

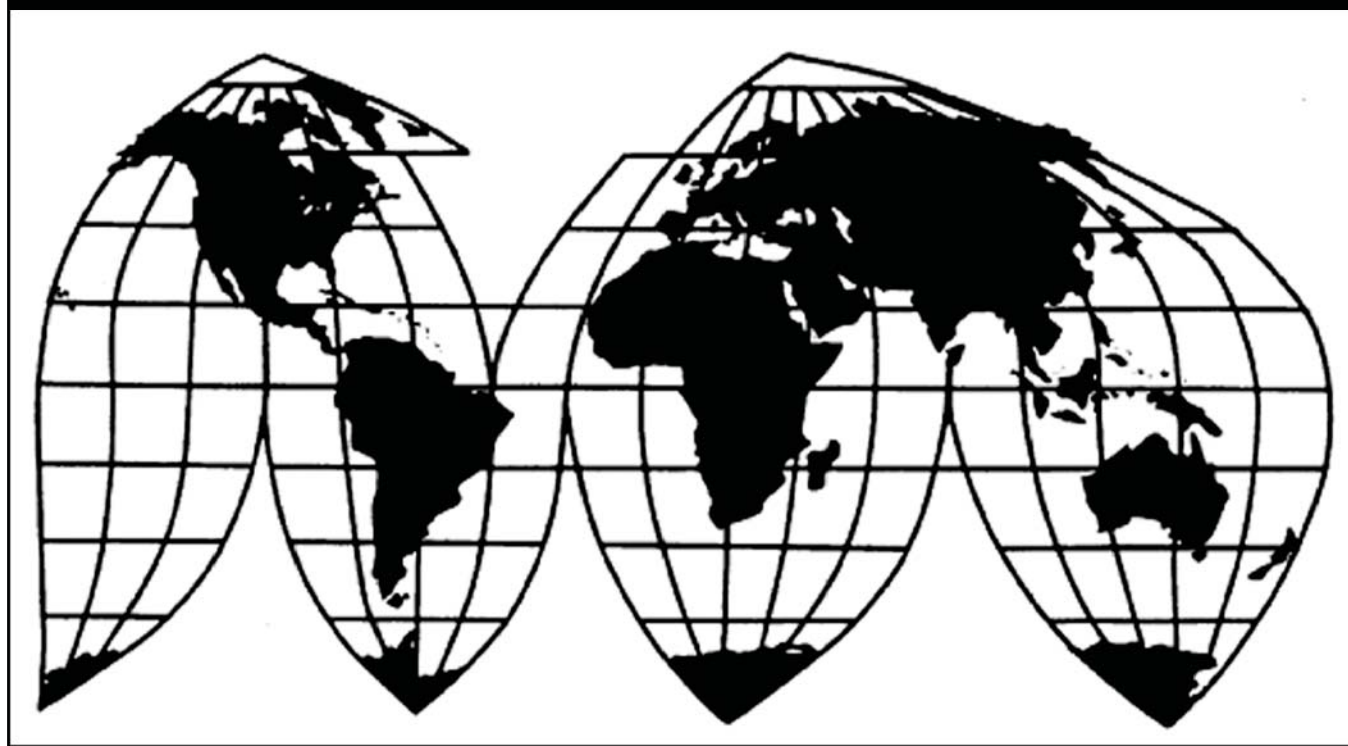
In the Matter of
**Certain Voltage Regulators, Components
Thereof and Products Containing Same**

Investigation No. 337-TA-564

Publication 4261

October 2011

U.S. International Trade Commission



Washington, DC 20436

U.S. International Trade Commission

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Washington, DC 20436**

U.S. International Trade Commission

Washington, DC 20436
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In the Matter of

Certain Voltage Regulators, Components Thereof and Products Containing Same

Investigation No. 337-TA-564



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

**In the Matter of
CERTAIN VOLTAGE REGULATORS,
COMPONENTS THEREOF AND
PRODUCTS CONTAINING SAME**

**Inv. No. 337-TA-564
Enforcement Proceeding**

NOTICE OF FINAL DETERMINATION

AGENCY: U.S. International Trade Commission.

ACTION: Notice.

SUMMARY: The United States International Trade Commission hereby provides notice that it has made a final determination in the above-captioned proceeding.

FOR FURTHER INFORMATION CONTACT: Paul M. Bartkowski, Office of the General Counsel, U.S. International Trade Commission, 500 E Street, SW., Washington, D.C. 20436, telephone (202) 708-5432. Copies of all nonconfidential documents filed in connection with this investigation are or will be available for inspection during official business hours (8:45 a.m. to 5:15 p.m.) in the Office of the Secretary, U.S. International Trade Commission, 500 E Street SW., Washington, D.C. 20436, telephone 202-205-2000. General information concerning the Commission may also be obtained by accessing its Internet server (<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 the matter can be obtained by contacting the Commission's TDD terminal on 202-205-1810.

SUPPLEMENTARY INFORMATION: The Commission instituted the investigation underlying this enforcement proceeding on March 22, 2006, based on a complaint filed by Linear Technology Corporation ("Linear") of Milpitas, California. 71 *Fed. Reg.* 14545. The complaint, as supplemented, alleged violations of section 337 of the Tariff Act of 1930 (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 voltage regulators, components thereof and products containing the same, by reason of infringement of certain claims of United States Patent No. 6,411,531 and of United States Patent No. 6,580,258 ("the '258 patent"). The complaint named Advanced Analogic Technologies, Inc. ("AATI") of Sunnyvale, California as the sole respondent. After Commission review of the administrative law judge's ("ALJ") final ID, the Commission determined that there was a violation of section 337 by AATI with respect to certain asserted claims of the '258 patent and issued a limited exclusion order ("LEO") consistent with its findings of violation. Subsequently, based on an enforcement complaint filed by Linear, the

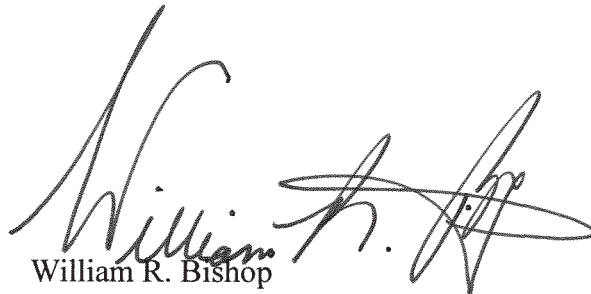
Commission instituted an enforcement proceeding by notice in the *Federal Register* on October 10, 2008.

On March 18, 2010, the ALJ issued the subject ID, finding that, due to infringement of claims 2 and 34 of the '258 patent by the accused products, AATI violated the LEO. On May 17, 2010, the Commission determined not to review the ID and requested briefing from the parties regarding remedy, the public interest, and bonding.

Having reviewed the record of this investigation, including the recent submissions by the parties, for the reasons set forth in the Commission Opinion, the Commission has determined not to modify the existing limited exclusion order and not to issue a cease-and-desist order. The products at issue in the enforcement proceeding are covered by the existing limited exclusion order, and should be excluded thereunder.

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

By order of the Commission.



William R. Bishop
Acting Secretary to the Commission

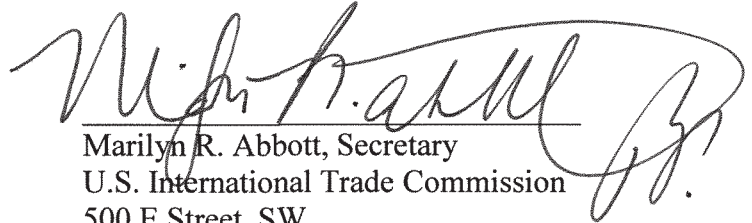
Issued: July 19, 2010

**CERTAIN VOLTAGE REGULATORS, COMPONENTS
THEREOF AND PRODUCTS CONTAINING SAME**

**337-TA-564
(Enforcement
Proceeding)**

CERTIFICATE OF SERVICE

I, Marilyn R. Abbott, hereby certify that the attached **NOTICE OF FINAL DETERMINATION** has been served by hand upon the Commission Investigative Attorney, Daniel L. Girdwood, Esq., and the following parties as indicated, on
July 19, 2010.



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

On Behalf of Complainant Linear Technology Corporation:

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- Via Hand Delivery
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On Behalf of Respondent Advanced Analogic Technologies, Inc.:

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

PUBLIC VERSION

**UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, DC 20436**

In the Matter of

**CERTAIN VOLTAGE REGULATORS,
COMPONENTS THEREOF, AND
PRODUCTS CONTAINING SAME**

Investigation No. 337-TA-564

Enforcement Proceeding

COMMISSION OPINION

I. INTRODUCTION

On March 18, 2010, the presiding administrative law judge (“ALJ”) (Judge Charneski) issued a final enforcement initial determination (“ID”) that a violation of the Commission’s limited exclusion order (“LEO”) issued in the underlying investigation has occurred. The LEO issued on September 24, 2007, at the conclusion of the underlying investigation. The ALJ determined that the respondent, Advanced Analogic Technologies, Inc.’s (“AATI”) redesigned products at issue in the enforcement proceeding do not avoid infringement of claims 2 and 34 of United States Patent No. 6,580,258 (“258 patent”), and recommended a cease and desist order issue against AATI. On May 14, 2010, the Commission determined not to review the ALJ’s ID, and issued a *Federal Register* notice regarding its determination and inviting briefing on the issues of remedy, the public interest, and bonding. This opinion details the Commission’s final determination regarding those issues.

II. BACKGROUND

A. Procedural History

The underlying investigation was instituted by publication of a notice in the *Federal Register* on March 22, 2006, in order 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 voltage regulators, components thereof or products containing same by reason of infringement of one or more of claims 1-14 and 23-35 of U.S. Patent No. 6,411,531 and claims 1-19, 31, 34, and 35 of U.S. Patent No. 6,580,258, and whether an industry in the United States exists as required by subsection (a)(2) of section 337.

71 Fed. Reg. 14545 (2006).

Linear Technology Corp. of Milpitas, California (“Linear”) was the complainant. For the violation investigation, the presiding ALJ was Judge Sidney Harris. On May 22, 2007, Judge Harris issued a violation initial determination in Investigation No. 337-TA-564, finding no violation of section 337 of the Tariff Act of 1930, as amended (19 U.S.C. § 1337). The ALJ found that none of the accused products of the respondent, AATI, infringed the asserted claims of the ‘258 patent, but that one accused product infringed two claims of United States Patent No. 6,411,531 (“the ‘531 patent”). The ALJ also determined that certain claims of the ‘258 and ‘531 patents (including the claims that the ALJ found to be infringed) were invalid due to anticipation.

The Commission determined to review certain portions of the violation initial determination concerning the ‘258 patent, but not to review the violation initial determination with respect to the ‘531 patent (except for one issue on which it ultimately took no position), resulting in a final determination of no violation with respect to the ‘531 patent. 72 Fed. Reg. 55250 (Sept. 28, 2007).

On September 24, 2007, the Commission issued its final determination in the violation investigation with respect to the '258 patent, reversing the ALJ on certain issues, and finding a violation of section 337. *Id.* The Commission found claims 2, 3, and 34 of the '258 patent valid and infringed by a representative AATI product. The Commission issued a LEO directed to AATI voltage regulators covered by claims 2, 3, and 34 of the '258 patent. The Commission required that the bond during the Presidential review period be 100 percent of the entered value of each voltage regulator subject to the LEO. *Id.*

Linear and AATI both appealed portions of the Commission's final determination to the United States Court of Appeals for the Federal Circuit. The Federal Circuit affirmed the Commission's final determination as to the '531 patent. With respect to the '258 patent, the Federal Circuit affirmed in part, reversed in part, and remanded in part the Commission's final determination. A remand proceeding was rendered unnecessary in light of a consent order entered into regarding products that were the subject of the violation investigation. The LEO was not modified.

On February 20, 2008, Linear (the complainant in the violation investigation) filed a complaint, an amended complaint on June 18, 2008, and a second amended complaint on August 29, 2008, requesting that the Commission institute a formal enforcement proceeding against AATI under Rule 210.75 of the Commission's Rules of Practice and Procedure for violation of the LEO based on alleged infringement of claims 2 and 34 of the '258 patent through the importation of AATI's redesigned products.¹ *See* 19 C.F.R. § 210.75. Pursuant to 19 U.S.C. § 1337, and Commission Rule 210.75, the Commission instituted a formal enforcement proceeding to determine whether AATI violated the LEO at issue, and what, if any, enforcement measures

¹ The redesigned products that are the subject of the enforcement proceeding will be referred to hereinafter as the "accused products."

were appropriate. The enforcement proceeding was assigned to Judge Charneski (hereinafter, “the ALJ”)

On March 18, 2010, Judge Charneski issued the enforcement ID, finding a violation of the LEO. AATI filed a petition for review of the ALJ’s ID and Linear filed a contingent petition for review thereof. The Commission determined not to review the ALJ’s ID and requested briefing on possible modification of the LEO, remedy, the public interest, and bonding. 75 Fed. Reg. 28284 (May 20, 2010). Linear, AATI, and the IA filed opening and responsive briefs regarding the topics for which briefing was requested.²

B. Technology and Patent at Issue

The ‘258 patent covers voltage regulators as used, for example, in cellular telephones, laptop computers, and other electronic equipment containing circuitry that requires a steady stream of current at a particular voltage.³ ID at 4. Voltage regulators help solve the voltage problem between mismatched batteries and circuitry.⁴ When a battery produces a voltage different than that required by the circuitry, a voltage regulator adapts the current from the battery to the current required by the load. This proceeding is particularly focused on switching voltage regulators. Switching voltage regulators contain a switch circuit that turns on and off to provide power through the circuit to the output. Necessary power adjustments are made by the correct timing of switches through an error amplifier. When compared to linear voltage regulators, which operate much like an adjustable valve to control power flow, switching voltage

² The parties’ opening briefs will be referred to as Linear Brief, AATI Brief, and IA Brief, respectively, and responses thereto will be referred to as Linear Response, AATI Response, and IA Response, respectively.

³ Voltage may be thought of as electrical pressure. Blauschild Tutorial Tr. 7-8. Current is the flow of electrons. Wei Tutorial Tr. 60-61.

⁴ Circuitry that needs to be powered is called a “load.”

regulators use much less power and more efficiently control power flow. Blauschild Tutorial Tr. 12-14.

1. The '258 Patent

The '258 patent, entitled "Control Circuit and Method for Maintaining High Efficiency Over Broad Current Ranges in a Switching Regulator Circuit," was filed on October 15, 2001, and issued on June 17, 2003. JX-3. Milton E. Wilcox and Randy G. Flatness are the named inventors, and complainant Linear is the named assignee. *Id.* The '258 patent generally discloses and claims a control circuit and method for maintaining high efficiency over broad current ranges, including low output currents, in a switching regulator circuit.

Claim 2 of the '258 patent, as well as claim 1 from which claim 2 depends, and claim 34 provide as follows:

1. A circuit for controlling a switching voltage regulator, the regulator having (1) a switch coupled to receive an input voltage and including a pair of synchronously switched switching transistors and (2) an output for supplying current at a regulated voltage to load which includes an output capacitor, the circuit comprising:

a first circuit for monitoring the output to generate a first feedback signal;

a second circuit for generating a first control signal during a first state of circuit operation, the first control signal being responsive to the first feedback signal to vary the duty cycle of the switching transistors to maintain the output at the regulated voltage; and

a third circuit for generating a second control signal during a second state of circuit operation to cause both switchin[g] transistors to be OFF for a first period of time during which the output capacitor maintains the output substantially at the regulated voltage.

2. The circuit of claim 1 wherein the second control signal is generated in response to the first feedback signal.

34. A method for controlling a switching voltage regulator, the regulator having (1) a switch coupled to receive an input voltage and including a pair of synchronously switched switching transistors and (2) an output for supplying current at a regulated voltage to a load which includes an output capacitor, the method comprising the steps of:

(a) monitoring the output to generate a first feedback signal;

(b) varying the duty cycle of the switching transistors in response to the first feedback signal to maintain the output at the regulated voltage during a first state of circuit operations;

(c) turning both switching transistors OFF for a first period of time following the first state of circuit operation so as to allow the output capacitor to maintain the output substantially at the regulated voltage by discharging during a second state of circuit operation; and

(d) turning at least one of said switching transistors ON to recharge the output capacitor following the second state of circuit operation.

JX-3, col. 16, lines 39-59; col. 18, line 57 through col. 19, line 10.

C. The Accused Products

Linear accuses AATI products bearing the following model numbers in this enforcement proceeding:

(referred to collectively as the “accused products”). Linear Br. At 16-17. The parties have stipulated that the AAT2158 is representative of the accused products. JX-1001C at 2. Linear accused AATI of violating the LEO by importing voltage regulators incorporating into their design and construction claims 2 or 34 of the ‘258 patent.

III. ANALYSIS

A. Remedy

1. Possible Modification of the Existing LEO

In light of potential confusion regarding the scope of the existing LEO, the Commission requested briefing regarding possible modifications to the LEO. At this stage, however, the parties agree that no modification to the LEO's existing language is necessary. AATI states that the issue in the enforcement proceeding was whether the accused products were covered by the LEO, that the ALJ determined that they are covered, and that the Commission affirmed that finding. Br. at 6. Accordingly, AATI concludes that "[s]ince the existing LEO covers these low-noise parts, no modification of the LEO is required." Similarly, the IA states that he agrees with the ALJ that, in light of the enforcement proceeding, the existing LEO would encompass the accused products in the enforcement proceeding, and that, therefore, he does not believe that modification is warranted. Br. at 2.

Linear also argues that modification is not necessary, but argues that the Commission should clarify in its opinion that the LEO's "entry for consumption" language covers entry for testing of the accused products. Br. at 4-5. Linear argues in the alternative that the LEO could be modified to make that clarification explicit.

In AATI's responsive brief, however, AATI does not contest that importation for testing is "entry for consumption" under the existing LEO. The IA argues that AATI never advanced the position upon which Linear bases its need for clarification, i.e., that importation for testing is not prohibited by the order.

In light of the agreement that the existing LEO covers the accused products, and need not be changed to reflect the ALJ's finding of indirect infringement, and agreement that the LEO covers importation of the accused products for testing, the Commission has determined to leave the existing LEO in place without modification.

2. Possible Issuance of a Cease-and-Desist Order

Linear and the IA argue that issuance of a cease-and-desist order is appropriate, while AATI opposes. Linear argues that a cease-and-desist order is appropriate because AATI maintains a commercially significant inventory in the United States, as found by the ALJ. *See* Br. at 6-7; ID at 43-44. Linear argues that AATI's inventory is significant both in quantity and in importance to AATI's operations. Br. at 7. Furthermore, Linear argues that AATI's "disregard" of the LEO, through importation of the infringing accused products, provides an additional justification for a cease-and-desist order. Br. at 9-10. The IA argues that a cease-and-desist order is warranted for two reasons: (1) as a deterrent to further violations of the LEO; and (2) because the record now shows a commercially significant domestic inventory of infringing products. Br. at 2. The IA argues further that AATI's decision not to seek an advisory opinion before importing the accused products provides an additional justification for the deterrent value of a cease-and-desist order.

AATI contends that the ALJ's recommendation to issue a cease-and-desist order rests on assumptions that are "based on a misapplication of the evidentiary record." Br. at 7. Specifically, AATI argues that its domestic inventory is not "commercially significant" but is merely not-for-sale "engineering parts" or "sample stock" worth only about \$1000. AATI argues that a packing list characterized in the ID (at page 44) as "for further distribution" actually reflects the shipment of material to a scrap facility for destruction. Br. at 9. AATI contends that in the original investigation the Commission rejected the exact argument Linear now makes regarding the commercial significance of AATI's inventory. Resp. at 4 (citing *Certain Voltage Regulators, Components Thereof, and Products Containing Same*, Inv. No. 337-TA-564, Comm'n Op. at 77-78 (Sept. 24, 2007)).

AATI argues that it showed no disregard of the LEO, noting that many of its products were found non-infringing by the ALJ and Commission in the violation phase, rendering importation of them permissible until issuance of the Federal Circuit's decision on appeal. Finally, AATI argues that "deterrence" is not a proper ground for the imposition of a cease-and-desist order, particularly in light of AATI's proactive cessation of importation and entry of consent orders after the Federal Circuit's decision in the violation phase.

We conclude that the evidence does not demonstrate that AATI maintains a commercially significant domestic inventory of accused products. While non-sellable products, such as sample stock and R&D parts, may be part of a commercially significant domestic inventory, the 5800 samples and 75,000 engineering parts at issue here do not constitute a commercially significant inventory in the context of the millions of parts maintained and sold abroad by AATI. *See* ID at 44. Moreover, we agree with AATI that it would be improper to conclude that AATI acted in disregard of the LEO by importing products found non-infringing by the ALJ and Commission in the violation phase, even if those findings were later reversed or vacated by the Federal Circuit. Accordingly, we disagree with Linear that AATI acted in disregard of the LEO, and disagree with the IA that a cease-and-desist order is needed for its deterrent effect. We note that this determination does not mean that Linear receives no remedy for AATI's violation, however, because the LEO has now been determined to cover all the accused products. *See Fuji Photo Film Co. v. Int'l Trade Comm'n*, 386 F.3d 1095, 1107 (Fed. Cir. 2004).

B. The Public Interest

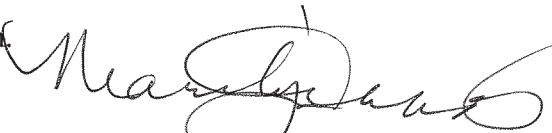
Linear argues that there is no evidence that any of the statutory public-interest factors are implicated by the relief requested. Br. at 12-13. Linear notes that the Commission already concluded that no public-interest concerns are raised by the LEO that ultimately issued, and

AATI presented no evidence that would alter that finding. The IA agrees, arguing that the analysis has not changed since the Commission addressed the issue at the violation stage. AATI does not address the public-interest factors. We agree with Linear and the IA that the analysis of the public-interest factors has not changed since the Commission's issuance of the LEO, and therefore find that the factors would not preclude the requested relief. The issue, however, is moot because we do not recommend issuing additional relief.

C. Bonding

Because the Commission has determined not to issue a cease-and-desist order, and because the parties agree that the existing LEO should remain in place with no need for modification or Presidential review, there is no need or reason to impose a bond.

By order of the Commission

A handwritten signature in cursive script, appearing to read "Marilyn R. Abbott".

Marilyn R. Abbott
Secretary to the Commission

Issued: August 3, 2010

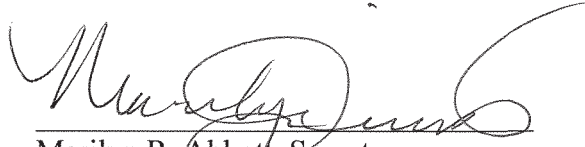
**CERTAIN VOLTAGE REGULATORS, COMPONENTS
THEREOF AND PRODUCTS CONTAINING SAME**

**337-TA-564
(Enforcement
Proceeding)**

CERTIFICATE OF SERVICE

I, Marilyn R. Abbott, hereby certify that the attached **COMMISSION OPINION** has been served by hand upon the Commission Investigative Attorney, Daniel L. Girdwood, Esq., and the following parties as indicated, on

AUG 03 2010



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

**On Behalf of Complainant Linear Technology
Corporation:**

Mark G. Davis, Esq.
WEIL GOTSHAL & MANGES LLP
1300 I Street, NW
Washington, DC 20005

Via Hand Delivery
 Via Overnight Mail
 Via First Class Mail
 Other: _____

**On Behalf of Respondent Advanced Analogic
Technologies, Inc.:**

Stephen J. Rosenman, Esq.
DECHERT LLP
1775 I Street, NW
Washington, DC 20006

Via Hand Delivery
 Via Overnight Mail
 Via First Class Mail
 Other: _____

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

**In the Matter of
CERTAIN VOLTAGE REGULATORS,
COMPONENTS THEREOF AND
PRODUCTS CONTAINING SAME**

**Inv. No. 337-TA-564
Enforcement Proceeding**

**NOTICE OF COMMISSION DETERMINATION NOT TO REVIEW THE
ENFORCEMENT INITIAL DETERMINATION; SCHEDULE FOR BRIEFING ON THE
ISSUES OF REMEDY, PUBLIC INTEREST, AND BONDING**

AGENCY: U.S. International Trade Commission.

ACTION: Notice.

SUMMARY: The United States International Trade Commission hereby provides notice that it has determined not to review the Enforcement Initial Determination (“ID”) issued by the presiding administrative law judge (“ALJ”) on March 18, 2010 in the above-captioned investigation. Notice is further given that the Commission is requesting briefing on remedy, the public interest, and bonding with respect to the ID’s findings and recommendations concerning enforcement measures.

FOR FURTHER INFORMATION CONTACT: Paul M. Bartkowski, Office of the General Counsel, U.S. International Trade Commission, 500 E Street, SW., Washington, D.C. 20436, telephone (202) 708-5432. Copies of all nonconfidential documents filed in connection with this investigation are or will be available for inspection during official business hours (8:45 a.m. to 5:15 p.m.) in the Office of the Secretary, U.S. International Trade Commission, 500 E Street SW., Washington, D.C. 20436, telephone 202-205-2000. General information concerning the Commission may also be obtained by accessing its Internet server (<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 the matter can be obtained by contacting the Commission's TDD terminal on 202-205-1810.

SUPPLEMENTARY INFORMATION: The Commission instituted the investigation underlying this enforcement proceeding on March 22, 2006, based on a complaint filed by Linear Technology Corporation (“Linear”) of Milpitas, California. 71 *Fed. Reg.* 14545. The complaint, as supplemented, alleged violations of section 337 of the Tariff Act of 1930 (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 voltage regulators, components thereof and products containing the same, by reason of infringement of certain claims of United States Patent No. 6,411,531 and of United States Patent No. 6,580,258 (“the ‘258 patent”). The complaint named Advanced Analogic Technologies, Inc. (“AATI”) of Sunnyvale, California as the sole respondent. After Commission review of the administrative law judge’s (“ALJ”) final ID, the

Commission determined that there was a violation of section 337 by AATI with respect to certain asserted claims of the '258 patent and issued a limited exclusion order ("LEO") consistent with its findings of violation. Subsequently, based on an enforcement complaint filed by Linear, the Commission instituted an enforcement proceeding by notice in the *Federal Register* on October 10, 2008.

On March 18, 2010, the ALJ issued the subject ID, finding that, due to infringement of claims 2 and 34 of the '258 patent by the accused products, AATI violated the LEO. AATI filed a petition for review of certain aspects of the ID, and Linear filed a contingent petition for review of the ID. AATI and Linear filed responses to each others' petitions, and the Commission investigative attorney filed a joint response to the private parties' petitions. Having reviewed the record of the enforcement proceeding, including the petition for review and the responses thereto, the Commission has determined not to review the ID.

In connection with the final disposition of this proceeding, the Commission may (1) modify the LEO and/or (2) issue a cease-and-desist order that could result in the respondent being required to cease and desist from engaging in unfair acts in the importation and sale of the subject articles. Accordingly, the Commission is interested in receiving written submissions that address the form of remedy, if any, that should be ordered. The Commission is particularly interested in receiving briefing regarding potential modifications to the LEO that ensure exclusion of the products for which a violation was found. 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).

If the Commission contemplates some form of remedy, it must consider the effects of that remedy upon the public interest. The factors the Commission will consider include the effect that a modified 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.

If the Commission orders some form of remedy, the U.S. Trade Representative, as delegated by the President, has 60 days to approve or disapprove the Commission's action. *See* Presidential Memorandum of July 21, 2005, 70 *Fed. Reg.* 43251 (July 26, 2005). During this period, the subject articles would be entitled to enter the United States under bond, in an amount determined by the Commission. The Commission is therefore interested in receiving submissions concerning the amount of the bond that should be imposed if a remedy is ordered.

WRITTEN SUBMISSIONS: The parties to the investigation, interested government agencies, and any other interested parties are encouraged to file written submissions on the issues of remedy, the public interest, and bonding. All parties are requested to submit proposed remedial orders for the Commission's consideration. Complainants are requested to state the dates that the patents expire and the HTSUS numbers under which the accused products are imported. The written submissions and proposed remedial orders must be filed no later than close of business on June 2, 2010. Reply submissions, if any, must be filed no later than the close of business on June 11, 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 section 210.42 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.42).

By order of the Commission.



Marilyn R. Abbott
Secretary to the Commission

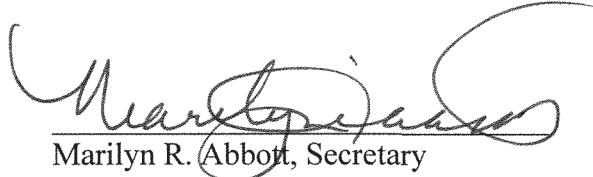
Issued: May 14, 2010

**CERTAIN VOLTAGE REGULATORS, COMPONENTS
THEREOF AND PRODUCTS CONTAINING SAME**

**337-TA-564
(Enforcement
Proceeding)**

CERTIFICATE OF SERVICE

I, Marilyn R. Abbott, hereby certify that the attached **NOTICE OF COMMISSION DETERMINATION NOT TO REVIEW THE ENFORCEMENT INITIAL DETERMINATION; SCHEDULE FOR BRIEFING ON THE ISSUES OF REMEDY, PUBLIC INTEREST, AND BONDING** has been served by hand upon the Commission Investigative Attorney, Daniel L. Girdwood, Esq., and the following parties as indicated, on **MAY 14 2010** .



Marilyn R. Abbott, Secretary
U.S. International Trade Commission
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Washington, DC 20436

On Behalf of Complainant Linear Technology Corporation:

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- Other: _____

On Behalf of Respondent Advanced Analogic Technologies, Inc.:

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Washington, DC 20006

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

PUBLIC VERSION

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

In the Matter of

**CERTAIN VOLTAGE REGULATORS,
COMPONENTS THEREOF, AND
PRODUCTS CONTAINING SAME**

**Inv. No. 337-TA-564
(Enforcement Proceeding)**

**ENFORCEMENT INITIAL DETERMINATION
Carl C. Charneski, Administrative Law Judge**

This enforcement initial determination is issued pursuant to the Notice of Institution of Formal Enforcement Proceeding (73 Fed. Reg. 60323 (2008)), and the Commission Order that issued therewith (Oct. 1, 2008). It is found that a violation has occurred of the Commission's limited exclusion order, which issued on September 24, 2007, at the conclusion of the underlying violation investigation. It is recommended that a cease and desist order issue against the respondent in this enforcement proceeding for violating the limited exclusion order.

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Abbreviations

The following abbreviations may be used in this determination:

ALJ	-	Administrative Law Judge
CDX	-	Complainant's Demonstrative Exhibit
CPX	-	Complainant's Physical Exhibit
CX	-	Complainant's Exhibit
Dep.	-	Deposition
EDIS	-	Electronic Document Imaging System
FF	-	Finding(s) of Fact
JPX	-	Joint Physical Exhibit
JX	-	Joint Exhibit
PCL	-	Proposed Conclusion of Law (CPCL, RPCL or SPCL)
PFF	-	Proposed FF (CPFF, RPFF or SPFF)
RDX	-	Respondent's Demonstrative Exhibit
RPX	-	Respondent's Physical Exhibit
RX	-	Respondent's Exhibit
SX	-	Commission Investigative Staff Exhibit
Tr.	-	Transcript

I. Background

A. Procedural History

On May 22, 2007, Administrative Law Judge (“ALJ”) Sidney Harris issued an initial determination (“ID”) in Investigation No. 337-TA-564, finding no violation of section 337 of the Tariff Act of 1930, as amended (19 U.S.C. § 1337). The 564 investigation involved voltage regulators. The ALJ found that none of the accused products of the respondent, Advanced Analogic Technologies, Inc. (“AATI”) of Sunnyvale, California, infringed the asserted claims of United States Patent No. 6,580,258 (“‘258 patent”), but that one accused product infringed two claims of U.S. Patent No. 6,411,531 (“‘531 patent”). The ALJ also determined that certain claims of the ‘258 and ‘531 patents (including the claims that the ALJ found to be infringed) were invalid due to anticipation. Finally, the ALJ determined that a domestic industry existed with regard to the ‘258 patent, but not with regard to the ‘531 patent. 73 Fed. Reg 60323 (2008).

The Commission determined to review certain portions of the ID concerning the ‘258 patent, but not to review the ID with respect to the ‘531 patent (except for one issue on which it ultimately took no position), resulting in a final determination of no violation with respect to the ‘531 patent. *Id.*

On September 24, 2007, the Commission issued its final determination in the violation investigation with respect to the ‘258 patent, reversing the ALJ on certain issues, and finding a violation of section 337. Specifically, the Commission found claims 2, 3, and 34 of the ‘258 patent valid and infringed by a representative AATI product. Accordingly, the Commission issued a limited exclusion order (“LEO”) directed to AATI with regard to voltage regulators covered by claims 2, 3, and 34 of the ‘258 patent. The Commission also required that the bond

during the Presidential review period would be 100 percent of the entered value of each voltage regulator subject to the LEO. *Id.*

Thereafter, Linear Technology Corporation (“Linear”) of Milpitas, California (the complainant in the violation investigation), filed a complaint on February 20, 2008, an amended complaint on June 18, 2008, and a second amended complaint on August 29, 2008, requesting that the Commission institute a formal enforcement proceeding against AATI under Rule 210.75 of the Commission’s Rules of Practice and Procedure (19 C.F.R. § 210.75) for violation of the LEO. *Id.*

Pursuant to 19 U.S.C. § 1337, and Commission Rule 210.75, the Commission instituted this formal enforcement proceeding to determine whether AATI is in violation of the aforementioned LEO, and what, if any, enforcement measures are appropriate. The Commission named Linear as the enforcement complainant, and AATI as the respondent. The Commission also named the Commission Investigative Staff (“Staff”) as a party. *Id.*; Commission Order (Oct. 1, 2008).¹

During the course of the enforcement proceeding, the number of AATI products accused by Linear was substantially decreased by the entry of two consents orders. *See* Order No. 18 (initial determination approving the first proposed consent order); Notice of Comm’n Decision Not to Review an Initial Determination Partially Terminating the Enforcement Proceeding on the Basis of a Consent Order (Sept. 30, 2009). *See also* Order No. 23 (initial determination approving the second proposed consent order); Notice of Comm’n Decision Not to Review an

¹ The Commission Order issued concurrently with the Notice of Institution of Formal Enforcement Proceeding, but the Order was not published in the *Federal Register*. *See* 73 Fed. Reg. 60323 (2008).

Initial Determination Partially Terminating the Enforcement Proceeding on the Basis of a Consent Order (Feb. 18, 2010).

A tutorial was held in the enforcement proceeding on January 5, 2010, and an evidentiary hearing was held on January 11-13, 2010. Thereafter, the parties filed post-hearing briefs. The issues are now ripe for determination.

B. The Accused Products and Their Importation

Linear accuses the following AATI voltage regulators in this enforcement proceeding: AAT1158B/2158, 1219, 2113, 2113A, 2120, 2146, 2148, 2153, 2500M, 2522, 2555, 2560, 2603, 2610, 2613, 2704, 2713, 2749, 2782, 2783, 2784, 2785, 2789, 3604, and 3608 (referred to collectively as the “accused products”).² Linear Br. at 16-17. The parties have stipulated that the AAT2158 is representative of the accused products. JX-1001C at 2 (Jt. Stip.) (referring to the accused products, by model number, as the “Representative Group”).

The parties have also stipulated that “since September 24, 2007, AATI has imported or caused to be imported into the United States or will have imported or caused to be imported into the United States as of the time of the evidentiary hearing at least one unit of each product in the Representative Group, including the AAT2158.” *Id.* at 3.

C. Jurisdiction

No party has contested the Commission’s subject matter jurisdiction over this formal enforcement proceeding, the Commission’s personal jurisdiction over the parties, or the Commission’s *in rem* jurisdiction over the accused products. Accordingly, it is found that the Commission has subject matter jurisdiction over this proceeding, personal jurisdiction over the

² The parties also refer to the accused products as the “design-around products.”

parties, and jurisdiction over the accused products, pursuant to section 337. 19 U.S.C. § 1337.³

D. Technological Background

This enforcement proceeding involves the technology of voltage regulators. In that regard, cell phones, laptop computers, and other electronic equipment contain circuitry that requires a steady stream of current at a particular voltage, such as 2.5 volts for some cell phones, or 12 volts for some laptop computers.⁴ Circuitry that needs to be powered is called a “load.” In portable devices, the power supply for the load is usually a battery. A problem arises, however, when there is a mismatch between the voltage of the battery and the voltage required by the load. For example, a 9-volt battery in a laptop may be required to supply current at a higher voltage, such as 12 volts; conversely, a 9-volt battery in a cell phone may be required to supply current at a lower voltage, such as 2.5 volts. This problem of battery and load mismatch is solved by the use of a voltage regulator that adapts the current from the battery to the current required by the

³ In a short footnote in its post-hearing brief, AATI appears to challenge the Commission’s “statutory authority” to find a violation of a limited exclusion order if the violation is based on infringement of a method claim. AATI does so by way of an attempted incorporation of its prehearing statement. AATI Br. at 33 n.8. Similarly, AATI argues in another short footnote that indirect infringement is not at issue in this enforcement proceeding, and does so by way of another attempted incorporation of its prehearing statement. AATI Br. at 48 n.12. AATI’s challenges are rejected as unclear and unsubstantiated. This is especially the case in view of the fact that section 337 offers a remedy for infringement of a method claim such as asserted claim 34 (which AATI was found to infringe). *See Linear*, 566 F.3d at 1054-65. Moreover, AATI lacks any basis for its attempts to incorporate its prehearing statement into its posthearing brief, especially in view of the instructions provided during the evidentiary hearing concerning the requirements and limitations placed on posthearing briefs. *See* Tr. 1044 (“A page limitation for all parties, 50 pages.” * * * “Each document is to be a stand-alone document.”). *See* Staff Reply at 24 n.7 (objection to AATI’s attempted circumvention of the page limitation imposed on all parties).

