Cir. 2007). Thus, it is Emcore's burden to prove by clear and convincing evidence that any of the alleged prior art references anticipate or render obvious the asserted claims of the patents in suit. Failure to do so means that Emcore loses on this point. *Id.* (stating, "[I]f the fact trier of the issue is left uncertain, the party with the burden [of persuasion] loses.").

Emcore also bears the burden of going forward with evidence, *i.e.*, the burden of production. *Id.* This is "a shifting burden the allocation of which depends on where in the process of a trial the issue arises." *Id.* However, this burden does not shift until a respondent presents "evidence that might lead to a conclusion of invalidity." *Pfizer*, 480 F.3d at 1360. Once a respondent "has presented a prima facie case of invalidity, the patentee has the burden of going forward with rebuttal evidence." *Id.*

B. Anticipation

A patent may be found invalid as anticipated under 35 U.S.C. § 102(a) if "the invention was known or used by others in this country, or patented or described in a printed publication in this country, or patented or described in a printed publication in a foreign country, before the invention thereof by the applicant for patent." 35 U.S.C. § 102(a). A patent may be found invalid as anticipated under 35 U.S.C. § 102(b) if "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." 35 U.S.C. § 102(b). Under 35 U.S.C. § 102(e), a patent is invalid as anticipated if "the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent." 35 U.S.C. § 102(e). Anticipation is a question of fact. *Texas Instruments, Inc. v. U.S. Int'l Trade Comm'n*, 988 F.2d 1165, 1177 (Fed. Cir. 1993) ("*Texas Instruments II*"). Anticipation is a two-step inquiry: first, the claims of the asserted patent must be properly construed, and then the construed claims must be compared to the alleged prior art reference. *See, e.g., Medichem, S.A. v. Rolabo, S.L.*, 353 F.3d 928, 933 (Fed. Cir. 2003). It is axiomatic that claims are construed the same way for both invalidity and infringement. *W.L. Gore v. Garlock, Inc.,* 842 F.2d 1275, 1279 (Fed. Cir. 2008).

"Claimed subject matter is 'anticipated' when it is not new; that is, when it was previously known. Invalidation on this ground requires that *every element and limitation* of the claim was *previously described in a single prior art reference*, either *expressly or inherently*, so as to place a person of ordinary skill in possession of the invention." *Sanofi-Synthelabo v. Apotex, Inc.*, 550 F.3d 1075, 1082 (Fed. Cir. 2008) (emphasis added) (citing *Schering Corp. v. Geneva Pharms., Inc.*, 339 F.3d 1373, 1379 (Fed. Cir. 2003) and *Continental Can Co. USA v. Monsanto Co.*, 948 F.2d 1264, 1267-69 (Fed. Cir. 1991)).

To anticipate, a single prior art reference must be enabling and it must describe the claimed invention, *i.e.*, a person of ordinary skill in the field of the invention must be able to practice the subject matter of the patent based on the prior art reference without undue experimentation. *Sanofi*, 550 F.3d at 1082. The presence in said reference of *both* a specific description and enablement of the subject matter at issue are required. *Id.* at 1083.

To anticipate, a prior art reference also must disclose all elements of the claim within the four corners of said reference. *Net Money IN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1369 (Fed. Cir. 2008) ("*NMI*"); *see also Abbott Labs. v. Sandoz, Inc.*, 544 F.3d 1341, 1345 (Fed. Cir. 2007) (stating, "Anticipation is established by documentary evidence, and requires that every claim element and limitation is set forth in a single prior art reference, in the same form and order as in the claim."). Further, "[b]ecause the hallmark of anticipation is prior invention, the prior art reference--in order to anticipate under 35 U.S.C. § 102--must not only disclose all elements of the claim within the four corners of the document, but must also disclose those elements 'arranged as in the claim.'" *Id.* (quoting *Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542, 1548 (Fed. Cir. 1983)). The Federal Circuit explained this requirement as follows:

> The meaning of the expression 'arranged as in the claim' is readily understood in relation to claims drawn to things such as ingredients mixed in some claimed order. In such instances, a reference that discloses all of the claimed ingredients, but not in the order claimed, would not anticipate, because the reference would be missing any disclosure of the limitations of the claimed invention 'arranged as in the claim.' But the 'arranged as in the claim' requirement is not limited to such a narrow set of 'order of limitations' claims. Rather, *our precedent informs that the 'arranged as in the claim' requirement applies to all claims and refers to the need for an anticipatory reference to show all of the limitations of the claims arranged or combined in the same way as recited in the claims, not merely in a particular order*. The test is thus more accurately understood to mean 'arranged or combined in the same way as in the claim.'

Id. at 1370 (emphasis added). Therefore, it is not enough for anticipation that a prior art reference simply contains all of the separate elements of the claimed invention. *Id.* at 1370-71 (stating that "*it is not enough [for anticipation] that the prior art reference discloses part of the claimed invention, which an ordinary artisan might supplement to make the whole*, or that it includes multiple, distinct teachings that the artisan might somehow combine to achieve the

claimed invention." (emphasis added)). Those elements must be arranged or combined in said reference in the same way as they are in the patent claim.

If a prior art reference does not expressly set forth a particular claim element, it still may anticipate the claim if the missing element is inherently disclosed by said reference. *Trintec Indus., Inc. v. Top-U.S.A. Corp.*, 295 F.3d 1292, 1295 (Fed. Cir. 2002); *In re Robertson*, 169 F.3d 743, 745 (Fed. Cir. 1999). Inherent anticipation occurs when "the missing descriptive material is 'necessarily present,' not merely probably or possibly present, in the prior art." *Id.*; *see also Rhino Assocs. v. Berg Mfg. & Sales Corp.*, 482 F. Supp.2d 537, 551 (M.D. Pa. 2007). In other words, inherency may not be established by probabilities or possibilities. *See Continental Can*, 948 F.2d at 1268. Thus, "[t]he mere fact that a certain thing may result from a given set of circumstances is not sufficient." *Id.*

The critical question for inherent anticipation here is whether, as a matter of fact, practicing an alleged prior art reference necessarily features or results in each and every limitation of the asserted claim at issue. *See, e.g., Toro Co. v. Deere & Co.*, 355 F.3d 1313, 1320 (Fed. Cir. 2004). Such is the case even if one of ordinary skill in the art would not have recognized said inherent anticipation at the time of the invention of the patent. *Id.* at 1320-21.

If there are "slight differences" between separate elements disclosed in a prior art reference and the claimed invention, those differences "invoke the question of obviousness, not anticipation." *NMI*, 545 F.3d at 1071; *see also Trintec*, 295 F.3d at 1296 (finding no anticipation and stating that "the difference between a printer and a photocopier may be minimal and obvious to those of skill in this art. Nevertheless, obviousness is not inherent anticipation."). Statements such as "one of ordinary skill may, in reliance on the prior art, complete the work required for the invention," and that "it is sufficient for an anticipation if the general aspects are the same and

the differences in minor matters is only such as would suggest itself to one of ordinary skill in the art," *actually relate to obviousness*, not anticipation. *Connell*, 722 F.2d at 1548; *see infra*.

1. The '447 Patent

Emcore has asserted that claims 1-3 of the '447 Patent are invalid as being anticipated under 35 U.S.C. § 102 by two prior art publications. The burden of demonstrating that the patent is anticipated is on the respondent. *See* 35 U.S.C. § 282 ("A patent shall be presumed valid."); *Praxair, Inc. v. ATMI, Inc.*, 543 F.3d 1306, 1327 (Fed. Cir. 2008) ("The party asserting invalidity due to anticipation must prove anticipation by clear and convincing evidence."). Under § 102, a patent claim is invalid for anticipation if every element thereof is described in a single piece of prior art such that a person of ordinary skill in the art could practice the invention without undue experimentation. *Advanced Display Systems, Inc. v. Kent State University*, 212 F.3d 1272, 1282 (Fed. Cir. 2000).

Emcore has asserted that claims 1-3 of the '447 Patent are anticipated by the following two prior art publications:

(1) Banwell, Thomas C. *et al.*, *VCSE Laser Transmitters for Parallel Data Links*, IEEE Journal of Quantum Electronics, Vol. 29 (February 1999) (hereinafter, "Banwell reference") (JX-54); and

(2) Von Lehmen, A.C., *et al.*, *High-Speed Operation of Hybrid CMOS Vertical Cavity Surface Emitting Laser Array*, Electronics Letters, Vol. 27, No. 13 (20 June 1991) (hereinafter, "Von Lehmen reference") (JX-62).

The Banwell reference was considered by the USPTO during the prosecution of the '447 Patent, and formed the basis for a rejection that was subsequently withdrawn by the patent examiner. (JX-1, References Cited.) The burden of proving invalidity by clear and convincing evidence is "especially difficult" when the alleged "infringer attempts to rely on prior art that was before the patent examiner during prosecution." *Glaxo Group Ltd. v. Apotex, Inc.*, 376 F.3d

1339, 1348 (Fed. Cir. 2004). In considering the rejection of the patent in light of the Banwell reference, the PTO considered the amended application, and the fact that the '447 Patent disclosed a large (eight micrometer) aperture and operating the laser in multiple transverse mode. (JX-2.) They stated that prior art, including the Banwell reference, avoided multi-transverse mode operation and that it was contrary to the teaching of the art.

The VCSELs disclosed in the Banwell and Von Lehmen references are not connected to "a power supply that provides a bias current to drive the laser into a multiple transverse mode of operation in which the laser is responsive to a signal carrying data to provide an optical signal modulated with the data and to emit the optical light through the aperture." It appears undisputed that neither the Banwell reference nor the Von Lehmen reference expressly discloses this limitation, which requires the VCSEL to operate in multiple transverse modes. Both references are silent as to the modal characteristics of the VCSELs described therein. While it may be *possible* for the VCSELs described in these references to operate under similar conditions in which multiple transverse modes are emitted, that is insufficient to establish inherent anticipation. The Federal Circuit has made it clear that anticipation based on inherency "may not be established by probabilities or possibilities." *See Trintec Indus., Inc. v. Top-U.S.A. Corp.*, 295 F.3d 1292, 1295 (Fed. Cir. 2002) ("Inherent anticipation requires that the missing descriptive material is 'necessarily present' not merely probably or possibly present, in the prior art."); *Crown Operations Int'l, LTD v. Solutia Inc.*, 289 F.3d 1367, 1377 (Fed. Cir. 2002)

In addition, the evidence does not establish that the Banwell and Von Lehmen references disclose the use of a "multimode optical medium" under the proper construction of that claim term. Emcore has asserted that both "[t]he Banwell and Von Lehmen references explicitly disclosed using atmosphere as the multimode optical medium." (RIB at 64.) Both the Banwell

and Von Lehmen references disclose that "[o]utput signals were monitored with an Optoelectronics PD30-G APD mounted directly above the laser chip with no collection optics." (JX-54 at p. 639; JX-62 at p. 1190.) The parties' experts agree that this teaching indicates that atmosphere, *i.e.*, free space, was used as the optical medium for the optical interconnects disclosed in these references. (RX-454C at Q. 51; CX-257C at Q. 262.) For the reasons explained in the claim construction section above (Section IV.A), a person of ordinary skill in the art would not have understood that free space is a "multimode optical medium" as used in the '447 Patent.

Therefore, the ALJ finds that Emcore has failed to show by clear and convincing evidence that the Banwell reference and the Von Lehmen reference anticipate claims 1-3 of the '447 Patent.

2. The '229 Patent

Emcore argues that the '229 Patent is anticipated by Japanese Patent Publications 62-269374 ("the JPO '374") and 60-86887 ("the JPO '887") (collectively "the JPO Publications").[8] Both the JPO '374 and the JPO '887 references were considered by the patent examiner during the prosecution of the '229 Patent, thus making Emcore's burden of proving anticipation "especially difficult." *Glaxo Group*, 376 F.3d at 1348; *see also* JX-3 at AV10215859 ("References Cited" "Foreign Patent Documents").

The dispute centers around whether the JPO Publications disclose "the intensity at which the laser generates the radiated light beam with a signal-to-noise ratio above a threshold level being greater than a predetermined maximum intensity" and "the coupling means to coupling

[8] The full English translation of JPO '887 was excluded pursuant to Order No. 9. However, the English abstract and the full Japanese language publication, including all of the figures, were admitted as they were part of the prosecution history.

such fraction of the radiated light beam to the light sensor means that the output light beam has a signal-to-noise ratio greater than the threshold level and an intensity less than the predetermined maximum intensity" limitations of claim 8. Emcore argues that the JPO '374 and the JPO '887 disclose each and every limitation of claim 8 of the '229 Patent. (RIB at 83-88.) Avago and Staff argue that the JPO Publications fail to disclose these limitations because they fail to disclose a "SNR threshold level" or "predetermined maximum intensity"; the lasers disclosed fail to generate a radiated light beam with a SNR that is above any threshold SNR level or greater than any predetermined maximum intensity; and fail to disclose a output light beam that has an intensity that is attenuated by a coupling means so that it falls below a predetermined maximum intensity, while maintaining an SNR above the threshold SNR. (CIB at 92-93; SIB at 92-93.)