⁴ Voltage may be thought of as electrical pressure. Blauschild Tutorial Tr. 7-8. Current is the flow of electrons. Wei Tutorial Tr. 60-61.

load. In other words, the “output voltage” of the regulator meets the needs of the load.

Blauschild Tutorial Tr. 7-8.

Voltage regulators are also circuits, and thus they need to be powered by the same battery whose current they adapt for the larger, or smaller, load (such as a laptop or cell phone). The goal is to minimize the amount of power used by the voltage regulator so that more power is available for the load, and so that the battery will last longer. Thus, the efficiency of a voltage regulator depends on the amount of current that it uses to perform its function. Blauschild Tutorial Tr. 9-10.

Another factor to consider when assessing the efficiency of a voltage regulator is that voltage regulators must work with loads that require varying amounts of power, at varying voltages, in different circumstances. For example, a cell phone that is in use by someone having a conversation requires more current (and is under “heavy load” conditions) than one that is turned on but is more-or-less idle and not being used for a conversation (and is under “light load” conditions). Similarly, a laptop playing a DVD requires more current than a laptop in standby mode. Further, a piece of electrical equipment, such as a cell phone or a laptop, typically has uses that require voltages between those required in extremely heavy and light conditions. Thus, circuit designers want to design a voltage regulator that uses reduced power from the battery, and that does so over the range of currents required by the load. Blauschild Tutorial Tr. 10; Wei Tutorial Tr. 47-48.

Inside the voltage regulator circuit there is a power transfer block whose input is a voltage that is usually labeled V_{IN} , and whose output voltage is usually labeled V_{OUT} . The battery is connected at the portion of the voltage regulator labeled V_{IN} , while the load (such as a cell phone

or laptop) is connected at V_{OUT} . There is a voltage reference (V_{REF}) within the voltage regulator that provides a voltage standard, *i.e.*, a very well-defined voltage level. There is also an error amplifier within the voltage regulator that compares the voltage reference to the regulator's output voltage in order to determine whether the output voltage is too high or too low. The error amplifier actually amplifies the difference between the voltage reference and output voltage, and then adjusts the amount of power that is transferred from the input to the output. Blauschild Tutorial Tr. 11-12.

There are two primary types of voltage regulators: linear voltage regulators and switching voltage regulators (*i.e.*, the type of voltage regulators at issue in this enforcement proceeding). Linear voltage regulators contain a device called a "linear pass element," which may be thought of as an adjustable valve. Switching voltage regulators contain a switch circuit that turns on and off to provide power through the circuit to the output. The necessary adjustments in power are made by the correct timing of the switches. Specifically, the error amplifier adjusts the on-and-off timing of the switch circuit. While a switching voltage regulator may be more complicated than a linear voltage regulator, a switching voltage regulator uses very little power, and is thus more efficient. Blauschild Tutorial Tr. 12-14.

When a switch turns on and off, it provides a pulse of current to the output of a voltage regulator. Such pulsing can be problematical because, as indicated above, a load needs a steady flow of current. This problem is addressed by the use of an output capacitor. In general, a capacitor is like a reservoir for electrons, or a bucket for electrical charge. A load therefore can extract a steady stream of charge out of the output capacitor in a voltage regulator. The output voltage from a regulator is proportional to the amount of charge in the capacitor. Consequently,

as the load takes charge from the capacitor, the capacitor must be recharged by switching action. When this operation is performed correctly, the load takes out of the capacitor the same amount of charge put into it by the switching action. In such a situation, there is an approximately constant level of charge in the capacitor, and thus there is a constant level of output voltage from the regulator. Blauschild Tutorial Tr. 16-19; Wei Tutorial Tr. 46.

Another problem that must be addressed in a switching voltage regulator is the surge of power that occurs when a switch is turned on. Power actually flows through a stack consisting of a top switch and a bottom switch. When the top switch is turned on, the pulse of current that flows from the switch to the output capacitor can jump up to a level that is so high that it causes damage to the circuit by damaging the capacitor, the wire or the switch. This problem is addressed, in large part, by the use of a device called an inductor, which consists essentially of windings of wire. An inductor limits the rate at which current can flow. Thus, in a switching voltage regulator, current flows from the switch, to the inductor, and then to the capacitor in order to recharge it. Blauschild Tutorial Tr. 19-21.

Nevertheless, if left unchecked, even current flowing from the top switch through the inductor to the capacitor would ramp up over time and reach a damaging level. However, by turning “off” the top switch, and turning “on” the bottom switch (also called the low-side switch) in the aforementioned stack of switches, the current flow decreases over time. Blauschild Tutorial Tr. 21-23.

In many switching voltage regulators, the switches are transistors, and the two switching transistors are referred to collectively as “simultaneously switched switching transistors.” Generally, when the top transistor is on, the bottom transistor is off, and vice versa. During such

alternate switching, there are brief transition periods when both transistors are off. Blauschild Tutorial Tr. 22-25.⁵ When both transistors are held in an off state, that condition is referred to as a “sleep mode.” Wei Tr. 54-55.

While controlling the current reaching the output capacitor is important to prevent damage to the regulator circuit and to keep the output capacitor charged, one must also control the regulator output voltage in order for the voltage regulator to fulfill its purpose of providing a steady stream of current at the correct voltage. This is accomplished by using a “control circuit.” A control circuit includes the error amplifier (discussed above) that compares the regulator’s output voltage to a voltage reference, and then adjusts the amount of power that is transferred from the input to the output. Blauschild Tutorial Tr. 25-26.

The control circuit takes into account the varying voltage needs of a load (such as the cell phone that leaves an idle state when someone makes a call). The control circuit monitors the output voltage and adjusts the value of the inductor current so that the average value of the inductor current, *i.e.*, the average of the ramping up and ramping down, is equal to the current being drawn out by the load. For example, when the control circuit senses an overcharge of the output capacitor, it changes the switch timing, and in this case, the ramp-up time is less than the

⁵ There may also be situations in which both transistors are on, and those situations must be minimized. If both transistors are on, the current will take the path of least resistance and thus flow from the top transistor to the bottom transistor (by-passing the path to the inductor because the inductor is actually a flow restrictor), and from the bottom transistor directly to ground. This is undesirable because current is being wasted by flowing to ground. Further, inasmuch as the flow restrictor (*i.e.*, the inductor) is by-passed, the current can reach a high level before it finally flows to ground, thereby causing damage to the circuit. *Id.*

ramp-down time.⁶ This change in switch timing changes the inductor current level. By making such an adjustment in the switching, the situation returns to an equilibrium in which the load is taking the same amount of charge out of the capacitor as the inductor current is putting into it.

Blauschild Tutorial Tr. 26-30.

Turning switches on and off requires energy that must come from the battery. Thus, there is a concern that the efficiency of a switching voltage regulator will be adversely affected by a phenomenon known as “switch driver loss.” This is especially the case when higher current flows through the switch, which may cause it to heat up to a relatively larger degree. In fact, switch driver loss is proportional to the square of how much current is flowing. Thus, for the sake of efficiency, it is preferable to minimize switching, and to switch at lower current levels. When the load drops to a low level, the regulator can take advantage of non-switching periods and resume switching just enough to refill the capacitor. Blauschild Tutorial Tr. 31-35.

The type of transistor typically used in voltage regulator switches is the MOSFET. MOSFET is an acronym for metal-oxide-semiconductor field-effect transistor. A MOSFET is constructed as a triple stack. It has a gate on top, an insulator (called an oxide) underneath the gate, and a semiconductor body at the bottom. The semiconductor material at the bottom of the stack is called a semiconductor because it neither allows current to flow easily (like a metal), nor is it an insulator. The conduction properties of a semiconductor can be changed, depending on how the material is formed and how electrical pressure is applied to various parts of the

⁶ The practice of adjusting the on-and-off timing of two switches in a voltage regulator is known as “varying the duty cycle” to change the average inductor current. A “duty cycle” is defined as the percentage of time that the top switch is on during an on/off cycle. Blauschild Tutorial Tr. 30-32.

semiconductor. Blauschild Tutorial Tr. 35-37.⁷

A MOSFET has three terminals: a drain (often referred to as the location of the drain node); a source (or source node); and a gate (or gate node). A transistor is designed so that, at the correct time, the device allows current to flow between the drain and the source.⁸ The drain and the source are the conducting terminals, while the gate is designed as a control terminal for the amount of current that flows between the drain and source. Blauschild Tutorial Tr. 38.

There are two main types of MOSFET transistors. One type is the p-channel MOSFET (sometimes called the PMOS). The other type is the n-channel MOSFET (sometimes called the NMOS). Plain silicon material at the bottom of a transistor stack can be doped (*i.e.*, impurities can be added to it) to create a region of n-type silicon (through the use of certain chemicals, including arsenic and phosphorus), or a region of p-type silicon (through the use of other chemicals that include boron).

In an n-channel MOSFET, n-type regions are formed for the drain and source that are located in a p-type silicon body. The configuration is sometimes referred to as NPN because the p-region extends up and between the two n-type regions. An n-channel MOSFET is usually designed so that the current will flow from the n-type drain through the p-type body (below the gate and oxide) to the n-type source and thus out. In fact, when gate-to-source voltage (often

⁷ The “bipolar” transistor is another type of transistor that is used in switching voltage regulators, but the use of MOSFETs is more common. The operation of a bipolar transistor does not rely on a gate-to-source voltage, or a threshold voltage, which are both concepts discussed below, with respect to MOSFETs. Blauschild Tutorial Tr. 42.

⁸ The current flow (*i.e.*, the flow of electrons) between drain and source may be denoted by the letter I . I_D denotes the drain current, while I_{DS} denotes the drain to source current flow. Wei Tutorial Tr. 60-61.

referred to as V_{GS}) reaches the aforementioned threshold, an inversion layer is formed under the transistor stack's oxide due to the effect of an electrical field. The inversion layer is a small layer in which the p-type region in an NMOS acts as though it has been turned into an n-type region. Conversely, when the control voltage is below the threshold (and is in the so-called sub-threshold, or cutoff, region), the impedance (*i.e.*, the resistance) to current flow is very high, and thus current flow between the drain and source will be very low. A p-channel MOSFET behaves in a similar way, although the n-type and p-type regions are reversed (*i.e.*, p-type drain and source located in an n-type silicon). Blauschild Tutorial Tr. 35-41; Wei Tutorial Tr. 58-63; Blauschild Tr. 158-160.

II. General Principles of Applicable Law

A. Claim Construction

All the alleged acts of LEO violation at issue in this proceeding are based on allegations of patent infringement. Any finding of patent 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. Second, a factual determination must be made as to whether the properly construed claims read on the accused devices. *See Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 976 (Fed. Cir. 1995) (*en banc*), *aff'd*, 517 U.S. 370 (1996).

Claim construction begins with the language of the claims themselves. Claims should be given their ordinary and customary meaning as understood by a person of ordinary skill in the art, viewing the claim terms in the context of the entire patent. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312-13 (Fed. Cir. 2005), *cert. denied*, 546 U.S. 1170 (2006). In some instances, claim terms do not have particular meaning in a field of art, and claim construction involves little more

than the application of the widely accepted meaning of commonly understood words. *Id.* at 1314.

In many cases, claim terms have a specialized meaning, and thus it is necessary to determine what a person of skill in the art would have understood the disputed claim language to mean. Inasmuch as the meaning of a claim term as understood by persons of skill in the art is often not immediately apparent, and because patentees frequently use terms idiosyncratically, the court looks to those sources available to the public that show what a person of skill in the art would have understood disputed claim language to mean. *Id.* The “sources” identified by the *Phillips* Court include “the words of the claims themselves, the remainder of the specification, the prosecution history, and extrinsic evidence concerning relevant scientific principles, the meaning of technical terms, and the state of the art.” *Id.*

In cases in which the meaning of a claim term is uncertain, the specification usually is the best guide to the meaning of the term. *Id.* at 1315. As a general rule, the particular examples or embodiments discussed in the specification are not to be read into the claims as limitations. *Markman*, 52 F.3d at 979. However, the specification is always highly relevant to the claim construction analysis and is usually dispositive. *Id.* Moreover, “[t]he 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.

Claims are not necessarily, and are not usually, limited in scope to the preferred embodiment. *RF Delaware, Inc. v. Pacific Keystone Techs., Inc.*, 326 F.3d 1255, 1263 (Fed. Cir. 2003); *Decisioning.com, Inc. v. Federated Dep’t Stores, Inc.*, 527 F.3d 1300, 1314 (Fed. Cir. 2008). Furthermore, claim interpretations that exclude the preferred embodiment are “rarely, if

ever, correct and require highly persuasive evidentiary support.” *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1583 (Fed. Cir. 1996). Such a conclusion can be mandated in rare instances by clear intrinsic evidence, such as unambiguous claim language or a clear disclaimer by the patentees during patent prosecution. *Elekta Instrument S.A. v. O.U.R. Sci. Int’l*, 214 F.3d 1302, 1308 (Fed. Cir. 2000); *Rheox, Inc. v. Entact, Inc.*, 276 F.3d 1319 (Fed. Cir. 2002).

If the intrinsic evidence does not establish the meaning of a claim, then extrinsic evidence may be considered. Extrinsic evidence consists of all evidence external to the patent and the prosecution history, including inventor testimony, expert testimony, and learned treatises. *Phillips*, 415 F.3d at 1317. Inventor testimony can be useful to shed light on the relevant art. In evaluating expert testimony, a court should discount any expert testimony that is clearly at odds with the claim construction mandated by the claims themselves, the written description, and the prosecution history, in other words, with the written record of the patent. *Id.* at 1318. Extrinsic evidence may be considered if a court deems it helpful in determining the true meaning of language used in the patent claims. *Id.*

B. Infringement

Linear accuses AATI of direct patent infringement, as well as indirect patent infringement, specifically induced and contributory infringement. Linear Br. at 15-17.

Direct infringement consists of making, using, offering to sell, or selling a patented invention without the consent of the patent owner. 35 U.S.C. § 271(a).

With respect to induced infringement, the Patent Act provides that “[w]hoever actively induces infringement of a patent shall be liable as an infringer.” 35 U.S.C. §271(b). “In order to

succeed on a claim of 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." *Cross Medical Products, Inc. v. Medtronic Sofamor Danek, Inc.*, 424 F.3d 1293, 1312 (Fed. Cir. 2005).

With respect to contributory infringement, the Patent Act provides that "[w]hoever offers to sell or sells within the United States or imports into the United 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 especially made or especially adapted for use in the infringement of such patent, and not a staple article or commodity of commerce suitable for substantial noninfringing use, shall be liable as a contributory infringer." 35 U.S.C. § 271(c). Thus, a seller of a component of an infringing product can 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).

In all cases, a section 337 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, Comm'n Notice of Final Determination of No Violation of Section 337, 2002 WL 448690 at *59, (Mar. 22, 2002); *Enercon GmbH v. Int'l Trade Comm'n*, 151 F.3d 1376 (Fed. Cir. 1998). In determining whether or not a patent has been infringed, each claim element

or limitation is considered material and essential. *London v. Carson Pirie Scott & Co.*, 946 F.2d 1534, 1538 (Fed. Cir. 1991).⁹ 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).

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 as 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). Such 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 is not satisfied, infringement cannot be found under the doctrine of equivalents as a matter of law. *See, Wright Medical*, 122 F.3d 1440, 1444 (Fed. Cir. 1997); *Dolly, Inc. v. Spalding & Evenflo Cos., Inc.*, 16 F.3d 394, 398 (Fed. Cir. 1994).

⁹ Thus, if an accused device lacks a limitation of an independent claim, the device cannot infringe a dependent claim. *See Wahpeton Canvas Co. v. Frontier, Inc.*, 870 F.2d 1546, 1552 n.9 (Fed. Cir. 1989).

C. Validity

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). 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). A respondent that has raised patent invalidity as an affirmative defense must overcome the presumption by “clear and convincing” evidence of invalidity. *Checkpoint Sys., Inc. v. United States Int’l Trade Comm’n*, 54 F.3d 756, 761 (Fed. Cir. 1995).

In this enforcement proceeding, AATI raises indefiniteness and lack of enablement as grounds for patent invalidity, should Linear’s and the Staff’s proposed claim construction be adopted. AATI Br. at 24-26, 49-50.

The definiteness requirement of 35 U.S.C. § 112 ensures that patent claims particularly point out and distinctly claim the subject matter that the patentee regards to be the invention. 35 U.S.C. § 112, ¶ 2; *Metabolite Labs., Inc. v. Laboratory Corp. of America Holdings*, 370 F.3d 1354, 1366 (Fed. Cir. 2004). If a claim’s legal scope is not clear enough so that a person of ordinary skill in the art could determine whether or not a particular product infringes, the claim is indefinite and is, therefore, invalid. *Geneva Pharm., Inc. v. GlaxoSmithKline PLC*, 349 F.3d 1373, 1384 (Fed. Cir. 2003).

A patent is enabled, under 35 U.S.C. § 112, ¶ 1, if its disclosure is sufficient to enable a person of ordinary skill in the art, after reading the specification, to make and use the claimed invention without undue experimentation. *In re Wands*, 858 F.2d 731, 736-37 (Fed. Cir. 1988); *Johns Hopkins Univ. v. Cellpro, Inc.*, 152 F.3d 1342, 1360 (Fed. Cir. 1998). Thus, a patent need not describe every mode of a claimed invention. *Invitrogen Corp. v. Clontech Labs., Inc.*,

429 F.3d 1052, 1070-71 (Fed. Cir. 2005).

III. Infringement

A. Claim Construction

The ‘258 patent, entitled “Control Circuit and Method for Maintaining High Efficiency over Broad Current Ranges in a Switching Regulator Circuit,” issued on June 17, 2003, to Milton E. Wilcox and Randy G. Flatness. Application No. 09/978,120, which matured into the ‘258 patent, was filed on October 15, 2001, based on continuations and divisions that extend back to March 23, 1993. JX-3 (‘258 patent).

The ‘258 patent specification incorporates by reference, in its entirety, patent application No. 08/035,423, which matured into United States Patent No. 5,408,150 (“‘150 patent”), entitled “Circuit for Driving Two Power MOSFETs in a Half-Bridge Configuration,” with Milton E. Wilcox named as the sole inventor. JX-3, col. 13, lines 46-51; CX-1182 (‘150 patent).¹⁰

One of ordinary skill in the art relevant to the ‘258 patent would have a bachelor’s degree in electrical engineering or a similar field, and at least two years of work experience designing switching regulators. Initial Determination (May 22, 2007) (J. Harris); Wei Tr. 789-790; Blauschild Tr. 133-134.

Linear alleges that the accused products in this enforcement proceeding infringe claims 2 and 34 of the ‘258 patent. Linear Br. at 15. Linear further alleges that, accordingly, the importation into the United States, the sale for importation, or the sale within the United States

¹⁰ The ‘258 patent additionally incorporates by reference, in its entirety, patent application No. 07/893,523, which is also expressly incorporated into the ‘150 patent specification. The application for the ‘150 patent was a continuation-in-part of application No. 893,523. JX-3, col. 13, lines 42-46; CX-1182, cover page & col. 1, lines 7-11.

after importation of the accused products violates the Commission's limited exclusion order (*i.e.*, the LEO) issued in the underlying investigation.

Claim 2 of the '258 patent, as well as claim 1 from which claim 2 depends, and claim 34 provide as follows:

1. A circuit for controlling a switching voltage regulator, the regulator having (1) a switch coupled to receive an input voltage and including a pair of synchronously switched switching transistors and (2) an output for supplying current at a regulated voltage to a load which includes an output capacitor, the circuit comprising:

a first circuit for monitoring the output to generate a first feedback signal;

a second circuit for generating a first control signal during a first state of circuit operation, the first control signal being responsive to the first feedback signal to vary the duty cycle of the switching transistors to maintain the output at the regulated voltage; and

a third circuit for generating a second control signal during a second state of circuit operation to cause both switchin[g] transistors to be OFF for a first period of time during which the output capacitor maintains the output substantially at the regulated voltage.

2. The circuit of claim 1 wherein the second control signal is generated in response to the first feedback signal.

* * *

34. A method for controlling a switching voltage regulator, the regulator having (1) a switch coupled to receive an input voltage and including a pair of synchronously switched switching transistors and (2) an output for supplying current at a regulated voltage to a load which includes an output capacitor, the method comprising the steps of:

(a) monitoring the output to generate a first feedback signal;

(b) varying the duty cycle of the switching transistors in response to the first feedback signal to maintain the output at the regulated voltage during a first state of circuit operations;

(c) turning both switching transistors OFF for a first period of time following the first state of circuit operation so as to allow the output capacitor to maintain the output substantially at the regulated voltage by discharging during a second state of circuit operation; and

(d) turning at least one of said switching transistors ON to recharge the output capacitor following the second state of circuit operation.

JX-3, col. 16, lines 39-59; col. 18, line 57 through col. 19, line 10.

In this enforcement proceeding, the parties dispute only one claim term. The disputed term is the word “OFF.” Linear Br. at 8; AATI Br. at 1-3; Staff Br. at 10. Only those claim terms that are 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.*, 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). Accordingly, only the term “OFF” is construed herein.

Linear argues that the plain and ordinary meaning of the term OFF, as understood by a person of ordinary skill in the art in the context of the ‘258 patent, is “driven to conduct only an insignificant amount of current.” Linear Br. at 8. The Staff proposes the same construction. Staff Br. at 10. AATI proposes a different claim construction for the term “OFF.” AATI argues that the term “OFF” should be construed to mean “rendered non-conducting.” AATI Br. at 3.

For the reasons stated below, the construction proposed by Linear and the Staff is adopted.

First, however, AATI raises a threshold claim construction argument that must be addressed. In that regard, AATI submits that during the underlying violation investigation before Judge Harris, Linear defined “OFF” as “does not conduct current,” and that Linear made similar arguments during an appeal to the Federal Circuit in the *Impala* litigation.¹¹ AATI further submits that the named inventors, as well as Linear’s expert, Robert Blauschild, testified in the *Impala* litigation that when a transistor is turned off it is not conducting current, and that a transistor in the off state prevents any current from flowing. *Id.* at 5-10.

Thus, AATI offers a one-paragraph argument that, under the equitable doctrine of judicial estoppel, Linear should be prevented from asserting “that the term ‘OFF’ has a meaning contrary to that argued to, and adopted by, the Federal Circuit.” *Id.* at 10 (citing *Linear Tech. Corp. v. Impala Linear Corp.*, 379 F.3d 1311, 1324 (appeal in the *Impala* litigation) and *SanDisk Corp. v. Memorex Prods. Inc.*, 415 F.3d 1278, 1290 (Fed. Cir. 2005) (requirements for judicial estoppel)).

AATI’s judicial estoppel argument is rejected. Respondent has not shown that Linear’s earlier representations are “clearly inconsistent” with its arguments in this proceeding, as one would normally encounter when the equities favor estoppel. *See SanDisk*, 415 F.3d at 1290. Nor has it been shown that the Federal Circuit construed the term “OFF” as it appears in the ‘258 patent, or that the Court adopted, or otherwise relied upon, a construction of that term proposed

¹¹ The *Impala* litigation was discussed in detail by Judge Harris in the ID on violation (the underlying investigation). The *Impala* litigation involved United States Patent No. 5,481,178 (“‘178 patent”), which is related to the ‘258 patent through the same ultimate parent application. *See* ID at 11-15; JX-3 (‘258 patent cover sheet listing the ‘178 patent).

by Linear.¹²

Thus, judicial estoppel does not apply. Further, it is unclear which arguments Linear would be estopped from making inasmuch as AATI has not shown inconsistencies between Linear's prior and current arguments.¹³

Now, on to the claim construction of the term "OFF." As explained by AATI's expert in this proceeding, Dr. Wei, persons of ordinary skill have long known (even since 1993, when the first application leading to the '258 patent was filed) that transistors, including MOSFETs, never completely stop the flow of current through them. Dr. Wei testified that even when the gate-to-source voltage (V_{GS}) is set at zero (or might be expected to be at zero), there will be at least a small amount of current flowing through the transistor. Wei Tr. 814-816. Dr. Wei's testimony on this point is consistent with his earlier statements that with respect to a MOSFET that "when the gate-to-source voltage is less than or equal to ground, it is cut off. It is turned off. No current flows. But, of course, we have to keep in mind this notion of the off-state leakage

¹² In the *Impala* appeal, the Federal Circuit construed the claim language "simultaneously OFF," which is found in the patent asserted in that case. The issue before the Court centered around questions such as the simultaneous operation of the switch's transistors, and whether or not switching transistors must be turned off or disabled at the same instant. *Linear*, 379 F.3d at 1322-25. Neither the Court's holding, nor Linear's arguments, turned on the precise meaning of the word "OFF," which is at issue now in this enforcement proceeding.

¹³ Although not part of its estoppel argument, AATI also argues that in Linear's appeal of the Commission's underlying violation decision, Linear argued that in sleep mode, "the bottom transistor is OFF (non-conducting)," and that a transistor acts like a switch by either allowing or preventing current to pass through it. AATI Br. at 6. Yet, the Federal Circuit did not construe the term "OFF," but rather the claim limitation "a second control signal ... to cause both transistors to be OFF." The Court determined that the required "first control signal" and "second control signal" need not be entirely distinct. An issue was not presented as to precise operation or state of a transistor in its OFF state. *See Linear*, 566 F.3d at 1056-57.

that we have been hearing about.” Wei Tr. 806.¹⁴ The testimony of Dr. Wei is also consistent with the testimony of Linear’s expert, Mr. Blauschild. Blauschild Tr. 161 (“[C]urrent flow is never zero. You always get some current through there. It is a small level.”).

Thus, to one of ordinary skill in the art, there is no inconsistency between the statement that no current flows through a MOSFET when it is turned off, and the statement that a small amount of current will in fact always flow through it. *See* Blauschild Tr. 324 (“Insignificant amount of current, people in the industry typically call no current. That’s just how we talk about it.”). The evidence relied upon by all parties shows that no MOSFET used in a circuit is ever in a completely non-conducting state when turned off.

Furthermore, AATI’s addition of the term “rendered” in its proposed construction of “rendered non-conducting” makes its proposed claim construction even more problematic. AATI’s expert (Dr. Wei) testified during the hearing that he inserted the word “rendered” into AATI’s claim construction in order to differentiate the non-conducting state of an “OFF” transistor according to the claims from the typical non-conducting state of a transistor in which leakage occurs. He testified on direct examination that in either case some current would flow, but that when a transistor is “rendered” non-conducting according to AATI’s proposed construction, the amount of current flowing through the transistor is intended (Dr. Wei: “Well, a transistor by itself cannot be conductive, non-conductive. You have to render it.” Tr. 867), whereas leakage current is something that is “uncontrolled,” “unintended,” and “unwanted,” and thus not covered by the claims. Wei Tr. 815, 866-867.

On cross-examination, Dr. Wei confirmed that under AATI’s proposed construction,

¹⁴ Leakage current is also called “sub-threshold leakage current.” Blauschild Tr. 295.

infringement of a '258 patent claim with the term "OFF" must be understood with respect to the *intention* of the one designing the circuit. In that regard, Dr. Wei testified, as follows:

Q. So you didn't render it non-conducting, it is still conducting, despite your best efforts?

A. It is, for all intents and purposes, rendered -- it is rendered non-conducting, but we -- one of ordinary skill in the art understands that there is this thing called an off-state leakage. So it -- I guess for me it works. I don't --

Q. But, I mean, isn't your definition really more rendered non-conducting of any intentional current?

A. That's another way we can say it. It is rendered non-conducting.

Q. So you insert this -- there is an element of intent there?

A. Right. When I design a circuit, there is always elements of intent as a designer to have it do this or have it do that, as I think Mr. Blauschild was saying yesterday. You don't just take it out and, you know, use transistors in isolation. They are a part of a circuit.

And they are driven. They are rendered, as I was saying, to do one thing or another. So one thing to render it to do is to be non-conducting. You can render it to be conducting, on/off.

Wei Tr. 955-956.

There is, however, nothing in the claim language or other intrinsic evidence relating to the '258 patent to indicate that intent plays any role in determining whether or not a circuit is OFF. Nor has it been shown that under law, a claim should be construed so that the metes and bounds of the claimed invention must be determined by the intent of a person or device that practices the limitations of a claim. Thus, Dr. Wei's testimony on this point is without record support.

By contrast, the proposed claim construction of Linear and the Staff, *i.e.*, “driven to conduct only an insignificant amount of current,” correctly construes the term “OFF” in accordance with the evidence intrinsic to the ‘258 patent.

The plain claim language indicates that both transistors are “OFF” in the second state of operation in which the transistors stop switching “for a first period of time during which the output capacitor maintains the output substantially at the regulated voltage.”¹⁵ JX-3, col. 16, lines 53-57. One of ordinary skill would understand that a small amount of current would still flow (for example, in some applications, approximately 10 microamps of sub-threshold drain current), and further that in a switching regulator application, that would be considered effectively zero. Blauschild Tr. 290-295. (This is the opposite of the position advanced by Dr. Wei and rejected above.)

This understanding is confirmed by the ‘150 patent specification which, as already discussed, is incorporated in its entirety into the ‘258 patent specification, and describes a transistor in such an OFF state. The ‘150 patent specification provides in pertinent part:

When INPUT terminal **31** is LOW, drive to gate **22a** of bottom MOSFET **22** (through bottom gate drive terminal **37**) is provided by logic circuit **32** only when the gate-to-source voltage of top MOSFET **21** ($V_{TG} - V_{TS}$) is below a predetermined threshold value $[(V_{TG} - V_{TS})_{THR}]$, which is typically set at a voltage value where current conduction through the top MOSFET is insignificant (e.g., approximately at the intrinsic threshold voltage of the top MOSFET). Because the drive to bottom MOSFET **22** is inhibited until top MOSFET **21** is substantially turned OFF and conducts an insignificant amount of current from its drain (supply rail V_S) to its source, logic circuit **32** reduces or prevents the occurrence of shoot-through due to premature turn-on of bottom MOSFET **22**

¹⁵ Although the term is not used in the claims, as indicated, *supra*, one of ordinary skill might refer to a time when both transistors are off as the “sleep mode.” Blauschild Tr. 136-137.

prior to turn-off of top MOSFET 21.

Similarly, when INPUT terminal 31 is HIGH, drive to gate 21a of top MOSFET 21 (through top gate drive terminal 36) is provided only when the gate to source voltage of bottom MOSFET 21 (V_{BG}) is below a second predetermined threshold value [$(V_{BG})_{THR}$], which is typically set at a voltage value where current conduction through the bottom MOSFET is insignificant (e.g., approximately at the intrinsic threshold voltage of the bottom MOSFET). Because the drive to top MOSFET 21 is inhibited until bottom MOSFET 22 is substantially turned OFF and conducts an insignificant amount of current from its drain to its source (ground), logic circuit 32 also reduces or prevents the occurrence of shoot-through due to premature turn-on of top MOSFET 21 prior to turn-off of bottom MOSFET 22.

CX-1182, col. 5, lines 1-31.

Thus, as set forth in the '150 patent specification (as incorporated into the '258 patent specification), a MOSFET transistor is OFF when it conducts an "insignificant" amount of current. The specification further provides an example of such "insignificant" current, specifically "approximately at the intrinsic threshold voltage" of the transistor. This is consistent with portions of the '150 specification that refer to a MOSFET as "OFF" when its gate-to-source voltage is "at a minimum," but which do not indicate that the voltage is zero, or that the current flow is zero. See CX-1182, col. 5, line 66 through col. 6, line 4.

AATI argues that the term "insignificant" in column 5 of the '150 patent "refers not to the charge flow associated with the transistor being OFF (*i.e.*, its gate-to-source voltage has fallen to the minimum), but to the larger current that exists during the transitional period when the transistor has only 'substantially turned OFF' (*i.e.*, its gate-to-source voltage is below a different,

higher 'threshold' value) on its way to being OFF." AATI Br. at 18.¹⁶

¹⁶ AATI's concentration on the specification of the '150 patent is curious inasmuch as its expert, Dr. Wei, testified (as set forth below) that he had not included that specification in his opinions.

Q. Right. You have, I believe, an Exhibit B to your report that lists the materials considered in coming up with your opinions?

A. Okay.

Q. Is that correct? And you listed everything you considered?

A. I believe I did.

Q. And that also includes everything you considered for your invalidity opinions, correct?

A. Given that they are written at closely the same time, yeah.

Q. Right. And in the materials considered, you did not include any of the materials that were incorporated by reference into the '258 patent, did you?

A. Incorporated by reference, if you are talking about the '150, it is not in here.

Q. Right. So you did not take into account –

* * * * *

THE WITNESS: I am saying that it is not in -- the '150 patent is not listed on this list.

Q. Right. And you didn't list it as something that you considered in coming up with your opinions that you reflected in the opening report, correct?

A. It is not listed on the Exhibit B list.

Q. Right. And you didn't address it at all in the substance of

(continued...)

Yet, while the text of column 5 does refer to the transistor being “substantially OFF,” there is no indication that the applicant sought to refer to an intermediate, or transitional, state between on and off. Indeed, elsewhere in the specification, the applicant discusses the operation performed in the above-quoted portion of column 5, and expressly refers to the transistor as

¹⁶(...continued)

your report, correct?

A. The ‘150 patent was a break before make shoot-through reduction patent, right?

Q. So my question to you is just whether you addressed it.

A. I don’t have -- I don’t believe the reports mention -- let’s see. I looked at the patent. I have read it. Things are getting fuzzy, but, let’s see, as far as whether it is specifically mentioned in the opening or rebuttal reports, I don’t believe it is.

Q. So you didn’t list it as one of the things that you considered in either report, correct?

A. I think the exhibit list basically speaks for itself. It is not in the exhibit list.

Q. Okay. Can we -- okay. And it is not in the exhibit list. And certainly it was not addressed in the substance of any of the opinions you have set forth in either of your expert reports?

A. So, I mean, this obviously has been going on for a while. Mr. Blauschild did not provide a specific –

Q. Sir, my question to you is just whether you addressed it in either of your reports.

A. No.

Wei Tr. 1014-1017.

being simply “OFF.”¹⁷

AATI argues at one point in its brief that within the four corners of the ‘258 patent specification, the patent uses the term “OFF” to mean a transistor that conducts “zero current,” and allow no dissipation of power. AATI Br. at 15-16 (citing JX-3, col. 10, lines 55-56 & col. 6, lines 11-14). However, AATI has not shown how the portions relied upon concern the synchronous switching operation covered by the asserted claims. It is also unclear how this portion of AATI’s argument can be squared with its expert’s testimony (discussed above) that MOSFETs always permit the conduction of some current, even if the amount is small. *See Wei Tr.* 806, 814-816. Similarly, AATI relies briefly on portions of the ‘258 patent specification that concern the non-asserted reverse current protection claims of the patent, which are not instructive when construing the term “OFF” in the context of synchronous switching. *See AATI Br.* at 15-16; *Blauschild Tr.* 124, 468.¹⁸

¹⁷ *See CX-1182*, col. 2, lines 11-16 (“The circuit includes means for driving the power transistors from a single input, and monitoring the gate-to-source voltages of the two power transistors so as to inhibit the turning-ON of each power transistor until the gate-to-source voltage of the other power transistor has fallen to a predetermined level indicative of the other transistor being OFF.”).

Indeed, the ‘150 patent specification warns against both transistors being ON at the same time, and thereby allowing “shoot-through” in which current flows through both transistors but not to the load. *CX-1182*, col. 1, lines 26-34 (“First, the driver circuit must ensure that both power transistors are not ON simultaneously. Otherwise, a low impedance path may exist between supply rails, giving rise to undesirable ‘shoot-through,’ or ‘cross-conduction,’ current. Shoot-through current can cause a reduction in power efficiency since it represents supply current which has bypassed the load. Additionally, in a worst case, shoot through can cause power transistor failure due to current overloading.”).

¹⁸ Linear’s expert explained the term “reverse current” at several points during the hearing, including the following:

- A. There has been mention a couple of times about the words

(continued...)

AATI also briefly cites portions of the prosecution histories of the '258 and '178 patents to argue that "OFF" must mean "rendered non-conducting." AATI Br. at 19-20 (citing JX-6 at LLT00230 & JX-4 at LTC00356). Those portions of the prosecutions show that the applicants or the examiner made general statements, apparently by way of background, that transistors in their OFF state do not dissipate power. There is no indication that the applicants sought to impart any special properties to the transistors used in the claimed invention so that they would prevent the conduction of all current, when normally transistors would allow the flow of a small amount of current. Nor is there any indication that they sought to distinguish the claimed invention from the prior art on the basis of their statements made about the dissipation of power. In sum, there is no disclaimer of any scope of the asserted claims based on the statements referenced by AATI from the prosecution histories.

Accordingly, based on the claim language at issue and the evidence intrinsic to the '258 patent, it is found that the claim term "OFF" means "driven to conduct only an insignificant

¹⁸(...continued)

reverse current. What that has to do is at low levels of load current, the inductor current is ramping up and down and we don't put the transistors to sleep, we're going to ramp up to some positive value, down to some negative value of current.

And the patent says that even if you don't want to turn off the switching action, stop switching, you better turn off that bottom switching transistor because if you leave that bottom switching transistor at low levels of current, current can actually get to a level where it flows backwards through the circuit, in other words, current is going to be taken – charge is taken off that capacitor, flowing towards the left instead of towards the load, and goes through the bottom switching transistor.

Blauschild Tr. 181.

amount of current.”