The ALJ finds that Emcore has failed to show by clear and convincing evidence that the JPO Publications disclose "the intensity at which the laser generates the radiated light beam with a signal-to-noise ratio above a threshold level being greater than a predetermined maximum intensity" and "the coupling means to coupling such fraction of the radiated light beam to the light sensor means that the output light beam has a signal-to-noise ratio greater than the threshold level and an intensity less than the predetermined maximum intensity" limitations of claim 8. As set forth *supra* in Section IV.C, the ALJ construed "the intensity at which the laser generates the radiated light beam with a signal-to-noise ratio above a threshold level being greater than a predetermined maximum intensity" to mean that the laser operates such that the signal-to-noise ratio of the light generated by the laser is above some threshold signal-to-noise ratio and the intensity of the light generated by the laser is greater than a predetermined maximum intensity. The evidence shows that the JPO Publications fail to disclose a threshold SNR or a predetermined maximum intensity. (*See* RX-208; RX-73; JX-63; RX-09; CX-257C at Q&A 467,

470.) The evidence further shows that the JPO Publications fail to disclose lasers that generate a radiated light beam that is above a threshold SNR level or greater than a predetermined intensity. (*Id.*) Furthermore, the JPO Publications also fail to disclose an output light beam that has an intensity that is attenuated by a coupling means such that it falls below a predetermined maximum intensity and greater than a threshold SNR level as required by the "the coupling means to coupling such fraction of the radiated light beam to the light sensor means that the output light beam has a signal-to-noise ratio greater than the threshold level and an intensity less than the predetermined maximum intensity" limitation of claim 8. (*Id.*)

Emcore argues that these limitations are inherently disclosed in the JPO Publications and premise their own inherency argument on Avago's argument that "light emitted from a VCSEL '***must meet***' some maximum intensity limit and '***must have*** a signal-to-noise ration that allows for effective data transmission, which ***requires*** laser intensity above a' specified limit." (RRB at 41 (emphasis in original); RIB at 85-87.) However, as set forth *supra* in Section V.C and *infra* in Section IX.B.2, the ALJ found that the Avago failed to show that the Accused '229 Products and the Exemplary Covered Avago Products disclose these limitations. Therefore, Emcore's arguments also fail.

Thus, the ALJ finds that Emcore has failed to prove by clear and convincing evidence that the JPO '374 and the JPO '887 references disclose each and every limitation of claim 8 of the '229 Patent.

C. Obviousness

Included within the presumption of validity is a presumption of non-obviousness. *Structural Rubber Prods. Co. v. Park Rubber Co.*, 749 F.2d 707, 714 (Fed. Cir. 1984). Obviousness is grounded in 35 U.S.C. § 103, which provides, *inter alia*, that:

> 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 negative by the manner in which the invention was made.

35 U.S.C. § 103(a). Under 35 U.S.C. § 103(a), a patent is valid unless "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." 35 U.S.C. § 103(a). The ultimate question of obviousness is a question of law, but "it is well understood that there are factual issues underlying the ultimate obviousness decision." *Richardson-Vicks Inc.*, 122 F.3d at 1479; *Wang Lab., Inc. v. Toshiba Corp.*, 993 F.2d 858, 863 (Fed. Cir. 1993).

Once claims have been properly construed, "[t]he second step in an obviousness inquiry is to determine whether the claimed invention would have been obvious as a legal matter, based on underlying factual inquiries including: (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) secondary considerations of non-obviousness" (also known as "objective evidence"). *Smiths Indus. Med. Sys., Inc. v. Vital Signs, Inc.*, 183 F.3d 1347, 1354 (Fed. Cir. 1999) (citing *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966)). The ultimate determination of whether an invention would have been obvious is a legal conclusion based on underlying findings of fact. *In re Dembiczak*, 175 F.3d 994, 998 (Fed. Cir. 1999).

Obviousness may be based on any of the alleged prior art references or a combination of the same, and what a person of ordinary skill in the art would understand based on his knowledge and said references. If all of the elements of an invention are found, then:

> a proper analysis under § 103 requires, inter alia, consideration of two factors: (1) whether the prior art would have suggested to those of ordinary skill in the art that they should make the claimed composition or device, or carry out the claimed process; and (2) whether the prior art would also have revealed that in so making or carrying out, those of ordinary skill would have a reasonable expectation of success. *Both the suggestion and the reasonable expectation of success must be founded in the prior art, not in the applicant's disclosure.*

Velander v. Garner, 348 F.3d 1359, 1363 (Fed. Cir. 2003) (emphasis added) (internal citations omitted).

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. *See C.R. Bard v. M3 Sys.*, 157 F.3d 1340, 1352 (Fed. Cir. 1998). For example:

> *[A] patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art.* Although common sense directs one to look with care at a patent application that claims as innovation the combination of two known devices according to their established functions, *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. This is so because inventions in most, if not all, instances rely upon building blocks long since uncovered*, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known.

KSR Int'l Co. v. Teleflex, Inc., 550 U.S. 398, 418-19 (2007) (emphasis added). The Federal Circuit case law previously required that, in order to prove obviousness, the patent challenger must demonstrate, by clear and convincing evidence, that there is a "teaching, suggestion, or motivation to combine. The Supreme Court has rejected this "rigid approach" employed by the Federal Circuit in *KSR Int'l Co. v. Teleflex Inc.*, 500 U.S. 398 (2007), 127 S.Ct. 1727, 1739. The Supreme Court stated:

> When a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, § 103

> likely bars its patentability. For the same reason, if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill. Sakraida and Anderson's-Black Rock are illustrative–a court must ask whether the improvement is more than the predictable use of prior art elements according to their established function.
>
> Following these principles may be more difficult in other cases than it is here because the claimed subject matter may involve more than the simple substitution of one known element for another or the mere application of a known technique to a piece of prior art ready for the improvement. Often, it will be necessary for a court to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue. To facilitate review, this analysis should be made explicitly. See *In re Kahn*, 441 F.3d 977, 988 (CA Fed. 2006) ("[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusions of obviousness"). 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.
>
> [. . .]
>
> The obviousness analysis cannot be confined by a formalistic conception of the words teaching, suggestion, and motivation, or by overemphasis on the importance of published articles and the explicit content of issued patents. The diversity of inventive pursuits and of modern technology counsels against limiting the analysis in this way. In many fields it may be that there is little discussion of obvious techniques or combinations, and it often may be the case that market demand, rather than scientific literature, will drive design trends. Granting patent protection to advance that would occur in the ordinary course without real innovation retards progress and may, in the case of patents combining previously known elements, deprive prior inventions of their value or utility.

KSR, 550 U.S. at 417-419; 127 S.Ct. at 1740-41. The Federal Circuit has harmonized the KSR opinion with many prior circuit court opinions by holding that when 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, or carry out the claimed process, 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) (citing *Medichem S.A. v. Rolabo S.L.*, 437 F.3d 1175, 1164 (Fed. Cir. 2006)); *Noelle v. Lederman*, 355 F.3d 1343, 1351-52 (Fed. Cir. 2004); *Brown & Williamson Tobacco Corp. v. Philip Morris, Inc.*, 229 F.3d 1120, 1121 (Fed. Cir. 2000); and *KSR*, 127 S.Ct. at 1740 ("a combination of elements 'must do more than yield a predictable result'; combining elements that work together 'in an unexpected and fruitful manner' would not have been obvious"). Further, a suggestion to combine need not be express and may come from the prior art, as filtered through the knowledge of one skilled in the art. *See Certain Lens-Fitted Film Pkgs.*, Inv. No. 337-TA-406, Order No. 141 at 6 (May 24, 2005).

"Secondary considerations," also referred to as "objective evidence of non-obviousness," must be considered in evaluating the obviousness of a claimed invention, but the existence of such evidence does not control the obviousness determination. *Graham*, 383 U.S. at 17-18. A court must consider all of the evidence under the *Graham* factors before reaching a decision on obviousness. *Richardson-Vicks Inc.*, 122 F.3d at 1483-84. Objective evidence of non-obviousness may include evidence of the commercial success of the invention, long felt but unsolved needs, failure of others, copying by others, teaching away, and professional acclaim. *See Perkin-Elmer Corp. v. Computervision Corp.*, 732 F.2d 888, 894 (Fed. Cir. 1984), *cert. denied*, 469 U.S. 857 (1984); *Avia Group Int'l, Inc. v. L.A. Gear California*, 853 F.2d 1557, 1564 (Fed. Cir. 1988); *In re Hedges*, 783 F.2d 1038, 1041 (Fed. Cir. 1986); *Kloster Speedsteel AB v. Crucible Inc.*, 793 F.2d 1565 (Fed. Cir. 1986), *cert. denied*, 479 U.S. 1034 (1987). The burden of showing secondary considerations is on the patentee and, in order to accord objective

evidence substantial weight, a patentee must establish a nexus between the evidence and the merits of the claimed invention; a *prima facie* case is generally set forth "when the patentee shows both that there is commercial success, and that the thing (product or method) that is commercially successful is the invention disclosed and claimed in the patent." *In re GPAC Inc.*, 57 F.3d 1573, 1580 (Fed. Cir. 1995); *Demaco Corp. v. F. Von Langsdorff Licensing Ltd.*, 851 F.2d 1387, 1392 (Fed. Cir. 1988), *cert. denied*, 488 U.S. 956 (1988); *Certain Crystalline Cefadroxil Monohydrate*, Inv. No. 337-TA-293, Comm'n Op. (March 15, 1990). Once a patentee establishes nexus, the burden shifts back to the challenger to show that, *e.g.*, commercial success was caused by "extraneous factors other than the patented invention, such as advertising, superior workmanship, etc." *Id.* at 1393.

Generally, a prior art reference that teaches away from the claimed invention does not create *prima facie* case of obviousness. *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994); *see also Andersen Corp. v. Pella Corp.*, No. 2007-1536, 2008 U.S. App. LEXIS 24087, *13-18 (Fed. Cir. Nov. 19, 2008); *Certain Rubber Antidegradants*, Inv. No. 337-TA-533 (Remand), Final ID (Dec. 3, 2008) (stating, "*KSR* reaffirms that obviousness is negated when the prior art teaches away from the invention."). However, the nature of the teaching is highly relevant. *Id.* "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.*" *Id.* (emphasis added). For example, "a reference will teach away if it suggests that the line of development flowing from the reference's disclosure is unlikely to be productive of the result sought by the applicant." *Id.*

1. The '447 Patent

Emcore argues that what the inventors asserted to have been the non-obvious limitation, the use of a VCSEL larger than 8 microns, was common in the art. In fact, most of the VCSELs in the art were larger than 8 microns. Emcore's argument is basically a classic reconstruction from the invention itself, working back and piecing together the prior art references to the result the invention produced. Working backwards it is now clear that one could obtain the known result from the items that existed at the time, but as 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, or carry out the claimed process, and would have had a reasonable expectation of success in doing so, the evidence presented by Emcore falls short. The post hoc analysis in cross examination produces the correct answers from Dr. Deppe:

> QUESTION: As you said, it was known to those of skill in the art that wide area, high power surface-emitting lasers would have low coherence due to many transverse modes, correct?
>
> ANSWER: It was known that the -- that if you made the implant aperture sufficiently large, that it would support multiple transverse mode operation.
>
> QUESTION: And sufficiently large means 8 microns or bigger, right?
>
> ANSWER: Yeah. I mean, for the types of devices that were most commonly studied, yep.
>
> QUESTION: Certainly, for the proton implant lasers that were common in that era, right?
>
> ANSWER: Yeah.

(Deppe, Tr. 1043:7-25.)

The ALJ finds, however, that given the state of the art at the time of the invention, it was not so simple or obvious. At the time of the invention, the teaching and use of VSCELs would not have suggested this was useful. At that time, it was thought that it would be better to attempt

to use single transverse mode lasers for long distance operations. The evidence establishes that the prior art low-coherence light sources operated in single transverse and multiple longitudinal mode. For example, Dr. Chang-Hasnain relied upon a 1986 paper by Antonius Koonen entitled "Bit-Error-Rate Degradation in a Multimode Fiber Optic Transmission Link Due to Modal Noise" to assert that "[t]he solution proposed in the patent, using a low-coherence light source to reduce the signal degradation from modal noise, was already known." (CX-454C at Q. 54; JX-67.) The Koonen article discloses that "[g]ain-guided lasers emit in several longitudinal modes, having low partition noise and low coherence." (JX-67 at 1517.) At the hearing, however, Dr. Chang-Hasnain acknowledged that this reference only disclosed achieving low coherence through multiple longitudinal modes and did not specify multiple transverse modes. (Chang-Hasnain, Tr. 1383:6-1385:1.) Similarly, in her witness statement, Dr. Chang-Hasnain also relied upon the teachings of the Soderstrom article (JX-68) that was cited in the '447 Patent, but acknowledged at the hearing that this prior art reference only taught the use of low-coherence CD lasers that operated in multiple longitudinal modes, but not multiple transverse modes. (Chang-Hasnain, Tr. 1348:15-1349:22.)

Dr. Shih-Yuan Wang, one of the inventors of the '447 Patent, also testified that while it was known that you may get multiple transverse modes with a VCSEL with a larger aperture, in the timeframe of the early 1990's, this was not thought to be suitable for telecommunications systems. (Wang, Tr. at 403:2-404:1.) Thus, while the physics may have been known, applying the physics to obtain a useful application was not obvious. The elements that went into the '447 Patent were known prior to the patent: Mr. Jewell and others worked with large cavity VSCELs in labs, there were edge emitting lasers that were used with multi-mode fibers, and there were communication systems that used multi-longitudinal modes for communication. (JX-56; Tr. at

420:18-23.) Without the benefit of hindsight however, there is no clear and convincing evidence that it would be obvious to combine a multi-transverse mode VSCEL with multi-mode fiber for short range optical communication functions. While it is obvious today that such systems work, it was not in 1994.

As set forth *supra* in Section VI.B., the Banwell reference was considered by the PTO in the patent examination and was distinguished by the patent holders based on the size of the apertures and the fact that the prior art taught that the size of VSCEL lasers directed their use in single mode function, not in a multimode function. The patent holders stated that the prior art taught the multimode function should be avoided with VSCELs. (JX-02 at AV10215961.) Similarly, as noted above, the Von Lehmen prior art used air as the media, not multi-mode optical media, as required by proper claim construction. The Maeda paper, presented by Emcore as a prior art reference, does not disclose whether the lasers were operated in multi-transverse mode at all. While Dr. Chang-Hasnain opined that they were at the hearing, her memory, as an expert years after the paper was published, cannot serve to supplement what the paper taught as prior art. (Tr. 1438:4-21.) In short, none of the prior art references, together or individually, make the invention of the '447 Patent obvious to one of skill in the art at the time of the invention.

Therefore, the ALJ finds that Emcore has failed to show by clear and convincing evidence that the '447 Patent is obvious.

2. The '229 Patent

Emcore argues that claim 8 of the '229 Patent is obvious in light of the JPO Publications combined with what was known to those of ordinary skill in the art. (RIB at 88-91.) Emcore argues that the use of beam splitters was well known in the prior art and that the use of the beam

splitter to split one beam into two and to adjust the properties of the beam splitter to reduce the intensity of the output so that it would not exceed a predetermined intensity would have been obvious to one of ordinary skill in the art. (RIB at 89.) Emcore argues that the inventors of the '229 Patent agree with their analysis and conclude that "[a]fter accounting for what was admitted prior art in the patent and what was admitted prior art by the inventors, there is nothing novel or non-obvious left in claim 8." (RIB at 89-91.)

Avago argues that there is no motivation to combine the two references, including any teaching that disclosed the use of a laser that was required to operate above a threshold SNR and caused the intensity of the radiated beam to be greater than a predetermined maximum intensity or a teaching that disclosed a coupling means that was used to attenuate the output of the laser that fell below a predetermined maximum intensity and an SNR above a threshold SNR. (CIB at 96-94.) Staff agrees. (SIB at 93-94.)

As set forth *supra* in Section VI.B.2, the ALJ found that the JPO Publications failed to disclose certain limitations of claim 8, namely "the intensity at which the laser generates the radiated light beam with a signal-to-noise ratio above a threshold level being greater than a predetermined maximum intensity" and "the coupling means to coupling such fraction of the radiated light beam to the light sensor means that the output light beam has a signal-to-noise ratio greater than the threshold level and an intensity less than the predetermined maximum intensity" limitations. Emcore cites to no other prior art reference that discloses these limitations nor does Emcore argue that this is within the general "knowledge" of one of ordinary skill in the art. (RIB at 88-91.) Thus, the ALJ finds that Emcore has failed to show by clear and convincing evidence that claim 8 of the '229 Patent is obvious in light of the JPO Publications and the knowledge of one of ordinary skill in the art.

3. Objective Indicia of Nonobviousness

As indicated above, one of the *Graham* factors that must be considered in an obviousness analysis, is "objective evidence of nonobviousness," also called "secondary considerations." *See Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1536 (Fed. Cir. 1983) ("Thus evidence arising out of the so-called 'secondary considerations' must always when present be considered en route to a determination of obviousness."). However, secondary considerations, such as commercial success, will not always dislodge a determination of obviousness based on analysis of the prior art. *See KSR Int'l*, 127 S.Ct. at 1745 (commercial success did not alter conclusion of obviousness).

a) The '447 Patent

The commercial success, namely, the tremendous volume of sales by both Avago and Emcore supports the conclusion that the subject of the '447 Patent was not obvious. From 2005 to 2008, sales of the Covered Avago Products in the United States total approximately [redacted], including [redacted] in 2008 alone. (JX-17C, ¶ 8.) Emcore presented testimony that it has also had commercial success with its products. (CX-121C; CX-147C.)

While the evidence of the commercial success of the invention is somewhat persuasive, there is also some evidence to support Avago's assertion that the reactions expressed by persons of ordinary skill in the art when they were faced with the proposal of using a large-area VCSEL emitting in multiple transverse modes to solve the modal noise problem included skepticism and disbelief. For example, Dr. Michael Tan, one of the inventors of the '447 Patent, testified in his witness statement that his audience was skeptical when he presented a paper on the use of multi-mode VCSELs in 1994. (CX-150C at Q. 65.) This skepticism of the invention by those in the scientific community further supports the non-obviousness of the '447 Patent. *See Cardiac*

Pacemakers, Inc. v. St. Jude Medical, Inc., 381 F.3d 1371, 1376 (Fed. Cir. 2004). While the evidence presented by the inventor of the patent must be viewed as somewhat self-serving, the evidence of commercial success and skepticism of those of ordinary skill in the art support the finding of non-obviousness while the evidence presented by respondents of obviousness is unpersuasive.

b) The '229 Patent

Avago argues that Emcore has failed to take into account its secondary considerations of non-obviousness, namely commercial success and failure by others, in its obviousness analysis. (CIB at 94-95.) Avago argues that the commercial success of both Avago's and Emcore's products that are covered by the '229 Patent is clear based on the sales volume and that the nexus is established by the requirement to limit the output based on eye safety requirements. (CIB at 94.) As for failure by others, Avago argues that the '229 Patent itself identifies at least one failure by others to solve the problems solved by the '229 Patent. (CIB at 95.)

Emcore argues that Avago has failed to overcome Emcore's strong prima facie showing of obviousness. (RIB at 43.) Regarding commercial success, Emcore argues that it does not concede that its products are covered by the '229 Patent and that Avago has failed to offer evidence to show a nexus between the sale of products and claim 8. (RIB at 44.) Emcore further argues that Avago has failed to demonstrate a nexus between the failure of others and claim 8. (RIB at 43-44.)

Since the ALJ finds that Emcore has failed to meet its burden proving of obviousness by clear and convincing evidence, the ALJ finds that an extensive analysis of secondary considerations to rebut the obviousness arguments is unnecessary. *WMS Gaming Inc. v. International Game Tech.*, 184 F.3d 1339, 1359 (Fed. Cir. 1999) ("The objective evidence of

non-obviousness may be used to rebut a prima facie case of obviousness based on prior art references.").

Nevertheless, as noted *supra*, the commercial success, namely, the tremendous volume of sales by both Avago and Emcore supports the conclusion that the '229 Patent is not obvious. Sales of the Covered Avago Products in the United States total approximately [redacted], including [redacted] in 2008 alone. (JX-17C, ¶ 8.) Emcore presented testimony that it has also had commercial success with its products. (CX-121C; CX-147C.) As set forth *infra* in Section IX, Avago has established a nexus between the sale of its products and the patents at issue, including the '229 Patent.

Therefore, the ALJ finds that these secondary considerations demonstrate that the '447 Patent and the '229 Patent are not obvious.

VII. LICENSING

Emcore argues that it has an implied license to practice the asserted claims of the '447 Patent.

A. Applicable Law

Selling or importing a licensed product can not result in infringement of a licensed patent. *See* 35 U.S.C. §271(a) ("whoever ***without authority*** makes, uses, offers to sell or sells any patented invention, within the United States or imports into the United States any patented invention … infringes the patent) (emphasis supplied). The Supreme Court long ago recognized that a license is a complete defense to a claim of infringement. *See De Forest Radio Tel. & Tel. Co. v. United States*, 273 U.S. 236, 241 (1927). A license is also a complete defense in a Section 337 Investigation. *See Certain Cardiac Pacemakers and Components Thereof*, ITC Inv. No. 337-TA-162, 1984 WL 273841, at *10 (May 23, 1984) ("Telectronics' motion for termination of

the Investigation relative to Telectronics for infringement of the '242 patent is hereby granted because a valid license is an absolute defense to patent infringement."). The burden of proof lies on the accused infringer to prove an implied license. *Bandag, Inc. v. Al Bolser's Tire Stores, Inc.*, 750 F.2d 903, 924 (Fed. Cir. 1984).

B. Implied License

Emcore argues, as a result of the conduct between Emcore and Avago, it has an implied license under the '447 Patent to import and sell its accused products. (RIB at 35-46.) Specifically Emcore argues it has an implied license 1) under the doctrine of equitable estoppel, 2) because of the relationship between Emcore and Avago or its predecessors as manufacturer and customer, respectively, and 3) because of Avago's and Emcore's participation in "multi-source agreements" ("MSAs") to create industry standards. (RIB at 33-39.) In the alternative, Emcore argues Avago is obligated to grant Emcore an express license on reasonable and non-discriminatory ("RAND") terms as stated in the MSAs. (RIB at 45-46.)

1. Equitable Estoppel Argument

Equitable estoppel requires three elements: 1) "the patentee, through misleading conduct, leads the alleged infringer to reasonably infer that the patentee does not intend to enforce its patent against the alleged infringer. 'Conduct' may include specific statements, action, inaction, or silence where there was an obligation to speak; 2) the alleged infringer relies on that conduct; 3) due to its reliance, the alleged infringer will be materially prejudiced if the patentee is allowed to proceed with its claim." *A.C. Aukerman Co. v. R.L. Chaides Constr. Co.*, 960 F.2d 1020, 1028 (Fed. Cir. 1992) (numbers supplied); *Winbond Elecs. Corp. v. ITC*, 2001 U.S. App. LEXIS 25113 (Fed. Cir. 2001); *see also Carbonated Candy Product*, ITC Inv. No. 337-TA-292, Initial

Determination at 118 (December 8, 1989). The party asserting the affirmative defense of equitable estoppel carries the burden of establishing all three factors. *Auckerman*, 960 F.2d at 1043.

Emcore argues that it has an implied license under the doctrine of equitable estoppel. (RIB at 34.)[9] Emcore argues that Avago misled Emcore because "neither Agilent nor Avago sued Emcore until December, 2008, more than seven years after [redacted] was sued for using Emcore VCSEL-based products." (RIB at 35.) Emcore further argues that Avago has "submitted **no** evidence explaining the more than seven-year delay in asserting patents against Emcore." (RIB at 36 (emphasis original).) Emcore asserts it relied on Avago's participation in various industry standard agreements and [redacted] to infer that Emcore had an implied license. (RIB at 39-40.) Emcore further asserts it will suffer material business prejudice and loss of evidence. (RIB at 41.)

Avago argues there is no equitable estoppel. Specifically Avago asserts that Emcore "had actual notice by virtue of its customer being sued for patent infringement…[and] by virtue of a license agreement in which the two patents were identified and Respondent [Emcore] was expressly not released." (CRB at 33.)

Staff asserts there is "no precedent which suggests that an implied license may be found as a result of Avago's alleged delay." (SRB at 12.) Staff recognizes that "Emcore asserts that Avago knew of Emcore's and its customers alleged use of the patents-in-suit and has introduced no evidence to explain this delay." (SRB at 12.) However, Staff argues that "this delay in bringing suit may potentially serve as basis for a laches defense, [but] it is well established that

[9] Emcore relies on that idea that an implied license can "arise by acquiescence, by conduct, by equitable estoppel (estoppel in pais), or by legal estoppel." *Wang Labs. Inc. v. Mitsubishi Elecs. Am. Inc.,* 103 F.3d 1571, 1582 (Fed. Cir. 1997).

laches does not serve as a valid defense in Section 337 investigations." (SRB at 12 (citations omitted).)

The ALJ finds that Emcore has failed to meet the burden of proving all three required elements of equitable estoppel. The ALJ finds that Avago did not mislead Emcore in such a way that Emcore could reasonably infer that Avago did not intend to enforce its patents. Emcore has offered no specific evidence of Avago's "conduct" such as "specific statements, action, inaction, or silence where there was an obligation to speak" that would indicate Avago misled Emcore. *Auckerman*, 960 F.2d at 1042.