B. Direct Infringement

The infringement analysis contained herein focuses primarily on the question of whether transistors in the accused products turn “OFF” in accordance with claims 2 and 34 of the ‘258 patent. *See* AATI Br. at 3, 27-31; Linear Reply at 12; Staff Reply at 13.

AATI argues that the accused products (represented by AAT2158, per stipulation) are manufactured and sold as loose chips that lack some of the components required in the asserted claims, such as an output capacitor, and therefore cannot directly infringe the asserted claims. AATI Br. at 31-32. This argument is not persuasive inasmuch as products at issue during the initial violation investigation also included loose chips, but ultimately direct infringement was found. *See* ID at 72; *Linear*, 566 F.3d at 1086. Further, even if the AAT2158 and similar products lack certain claim limitations (whose construction was not at issue in this proceeding), AATI nevertheless uses the AAT2158 chip (which the parties have identified in their Stipulation as a “switching voltage regulator”) to build evaluation boards, and there is no allegation that such boards lack any components needed for a complete circuit. *JX-1001C* at 1; *D’Angelo Tr.* 680. In addition, as discussed below with respect to indirect infringement, AATI purposely imports the accused products, and sells them to customers for use in complete, functioning voltage regulator circuits. Accordingly, for the reasons discussed below, it is found that AATI has literally infringed claims 2 and 34 of the ‘258 patent.

1. Literal Infringement

Independent claim 1 of the ‘258 patent, from which asserted claim 2 depends, requires “a third circuit for generating a second control signal during a second state of circuit operation to

cause both switchin[g] transistors **to be OFF** for a first period of time during which the output capacitor maintains the output substantially at the regulated voltage.” Similarly, asserted claim 34 requires “turning both switching **transistors OFF** for a first period of time following the first state of circuit operation so as to allow the output capacitor to maintain the output substantially at the regulated voltage by discharging during a second state of circuit operation.” JX-3, col. 16, lines 53-57 (emphasis added) & col. 19, lines 3-7 (emphasis added).¹⁹

The evidence shows that when the accused chips are in a complete circuit, such as an evaluation, test or demo board, they include first circuitry for monitoring an output to generate a feedback signal, and second circuitry to generate a first control signal in response to the feedback signal to vary the duty cycle of the switching transistors during a high load, synchronous switching mode so as to maintain the output at the regulated voltage as claimed. Blauschild Tr. 212-214; D’Angelo Tr. 679-681; CX-1025 at LTCENF004372, 81 (data sheet for the AAT2158); CX-1081C at AATIENF149433, 47- 48 (AAT2158 schematics). As seen in AATI datasheets, during the high load, synchronous switching mode, the output current ripple ramps up and down as a result of the synchronous switching. Blauschild Tr. 246; CX-1025 at LTCENF004378 (AAT2158 datasheet).

Furthermore, evidence shows that the accused products include additional third circuitry to generate a second control signal in response to the feedback signal to cause both the switching transistors to be held in an OFF state, *i.e.*, putting them in sleep mode, for a period of time during light load conditions. Blauschild Tr. 227, 239; D’Angelo Tr. 678-679; Yu Tr. 752-753;

¹⁹ By testing the accused products on evaluation or test boards at its facility in California, AATI has ensured that every step of method claim 34 is practiced in the United States. *See* D’Angelo Tr. 659, 664, 672, 680-683.

CX-1081C at AATIENF149433, 47-48 (AAT2158 schematics). As reflected in the AAT2158 datasheet, the output current ripple demonstrates sleep mode (with a capacitor maintaining the output voltage) with a period of no switching, followed by a spike of switching to recharge the output capacitor, followed by a period of no switching. Blauschild Tr. 249-250 (discussing CX-1025 as reproduced in CDX-1023); D'Angelo Tr. 685-687; CX-1025 at LTCENF004379 (AAT2158 data sheet).

Thus, the drive circuitry within the accused products causes at least one of the transistors to enter the high impedance state by biasing the transistor at a non-zero gate-to-source voltage (V_{GS}). Blauschild Tr. 188-190; CX-1066C at AATIENF222140 (AAT2158 schematic); D'Angelo Tr. 654-656; RX-2050C at AATIENF222809 (AATI presentation on AAT2158). This gate-to-source voltage was shown to be approximately 560 millivolts in the accused products. Blauschild Tr. 190-193; CX-1102C at AATIENF107091 (AATI design review); CX-1119C at AATIENF155306 (AATI design review); D'Angelo Tr. 670; RX-1051C at AATIENF157499 (AATI design review).

A gate-to-source voltage in the region of 560 millivolts is too small to create a significant inversion layer within the transistor, thus the current flow is restricted to an amount generally at or below $20\mu\text{A}$ (20 microamps). See Blauschild Tr. 165-166, 190-197 (testimony concerning OFF state conduction in the range of 1 to $20\mu\text{A}$); D'Angelo Tr. 669-670, 689; Yu Tr. 748-750, 759-760; CX-1112C at AATIENF145098 (design review for AAT2146). In the context of the asserted '258 patent claims, $20\mu\text{A}$ of drain current conduction is insignificant, and indicative of a transistor in the claimed OFF state. Blauschild Tr. 165-167, 195.

Thus, AATI documentation is able to tout the "high efficiency" of the accused products

across a broad range of loads. *See* CX-1025 at LTCENF004380 (AAT2158 data sheet); Blauschild Tr. 167-168. This high efficiency is achievable in large part because drain current flow in the high impedance state is restricted to an amount far lower than it otherwise would be if the transistor were ON. Blauschild Tr. 169-171.

Moreover, the evidence shows that the 560mV gate-to-source voltage for a high-impedance transistor in the accused products is below the transistor's threshold voltage. Specifically, the threshold voltage of the transistors in the accused products can be reliably estimated to be in the range of 600mV to 1V using techniques known in the art. Blauschild Tr. 438-439, 505-509. While the true threshold voltage may vary slightly from part-to-part, the known techniques for estimating the threshold voltage are sufficiently accurate and reliable to confirm that it is in the range of 600mV to 1 volt. Blauschild Tr. 510-512; Yu Tr. 763-764. Thus, the 560mV gate-to-source voltage (V_{GS}) indicates that the drain current is insignificant sub-threshold conduction.

AATI argues that since the violation investigation, it designed the AAT2158 and the other accused products to address an oscillation problem known as "ringing." Ringing is a form of high-frequency electromagnetic noise occurring in light load conditions when both transistors are normally turned OFF, and thus there is no path through the MOSFET channel to drain stored energy in the inductor. AATI argues that in the AAT2158, the bottom transistor is designed so that it is never "OFF," and indeed the "constant controlled channel current is 32 microamps or greater." AATI further argues that to help drain the stored energy that causes ringing, constant current flows from the inductor to ground, or in the "reverse" direction from that taught in the '258 patent. AATI Br. at 27-31.

AATI's non-infringement arguments must fail because they are based on its rejected claim construction that emphasized the intent of the circuit design (*e.g.*, controlled current versus leakage), and a "non-conducting" transistor (rather than one that allowed an "insignificant" flow of current, as per Linear's and the Staff's proposed construction adopted herein). Further, the addition of elements for the purpose of lessening or eliminating noise in the circuit cannot vitiate infringement if the accused products still practice the asserted claims.

For example, the testimony of Linear's expert concerning a 20 microamp flow of current in the design-around products was based on AATI's own product documentation and the testimony of AATI witnesses. Even if one were to accept AATI's representation that the design-around products permit a 32 microamp current flow, this defense to infringement would fail because the record shows that a 40 microamp current flow would be indicative of sub-threshold conduction by the bottom transistor, and would be insignificant. Blauschild Tr. 189-191.

Accordingly, it is found by at least a preponderance of the evidence that the accused products literally infringe claims 2 and 34 of the '258 patent.

2. Doctrine of Equivalents

Linear and the Staff argue that even if the accused products do not infringe the asserted claims of the '258 patent literally, they nonetheless would infringe under the doctrine of equivalents. Linear Br. at 36-39; Staff Br. at 29-30, 38-39. AATI argues that the accused products do not so infringe. AATI Br. at 38-48.²⁰

²⁰ In fact, AATI argues that a doctrine of equivalents analysis is improper because the disclosure-dedication rule precludes Linear from relying on this doctrine. *See* AATI Br. at 38. AATI is wrong. The disclosure-dedication rule does not preclude an equivalents analysis given the adoption of Linear's and the Staff's claim construction of the term "OFF," and the rejection
(continued...)

It is not appropriate at this juncture to revisit the entire question of claim construction, or to assume facts or proposed legal findings that have been rejected. Yet, for the reasons discussed below, if “OFF” were construed to mean “non-conducting,” such that an “insignificant” amount of current flow were deemed outside the literal scope of the claim, the accused products would nonetheless infringe under the doctrine of equivalents.

Even under a more restrictive interpretation of the claim term “OFF,” the accused products, through their operation of switching transistors, perform substantially the same function, in substantially the same way, to achieve substantially the same result required by the claims. Specifically, in order to switch the switching transistors in a synchronous manner, the accused products place the low-side switch in a high-impedance, blocking condition when the top-side switch is ON. Blauschild Tr. 269-270; D’Angelo Tr. 684-685. In this state, the low-side switch has a high resistance to current flow and blocks any current higher than 20 μ A. Blauschild Tr. 269-270. Thus, the low-side switch blocks current and has a high resistance.

Similarly, when both transistors are in their high-impedance state, the accused products achieve the results expected from the claimed invention: (1) the power that would otherwise have been required to turn the switches ON and OFF for each cycle (switch driver current) is saved; (2) switch losses are minimized; and (3) no significant current from the output capacitor is drawn back into the regulator during the period of time when the output capacitor provides current to the load. Despite the 20 μ A current flowing through the low-side transistor, the accused products achieve high efficiency at light load levels by stopping the switching action. Blauschild Tr.

²⁰(...continued)
of AATI’s opposing construction, including its misreading of both the ‘258 and the ‘150 patent specifications.

171-172, 270-275; D'Angelo Tr. 679-680.

Consequently, under the doctrine of equivalents, the differences between the accused products and the claimed invention would not be substantial, and the accused products would infringe.

C. Indirect Infringement

Linear also accuses AATI of both induced infringement and contributory infringement. Linear's allegations are supported by the Staff. 35 U.S.C. §§ 271(b) & (c). As discussed below, the evidence shows that AATI has engaged in both forms of indirect infringement.

First, AATI's argument that the Commission lacks the authority to find indirect infringement in this enforcement proceeding is rejected. In that regard, the LEO (limited exclusion order) issued by the Commission in the underlying investigation broadly addresses all "covered" voltage regulator products without limitation as to a particular form of infringement.²¹

With respect to induced infringement (§ 271(b)), the record shows that AATI actively induces infringement by instructing its customers to use the imported accused products in ways that infringe the asserted claims. While Linear has not adduced direct evidence that an end user infringes the '258 patent, there is strong circumstantial evidence that such infringement occurs. *See Lucent Techs., Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1319-20 (Fed. Cir. 2009) (holding that inducement can be shown by "circumstantial evidence" of end users of an accused product within the United States likely using the product in an infringing manner coupled with evidence that such use is intended by the inducer). As discussed above, use of the accused products infringes

²¹ Correspondingly, AATI's impermissible (and reoccurring) attempt to incorporate its prehearing statement into its post-hearing brief is rejected. *See* AATI Br. at 48 n.12.

claims 2 and 34 of the '258 patent. Nevertheless, AATI creates datasheets for each accused product for the purpose of providing instructions for using the products in customer applications. Blauschild Tr. 128; Yu Tr. 769-770; CX-1018 (AAT2113A), CX-1025 (AAT2158), CX-1052 (AAT2749).

The datasheets teach AATI's customers how the products work, and how to configure the accused products with external components, including external capacitors required to use the accused products in an infringing manner. Each datasheet includes a functional block diagram showing the circuitry at a high level, a typical application of the product, a section teaching customers how to choose external components and hook up the product to an evaluation board, and a section showing customers how the product works under normal operating conditions. AATI sometimes also provides its customers and potential customers with the aforementioned evaluation boards, which are also called "demo boards." AATI configures the demo boards in the manner shown on the datasheets for each accused product, and uses the demo boards to attract customers and to show customers how the accused products work. D'Angelo Tr. 676-683.

The intent required for induced infringement may be shown through circumstantial evidence. *Broadcom Corp. v. Qualcomm, Inc.*, 543 F.3d 683, 699 (Fed. Cir. 2008). In this case, AATI has been on notice of its infringing activities since at least February 17, 2006, when Linear filed its complaint in the underlying violation investigation. Moreover, despite the Commission's and the Federal Circuit's findings of infringement, AATI continued to provide datasheets and demo boards to customers in order to induce others to infringe. D'Angelo Tr. 676-683. AATI has not produced any opinion providing a noninfringement analysis of its new products. A failure to produce such an opinion is a factor indicating the requisite intent. *See*

Broadcom, 543 F.3d at 699 (lack of reasonable reliance on a competent opinion of counsel is one factor that can be used to prove that the alleged infringer had an affirmative intent to induce).

Accordingly, it is found by a preponderance of the evidence that AATI has induced infringement of the asserted claims of the '258 patent.

With respect to contributory infringement (§ 271(c)), it has been shown that AATI's customers use the accused products to infringe the '258 patent and further, that AATI is aware of, and induces, the infringement. In addition, it has been shown that the accused products are not staples of commerce and also that they lack any substantial non-infringing use.

Specifically, according to their datasheets, the accused products are designed to regulate power for portable electronics in applications such as cellular phones, digital cameras, hard disk drives, MP3 players, PDAs, handheld computers, portable media players, and USB devices. CX-1025 at LTCENF004372; Blauschild Tr. 252-253. AATI's customers directly infringe the '258 patent when they build those completed circuits with the accused products in accordance with AATI's instructions. Considering AATI's argument that many or all of the accused products are imported and sold as loose chips, those products constitute a material part of the patented invention though they lack required external components (*e.g.*, a capacitor). Blauschild Tr. 212.

The accused products have no feasible utility absent direct infringement, as per AATI's instructions. Blauschild Tr. 175-177. As explained above in the discussion of direct infringement, the accused products' light load circuitry has no non-infringing use. The addition of a pin (labeled PIN in the datasheet) to provide the option of disabling the circuitry does not avoid infringement because those products still include that infringing circuitry. *Ricoh Co., Ltd. v. Quanta Computer Inc.*, 550 F.3d 1325, 1333 (Fed. Cir. 2008).

Similarly, bundling infringing circuitry with non-infringing elements does not avoid infringement inasmuch as the accused products still include the sleep mode circuitry, which has no non-infringing use. As held by the Federal Circuit, a product containing a tool “suitable only for an infringing use” cannot be argued to have a substantial non-infringing use under section 271(c) simply because that product also contains other, non-infringing tools. *Lucent*, 580 F.3d at 1321; *Ricoh*, 550 F.3d at 1336-40 (infringer cannot escape liability by bundling an infringing device with separate and distinct components that are capable of a non-infringing use).

Accordingly, it is found by a preponderance of the evidence that AATI has engaged in contributory infringement of the asserted claims of the ‘258 patent.

IV. Validity

As discussed in section III.A (claim construction), the construction for the claim term “OFF” proposed by Linear and the Staff has been adopted. AATI argues that in that event, the asserted claims, *i.e.*, claims 2 and 34 of the ‘258 patent, are invalid due to indefiniteness and lack of enablement. While the invalidity section of AATI’s brief is only two paragraphs in length, it references some of its arguments made in connection with the issue of claim construction. AATI Br. at 49-50.

Linear and the Staff argue that AATI should be barred from raising invalidity in this proceeding under principles of *res judicata* and, or, issue preclusion. Linear Br. at 39-41; Staff Br. at 41-44. AATI opposes those arguments. AATI Br. at 49 n.13 (wherein respondent, in part, again improperly attempts to incorporate its prehearing statement and other pleadings).

It is undisputed that “traditional principles of *res judicata* or collateral estoppel” may bar invalidity defenses in an enforcement proceeding, especially in a case such as this in which the

respondent was a party in the underlying violation investigation, and thus had the opportunity to present defenses during that investigation. See *VastFame Camera, Ltd. v. Int'l Trade Comm'n*, 386 F.3d 1108, 1115 n.2 (Fed Cir. 2004). This, however, is not a case in which a respondent seeks to re-litigate a defense that has already been rejected, or that it neglected to raise in the initial (*i.e.*, underlying) investigation. Nor is a case where the respondent (AATI) seeks to challenge the prior claim construction or validity determinations by the Commission or the Federal Circuit.

Rather, the claim term “OFF” was *not* construed in the earlier proceedings because it was not at issue. It is only because complainant has accused a new set of products in this formal enforcement proceeding that the claim term “OFF” must now be construed in order to address AATI’s non-infringement arguments. Respondent, therefore, is entitled to argue that complainant’s proposed construction would render the asserted claims invalid.²²

Invalidity is an argument that respondent never could have made before, and an issue that the Commission did not, and could not, have examined and resolved in the past. No party has cited any law under which a respondent, or the Commission, during a violation investigation, is required to anticipate every way in which a complainant might interpret every claim term in a possible future enforcement proceeding involving new products. Nor has any party cited any law under which the Commission must enforce an exclusion order against new products, under a novel claim construction, even though the asserted claims may be invalid. Thus, AATI is permitted to argue that the asserted claims are invalid due to indefiniteness and lack of

²² Indeed, in doing so, respondent argues only that under the novel claim construction offered by Linear and Staff, the asserted claims would fail to meet the requirements of section 112 of the Patent Act.

enablement, given the construction of the claim term “OFF” proposed by Linear and the Staff (and which has been adopted herein).

With respect to alleged indefiniteness, AATI argues that under the adopted claim construction, claims 2 and 34 of the ‘258 patent would be invalid because “a person of skill in the art would not be able to determine the boundary between ‘insignificant’ and ‘not insignificant’ current.” AATI Br. at 49. AATI further argues in the claim construction portion of its brief that its expert (Dr. Wei) explained that the term “insignificant” is inherently vague. AATI also asserts that, moreover, Linear’s expert (Mr. Blauschild) admitted that there is no set value or ratio of currents that provides a boundary between “insignificant” and “not insignificant” current under Linear’s construction. AATI Br. at 24 (citing Wei Tr. 787, 867-871; Blauschild Tr. 408-410). AATI’s arguments concerning alleged indefiniteness are opposed by Linear and the Staff. Linear Br. at 44-45; Staff Br. at 45-46.

As detailed above in section III.A (claim construction), AATI’s expert did not include the ‘150 patent specification in his opinion concerning the proper construction of the asserted claims, even though the ‘150 patent specification is incorporated, in its entirety, into the specification of the ‘258 patent. This is a critical omission. The term “insignificant,” as well as an example of insignificant current, is contained in the ‘150 patent specification. Further, as explained by Linear’s expert during the hearing in this enforcement proceeding, a determination of whether or not a current is insignificant within the context of the asserted claims is not defined numerically, but by the operation of a circuit and the characteristics of the transistors used in the circuit. In order to verify that the design of a circuit operates as expected, one could run circuit simulations, which are commonly performed by one of ordinary skill in the art. Blauschild Tr. 499-500,

1022-1024, 1042-1043.

Accordingly, AATI has not proven by clear and convincing evidence that any claim of the '258 patent is invalid due to indefiniteness.

With respect to the alleged lack of enablement, AATI argues that under the claim construction adopted herein, claims 2 and 34 of the '258 patent (*i.e.*, the asserted claims) would be invalid because "a person of ordinary skill in the art would not be able to practice the full scope of those claims without undue experimentation." AATI Br. at 49-50. In its claim construction argument, AATI argues that "the '258 patent does not teach a person of ordinary skill in the art how to build a switching voltage regulator in which one transistor remains conducting in the second state of circuit operation, or in which one transistor is maintained at an intermediate gate voltage between V_{IN} and ground." *Id.* at 26. AATI's argument is opposed by Linear and the Staff. Linear Br. at 42-43; Staff Br. at 46-47.

AATI's argument is based on its faulty claim construction, rejected above, that does not allow a transistor to be "OFF" if it still conducts some current, unless it is apparently unintended leakage current. Further, the '258 patent (including the incorporated '150 patent specification) discloses a transistor that is completely OFF, completely ON, and even inhibiting the turn-on of the top until the gate-to-source voltage of the other power transistor has fallen to a voltage level indicative of the other transistor, the bottom transistor, being off. Blauschild Tr. 1024-1029, 1033. Thus, under the claim construction adopted herein, the disclosure of the '258 patent is sufficient for one of ordinary skill to practice the claimed invention.

Accordingly, AATI has not proven by clear and convincing evidence that any claim of the '258 patent is invalid due to a lack of enablement.

V. Recommendations Concerning Enforcement Measures

Linear requests that the Commission provide various remedies for AATI's violation of section 337, only two of which extend beyond the protections already afforded by the outstanding LEO, *viz.*, the issuance of a cease and desist order, and modification of the LEO "in any manner that would assist in the prevention of the unfair practices." Linear Br. at 45-49. AATI opposes the issuance of a cease and desist order. AATI Br. at 50; AATI Reply at 24-25. The Staff opposes modification of the LEO, but supports the issuance of a cease and desist order (albeit partially on different grounds from those argued by Linear). Staff Br. at 47-49.

It is unclear how Linear would have the LEO modified, or how any modification to the order would assist in its enforcement. Simply stated, the Commission's limited exclusion order would encompass the accused products at issue in this enforcement proceeding (*i.e.*, the design-around products) should the Commission find a section 337 violation here. Accordingly, no modification of the LEO is recommended.

The dispute among the parties with respect to the issuance of a cease and desist order concerns the question of whether or not a commercially significant domestic inventory should be required for issuance, and whether such an inventory exists.²³ In this case, a commercially significant inventory does exist.

AATI keeps a large inventory in Hong Kong. Yet, commercial significance within the United States market cannot be ascertained with respect to the size of the inventories maintained

²³ The Commission "generally issues a cease and desist order only when a respondent maintains a commercially significant inventory of infringing products in the United States." *Certain Ground Fault Circuit Interrupters and Products Containing Same*, Inv. No. 337-TA-615, Comm'n Op. at 24 (Mar. 26, 2009).

in Hong Kong because 97 percent of AATI's orders come from Asia. *See Williams Tr. 545, 599.* The inventories of accused products in the United States are smaller, but nonetheless commercially significant. AATI has stipulated that as of the time of the hearing that it maintained a domestic inventory of products accused in this proceeding, consisting of approximately 5,800 sample stock, 75,000 engineering parts (either packaged or on a semiconductor wafer), and 45 engineering semiconductor wafers. *See Jt. Stip. Regarding AATI's Domestic Inventory of the Accused Products at 2.*

Moreover, at least some products subject to the LEO ship first to AATI in the United States for further distribution. For example, in just one shipment originating from AATI in California, which was made in August of 2009, there were approximately 33,000 demo boards, as well as one million finished parts from a family of products that were the subject of the initial violation investigation. *William Tr. 636-638.*

Consequently, it is recommended that the Commission issue a cease and desist order that extends to all products covered by the LEO.

VI. Conclusion

It is the undersigned's enforcement initial determination that due to infringement of claims 2 and 34 of the '258 patent by the accused products, the enforcement respondent AATI violated the LEO, which issued on September 24, 2007, at the conclusion of Investigation No. 337-TA-564. It is the recommendation of the undersigned that enforcement measures, as forth in section V (above), are appropriate due to the violation of the Commission's LEO.

Further, this EID is CERTIFIED to the Commission, 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 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 EID upon all parties of record and the confidential version upon counsel who are signatories to the Protective Order (Order No. 1) issued in this formal enforcement proceeding, and upon the Commission investigative attorney.

To expedite service of the public version, each party is hereby ORDERED to file with the Commission Secretary by no later than March 26, 2010, a copy of this EID with brackets that show any portion considered by the party (or its suppliers of information) to be confidential, accompanied by a list indicating each page on which such a bracket is to be found. At least one copy of such a filing shall be served upon the undersigned, and the brackets shall be marked in red. If a party (and its suppliers of information) considers nothing in the EID to be confidential, and thus makes no request that any portion be redacted from the public version of this EID, then a statement to that effect shall be filed in lieu of a document with brackets.

Pursuant to the Commission Order of October 1, 2008, petitions for review of the EID may be filed within twelve (12) days of service of the EID. Responses to any petitions for review may be filed within eight (8) days of service of any petitions for review.

Notwithstanding 19 C.F.R. § 210.75(b)(3), the EID shall become the Commission's final determination on violation 60 days after service of the EID, unless the Commission orders review

of the EID, or changes the deadline for determining whether to review it.

Carl C. Charneski

Carl C. Charneski
Administrative Law Judge

Issued: March 18, 2010

**CERTAIN VOLTAGE REGULATORS, COMPONENTS THEREOF AND PRODUCTS
CONTAINING SAME**

**INV. NO. 337-TA-564
Enforcement Proceeding**

PUBLIC MAILING LIST

Heather Hall
LEXIS-NEXIS
9443 Springboro Pike
Miamisburg, OH 45342

Kenneth Clair
Thomson West
1100 Thirteen Street, NW, Suite 200
Washington, D.C. 20005

claims of the '258 patent. He found that claims 4, 9, and 26 of the '531 patent and claim 35 of the '258 patent are invalid due to anticipation. He further found that a domestic industry exists that practices the '258 patent, but that there is no domestic industry that practices the '531 patent, because of a failure to meet the technical prong of the domestic industry requirement.

On July 24, 2007, the Commission determined to review the ID in part. 72 Fed. Reg. 41774-75 (July 24, 2007). Specifically, the Commission determined to review claim construction, infringement, and validity of the '258 patent, but determined not to review the ID regarding the '531 patent (except for one issue on which it took no position). On September 24, 2007, after review, the Commission issued its final determination in the investigation with respect to the '258 patent reversing the ALJ on certain issues and finding a violation of section 337. 72 Fed. Reg. 55250-51 (Sept. 28, 2007). Specifically, the Commission found claims 2, 3, and 34 of the '258 patent not invalid and infringed by only one representative product of AATI. The Commission issued a limited exclusion order directed to AATI with regard to voltage regulators covered by claims 2, 3, and 34 of the '258 patent.

On May 21, 2009, the Court of Appeals for the Federal Circuit (“the Court”) ruled on Linear’s appeal, and AATI’s cross-appeal, of the Commission’s September 2007 final determination. *Linear Tech. Corp. v. International Trade Comm’n*, 566 F.3d 1049 (Fed. Cir. 2009). Although the Court substantially affirmed the Commission, certain aspects of the final determination were reversed or vacated. Specifically, the Court reversed the Commission’s construction of the term “monitoring the current to the load,” which appears in claim 35 of the '258 patent. The Court held that “this limitation can be satisfied by monitoring voltage to

indirectly monitor current.” *Id.* at 1060. Based on that revised construction, the Court vacated the Commission’s finding that the accused AAT1143 and AAT1146 devices do not infringe claim 35 of the ’258 patent. Similarly, the Court vacated the Commission’s finding that claim 35 is anticipated by the prior art MAX782 product, and remanded for further proceedings to determine whether “despite the fact that prior invention of the ‘monitoring the current’ limitation can be shown by prior disclosure of monitoring voltage, there is some other absent limitation that precludes” an invention date prior to the MAX782 product. *Id.* at 1068. Separately, the Court reversed the Commission and found that the accused AAT1146 device infringed claims 2, 3 and 34 of the ’258 patent. The Court vacated the Commission’s finding that the accused AAT1151 and AAT1265 devices infringe claim 34 of the ’258 patent, and remanded the issue to the Commission. *Id.* at 1065 & n.9. The Court’s mandate issued on August 26, 2009, returning jurisdiction to the Commission.

While appellate review of the September 2007 final determination was ongoing, an enforcement proceeding in this matter began. Linear filed a complaint on February 20, 2008, an amended complaint on June 18, 2008, and a second amended complaint on August 29, 2008, requesting that the Commission institute a formal enforcement proceeding against AATI under Commission rule 210.75 for violation of the September 2007 limited exclusion order. On October 1, 2008, the Commission instituted a formal enforcement proceeding. ALJ Carl Charneski presides over the proceeding, which is ongoing. In the enforcement proceeding, the ALJ granted the parties’ joint motion for partial termination of the proceeding based on the entry of a consent order specific to certain AATI products. Order No. 18, Initial Determination

Partially Terminating the Proceeding on the Basis of a Consent Order (Sept. 9, 2009). It is unclear from the record whether the consent order affects consideration of issues on remand from the Court.

Upon consideration of this matter, it is hereby ORDERED that:

(1) Within fourteen (14) days of service of this Order, the parties shall submit a joint comment regarding whether, for what issues, and for which accused products, it is warranted that further proceedings be conducted consistent with the May 21, 2009, judgment of the U.S. Court of Appeals for the Federal Circuit (“the Court”) in *Linear Technology Corp. v. International Trade Commission*, Nos. 2008-1117 & -1165, in light of Order No. 18, Initial Determination Partially Terminating the Proceeding on the Basis of a Consent Order (Sept. 9, 2009). To the extent that matters on remand from the Court remain to be decided even after Order No. 18, the parties shall further explain in their joint comment whether it is appropriate for the Commission to decide such matters itself without remand to the Chief ALJ for assignment, whether the matters should be remanded to the Chief ALJ to be consolidated with the enforcement proceeding pursuant to Commission rule 201.7(a), or whether the matters should be remanded to the Chief ALJ for assignment, but not consolidated with the enforcement proceeding.

(2) The Secretary to the Commission shall serve a copy of this Order upon each party to the investigation.

By order of the Commission.

A handwritten signature in black ink, appearing to read "Marilyn R. Abbott". The signature is fluid and cursive, with a large initial "M" and "A".

Marilyn R. Abbott
Secretary to the Commission

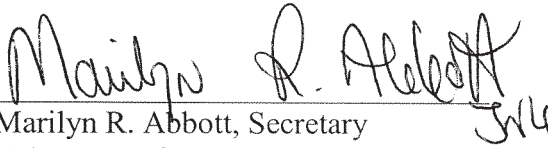
Issued: November 5, 2009

**CERTAIN VOLTAGE REGULATORS, COMPONENTS
THEREOF AND PRODUCTS CONTAINING SAME**

**337-TA-564
(Enforcement
Proceeding)**

CERTIFICATE OF SERVICE

I, Marilyn R. Abbott, hereby certify that the attached **ORDER** has been served by hand upon the Commission Investigative Attorney, Daniel L. Girdwood, Esq., and the following parties as indicated, on
November 6, 2009


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

**On Behalf of Complainant Linear Technology
Corporation:**

Mark G. Davis, Esq.
WEIL GOTSHAL & MANGES LLP
1300 I Street, NW
Washington, DC 20005

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

**On Behalf of Respondent Advanced Analogic
Technologies, Inc.:**

Stephen J. Rosenman, Esq.
DECHERT LLP
1775 I Street, NW
Washington, DC 20006

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

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

**In the Matter of
CERTAIN VOLTAGE REGULATORS,
COMPONENTS THEREOF AND
PRODUCTS CONTAINING SAME**

**Inv. No. 337-TA-564
Enforcement Proceeding**

NOTICE OF INSTITUTION OF FORMAL ENFORCEMENT PROCEEDING

AGENCY: U.S. International Trade Commission.

ACTION: Notice.

SUMMARY: Notice is hereby given that the U.S. International Trade Commission has instituted a formal enforcement proceeding relating to the limited exclusion order issued at the conclusion of the above-captioned investigation.

FOR FURTHER INFORMATION CONTACT: Paul M. Bartkowski, Office of the General Counsel, U.S. International Trade Commission, 500 E Street, SW., Washington, D.C. 20436, telephone (202) 708-5432. Copies of all nonconfidential documents filed in connection with this investigation are or will be available for inspection during official business hours (8:45 a.m. to 5:15 p.m.) in the Office of the Secretary, U.S. International Trade Commission, 500 E Street SW., Washington, D.C. 20436, telephone 202-205-2000. General information concerning the Commission may also be obtained by accessing its Internet server (<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 the matter can be obtained by contacting the Commission's TDD terminal on 202-205-1810.

SUPPLEMENTARY INFORMATION: The Commission instituted this investigation on March 22, 2006 based on a complaint filed by Linear Technology Corporation ("Linear") of Milpitas, California. 71 *Fed. Reg.* 14545 (March 22, 2006). The complaint, as supplemented, alleged violations of section 337 of the Tariff Act of 1930 ("section 337") in the importation into the United States, the sale for importation, and the sale within the United States after importation of certain voltage regulators, components thereof and products containing the same by reason of infringement of claims 1-14 and 23-25 of U.S. Patent No. 6,411,531 ("the '531 patent") and claims 1-19, 31, 34, and 35 of U.S. Patent No. 6,580,258 ("the '258 patent"). The complaint further alleged that an industry in the United States exists as required by subsection (a)(2) of section 337. The complaint named Advanced Analogic Technologies, Inc. ("AATI") of Sunnyvale, California as the sole respondent. Several claims were terminated during the investigation, and only claims 4, 9, and 26 of the '531 patent and claims 2, 3, 34, and 35 of the '258 patent were adjudicated.

On May 22, 2007, the presiding administrative law judge (“ALJ”) issued a final initial determination (“ID”), finding no violation of section 337. Specifically, the ALJ found that none of AATI’s accused products directly infringed the asserted claims of the ‘258 patent, but that one accused product directly infringed claims 4 and 26 of the ‘531 patent. The ALJ found no indirect infringement of the asserted claims of either patent. As to validity, the ALJ determined that claim 35 of the ‘258 patent and claims 4, 9, and 26 of the ‘531 patent were invalid due to anticipation, rejecting other arguments of invalidity, unenforceability, and estoppel. The ALJ also determined that a domestic industry existed with regard to the ‘258 patent, but not with regard to the ‘531 patent, because of a failure to meet the technical prong of the domestic industry requirement.

On July 24, 2007, the Commission determined to review certain issues regarding the ‘258 patent, but determined not to review the ALJ’s ID regarding the ‘531 patent (except for one issue on which it took no position), resulting in a final determination of no violation with respect to the ‘531 patent. On September 24, 2007, after review, the Commission issued its final determination in the investigation with respect to the ‘258 patent, reversing the ALJ on certain issues and finding a violation of section 337. Specifically, the Commission found claims 2, 3, and 34 of the ‘258 patent valid and infringed by one representative product of AATI. The Commission issued a limited exclusion order directed to AATI with regard to voltage regulators covered by claims 2, 3, and 34 of the ‘258 patent. The Commission also determined that the public interest factors enumerated in 19 U.S.C. § 1337(d) did not preclude issuance of the limited exclusion order, and that the bond during the Presidential review period would be 100 percent of the entered value of each voltage regulator that is subject to the order.

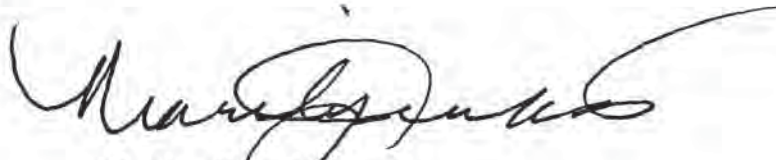
Linear filed a complaint on February 20, 2008, an amended complaint on June 18, 2008, and a second amended complaint on August 29, 2008, requesting that the Commission institute a formal enforcement proceeding against AATI under Commission rule 210.75 for violation of the limited exclusion order.

Having examined the amended enforcement complaint, and having found it complies with the requirements for institution of a formal enforcement proceeding contained in Commission rule 210.75, the Commission has determined to institute a formal enforcement proceeding to determine whether AATI is in violation of the Commission’s limited exclusion order issued in the investigation, and what, if any, enforcement measures are appropriate.

The following entities are named as parties to the formal enforcement proceeding: (1) complainant Linear, (2) respondent AATI, and (3) a Commission investigative attorney to be designated by the Director, Office of Unfair Import Investigations.

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 210.75 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.75).

By order of the Commission.

A handwritten signature in black ink, appearing to read 'Marilyn R. Abbott', with a large, sweeping flourish extending to the right.

Marilyn R. Abbott
Secretary to the Commission

Issued: October 1, 2008

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

**In the Matter of
CERTAIN VOLTAGE REGULATORS,
COMPONENTS THEREOF AND
PRODUCTS CONTAINING SAME**

**Inv. No. 337-TA-564
Enforcement Proceeding**

COMMISSION ORDER

On September 24, 2007, the Commission issued a limited exclusion order in the above-captioned investigation. The limited exclusion order prohibits the unlicensed entry into the United States of voltage regulators that are covered by one or more of claims 2, 3, and 34 of U.S. Patent No. 6,580,258 that are manufactured abroad by or on behalf of, or imported by or on behalf of respondent Advanced Analogic Technologies, Inc. ("AATI") or any of its affiliated companies, parents, subsidiaries, or other related business entities, or their successors or assigns.

Linear Technology Corporation ("Linear"), the complainant in the original investigation, filed a complaint on February 20, 2008, an amended complaint on June 18, 2008, and a second amend complaint on August 29, 2008, requesting that the Commission institute a formal enforcement proceeding against AATI under Commission rule 210.75 for alleged violation of the limited exclusion order.

The Commission, having examined Linear's amended complaint seeking a formal enforcement proceeding, has determined that the complaint complies with the requirements for institution of a formal enforcement proceeding.

Accordingly, the Commission hereby **ORDERS THAT --**

1. Pursuant to Commission rule 210.75(b), 19 C.F.R. § 210.75(b), a formal enforcement proceeding is instituted to determine whether the enforcement respondent identified in paragraph 2 below is in violation of the Commission's limited exclusion order issued in the above-captioned investigation, and what, if any, enforcement measures are appropriate.
2. For purposes of the enforcement proceeding so instituted, the following are parties to the proceeding:

Complainant(s):

Linear Technology Corporation
1630 McCarthy Boulevard
Milpitas, CA 95035

Respondent(s):

Advanced Analogic Technologies, Inc.
3230 Scott Boulevard
Santa Clara, CA 95054

A Commission investigative attorney to be designated
by the Director, Office of Unfair Import Investigations.