The ALJ finds the delay of seven years in filing the instant investigation does not constitute misleading conduct. Precedent indicates that a respondent must show more than just delay by the complainant in filing suit to establish that complainant's conduct was misleading. *A.C. Aukerman Co. v. R.L. Chaides Constr. Co.*, 960 F.2d 1020, 1042 (Fed. Cir. 1992) ("Delay in filing suit may be evidence which influences the assessment of whether the patentee's conduct is misleading but it is not a requirement of equitable estoppel...plaintiff's inaction must be combined with other facts respecting the relationship or contacts between the parties to give rise to the necessary inference that the claim against the defendant is abandoned."); *Sortation Systems*, ITC Inv. No. 337-TA-460, Comm. Op at 18 (February 19, 2003) (Commission agreeing with ALJ that complainant's conduct was insufficient to be misleading when after two warnings of its intent to enforce its rights and then almost three years of silence, it filed a complaint); *Carbonated Candy Products,* Initial Determination at 118-135 (ALJ finding that a delay in filing the complaint nine years after infringement and almost eight years after the importation and selling was not an unreasonable delay and failed to prove affirmative conduct on behalf of the patentee that it had abandoned its claims against the accused infringement). In fact, Avago put

Emcore on notice that Avago did not plan to release Emcore from infringement liability. (CX-179C at ¶ 3.1; Anderson, Tr. 645:12-18; CPFF 629-631.)

With regards to reliance, the ALJ finds that the customer-manufacturer relationship between Avago and Emcore does not provide sufficient evidence that Emcore relied on that relationship to infer an implied license with Avago.[10] Emcore fails to cite any applicable case law in support of its argument.[11] Additionally, the ALJ finds that Emcore's and Avago's communications as part of the MSAs do not provide sufficient evidence that Emcore relied on Avago's conduct. In fact, Avago put Emcore on notice that Avago did not plan to release Emcore from infringement liability. (CX-179C at ¶ 3.1; Anderson, Tr. 645:12-18; CPFF 629-631.) As for the third element, the ALJ finds that Emcore will not be materially prejudiced if Avago is allowed to continue with its claim, even after seven years.[12] Emcore did not meet its burden of establishing that it would be materially prejudiced by a loss of evidence[13] or a change in economic position.[14] *Auckerman*, 960 F.2d at 1043. In fact, for seven years Emcore has been

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[10] "To show reliance, the infringer must have had a relationship or communication with the plaintiff which lulls the infringer into a sense of security...." *A.C. Aukerman Co. v. R.L. Chaides Constr. Co.*, 960 F.2d 1020, 1043 (Fed. Cir. 1992).

[11] Emcore relies heavily on *Met-Coil* to support its argument that the customer-manufacturer relationship between Emcore and Avago infers the grant of an implied license. (RIB at 33-34, 36 (citing *Met-Coil Systems Corp. v. Korners Unlimited, Inc.*, 803 F.2d 684, 686-687 (Fed. Cir. 1986)).) Unlike the situation here where the manufacturer is the accused infringer and the customer is the Complainant and patent holder, in *Met-Coil*, the manufacturer was also the patent holder and sued its customers for infringement. Thus, *Met-Coil* is not applicable here.

[12] The ALJ notes that unlike the doctrine of laches where prejudice may be presumed after unreasonable delay, "[n]o presumption is applicable to equitable estoppel." *Auckerman*, 960 F.2d at 1028.

[13] Emcore argues that it "has faced material harm from a loss of evidence, or diminished memories of parties and witnesses due to the length of time that has elapsed." (RIB at 41.) However, Emcore's only evidence of this is that the delay prevented Avago from "provid[ing] information in discovery because it [] did not have the information (because its predecessors, Agilent and HP, had it)...." (RIB at 41.) The ALJ is not persuaded by this argument because Emcore has simply claimed the information is in the hands of a third party, not that the evidence is lost as a result of Avago's delay.

[14] Emcore argues that it "will suffer business prejudice because it has invested considerable time and effort to develop and successfully market its accused products...." (RIB at 41.) However, the ALJ is not persuaded because

economically advantaged, not economically harmed, by reaping profits from manufacturing and selling products that are accused of infringing Avago's '447 Patent. Thus, the ALJ finds that Emcore has not established all of the elements necessary for finding an implied license by equitable estoppel.

2. "Course of Conduct" Argument

Emcore argues it has an implied license based on "an accord implicit in the entire course of conduct between parties." (RIB at 34 (citing *Wang Labs. Inc. v. Mitsubishi Elecs. Am. Inc.*, 103 F.3d 1571, 1582 (Fed. Cir. 1997)).) Emcore asserts it "received an implied license to practice the patents in suit on the basis of [redacted]. Additionally, Emcore argues that Avago did not complain or provide notice of infringement despite the fact that "Avago knew that VCSELs equivalent to those they purchased were incorporated into Emcore's TO and TOSA products sold to others...." (RIB at 39.) Emcore further argues that [redacted] (RIB at 39.)

Emcore's evidence does not indicate *future* harm to Emcore and as a determination of a violation under Section 337 only provides non-monetary and prospective remedies, Emcore must show *future* harm. *See Personal Watercraft,* ITC Inv. No. 337-TA-452, Order 54 at 1-2 (September 19, 2001).

15 [redacted]

[redacted]

Staff argues "the evidence does not establish that Emcore received an implied license to practice the '447 patent as a result of [redacted] Staff, too, distinguishes the Avago-Emcore relationship from the situation in *Wang Labs* stating "there is no evidence in this investigation Avago tried to 'coax' Emcore into the VCSEL market." (SIB at 78.) Specifically, Staff submits that "[redacted] Staff further argues "unlike the SIMM products purchased by Wang, there is nothing to suggest that [redacted]

An implied license "signifies a patentee's waiver of the statutory right to exclude others from making, using, selling, offering to sell, or importing, the patented invention." *Winbond Elecs. Corp. v. ITC*, 2001 U.S. App. LEXIS 25113 (Fed. Cir. 2001) (citing *Wang Labs.*, 103 F.3d at 1580). An implied license can "ar[i]se from an accord implicit in the entire course of conduct between the parties." *Wang Labs.*, 103 F.3d at 1582 (holding Mitsubishi properly inferred consent to use the inventions of Wang's patents where "the record shows that Wang tried to coax Mitsubishi into the SIMM market, that Wang provided designs, suggestions, and samples to Mitsubishi, and that Wang eventually purchased SIMMs from Mitsubishi, before accusing Mitsubishi years later of infringement.").

The ALJ finds that there was not an "accord implicit in the entire course of conduct between the parties" such that Emcore could properly infer consent to use Avago's '447 Patent. As argued by Avago and Staff, the relationship here is distinguishable from the situation in *Wang Labs*. The evidence shows that Emcore used [redacted] as a method of "selecting" and "customizing" the products within its existing stock collection to meet [redacted] needs. (CX-269C, p. 5-7 ([redacted] Wit. Stmt: Dep. Tr. 85:7 – 86:9, 87:1-88:4, and 90:2-13); JX-33C; RX-456C:11 ([redacted] Wit. Stmt: Q52).) The ALJ finds this customization and selection by Emcore is distinctly different from *Wang Labs* where Wang "coaxed" Mitsubishi into the market. Here, the evidence shows that Emcore was already in the VCSELs market before [redacted], became one of Emcore's customers, and Emcore has presented no evidence to suggest [redacted] "coaxed" Emcore into the market. (RX-456C:11 ([redacted] Wit. Stmt: Q50 and Q51).)[16] Therefore, the course of conduct between Emcore and [redacted] and its predecessors does not meet the requirements for finding an implied license.

3. Multi-Source Agreements ("MSAs") Argument

Emcore argues "Avago and its predecessor, Agilent, entered into agreements with Emcore and others to encourage others to make products conforming to industry standards that necessitated use of the patents-in-suit." (RIB at 36.) Emcore further argues that "neither Avago nor Agilent gave notice of the patents as required by these agreements, thereby giving Emcore (and other industry members), by their silence, an implied license to the required intellectual property to practice the standards." (RIB at 36 (internal citations omitted).) Additionally, Emcore argues that an implied license exists because the '447 patent was necessary to comply

16 [redacted]

with various standards "at the time that the 'implied license would have arisen' (ie., the time the standards were developed)." (RRB at 15.) Specifically, Emcore argues the '447 patent was necessary because even if "a single-channel 10 Gb/s product could be made in 2000 or 2002 does not mean that Emcore, or anyone else in the industry, could have made all of the other standard-compliant products, including the 12-channel DDR MSA and SNAP 12 products in 2000 or 20002 using VCSELs with apertures smaller than 8 microns." (RRB at 15 n. 12.)

Avago argues "the invention of the '447 patent was not required to practice the standard" and "it was a business or profit motive decision by Respondent Emcore to infringe...." (CIB at 68-70.) Avago asserts "the manufacture of a product under the MSA would not necessarily infringe the Avago patents." (CIB at 69.) Specifically Avago argues "the testimony indicated that the VCSEL was accepted as an alternative to the edge-emitting CD laser" and "the standard could still be met by using the prior art CD laser." (CIB at 70.) Avago further argues "Respondent's witness conceded that there was no obligation to identify patents unless Complainants knew that standards could not be met without infringing"[17] and Emcore offers no such evidence. (CRB at 34.) Avago also argues that "[a]ccording to Emcore itself, its products may be operated in the single longitudinal mode and, as a result, may be operated in a non-infringing manner." (CIB at 68 (citations omitted).) Avago further argues "[a]ccording to Emcore itself, it could make VCSELs having apertures less than 8 microns which...complied with the performance requirements of the various agreements but there was a commercial (ie. manufacturing) reason not to do so...." (CIB at 68 (citations omitted).)

Staff argues that the evidence here does not establish that the invention claimed in the '447 Patent is necessary to comply with the industry standard that resulted from the MSAs in

[17] Avago states "Dr. Jackson also agreed that if Avago's predecessor did not believe it was necessary to practice the invention of the '447 patent in order to make compliant products, then there was no obligation to notify anyone about the patent. (Jackson, Tr. 897, lines 3-8)." (CRRFF III.D.71-c.)

which Avago and its predecessors participated. (SIB at 76.) Staff asserts the evidence presented does not indicate the industry standard requires a VCSEL with an aperture greater than eight microns that operates in multiple transverse modes as required by the claims of the '447 Patent. (SIB at 76.) Specifically, Staff argues [redacted] testified, on behalf of Emcore, that the standards do not require operation in multiple transverse mode, as claimed in the '447 Patent. (SIB at 77.) Additionally, Staff argues that [redacted] testimony indicates "that it would have been physically possible, but not 'practical,' to design products with apertures less than eight microns that complied with the DDR and SNAP 12 MSAs." (SIB at 76-77.) Staff further argues the testimony indicated Emcore had the ability to produce VCSEL products with smaller apertures since at least 2002, if not earlier, but it would have been "modestly more" costly to do so.[18] (SIB at 77 n. 26.) Staff asserts "the fact that it may have been more costly for Emcore to commercially manufacture MSA-compliant products without infringing the '447 did not give Emcore an implied license under the patent." (SIB at 77 n. 26.)

Finding an implied license requires "language used by the owner of the patent, or any conduct on his part exhibited to another from which that other may properly infer that the owner consents to his use of the patent in making or using it, or selling it...." *Windbond Elecs. Corp. v. ITC*, 262 F.3d 1363, 1374 (Fed. Cir. 2001) (citing *De Forest Radio Tel. Co. v. United States*, 273 U.S. 236, 241 (1927)). Additionally, to find an implied license based on a patent holder's failure to disclose its patent during a standard-setting process, and thus preclude patent enforcement, the court must first determine whether the language of the standards-setting agreements required disclosure of the asserted patents. *See, e.g., Qualcomm v. Broadcom Inc.*, 548 F.3d 1004, 1018

[18] Staff cites to Emcore's witness, [redacted], who testified that Emcore had been able to commercially make VCSEL products with smaller apertures since at least 2002. (SIB at 77 n. 26 (citing RX-456C at Q. 22; Caron, Tr. 834:16-836:13).) Staff also cites to Avago's witness, [redacted], who testified it would have been possible, but "modestly more" costly, to make VSCELs in 2000 with apertures less than eight microns. (SIB at 77 n. 26 (citing CX-123C at Q. 102-106).)

(Fed. Cir. 2008) (finding, based on language in the agreement requiring disclosure of patents if they "reasonably might be necessary" to practice the standard, that Qualcomm's failure to disclose was an implied waiver of patent rights); *Wang Labs., Inc. v. Mitsubishi Elecs. America, Inc.*, 103 F.3d 1571, 1575 (Fed. Cir. 1997) (finding implied license based on Wang's express representation that it did not hold patent rights on the standard when in fact, Wang did hold patent rights related to the standard); *Netscape Communs. Corp. v. Valueclick, Inc.*, 2010 U.S. Dist. LEXIS 8733 (E.D. Va. Jan. 29, 2010) ("The question whether a disclosure duty exists is legal in nature, but importantly is based on factual underpinnings, such as the scope of the [standard setting agreement's] disclosure provisions and the manner of their implementation.").

The ALJ finds that Emcore does not have an affirmative defense of implied license to Avago's '447 Patent based on the language of the MSAs. The agreements Emcore relies on explicitly state "nothing in this Agreement is intended to grant any rights or licenses to either party under any patent…or any other intellectual property right of the other party…." (RX-80C, ¶ 9; *see also*, RX-81C, p. 2 § B; RX-83C, § 8.1.)

The ALJ finds the evidence shows the '447 Patent was not essential or necessary for compliance with the MSAs that Avago and its predecessors participated in. The '447 Patent requires a VSCEL with an aperture greater than eight microns that operates in multiple transverse modes. The evidence presented indicates a VSCEL with an aperture smaller than eight microns complies with the industry standard. ([redacted]n, Tr. 816:14-20).[19] Additionally, the evidence indicates the industry standards do not specify an aperture size. ([redacted], Tr. 809:24-

[19] Testimony of [redacted], Emcore's witness:

Q. I would like to go back to my more fundamental question. Would it have been possible to design the products with apertures less than eight microns that, in fact, complied with the MSA?

A. I think it would have been physically possible, but not practical. ([redacted], Tr. 816:14-20.)

810:8.)[20] Further, the evidence presented indicates the industry standard does not require operation in a multiple transverse mode. ([redacted] Tr. 819:12-18).[21] Therefore, the '447 Patent was not required to practice the industry standards that resulted from the MSAs.

The ALJ further finds the evidence here does not establish that Avago had a duty to disclose the '447 Patent because the MSA language, at most, required disclosure of "essential" patented claims. Emcore cites to three agreements that Emcore believes "necessitate[] the use of the patents-in-suit": [redacted] (RX-80C), [redacted] MSA (RX-81C), and [redacted] MSA (RX-83C). (RIB at 36.) The ALJ adopts Avago's characterization of the [redacted] refers to a 'Definition' to be developed in the future (RX-80C, first 'whereas clause'); provides for a royalty free license for any inventions developed 'in the course of developing the Definition' (RX-80C, p. 2, Section 4); states that there are no other licenses granted (RX-80C, p. 4, Section 9), and requires each party to use commercially reasonable efforts to advise the other party of potential or actual patent infringement (RX-80C, p. 4, Section 9)." (CRRFF III.D.97-a (characterizing RX-80C).) The [redacted] Agreement states: "B. Each of the MSA parties have agreed that **licenses to all required intellectual property** will be made available to all interested parties under reasonable and non-discriminatory terms and conditions applicable to that MSA party." (RX-81C at II.B (emphasis supplied).) The [redacted] MSA states: "8.2 Each of the MSA parties have agreed that **licenses to all intellectual property**

[20] Testimony of [redacted], Emcore's witness:

Q. Isn't it correct that none of these standards or agreements say anything about the aperture size for the aperture in the VCSEL?

A. It is true that the standards themselves do not cull [sic] out the aperture. However, the aperture size, given industry practice and given state of the industry art, the aperture size to build these things in any reasonable manner, reasonable deals, reasonable reliability would be pretty well-known. ([redacted], Tr. 809:24-810:8.)

[21] Testimony of [redacted], Emcore's witness:

Q. By the way, is there anything in the standards, whether SNAP 12 or anything else, that says you must operate in multiple transverse mode?

A. There is nothing in those standards that I think indicates you have to operate in multiple transverse mode. ([redacted], Tr. 819:12-18.)

necessary to realize a module conforming to this MSA will be made available to all interested parties." (RX-83C, p. 6, Section 8.2 (emphasis supplied).)

Additionally, both parties agree that the Standards Board Bylaws for the IEEE Standards Association ("IEEE-SA") is an informative authority on when patent disclosure is required amongst IEEE members in various agreements. (RFF III.D.69-71; CRRFF III.D.71-a.) The Standards Board Bylaws of IEEE- SA state: " '*Essential Patent Claim*' shall mean any Patent claim **the use of which was necessary to create a compliant implementation** of either mandatory or optional portions of the normative clauses of the [Proposed] IEEE Standard when, at the time of the [Proposed] IEEE Standard's approval, there was **no commercially and technically feasible non-infringing alternative**. An Essential Patent Claim does not include any Patent claim that was essential only for '*Enabling Technology*' or any claim other than that set forth above even if contained in the same patent as the Essential Patent Claim." (RX-1, p. 1 (emphasis added).)

The ALJ finds that the agreements refer to licensing intellectual property that is "required" (RX-81C at II.B) and "necessary" (RX-83C, p. 6, Section 8.2). The ALJ finds that application of the IEEE-SA "*Essential Patent Claim*" definition is appropriate in light of the language of the MSAs, and because the '447 Patent did not claim "essential" technology, Avago did not have a duty of disclosure. As such, the ALJ finds that Avago did not have a duty to disclose and thus, Emcore does not have an implied license based on Avago's or its predecessor's participation in these MSAs.

C. RAND

If an implied license does not exist, Emcore argues in the alternative that it is entitled to a license on reasonable and non-discriminatory ("RAND") terms. Emcore asserts "the standards

agreements…include requirements for parties to the agreement (including Avago) to license required intellectual property on a reasonable and non-discriminatory basis." (RIB at 41.) Specifically, Emcore relies on a provision in the SFP agreement stating: "Each of the MSA parties have agreed that licenses to all required intellectual property will be made available to all interested parties under reasonable and non-discriminatory terms and conditions applicable to that MSA party." (RX-81 at II.B.) Similarly, Emcore relies on a provision in the [redacted] agreement stating: "Each of the MSA parties have agreed that licenses to all intellectual property necessary to realize a module conforming to this MSA will be made available to all interested parties. These licenses will be granted under reasonable and non-discriminatory terms and conditions applicable to that MSA party, conditional on the interested party also agreeing to license any necessary intellectual property to the parties of this MSA." (RX-83C at § 8.2.) Emcore asserts Avago is obligated to offer Emcore a license on RAND terms, but Emcore argues "[t]here is no evidence that Avago has negotiated in good faith" to do so. (RRB at 16.) Emcore further asserts, it has "offered what it believes to be a RAND royalty to Avago." (RIB at 42.) Thus, Emcore argues, "Avago is prevented from denying Emcore the ability to practice the standards because it has not yet offered Emcore a license on reasonable and non-discriminatory terms." (RIB at 42.)

Avago argues Emcore "has failed to meet its burden of proof." (CRB at 34.) Avago specifically argues that Emcore should have requested a license on RAND terms in 2003 "when the patents were first asserted against [redacted]…" and each time a new standard was developed. (CRB at 34.) Additionally, Avago asserts there is no "evidence that the amount which was belatedly proffered by Respondent, clearly a litigation-induced strategy, was a mutually agreed-upon reasonable amount." (CRB at 34.)

Staff argues "the evidence does not support Emcore's RAND defense." (SIB at 79.) Staff argues that "the evidence in this investigation does not establish[] that the patents asserted in this investigation are either 'required intellectual property' or 'necessary to realize a module conforming to this MSA' as required by the MSA provisions." (SIB at 79.) Additionally, Staff asserts the evidence shows Avago has satisfied any RAND obligations it may have. (SIB at 78.)

The ALJ finds Avago is not obligated to offer a license on RAND terms to Emcore for the patent-in-suit based on the language of the MSAs. The MSAs require licenses with RAND terms for "required" (RX-81C at II.B) and "necessary" (RX-83C, p. 6, Section 8.2) intellectual property. As stated *supra* in Section VII.B, the ALJ finds the '447 Patent's invention is not required for compliance with standards established by the MSAs. (*See* subsection "Multi-Source Agreements Argument" under the "Implied License" section of this Initial Determination.) Because Avago's patent-in-suit is not a required or necessary technology for compliance with the standards established in the MSAs, Avago is not obligated to offer Emcore a license on RAND terms

Therefore, the ALJ finds that Emcore has failed to show that is licensed to practice the '447 Patent.

VIII. UNENFORCEABILITY

Emcore argues the '447 Patent is unenforceable because it was obtained by inequitable conduct.

A. Applicable Law

A patent is unenforceable on grounds of "inequitable conduct" if the patentee withheld material information from the PTO with intent to mislead or deceive the PTO into allowing the claims. *LaBounty Mfr., Inc. v. U.S. Int'l Trade Comm'n*, 958 F.2d 1066, 1070-1074 (Fed. Cir.

1992). Both materiality and intent must be proven by clear and convincing evidence. *Id.*; *Kingsdown Med. Consultants, Ltd. v. Hollister, Inc.*, 863 F.2d 867, 872 (Fed. Cir. 1988), *cert. denied*, 490 U.S. 1067 (1989); *Certain Salinomycin Biomass and Preparations Containing Same*, Inv. No. 337-TA-370, Unreviewed Initial Determination at 76, 1995 WL 1049822 (U.S.I.T.C. November 6, 1995), *aff'd sub nom. Kaken Pharmaceutical Co., Ltd. v. U.S. Int'l Trade Comm'n*, 111 F.3d 143 (Fed. Cir. 1997) (Table) (nonprecedential) ("*Salinomycin*"). When inequitable conduct occurs in relation to one or more claims of a patent, the entire patent is unenforceable. *Kingsdown*, 863 F.2d at 874.

According to the rules of the PTO, the duty to disclose information "exists with respect to each pending claim until the claim is canceled or withdrawn from consideration, or the application becomes abandoned. Information material to the patentability of a claim that is canceled or withdrawn from consideration need not be submitted if the information is not material to the patentability of any claim remaining under consideration in the application. There is no duty to submit information which is not material to the patentability of any existing claim." 37 C.F.R. § 1.56(a).

Generally, when withheld information is highly material, a lower showing of deceptive intent will be sufficient to establish inequitable conduct. *American Hoist & Derrick Co. v. Sowa & Sons, Inc.*, 725 F.2d 1350, 1363 (Fed. Cir.), *cert. denied*, 469 U.S. 821 (1984). Moreover, "[d]irect proof of wrongful intent is rarely available but may be inferred from clear and convincing evidence of the surrounding circumstances." *LaBounty*, 958 F.2d at 1076; *Salinomycin*, ID at 77. The conduct at issue must be viewed in light of all the evidence, including evidence of good faith. *Kingsdown*, 863 F.2d at 876; *Salinomycin*, ID at 77.

"Information is material where there is a substantial likelihood that a reasonable examiner would consider it important in deciding whether to allow the application to issue as a patent." *LaBounty*, 958 F.2d at 1074; *Salinomycin*, ID at 77. A patent applicant, however, has no obligation to disclose a reference that is cumulative or less pertinent than those already before the examiner. *Halliburton Co. v. Schlumberger Tech. Corp.*, 925 F.2d 1435, 1439-40 (Fed. Cir. 1991). Under the rules of the PTO, information is material when it is not cumulative to information of record and it either (i) "establishes, by itself or in combination with other information, a prima facie case of unpatentability of a claim"; or (ii) "it refutes, or is inconsistent with, a position the applicant takes" in either opposing the PTO's argument of unpatentability or asserting the applicant's own argument of patentability. 37 C.F.R. § 1.56(b). Close cases, however, "should be resolved by disclosure, not unilaterally by applicant." *Abbott Laboratories v. TorPharm, Inc.*, 300 F.3d 1367, 1379 (Fed. Cir. 2002) *quoting LaBounty,* 958 F.2d at 1076.

B. Applicants' Statements During Prosecution

Emcore asserts the '447 Patent is unenforceable due to inequitable conduct before the USPTO because applicants misrepresented the state of the prior art. (RIB at 64.) Emcore must prove both that the applicants 1) made an affirmative misrepresentation of material fact and 2) did so with an intent to deceive. *Impax Labs., v. Aventis Pharm. Inc.*, 468 F.3d 1366, 1374 (Fed. Cir. 2006).

1. Material Misrepresentation

Emcore argues the "'447 patent is unenforceable because one or more individuals breached their duty of candor in connection with obtaining the '447 patent." (RIB at 64.) Specifically, Emcore asserts that to overcome the rejection for obviousness in light of the

Banwell reference, the applicants stated: "[VCSELs] have been preferred for use in prior art fiber optic systems precisely because they are so small that they ordinarily can operate only in a single mode." (RIB at 65.) Emcore argues this statement is a misrepresentation because "applicants now admit VCSELs capable of operating in multimode were well known in the prior art" and "it was known that VCSELs were not so small that they would only operate in single mode." (RIB at 65.)

Emcore additionally argues that applicants, in their response to the examiner, stated: "The Applicants respectfully disagree that an eight-micrometer aperture would have been obvious. Conventional wisdom in the art was that multiple transverse mode operation was to be avoided; this inherently limited the aperture size to less than eight micrometers." (RIB at 65.) Emcore argues "[t]his was false" because "Avago's own expert concedes there was no consensus to select VCSELs with aperture smaller than 8 microns or to operate VCSELs in single transverse mode." (RIB at 65.) Emcore argues "the applicants grossly mischaracterized the prior art by falsely stating that use of VCSELs with apertures greater than 8 microns was antithetical to the entirety of the prior art." (RIB at 68.)

Avago argues the statements in response to the examiner's obviousness rejection in light of the Banwell reference were neither false nor misrepresentative. (CIB at 64-68.) Specifically, Avago argues "Respondent's expert confirmed the accuracy of this general statement which was consistent with contemporaneous writings as of that time including those of the Respondent's expert." (CIB at 65.) Avago also argues there is no evidence a "reasonable patent examiner would have found the applicant's statement to be materially misleading in part because it was not accompanied by affidavits, test data, or other factual evidence." (CIB at 65-66 (citation omitted).)