3. The enforcement proceeding is hereby certified to Chief Administrative Law Judge Paul J. Luckern for designation of a presiding administrative law judge and for the appropriate proceedings and the issuance of an enforcement initial determination ("EID"). In accordance with Commission rule 210.51(a), the presiding administrative law judge is directed to set the earliest practicable target date for completion of the enforcement proceeding within 45 days of institution thereof. Such target date is to exceed the date of issuance of the ALJ's EID by four months.
4. The presiding administrative law judge, in his discretion, may conduct any proceedings he deems necessary, including issuing a protective order, holding hearings, taking evidence, ordering discovery, and seeking documents from other agencies consistent with Commission rules to issue his EID. The EID will rule on the question of whether the enforcement respondent violated the limited exclusion order issued at the conclusion of the above-captioned investigation on September 24, 2007. All defenses not barred by claim preclusion may be raised in this proceeding.

5. The presiding administrative law judge shall also recommend to the Commission what enforcement measures are appropriate if the respondent is found to have violated the limited exclusion order. The presiding administrative law judge, in his discretion, may conduct any proceedings he deems necessary, including taking evidence and ordering discovery, to issue his recommendations on appropriate enforcement measures.
6. Petitions for review of the EID may be filed within twelve (12) days of service of the EID. Responses to any petitions for review may be filed within eight (8) days of service of any petitions for review.
7. Notwithstanding Commission rule 210.75(b)(3), the EID shall become the Commission's final determination on violation 60 days after service of the EID, unless the Commission orders review of the EID or changes the deadline for determining whether to review it.
8. The Secretary shall:
 - (a) Docket Linear's complaint for a formal enforcement proceeding;
 - (b) serve a copy of Linear's enforcement complaint on respondent AATI, and advise enforcement respondent AATI of the provisions of Commission rule 210.75 concerning responses to a complaint seeking a formal enforcement proceeding;
 - (c) serve a copy of this order upon each party to the formal enforcement proceeding;
 - (d) publish notice of this order in the *Federal Register*.

By order of the Commission.



Marilyn R. Abbott
Secretary to the Commission

Issued: October 1, 2008

Secretary



UNITED STATES INTERNATIONAL TRADE COMMISSION

WASHINGTON, DC 20436

October 1, 2008

Advanced Analogic Technologies, Inc.
3230 Scott Boulevard
Santa Clara, CA 95054

Re: Enforcement Complaint under Section 337 of the Tariff
Act of 1930 in *Certain Voltage Regulators, Components
Thereof and Products Containing Same*, Inv. No. 337-
TA-564

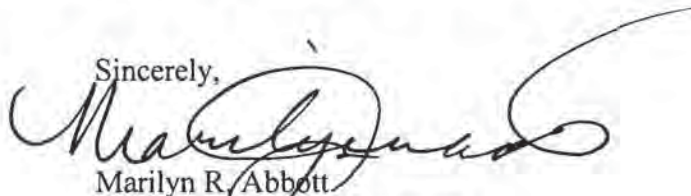
Dear Sir/Madam:

The Commission has instituted a formal enforcement proceeding based upon an enforcement complaint in which you were named as a respondent. The following entities are named as parties to the formal enforcement proceeding: (1) enforcement complainant Linear Technology Corporation, (2) enforcement respondent Advanced Analogic Technologies, Inc., and (3) a Commission investigative attorney to be designated by the Director, Office of Unfair Import Investigations. Enclosed is a copy of the Commission's order and the relevant complaint. The enforcement proceeding concerns alleged violations of the Commission's limited exclusion order issued at the conclusion of the above-referenced investigation conducted under the authority of section 337 of the Tariff Act of 1930 (19 U.S.C. § 1337).

You are advised that, pursuant to Commission rule 210.75, 19 C.F.R. § 210.75, you have fifteen (15) days after the date of receipt of this letter to file a response to the complaint. Any such response should fully advise the Commission as to the nature of any defense and shall admit or deny each allegation of the complaint specifically and in detail unless you are without knowledge, in which case your answer should so state and the statement shall operate as denial. Allegations of fact not denied or controverted shall be deemed admitted. Matters alleged as affirmative defenses shall be separately stated and numbered.

Failure to file and serve on all parties to the formal enforcement proceedings a response to the complaint within the time specified and in the manner prescribed herein shall authorize the Commission, in its discretion, to find the facts alleged in the complaint to be true and to take such action as may be appropriate without notice or hearing, or, in its discretion, to proceed without notice to take evidence on the allegations or charges set forth in the complaint. The presiding administrative law judge may permit late filing of a response for good cause shown.

Sincerely,

A handwritten signature in cursive script, appearing to read "Marilyn R. Abbott", written in black ink.

Marilyn R. Abbott

Secretary to the Commission

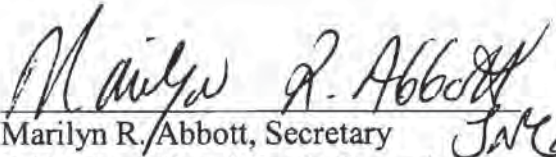
cc: Linear Technology Corporation

**CERTAIN VOLTAGE REGULATORS, COMPONENTS
THEREOF AND PRODUCTS CONTAINING SAME**

**337-TA-564
Enforcement
Proceeding**

CERTIFICATE OF SERVICE

I, Marilyn R. Abbott, hereby certify that the attached **NOTICE OF INSTITUTION OF FORMAL ENFORCEMENT PROCEEDING** has been served by hand upon the Commission Investigative Attorney, Spence T. Chubb, Esq., and the following parties as indicated, on October 1, 2008.


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

**ON BEHALF OF COMPLAINANT LINEAR
TECHNOLOGY CORPORATION:**

Linear Technology Corporation
1630 McCarthy Boulevard
Milpitas, CA 95035

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

RESPONDENT:

Advanced Analogic Technologies, Inc.
3230 Scott Boulevard
Santa Clara, CA 95054

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

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

In the Matter of

**CERTAIN VOLTAGE REGULATORS,
COMPONENTS THEREOF AND
PRODUCTS CONTAINING SAME**

Inv. No. 337-TA-564

COMMISSION OPINION

On September 24, 2007, the Commission issued notice that it had determined (1) that there was a violation of section 337 of the Tariff Act of 1930, 19 U.S.C. § 1337, in the above-captioned investigation as to asserted claims 2, 3, and 34 of United States Patent No. 6,580,258, (2) that a limited exclusion order is the appropriate remedy for such violation, (3) that the remedy shall not extend to downstream products that contain the infringing articles, (4) that consideration of the public interest factors set out in 19 U.S.C. § 1337(d) does not preclude issuance of that remedy, and (5) that the amount of bond to permit entry during the Presidential review period should be set at 100 percent of the entered value of the involved articles. This opinion sets forth the reasons for the Commission's determinations.

I. BACKGROUND

The Commission instituted this section 337 investigation on March 22, 2006, based on a complaint filed by Linear Technology Corporation of Milpitas, California ("Linear"). 71 *Fed. Reg.* 14545 (March 22, 2006). The complaint alleged violations of section 337 of the Tariff Act of 1930, 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 voltage regulators, components

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thereof and products containing the same by reason of infringement of claims 1-14 and 23-35 of United States Patent No. 6,411,531 (“the ‘531 patent”), and claims 1-19, 31, 34, and 35 of United States Patent No. 6,580,258 (“the ‘258 patent”). The complaint further alleged that an industry in the United States exists as required by subsection (a)(2) of section 337. The complaint and notice of investigation named Advanced Analogic Technologies, Inc. of Sunnyvale, California (“AATT”) as the sole respondent. The investigation was assigned to administrative law judge (“ALJ”) Sidney Harris, who conducted an evidentiary hearing from December 4 to December 15, 2006. Only claims 2, 3, 34, and 35 of the ‘258 patent and claims 4, 9, and 26 of the ‘531 patent remained at issue in the investigation when the ALJ issued his final initial determination.

On May 22, 2007, the ALJ issued his final initial determination (“ID”) finding no violation of section 337. Specifically, the ALJ determined that none of respondent AATT’s accused products directly infringe the asserted claims of the ‘258 patent, either literally or under the doctrine of equivalents, and that only its AAT3119 product directly infringes claims 4 and 26 of the ‘531 patent. He found that no indirect infringement had occurred in connection with any of the asserted claims of either patent. As to validity, the ALJ determined that claim 35 of the ‘258 patent and claims 4, 9, and 26 of the ‘531 patent are invalid due to anticipation, rejecting other arguments of invalidity. He also rejected arguments of unenforceability for inequitable conduct and estoppel. The ALJ determined that a domestic industry exists that practices the ‘258 patent, but that there was no domestic industry that practices the ‘531 patent, because of a failure to meet the technical prong of the domestic industry requirement.

On May 30, 2007, the ALJ issued his recommended determination on remedy and

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bonding. The ALJ recommended that if a violation of section 337 is found with respect to one or both patents, a limited exclusion order should be issued which includes all accused devices and any downstream products manufactured by AATI, as well as cell phones manufactured by third parties that contain the accused devices. The ALJ also recommended that the amount of bond to permit temporary importation during the Presidential review period be set at 100% of the customs entered value of the infringing devices.

On June 4, 2007, all parties filed petitions for review of the final ID. On June 11, 2007, all parties filed responses to the petitions for review.

On July 24, 2007, the Commission determined to review the ID in part. *72 Fed. Reg.* 41774-75 (July 24, 2007). Specifically, the Commission determined to review claim construction, infringement, and validity of the '258 patent, but not to review the remainder of the ID as to the '258 patent. With respect to the '531 patent, the Commission determined to review the ID concerning the issue of whether asserted claim 9 of the '531 patent is invalid for anticipation by the Kase reference, and upon review, to take no position as to that issue. The Commission determined not to review the remainder of the ID as to the '531 patent.

The Commission requested the parties to submit briefing on the issues on review. In connection with that review, the Commission stated that it was particularly interested in responses to the following questions:

1. With respect to claim 35 of the '258 patent, whether monitoring a voltage threshold in the accused products can be considered an equivalent to "monitoring the current" using a "current threshold" in assessing the infringement of claim 35 under the doctrine of equivalents? (parties should discuss the "function, way, result" test in their analysis.)

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2. With respect to the '258 patent, provide an analysis of indirect infringement under §§ 271(b) and (c), including an analysis of any evidence upon which you rely.

Further, the Commission requested written submissions relating to the appropriate remedy, the public interest, and the amount of bond to permit importation during the Presidential review period.

On August 7 and August 14, 2007, Linear, AATI, and the Commission investigative attorney ("IA") filed briefs and reply briefs, respectively, on the issues on review and on remedy, public interest, and bonding. On August 7 and August 14, 2007, third parties LG Electronics Inc., LG Electronics U.S.A., Inc., and LG Electronics MobileComm U.S.A., Inc. (collectively, "LG"), filed a brief and reply brief, respectively, on the appropriate scope of any remedy.

II. TECHNOLOGY AT ISSUE

The imported products and asserted patents involved in the investigation concern electronic devices called voltage regulators. The purpose of a voltage regulator or a voltage regulator circuit is to provide a predetermined output voltage to a load, such as a notebook computer or cell phone, from an unregulated (*i.e.*, fluctuating) voltage source. For instance, a voltage source (*e.g.*, a battery) may supply power at raw input voltage levels that may be unusable by a device or load because the raw input voltage fluctuates to levels that are either too high or too low. Further, changes in the power demanded by the load can cause voltage fluctuations in the voltage source as it tries to compensate for such changing power demands (*e.g.*, a notebook computer demands more power when its hard drive is activated). Absent a voltage regulator circuit, the voltage fluctuations in the voltage source can result in situations similar to a momentary dimming of lights in the home when an appliance (such as an air

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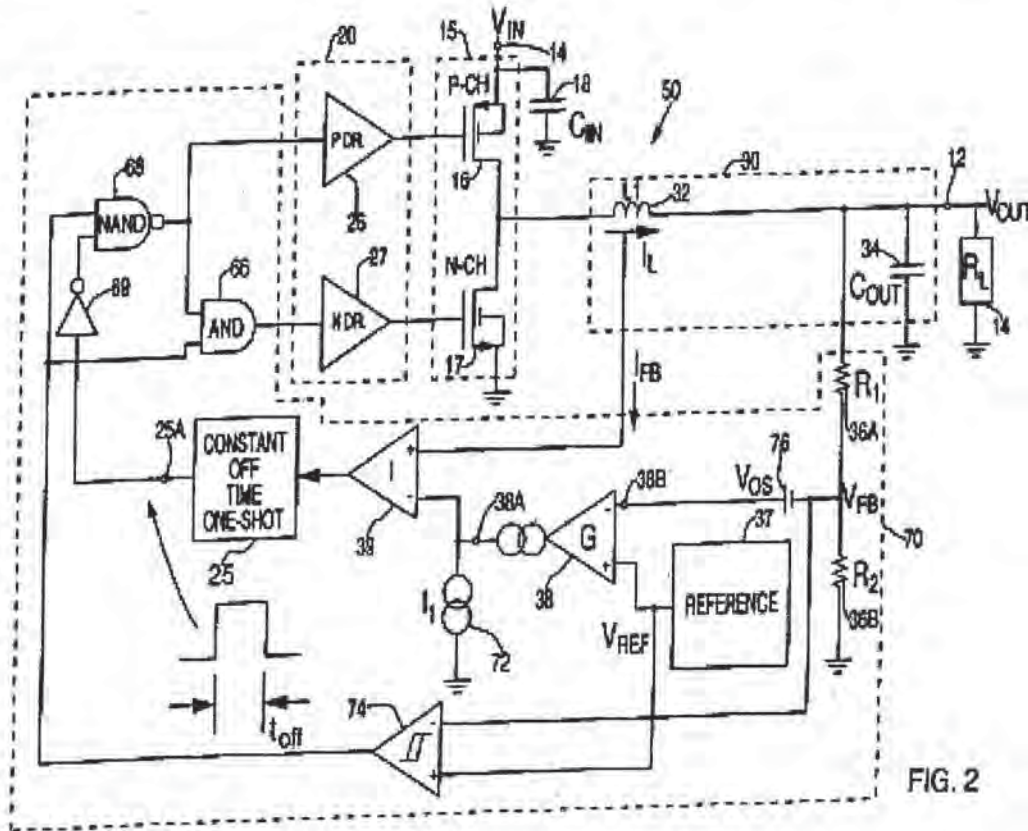
The '258 Patent

The '258 patent, entitled "Control Circuit And Method For Maintaining High Efficiency Over Broad Current Ranges In A Switching Regulator Circuit," issued on June 17, 2003, naming Milton E. Wilcox and Randy G. Flatness as inventors and Linear as assignee. JX-3 ('258 patent). The '258 patent relates to a type of voltage regulator called a switching regulator, which provides improvements in efficiency and reduced power dissipation in a voltage regulator circuit. In a switching voltage regulator, voltage at the output node is regulated by controlling transmission of power by using a power switch having a duty cycle (*i.e.*, ratio of ON/OFF time). Two major types of switching regulators are "asynchronous" switching voltage regulators (which use a transistor and a diode as the power switch) and "synchronous" switching voltage regulators (which use two transistors as the power switch). Synchronous switching voltage regulators provide an advantage over asynchronous switching voltage regulators in that they use the power that drives the voltage regulator circuit more efficiently. The '258 patent is directed toward a synchronous switching voltage regulator which regulates voltage by controlling the duty cycle of two transistors (*e.g.*, transistors 16 and 17 in Fig. 2 of the '258 patent) which make up the power switch (15 in Fig. 2 of the '258 patent). Figure 2 of the '258 patent is illustrative of the claimed

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invention, and is reproduced below.

There are two groups of asserted claims in the '258 patent, the "sleep mode" claims



(claims 2, 3, and 34), and the "reverse current" claim (claim 35). The sleep mode claims of the '258 patent cover a circuit and method for controlling a switching voltage regulator which operates to control the two transistors (e.g., 16 and 17) in the voltage regulator circuit (Fig. 2 of the '258 patent, above) to be OFF at the same time so as to conserve power used by the voltage regulator. The reverse current claim of the '258 patent covers a circuit for controlling a switching voltage regulator which operates to turn one of the pair of transistors OFF on the

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condition that a monitored current falls below a certain threshold, so that current does not flow in reverse through the voltage regulator circuit to ground and drain power from the load.

III. DETERMINATION ON VIOLATION

For the reasons set forth below, we determine to reverse-in-part the subject ID finding no violation of section 337 by AATI's accused products with respect to the '258 patent. In that connection, we modify (broaden) the construction of the relevant claims of the '258 patent, reverse the ALJ's finding of no infringement as to the sleep mode claims (claims 2, 3, and 34), affirm the ALJ's finding of no infringement as to the reverse current claim (claim 35), and affirm the ALJ's findings of validity of claims 2, 3, and 34 and invalidity of claim 35.

Specifically, we modify (broaden) the ALJ's claim construction of three terms of the '258 patent: (i) "a switch coupled to receive an input voltage and including a pair of synchronously switched switching transistors" (all asserted claims), (ii) "substantially at the regulated voltage" (claims 2, 3, and 34), and (iii) "first state of circuit operation" and "second state of circuit operation" (all asserted claims).

We also modify the ALJ's application of three additional terms of asserted claims 2 and 3 of the '258 patent: (i) "a second circuit for generating a first control signal during a first state of circuit operation" and "a third circuit for generating a second control signal during a second state of circuit operation," (ii) "first control signal ... second control signal," and (iii) "a second control signal during a second state of circuit operation to cause both switching transistors to be OFF." Applying our claim construction, we determine to reverse-in-part the ALJ's finding of no direct infringement of the '258 patent, determine that AATI's accused product AAT1143 directly

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infringes claims 2, 3, and 34, and fails to infringe claim 35 either literally or under the doctrine of equivalents. We affirm the ALJ's finding of no infringement by the other three accused representative products (AAT1146, AAT1151, and AAT1265) based on the discussion in this opinion. We do not reach the ALJ's finding of no indirect infringement of any of the asserted claims of the '258 patent.

With respect to validity, we affirm the ALJ's rulings that claims 2, 3, and 34 are valid and that claim 35 is invalid due to anticipation.

As discussed *infra*, we determine to issue a limited exclusion order with respect to claims 2, 3, and 34 of the '258 patent, that the remedy shall not extend to downstream products incorporating the infringing articles, that the public interest factors set out in section 337(d) do not preclude issuance of that remedy, and that the amount of bond to permit importation during the Presidential review period should be set at 100 percent of the entered value of the involved articles.

IV. ISSUES

A. Claim Construction

1. Applicable Law

Claim construction "begin[s] with and remain[s] centered on the language of the claims themselves." *Storage Tech. Corp. v. Cisco Sys., Inc.*, 329 F.3d 823, 830 (Fed. Cir. 2003); *see also Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (*en banc*), *cert. denied*, 126 S.Ct. 1332, 164 L.Ed.2d 49 (2006). The language is read in the context of the entire patent, including the specification. *Phillips*, 415 F.3d at 1313-14. The court may consult the intrinsic

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evidence, including the claims themselves, the specification, and the prosecution history, and, under some circumstances, may also consult extrinsic evidence, such as dictionaries, treatises, and expert testimony. *Phillips*, 415 F.3d at 1318. It is the claims of the patent which measure the right to exclude. *See, e.g., Johnson & Johnston Assocs. Inc. v. R.E. Service Co., Inc.*, 285 F.3d 1046, 1052 (Fed. Cir. 2002) (*en banc*).

Claim construction 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). For the reasons that follow, we have determined to modify the construction of the asserted claims of the '258 patent.

2. Sleep Mode Claims (claims 2, 3, and 34)

The asserted sleep mode claims of the '258 patent are dependent apparatus claims 2 and 3, which depend from independent claim 1, and independent method claim 34. For convenience, non-asserted claim 1 and asserted claims 2, 3, and 34 are reproduced below with claim limitations construed by the ALJ in the ID in his claim construction section (ID 3-25) in bold, and with additional claim limitations applied by the ALJ in his infringement analysis (ID 48-55, 56-58) underlined.

1. A circuit for controlling a switching voltage regulator, the regulator having (1) a **switch coupled to receive an input voltage and including a pair of synchronously switched switching transistors** and (2) an output for supplying current at a regulated voltage to a load which includes an output capacitor, the circuit comprising:

a first circuit for monitoring the output to generate a first feedback signal;

a second circuit for generating a first control signal during a first state of circuit operation, the first control signal being responsive to the first feedback signal to vary the duty cycle of the switching

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transistors to maintain the output at the regulated voltage; and

a third circuit for generating a second control signal during a **second state of circuit operation** to cause both switching transistors to be **OFF** for a first period of time during which the output capacitor maintains the output **substantially at the regulated voltage**.

2. The circuit of claim 1 wherein the second control signal is generated in response to the first feedback signal.

3. The circuit of claim 2 wherein the circuit changes from the second to the **first state of operation** in response to the magnitude of the first feedback signal falling below a first threshold level.

34. A method for controlling a switching voltage regulator, the regulator having (1) a switch coupled to receive an input voltage and including a pair of synchronously switched switching transistors and (2) an output for supplying current at a regulated voltage to a load which includes an output capacitor, the method comprising the steps of:

(a) monitoring the output to generate a first feedback signal;

(b) varying the duty cycle of the switching transistors in response to the first feedback signal to maintain the output at the regulated voltage during a **first state of circuit operations**;

(c) turning both switching transistors OFF for a first period of time following the **first state of circuit operation** so as to allow the output capacitor to maintain the output **substantially at the regulated voltage** by discharging during a **second state of circuit operation**; and

(d) turning at least one of said switching transistors ON to recharge the output capacitor following the **second state of circuit operation**.

3. Reverse Current Claim (claim 35)

The asserted reverse current claim of the '258 patent is independent apparatus claim 35, reproduced below with claim limitations construed by the ALJ in the ID in his claim construction

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section (ID 3-25) in bold, and with additional claim limitations applied by the ALJ in his infringement analysis (ID 48-55, 56-58) underlined.

35. A circuit for controlling a switching voltage regulator, the regulator having (1) **a switch coupled to receive an input voltage and including a pair of synchronously switched switching transistors** and (2) an output for supplying current at a regulated voltage to a load which includes an output inductor, the circuit comprising:

a first circuit for monitoring the output to generate a first feedback signal;

a second circuit for generating a first control signal during a first state of circuit operation, the first control signal being responsive to the first feedback signal to vary the duty cycle of the switching transistors to maintain the output at the regulated voltage; and

a third circuit for monitoring the current to the load to generate a second control signal during a second state of circuit operation to cause one of said switching transistors to be maintained OFF when the magnitude of the monitored current falls below a **current threshold**.

4. Claim Terms at Issue

a. **“a switch coupled to receive an input voltage and including a pair of synchronously switched switching transistors”**

The ALJ’s ID

The ALJ construed the claim term “a switch coupled to receive an input voltage and including a pair of synchronously switched switching transistors,” which occurs in all of the asserted claims of the ‘258 patent, to require that “the switching transistors of the claimed invention are configured in a single switch” (ID 19), that the switching transistors are connected so as to be “controlled as a single unit” (ID 17), and that “[t]hey can, as AATI argues, be thought of as operating as a single unit.” (ID 19) (citing expert testimony of AATI’s expert, Dr. Wei).

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The ALJ thus interpreted the pair of switching transistors (*i.e.*, 16 and 17 in Fig. 2 of the '258 patent) to be a "single unit" controlled at a single node which required a single control circuit to control the transistors. ID 17-19, 47. As discussed *infra*, based on this construction of the claims, the ALJ found that the accused AATI products did not infringe the claims of the '258 patent since the accused products require two separate control circuits to control two switching transistors. ID 47-48.

Linear's Position

Linear argues that the ALJ's requirement that the two transistors be controlled by a single node, and thus the same unitary control circuitry, improperly limits the claims to a perceived preferred embodiment. Linear Review Brief 23-24. Linear further argues that not only did the ALJ misapply the law governing claim construction, he also misread the patent, pointing out that Fig. 2, relied on by the ALJ in reaching his claim construction determination, does not disclose two transistors controlled by a single node. Linear Review Brief 24-25. Linear argues that "[n]othing in the claim language, in the patent specification, or in the prosecution history of the '258 [p]atent restricts its claims to two switching transistors controlled from a single node" and notes that "neither the words 'control' nor 'node' appear anywhere in the patent." Linear Review Brief 24. Finally, Linear asserts that a proper reading of Fig. 2 shows that two driving signals emanate from circuit elements 25 and 74, respectively, and are then fed to separate circuit elements (drivers 26 and 27), and that "[a]s such, the driving signals do not originate from a "single node" to control the switching behavior of both transistors." Linear Review Brief 25.

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AATI's Position

AATI argues that the ALJ's claim construction is correct, *i.e.*, that the asserted claims require that the two transistors be controlled as part of a single unitary switch, and that "the two transistors must operate as a single unit" and "[t]he switching of those two transistors is controlled by a single node." AATI Review Reply Brief 28. However, AATI also argues that "Judge Harris's [the ALJ's] claim construction does not require that the two transistors be controlled by a single node." AATI Review Reply Brief 30. AATI further argues that the claim language and the specification support their interpretation (AATI Review Reply Brief 28), and that "nothing in the specification suggests a broader meaning for this claim language" (AATI Review Reply Brief 29). AATI also takes the position that Linear's and the IA's claim construction improperly define the term functionally, instead of structurally. AATI Review Reply Brief 27-31.

The IA's Position

The IA argues that the ALJ erred insofar as he sought to confine the asserted claims to the specific type of switch structure shown in Figure 2 of the patent. IA Review Brief 15. The IA argues that although "[t]he specification of the '258 patent explicitly states that 'the term "synchronously-switched switch" refers to a switch including two switching transistors that are driven out of phase to supply current at a regulated voltage to a load"' (column 7, lines 48-51 of the '258 patent), the ID "adds the requirements that the two transistors must be configured in a single switch and operate within a single unit." IA Review Brief 13-14. The IA also argues that separate control circuitry should not disqualify switching transistors from satisfying the claim

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term of “a switch ... including a pair of synchronously switched switching transistors.” IA Review Brief 14. Finally, the IA argues that AATI and the ID incorrectly require the two transistors to use the same control circuitry, and that “separate control circuitry” should not disqualify the transistors from functioning as a single unitary switch. IA Review Reply Brief 2-4.

Determination

We determine to modify the ALJ’s claim construction. We agree with the IA’s arguments that “synchronously switched switch” is broadly defined by the text of the ‘258 patent as “a switch including two switching transistors that are driven out of phase to supply current at a regulated voltage to a load.” IA Review Brief 13; *see also* column 7, lines 48-51 of the ‘258 patent. We also agree that “[t]he ID errs insofar as it seeks to confine the asserted claims to the specific type of switch control structure shown in Figure 2.” IA Review Brief 15. We also agree with Linear that “[n]othing in the claim language, in the patent specification, or in the prosecution history of the ‘258 Patent restricts its claims to two switching transistors controlled from a single node.” Linear Review Brief 24.

Even assuming, for the sake of argument, that only Fig. 2 is instructive in interpreting the claims, we agree with Linear’s argument that contrary to the ALJ’s reasoning, “Figure 2 does not disclose ‘two transistors controlled by a single node.’” Linear Review Brief 24. We also agree with Linear that “[n]otably, neither the words ‘control’ or ‘node’ appear anywhere in the [‘258] patent.” Linear Review Brief 24.

Specifically, we note that the first embodiment, Figure 2, of the ‘258 patent is exemplary. Figure 2 shows a switch (15) including a pair of synchronously switched transistors (16 and 17)

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controlled by two nodes. The first node is the one pointed out by the ALJ at page 18 of the ID which is at the junction of the top input to NAND gate 68 and the bottom input to AND gate 66, and the second node is the one at the output of NAND gate 68 and connected to the top input of AND gate 66. The transistors (16 and 17) are synchronously controlled by control circuit 70 which in turn is composed of at least two separate circuits, a voltage feedback circuit and a current feedback circuit, which control these two nodes, respectively. Although Figure 2 clearly delineates the boundaries and therefore the components of control circuit 70 (see the dashed line), it does not clearly delineate the boundaries and components of the current feedback circuit and voltage feedback circuit. The first node is controlled by the voltage feedback circuit which comprises at least reference source 37 and hysteretic comparator 74. The second node is controlled by the current feedback circuit which comprises at least current source 72, current comparator 39, and one-shot circuit 25.

We also agree with Linear's alternative analysis that Fig. 2 shows that two driving signals emanate from circuit elements 25 and 74, respectively, and are fed then to separate circuit elements (drivers 26 and 27), and that "[a]s such, the driving signals do not originate from a 'single node' to control the switching behavior of both transistors." Linear Review Brief 24-25.

Thus, in our view, the ALJ appears to have erred in limiting the asserted claims of the '258 patent to a synchronously switched switch having a single control circuit controlling the transistors from a single node as a single unit. The ALJ's claim construction of this term in the ID seems to be contrary to the plain meaning of the words of the asserted claims, and more limiting than the definition provided in the specification of the '258 patent (column 7, lines 48-

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51) requires.¹

Accordingly, because there are at least two distinct nodes which correspond to at least two distinct control circuits, we do not agree with the ALJ that the specification limits the claims to only one node and only one control circuit. In our view, a proper construction of the claim term should not preclude the existence of more than one control circuit or more than one control node.

We determine to modify the construction to mean that “synchronously switched switch” is “a switch including two switching transistors that are driven out of phase to supply current at a regulated voltage to a load.” IA Review Brief 13; *see also* column 7, lines 48-51 of the ‘258 patent. Under this construction, during normal operation of the two transistors, one must be ON while the other is OFF (except for deadtime), without precluding both being OFF at the same time (*i.e.*, sleep mode), and that more than one separate control circuit and/or more than one control node are not precluded.

b. “substantially at the regulated voltage”

The ALJ’s ID

The ALJ considered the construction of the claim term “substantially at the regulated voltage” (ID 19-23) with respect to claims 2, 3, and 34, specifically construing the term “substantially.” He found that upon examination of the entire claim language and specification, the term “substantially” does not merely indicate a certain tolerance or leeway, but is used to

¹ As stated in the ‘258 patent, “the term ‘synchronously-switched switch’ refers to a switch including two transistors that are driven out of phase to supply current at a regulated voltage to a load.” Column 7, lines 48-51.

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mean that the voltage should not be the same as the regulated voltage and that the difference between the voltages is important for operation of the claimed invention. ID 23. The ALJ noted the expert testimony of Dr. Wei (AATI's expert), stating that "the average values must be different in the two states in order for the two circuits to operate..." ID 21. The ALJ thus agreed with AATI's narrow construction of the claims of the '258 patent that the "regulated voltage" in the first state must be different than the "substantially regulated voltage" in the second state due to the presence of the term "substantially" (ID 20-21), and found that "the term substantially at the regulated voltage requires that in the second state of circuit operation, the voltage is maintained substantially at the regulated voltage although not at the same voltage." ID 23.

Linear's Position

Linear argues that the ALJ's construction in the final ID is contrary to the plain meaning of the claim language and inappropriately limits the claims to specific embodiments in the specification; that the interpretation of "substantially at the regulated voltage" in the *Impala* litigation (that the claim term "allows for, but does not require, greater variation in the regulated voltage") is dispositive of this issue; that the ALJ's construction of "substantially at the regulated voltage" contradicts well-established Federal Circuit law interpreting the term "substantially;" that the ALJ erred in reading "substantially at [the][sic] regulated voltage" to mean "not at the regulated voltage;" that the ALJ's analysis limits the construction to a preferred embodiment containing a hysteretic comparator; and that it violates the doctrine of claim differentiation because it implicitly reads the hysteretic comparator limitation from claim 5 into claim 1 (and thus into dependent claims 2 and 3). Linear Review Brief 18-22.

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AATI's Position

AATI generally argues that the ALJ's construction of the the term "substantially at the regulated voltage" is correct. AATI Review Reply Brief 31-39. AATI argues that the evidence supports a finding that the voltages are different in the two states for proper operation (AATI Review Reply Brief 31-33), and that the Federal Circuit case law cited by Linear relating to "substantially" is not pertinent because none of those cases involved a difference between two conditions necessary for operation of the claimed invention here. AATI Review Reply Brief 33-34. AATI also argues that the *Impala* litigation "cannot legally bind AATI in this investigation" and did not relate to the same claim construction issue. AATI Review Reply Brief 34-35. AATI also argues that Linear incorrectly asserts that the ALJ's construction of this term limits the asserted claims to a specific embodiment involving a hysteretic comparator. AATI Review Reply Brief 35-38.

The IA's Position

The IA argues that the ALJ's construction is contrary to the plain meaning of the claim language and inappropriately limits the claims to one particular disclosed embodiment. IA Review Reply Brief 13-14. Specifically, the IA argues that the term "substantially at the regulated voltage," describing the second state of circuit operation, stands in contrast to the asserted claims' description of the first state of circuit operation requiring that the output be maintained "at" the regulated voltage. IA Review Brief 25. The IA argues that the use of the word "substantially" merely establishes that in the second state of circuit operation the output voltage can vary from the designated level to a greater degree than in the first state of circuit

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operation. IA Review Reply Brief 14. The IA further argues that “[t]he ID’s construction of ‘substantially at the regulated voltage’ should be rejected because it imposes a limitation that is not compelled by the language of the claim.” IA Review Brief 26.

Determination

As pointed out by the ALJ in the ID, the claim construction dispute among the parties is centered on the meaning of the term “substantially.” ID 20. We agree with the ALJ that the interpretation of this term in the *Impala* litigation as allowing for, but not requiring, greater variation in the regulated voltage is informative, although not dispositive. *See* ID 12-14, 21. We agree with Linear that “[w]hen construing ‘substantially’ as a term of approximation modifying a condition, the Federal Circuit does not exclude the exact condition from the meaning of the construed term” and that “the ALJ clearly erred in reading ‘substantially at the regulated voltage’ to exclude ‘at the regulated voltage.’” Linear Pet. 27, Linear Review Brief 20.

We agree with Linear that “[t]he plain and ordinary meaning of the term ‘substantially at the regulated voltage’ encompasses voltages that are near or ‘at the regulated voltage.’” Linear Review Brief 19. We agree with the IA that in the second state of circuit operation the output voltage can vary from the designated level to a greater degree than in the first state of circuit operation. IA Review Reply Brief 14. We also agree with the IA that if Linear “intended to *require* the use of a different average output voltage during the sleep mode of operation, the patent could have been drafted so as to make that intent clear.” IA Review Reply Brief 14.

The ALJ and AATI appear to place undue emphasis on one of the disclosed embodiments, contrary to established Federal Circuit precedent. *See Ventana Medical System,*

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Inc. v. Biogenex Laboratories, Inc., 473 F.3d 1173, 1181-82 (Fed. Cir. 2006) (finding that the mere fact that embodiments included a particular example does not limit claims to that example); *see also Phillips v. AWH Corp.*, 415 F.3d 1303, 1323 (Fed. Cir. 2005) (claim need not be limited to single embodiment disclosed in the specification); *see also Cordis Corp. v. Medtronic AVE, Inc.*, 339 F.3d 1352, 1365 (Fed. Cir. 2003), *cert. denied*, 540 U.S. 1213 (2004) (“As our case law makes clear, however, ‘an applicant is not required to describe in the specification every conceivable and possible future embodiment of his invention.’”). Thus, we agree with both the IA and Linear that the ALJ’s construction in the final ID is contrary to the plain meaning of the claim language and inappropriately limits the claims to the hysteretic comparator embodiments of the specification (*see* at least embodiments of Figures 2, 7, 9, and 10), since other embodiments exist which do not require a hysteretic comparator (*see* at least the embodiments of Figures 4, 5, 6, and 8). IA Review Brief 26-27, IA Pet. 14, Linear Review Brief 20-22.

Lastly, although we agree with Linear that the doctrine of claim differentiation supports the view that asserted claims 2 and 3 do not require the hysteresis embodiment from the specification (Linear Review Brief 22), we find that claims 2 and 3 do not exclude the hysteresis embodiment. For the foregoing reasons, we conclude that the ALJ erred in limiting the asserted claims of the ‘258 patent such that the “regulated voltage” of the first state of circuit operations must be different than the “substantially regulated voltage” of the second state of circuit operation.

Accordingly, we determine to modify the ALJ’s construction of the term “substantially at the regulated voltage” to mean that in the second state of circuit operation the output voltage is

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maintained substantially at the regulated voltage although not necessarily at the same voltage as in the first state of circuit operation. In our view, a proper construction of the claim term permits the output voltages in the two states of operation to be different, but does not require them to be different.

c. “first state of operation” and “second state of operation”

The ALJ’s ID

With respect to all the asserted claims of the ‘258 patent, the ALJ considered the construction of the claim terms “first state of operation” and “second state of operation” at ID 23-25. Here again, as with the second claim term he construed, the ALJ relied on the expert testimony of Dr. Wei (AATI’s expert) in determining that the first and second states of operation correspond to high and low load currents, respectively. ID 24. The ALJ found that “the first state of operation is linked to high load currents, and the second state is linked to low load currents.” ID 25.

Linear’s Position

Linear argues that the ALJ’s construction of these claim terms improperly reads in a limitation that excludes disclosed embodiments, and points to portions of the specification of the ‘258 patent (column 7, lines 11-14 and 19-23; column 9, lines 3-10; and column 13, lines 20-25) which disclose changing between first and second states of operation during a period of low load current (*i.e.*, sleep mode). Linear Review Brief 26-29. Linear argues that a “proper construction for the ‘first state of circuit operation’ and the ‘second state of circuit operation’ in no way requires that these two states of circuit operation be linked to any particular load current levels.”