Staff asserts there is not "clear and convincing evidence to support Emcore's inequitable conduct defense." (SIB at 72.) Staff argues that the applicant's statement in response to the patent examiner's obviousness rejection of the pending claims in light of the Banwell reference "is neither false nor misleading." (SIB at 72.) Specifically, Staff argues that "the statement is not to be read as a factual assertion that *all* VCSELs with apertures greater than eight microns would have necessarily operated in multiple transverse modes." (SIB at 72 (emphasis in original).) Staff further argues the statement should not "be read as a factual assertion that Banwell did *not* disclose a VCSEL with an aperture greater than eight microns." (SIB at 72 (emphasis in original).) Staff asserts that the applicant's statement "is merely an argument that it would not have been considered obvious to use a VCSEL with an aperture size greater than eight microns because single transverse mode operation was preferred for most VCSEL applications at the time." (SIB at 72.) Staff further argues "even assuming that the statement was not accurate, attorney arguments made to distinguish prior art or to overcome a patent examiner's rejection do not constitute inequitable conduct unless they are 'gross mischaracterizations or unreasonable interpretations.'" (SIB at 72-73 (citations omitted).) Additionally, Staff asserts "that a reasonable patent examiner would not have found the applicant's statement to be materially misleading" because the applicant made "the bare statement that 'conventional wisdom' required the aperture size to be inherently limited…" and because the applicant did not submit "any affidavits, test data or other factual evidence." (SIB at 73.)

In response to the patent examiner's obviousness rejection of the pending claims in light of the Banwell reference, the applicants stated: "[VCSELs] have been preferred for use in prior art fiber optic systems precisely because they are so small that they ordinarily can operate only in a single mode." (JX-02 at AV10215961.) The ALJ finds that applicant's statement was not a

material misrepresentation. Emcore reads this statement as if applicants are informing the USPTO that VCSELs are not capable of operating in multimode and that VCSELs are so small they can only operate in single mode. (*See* RIB at 65.) However, the ALJ finds applicants' statement is not a misrepresentation because it does not state absolutely that VCSELs are so small that they can only operate in single mode and never multimode, but instead uses the words "preferred" and "ordinarily" instead of absolutes like "always" or "must." (Chang-Hasnain, Tr. 1301:14-24.) Additionally, the evidence shows that small VCSELs, at the time of the prosecution in 1993, usually operated in single mode. (Chang-Hasnain, Tr. 1302:15-20; CX-257C, answers to Q. 360-362.)

In response to the patent examiner's obviousness rejection of the pending claims in light of the Banwell reference, the applicants also stated: "The Applicants respectfully disagree that an eight-micrometer aperture would have been obvious. Conventional wisdom in the art was that multiple transverse mode operation was to be avoided; this inherently limited the aperture size to less than eight micrometers." (JX-02 at AV10215961.) The ALJ finds that applicant's statement was intended to be advocacy of the claimed invention, not a material misrepresentation. The term "conventional wisdom" refers to the fact that there was more than one option available in the art. (Chang-Hasnain, Tr. 1302:3-7) Additional evidence indicates that the applicant's statement was a true statement at the time it was written. (Chang-Hasnain, Tr. 1302:15-20; Deppe, Tr. 1096:24-1097:18.)

As neither statement was accompanied with factual evidence for the examiner, the ALJ finds both statements were intended to be advocacy for the claimed invention. (JX-02.) Additionally, the ALJ finds that neither statement made by applicants would be considered material because a reasonable examiner would not find the statements important in deciding

whether to allow the application to issue as a patent. As neither statement was a material misrepresentation, Emcore has not met its burden of proving inequitable conduct.

2. Intent to Deceive

Emcore argues that Avago has not contradicted the inference of intent to deceive. (RIB at 69.) Emcore asserts that "[d]irect evidence of intent is not necessary to prove intent. Rather intent 'is most often proven by a showing of acts, the natural consequences of which are presumably intended by the actor.'" (RIB at 69 (citing *Molins PLC v Textron, Inc.*, 48 F.3d 1172, 1180 (Fed. Cir. 1995) (citing *Kansas Jack, Inc. v. Kuhn*, 719 F.2d 1144, 1151 (Fed. Cir. 1983))).) Emcore argues the applicants "falsely asserted that the prior art was completely contrary to their claimed invention while simultaneously amending their application to incorporate the 8 micron diameter aperture limitation disclosed in the prior art into all of their claims." (RIB at 71.) Specifically, Emcore argues "at trial, Hahn admitted that in fact Iga and Hadley did not teach away from using multimode VCSELs with MMF, as he had argued in response to the rejection" and that "to justify his misrepresentation to the PTO, Hahn claimed that the real reason he had argued multimode VCSELs were disfavored for MMFs was that he thought multimode VCSELs were not yet viable." (RRB at 30.) Thus, Emcore argues, "[t]he 'natural consequence[]' of such actions is to deceive the patent office such that it would rely on their misstatement of the state of the art, fail to further investigate the Banwell reference or look to other prior art, and believe that the newly limited claims were patentable." (RIB at 71-72.)

Avago argues "[v]iewed in its context, the applicant's statement was clearly intended to be advocacy of their claimed invention, rather than a material misrepresentation or gross mischaracterization of the prior art." (CIB at 66.) Specifically, Avago submits that there seems to be disagreement amongst the experts about the "conventional wisdom" and Avago argues

"certainly this disagreement between two experts precludes...any intentional falsity let alone precluding the requisite intent to deceive." (CRB at 32.) Thus, Avago asserts, Emcore "has not established that the only reasonable inference to be drawn from the allegedly misleading statement is an intent to deceive." (CIB at 66.)

Staff argues that "clear and convincing evidence does not establish that the applicants acted with an intent to deceive the USPTO." (SIB at 73.) Specifically, Staff argues even though "intent to deceive may be inferred from circumstantial evidence," Staff asserts that "Emcore has not established that the only reasonable inference to be drawn from the allegedly misleading statement was an intent to deceive." (SIB at 73-74 (citing to *Star Scientific, Inc. v. R.J. Reynolds Tobacco Co.*, 537 F.3d 1357, 1366 (Fed. Cir. 2008) (determining an inference for intent to deceive drawn from circumstantial evidence "must also be the single most reasonable inference able to be drawn from the evidence to meet the clear and convincing standard.")).)

The ALJ finds no clear and convincing evidence of applicant's intent to deceive. The burden is on Emcore to identify evidence of intent, not on Avago to provide evidence contradicting the inference of intent to deceive. *See Impax Labs., v. Aventis Pharm. Inc.*, 468 F.3d 1366, 1374 (Fed. Cir. 2006). Emcore has asserted that circumstantial evidence indicates intent to deceive, but Emcore has not identified specific evidence of intent. (Tan, Tr. 502:5-18; Hahn, Tr. 270:1-19; Wang, Tr. 488:4-18.) In fact, the evidence indicates there was even a disagreement between the experts about what the "conventional wisdom" or "consensus" in the art was at the time. (Deppe, Tr. 1080:1-1084:3; Hahn, CX-146C, Q. 142-143; Chang-Hasnain, Tr. 1302:15-20.) This weighs against a finding of intent to deceive because to the extent experts cannot agree as to what is "conventional wisdom" or "consensus" it follows that the applicants could not intentionally deceive the examiner into believing a false answer if there was not a "true

and correct" answer. Further, the ALJ finds the most reasonable inference drawn from the evidence presented indicates the applicants' statements were intended as advocacy to overcome a prior art rejection, not an intention to deceive the USPTO. (Hahn, Tr. 267:11-24; Deppe, Tr. 1096:24-1097:18; JX-02.)

Therefore, the ALJ finds that Emcore has failed to show be clear and convincing evidence that the '447 Patent is unenforceable due to inequitable conduct.

C. Applicant's Alleged Failure to Disclose Prior Art References

Emcore argue that the '447 Patent is unenforceable due to inequitable conduct before the USPTO because "applicants withheld multiple prior art references disclosing large area VSCELs operating in multiple transverse modes, including the Jewell article, the 1990 Chan-Hasnanin article, and other Bellcore and Bell Labs articles,..." (RIB at 32.) In Respondent's Initial Pre-hearing Brief, Emcore only discuss applicant's statements relating to the state of the art relating to VCSELs generally and the Patent Office's error in misinterpreting the Banwell reference in the initial rejection. (Respondent Initial Pre-hearing Brief at 95.) Emcore then argued the misrepresentations were material and there was intent to deceive. (*Id.* at 95-104.) However, Emcore never presented any inequitable conduct argument on the basis of withholding specific prior art (as opposed to allegedly misrepresentative statements made by the applicants). (*Id.*) Additionally, Emcore did not provide any explanation as to why it was not aware and could not have been aware of this argument through the exercise of reasonable diligence at the time of filing its Pre-Hearing Brief. *Id.* Pursuant to Ground Rule 8(f), Emcore has waived any inequitable conduct argument on the basis of withholding specific prior art related to the prosecution of the '447 Patent.

IX. DOMESTIC INDUSTRY

A. Applicable Law

As stated in the notice of investigation, a determination must be made as to whether an industry in the United States exists as required by subsection (a)(2) of section 337. 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 only if an industry in the United States, relating to articles protected by the patent . . . concerned, exists or is in the process of being established. There is no requirement that the domestic industry be based on the same claim or claims alleged to be infringed. 19 U.S.C. § 1337(a)(2).

The domestic industry requirement consists of both an economic prong (*i.e.,* there must be an industry in the United States) and a technical prong (i.e., that industry must relate to articles protected by the patent at issue). *See Certain Ammonium Octamolybdate Isomers,* Inv. No. 337-TA-477, Comm'n Op. at 55, USITC Pub. 3668 (Jan. 2004). The complainant bears the burden of proving the existence of a domestic industry. *Certain Methods of Making Carbonated Candy Products,* Inv. No. 337-TA-292, Comm'n Op. at 34-35, USITC Pub. 2390 (June 1991).

Thus, in this investigation Avago must show that it satisfies both the technical and economic prongs of the domestic industry requirement with respect to the '447 and '229 Patents. As noted, and as explained below, it is found that these domestic industry requirements have been satisfied for the '447 Patent, but have not been satisfied for the '229 Patent.

A complainant in a patent-based Section 337 investigation must demonstrate that it is practicing or exploiting the patents at issue. *See* 19 U.S.C. § 1337(a)(2) and (3); *also see Certain Microsphere Adhesives, Process for Making Same, and Products Containing Same, Including Self-Stick Repositionable Notes*, Inv. No. 337-TA-366, Commission Opinion at 8, 1996 WL

1056095 (U.S.I.T.C., January 16, 1996) ("*Certain Microsphere Adhesives*"), *aff'd sub nom. Minnesota Mining & Mfg. Co. v. U.S. Int'l Trade Comm'n*, 91 F.3d 171 (Fed. Cir. 1996) (Table); *Certain Encapsulated Circuits*, Commission Opinion at 16. The complainant, however, is not required to show that it practices any of the claims asserted to be infringed, as long as it can 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, 2005 ITC LEXIS 374, *26 (April 11, 2005). Fulfillment of this so-called "technical prong" of the domestic industry requirement is not determined by a rigid formula, but rather by the articles of commerce and the realities of the marketplace. *Certain Diltiazem Hydrochloride and Diltiazem Preparations*, Inv. No. 337-TA-349, U.S.I.T.C. Pub. No. 2902, Initial Determination at 138, 1995 WL 945191 (U.S.I.T.C., February 1, 1995) (unreviewed in relevant part) ("*Certain Diltiazem*"); *Certain Double-Sided Floppy Disk Drives and Components Thereof*, Inv. No. 337-TA-215, 227 U.S.P.Q. 982, 989 (Commission Opinion 1985) ("*Certain Floppy Disk Drives*").

The test for claim coverage for the purposes of the technical prong of the domestic industry requirement is the same as that for infringement. *Certain Doxorubicin and Preparations Containing Same*, Inv. No. 337-TA-300, Initial Determination at 109, 1990 WL 710463 (U.S.I.T.C., May 21, 1990) ("*Certain Doxorubicin*"), *aff'd*, Views of the Commission at 22 (October 31, 1990). "First, the claims of the patent are construed. Second, the complainant's article or process is examined to determine whether it falls within the scope of the claims." *(Id.)* As with infringement, the first step of claim construction is a question of law, whereas the second step of comparing the article to the claims is a factual determination. *Markman,* 52 F.3d at 976. The technical prong of the domestic industry can be satisfied either literally or under the doctrine of equivalents. *Certain Excimer Laser Systems for Vision Correction Surgery and*

Components Thereof and Methods for Performing Such Surgery, Inv. No. 337-TA-419, Order No. 43, 1999 ITC LEXIS 245, *7 (July 30, 1999). The patentee must establish by a preponderance of the evidence that the domestic product practices one or more claims of the patent. *See Bayer,* 212 F.3d at 1247.

The economic prong of the domestic industry requirement is defined in subsection 337(a)(3) as follows:

> (3) For purposes of paragraph (2), an industry in the United States shall be considered to exist if there is in the United States, with respect to the articles protected by the patent, copyright, trademark or mask work concerned –
>
> (A) Significant investment in plant and equipment;
> (B) Significant employment of labor or capital; or
> (C) Substantial investment in its exploitation, including engineering, research and development, or licensing.

19 U.S.C. § 1337(a)(3).

The economic prong of the domestic industry requirement is satisfied by meeting the criteria of any one of the three factors listed above.

Section 337(a)(3)(C) provides for domestic industry based on "substantial investment" in the enumerated activities, including licensing of a patent. *See Certain Digital Processors and Digital Processing Systems, Components Thereof, and Products Containing Same*, Inv. No. 337-TA-559, Initial Determination at 88 (May 11, 2007) ("*Certain Digital Processors*"). Mere ownership of the patent is insufficient to satisfy the domestic industry requirement. *Certain Digital Processors* at 93. (Citing the Senate and House Reports on the Omnibus Trade and Competitiveness Act of 1988, S.Rep. No. 71. However, entities that are actively engaged in licensing their patents in the United States can meet the domestic industry requirement. *Certain Digital Processors* at 93. In establishing a domestic industry under Section 337(a)(3)(C), the complainant does not need to show that it or one of its licensees is practicing a patent-in-suit.

See Certain Semiconductor Chips with Minimized Chip Package Size and Products Containing Same, Inv. No. 337-TA-432, Order No. 13, at 11, (Jan. 24, 2001) ("*Certain Semiconductor Chips*"). The complainant must, however, receive revenue, e.g. royalty payments, from its licensing activities. *Certain Digital Processors,* at 93-95 ("Commission decisions also reflect the fact that a complainant's receipt of royalties is an important factor in determining whether the domestic industry requirement is satisfied...[t]here is no Commission precedent for the establishment of a domestic industry based on licensing in which a complainant did not receive any revenue from alleged licensing activities. In fact, in previous investigations in which a complainant successfully relied solely on licensing activities to satisfy section 337(a)(3), the complainant had licenses yielding royalty payments.") (citations omitted). *See also Certain Video Graphics Display Controllers and Products Containing Same*, Inv. No. 337-TA-412, Initial Determination at 13 (May 14, 1999) (*"Certain Video Graphics Display Controllers"*); *Certain Integrated Circuit Telecommunication Chips and Products Containing Same Including Dialing Apparatus*, Inv. No. 337-TA-337, U.S.I.T.C. Pub. No. 2670, Initial Determination at 98 (March 3, 1993) (*"Certain Integrated Circuit Telecommunication Chips"*); *Certain Zero-Mercury-Added Alkaline Batteries, Parts Thereof and Products Containing Same*, Inv. No. 337-TA-493, Initial Determination at 142 (June 2, 2004) (*"Certain Zero-Mercury-Added Alkaline Batteries"*); *Certain Semiconductor Chips*, Order No. 13 at 6 (Jan. 24, 2001); *Certain Digital Satellite System DSS Receivers and Components Thereof*, Inv. No. 337-TA-392, Initial and Recommended Determinations at 11 (Dec. 4, 1997) ("*Certain Digital Satellite System DSS Receivers"*).

B. Technical Prong

1. The '447 Patent

Avago listed the products it manufactures that meet the technical prong of the economic analysis in exhibit 12 of the Complaint and JX-16.

Claim 1 of the '447 Patent reads as follows:

> An optical communication network comprising:
> A vertical-cavity, surface-emitting semiconductor laser structure having an aperture larger than eight micrometers through which an optical signal may be emitted;
> A power supply that provides a bias current to drive the laser into a multiple transverse mode of Operation in which the laser is responsive to a signal carrying data to provide an optical signal modulated with the data and to emit the optical signal through the aperture; and
> A multimode Optical medium optically coupled to the laser to carry the optical signal from the laser to a remotely located receiver.

(JX-1 at claim 1.)

A preponderance of the evidence establishes that certain Avago products, including its pluggable parallel fiber optic transmitter and receiver modules, ultra short link pluggable parallel fiber optic transmitter and receiver modules, and optical transceivers, are used in optical communication networks that meet the requirements of claim 1 of the '447 patent. Although Avago's products do not directly practice the patents by themselves, the technical prong of the domestic industry requirement may still be satisfied if it can be established that Avago or its customers configure the allegedly covered products in a manner that practices the claims within the United States. *See, e.g., Certain Foam Masking Tape*, Inv. No. 337-TA-528, Order No. 41, at 18 (June 21, 2005) (unreviewed initial determination) (finding the technical prong satisfied where 3M made masking tape and its customers practiced the claimed method of using the tape); *Certain Integrated Repeaters, Switches, Transceivers and Products Containing Same*, Inv. No. 337-TA-435, Initial Determination at 176-91, USITC Pub. 3547 (Oct. 2002) (unreviewed)

(finding the technical prong satisfied where the complainants induced their customers to create devices that were covered by the patent). The evidence shows that the Avago products listed in JX-16 all have a transmitter, a receiver, one or more vertical-cavity, surface-emitting semiconductor laser(s) (VCSEL(s)) with an aperture greater than 8 micrometers, and a power supply to drive the VCSEL(s) into multiple transverse mode operation. (JX-8.) When these components are used in an optical communications network, with an optical medium the medium carries the signals from the VCSEL(s) to the receiver. (*Id.*)

2. The '229 Patent

Avago argues that its pluggable parallel fiber optic transmitter modules, such as Avago Technologies Part Nos. FIFBR-772BWZ/BEWZ/BHWZ/BEPWZ; ultra short link pluggable parallel fiber optic transmitter modules, such as Avago Technologies Part Nos. AFBR-732BWZ/BEWZ/BEHWZ; and optical transceivers, such as Avago Technologies Part No. AFBR-720XPDZ are exemplary products for the domestic industry requirement ("Exemplary Covered Avago Products"). (CIB at 91.) Avago argues that the datasheets on the Exemplary Covered Avago Products provide information such as modulation rate and either SNR or RIN and that based on this information and the tests performed by Dr. Deppe, the Exemplary Covered Avago Products are covered by claim 8 of the '229 Patent and cite to its findings of fact in support thereof. (CIB at 92.)

Emcore argues that Avago has failed to show that the Exemplary Covered Avago Products practice claim 8. Specifically, Emcore argues that Avago has failed to show that it meets the "the intensity at which the laser generates the radiated light beam with a signal-to-noise ratio above a threshold level being greater than a predetermined maximum intensity" and "the coupling means to coupling such fraction of the radiated light beam to the light sensor

means that the output light beam has a signal-to-noise ratio greater than the threshold level and an intensity less than the predetermined maximum intensity" limitations. (RIB at 81-82.) Emcore's arguments parallel those set forth *supra* in Section V.C where Emcore explained how Avago's evidence failed to prove infringement by the Accused '229 Patent. (RIB at 81-82.) Staff agrees. (SIB at 90-91.)

The ALJ finds that Avago has failed to show that the Exemplary Covered Avago Products practice claim 8. Specifically, the ALJ finds that Avago has failed to show that the Exemplary Covered Avago Products meet the "the intensity at which the laser generates the radiated light beam with a signal-to-noise ratio above a threshold level being greater than a predetermined maximum intensity" and "the coupling means to coupling such fraction of the radiated light beam to the light sensor means that the output light beam has a signal-to-noise ratio greater than the threshold level and an intensity less than the predetermined maximum intensity" limitations.

As set forth *supra* in Section IV.C, the ALJ construed "the intensity at which the laser generates the radiated light beam with a signal-to-noise ratio above a threshold level being greater than a predetermined maximum intensity" to mean that the laser operates such that the signal-to-noise ratio of the light generated by the laser is above some threshold signal-to-noise ratio and the intensity of the light generated by the laser is greater than a predetermined maximum intensity. The evidence shows that Avago and its expert never actually measured signal-to-noise ratio in the Exemplary Covered Avago Products and did not identify a SNR "threshold level." (Deppe, Tr. 1160:18-20 ("Q. And did you measure the signal to noise ratio on any Avago VCSELs? A. No, I did not.").) Dr. Deppe conclusorily stated that:

> Dr. Su also declared that the intensity at which the laser of the optical transceiver of Exhibit F generates the radiated light beam with a signal-to-noise ratio above a threshold level is greater than a maximum intensity or eye safety level.

(CX-531C at Q&A 617.) To the extent that Avago failed to identify a threshold SNR, it is not possible for Avago to show that its laser operates such that the signal-to-noise ratio of the light generated by that laser is above an unknown and unidentified threshold. Dr. Deppe cites his L-I tests in support of his argument, but as noted above, these tests are inapposite as they merely show the light intensity emitted by the Exemplary Covered Avago Products, but fail to actually show that the VCSEL has an SNR that surpasses any specific threshold SNR or above a predetermined maximum intensity requirement. (*See* CX-111 at AV10210484.) Avago's datasheets also fail to provide any information on the SNR of any of the Exemplary Covered Avago Products because they merely disclose a relative intensity noise (RIN). (*See* JX-8C; JX-12C; RX-455C at Q&A 107.) As set forth *supra* in Section V.C, the ALJ found that RIN and SNR are different measurements; are not interchangeable; that RIN is not an alternative measurement of SNR; and that a threshold SNR cannot be implied by a specified RIN level.

Similarly, Avago has failed to show Exemplary Covered Avago Products meet the "the coupling means to coupling such fraction of the radiated light beam to the light sensor means that the output light beam has a signal-to-noise ratio greater than the threshold level and an intensity less than the predetermined maximum intensity" limitation. As set forth *supra*, Avago failed to measure any signal-to-noise ratio in the Exemplary Covered Avago Products and failed to identify a SNR "threshold level" for these products. Rather, the evidence cited by Avago conclusorily states

> The window of the optical transceiver of Exhibit F couples a portion of the radiated light beam to the PIN photodiode such that the output light beam has a signal-to-noise ratio greater that the threshold level and an intensity less than the predetermined maximum intensity. I agree. [. . .] My own testing of the Avago

> Sample also showed that the window in that product attenuated roughly 60% of the radiated light beam, while maintaining a desired signal-to-noise thresholds.

(CX-231C at Q&A 620.) However, this does not show whether the SNR is greater than a threshold level or that the Exemplary Covered Avago Products have an intensity that is less than the predetermined intensity. Thus, the ALJ finds that Avago has failed to show that the Exemplary Covered Avago Products meet the "the intensity at which the laser generates the radiated light beam with a signal-to-noise ratio above a threshold level being greater than a predetermined maximum intensity" and "the coupling means to coupling such fraction of the radiated light beam to the light sensor means that the output light beam has a signal-to-noise ratio greater than the threshold level and an intensity less than the predetermined maximum intensity" limitations. Consequently, the ALJ finds that Avago has failed to meet the technical prong of the domestic industry requirement for the '229 Patent.

C. Economic Prong

Avago argues that it has satisfied the domestic industry requirement through significant investment in plant and equipment, through the significant employment of labor and capital, and through investments in research and development. (CIB at 96-97.) Avago argues that it has invested in facilities in the U.S., including a co-headquarters in San Jose, California and offices in Fort Collins, Colorado and Andover, Massachusetts, for activities related to the Covered Avago Products. (CIB at 96.) The San Jose headquarters include Avago Technologies' U.S. R&D centers, a Technical Response Center, and facilities for marketing and sales of the Covered Avago Products that are approximately [redacted] square feet. (CIB at 96.) The approximate value and size of the buildings exceed [redacted] annually and [redacted] square feet. (CIB at 96.)

Avago's VCSEL-based R&D is performed in the United States. (CIB at 96.) In FY 08,

Avago incurred marketing expenses in the United States for the Fiber Optics business unit of approximately [redacted] and incurred R&D expenses for the Fiber Optics business unit in the United States that totaled approximately [redacted]. (CIB at 96.) Avago Technologies has also invested [redacted] in equipment for its R&D activities for use in the R&D laboratories at Avago Technologies' San Jose, California location. (CIB at 96-97.)

Avago employs approximately [redacted] employees in the San Jose, California and Andover, Massachusetts locations who devote man-hours having an approximate value of [redacted] annually to activities related to the Covered Avago Products. (CIB at 97.) Avago Technologies also employs R&D personnel who work on activities relating to the Covered Avago Products and/or the Avago Patents, including R&D Engineers, Design Support Engineers, and R&D Managers. (*Id.*) The fiber optics division employs between [redacted] people in San Jose. (*Id.*) The number of employees in R&D was approximately [redacted] R&D engineers, [redacted] design support engineers and [redacted] R&D management personnel. (CIB at 97-98.) Avago further argues that all of the R&D in the United States pertains to multimode VCSEL based Avago products and at least [redacted] of expenses should be allocated to the Covered Avago Products with no more than [redacted] of expenses allocated to non-covered products such as its single mode fiber optics products. (CIB at 98.)

Emcore argues that Avago has failed to establish a nexus between its domestic expenditures and the Covered Avago Products because it has failed to provide evidentiary support for its allocation of expenditures between Covered and non-Covered Avago Products. (RIB at 96-97.) Emcore further argues that the inconsistent statements between Avago's Pre-Hearing Statement and the testimony of Avago's own employees "raise insurmountable issues of

the credibility of Avago's witnesses" such that Avago has failed to meet its burden. (RIB at 97-98.)

Staff argues that Avago has shown by a preponderance of the evidence that Avago has made substantial investments in plant and equipment, labor and capital, and engineering and research and development. (SIB at 95-96.)