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Linear Review Brief 28. Linear also argues that the claim language provides no limitations linking the first and second states to corresponding load conditions. Linear Review Brief 26-29.

AATI's Position

AATI argues that the ALJ's construction is correct. AATI Review Reply Brief 38-42. AATI argues that the ALJ properly read the claim terms in the context of the patent specification and that the states are defined by the load current condition such that "the first state of circuit operation is linked to high load currents and the second state of circuit operation is linked to low load current." AATI Review Reply Brief 39. AATI argues that "[t]he file history of the '258 patent also supports Judge Harris's construction." AATI Review Reply Brief 40. AATI also argues that despite the IA's assertion that the ID's construction improperly imports limitations from the preferred embodiment into the claim, the ALJ "properly read the claim terms as a person of ordinary skill would in the context of the patent specification" based on a "finding that all of the embodiments in the '258 patent require a linking between the first state/second state and the load current" and that "the distinction based on load current is a required characteristic of the way in which the claimed invention works." AATI Review Reply Brief 42 (emphasis in original).

The IA's Position

The IA argues that the claim language does not require a link between the load current and the claimed states of operation and that such a construction imports a limitation from the preferred embodiments into the claims. IA Review Brief 19-21, IA Review Reply Brief 7-11.

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Determination

In our view, the ALJ's construction of the asserted claims of the '258 patent that "the first state of operation is linked to high load currents, and the second state is linked to low load currents" (ID 25), is too narrow. We agree with Linear and the IA that the ALJ's construction of this term in the ID seems contrary to the plain meaning of the words of the asserted claims, and that "[n]othing in the claim language, however, requires a link between the load current and the claimed states of circuit operation." IA Review Brief 20. With respect to Linear's argument that "the ALJ's reading of the claim limitation is ... precluded by the specification" (Linear Pet. 37), although the specification teaches that the circuit can operate to "periodically change back and forth between the second and first states even during periods of low load current [*i.e.*, during sleep mode]" (Linear Pet. 35), the specification does not require such operation at all times. Thus, contrary to AATI's arguments, the specification of the '258 patent does not support the conclusion that all of the embodiments in the '258 patent require a link between the state of operation and the load current. In other words, the specification supports the possibility, but not the necessity, that load current and states of circuit operation be linked.

We therefore determine to modify and broaden the ALJ's construction of the terms "first state of operation" and "second state of operation" to mean that the first state of operation can be linked to high load currents, and the second state can be linked to low load currents, although the states of operation do not necessarily have to be linked to a high or low load current.

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B. Infringement of the '258 Patent

1. Applicable Law

Direct infringement requires a two-step analysis. First, the claims must be construed and then the trier of fact must determine whether the claims cover the accused device or process, literally or under the doctrine of equivalents. *Smithkline Diagnostics, Inc. v. Helena Labs. Corp.*, 859 F.2d 878, 889 (Fed. Cir. 1988). The burden is on the patent owner to prove infringement by a preponderance of the evidence. *Smithkline Diagnostics*, 859 F.2d at 889.

A product which does not literally infringe, however, may still infringe under the doctrine of equivalents when, for example, the accused product and the claimed invention perform substantially the same function in substantially the same way to yield substantially the same result. *Atlas Powder Co. v. E.I. duPont de Nemours & Co.*, 750 F.2d 1569, 1579 (Fed. Cir. 1974). The Supreme Court has described the essential inquiry of the doctrine of equivalents analysis as follows: “[D]oes the accused product or process contain 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). 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. 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*, 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).

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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.*, 962 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.

Indirect infringement consists of active inducement of others to directly infringe, or contributory infringement, and depends on the existence of direct infringement. *Dynacore Holdings Corp. v. U.S. Philips Corp.*, 363 F.3d 1263, 1272 (Fed. Cir. 2004).

2. Discussion

Based on his construction of claims 2, 3, 34, and 35, discussed *supra*, along with the interpretation of additional claim terms, discussed *infra*, the ALJ found that none of the accused AATI products directly or indirectly infringe any of the asserted claims of the '258 patent. ID 63.

The ALJ's ID

The ALJ made factual findings based on the evidence "that the switching transistors in the accused AATI products are not configured in a single switch, and that instead the switching

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transistors [of the accused products] have separate control circuitry,” and that “[t]hey are not controlled as a single unit.” ID 47. As a result of these findings, the ALJ found that the accused products do not meet the limitation of the asserted claims 2, 3, and 34 of “a switch . . . including a pair of synchronously switched switching transistors,” since the accused products require two separate control circuits to control two switching transistors. ID 47-48, 60.

The ALJ also found that the representative accused products (AAT1143, AAT1146, AAT1151, and AAT1265) do not infringe the asserted sleep mode claims of the ‘258 patent “because they maintain the same average voltage in both the alleged first and second states of operation” and they “do not maintain the output at a different voltage in the first and second states.” ID 59. They thus do not meet the “substantially at the regulated voltage” of asserted claims 2, 3, and 34.

He found that “at least the AAT1143, AAT1146, and AAT1151 representative products do not depend on states of operation with the requisite high or low load currents” and thus that “at least three of the four representative AATI products accused under the ‘258 patent lack the required ‘first state of circuit operation’ and ‘second state of circuit operation’” of asserted claims 2, 3, and 34. ID 55-56.

As to claim 35, the ALJ found that the accused devices (AAT1143 and AAT1146) failed to meet the limitation of “a switch . . . including a pair of synchronously switched switching transistors” for the same reason the accused devices did not meet the similar limitations in claims 2, 3, and 34. ID 60. The ALJ also determined that no accused product (AAT1143 or AAT1146) satisfies the limitation of claim 35 of “monitoring the current to the load,” since monitoring of

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instantaneous inductor current was not shown as a matter of fact to constitute monitoring current to the load. ID 60-61. The ALJ also concluded that the accused products (AAT1143 and AAT1146) do not meet the limitation of claim 35 of comparing monitored current to “a current threshold” since “the accused products compare ... monitored voltage to a voltage threshold, not to a current threshold as required by claim 35.” ID 62.

The ALJ found that Linear had not presented evidence of literal infringement under the doctrine of equivalents. ID 62-63. Lastly, because there was no finding of direct infringement with respect to any asserted claim of the ‘258 patent, and because “indirect infringement, whether inducement to infringe or contributory infringement, can only arise in the presence of direct infringement” (*Dynacore Holdings Corp.*, F.3d at 1272), the ALJ likewise concluded there was no indirect infringement of the asserted claims of the ‘258 patent. ID 71-72.

Additional Terms Applied By the ALJ in His Infringement Analysis

Although not discussed by the ALJ in the claim construction section of the ID, the ALJ applied three additional terms in the course of making his determination of non-infringement: (i) “a second circuit for generating a first control signal during a first state of circuit operation” and “a third circuit for generating a second control signal during a second state of circuit operation,” (ii) “first control signal ... second control signal,” and (iii) “a second control signal during a second state of circuit operation to cause both switching transistors to be OFF.” ID 48-55, 56-58.

(i) “*second circuit ...*” and “*third circuit ...*”

With respect to the first additional term applied by the ALJ with regard to infringement, the ALJ found that none of the accused products (AAT1143, AAT1146, AAT1151, and

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AAT1265) meet the limitations of claim 1 (and thus asserted claims 2 and 3 depending therefrom) of “a second circuit for generating a first control signal during a first state of circuit operation” and “a third circuit for generating a second control signal during a second state of circuit operation.” ID 48-55. He arrived at the same conclusion for claim 34 because of its similar limitations. ID 48, 55. Based on the second and third circuits having different operations ascribed to them, the ALJ interpreted claims 1 and 34 to require that the second and third circuit be separate and distinct. ID 52. However, the ALJ made findings of fact (based primarily on the expert testimony of AATI’s expert, Dr. Wei) that the second and third circuits of the accused products are not separate and distinct, since “the portions of each of the accused devices alleged to constitute the second circuit and the third circuit are the same, with the exception of

.” ID 52. Further, the ALJ determined that [redacted] failed to fulfill the required operations of the third circuit, and thus he determined that [redacted] failed to distinguish the second and third circuits as two distinct circuits. ID 52-53.

(ii) “*first control signal ... second control signal*”

With respect to the second additional term (“first control signal ... second control signal”), Linear identified the [redacted] signal of the accused AAT1143 product as the “first control signal” and [redacted] of the accused AAT1143 product as the “second control signal.” ID 56. The ALJ stated that [redacted] and found that “in the accused products [redacted] are not two distinct signals, and the accused products do not contain the required limitation.” *Id.*

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(iii) “*a second control signal during a second state of circuit operation to cause both switching transistors to be OFF*”

With respect to the third additional term, the ALJ found that the AAT1143, AAT1146, and AAT1151 products “do not contain any control signal that causes both transistors to be OFF and do not perform any step that turns both transistors OFF.” ID 57. The ALJ based this finding on the testimony of Dr. Wei (AATI’s expert) that the AATI accused products use

, and that intervention of

is required to perform the function of turning both transistors OFF. ID 57-58.

He concluded that the accused products do not satisfy the “second control signal” limitation of claims 2 and 3. ID 58. He also found that the accused products do not meet the requirement of claim 34 of the step of turning both transistors OFF. ID 58.

The Parties’ Positions

Linear (Linear Review Brief 48-66) and the IA (IA Review Brief 13-33) argue that the accused products infringe the asserted claims of the ‘258 patent. Both Linear and the IA present arguments not only with respect to literal infringement (Linear Review Brief 48-65, IA Review Brief 13-29, IA Review Reply Brief 2-15), but also with respect to infringement under the doctrine of equivalents (Linear Review Brief 1-5, 65-66; Linear Review Reply Brief 2-18; Linear Pet. 62-63; IA Review Brief 29-31, IA Review Reply Brief 15-17 (as to claim 35)), and indirect infringement (active inducement and contributory infringement) (Linear Review Brief 5-15, Linear Review Reply Brief 19-27; IA Review Brief 31-33; IA Review Reply Brief 17-19).

AATI argues that the ALJ correctly found that the accused products do not infringe claims 2, 3, and 34 (*i.e.*, the sleep mode claims) (AATI Review Reply Brief 42-65). AATI also

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argues that the ALJ's determination of non-infringement with respect to claim 35 (*i.e.*, the reverse current claim) is correct (AATI Review Brief 2-29, AATI Review Reply Brief 65-72), that the accused products monitor instantaneous inductor current rather than current to the load (AATI Review Brief 18), and that the accused products monitor a voltage and voltage threshold and not a current threshold. AATI Review Brief 2-29, AATI Review Reply Brief 65-72.

Direct Infringement²

“switch . . . including a pair of synchronously switched switching transistors”

With respect to the all of the asserted claims of the '258 patent, Linear argues that each of the accused products meets the limitation “switch . . . including a pair of synchronously switched switching transistors.” Linear Review Brief 48-50. Linear argues that in the accused products the ZC signal plays no part in the switching of the top and bottom transistors at high load currents, and that thus the accused products have a signal that is generated by the top switch logic to control both the top switching transistor and the bottom switching transistor. Linear Review Brief 49-50. Thus, Linear asserts that in the accused products “the AATI switching transistors are indeed connected for complementary switching and are controlled as a single unit - just like the circuit set up shown in multiple embodiments of the '258 Patent.” Linear Review Brief 50. Linear also argues that the accused products infringe this limitation under the doctrine of equivalents. Linear Review Brief 65-66, Linear Review Reply Brief 2-18. For these reasons, Linear argues that the AAT1143 and AAT1146 products satisfy the limitation of a “switch . . .

² Given our finding that AATI directly infringes the asserted claims, it is not necessary to reach the issue of whether AATI indirectly infringes those claims. We also note that indirect infringement here is based on direct infringement by third parties importing an infringing product (itself or via downstream products), but that evidence in the record is slight on this point.

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including a pair of synchronously switched switching transistors.” Linear Review Brief 63.

AATI argues that the accused AAT143 and AAT1146 products do not infringe any of the asserted claims with respect to the limitation “switch . . . including a pair of synchronously switched switching transistors.” AATI Review Reply Brief 43-45, 65. AATI argues that “the accused products do not satisfy this limitation because

AATI Review Reply Brief 43. AATI also argues

that

and that “the accused products have

.” AATI Review Reply Brief

44. AATI also disputes the IA’s interpretation that the accused products “effectively operate” in a synchronous manner. AATI Review Reply Brief 45. However, we note that AATI appears to admit that the limitation of all of the asserted claims of “a switch ... including a pair of synchronously switched switching transistors” is met when it states “that the switching transistors may appear to switch in a synchronous manner under certain operating conditions.” AATI Review Reply Brief 45.

With respect to all of the asserted claims of the ‘258 patent, the IA argues that “the transistors of the accused AATI products operate in essentially the same complementary manner as the switches in the patent under high load conditions” (IA Pet. 7), and that “[t]he ID errs insofar as it seeks to confine the asserted claims to the specific type of switch control structure shown in Figure 2.” IA Review Brief 15. The IA also argues that “the evidence indicates, despite their purportedly ‘separate’ control circuitry, that the transistors of the accused products

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effectively operate in a synchronous manner as part of a single switch.” IA Review Brief 16.

“first state of circuit operation ... second state of circuit operation”

As to claims 2, 3, and 34, Linear argues the first and second states of circuit operation are not restricted to any specific levels of load currents, and that they are distinct states in any event and met by the accused products. Linear Review Brief 26-29, 51-54. AATI argues that the first and second states of operation of the asserted claims must be distinct, a limitation not met by the accused products. AATI Review Reply Brief 48-54. The IA agrees with Linear. IA Review Brief 19-21, IA Review Reply Brief 7-11. The IA specifically points out that, contrary to the ID’s conclusions based on Dr. Wei’s testimony (AATI’s expert), “the accused AATI products do have distinct states of operation that correspond to the load current level.” IA Review Brief 20.

“substantially at the regulated voltage”

Linear argues that “[u]nder the proper construction in which ‘substantially at the regulated voltage’ encompasses ‘at the regulated voltage,’ the ‘258 Accused Products infringe.” Linear Review Brief 60. Linear argues similarly that under the doctrine of equivalents maintaining at a voltage is encompassed by maintaining substantially at a voltage. Linear Review Brief 66. Linear also argues that the ‘258 accused products infringe even under the ALJ’s improper construction requiring operation at a different voltage in the first and second states, because AATI’s products exhibit greater (*i.e.*, different) variation in the regulated voltage during the second state than they do during the first state. Linear Review Brief 60-63. Linear supports this argument by pointing to graphs showing load current conditions taken from AATI’s product datasheets, and argues that these graphs show that the AATI products maintain output at

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different regulated voltage levels depending on different states of circuit operation. Linear Review Brief 61-63, Linear Pet. 56-59. Specifically, Linear points out that the AAT1151 has a low load current state (*i.e.*, second state at 50mA) and a high load current state (*i.e.*, first state at 700mA) (Linear Review Brief 61), and that since regulated voltage is dependent upon the I(EA) signal (shown in RDX-664, Linear Review Brief 63), “a voltage difference in the I(EA) values necessarily indicates different value for the regulated voltage as well.” Linear Review Brief 62.

AATI argues that the ALJ’s claim construction and non-infringement rulings “relate[s] to the *average* voltage level in each state, not to the amount of *variation* (or ripple) about those average voltages” (AATI Review Reply Brief 62 (emphasis in original)), and that “[w]hether the products show different amounts of variation about the average voltage is irrelevant to the infringement question.” AATI Review Reply Brief 62. AATI also argues that “a change in I(EA) provides no indication of a change in the average output voltage.” AATI Review Reply Brief 64. AATI argues in favor of the ALJ’s non-infringement ruling based on its assertion that “the phrase ‘an output maintained substantially at the regulated voltage’ should be construed to require operation at a different average voltage in the first and second states.” AATI Review Reply Brief 62.

With respect to the sleep mode claims, the IA argues that the ID’s construction of ‘substantially at the regulated voltage’ is contrary to the plain meaning of the claim language and inappropriately limits the claims to the disclosed embodiments. IA Review Brief 26-27; *see also* IA Review Reply Brief 14. The IA also argues that the use of the word “substantially” merely establishes that in the second state of circuit operation the output voltage can vary from the

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designated level to a greater degree than in the first state of circuit operation, and that “[t]he use of the word ‘substantially’ suggests that in the second state of circuit operation the output voltage need not be maintained precisely ‘at’ the regulated voltage level, but merely ‘substantially at’ that level.” IA Review Brief 25. Therefore, the IA argues that the ID’s findings that the accused products do not meet the limitation of claims 2, 3, and 34 of “substantially at the regulated voltage” are erroneous. IA Review Reply Brief 13.

“monitoring current to the load”

Linear argues that the AAT1143 and AAT1146 accused products infringe claim 35, including the limitation “monitoring current to the load.” Linear Review Brief 1, Linear Review Reply Brief 2-10. Specifically, Linear argues that “monitoring a voltage that is indicative of current should be within the literal scope of Claim 35, since the claim language only requires monitoring the ‘current to the load’ and does not dictate a specific way of monitoring that current.” Linear Review Brief 1. Specifically, Linear argues that it is “clear that the Fig. 8 embodiment operates by monitoring the instantaneous inductor current in order to monitor the current to the load,” and that “monitoring the instantaneous inductor current satisfies the ‘monitoring the current to the load’ limitation of Claim 35 of the ‘258 Patent.” Linear Review Reply Brief 5.

Linear argues that, based on Ohm’s law (expressed as $V = I \times R$, where V is voltage in volts, I is current in amps, and R is resistance in ohms), “if one determines the value of the voltage (V), then one also knows the value of the current (I) and vice versa,” accordingly, Linear then argues that “monitoring the voltage is a precise way of monitoring the current” (Linear

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Review Brief 4), and “the accused products infringe Claim 35 of the ‘258 Patent, because monitoring a voltage using a voltage threshold is equivalent to monitoring the current using a current threshold.” Linear Review Brief 4.

AATI argues that “the accused products do not monitor ‘current to the load’ because instantaneous inductor current is not the same as, or indicative of, the current to the load, as Judge Harris correctly determined.” AATI Review Reply Brief 66-70. AATI also argues that one of ordinary skill in the art would understand that $I(fb2)$ in Fig. 8 represents “average inductor current” and not instantaneous inductor current. AATI Review Reply Brief 70.

With respect to the reverse current claim 35, the IA argues that monitoring instantaneous inductor current satisfies the limitation of “monitoring the current to the load,” that the claim limitation is met by the embodiment shown in Figure 8 of the ‘258 patent which monitors current, and that, thus, the ID’s conclusion that the accused products do not infringe this limitation of claim 35 is based on an improper reading of the specification. IA Review Brief 27-29, IA Review Reply Brief 14-15.

Further with respect to the reverse current claim 35, Linear argues that the AAT1143 and AAT1146 accused products meet the limitation of “monitoring current to the load” since these products have “a circuit that monitors _____” which “is indicative of the instantaneous inductor current.” Linear Review Reply Brief 5-10. Linear also argues that the AAT1143 and AAT1146 monitor current by looking at _____ that is directly proportional to the current and is therefore indicative of the current, and thus these products meet the limitation of claim 35 of using a current threshold. Linear Review Brief 1-5, Linear Pet. 62.

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Linear further explains and expands these arguments as to the doctrine of equivalents in its response and reply to the briefing questions in the review notice. Linear Review Brief 1-5, 65-66; Linear Review Reply Brief 2-18. Linear makes the broad argument that Ohm's law ($V = I \times R$), which states the relationship between voltage and current, means that "monitoring the voltage is a precise way of monitoring the current." Linear Review Brief 4. Linear further argues that on this basis, AAT1143 and AAT1146 infringe claim 35 "because they each have circuitry that performs the same function _____ in substantially the same way _____, to accomplish the same result _____." Linear Review Brief 4-5, Linear Review Reply Brief 8.

AATI argues generally that Linear has not established infringement of claim 35 of the '258 patent under the doctrine of equivalents. AATI Review Brief 2-29, AATI Review Reply Brief 6-13, 70-72. Specifically, AATI argues that Linear has failed to submit sufficient evidence and argument regarding the equivalence of the 'magnitude of the monitored current falls below a current threshold' limitation of claim 35. AATI Review Brief 6-7. AATI then argues that since the '258 patent "does not *explicitly* state whether current feedback signal I(fb2) indicates instantaneous or average inductor current, a person of ordinary skill in the art would understand that I(fb2) indicates average inductor current." AATI Review Brief 11. AATI argues that current to the load is equal to average inductor current and is quite different from instantaneous inductor current. AATI Review Brief 8-12.

AATI argues that the accused AAT1143 and AAT1146 products do not monitor current to the load or determine when that current falls below a current threshold as required by claim 35,

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and instead the products monitor . AATI Review Brief 12-19. AATI provides its own doctrine of equivalents analysis and argues that the function/way/result test is not met. AATI Review Brief 15-18. More specifically, AATI argues that the function is not met since the accused products monitor indicative of instantaneous inductor current which is not the same as monitoring “current to the load.” AATI Review Brief 16. AATI argues that the the way in which the accused products operate is substantially different since the accused products use a voltage comparator instead of a current comparator, and since the current threshold in claim 35 is “carefully selected” and not always the same as in the accused products. AATI Review Brief 17. Also, AATI argues that the result is substantially different since the signal resulting from the determination of the accused products (*i.e.*, from) depends on , and not on the current to the load as in claim 35. AATI Review Brief 18. Finally, AATI argues that Linear’s function/way/result test (applied in Linear’s Review Brief) is too broad. AATI Review Reply Brief 7-10.

AATI also makes arguments that Linear is precluded from relying on the doctrine of equivalents under the disclosure-dedication rule, based on Linear’s intentional decision to use certain phrases containing the word “current,” and based on the hypothetical claim rule. AATI Review Brief 19-29. Based on these additional arguments, AATI argues that “the Commission should find that Linear has failed to establish that the accused AATI products infringe claim 35 under the doctrine of equivalents.” AATI Review Brief 29.

The IA argues, along lines similar to those of Linear, that the accused products meet, literally or under the doctrine of equivalents, the limitations of asserted claim 35 of monitoring

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current and comparing a current with a threshold, and that although “the accused products actually monitor _____ and trigger the second control signal when the _____” this “is effectively the same as monitoring the inductor current and detecting when it falls below zero.” IA Review Brief 29 (emphasis added). The IA further explains and expands these arguments as to the doctrine of equivalents in his response and reply to the briefing questions. IA Review Brief 29-31, IA Review Reply Brief 15-17. Specifically, the IA argues that the ‘258 patent specification states that as “will be apparent to those of ordinary skill in the art . . . others means of generating a feedback signal indicative of current reversal in inductor current . . . could be used as well,” (IA Review Brief 30 (citing the ‘258 patent, column 15, lines 1-10)), and asserts that “monitoring _____ that is indicative of current rather than monitoring current directly” is equivalent and achieves the same result. IA Review Brief 31 (emphasis added).

Parties’ Positions Regarding Additional Terms Applied by ALJ in Infringement Analysis

(i) “*second circuit ...*” and “*third circuit ...*”

With respect to all of the asserted sleep mode claims of the ‘258 patent (claims 2, 3, and 34), Linear argues that there is no requirement that the second and third circuits be entirely distinct and without common circuit elements (Linear Review Brief 50-51), that the ALJ’s infringement analysis “erroneously applies an extremely narrow interpretation ... which requires that every element in the second circuit be completely distinct from every element in the third circuit” (Linear Pet. 41), and that under the doctrine of equivalents the shared elements between the two circuits would not change the function or result. Linear Review Brief 65-66. Linear also

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argues that “the existence of even one unique component (such as [redacted]) to the third circuit should be enough to distinguish it from the second circuit.” Linear Review Brief 50.

AATI argues in its response that the accused products do not have distinct second and third circuits and that the ALJ correctly interpreted the claims to require these circuits to be distinct. AATI Review Reply Brief 45-48. AATI argues that “[redacted] cannot properly be considered part of any alleged third circuit because it has nothing to do with generating the alleged second control signal [redacted] which is the function of the third circuit” (AATI Review Reply Brief 46), and that because the second and third circuits have different operations ascribed to them in the claims they must be distinct circuits. AATI Review Reply Brief 46-47.

Similar to Linear, the IA also seeks review of the ID’s conclusion of non-infringement based on its overly narrow claim construction that erroneously precludes shared use of the same circuitry by the “second” and “third” circuits of the asserted sleep mode claims. IA Review Brief 16-19.

The IA argues that the evidence shows that each of the AAT1143, AAT1146, AAT1151, and AAT1265 accused products have the “second circuit” which generates the “first control signal” because at high load current conditions, “[redacted] effectively controls the state of both switching transistors.” IA Review Brief 17.

The IA argues that the AAT1143 and AAT1146 accused products have the required “third circuit” which generates the “second control signal” because at low load currents, “the

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” (IA Review Brief 18), and causing the bottom transistor to be OFF as long as the
. IA Review Brief 17-18. The IA also argues that the AAT1151
accused products lack instead, but still have a second control
signal. IA Review Brief 18.

(ii) “*first control signal ... second control signal*”

With respect to whether or not the accused products meet the “second control signal”
limitation of the sleep mode claims, Linear asserts that are distinct and separate
signals and that

. Linear Review Brief 54-60. Linear argues that “
within the AATI products is identical to the operation of
the Fig. 7 embodiment disclosed in the ‘258 Patent.” Linear Review Brief 55. Linear then
graphically explains how the operation of the signals in the AATI accused products is analogous
to the operation of Fig. 7. See Linear Review Brief 56 (chart explaining Figure 7).

AATI argues in response that the accused products do not have distinct first and second
control signals (i.e., respectively), and therefore do not infringe. AATI
Review Reply Brief 54-58, AATI Resp. 41-45. AATI argues that the ALJ “properly determined
that the cannot satisfy the claim requirement of two distinct control
signals.” AATI Review Reply Brief 55.

Although the IA agrees with the ID that the are not entirely
independent, the IA argues that the asserted claims do not strictly require the first and second
control signals to be completely independent and distinct. IA Review Brief 21-22. The IA

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“agrees with AATI that [redacted] are closely related signals at high load currents” (IA Review Reply Brief 11) (emphasis added), but that by virtue of having different functionalities, [redacted] IA Review Reply Brief 12.

The IA argues that “[t]he ID does not explain, however, why the claimed ‘second control signal’ must be entirely independent of the ‘first control signal,’” and that this aspect of the ID is based on an overly restrictive claim construction that forbids any relationship between the first and second control signals. IA Pet. 11. The IA argues that the ID took an overly narrow view of these terms of the asserted claims, that the ID incorrectly came to a conclusion of non-infringement, and that this conclusion of the ID should be reversed. IA Review Brief 21, 22.

(iii) *“a second control signal during a second state of circuit operation to cause both switching transistors to be OFF”*

Linear further asserts that the second control signal [redacted] even if not directly, initiates a sequence of events that turns both transistors OFF in the sleep mode claims. Linear Review Brief 60, Linear Pet. 54-56. Linear then argues that “*but for* [redacted] the accused products could not and would not turn off both switching transistors during the second state of circuit operation, and therefore [redacted] is the ‘second control signal’ that causes ‘both switching transistors to be OFF’ as recited” in claims 2, 3, and 34. Linear Review Brief 60.

AATI argues that the ALJ correctly determined that the accused products do not have a second control signal that causes both transistors to be OFF. AATI Review Reply Brief 58-60. AATI Resp. 45-49. AATI argues that the second control signal in Figure 7 of the ‘258 patent differs fundamentally in operation from [redacted] of the accused products, and that Figure 7 thus fails to show that the accused products infringe. AATI Review Reply Brief 60-61.

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Similar to Linear, the IA argues that [redacted] constitutes a second control signal that initiates a sequence or starts a chain of events that results in both transistors being turned OFF, that the [redacted] of the accused products “ultimately causes” both transistors to be maintained OFF for a period of time, and that nothing in the claim language requires a direct or immediate result. IA Review Brief 22-23, IA Review Reply Brief 12. The IA also argues that the asserted sleep mode claims be construed to cover Figure 7 since the operation of the hysteretic comparator in Figure 7 is similar to that of [redacted]. IA Review Brief 24-25, IA Review Reply Brief 12-13.

Determination

We agree with the ALJ’s statement in the final ID of the general principle that whether or not the accused products infringe the asserted claims hinges on a proper claim construction. *See* ID 47. We agree with Linear with respect to the sleep mode claims (claims 2, 3, and 34) that the finding of non-infringement of the ‘258 patent is based on an apparently faulty claim construction. Linear Pet. 37. Based on our claim construction, we find that the accused products represented by AAT1143 infringe asserted claims 2, 3, and 34, but we do not find that the other accused products infringe these claims. We find that the AAT1143 and AAT1146 products do not infringe claim 35. Details of our views on these findings follow below.

Element-by-Element Analysis of Direct Infringement of Claims 2, 3, and 34

Because the following six disputed terms of claims 2, 3, and 34 are met by an accused product (AAT1143) under our modified claim construction, they are directly infringed. The other three accused products do not infringe these claims.

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(1) “a switch coupled to receive an input voltage and including a pair of synchronously switched switching transistors” (all asserted claims)

We agree with the IA that “[t]he ID errs insofar as it seeks to confine the asserted claims to the specific type of switch control structure shown in Figure 2.” IA Review Brief 15.

We agree with the ALJ that “the question of whether or not this claim limitation is satisfied by any of the accused AATI products hinges on the proper construction of this limitation.” ID 47. Based on our claim construction modification, in the Claim Construction section *supra*, finding that the claims are not limited to a switch having a single unitary control circuit structure, it is our view that all of the accused products (AAT1143, AAT1146, AAT1151, AAT1265) meet this limitation since they have separate control circuitry and are configured with a single switch composed of a pair of switches (transistors).

(2) “substantially at the regulated voltage” (claims 2, 3, and 34)

With respect to the term “substantially at the regulated voltage,” we agree with the IA that if Linear “intended to *require* the use of a different average output voltage during the sleep mode of operation, the patent could have been drafted so as to make that intent clear.” IA Review Reply Brief 14. Because we have modified the ALJ’s construction of the term “substantially at the regulated voltage” to mean that in the second state of circuit operation the voltage is maintained substantially at the regulated voltage although not necessarily at the same voltage as in the first state of circuit operation, and because in our view, a proper construction of the claim term permits the regulated voltages in the two states of operation to be different, but does not require them to be different, it is our view that all of the accused products (AAT1143, AAT1146, AAT1151, AAT1265) meet this limitation.

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Specifically, we agree with Linear that under a proper construction of this term, all of the accused products meet this limitation based on the existence of two different states of operation as shown in the output ripple graphs of AATI's product datasheets (AAT1143, CX-123C; AAT1146, CX-124C; AAT1151, CX-125C; and AAT1265, CX-118C).

(3) "*first state ... operation*" and "*second state ... operation*" (all asserted claims)

The IA states that contrary to the ID's conclusions based on Dr. Wei's testimony (AATI's expert), "the accused AATI products do have distinct states of operation that correspond to the load current level." IA Review Brief 20. As stated by the IA, "[a]t high load currents the switches of the accused AATI products operate in a complementary manner, *i.e.*, one ON, one OFF, except for deadtime," and "at low load currents the products reach a state of operation during which both transistors are OFF and the output capacitor maintains the output voltage at the regulated level." IA Review Brief 20. Thus, even if the first and second states of operation are said to correspond to high and low load current levels, respectively, we agree with Linear that the accused products (AAT1143, AAT1146, and AAT1151) meet this limitation of the sleep mode claims (claims 2, 3, and 34). Linear Review Brief 52.

Based on our determination to broaden the ALJ's construction of the terms "first state of operation" and "second state of operation" to mean that the first state of operation can be linked to high load currents, and the second state can be linked to low load currents (although the states of operation do not necessarily have to be linked to a high or low load current), it is our view that the AAT1143, AAT1146, and AAT1151 accused products meet this limitation since they have two separate states of operation, and in our view, the AAT1265 accused product does not meet

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this limitation since it has not been shown to have distinct states of operation, as required by the asserted claims.

(4) “a second circuit for generating a first control signal during a first state of circuit operation” and “a third circuit for generating a second control signal during a second state of circuit operation” (claims 2, 3, and 35)

We do not agree with the ALJ’s interpretation of claims 1-3 and 34 as requiring the second and third circuit to be separate and distinct with no overlapping circuit elements. Further, we do not agree that “portions” of the language of claim 34 “correspond” to that of claim 1. In other words, the ALJ appears to have erred in interpreting claim 34 as requiring second and third circuits and first and second control signals. Although asserted claim 35 contains these limitations, asserted claim 34 is a method claim and simply does not contain the limitations of “a second circuit for generating a first control signal during a first state of circuit operation” and “a third circuit for generating a second control signal during a second state of circuit operation.”

We agree with Linear and the IA that the ALJ seems to have too narrowly construed the asserted claims as requiring that the “second” and “third” circuits be entirely distinct and without common circuit elements, that every element in the second circuit be completely distinct from every element in the third circuit, and as precluding shared use of the same circuitry by the “second” and “third” circuits of the asserted sleep mode claims. We agree that even a difference such as having an additional _____ can cause the circuits to be different and distinct in their topology and their operation.

We agree with the IA that each of the AAT1143, AAT1146, AAT1151, and AAT1265 accused products have the “second circuit” which generates the “first control signal” because at

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high load current conditions,

IA Review Brief 17.

We also agree with the IA that the AAT1143 accused product has the required “third circuit” which generates the “second control signal” because at low load currents,

(IA Review Brief 18), and causing the bottom transistor to be OFF as long as

. IA Review Brief 17-18.

Although the IA argues that “[t]he AAT1146 is similar to the AAT1143 in all patent-relevant aspects” (IA Review Brief 18), we note that the schematics and datasheets of the AAT1143 and AAT1146 show differences in circuit logic and output characteristics (*compare* CX-115C at p. 10 (AAT1143 schematic) and CX-123C at pp. 1, 8 (AAT1143 datasheet) *with* CX-116C at p. 10 (AAT1146 schematic) and CX-124C at pp. 1, 9 (AAT1146 datasheet)). In our view, there is not sufficient record evidence to support a finding that this claim limitation is met with regard to the AAT1146, especially since neither Dr. Wei (AATT’s expert) nor Dr. Pedrom (Linear’s expert) testified with specificity regarding whether or not the AAT1146 actually functions the same as the AAT1143, and Linear has not argued with specificity that the AAT1146 meets this limitation (instead Linear argues generally that all of the accused products meet all of the claim limitations). The majority of Linear’s briefs are drawn to discussion of the AAT1143 in relation to the limitations of the asserted claims.

We agree with the IA that the AAT1151 and AAT1265 differ from the AAT1143 in that they lack a . IA Review Brief 18, 19 at fn. 11. In our view, the presence of

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in the AAT1143 represents a concrete physical difference in circuitry between the second and third circuits, and this distinction is not present in the AAT1151 or AAT1265. Thus, the AAT1151 and AAT1265 accused products do not meet the “third circuit” limitation since they lack [redacted] which would distinguish a third circuit from the second circuit. Thus, the AAT1146, AAT1151, and AAT1265 do not meet the “third circuit” limitation required by asserted claims 2 and 3.

Based on our construction of this term, and the above discussion, it is our view that only the AAT1143 accused product meets both of the limitations of a second and third circuit.

(5) “*first control signal ... second control signal*” (claims 2, 3, and 35)

We agree with Linear that [redacted] are distinct and separate signals corresponding to the first and second control signals, and that

[redacted]. We also agree with the IA that the asserted claims do not strictly require the first and second control signals to be completely independent and distinct as required by the ALJ in the ID. As provided above with respect to the “second circuit” and “third circuit,” all of the accused products have a [redacted] which meets the “first control signal” limitation, but in our view only the AAT1143 meets the “second control signal” limitation. We agree with the IA that the AAT1143 meets both limitations since the AAT1143 has the [redacted], which correspond to the first and second control signals respectively, and since [redacted] of the AAT1143 operates in combination with [redacted] (*i.e.*, second control) signal from [redacted] (*i.e.*, first control) signal. IA Review Brief 22.

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However, in our view, the other three products do not meet the “second control signal” limitation. Specifically, we do not agree with the IA that (i) the AAT1151 product’s corresponds to and operates the same as (IA Review Brief 18, 22), or that (ii) the AAT1265 product’s corresponds to and operates the same as . IA Review Brief 18. In our view, the AAT1151 and AAT1265 accused products do not meet this limitation since neither accused product has been shown to have distinct first and second control signals (*i.e.*, no to distinguish the two signals from each other), as required by the asserted claims.

In addition, the AAT1146 does not meet this limitation since neither Dr. Wei (AATI’s expert) nor Dr. Pedrom (Linear’s expert) testified with specificity regarding whether or not the AAT1146 (or the AAT1151 or AAT1265) actually functions the same as the AAT1143, since Linear has not argued that with specificity that the AAT1146 (or the AAT1151 or AAT1265) meets this limitation (instead Linear argues generally that all of the accused products meet all of the claim limitations), and since Linear has not sufficiently shown that the AAT1146 (or the AAT1151 or AAT1265) generates the “second control signal” which causes both switching transistors to be OFF for a first period of time during which the output capacitor maintains the output substantially at the regulated voltage, as required by asserted claims 2 and 3.

Based on our claim construction, in the Claim Construction section *supra*, it is our view that only the AAT1143 meets this limitation since the signals in the accused products constitute two distinct signals as claimed.

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(6) *“a second control signal during a second state of circuit operation to cause both switching transistors to be OFF”* (claims 2 and 3)

We agree with the IA that the ID applies an overly narrow construction of “a second control signal ... to cause both switching transistors to be OFF,” and that the ALJ does not explain in the ID why this limitation cannot be satisfied by a signal “that starts a chain of events that ultimately results in both transistors being maintained OFF.” IA Pet. 13. In other words, it is our view that this claim limitation is broad enough to cover a signal which causes, or ultimately results in, both switching transistors being OFF. In our view, the plain language of the claim does not provide any time restriction or requirement of immediate or direct connection between the second control signal and the turning OFF of the two transistors.

We agree with Linear and the IA that the [redacted] of the AAT1143 causes the bottom transistor to turn OFF and meets the limitation of “a second control signal ... to cause both switching transistors to be OFF.”

Since we do not agree with the IA that the AAT1151 product’s [redacted] corresponds to [redacted] (IA Review Brief 18, 22), and because the AAT1151 thus does not have a distinct “second control signal,” it is our view that the AAT1151 does not meet the “second control signal during a second state of circuit operation to cause both switching transistors to be OFF” limitation. Likewise, since we do not agree with the IA that the [redacted] of the AAT1265 corresponds to [redacted] (IA Review Brief 18), and the AAT1265 thus does not have a distinct “second control signal,” it is our view that the AAT1265 does not meet the “second control signal during a second state of circuit operation to cause both switching transistors to be OFF” limitation. In our view, Linear has not adequately shown that

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this limitation is met by the AAT1151 or AAT1265 accused products.

With regard to the AAT1146, it is our view that Linear has not adequately demonstrated that the AAT1146 meets the limitation of a “second control signal” for reasons given *supra*, due to differences in the schematics and datasheets of the AAT1143 and AAT1146. In our view there is not sufficient record evidence to support a finding that this claim limitation is met with regard to the AAT1146.

Accordingly, it is our view that only the AAT1143 accused product includes every disputed element of the sleep mode claims (claims 2, 3, and 34). Therefore, we determine that the sleep mode claims are infringed by the AAT1143 and reverse the ID in this respect.³

Infringement of Claim 35, Literally or Under the Doctrine of Equivalents

The ALJ found that none of the accused products infringed claim 35, the reverse current claim, literally or under the doctrine of equivalents. ID at 59-63. Linear contests this finding and argues that the AAT1143 and AAT1146 products infringe claim 35. Claim 35 includes several terms, “monitoring the current to the load,” “monitoring the current,” and “current threshold” which are not found in the sleep mode claims.

It is our view that the features of the accused products of monitoring a voltage using a voltage threshold do not meet the limitations of “monitoring the current to the load” or “monitoring the current” using a “current threshold”, literally or by equivalents. We do not agree with Linear that, based on Ohm’s law, “monitoring the voltage is a precise way of monitoring the

³ Linear’s cursory arguments on infringement of the sleep mode claims under the doctrine of equivalents are either based on a claim construction we have not adopted or are unsupported or both.

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current.” Linear Review Brief 4. Use of Ohm’s law would require another element, a known resistance, in order to calculate current from

Instead, we generally agree with AATI that using _____ is not the same as using a current threshold, and that thus the accused products were properly found by the ALJ not to infringe claim 35 since the accused products monitor a voltage and use _____ instead of a current threshold. AATI Review Brief 2-29, AATI Review Reply Brief 6-13, 70-72. Thus, we find no literal infringement of claim 35.

With respect to the doctrine of equivalents, it is our view that, although the accused products may perform the same function and result as recited in claim 35 (*i.e.*, “to cause one said switching transistors to be maintained OFF,” at column 20, lines 11-12 of the ‘258 patent), they do not perform that function in substantially the same way (*i.e.*, by “monitoring current to the load” and performing the function/result “when the magnitude of the monitored current falls below a current threshold.” at column 20, lines 9 and 12-14). The claim language in the last paragraph of claim 35, “monitoring current to the load,” is inextricably tied to the claim language “when the magnitude of the monitored current falls below a current threshold.” While these terms taken individually and separately could be argued to leave open the possibility that the third circuit could be equivalent by monitoring using a voltage instead of a current, the existence of a second claim term specifically defining *how* the current is monitored (*i.e.*, “when the magnitude of the monitored current falls below a current threshold”) militates against such a construction. Furthermore, when these terms are read together in the same paragraph they operate in combination to provide a clear function and to describe specifically how that function is performed.

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In our view, Linear and the IA have not sufficiently shown that the features of the accused products of monitoring meet the limitations of claim 35 of “monitoring the current” using a “current threshold,” either literally or by equivalents. The difference between monitoring current versus voltage and using a current instead of a voltage threshold is not insubstantial in this case. Accordingly, we determine that the features of the accused products of monitoring do not meet the subject limitation under the doctrine of equivalents. We thus determine that claim 35 is not directly infringed, either literally or under the doctrine of equivalents.

Summary of Infringement

For the foregoing reasons, based on our claim construction, we determine to reverse-in-part the ALJ’s conclusions on infringement of the ‘258 patent in the ID. With respect to the sleep mode claims (asserted claims 2, 3, and 34), we (i) reverse the ALJ’s finding of no literal infringement, but only with respect to representative product AAT1143, and (ii) affirm the ALJ’s finding of no infringement by representative products AAT1146, AAT1151, or AAT1265. With respect to the reverse current claim (asserted claim 35), we affirm the ALJ’s findings of no direct infringement (literal or under the doctrine of equivalents). We do not reach the issue of indirect infringement with respect to any of the claims.

C. Validity

1. Applicable Law

A patent is presumed valid. 35 U.S.C. § 282. The burden of showing invalidity is on the challenger, who must do so by clear and convincing evidence. *Hybritech, Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1375 (Fed. Cir. 1986). Further, as stated by the Federal Circuit

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in *Ultra-Tex Surfaces, Inc. v. Hill Bros. Chem. Co.*, 204 F.3d 1360, 1367 (Fed. Cir. 2000)

(emphasis added in italics), “when a party alleges that a claim is invalid based on *the very same references* that were before the examiner when the claim was allowed, that party assumes the following additional burden:”

When no prior art other than that which was considered by the PTO examiner is relied on by the attacker, he has the added burden of overcoming the deference that is due to a qualified government agency presumed to have properly done its job, which includes one or more examiners who are assumed to have some expertise in interpreting the references and to be familiar from their work with the level of skill in the art and whose duty it is to issue only valid patents. *American Hoist & Derrick Co. v. Sowa & Sons, Inc.*, 725 F.2d 1350, 1359 (Fed. Cir. 1984).

One ground for invalidity is anticipation of the claimed invention, and another ground is obviousness of the claimed invention.

A determination that a patent is invalid as being anticipated under 35 U.S.C. § 102 requires a finding that each and every limitation is found either expressly or inherently in a single prior art reference. See *State Contracting and Eng'g Corp. v. Condotte Am., Inc.*, 346 F.3d 1057, 1068 (Fed. Cir. 2003); *Celeritas Techs. Inc. v. Rockwell Int'l Corp.*, 150 F.3d 1354, 1360 (Fed. Cir. 1998).

A determination that a patent is invalid for obviousness under 35 U.S.C. § 103 requires a finding 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). A conclusion of obviousness hinges on four factual findings set forth in *Graham v. John Deere Co.*, 383 U.S. 1 (1966): (1) the scope and content of the prior art; (2) the differences between the prior art and the claims; (3) the level of ordinary skill in the art; and (4) objective evidence of nonobviousness such as

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commercial success, long felt but unsolved needs, or the failure of others. *Id.* at 13-17.

Obviousness is a conclusion of law based on the underlying factual findings which are the result of the foregoing inquiry. *In re Vaeck*, 947 F.2d 488, 493 (Fed. Cir. 1991). The Supreme Court has recently addressed obviousness in *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727 (2007). While confirming the applicability of the four factors in *Graham v. John Deere Co.*, the Supreme Court criticized the Federal Circuit's "teaching, suggestion, or motivation" (TSM) test, under which a patent claim is only shown to be invalid for obviousness if the prior art, the problem's nature, or the knowledge of a person having ordinary skill in the art reveals some motivation or suggestion to combine the prior art teachings. *KSR Int'l Co.*, 127 S. Ct. at 1742-43. The Supreme Court warned against rigid application of the TSM test: "Rigid preventative rules that deny factfinders recourse to common sense, however, are neither necessary under our case law nor consistent with it." *Id.* The Supreme Court also stated in *KSR Int'l Co.* that the fact that a combination was obvious to try might show that it was obvious under § 103. *Id.* at 1742.

2. Discussion

The ALJ's ID

The ALJ determined that asserted claims 2, 3, and 34 (*i.e.*, the sleep mode claims) are valid and that asserted claim 35 (*i.e.*, the reverse current claim) is invalid due to anticipation by the MAX782 reference under § 102(a). ID 81, 86.

In addressing the validity of the '258 patent in his ID, the ALJ considered the following challenges to validity: (1) anticipation or obviousness of all asserted claims by

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various combinations of the Siliconix Si9150, Linear Application Note 35 ("LAN35"), Linear Application Note 19 ("LAN19"), and prior art Figure 1 of the '258 patent (ID 78-81); (2) anticipation of the reverse current claim 35 by the MAX782 Evaluation Board (ID 81-86); (3) anticipation of claim 35 by the Ron Vinsant Laptop Switcher Proposal (ID 87-88); (4) anticipation of claim 35 by the ML4861 Datasheet (ID 88-89); (5) anticipation of all asserted claims by the Ziermann patent (U.S. Pat. No. 5,237,606) (ID 89-90); (6) obviousness of claim 35 in view of the MAX782 and ML4861; and (7) double patenting with respect to U.S. Patent No. 6,304,606. ID 91.

The ALJ rejected all of these arguments except for (2), anticipation of claim 35 by the MAX782 Evaluation Board under § 102(a). ID 73-91. The ALJ noted in the ID that there was no dispute among the parties that the MAX782 met all of the limitations of claim 35 (ID 82), but that there was a dispute as to the invention date (*i.e.*, conception and reduction to practice) of the '258 patent which would affect the availability of the MAX782 as prior art. ID 82-84. The ALJ determined that Linear did not have an invention date for the invention of claim 35 before the sale and distribution date of the MAX782 (prior to March 23, 1993, the effective U.S. filing date), including the feature of including a circuit for monitoring the current. ID 85. The ALJ determined in the ID that "[i]t has been shown by clear and convincing evidence that claim 35 of the '258 patent is invalid due to anticipation by the MAX782 Evaluation Board" and that "[n]o other claim of the [sic]'258 patent has been shown by clear and convincing evidence to be invalid." ID 91.

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Linear's Position

Linear argues that AATI bears a heightened burden to show invalidity since the very same references (i.e., Siliconix Si9150, LAN35, LAN19, and prior art Figure 1 of the '258 patent) were before the examiner during the prosecution of the '258 patent. Linear Review Brief 29. Linear argues that AATI has not shown by clear and convincing evidence that the asserted sleep mode claims are anticipated by LAN35 (Linear Review Brief 29-34), that LAN35 discloses an asynchronous switching regulator which does not have two transistors as required by the asserted claims (Linear Review Brief 31-34), that the asserted claims of the '258 patent are not obvious in view of LAN35 combined with Figure 1 of the '258 patent (Linear Review Brief 40-43), and that the asserted claims of the '258 patent are not obvious in view of LAN35 combined with LAN19. Linear Review Brief 43-45. Linear also argues that secondary considerations such as failure of others, solution of a long-standing problem, and commercial success provide compelling proof of nonobviousness. Linear Review Brief 45-48.

Linear argues that the MAX782 fails to anticipate claim 35 of the '258 patent (Linear Review Brief 34-37), and that the European prosecution history should not be considered in determining the validity of the MAX782. Linear Review Brief 36-37. Specifically, Linear argues that conception occurred as early as February of 1991 (Linear Review Brief 34-35), and that inventor Wilcox's notebook drawings which show

meet the limitation of claim 35 of monitoring current. Linear Review Brief 35. Linear also argues that public statements of Maxim's CEO concerning a license Maxim took to the '258 patents contradicts anticipation by the MAX782. Linear Review

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Brief 34-35.

AATI's Position

AATI argues that the ALJ correctly determined that claim 35 is invalid based on the MAX782. AATI Review Reply Brief 74. AATI requests review with respect to the validity of asserted claims 2, 3, and 34 (the sleep mode claims), should the Commission review and broaden the claim construction in the ID. AATI 74-93. AATI argues that, as discussed in its petition (AATI Pet. 3- 4), if the Commission were to adopt a broader claim construction, a number of validity issues would arise which the ALJ did not reach. AATI Review Reply Brief 79. Specifically, AATI argues that the Commission should consider whether the sleep mode claims were: (1) anticipated by LAN35 (AATI Review Reply Brief 79-83), (2) obvious in view of LAN35 alone or in combination with LAN19 (AATI Review Reply Brief 84-88), and (3) obvious in view of the admitted prior art of Figure 1 of the '258 patent in combination with LAN35. AATI Review Reply Brief 88-93. As AATI states in its petition, and we do not disagree, “[i]t is axiomatic that claims must be construed consistently for asserting both infringement and validity.” AATI Pet. 4 (citing *Amgen Inc. v. Hoescht Marion Roussel Inc.*, 314 F.3d 1313, 1330 (Fed. Cir. 2003)).

AATI argues that the ALJ properly found asserted claim 35 to be invalid due to anticipation by the MAX782. AATI Review Reply Brief 74-79, AATI Resp. 64-73. AATI asserts that Linear has not shown conception and reduction to practice of the “monitoring current” limitation of asserted claim 35 by clear and convincing evidence (AATI Review Reply Brief 75, AATI Resp. 68-70), and that the ALJ correctly

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determined that Linear was not entitled to an invention date earlier than the March 23, 1993, the effective U.S. filing date of the '258 patent. AATI Review Reply Brief 75, AATI Resp. 65, 68.

AATI also argues that “Linear failed to establish an earlier conception date for claim 35 because all of the documents that Linear relies upon utilize circuits that monitor the voltage across a timing capacitor rather than monitoring the current to the load as required by claim 35.” AATI Review Reply Brief 75. AATI argues that “Linear’s statements to the European Patent Office (“EPO”) during prosecution of the counterpart related to the '258 patent confirms that the timing-capacitor design does not ‘monitor current to the load.’” AATI Review Reply Brief 76. Lastly, AATI argues that the public statement of Mr. Gifford, Maxim’s CEO (that Maxim settled the *Impala* litigation and took a license to Linear’s patents because there was not any prior art that was that strong), “sheds no light on the validity of claim 35 of the '258 patent.” AATI Review Reply Brief 78.

The IA’s Position

The IA does not dispute the ID’s findings as to the validity of claims 2, 3, and 34, or the invalidity of claim 35. IA Review Reply Brief 19-22, IA Pet. 1.

In response to AATI’s arguments of invalidity based on LAN35 either alone or in combination with other references (AATI Review Reply Brief 79-93, AATI Pet. Resp. 73-100), the IA argues that LAN35 uses an asynchronous device with one transistor having a different type of duty cycle control and that additional nonobvious circuitry would be needed to achieve the asserted claims. IA Review Reply Brief 22. The IA also

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argues that since strong objective evidence of nonobviousness such as commercial success exists, LAN35 does not render the asserted sleep mode claims (claims 2, 3, and 34) obvious. IA Review Reply Brief 22.

In response to Linear's arguments that MAX782 does not anticipate claim 35 (Linear Review Brief 34-37), the IA argues that even if Linear has proven conception back to February 1991 (before the 1993 date of MAX782), Linear has not met its burden of proving either a prior reduction to practice or the required diligence. IA Review Reply Brief 19-21.

In response to Linear's arguments that the statements of Maxim's CEO Jack Gifford concerning their licensing of the '258 patent (that "there wasn't any prior art that was strong" and that) preclude a finding of anticipation of claim 35 (Linear Review Brief 35-36), the IA argues that the statement was broadly directed to the entire '258 patent (including sleep mode claims and the reverse current claim) and it is possible that the statement applied to only the sleep mode claims and not the reverse current claim. IA Review Reply Brief 21. Thus, the possibility exists, the IA argues, that Maxim settled in response to the existence of prior art to the sleep mode claims and not the reverse current claim, and that the MAX782 still constitutes invalidating prior art as to claim 35. IA Review Reply Brief 21 (citing *Gemstar-TV Guide Int'l, Inc. v. U.S. Int'l Trade Comm'n*, 383 F.3d 1352, 1381 (Fed. Cir. 2004) (standing for the proposition that inventorship is determined on a claim-by-claim basis)).

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Determination

We agree that it may be more difficult for AATI to meet its burden of showing invalidity in light of the fact that during the prosecution of the '258 patent the examiner had the LAN35, LAN19, and Figure 1 prior art before him. *See Ultra-Tex Surfaces*, 204 F.3d at 1367. Linear Review Brief 29; Linear Pet. Resp. 5-6, 26. We also agree with the IA with respect to the validity of claims 2, 3, and 34. IA Review Reply Brief 22, IA Pet. 1. In our view, AATI's validity challenges (based on the LAN35, LAN19, etc.) do not provide clear and convincing evidence that these asserted claims are invalid, taking into account our broader claim construction.

As to claims 2, 3, and 34, with respect to AATI's validity argument based on LAN35 and various combinations of LAN35, we agree with Linear and the IA that LAN35 is an asynchronous switching voltage regulator as opposed to a synchronous switching voltage regulator, and that LAN35 therefore does not disclose the second switching transistor required by the asserted claims. Linear Review Brief 31-33, IA Review Reply Brief 22. We find this significant, since asynchronous and synchronous switching regulators vary the power switch duty cycle in very different ways (*e.g.*, asynchronous switching regulators are not as efficient at low load current as synchronous switching regulators). *See RX-619C* at 11. Furthermore, the control circuitry for synchronous regulators is much more complex than that of asynchronous regulators due to having to provide circuitry for driving a second transistor and due to having to include circuitry to include brief deadtimes during switching (*i.e.*, where both transistors are turned OFF) to make sure that the two transistors do not cross-conduct (a condition where

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current flows from the battery or voltage source and through the two transistors to ground, instead of to the load). *See* RX-619C at 10. In our opinion, an asynchronous switching regulator having a single transistor and a diode fails to anticipate or meet the limitation of the asserted claims of a pair of synchronous switching transistors. Thus, it is our view that LAN35 cannot anticipate claims 2, 3, and 34.

Likewise, we agree with Linear that due to the significant differences in circuitry between asynchronous and synchronous switching regulators, discussed *supra*, it would not have been obvious to one of ordinary skill in the art at the time of the '258 patent to have substituted a pair of transistors for the transistor and diode of LAN35 to achieve the claimed invention. Linear Review Brief 40-45, Linear Resp. 9.

With respect to the combination of LAN35 with LAN19, we agree with Linear that LAN19 discloses replacing a transistor with a diode, which is exactly opposite and actually teaches away from what AATI asserts LAN19 stands for - the proposition that it would have been obvious to modify LAN35's asynchronous switching regulator by replacing the diode with a second transistor to create a synchronous switching regulator. Linear Pet. Resp. 19. In other words, LAN19 discloses replacing transistors with diodes but not replacing diodes with transistors.

With respect to the combination of LAN35 with the Figure 1 prior art, we agree with Linear that it would not have been obvious to one of ordinary skill in the art to combine the circuitry of these vastly different types of switching regulators (*i.e.*, the asynchronous switching regulator of the LAN35 and the synchronous switching regulator of the Figure 1 prior art). Linear Review Brief 40-43. Even if one of ordinary skill in the

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art would be motivated to combine the on/off transistor control circuitry of the LAN35 (assumedly for the top transistor, since LAN35 has no bottom transistor) with the synchronous switching regulator of the Figure 1 prior art as suggested by AATI (AATI Review Reply Brief 89), the resultant regulator would still not meet the limitation of claim 35 of a “third circuit for generating a second control signal during a second state of circuit operation to cause both switching transistors to be OFF for a first period of time during which the output capacitor maintains the output substantially at the regulated voltage.” This important sleep mode aspect of the asserted claims of the ‘258 patent is neither taught nor suggested by the on/off circuitry from the Figure 1 prior art, by the asynchronous regulator of the LAN35, or in any possible combination thereof.

We agree with AATI and the IA with regard to the invalidity of claim 35. In our view, a circuit that monitors voltage does not meet the requirement of claim 35 of monitoring current, and the ALJ correctly determined that claim 35 of the ‘258 patent does not have an invention date prior to March 23, 1993 (the effective U.S. filing date of the ‘258 patent). We agree with the IA that Linear has not established that the breadboard circuit tested in August 1991 constitutes a reduction to practice of claim 35 which requires “monitoring the current to the load” to generate a control signal when the monitored current falls below the “current threshold.” IA Review Reply Brief 20-21. “In order to establish actual reduction to practice, the inventor must prove that he constructed an embodiment . . . that met *all* the limitations of the claim.” *Slip Track Systems, Inc. v. Metal-Lite, Inc.*, 304 F.3d 1256, 1265 (Fed. Cir. 2002) (emphasis added). Linear has at best established reduction to practice of a circuit that

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Accordingly, we agree with AATI and the IA that the MAX782 is prior art to the '258 patent under § 102(a).

We are not persuaded by Linear's argument that the ALJ incorrectly considered the European prosecution history in interpreting the scope of the '258 patent as limited to a comparator which monitors current and compares one current to another as disclosed in Fig. 8 of the '258 patent. Linear Review Brief 36-37. To the contrary, in our view, the European prosecution history is quite relevant to the validity issues concerning reverse current claim 35 of the '258 patent since the European claim in question was directed to a circuit which compared a "current" to a threshold to determine "reverse polarity" in a voltage regulator. Thus, we agree with AATI that the ALJ properly considered the European prosecution history.

For the aforementioned reasons, based on our claim construction, we affirm the ALJ's findings of validity of claims 2, 3, and 34 of the '258 patent, and of invalidity with respect to claim 35 of the '258 patent.

D. Remedy, Public Interest, and Bonding

We find on the record before us, that a violation of section 337 with respect to claims 2, 3, and 34 of the '258 patent has occurred. For the reasons discussed below, we determine that (1) a limited exclusion order excluding from entry AATI products (but not downstream products) that infringe claims 2, 3, and 34 of the '258 patent is the appropriate remedy in this case, (2) the order shall not extend to downstream products containing infringing articles, (3) such an order is not precluded by consideration of the public interest factors, and (4) the bond for importation during the Presidential review

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period should be 100 percent of the entered value of the articles concerned.

The ALJ's RD

The ALJ recommended that, if the Commission determines there has been a violation of section 337 of either or both of the '258 patent and the '531 patent, a limited exclusion order covering all accused devices and any downstream products manufactured by AATI, and cell phones manufactured by third parties that contain the accused devices, is the appropriate remedy. RD 3-6.

Regarding downstream products, the ALJ stated that “[a]lthough the record indicates that AATI rarely if ever imports products containing such devices, any downstream AATI products that might exist should also be covered by the order.” RD 4. He then addressed the question of downstream products of third parties, noting that “almost all sales of accused devices (voltage regulators and charge pumps) occur overseas.” RD 4. He reasoned that an exclusion order against only AATI accused devices might be ineffective if the accused devices could be imported as a component of other products. RD 4. Therefore, the ALJ reviewed the *EPROMs* factors to determine if downstream products containing the accused devices should be subject to an exclusion order. RD 4-6; see *Certain Erasable Programmable Read-Only Memories, Components Thereof, Products Containing Such Memories, and Process for Making Such Memories*, Inv. No. 337-TA-276, Commission Opinion at 125-26 (May 1989) (“*EPROMs*”).

From the record evidence presented, the ALJ found that “the vast majority if not all sales of accused AATI devices are made to third parties located outside the United States” (RD 5-6), and determined that since almost all AATI accused devices enter the

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U.S. by being imported in downstream products, any exclusion order without downstream relief would be meaningless. RD 4, 5-6. He noted, however, that “the record contains little evidence of the types of imported products that actually contain accused devices, except for cellular telephones.” RD 6. Therefore, the ALJ recommended that any exclusion order should be directed to all accused devices and any downstream products manufactured by AATI, as well as cell phones manufactured by third parties that contain the accused devices. RD 6.

The ALJ did not recommend that the Commission issue a cease and desist order because although it was not disputed that AATI has imported some accused devices into the United States, “Linear has not shown that AATI maintains any commercially significant domestic inventory of the devices.” RD 7.

Regarding bonding, the ALJ reviewed Commission precedent on the amount of the bond to be posted pursuant to section 337(j)(3) during the 60-day Presidential review period. RD 7-8. According to that precedent, when reliable price information is available, the Commission often sets the bond based on the price differential. RD 7. However, he also noted that when such a comparison could not be made, the Commission has set the bond at 100 percent of entered value. RD 7-8. He noted that while there was record evidence of “wide price differentials between Linear and AATI products,” as well as smaller differentials, “it is not possible to calculate the difference between Linear and AATI prices.” RD 8. The ALJ also found that “there is no clear evidence relating to a reasonable royalty.” *Id.* Based on these findings, and to insure that Linear is protected from injury, the ALJ recommended that the temporary importation bond be set at 100

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percent of entered value. *Id.*

Parties' Submissions

As noted above, the Commission requested written submissions from the parties relating to the appropriate remedy, whether the statutory public interest factors preclude issuance of that remedy, and the amount of bond to be imposed during the Presidential review period. The Commission also directed AATI and the IA to submit proposed remedial orders. Additionally, third party LG made written submissions concerning the scope of the remedy.

Linear's Position

Linear argues that the Commission should issue a limited exclusion order that excludes not only AATI's own products, but also other downstream products incorporating the infringing AATI devices such as "cellular telephones, wireless LAN cards, and laptops." Linear Remedy Brief 1, Linear Remedy Reply Brief 4. Linear also requests a certification provision permitting AATI's third party customers to certify that their products do not contain infringing products. *Id.*

Linear contends that an *EPROMs* factors analysis demonstrates that downstream product relief is appropriate and necessary. Linear Remedy Reply Brief 4-14. Linear argues that the facts of this case closely resemble those in *Certain Baseband Processor Chips and Chipsets, Transmitter and Receiver (Radio) Chips, Power Control Chips, and Products Containing Same, Including Cellular Telephone Handsets*, Inv. No. 337-TA-543 (June 19, 2007) ("*Baseband Processor Chips*") and *Certain Display Controllers with Upscaling Functionality and Products Containing Same*, Inv. No. 337-TA-481, Comm'n

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Op. (Aug. 30, 2004) (“*Display Controllers*”), and favors issuance of a limited exclusion order extending to downstream products since absent such an order Linear “would effectively receive no relief at all because there was virtually no importation of the accused products outside of downstream products.” Linear Remedy Brief 7-8. Linear discusses each *EPROMs* factor and contends that each factor either does not preclude or weighs in favor of issuing a limited exclusion order covering infringing AATI products as well as any downstream products containing the same. Linear Remedy Brief 5-17, Linear Remedy Reply Brief 14-22.

Linear also requests a cease and desist order. Linear Remedy Brief 17-18, Linear Remedy Reply Brief 22. Specifically, Linear argues that AATI maintains an inventory of voltage regulators for testing as well as demonstration boards incorporating such in its facilities in Sunnyvale, California. Linear Remedy Reply Brief 22.

With regard to the public interest, Linear argues that there is no evidence that U.S. consumers will be adversely impacted by any exclusion order, that an exclusion order would not adversely affect the U.S. economy, and that a number of other manufacturers exist which produce non-infringing circuits for sale to third parties potentially impacted by any exclusion order. Linear Remedy Brief 18-19. Linear also argues that to deny relief here would adversely affect the marketplace by discouraging investment in the development of technological innovations. Linear Remedy Brief 19. Linear argues that there is no evidence to support AATI’s argument that the exclusion order would adversely affect the development of advanced semiconductor technology or adversely affect consumer model choice in the U.S. market. Linear Remedy Reply Brief 23.

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Linear agrees with the ALJ's recommendation in the RD that the bond should be set at 100 percent of the entered value. Linear Remedy Brief 19, Linear Remedy Reply Brief 23-24. Linear argues against AATI's suggested bond rate of 30 or 40 percent. Linear Remedy Reply Brief 24; *see also* AATI Review Brief 60.

AATI's Position

AATI argues that the record does not support Linear's request for a broad exclusion order that would cover downstream products. AATI Review Brief 34-58. Generally, AATI asserts an exclusion order covering a number of downstream products in addition to AATI infringing voltage regulators is burdensome and impractical based on the evidence of record. AATI Review Reply Brief 93-95. AATI argues that Linear has mischaracterized the evidence relating to remedy and that "there is no evidence in the record" "that any manufacturer of downstream products imports even a single product model into the United States that incorporates an accused AATI switching regulator device." AATI Review Reply Brief 95-97, *see also* AATI Review Reply Brief 34-38.

AATI generally argues that the balance of all of the *EPROMs* factors weighs against issuing a downstream remedy. AATI Review Reply Brief 97-105, AATI Review Brief 42-57. AATI further argues that Linear's proposed limited exclusion order would "encompass and unduly burden legitimate commerce in an enormous variety of unaccused and noninfringing products," and that other than requiring a higher bond than necessary (100 percent instead of AATI's recommended 40 percent of entered value of the accused devices), "OUII's proposed limited exclusion order is a more appropriate and narrowly-tailored order, which conforms to the proof Linear sought in discovery and

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presented at the final hearing.” AATI Review Reply Brief 107-08.

AATI argues that Linear has not met its burden of proving that AATI has a “commercially significant” inventory of infringing products in the United States as required by *Baseband Processor Chips*, that there is not sufficient evidence to support such a finding, and that therefore no cease and desist order should issue. AATI Review Reply Brief 106, AATI Review Brief 58-59.

AATI argues that the public interest would be adversely impacted by issuance of a limited exclusion order reaching downstream products. AATI Review Reply Brief 105. Specifically, AATI argues that including downstream products would have an adverse effect on advanced semiconductor technology development as well as U.S. consumer choice of consumer electronics models in the U.S. market. AATI Review Reply Brief 105.

Regarding bonding, AATI argues that the ALJ’s recommendation in the RD of a 100 percent bond, which makes no distinction between bond amount for directly imported infringing AATI voltage regulators and downstream products containing them, is inappropriate. AATI Review Brief 59-60. AATI argues in its brief that the appropriate bond for accused AATI voltage regulators is 30 or 40 percent. AATI Review Brief 60. AATI also argues in its brief that based on the selling price of accused AATI products, “the appropriate bond amount for any downstream product included in a limited exclusion order is 1% of entered value.” AATI Review Brief 61. AATI argues in its reply brief that the appropriate bond amount for accused switching regulator devices should be set at 40 percent for imported, infringing devices and at one percent for

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downstream products. AATI Review Reply Brief 107.

Third Party LG's Position

LG asserts that none of its imported products, including cell phones, use the AATI voltage regulators accused of infringing the '258 patent, and that Linear's accusations are based on AATI's charge pumps (the subject of the '531 patent). LG Remedy Brief 2-4, LG Remedy Reply Brief 2-6. LG argues that "LG's use of AATI's charge pumps is irrelevant to any remedy" "because the charge pumps are not covered by Linear's '258 patent." LG Remedy Reply Brief 4. LG argues that any exclusion order that may issue in this case should not cover LG's products (LG Remedy Brief 6), and if issued "such an order should exempt LG products, including cell phones, that are imported in the United States, sold for importation, or sold in the United States after importation." LG Remedy Brief 6.

LG argues that the *EPROMs* analysis is irrelevant to LG's downstream products since "LG's downstream products in the United States do not contain AATI's accused switching voltage regulators" and thus fall squarely in the category of "legitimate commerce" which should not be interfered with. LG Remedy Reply Brief 6 (citing *Certain Audio Processing Integrated Circuits, And Products Containing Same*, Inv. No. 337-TA-538, Final Initial and Recommended Determination (March 20, 2006)). LG argues that "[e]ven if the *EPROMs* factors were to be considered, they would uniformly weigh against including LG's downstream products in the exclusion order." LG Remedy Reply Brief 7-9, *see also* LG Remedy Brief 4-5. Lastly, LG argues that a certification provision is no substitute for proof that infringing products have been imported, and the

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Commission has previously refused to issue downstream relief where there was insufficient specific evidence of infringing downstream products entering the United States. LG Remedy Reply Brief 11-12 (citing *High-Brightness LEDs and Products Containing Same*, Inv. No. 337-TA-556, Comm'n Op. 27-28 (May 31, 2007)).

With regard to the public interest, LG argues that the public welfare, competitive conditions in the U.S. economy, employment, lower prices, and wider product choices do not warrant excluding LG's cell phones and other non-infringing downstream products from the scope of remedy. LG Remedy Brief 5-6.

In summary, LG argues that it "agrees with the Commission investigative attorney and AATI that the Commission should not issue an exclusion order that covers downstream products, particularly those products being imported or sold in the United States by LG, since LG's products do not contain the accused switching voltage regulators." LG Remedy Reply Brief 12. LG presents no arguments with respect to bonding in either its brief or reply brief.

The IA's Position

Generally, the IA argues that a limited exclusion order directed to AATI's voltage regulators and applying a 100 percent bond is appropriate. IA Review Reply Brief 23-27. However, the IA disagrees with Linear with respect to downstream products, and "does not support the extension of the exclusion order to downstream products containing the infringing voltage regulators." IA Review Brief 34. Specifically, the IA "believes that the *EPROMs* factors weigh against a downstream products remedy" due to "the limited evidence regarding downstream use of the infringing products as to the '258 patent," and

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since the vast majority of record evidence relied on by Linear and the IA concerns “the use of AATI charge pump products accused of infringing the ‘531 patent” and evidence with regard to the voltage regulator products accused of infringing the ‘258 patent “is limited and lacking in specificity.” IA Review Brief 36.

The IA argues that the principal remedy issue concerning downstream products “does not hinge directly on the differing applications of the so-called ‘*EPROMs* factors,’ but instead involves a more fundamental concern, namely the limited evidence of specific imported downstream products containing the infringing voltage regulators.” IA Review Reply Brief 23. The IA argues that Linear’s requested remedy is too broad, and that although “Linear has identified AATI’s top customers, described AATI’s sales practices, and identified certain categories of products that use switching voltage regulators” (IA Review Reply Brief 23-24), Linear “fails to specifically link any particular types of downstream products to the infringing AATI parts.” IA Review Reply Brief 24.

The IA argues that a cease and desist order is inappropriate based on “the absence of evidence of a commercially significant inventory of infringing products in the United States.” IA Review Brief 37; *see also* IA Review Reply Brief 25.

Regarding the public interest, the IA finds that the entry of a limited exclusion order covering AATI’s infringing voltage regulators is not contrary to the public interest since there is no indication that Linear or other licensed entities will be unable to satisfy the market’s demands in the foreseeable future for voltage regulators, since voltage regulators do not appear to be products which have significant public health or welfare implications. IA Review Brief 37-38.

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Regarding bonding, the IA argues that based on the evidence of record “it is unclear whether a 40% bond would make Linear whole in the event AATI continued to import infringing products during the Presidential review period,” and recommends a 100 percent bond. IA Review Reply Brief 26. The IA also argues that the evidence does not allow precise calculations as to price differentials. IA Review Reply Brief 26.

Determination

1. Remedy

In our view, a limited exclusion order is the appropriate remedy for the violation we have found. However, because there is not sufficient evidence as to the importation of downstream products containing voltage regulators infringing the ‘258 patent, either by AATI or third parties, we agree with the IA and do not include downstream products in the remedy.

Specifically, we note that, absent sufficient evidence concerning downstream products containing the infringing components, the Commission has declined to provide a downstream products remedy. *See High-Brightness LEDs and Products Containing Same*, Inv. No. 337-TA-556, Comm’n Op. 27-28 (May 31, 2007) (applying *EPROMs* factors analysis to first level intermediate downstream products such as packaged LEDs, and declining to apply *EPROMs* factors analysis to second level downstream products such as mobile phones due to a lack of evidence that the second level downstream products containing the infringing LEDs actually enter the U.S.); *Certain Audio Digital-to-Analog Converters and Products Containing Same*, Inv. No. 337-TA-499, Comm’n Op. at 21-22 (declining to extend an exclusion order to cover downstream products,

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absent evidence that a significant volume of imported products actually contained the infringing component; “the Commission will not simply assume the existence of such imports”).

In this case, Linear’s evidence relates almost exclusively to the ‘531 patent. Thus, in our view Linear has not pointed to substantial evidence showing that AATI or third parties have actually imported downstream products infringing claims 2, 3, and 34 of the ‘258 patent into the United States.

Because Linear has not provided sufficient evidence of importation of downstream products containing articles infringing the sleep mode claims of the ‘258 patent, we are unable to conduct an analysis of the *EPROMs* factors.

More specifically, although Linear argues that AATI
and alleges sales in excess of
(Linear Review Reply Brief 23; Linear Remedy Reply Brief 7-8, 8 at
footnote 4), we note that Linear fails to show significant evidence of importation of the
(although the is in the
AAT1143 respective group and allegedly corresponds to the AAT1143). *See* CX-82C
(Joint Stipulation Regarding Selection of Representative Accused AATI Products Based
on Structure and Operation of Respective Circuitry) (showing that is in the
group represented by AAT1143). In other words, although Linear may have
demonstrated that the products incorporate the
(*see* CX-283C at AATI0046303) and AATI made sales of the for the

(*see* CX-466C at AATI0046984), Linear

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has not shown that a member of the group represented by the AAT1143, here the _____, was incorporated into a downstream product which was actually and significantly imported into the United States.

Although Linear has demonstrated use of the AAT1143 in _____ (Linear Review Reply Brief 23; *see also* CX-433C at 49906-07), Linear has not sufficiently demonstrated that the _____ have actually been imported into the United States. The statement relied upon by Linear to supposedly show importation is the testimony of Mr. Williams, AATI's CEO, stating "that AATI sells to _____ and 'some of those models come into the United States.'" Linear Remedy Reply Brief 8 (citing Williams Tr. 1238:12-1239:3). However, our review of the cited transcript reveals this testimony to be inconclusive as to whether the models Mr. Williams refers to as coming into the United States are actually the _____ that contain the accused AAT1143 product, or other non-infringing models.