The ALJ finds that Avago has met the economic prong of the domestic industry requirement through substantial investments in plant and equipment, labor and capital, and in engineering and R&D relating to Covered Avago Products. The evidence shows substantial investment in plant and equipment, labor and capital, and in engineering and R&D related to the Covered Avago Products:

- From 2005 to 2008, Avago expended a total of [redacted] for R&D in the United States with respect to the Covered Avago Products. (CX-130C at Q&A 42-52; JX-17C ¶ 6; JX-18C);
- Avago spent in excess of [redacted] in the fiscal year 2008, over [redacted] in fiscal year 2007, and [redacted] million in fiscal year 2006 on R&D relating to the covered products. (CX-130C at Q&A 81-84; JX-18C);
- Avago maintains R&D facilities in San Jose, California with over [redacted] square feet of laboratory space at an annual cost of over [redacted]. (CX-130C at Q&A 85-86; JX-17C, ¶ 6; JX-19C);
- Avago employs approximately [redacted] R&D personnel, including [redacted] R&D engineers, [redacted] design support engineers, and [redacted] R&D "manufacturers" at its San Jose facility. (CX-130C at Q&A 59-60; JX-17C, ¶ 6; JX-19C);
- Avago expends [redacted] annually on direct labor costs for its R&D personnel within the United States (CX-130C at Q&A 61; JX-17C, ¶ 6; JX-19C); and
- Avago spent approximately [redacted] for equipment in its U.S. R&D facilities during FY 2008 (CX-130C at Q&A 87-88; JX-17C, ¶ 6; JX-19C)

Emcore argues that Avago's figures are unreliable and that there is an insufficient nexus between the expenditures and the Covered Avago Products. The evidence shows, however, that between [redacted] of the sales are attributable to the Covered Avago Products. (CX-130C at Q&A 14-15.) Emcore argues that this evidence should be given no weight as the witness providing this

testimony "had no personal knowledge." (RIB at 96, note 11.) The ALJ finds such an argument unpersuasive because there is no evidence that the underlying information in that testimony is in any way unreliable or that it has been manipulated. (CX-169C; CX-153C; CX-151C; CX-120C; CX-160C; JX-17C.) Furthermore, the evidence shows that Avago's financial information is maintained according to generally accepted accounting principles (GAAP). (CX-130C at Q. 16-17.) As such, the ALJ finds that Avago's figures are reliable.

The ALJ further finds that Avago has established a sufficient nexus between the expenditures and the Covered Avago Products. The evidence shows all of the R&D expenses in San Jose are related to the Covered Avago Products. (CX-130C at Q&A 47-54.) Furthermore, the evidence cited by Avago for FY 2005 through 2008 was for the Covered Avago Products only. (CX-130C at Q&A 47-49.) Therefore, the ALJ finds that Avago has satisfied the economic prong of the domestic industry requirement.

X. CONCLUSIONS OF LAW

1. The Commission has personal jurisdiction over the parties, and subject-matter jurisdiction over the accused products.
2. The importation or sale requirement of Section 337 is satisfied.
3. The accused products infringe the claims 1, 2, 3 and 5 of the '447 Patent.
4. The accused products do not infringe claim 6 of the '447 Patent.
5. The accused products do not infringe the asserted claim of the '229 Patent
6. Respondent induces infringement of claims 1, 2, 3, and 5 of the '447 Patent.
7. Respondent contributes to the infringement of claims 1, 2, 3, and 5 of the '447 Patent.
8. Respondent does not induce or contribute to the infringement of claim 6 of the '447 Patent.
9. Respondent does not induce infringement of the asserted claim of the '229 Patent.
10. The asserted claims of the '447 Patent are not invalid under 35 U.S.C. § 102 for anticipation.
11. The asserted claim of the '229 Patent is not invalid under 35 U.S.C. § 102 for anticipation.
12. The asserted claims of the '447 Patent are not invalid under 35 U.S.C. § 103 for obviousness.
13. The asserted claim of the '229 Patent is not invalid under 35 U.S.C. § 103 for obviousness.
14. Respondent does not have an implied license to practice the asserted claims of the '447 Patent.
15. The '447 Patent is not unenforceable due to inequitable conduct.

16. The technical prong of the domestic industry requirement for the '447 Patent has been satisfied.

17. The technical prong of the domestic industry requirement for the '229 Patent has not been satisfied.

18. The economic prong of the domestic industry requirement for the '447 Patent and the '229 Patent has been satisfied.

19. It has been established that a violation exists of Section 337 with respect to claims 1, 2, 3, and 5 of the '447 Patent.

20. It has not been established that a violation exists of Section 337 with respect to claim 6 of the '447 Patent and the asserted claim of the '229 Patent.

XI. INITIAL DETERMINATION AND ORDER

Based on the foregoing, it is the INITIAL DETERMINATION ("ID") of this ALJ that a violation of section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. § 1337, has occurred in the importation into the United States, the sale for importation, or the sale within the United States after importation of certain optoelectronic devices, components thereof and products containing same that infringe one or more of claims 1, 2, 3, and 5 of U.S. Patent No. 5,359,447. It is further the INITIAL DETERMINATION of this ALJ that no violation of section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. § 1337, has occurred in the importation into the United States, the sale for importation, or the sale within the United States after importation of certain optoelectronic devices, components thereof and products containing same that infringe one or more of claim 6 of U.S. Patent No. 5,359,447 and claim 8 of U.S. Patent No. 5,761,229.

Further, this Initial Determination, together with the record of the hearing in this investigation consisting of:

(1) the transcript of the hearing, with appropriate corrections as may hereafter be ordered, and

(2) the exhibits received into evidence in this investigation, as listed in the attached exhibit lists in Appendix A,

are CERTIFIED to the Commission. In accordance with 19 C.F.R. § 210.39(c), all material found to be confidential by the undersigned under 19 C.F.R. § 210.5 is to be given *in camera* treatment.

The Secretary shall serve a public version of this ID upon all parties of record and the confidential version upon counsel who are signatories to the Protective Order (Order No. 1.) issued in this investigation, and upon the Commission investigative attorney.

RECOMMENDED DETERMINATION ON REMEDY AND BOND

I. Remedy and Bonding

The Commission's Rules provide that subsequent to an initial determination on the question of violation of section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. § 1337, the administrative law judge shall issue a recommended determination containing findings of fact and recommendations concerning: (1) the appropriate remedy in the event that the Commission finds a violation of section 337, and (2) the amount of bond to be posted by respondents during Presidential review of Commission action under section 337(j). *See* 19 C.F.R. § 210.42(a)(1)(ii).

A. Limited Exclusion Order

Under Section 337(d), the Commission may issue either a limited or a general exclusion order. A limited exclusion order directed to respondents' infringing products is among the remedies that the Commission may impose, as is a general exclusion order that would apply to all infringing products, regardless of their manufacturer. *See* 19 U.S.C. § 1337(d).

Avago seeks a permanent exclusion order to exclude from entry those Emcore products that infringe the '447 and the '229 Patents. (CIB at 98.)

Emcore argues that a limited exclusion order is not appropriate in this investigation because its VCSELs are manufactured, finally tested and assembled here in the United States. (RIB at 99.) Emcore further argues that it "is a U.S. company and Complainants are a Singapore company manufacturing outside the U.S." (RIB at 99.)

Staff supports the issuance of a limited exclusion order should the Commission find a violation. (SIB at 97.)

The ALJ recommends that a limited exclusion order be issued for the Accused Products that infringe the claims 1, 2, 3, and 5 of the '447 Patent.

B. Cease and Desist Order

Section 337 provides that in addition to, or in lieu of, the issuance of an exclusion order, the Commission may issue a cease and desist order as a remedy for violation of section 337. *See* 19 U.S.C. § 1337(f)(1). The Commission generally issues a cease and desist order directed to a domestic respondent when there is a "commercially significant" amount of infringing, imported product in the United States that could be sold so as to undercut the remedy provided by an exclusion order. *See Certain Crystalline Cefadroxil Monohydrate*, Inv. No. 337-TA-293, USITC Pub. 2391, Comm'n Op. on Remedy, the Public Interest and Bonding at 37-42 (June 1991); *Certain Condensers, Parts Thereof and Products Containing Same, Including Air Conditioners for Automobiles*, Inv. No. 337-TA-334, Comm'n Op. at 26-28 (Aug. 27, 1997).

Avago seeks a cease and desist order prohibiting the importation, sale, offer for sale, advertising, solicitation, use and/or warehousing for inventory for distribution of such products into the United States. (CIB at 98.)

Emcore argues that a cease and desist order is not appropriate as Avago has failed to adduce any evidence that Emcore maintains "commercially significant" inventory of the accused products in the United States. (RIB at 99.)

Staff supports the issuance of a cease and desist order arguing that the evidence shows that Emcore maintains "commercially significant" inventories of the accused products in the United States. (SIB at 97.) Staff further notes that [redacted] (SIB at 97.)

The ALJ recommends that the Commission issue a cease and desist order. While Avago has not presented evidence of commercially significant inventories of the Accused Products in a traditional format, *e.g.* the actual quantity of good stored at a warehouse, the evidence shows that [redacted], Tr. 855:11-15.) [redacted] (RIB at 99.) Thus, it is clear that, based on these activities, Emcore maintains "commercially significant" inventories of the accused products in the United States.

C. Bond During Presidential Review Period

The Administrative Law Judge and the Commission must determine the amount of bond to be required of a respondent, pursuant to section 337(j)(3), during the 60-day Presidential review period following the issuance of permanent relief, in the event that the Commission determines to issue a remedy. 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).

When reliable price information is available, the Commission has often set the bond by eliminating the differential between the domestic product and the imported, infringing product. *See Certain Microsphere Adhesives, Processes for Making Same, and Products Containing Same, Including Self-Stick Repositionable Notes*, Inv. No. 337-TA-366, Comm'n Op. a 24 (1995). In other cases, the Commission has turned to alternative approaches, especially when the level of a reasonable royalty rate could be ascertained. *See, e.g., Certain Integrated Circuit Telecommunication Chips and Products Containing Same, Including Dialing Apparatus*, Inv. No. 337-TA-337, Comm'n Op. at 41 (1995). A 100 percent bond has been required when no effective alternative existed. *See, e.g., Certain Flash Memory Circuits and Products Containing*

Same, Inv. No. 337-TA-382, USITC Pub. No. 3046, Comm'n Op. at 26-27 (July 1997)(a 100% bond imposed when price comparison was not practical because the parties sold products at different levels of commerce, and the proposed royalty rate appeared to be *de minimis* and without adequate support in the record).

Avago argues that the bond should be set at [redacted] the price differential for comparable products. (CIB at 98.)

Emcore argues that the bond should be set at [redacted] the price differential, but no more than [redacted] of the entered value of the accused products. (RIB at 100.)

Staff argues that the bond should be set at [redacted], which is based on a reasonable royalty rate for the '447 and the '229 Patents. (SIB at 98.) Staff cites the 2003 Patent Cross-License Agreement between Avago's predecessor, Agilent, and [redacted] as the basis for the royalty rate. (SIB at 98.)

The ALJ recommends a bond be set at 3% as a reasonable royalty rate can be ascertained.

II. Conclusion

In accordance with the discussion of the issues contained herein, it is the RECOMMENDED DETERMINATION ("RD") of the ALJ that the Commission should issue a limited exclusion order directed at Emcore's products found to infringe the claims 1, 2, 3, and 5 of the '447 Patent. The Commission should also issue a cease and desist order directed toward Emcore that prohibits the sale of any commercially significant quantities of the Accused Products that infringe claims 1, 2, 3 and 5 of the '447 Patent. Furthermore, if the Commission imposes a remedy following a finding of violation, Emcore should be required to post a bond set at 3%, which is the reasonable royalty rate of the entered value of the accused products during the Presidential review period.

Within seven days of the date of this document, each party shall submit to the office of 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. The parties' submissions must be made by hard copy by the aforementioned date.

Any party seeking to have any portion of this document deleted from the public version thereof must submit to this office a copy of this document with red brackets indicating any portion asserted to contain confidential business information by the aforementioned date. The parties' submission concerning the public version of this document need not be filed with the Commission Secretary.

SO ORDERED.

Theodore R. Essex
Administrative Law Judge

IN THE MATTER OF CERTAIN OPTOELECTRONIC DEVICES, COMPONENTS THEREOF AND PRODUCTS CONTAINING THE SAME **Inv. No. 337-TA-669**

CERTIFICATE OF SERVICE

I, Marilyn R. Abbott, hereby certify that the attached **INITIAL DETERMINATION ON VIOLATION OF SECTION 337 AND RECOMMENDED DETERMINATION ON REMEDY AND BOND** has been served by hand upon, the Commission Investigative Attorney, **Christopher G. Paulraj, Esq.** and the following parties as indicated on March 29, **2010.**

Marilyn R. Abbott

Marilyn R. Abbott, Secretary JNC
U.S. International Trade Commission
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IN THE MATTER OF CERTAIN OPTOELECTRONIC DEVICES, COMPONENTS THEREOF AND PRODUCTS CONTAINING THE SAME

Inv. No. 337-TA-669

CERTIFICATE OF SERVICE - PAGE 2

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