We are likewise not persuaded by Linear's arguments that "AATI's sales representative, Mr. Nah, testified that

_____ " (Linear Remedy Reply Brief 8), since Mr. Nah did not specify whether the accused devices he was testifying about were from the groups representative of the products accused of infringing the '531 patent or from the groups representative of the products accused of infringing the '258 patent. Accordingly, it is our view that Mr. Nah's testimony is not conclusive as to

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which contained voltage regulators infringing the sleep mode claims of the '258 patent.

We agree with the IA that *Baseband Processor Chips* does not indicate the Commission's endorsement of "full downstream relief" in the absence of evidence of actual downstream imports. IA Review Reply Brief 25. To the contrary, since it appears that the significant portion of the downstream products imported include charge pumps which are covered by the '531 patent, and the Commission has determined that there is no violation of section 337 with respect to the '531 patent, we agree with the IA that Linear's evidence to support downstream product exclusion is insufficient. IA Review Reply Brief 23-25. Thus, we agree with the IA that "the vast majority of the downstream product evidence relied upon by Linear and OUII concerned the use of AATI charge pump products accused of infringing the '531 patent," and "[i]n comparison, with regard to the switching regulator products accused of infringing the '258 patent, evidence concerning the downstream use of these products is limited and lacking in specificity." IA Review Brief 36. Linear simply has not shown enough evidence that actual downstream products imported into the U.S. include AATI's infringing voltage regulators, and therefore should be excluded.⁴

With respect to Linear's request for a cease and desist order, although Linear may be correct that AATI keeps some inventory of infringing voltage regulators in its

⁴ We note that LG has argued that Linear (*see* Linear Review Brief 9) appears to have mischaracterized Mr. Kim's testimony (LG's witness) as stating that the cell phone used an AATI voltage regulator (of the '258 patent) and not the charge pump (of the '531 patent). LG Remedy Reply Brief 4-6. We find no evidence that contradicts LG's argument on this issue.

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Sunnyvale, California facilities, we agree with the ALJ's conclusion that AATI's domestic inventory of infringing, imported products is not "commercially significant" (*see* Linear Remedy Reply Brief 22; *see also* RD 6-7). We thus agree with AATI that Linear has not met its burden of proving the AATI has a "commercially significant" inventory of infringing products in the United States as required by *Baseband Processor Chips*.

Accordingly, we determine to issue a limited exclusion order covering only AATI infringing voltage regulators and no downstream products, and determine not to issue a cease and desist order.

2. 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 agree with the IA and Linear that no public interest concerns will be raised by issuing a limited exclusion order directed to infringing voltage regulators produced by AATI. Linear Remedy Brief 18-19, Linear Remedy Reply Brief 22-23. The IA is correct that viable non-infringing alternatives exist and there is no evidence that Linear cannot meet the demand for voltage regulators. Both of these circumstances obviate any public interest concerns. Thus, we believe that excluding AATI's infringing voltage regulators

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will not harm the public health and welfare, nor will it harm United States consumers. Linear Remedy Brief 18-19. In addition, the market will be supported by non-infringing alternatives. Linear Remedy Brief 19. Accordingly, we determine that the statutory public interest factors do not preclude issuance of the proposed limited exclusion order.

3. 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).

Commission precedent allows for a 100 percent bond when it is not practical or possible to set the bond based on price differential. *See Certain Flash Memory Circuits and Products Containing Same*, Inv. No. 337-TA-382, Comm’n Op. at 26-27 (July 1997) (a 100 percent 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). We agree with Linear (Linear Remedy Brief 19, Linear Remedy Reply Brief 23-24) and the ALJ (RD 8) that wide price differentials between Linear and AATI products, lack of clear evidence relating to a reasonable royalty, and the need to insure that Linear is protected from injury weigh in favor of setting the importation bond at 100 percent of entered value. We also agree with the IA that the evidence does not allow precise calculations as to price differentials, and that the evidence generally indicates a price differential “considerably greater than the 30% claimed by AATI.” IA Review Reply Brief 26.

PUBLIC VERSION

Accordingly, we determine that the appropriate amount of bond is 100 percent of the entered value of infringing AATI voltage regulators.

V. CONCLUSION

For the reasons discussed herein, we determine to reverse-in-part the subject ID such that: (i) the ALJ's construction of the terms in claims 2, 3, 34, and 35 of the '258 patent is modified; (ii) the ALJ's conclusions on infringement of the '258 patent are reversed-in-part by reversing the ALJ's finding of no literal infringement with respect to the sleep mode claims (asserted claims 2, 3, and 34) as to representative product AAT1143, affirming the ALJ's finding of no infringement with respect to the reverse current claim (asserted claim 35), and not reaching the ALJ's findings of no indirect infringement with respect to all asserted claims; and (iii) the ALJ's findings of validity of claims 2, 3, and 34 and of invalidity of claim 35 of the '258 patent are affirmed.

Further, we have determined to exclude from entry for consumption into the United States AATI's voltage regulators that infringe one or more of claims 2, 3, and 34 of the '258 patent. The public interest factors found in 19 U.S.C. § 1337(d)(1) do not preclude issuance of this order. The amount of the bond for temporary importation during the Presidential review period is set at one hundred (100) percent of the entered value of the infringing, imported voltage regulators.

PUBLIC VERSION

By order of the Commission.

Marilyn R. Abbott
Secretary to the Commission

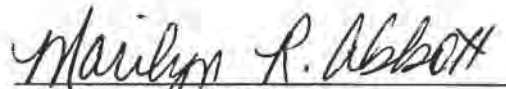
Issued: October 19, 2007

**CERTAIN VOLTAGE REGULATORS, COMPONENTS
THEREOF AND PRODUCTS CONTAINING SAME**

337-TA-564

CERTIFICATE OF SERVICE

I, Marilyn R. Abbott, hereby certify that the attached **COMMISSION OPINION** has been served by hand upon the Commission Investigative Attorney, David Hollander, Esq., and the following parties as indicated, on October 19, 2007.



Marilyn R. Abbott, Secretary
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500 E Street, SW
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UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.

In the Matter of

**CERTAIN VOLTAGE REGULATORS,
COMPONENTS THEREOF AND
PRODUCTS CONTAINING SAME**

Investigation No. 337-TA-564

**NOTICE OF COMMISSION FINAL DETERMINATION OF VIOLATION OF
SECTION 337; TERMINATION OF INVESTIGATION; ISSUANCE OF LIMITED
EXCLUSION ORDER**

AGENCY: U.S. International Trade Commission.

ACTION: Notice.

SUMMARY: Notice is hereby given that the U.S. International Trade Commission has determined that there is a violation of 19 U.S.C. § 1337 by Advanced Analogic Technologies, Inc. ("AATI") of Sunnyvale, California in the above-captioned investigation, and has issued a limited exclusion order directed against products of respondent AATI. The investigation is terminated.

FOR FURTHER INFORMATION CONTACT: Eric Frahm, Office of the General Counsel, U.S. International Trade Commission, 500 E Street, S.W., Washington, D.C. 20436, telephone (202) 205-3107. 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: This investigation was instituted on March 22, 2006, based on a complaint filed by Linear Technology Corporation ("Linear") of Milpitas, California. The complaint, as supplemented, alleged violations of section 337 of the Tariff Act of 1930 (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 voltage regulators, components thereof and products containing the same, by reason of infringement of various claims of United States

Patent No. 6,411,531 (“the ‘531 patent”) and United States Patent No. 6,580,258 (“the ‘258 patent”). The complaint named AATI as the sole respondent.

On May 22, 2007, the ALJ issued his final ID finding no violation of section 337. Specifically, he found that none of AATI’s accused products directly infringe the asserted claims of the ‘258 patent, and that one accused product directly infringed claims 4 and 26 of the ‘531 patent. He found that no indirect infringement had occurred in connection with any of the asserted claims of either patent. As to validity, the ALJ determined that claim 35 of the ‘258 patent and claims 4, 9, and 26 of the ‘531 patent are invalid due to anticipation, rejecting other arguments of invalidity, unenforceability, and estoppel. The ALJ also determined that a domestic industry exists with regard to the ‘258 patent; but that there was no domestic industry with regard to the ‘531 patent, because of a failure to meet the technical prong of the domestic industry requirement. On May 30, 2007, the ALJ issued his Recommended Determination (“RD”) on remedy and bonding. Linear, AATI, and the Commission investigative attorney (“IA”) filed petitions for review of the ALJ’s ID.

On July 6, 2007, the Commission determined to extend the deadline for determining whether to review the subject final ID by fifteen (15) days, *i.e.*, to July 24, 2007. On July 24, 2007, the Commission determined to review the final ID in part. Specifically, the Commission made the following determinations. With respect to the ‘258 patent, the Commission determined (1) to review the ID concerning the issues of claim construction, infringement, and validity; and (2) not to review the remainder of the ID as to the ‘258 patent. With respect to the ‘531 patent, the Commission determined (1) to review the ID concerning the issue of whether asserted claim 9 of the ‘531 patent is invalid for anticipation by the Kase reference, and upon review to take no position as to that issue, and (2) not to review the remainder of the ID as to the ‘531 patent.


The Commission requested written submissions from the parties relating to the issues on review, and submissions on the appropriate remedy, whether the statutory public interest factors preclude issuance of that remedy, and the amount of bond to be imposed during the Presidential review period.

Having examined the record of this investigation, including the ALJ’s final ID, the Commission has determined to reverse-in-part the subject ID such that: (i) the ALJ’s construction of the terms in claims 2, 3, 34, and 35 of the ‘258 patent are modified; (ii) the ALJ’s conclusions on infringement of the ‘258 patent are reversed-in-part by reversing the ALJ’s finding of no literal infringement with respect to the sleep mode claims (asserted claims 2, 3, and 34) only as to representative product AAT1143, and affirming the ALJ’s finding of no infringement with respect to the reverse current claim (asserted claim 35); and (iii) the ALJ’s findings of validity of claims 2, 3, and 34 and of invalidity of claim 35 of the ‘258 patent are affirmed. The Commission determined not to reach the issue of indirect infringement. The Commission has determined that the appropriate form of relief is a limited exclusion order prohibiting the unlicensed entry of voltage regulators that infringe one or more of claims 2, 3, and 34 of the ‘258 patent and that are manufactured by or on behalf of AATI, its affiliated companies, parents, subsidiaries, licensees, contractors, or other related business entities, or successors or assigns.

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. Finally, the Commission determined that the amount of bond to permit temporary importation during the Presidential review period (19 U.S.C. § 1337(j)) shall be in the amount of one hundred (100) percent of the entered value of the articles that are subject to the order. The Commission's order was delivered to the President and the United States Trade Representative on the day of its issuance.

The authority for the Commission's determination is contained in section 337 of the Tariff Act of 1930, as amended (19 U.S.C. § 1337), and in section 210.45 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.45).

By order of the Commission.



Marilyn R. Abbott
Secretary to the Commission

Issued: September 24, 2007

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

In the Matter of

**CERTAIN VOLTAGE REGULATORS,
COMPONENTS THEREOF AND
PRODUCTS CONTAINING SAME**

Inv. No. 337-TA-564

LIMITED EXCLUSION ORDER

The Commission has determined that there is a violation of section 337 of the Tariff Act of 1930, as amended, (19 U.S.C. § 1337) in the unlawful importation and sale by Advanced Analogic Technologies, Inc. ("AATI") of voltage regulators that infringe claims 2, 3, and 34 of U.S. Patent No. 6,580,258.

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 voltage regulators manufactured by or on behalf of AATI.

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 and that the bond during the Presidential review period shall be in

the amount of 100% of the entered value of each voltage regulator that is subject to this Order.

Accordingly, the Commission hereby ORDERS that:

1. Voltage regulators that are covered by one or more of claims 2, 3, and 34 of U.S. Patent No. 6,580,258 and are manufactured abroad or imported by or on behalf of AATI or any of its affiliated companies, parents, subsidiaries, or other related business entities, or their successors or assigns, are excluded from entry for consumption into the United States, entry for consumption from a foreign trade zone, or withdrawal from a warehouse for consumption, for the remaining term of the patent, except under license of the patent owner as provided by law.

2. Voltage regulators described in 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 one hundred (100) percent of entered value for covered voltage regulators, 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 until such time as she notifies the Commission that she approves or disapproves this action

but, in any event, not later than sixty (60) days after the date of receipt of this Order.

3. At the discretion of U.S. Customs and Border Protection (“CBP”) and pursuant to procedures it establishes, persons seeking to import voltage regulators that are potentially subject to this Order may be required to certify that they are familiar with the terms of this Order, that they have made appropriate inquiry, and thereupon state that, to the best of their knowledge and belief, the products being imported are not excluded from entry under paragraph 1 of the Order. At its discretion, CBP may require persons who have provided the certification described in this paragraph to furnish such records or analyses as are necessary to substantiate the certification.

4. In accordance with 19 U.S.C. § 1337(l), the provisions of this Order shall not apply to voltage regulators 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 Commission 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
Customs and Border Protection.

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

By Order of the Commission.

A handwritten signature in black ink, appearing to read "Marilyn R. Abbott". The signature is fluid and cursive, with a large initial "M" and a long, sweeping underline.

Marilyn R. Abbott
Secretary to the Commission

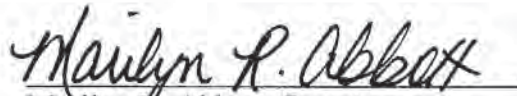
Issued: September 24, 2007

**CERTAIN VOLTAGE REGULATORS, COMPONENTS
THEREOF AND PRODUCTS CONTAINING SAME**

337-TA-564

CERTIFICATE OF SERVICE

I, Marilyn R. Abbott, hereby certify that the attached **NOTICE OF COMMISSION FINAL DETERMINATION OF VIOLATION OF SECTION 337; TERMINATION OF INVESTIGATION; ISSUANCE OF LIMITED EXCLUSION ORDER** has been served by hand upon the Commission Investigative Attorney, David Hollander, Esq., and the following parties as indicated, on September 25, 2007.


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

**In the Matter of
CERTAIN VOLTAGE REGULATORS,
COMPONENTS THEREOF AND
PRODUCTS CONTAINING SAME**

Investigation No. 337-TA-564

**NOTICE OF COMMISSION DETERMINATION TO REVIEW PORTIONS OF A
FINAL INITIAL DETERMINATION OF VIOLATION OF SECTION 337; SCHEDULE
FOR FILING WRITTEN SUBMISSIONS ON THE ISSUES UNDER REVIEW AND ON
REMEDY, THE PUBLIC INTEREST, AND BONDING**

AGENCY: U.S. International Trade Commission.

ACTION: Notice.

SUMMARY: Notice is hereby given that the U.S. International Trade Commission has determined to review portions of the final Initial Determination ("ID") issued by the presiding Administrative Law Judge ("ALJ").

FOR FURTHER INFORMATION CONTACT: Eric Frahm, Office of the General Counsel, U.S. International Trade Commission, 500 E Street, S.W., Washington, D.C. 20436, telephone (202) 205-3107. 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: This investigation was instituted on March 22, 2006, based on a complaint filed by Linear Technology Corporation ("Linear") of Milpitas, California. The complaint, as supplemented, alleged violations of section 337 of the Tariff Act of 1930 (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 voltage regulators, components thereof and products containing the same, by reason of infringement of claims 1-14 and 23-35 of United States Patent No. 6,411,531 ("the '531 patent") and claims 1-19, 31, 34, and 35 of United States

Patent No. 6,580,258 (“the ‘258 patent”). The complaint named Advanced Analogic Technologies, Inc. (“AATI”) of Sunnyvale, California as the sole respondent. Only claims 4, 9, and 26 of the ‘531 patent and claims 2, 3, 34, and 35 of the ‘258 patent remain in the investigation.

On May 22, 2007, the ALJ issued his final ID finding no violation of section 337. Specifically, he found that none of AATI’s accused products directly infringe the asserted claims of the ‘258 patent, and that one accused product directly infringes claims 4 and 26 of the ‘531 patent. He found that no indirect infringement had occurred in connection with any of the asserted claims of either patent. As to validity, the ALJ determined that claim 35 of the ‘258 patent and claims 4, 9, and 26 of the ‘531 patent are invalid due to anticipation, rejecting other arguments of invalidity, unenforceability, and estoppel. The ALJ also determined that a domestic industry exists with regard to the ‘258 patent; but that there was no domestic industry with regard to the ‘531 patent, because of a failure to meet the technical prong of the domestic industry requirement. With respect to the ‘531 patent, the Commission understands the ALJ to have construed the term “voltage regulator” to include a tolerance of approximately five percent as set forth at page 35 of the ID. On May 30, 2007, the ALJ issued his Recommended Determination (“RD”) on remedy and bonding. Linear, AATI, and the Commission investigative attorney (“IA”) filed petitions for review of the ALJ’s ID.

Having examined the pertinent portions of the record of this investigation, including the ALJ’s final ID, the petitions for review, and the responses thereto, the Commission has made the following determinations. With respect to the ‘258 patent, the Commission has determined (1) to review the ID concerning the issues of claim construction, infringement, and validity; and (2) not to review the remainder of the ID as to the ‘258 patent. With respect to the ‘531 patent, the Commission has determined (1) to review the ID concerning the issue of whether asserted claim 9 of the ‘531 patent is invalid for anticipation by the Kase reference, and upon review to take no position as to that issue, and (2) not to review the remainder of the ID as to the ‘531 patent.

The parties should brief their position on these issues with reference to the applicable law and the evidentiary record. In connection with its review, the Commission is particularly interested in responses to the following questions:

1. With respect to asserted claim 35 of the ‘258 patent, can monitoring a voltage using a voltage threshold in the accused products be considered an equivalent to “monitoring the current” using a “current threshold” in assessing infringement of claim 35 under the doctrine of equivalents? (parties should discuss the “function, way, result” test in their analysis.)
2. With respect to the ‘258 patent, provide an analysis of indirect infringement under §§ 271(b) and (c), including an analysis of any evidence upon which you rely.

In connection with the final disposition of this investigation, the Commission may (1) issue an order that could result in the exclusion of the subject articles from entry into the United

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

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

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

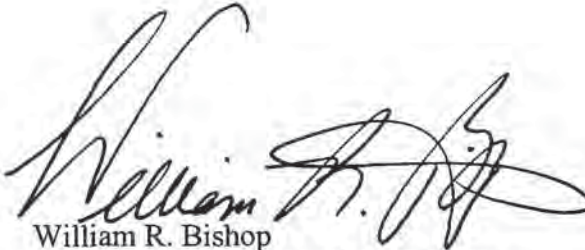
WRITTEN SUBMISSIONS: The parties to the investigation are requested to file written submissions on the issues for review identified in this notice. Parties to the investigation, interested government agencies, and any other interested parties are encouraged to file written submissions on the issues of remedy, the public interest, and bonding. Such submissions should address the RD issued by the ALJ on remedy and bonding on May 30, 2007. Complainant and the Commission investigative attorney are also requested to submit proposed remedial orders for the Commission's consideration. Complainant is requested to state the dates that the '258 patent expires and the HTSUS numbers under which the accused products are imported. The written submissions and proposed remedial orders must be filed no later than close of business on August 7, 2007. Reply submissions must be filed no later than the close of business on August 14, 2007. 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. § 210.6. 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 and 210.50 of the Commission's Rules of Practice and Procedure (19 C.F.R. §§ 210.42-46 and 210.50).

By order of the Commission.



William R. Bishop
Acting Secretary to the Commission


Issued: July 24, 2007

**CERTAIN VOLTAGE REGULATORS, COMPONENTS
THEREOF AND PRODUCTS CONTAINING SAME**

337-TA-564

CERTIFICATE OF SERVICE

I, Marilyn R. Abbott, hereby certify that the attached **NOTICE OF COMMISSION DETERMINATION TO REVIEW PORTIONS OF A FINAL INITIAL DETERMINATION OF VIOLATION OF SECTION 337; SCHEDULE FOR FILING WRITTEN SUBMISSIONS OF THE ISSUES UNDER REVIEW AND ON REMEDY, THE PUBLIC INTEREST, AND BONDING** has been served by hand upon the Commission Investigative Attorney, David Hollander, Esq., and the following parties as indicated, on July 25, 2007.


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PUBLIC VERSION

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.

In the Matter of

**Certain Voltage Regulators, Components
Thereof and Products Containing Same**

Investigation No. 337-TA-~~564~~

INITIAL DETERMINATION

Administrative Law Judge Sidney Harris

Pursuant to the notice of investigation, 71 Fed. Reg. 14545 (2006), this is the Administrative Law Judge's Initial Determination in the matter of Certain Voltage Regulators, Components Thereof and Products Containing Same, United States International Trade Commission Investigation No. 337-TA-564. *See* 19 C.F.R. § 210.42(a).

The Administrative Law Judge hereby determines that no violation of section 337 of the Tariff Act of 1930, as amended, has occurred in the importation into the United States, the sale for importation, or the sale within the United States after importation, of certain voltage regulators, components thereof and products containing same by reason of infringement of claims 1- 14 or 23-35 of United States Patent No. 6,411,531, or claims 1-19, 31, 34 or 35 of United States Patent No. 6,580,258.¹

¹ The Administrative Law Judge has included findings of fact in the Opinion portion of this Initial Determination. The Findings of Fact portion contains additional findings.

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The following abbreviations may be used in this Initial Determination:

- ALJ - Administrative Law Judge
- ALJX - Administrative Law Judge Exhibit
- CDX - Complainant's Demonstrative Exhibit
- CPX - Complainant's Physical Exhibit
- CX - Complainant's Exhibit
- Dep. - Deposition
- EDIS - Electronic Document Imaging System
- FF - Finding(s) of Fact
- JPX - Joint Physical Exhibit
- JX - Joint Exhibit
- PCL - Proposed Conclusion of Law (CPCL, RPCL or SPCL)
- PFF - Proposed FF (CPFF, RPFF or SPFF)
- PRF - Proposed Reply or Rebuttal Finding (CPRF, RPRF or SPRF)
- RDX - Respondent's Demonstrative Exhibit
- RPX - Respondent's Physical Exhibit
- RX - Respondent's Exhibit
- SX - Commission Investigative Staff Exhibit
- Tr. - Transcript.

I. BACKGROUND

A. Institution and Procedural History of This Investigation

By publication of a notice in the *Federal Register* on March 22, 2006, pursuant to subsection (b) of section 337 of the Tariff Act of 1930, as amended, the Commission instituted this investigation 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 voltage regulators, components thereof or products containing same by reason of infringement of one or more of claims 1- 14 and 23-35 of U.S. Patent No. 6,411,531 and claims 1-19, 31, 34, and 35 of U.S. Patent No. 6,580,258, and whether an industry in the United States exists as required by subsection (a)(2) of section 337.

71 Fed. Reg. 14545 (2006).

The complainant is Linear Technology Corp. (Linear) of Milpitas, California. The Commission named Advanced Analogic Technologies, Inc. (AATI) of Sunnyvale, California as the respondent. The Commission Investigative Staff of the Office of Unfair Import Investigations (OUII) is also a party in this investigation. *Id.*

The evidentiary hearing on the question of violation of section 337 commenced on December 4 and ended on December 15, 2006. The parties have filed post-hearing briefs, reply briefs and proposed findings of fact and conclusions of law.

On March 9, 2007, AATI filed a copy of an opinion recently issued by the Court of Appeals for the Federal Circuit in *Hakim v. Cannon Avent Group*, 2005-1398 (Fed. Cir. Feb. 23, 2007), and a memorandum arguing that the Federal Circuit's opinion would support a new argument concerning construction of the '258 patent. On March 21, 2007, Linear filed an

opposition to AATI's brief. The new argument would not affect the outcome of this investigation with regard to the '258 patent, and the Federal Circuit's opinion does not affect the claim construction or other analyses carried out on the basis of the parties' current post-hearing briefing. Thus, the question of whether the new argument should be permitted is moot.

Following the close of the hearing, Linear filed Motion No. 564-32 to strike the hearing testimony of an AATI's expert witness, Dr. Wei. Dr. Wei's testimony did not prejudice any party, and is crucial to the development of a full and fair record. The motion is DENIED. Linear's Motion No. 564-30 for sanctions is DENIED.

Further, after the close of the hearing, AATI and Linear filed several motions to add exhibits or conform the record to the hearing evidence and the agreements of the parties. Motions No. 564-33, 564-34, 564-35 and 654-36 are GRANTED.

B. The Products at Issue

The products at issue are electronic devices that are grouped in two categories: (1) devices called voltage regulators which are accused of infringing certain claims of the '258 patent, and (2) devices called charge pumps which are accused of infringing certain claims of the '531 patent. Many of the accused devices share similar or identical circuitry. The parties have therefore been able to stipulate that only a relatively small number of AATI products must be analyzed in order to make infringement determinations for the dozens of products accused in this investigation. *See CX-82C (Joint Stipulation Regarding Section of Representative Accused AATI Products Based on Structure and Operation of Respective Circuitry (Nov. 3, 2006)).*

II. IMPORTATION OR SALE

No party has contested the fact that AATI has imported and/or sold the accused products, and thus the statutory requirement of importation or sale has been satisfied, even with respect to products that were in development at the time that the parties entered into the aforementioned stipulation regarding representative products. In addition, no party has contested the Commission's personal jurisdiction over the parties and subject-matter jurisdiction over the products subject to this investigation. *See, e.g.*, Linear Post-Hearing Brief at 3; AATI Post-Hearing Brief at 1; OUII Post-Hearing Brief at 59.

III. CLAIM CONSTRUCTION

This is a patent-based investigation. Any finding of infringement or non-infringement requires a two-step analytical approach. First, the asserted claims of a patent must be construed as a matter of law to determine their proper scope. Second, a factual determination must be made as to whether the properly construed claims read on an accused device. *See Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 979 (Fed. Cir. 1995)(*en banc*), *aff'd*, 517 U.S. 370 (1996).

Only those claim terms that are 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.*, 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).

Claim construction begins with the language of the claims themselves, which should be given their ordinary and customary meaning as understood by a person of ordinary skill in the art,

viewing the claim terms in the context of the entire patent.² *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312-13 (Fed. Cir. 2005), *cert. denied*, 126 S.Ct. 1332, 164 L.Ed.2d 49 (2006). In some instances, claim terms do not have particular meaning in a field of art, and claim construction involves little more than the application of the widely accepted meaning of commonly understood words. *Id.* at 1314 (In such circumstances, general purpose dictionaries may be helpful.). In many cases, claim terms have a specialized meaning, and it is necessary to determine what a person of skill in the art would have understood disputed claim language to mean, by analyzing the words of the claims themselves, the remainder of the specification, the prosecution history, and extrinsic evidence concerning relevant scientific principles, [as well as]

² With respect to claim preambles, the Court of Appeals for the Federal Circuit has explained 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) (quoting *Bell Communications Research, Inc. v. Vitalink Communications Corp.*, 55 F.3d 615, 620 (Fed. Cir. 1995)).

Moreover, the court has stated:

[A]s we explained in *Griffin v. Bertina*, 285 F.3d 1029, 62 U.S.P.Q.2d 1431 (Fed. Cir. 2002), preamble language will limit the claim if it recites not merely a context in which the invention may be used, but the essence of the invention without which performance of the recited steps is nothing but an academic exercise. *Id.* at 1033, 62 U.S.P.Q.2d at 1434. This principle holds true here, as it frequently does for method claims: growing and isolating are not merely circumstances in which the method may be useful, but instead are the *raison d'être* of the claimed method itself.

Boehringer Ingelheim Vetmedica, Inc. v. Scherring-Plough Corp., 320 F.3d 1339, 1345 (Fed. Cir. 2003). *See also In re Paulsen*, 30 F.3d 1475, 1479 (Fed. Cir. 1994) (terms appearing in a preamble may be deemed limitations of a claim when they give meaning to the claim and properly define the invention) (internal quotation omitted).

the meaning of technical terms, and the state of the art. *Id.* (quoting *Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1116 (Fed. Cir. 2004)).

In cases in which the meaning of a claim term is uncertain, the specification usually is the best guide to the meaning of the term. *Phillips*, 415 F.3d at 1315. As a general rule, the particular examples or embodiments discussed in the specification are not to be read into the claims as limitations. *Markman*, 52 F.3d at 979. However, the specification is always highly relevant to the claim construction analysis. The specification is usually dispositive. It is the single best guide to the meaning of a disputed term. *Phillips*, 415 F.3d at 1315. Moreover, “[t]he 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.

If the intrinsic evidence does not establish the meaning of a claim, then extrinsic evidence may be considered. Extrinsic evidence consists of all evidence external to the patent and the prosecution history, including inventor testimony, expert testimony and learned treatises. *Phillips*, 415 F.3d at 1317. Inventor testimony can be useful to shed light on the relevant art. In evaluating expert testimony, a court should discount any expert testimony that is clearly at odds with the claim construction mandated by the claims themselves, the written description, and the prosecution history, in other words, with the written record of the patent. *Id.* at 1318. Extrinsic evidence may be considered if a court deems it helpful in determining the true meaning of language used in the patent claims. *Id.*

A. U.S. Patent No. 6, 580,258

United States Patent No. 6,580,258 is entitled Control Circuit and Method for Maintaining High Efficiency over Broad Current Ranges in a Switching Regulator Circuit. The

'258 patent issued on June 17, 2003, to Milton E. Wilcox and Randy G. Flatness, and it was assigned to Linear. *See* JX-3 ('258 Patent). The specification of the '258 patent provides the following description of voltage regulation as background to the claimed invention:

The present invention relates to a switching regulator circuit. More particularly, the present invention relates to a control circuit and method for maintaining high efficiency over broad current ranges in a switching regulator circuit.

The purpose of a voltage regulator is to provide a predetermined and constant output voltage to a load from a poorly-specified and fluctuating input voltage source. Generally, there are two different types of regulators: series regulators and switching regulators.

The series regulator employs a pass element (e.g., a power transistor) coupled in series with a load and controls the voltage drop across the pass element in order to regulate the voltage which appears at the load. In contrast, the switching regulator employs a switch (e.g., a power transistor) coupled either in series or parallel with the load. The regulator controls the turning ON and turning OFF of the switch in order to regulate the flow of power to the load. The switching regulator employs inductive energy storage elements to convert the switched current pulses into a steady load current. Thus, power in a switching regulator is transmitted across the switch in discrete current pulses, whereas in a series regulator, power is transmitted across the pass element as a steady current flow.

In order to generate a stream of current pulses, switching regulators typically include control circuitry to turn the switch on and off. The switch duty cycle, which controls the flow of power to the load, can be varied by a variety of methods. For example, the duty cycle can be varied by either (1) fixing the pulse stream frequency and varying the ON or OFF time of each pulse, or (2) fixing the ON or OFF time of each pulse and varying the pulse stream frequency.

Which ever method is used to control the duty cycle, switching regulators are generally more efficient than series regulators. In series regulators, the pass element is generally operated in its linear region where the pass element conducts current continuously. This results in the continuous dissipation of power in the pass transistor. In contrast, in switching regulators, the switch is either OFF, where no power is

dissipated by the switch, or ON in a low impedance state, where a small amount of power is dissipated by the switch. This difference in operation generally results in reduced amounts of average power dissipation in switching regulators.

The above difference in efficiency can be more apparent when there is a high input-output voltage difference across the regulator. For example, it would not be unusual for a series regulator to have an efficiency of less than 25 percent when a switching regulator could perform an equivalent function with an efficiency of greater than 75 percent.

Because of their improved efficiency over series regulators, switching regulators are typically employed in battery-operated systems such as portable and laptop computers and hand-held instruments. In such systems, when the switching regulator is supplying close to the rated output current (e.g., when a disk or hard drive is ON in a portable or laptop computer), the efficiency of the overall circuit can be high. However, the efficiency is generally a function of output current and typically decreases at low output current. This reduction in efficiency is generally attributable to the losses associated with operating the switching regulator. These losses include, among others, quiescent current losses in the control circuitry of the regulator, switch losses, switch driver current losses and inductor/transformer winding and core losses.

The reduction in efficiency of a switching regulator at low output current can become important in battery-operated systems where maximizing battery lifetime is desirable.

In view of the foregoing, it would be desirable to provide a high efficiency switching regulator.

It would also be desirable to provide a control circuit and method for maintaining high efficiency over broad current ranges, including low output currents, in a switching regulator circuit.

JX-3 ('258 Patent), col. 1, line 20 through col. 2, line 27 (Background).

The '258 patent specification explains how the inventors addressed the desirability of providing both a high efficiency switching regulator, and a switching regulator circuit with a

control circuit and method for maintaining high efficiency over broad current ranges (including low output currents). The claimed invention is summarized as follows:

It is therefore an object of the present invention to provide a high efficiency switching regulator.

It is also an object of the present invention to provide a control circuit and method for maintaining high efficiency over broad current ranges, including low output currents, in a switching regulator circuit.

In accordance with these and other objects of the invention, there is provided a circuit and method for controlling a switching voltage regulator having (1) a switch including one or more switching transistors and (2) an output adapted to supply current at a regulated voltage to a load including an output capacitor. The circuit and method generates a control signal to turn the one or more switching transistors OFF under operating conditions when the voltage at the output is capable of being maintained substantially at the regulated voltage by the charge on the output capacitor (e.g., during low output currents). During such periods of time, the load does not consume power from the input power source. Therefore, the regulator efficiency is increased. If desired, other components in the switching regulator, in addition switching transistors, can also be intentionally held OFF to conserve additional power. This additional feature of the present invention can further increase the efficiency of the overall regulator circuit.

The circuit and method of the present invention can be used to control various types of switches in switching regulator circuits, including switches that use either one or more power transistors. Additionally, the circuit and method can be used to control switches in various types of switching regulator configurations, including voltage step-down, voltage step-up and polarity-inversing configurations.

Additionally, the circuit and method of the present invention can vary the OFF time of the switching transistor in response to the input and output voltages of the switching regulator. This feature of the present invention reduces the emission of audible noise from the switching regulator during low input voltage conditions. It also reduces the potential for current runaway during short circuits in the output voltage for some regulator configurations.

JX-3('258 Patent), col. 2, line 30 through col. 3, line 2 (Summary of the Invention).

One of ordinary skill in the art relevant to the '258 patent would have a bachelor's degree in electrical engineering or a similar field, and at least two years of work experience designing switching regulators.³ Wei Tr. 1679-1680.

The claimed invention of the '258 patent is set forth in a series of 35 claims. Linear accuses the AATI products at issue of infringing claims 2, 3, 34 and 35. *See* Linear Post-Hearing Brief at 5-11. Claim 2 depends directly from claim 1, while claim 3 depends from claim 1 through claim 2.⁴ Claims 34 and 35 are independent claims. Reproduced below are independent claim 1 and its asserted dependent claims 2 and 3, along with independent asserted claims 34 and 35.

1. A circuit for controlling a switching voltage regulator, the regulator having (1) a switch coupled to receive an input voltage and including a pair of synchronously switched switching transistors and (2) an output for supplying current at a regulated voltage to a load which includes an output capacitor, the circuit comprising:

a first circuit for monitoring the output to generate a first feedback signal;

a second circuit for generating a first control signal during a first state of circuit operation, the first control signal being responsive to the first feedback signal to vary the duty cycle of the switching transistors to maintain the output at the regulated voltage; and

³ This definition of ordinary skill was provided by AATI's expert witness in response to a question asked by the Administrative Law Judge, and it is supported by AATI and the Commission Investigative Staff. *See* AATI Post-Hearing Brief at 21; RPF 875; OUII Post-Hearing Brief at 4 n.2; SPFF 184. It does not appear that Linear briefed this question.

⁴ A dependent claim includes all the limitations of the claim from which it depends. *See, e.g., Wahpeton Canvas Co. v. Frontier, Inc.*, 870 F.2d 1546, 1553 (Fed. Cir. 1989).

a third circuit for generating a second control signal during a second state of circuit operation to cause both switching transistors to be OFF for a first period of time during which the output capacitor maintains the output substantially at the regulated voltage.

2. The circuit of claim 1 wherein the second control signal is generated in response to the first feedback signal.

3. The circuit of claim 2 wherein the circuit changes from the second to the first state of operation in response to the magnitude of the first feedback signal falling below a first threshold level.

34. A method for controlling a switching voltage regulator, the regulator having (1) a switch coupled to receive an input voltage and including a pair of synchronously switched switching transistors and (2) an output for supplying current at a regulated voltage to a load which includes an output capacitor, the method comprising the steps of:

(a) monitoring the output to generate a first feedback signal;

(b) varying the duty cycle of the switching transistors in response to the first feedback signal to maintain the output at the regulated voltage during a first state of circuit operations;

(c) turning both switching transistors OFF for a first period of time following the first state of circuit operation so as to allow the output capacitor to maintain the output substantially at the regulated voltage by discharging during a second state of circuit operation; and

(d) turning at least one of said switching transistors ON to recharge the output capacitor following the second state of circuit operation.

35. A circuit for controlling a switching voltage regulator, the regulator having (1) a switch coupled to receive an input voltage and including a pair of synchronously switched switching transistors and (2) an output for supplying current at a regulated voltage to a load

which includes an output inductor, the circuit comprising:

a first circuit for monitoring the output to generate a first feedback signal;

a second circuit for generating a first control signal during a first state of circuit operation, the first control signal being responsive to the first feedback signal to vary the duty cycle of the switching transistors to maintain the output at the regulated voltage; and

a third circuit for monitoring the current to the load to generate a second control signal during a second state of circuit operation to cause one of said switching transistors to be maintained OFF when the magnitude of the monitored current falls below a current threshold.

JX-3 ('258 Patent), col. 16, lines 39-63, and col. 18, line 57 through col. 20, line 14.

The parties have taken markedly different approaches with respect to the presentation of their proposed claim constructions, both during the hearing and in their post-hearing briefs. Most notably, Linear did not allocate any of its main post-hearing brief to claim construction arguments, including the substantive issues raised by the parties' disputed claim interpretations. Rather, as it did during the hearing, Linear stated that both it and its expert, Dr. Pedram, rely on the district court's claim construction order from the prior *Impala* litigation (CX-50), as revised by the Federal Circuit (CX-52); CFF 1395-1399. Linear Post-Hearing Brief at 4; *see also* Linear Reply Brief at 1 (reference to *Impala* re claim construction), 7 (reference to *Impala* re infringement).⁵

⁵ Linear's reply brief is entitled Linear Technology Corporation's Response to Respondent Advanced Analogic Technologies Inc.'s Post Hearing Brief. It appears, however, to be Linear's comprehensive reply brief because it addresses arguments of both AATI and the Commission Investigative Staff, and it uses 29 of the 30 pages permitted for a party's reply brief. *See* Tr.

(continued...)

The *Impala* litigation referred to in Linear's brief is a suit brought by Linear in the United States District Court for the Northern District of California against several defendants for alleged infringement of U.S. Patent No. 5,481,178. Although AATI is the respondent in this investigation, it was not a defendant or otherwise represented in the *Impala* litigation, nor were any of the accused AATI products at issue in the prior case. The '178 patent at issue in the *Impala* litigation is a predecessor to the '258 patent which is asserted in this investigation at the Commission.⁶ With the exception of certain claims (which are technically part of the specification), the '178 and '258 patents have specifications that are substantively identical.

The *Impala* claim construction is not contained in a single, unified document nor, of course, was it rendered with respect to the issues present in this litigation. Eight years ago, following a *Markman* hearing, the District Court construed certain claims of the predecessor '178 patent in *Linear Tech. Corp. v. Impala Linear Corp.*, No. C 98-1727 FMS, Claim Construction Order (N.D. Cal. June 9, 1999)(CX-50). The District Court subsequently issued an order addressing a number of summary judgment motions, and altered some of the claim constructions

⁵ (...continued)
2417.

⁶ The '258 patent records its history as follows:

The present application is a continuation of application Ser. No. 09/395,895, filed Sep. 14, 1999, now U.S. Pat. No. 6,304,066, which is a continuation of application Ser. No. 08/978,167, filed Nov. 26, 1997, now U.S. Pat. No. 5,994,885, which is a division of application Ser. No. 08/799,467, filed Feb. 13, 1997, now U.S. Pat. No. 5,731,694, which is a continuation of application Ser. No. 08/634,688, filed Apr. 18, 1996 now abandoned, which is a continuation of application Ser. No. 08/476,232, filed Jun. 07, 1995 now abandoned, which is a division of application Ser. No. 08/036,047, filed Mar. 23, 1993, now U.S. Pat. No. 5,481,178.

JX ('258 Patent), col. 1, lines 6-17.

set forth the earlier claim construction order. *See* CX-51. The District Court's decision granting summary determination of non-infringement as to one of the defendants was appealed to and vacated by the Federal Circuit, which reviewed and reversed certain of the District Court's claim constructions. *See Linear Technology Corp. v. Impala Linear Corp.*, 379 F.3d 1311 (Fed. Cir. 2004)(CX-52). A review of the *Impala* decision of the District Court and the Federal Circuit (i.e., CX-50, CX-51 and CX-52) shows that those courts have addressed numerous and varied claim terms and limitations of the '178 patent with varying degrees of relevancy to the issues presented in this investigation under the '258 patent. Linear did not analyze the claim constructions of the various *Impala* opinions in its main post-hearing brief, although it refers to portions of the opinions in connection with its infringement arguments.

While Linear and its expert rely exclusively upon the opinions of the District Court and the Federal Circuit, Linear has not argued in its briefs that those prior constructions are legally binding in this investigation. *See* Linear Post-Hearing Brief at 4; Linear Reply Brief at 1-2. Indeed, as argued by the Commission Investigative Staff, those prior opinions based on cases in which AATI did not participate could not legally bind AATI in this investigation or foreclose the Commission from construing the asserted claims in order to address all of the material issues in this investigation relating to the later-issued '258 patent. *See* OUII Post-Hearing Brief at 4-5 (citing *Texas Instruments, Inc. v. Linear Tech. Corp.*, 182 F. Supp. 2d 580, 586 (E.D. Tex. 2002) (A claim construction in prior suit did not collaterally estop unrelated defendant from seeking a new claim construction. An independent review of the claims would ensure fairness to all

parties.).⁷

Moreover, the claim construction issues raised in this investigation with respect to the ‘258 patent are not identical to those addressed in the prior *Impala* litigation with respect to the ‘178 patent. While the claim constructions from prior litigation involving the ‘178 patent may be informative, disputed terms of the ‘258 patent are construed in this Initial Determination.

In AATI’s main post-hearing brief, the respondent argues that the asserted claims of the ‘258 patent can be divided into two groups: (1) the sleep mode claims (i.e., claims 2, 3 and 34), and (2) the reverse current prevention claim (i.e., claim 35). AATI notes that in some instances a claim term is found in more than one claim, or is found in unasserted independent claim 1 whose dependent claims 2 and 3 are specifically asserted by Linear. Based on the evidence and arguments offered during the hearing, AATI argues that the only disputed terms relevant to the asserted claims may be delineated as follows: (1) a switch including . . . a pair of synchronously switched switching transistors, (2) substantially at the regulated voltage, and (3) first state of circuit operation and the concomitant second state of circuit operation. AATI Post-Hearing Brief at 21. In its reply brief, Linear responds directly to the above three claim terms, which were briefed by AATI. *See* Linear Reply Brief at 1-2.

⁷ Linear is especially aware of the fact that AATI cannot be bound by the *Impala* case. In the *Texas Instruments* case, cited in the text *supra*, Linear was the defendant accused of patent infringement, and demonstrated that it could not be bound by a claim construction from a prior suit in which it was not a party. *See* 182 F. Supp. at 585. Other cases addressing similar circumstances include *Kollmorgen Corp. v. Yaskawa Elec. Corp.*, 147 F. Supp. 2d 464, 470 (W.D. Va. 2001) (Courts need not blindly apply the doctrine of collateral estoppel to a prior *Markman* ruling that construes a patent’s scope and claim.) and *Graco Children’s Products, Inc. v. Regalo International U.C.*, 77 F. Supp.2d 660, 663 (E.D. Pa. 1999) (The Court in *Markman* did not guarantee that collateral estoppel would apply in every case, and this Court will not extend the Supreme Court ruling to mean as much, especially where, as here, the circumstances of the instant action require that a different result be reached).

The Staff's main post-hearing brief takes a different approach by discussing in detail each of the asserted claims (and independent claim 1) in a nearly limitation-by-limitation manner. *See* OUII Post-Hearing Brief at 25-35. However, it is evident that the primary areas of dispute among the parties are adequately encapsulated in the three claim terms identified by AATI, and those terms provide the structure of the claim construction portion of this Initial Determination relating to the '258 patent.⁸ Any further claim construction will be addressed directly in connection with the infringement analysis.⁹

1. a switch including . . . a pair of synchronously switched switching transistors

The preamble of unasserted independent claim 1 (and thus asserted dependent claims 2 and 3), and the preamble of independent asserted claim 35 indicate that the claimed invention is a circuit for controlling a switching voltage regulator in which the regulator has, *inter alia*, a switch coupled to receive an input voltage and including a pair of synchronously switched

⁸ The Staff concurs with AATI that claims 2, 3 and 34 are sleep mode claim, and that the claimed invention also covers reverse current protection. *See* OUII Post-Hearing Brief at 20-25, 49.

In its *Impala* opinion, the Federal Circuit identified sleep mode and current reversal protection mode as features of the claimed invention of the related '178 patent, as follows:

The '178 patent discloses a sleep mode where both switching transistors are turned off to additionally reduce the power consumed by the regulator itself to further improve the regulator's efficiency. ['258 patent] at col. 5, ll. 59-66. Also disclosed is a current reversal prevention mode where the regulator prevents the reverse flow of electrical current to forestall power from being drained from the load. *Id.* at col. 14, ll. 1-10.

See 379 F.3d at 1316.

⁹ Any Linear argument concerning the interpretation of claim language appears almost exclusively in connection with infringement arguments and related proposed findings of fact.

switching transistors. Asserted independent claim 34 is a method claim that similarly pertains to controlling a switching voltage regulator, the regulator having . . . a switch coupled to receive an input voltage and including a pair of synchronously switched switching transistors.

As indicated in the discussion of the general law pertaining to claim construction, terms appearing in a preamble may be deemed claim limitations when they give meaning to the claim and properly define the invention. *See Eaton Corp.*, 323 F.3d at 1339; *In re Paulsen*, 30 F.3d at 1479. No party disputes the fact that the preambles at issue add a limitation pertaining to synchronously switched switching transistors. There are, however, disputes as the meaning of the limitation.

AATI argues that the pair of transistors covered by the phrase synchronously switched switching transistors must be controlled as a single unit. AATI argues that its construction is based on the plain claim language, which indicates that the two transistors are part of single switch. Further, it is argued, each embodiment on the '258 patent specification that has switching transistors controls them as a single unit in a complimentary switching configuration. AATI refers to Figure 2 in which the patent discloses two transistors controlled by a single node so that when one transistor is on, the other is off, and there is no way to turn one transistor on or off independently of the other. AATI argues that similarly, Figures 1, 4-5, and 7-9 also disclose switching transistors that are connected for complementary switching and controlled as single unit, and that nothing in the specification suggests a broader meaning for the claim language. *See, e.g.*, AATI Post-Hearing Brief at 21-22; *see also* AATI Reply Brief at 12.

Linear argues that in general AATI proposes constructions for the asserted claims of the '258 patent that are plainly incorrect because they exclude most if not all embodiments, yet

nevertheless are later abandoned by AATI in favor of broader constructions needed to support the respondent's theories of patent invalidity. With respect to the required pair of synchronously switched switching transistors, Linear argues that nothing in the claims indicates that they must be controlled by a single node. It is argued that AATI relies on preferred embodiments, which should be covered by the claim but not used to restrict them. Linear argues that the limitations only relevant requirement is that the two transistors be driven out of phase (i.e., one is on and the other off, except for deadtime) to supply current at a regulated voltage to the load, and that such a requirement does not preclude a distinct state of operation in which both transistors are OFF (e.g., sleep mode). Linear Reply Brief at 1.

The Staff argues that the switching transistors operate in a complementary fashion, alternatively ON and OFF, except for deadtime periods during the transition between phases, during which both transistors are briefly OFF. OUII Post-Hearing Brief at 26. The Staff argues that AATI effectively seeks to limit the claim terms at issue to the precise switch configuration found in the Figures of the '258 patent, and ignores the specification's explicit definition of synchronously-switched switch as simply a switch including two switching transistors that are driven out of phase to supply current at a regulated voltage to a load. OUII Reply Brief at 3-4.

AATI's has not relied on the Figures disclosed in the '258 patent improperly to limit the patent claims. However, AATI's arguments demonstrate that the specification provides examples of the switching transistors connected by a single node or otherwise connected for complementary switching and controlled as single unit. No party disputes that fact. While the embodiments depicted or described in the specification may not require the claims to be construed in the manner proposed by AATI, the specification provides little or no support for the

proposals of Linear and the Staff. Indeed, neither Linear nor the Staff points to any Figure or embodiment of the '258 patent specification to support their arguments that the switching transistors operate in a broader manner, or in way that is outside the construction proposed by AATI.

In support of its broader construction of a synchronously-switched switch, the Staff refers to a definition contained in the '258 patent specification, which is a switch including two switching transistors that are driven out of phase to supply current at a regulated voltage to a load. It does not appear, however, that this sentence provides a comprehensive definition of such a switch, especially when it is considered in context. The sentence relied upon by the Staff occurs in connection with the specification's discussion of Figure 2, which as discussed above, not only discloses the two switching transistors configured as a single unit in a complimentary switching configuration, as described by AATI, the Figures show the transistors controlled by a single node.¹⁰

Moreover, whether one considers the text relating to Figure 2 or any other part of the specification, including the claims at issue, a pair of synchronously switched switching transistors are not merely driven out of phase, nor are they merely two transistors that act in a complementary manner. The transistors are described as constituting a pair and are always described in the specification's embodiments and claims as constituting or being a part of a

¹⁰ See JX-3 ('258 patent), col. 7, lines 46-51 (Control circuit **70** of switching regulator **50** shown in FIG. **2** is used to drive a synchronously-switched switch including MOSFETs **16** and **17**. As used herein, the term 'synchronously-switched switch' refers to a switch including two switching transistors that are driven out of phase to supply current at a regulated voltage to a load.).

single switch.¹¹ While Linear and the Staff reject this switch limitation in claim construction, they rely on the single switch limitation when arguing in favor of patent validity. In particular, when attempting to distinguish the prior art, the Staff argues not only that the synchronously switched switching transistors must be coupled to the input voltage, but also that the transistors must form a unified switch. *See* AATI Reply Brief at 12 (citing OUII Post-Hearing Brief at 54 (The transistors in Ziermann [prior art] are on opposite sides of the transformer, and thus do not form a *unified switch* connected to the input voltage.)(emphasis added); Linear Post-Hearing Brief at 33; CPFF 3633 (The switches disclosed in the Ziermann patent are not coupled together.); Pedram Tr. 2212-2213.

The switching transistors of the claimed invention are configured in a single switch. They can, as AATI argues, be thought of as operating within a single unit. *See* Wei Tr. 1679. While the term single unit does not appear from the expert testimony to be a term of art, it is an accurate description of the way in which the transistors must be used given the claim limitation at issue.

2. substantially at the regulated voltage

The term substantially at the regulated voltage is found verbatim in non-asserted independent claim 1 (and therefore incorporated into asserted dependent claims 2 and 3) and independent asserted claim 34. In particular, the device covered by claim 1 requires:

¹¹ According to the specification, the basic definition of a switch used in a switching regulator is a power transistor, which may be coupled in series or parallel with the load. *See* JX-3 ('258 patent), col. 1, lines 33-35. The specification further teaches that [t]he circuit and method of the present invention can be used to control various types of switches in switching regulator circuits, including switches that use either one or more power transistors. JX-3 ('258 patent), col. 2, lines 55-58.

a third circuit for generating a second control signal during a second state of circuit operation to cause both switching transistors to be OFF for a first period of time during which the output capacitor maintains the output substantially at the regulated voltage.

JX-3 ('258 patent), col. 16, lines 53-57.

The method of claim 34 similarly requires:

(c) turning both switching transistors OFF for a first period of time following the first state of circuit operation so as to allow the output capacitor to maintain the output substantially at the regulated voltage by discharging during a second state of circuit operation. . . .

JX-3 ('258 patent), col. 19, lines 3-7.

These claim limitations recall the invention summary, quoted in full above, in which the specification explained the way in which the claimed invention would regulate voltage in an efficient way, as follows:

The circuit and method generates a control signal to turn the one or more switching transistors OFF under operating conditions when the voltage at the output is capable of being maintained substantially at the regulated voltage by the charge on the output capacitor (e.g., during low output currents). During such periods of time, the load does not consume power from the input power source. Therefore, the regulator efficiency is increased.

JX-3 ('258 patent), col. 2, lines 42-58.

The claim construction dispute among the parties is centered on the narrow phrase substantially at the regulated voltage, and more precisely the meaning of the term substantially.

In its main post-hearing brief, AATI argues that according to the claims, during the first state of circuit operation, the voltage is maintained at the regulated voltage, and during the second state of circuit operation, the voltage is maintained substantially at the regulated voltage.

It is argued that by using these different terms, the claims require that the voltages be different.

AATI observes that the patent specification consistently uses the phrase substantially at the regulated voltage to refer to an operation in the second state during which the voltage is different from the regulated voltage of the first state, and that the specification never suggests that substantially at the regulated voltage can mean operating at the same average voltage as the regulated voltage. Indeed, it is argued that the specification does not disclose how to construct a circuit that would operate at the same voltage in both states. AATI Post-Hearing Brief at 22-23.

In addition, AATI relies on the hearing testimony of its expert, Dr. Wei, who testified that one of ordinary skill in the art would understand that the average values must be different in the two states in order for the two circuits to operate in the manner described in the patent. *See Id.* at 22-23 (citing, RPF 971-977). Dr. Wei testified that notwithstanding the *Impala* District Court's construction of the '178 patent to the effect that the regulation range may be different, the voltages must be different because without a difference, the third circuit would always override the second circuit. Thus, if the voltages were the same, the voltage regulator would never operate in the first state as required by the claims. *See Wei Tr.* 1713-1719, 2127-2128.

Linear argues that AATI's proposal is a strained argument that narrows the scope and plain meaning of the claims, and contradicts the *Impala* court's ruling that substantially at allows for, but does not require, greater variation in the regulated voltage. Linear Reply Brief at 1 (citing CX-50 at LLTC3801-3802). Linear further argues that AATI's argument limits the asserted claims to a particular embodiment of the specification in which a circuit called a hysteretic comparator creates by design a necessary difference in the regulated voltage between the first and second states of circuit operation, while AATI ignores another embodiment that does not use such a comparator to take the voltage regulator out of sleep mode. It is argued that AATI

impermissibly reads the hysteretic comparator limitation of claim 5 into claim 1.¹² *Id.* at 1-2.

The Staff argues that use of the word substantially in connection with the second state of circuit operation suggests that the output voltage can vary from the designated level to a greater degree than permitted by the regulated voltage of the first state of operation, and that such a variation is consistent with the teachings of the specification in which one of the embodiments enters sleep mode when the output voltage exceeds the regulated voltage by a predetermined value. Nevertheless, it is argued that the claim language does not require a greater degree of variability in the second state of circuit operation as compared to the first state, but merely permits such a greater degree of variation. OUII Post-Hearing Brief at 28-30; OUII Reply Brief at 4-5.

The term substantially might be understood to mean “nearly” or “for the most part.” It

¹² Claim 5 of the ‘258 patent is as follows:

The circuit of claim 4, wherein the first feedback signal is a voltage feedback signal and the third circuit includes a voltage comparator having hysteresis.

JX-3 (‘258 patent), col. 17, lines 1-3.

The operation of a hysteretic comparator is described in several portions of the specification describing an embodiment of the claimed invention. For example, the specification provides:

In accordance with the present invention, regulator circuit 50 goes into sleep mode at low output current levels as follows. Hysteretic comparator 74 monitors the feedback voltage V_{FB} and goes LOW when V_{FB} exceeds a predetermined voltage value in excess of the reference voltage V_{REF} . Such a condition is indicative of the output voltage V_{OUT} exceeding a predetermined voltage value in excess of the regulated voltage V_{REG} . This over voltage condition is intentionally induced at low average output currents by providing a constant current source I_1 , 72 coupled in parallel with amplifier 38. During the over voltage condition both MOSFETS 16 and 17 are maintained OFF by way of AND gate 66 and NAND gate 68.

Id. at col. 6, lines 43-55.

might also in some circumstances indicate that a certain amount of leeway or difference is permitted when comparing two objects or events to determine whether or not they are the same. However, the issue presented has nothing to do with making such a comparison. Rather, the Commission is called upon to construe the specific term “substantially” at the regulated voltage. When one examines the entire claim language and the specification to determine the meaning of this term in its full and proper context, one discovers that the patent does not employ the term substantially merely to indicate a certain tolerance or leeway. The word substantially is used to indicate that the voltage should not be exactly the same, and that the difference between the voltages is important for operation of the claimed invention.

Indeed, as pointed out by AATI, the specification does not disclose or support an embodiment in which the voltages are the same, at least not when they are measured as averages. Moreover, the testimony of Dr. Wei demonstrates that although the voltages are substantially the same, there must in fact be a difference between them for the required circuits to operate, and this would be understood by one of ordinary skill in the art reading the ‘258 patent.

Accordingly, it is found that the term substantially at the regulated voltage requires that in the second state of circuit operation, the voltage is maintained substantially at the regulated voltage although not at the same voltage.

3. first state of circuit operation . . .second state of circuit operation

It is undisputed that the claims require a first state of circuit operation and a second state of circuit operation. However, the parties disagree as to whether the states of operation are restricted to load current levels. In particular, AATI argues that the first state of operation must be linked to high load currents, and the second state must be linked to low load currents. *See,*

e.g., AATI Post-Hearing Brief at 23-25. Linear argues that although the first state generally occurs during high and medium load currents, and the second state generally occurs during low load currents, the claim language provides no limitations to that effect. *See, e.g.*, Linear Reply Brief at 2. Similarly, the Staff argues that the claims do not require the first and second states to be linked to corresponding load conditions. *See, e.g.*, OUII Post-Hearing Brief at 28, 30.

There is no question that the particular embodiments described in the specification rely on the fact that there are different load currents for the first and second states of operation. For example, as explained, by the specification:

As discussed above, control circuits **70** and **125** of FIGS. **2** and **3**, respectively, provide high-efficiency operation at low average output current levels. Such operation adapts automatically to the output current level. For example, at high output current levels during a first state of operation the switch continually alternates between an ON state and an OFF state to maintain the output voltage V_{OUT} at the regulated voltage level V_{REG} . At low output current levels during a second state of operation, where circuit efficiency would otherwise be low, the output voltage V_{OUT} is able to be maintained substantially at the regulated voltage level V_{REG} by output capacitor C_{OUT} without continuously turning the switch ON and OFF. Thus, the control circuit automatically identifies such a condition and allows the regulator circuit to go into a sleep mode where a minimal number of circuit components are required to be ON.

JX-3 ('258 patent), col. 8, lines 9-24.

The question is whether such an understanding of the load currents associated with the different states of operation is restricted only to certain embodiments of the claimed invention. The testimony of AATI's expert, Dr. Wei, shows that one of ordinary skill in the art would understand that such a correspondence between the states of operation and varied load currents is characteristic of the way in which the claimed invention works, and is not specific to any particular embodiment. *See* Wei Tr. 1687-1706, 1912-1915, 2127, 2144. Further, in attempting

to distinguish the prior art, Linear's expert also relied on the fact that there are different load currents associated with the first and second states of operation in the claimed invention of the '258 patent. *See* Pedram Tr. 2213.

Consequently, it is found that the first state of operation is linked to high load currents, and the second state is linked to low load currents.

B. U.S. Patent No. 6,411,531

United States Patent No. 6,411,531 is entitled "Charge Pump DC/DC Converters with Reduced Input Noise." The '531 patent issued on June 25, 2001 to Samuel H. Nork, William L. Walter and Steven L. Martin, and was assigned to Linear. JX-1.

The specification of the '531 patent provides the following description of relevant charge pumps as background to the claimed invention:

This invention relates to charge pump DC/DC converters. More specifically, this invention relates to charge pump DC/DC converters with reduced noise at the input voltage source.

A charge pump DC/DC converter is a power supply circuit that provides a regulated output voltage to a load from an input voltage source. One type of charge pump DC/DC converter is a switching DC/DC converter power supply that uses switches to convert the input voltage to a regulated output voltage. The switches are operated in sequence to first charge a capacitor from the input voltage and then transfer the charge to the output.

However, one of the most common drawbacks of switching power supplies is the noise induced on the input voltage source due to fluctuations or variations in the current drawn by the converter power supply. When current flows from the input voltage to the capacitor, the input voltage is loaded causing it to decrease slightly. When the capacitor is decoupled from the input voltage, the input voltage rises. These voltage changes appear as noise on the input voltage bus. The magnitude of these changes in the input voltage level depends upon the equivalent series resistance of the input voltage source and the magnitude of the changes in the input current.

Certain applications such as cellular telephones, precision instrumentation, etc. are sensitive to noise generated on the input voltage. Therefore, noise on the input voltage caused by a power supply must be filtered to prevent degraded electrical performance in other circuitry that is powered from the same input voltage source.

It would therefore be desirable to provide a charge pump DC/DC converter that has reduced noise on the input voltage source.

It would therefore be desirable to provide a charge pump DC/DC converter with a substantially constant input current.

JX-1 ('531 Patent), col. 1, lines 5-40.

The '531 patent specification explains how the inventors addressed both the desirability of providing a charge pump DC/DC converter that has reduced noise on the input voltage source, and a charge pump DC/DC converter with a substantially constant input current. The claimed invention is summarized as follows:

It is an object of the present invention to provide a charge pump DC/DC converter that has reduced noise on the input voltage source.

It is an object of the present invention to provide a charge pump DC/DC converter with a substantially constant input current.

These and other objects of the present invention are provided by charge pump DC/DC converters including circuitry to reduce variations in the input current, and methods for using the same. The circuitry may include an adjustable resistor, current mirror, or current mirrors coupled to the input voltage, and feedback loop circuitry. The feedback loop circuitry is coupled to the output voltage, and responds to changes in the output voltage to control the output current of the charge pump to maintain the output voltage at the regulated value. Additional circuitry may be added to charge pumps of the present invention to provide a substantially constant input current during the blanking intervals when all of the switches are open. Charge pump DC/DC converters of the present invention include buck and boost converters.

JX-1 ('531 Patent), col. 1, lines 43-63 (Summary of the Invention).

One of ordinary skill in the art relevant to the '531 patent would have a bachelor's or master's degree in a field such as electrical engineering, physics or applied physics.¹³ In addition, AATI's expert testified that such a person would also have approximately four years of experience in the design of voltage regulators. That additional requirement is necessary because the claimed invention is both technically complex and geared toward problems that a designer would encounter in practice. *See* Szepesi Tr. 1260-1261.

The claimed invention of the '531 patent is set forth in a series of 44 claims. Linear accuses the AATI products at issue of infringing claims 4, 9 and 26 of the '531 patent. *See, e.g.,* Linear Post-Hearing Brief at 12-19. Claim 4 depends directly from independent claim 1. Claim 9 is an independent claim. Claim 26 depends directly from independent claim 23. Reproduced below are claims 1, 4, 9, 23 and 26.

1. A method for regulating a voltage at an output node of a boost voltage regulator, the method comprising:

providing a first capacitor;

providing a first switch coupled between the first capacitor and the output node;

providing a second switch coupled to the first capacitor;

controlling the first and second switches to alternately charge the first capacitor from an input voltage and discharge the first capacitor to the output node;

monitoring the voltage at the output node to generate a control signal; and

¹³ The level of skill was briefed by AATI and the Staff. *See* AATI Post-Hearing Brief at 2; OUII Post-Hearing Brief at 4 n.2. It does not appear that the question was briefed by Linear. *See* AATI Post-Hearing Brief at 2 (concerning the absence of testimony by Linear's expert).

controlling the current flowing through the first capacitor in response to the control signal when the first switch is closed.

4. The method of claim 1 further comprising:

controlling the current through the first capacitor in response to the control signal when the second switch is closed.

9. A method for regulating a voltage at an output node of a boost voltage regulators the method comprising:

providing a first capacitor;

providing a first switch coupled between the first capacitor and the output node;

providing a second switch coupled to the first capacitor;

controlling the first and second switches to alternately charge the first capacitor from an input voltage and discharge the first capacitor to the output node;

monitoring the voltage at the output node to generate a control signal;

controlling the current flowing through the first capacitor in response to the control signal when the first switch is closed; and

controlling the current through the first capacitor in response to the control signal when the second switch is closed, by providing a variable resistance in series between the input voltage and the first capacitor when the second switch is closed.

23. A boost voltage regulator that regulates a voltage at an output node, comprising:

a first capacitor;

a first switch coupled between the first capacitor and the output node;

a second switch coupled to the first capacitor, wherein current alternately flows from an input voltage to the first capacitor and from the first capacitor to the output node;

feedback loop circuitry that monitors the voltage at the output node and generates a control signal; and

a transistor that controls the current flowing through the first switch in response to the control signal when the first switch is closed.

26. The regulator of claim 23 wherein:

the transistor controls the current through the second switch in response to the control signal when the second switch is closed.

JX-1('531 Patent), col. 17, lines 21-35 and lines 48-51; col. 18, lines 18-39; col. 20, line 65 through col. 21, line 12; and col. 21, lines 23-26.

AATI states in its main post-hearing brief that that four claim terms in three categories appear to be disputed by the parties: (1) voltage regulator, (2) switch and switch is closed, and (3) controlling the current. *See* AATI Post-Hearing Brief at 2-7.

Unlike the '258 patent, Linear does not claim to rely on the prior construction of a court concerning the '531 or a similar patent. Nevertheless, as in the case of the '258 patent, Linear did not present its proposed claim construction for the '531 patent in a distinct section of its main post-hearing brief. Linear's claim interpretations are presented to some degree in the infringement section of its main brief, and are closely linked to its arguments concerning the accused products. *See* Linear Post-Hearing Brief at 12-19. Also, as in the case of the '258 patent, there is an asymmetry in the way that the parties set forth their claim construction

arguments in that the respondent allocated a significant portion of its main post-hearing brief to the relevant issues of claim construction, and complainant Linear used its reply to argue against specific claim construction arguments made by AATI. *See* Linear Reply Brief at 19-21.

The Staff presents detailed arguments relating to several limitations of the asserted claims in its main post-hearing brief, and additional arguments in its reply. *See* OUII Post-Hearing Brief at 10-18; OUII Reply Brief at 1-3.

It appears that interpretation of the claim terms identified by AATI in its main post-hearing brief adequately addresses the primary areas of dispute among the parties concerning construction of the asserted claims, and those terms are discussed below.

1. voltage regulator

The preambles of claims 1, 9 and 12 refer to a method for regulating a voltage at an output node of a boost voltage regulator comprising The preamble of claim 23 provides: A boost voltage regulator that regulates a voltage at an output node, comprising The first area of dispute concerns the question of whether or not these preambles limit the claimed invention, with Linear arguing that the above language does not create a claim limitation, and AATI and the Staff treating the preambles as limitations.

As indicated above in the discussion of the general law pertaining to claim construction, a claim preamble has the import that the claim as a whole suggests for it. [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. *Eaton Corp.*, 323 F.3d at 1339; *In re Paulsen*, 30 F.3d at 1479 (terms appearing in a preamble may be deemed limitations of a claim when they give meaning to the claim and properly define the

invention). In this instance, the term voltage regulator is not added verbiage or a mere introductory phrase. The preambles in question specify that the claimed invention is for a boost voltage regulator, and that the voltage regulator is used to regulate a voltage at an output node. In addition, as seen clearly in claim 23, the claimed voltage regulator comprises all of the circuitry elements that follow (such as a capacitor, switches, feedback loop circuitry, and a transistor to control current flow). The voltage regulator is the device claimed by claim 23, and the term voltage regulator gives meaning to all of the asserted claims of the '531 patent, and is thus a claim limitation.

Linear argues that even assuming the term voltage regulator is understood to be a claim limitation, the only way to give meaning to the 'regulating a voltage' and 'voltage regulator' language of the preamble is to interpret 'voltage regulator' as a physical product having circuitry capable of regulating voltage and to interpret 'regulating a voltage' as the actual step of regulating the voltage. Linear argues that AATI's proposed construction impermissibly mixes the method limitations with the physical limitations. It is argued that AATI's proposal is based on the disclosures made in the accused products' datasheets, and that in the future an accused infringer could simply change its datasheets to avoid liability. Linear Post-Hearing Brief at 12-13 (infringement).

AATI argues that initially both experts agreed that a voltage regulator must provide a predetermined constant output voltage to a load, and that a voltage regulator provides this constant DC output voltage and contains circuitry that continuously maintains the output voltage at the target value regardless of changes in load current or input voltage (assuming that the load current and input voltage are within the specified operating range for the part). AATI argues that

while its expert's opinion has remained consistent in this investigation, Linear's expert (who once opined that an output voltage must remain within 2% to 3% of the target) attempted to change his previous construction and would now allow virtually any variance in output voltage for a circuit called a voltage regulator. AATI argues that as demonstrated by its own expert, Dr. Szepesi, who has over 25 years of relevant industry and academic experience, one of ordinary skill in the art would understand that a voltage regulator must continuously maintain a constant output voltage as a predetermined, known and specified target value over a device's specified operating conditions, within a $\pm 5\%$ tolerance. According to AATI, this is known as a box specification for a device. AATI Post-Hearing Brief at 2-4.

The Staff argues that it is apparently undisputed that a boost voltage regulator, such as that required by the asserted claims, provides an output voltage above the level of input voltage. The Staff also argues that Linear's expert changed his definition of a voltage regulator, so that by the time of the hearing his testimony was that a voltage regulator need provide a constant output voltage for only a portion of its operating range, and that the output voltage need not be predetermined and known. However, the Staff argues, such a definition does not correspond to the definition of a voltage regulator in the industry. OUII Post-Hearing Brief at 10-11.

The Staff argues that in the industry, voltage regulators are products designed to produce an output within a narrow range (typically within 5% or less of the specified value) in a variety of operating conditions covering a specified range of a load current, temperature, process variation and input voltage. It is argued that although the '531 patent does not explicitly define the term voltage regulator, the extrinsic evidence shows that to a person of ordinary skill in the art, regulating a voltage means to produce a known, predetermined and substantially fixed output

voltage as a known value, and that a voltage regulator is a device that can maintain an approximately fixed specified output voltage, independent of variations in the input voltage and load current as long as those variations are within the specified operating range of the part. Indeed, it is argued, voltage regulator products typically include a datasheet that informs the customer of the specified range of load current and input voltage over which the product is capable of providing an output voltage at or near the specified value. OUII Post-Hearing Brief at 11-12.

The plain claim language expressly requires that the voltage regulator must both provide a voltage boost and actually perform the task of regulating a voltage at an output node.¹⁴ The term voltage regulator is not further defined in the '531 patent specification, and no party has argued that the prosecution history should play any role in construing this term. Thus, the term is understood to have its ordinary meaning in the relevant art within the context of the claims.

AATI's expert, Dr. Szepesi, defined a voltage regulator as a device that continuously maintains a constant, predetermined, known output voltage, despite variations in the input voltage and the load current, within a narrow tolerance over the specified operating ranges for the input voltage and the load current. Szepesi Tr. 1261; RDX-005; RDX-006; RDX-007. His testimony showed that industry-standard voltage regulators have output voltage tolerances of up to approximately five percent. Szepesi Tr. 1271-1272.

As detailed above, one of ordinary skill in the art relevant to the '531 patent would have a bachelor's or master's degree in a field such as electrical engineering, physics or applied physics,

¹⁴ As argued by the Staff, there is indeed no dispute that a boost voltage regulator provides an output voltage (for use by a load such as a cell phone) above the level of input voltage which may be provided, for example, by a battery. *See* Nork Tr. 623, 688; Pedram Tr. 855-856.

and also about four years of experience in the design of voltage regulators. Thus, one of ordinary skill would know that voltage regulators have typically given a box specification, which may be represented as a rectangle bounded on the X-axis by the maximum/minimum input voltages, and on the Y-axis by the maximum/minimum output voltages. The output voltage of the regulator must remain within this rectangle over variations in the process, load, and temperature, if all these parameters are in the specified operating range.¹⁵ See Szepesi Tr. 1268-1271; RDX-300. Accordingly, a part that is out of regulation for a large portion of its normal operating range cannot be a voltage regulator. See Szepesi Tr. 1267.

The proposal of AATI and its expert for the construction of voltage regulator is consistent with the specification of the '531 patent. For example, in the portion of the specification that summarizes the overall claimed invention, the specification explains how the invention covers circuitry designed to maintain a regulated voltage. See JX-1 ('531 patent) at col. 1, lines 54-58 (The feedback loop circuitry is coupled to the output voltage, and responds to changes in the output voltage to control the output current of the charge pump to maintain the output voltage *at the regulated value.*)(emphasis added).

In addition, AATI's proposed construction is consistent with extrinsic evidence, such as documents created by Linear for purposes unrelated to this litigation. See RX-851 (SEC filing) at 5 (Voltage regulators deliver a tightly controlled voltage to power electronic systems.). Nevertheless, Linear's position appeared to evolve during the hearing such that it conflicted with

¹⁵ Examples of Linear's charge pump boost voltage regulators which are shown to have box specifications include: LTC1522, LTC1514, LTC1515, LTC1517, LTC1516, and LTC1751. An example of an AATI charge pump boost voltage regulator which has a box specification is the AAT3119. Szepesi Tr. 1270-1271.

its own documentation concerning the technical specifications for its parts, other documents such as SEC filings, and positions that it had taken earlier in this investigation. For example, at first during the hearing, Linear's expert, Dr. Pedram, construed the term voltage regulator in a manner that is in some ways similar to of AATI. Dr. Pedram testified that a voltage regulator produces a predetermined fixed output voltage, such that the output voltage has a known value and a constant amplitude, not changing very much. Pedram Tr. 864-865. However, in contrast to testimony given during the Pedram deposition, it was difficult to discern from Dr. Pedram or Linear what their position was concerning the level of variance that one of ordinary skill would expect from a voltage regulator. *See* Pedram Tr. 960. Indeed, Dr. Pedram's hearing testimony on voltage regulators seemed to cover devices with widely ranging variances, of as much as 20 percent and more, which would call into question any real meaning for the term if one adopted this analysis. *See* Pedram Tr. 990; Szepesi Tr. 1272-1274. In any event, for the reasons discussed, *supra* in the text, a tolerance of approximately five percent gives meaning to the terms regulate and regulator, and is in accordance with current industry standards.

The term voltage regulator in the asserted claims is construed as a device that continuously maintains a constant output voltage at a predetermined, specified target value regardless of changes in input voltage or load current, so long as the input voltage and load current are within the specified operating range for the device.

2. "switch" and "switch is closed"

Each asserted claim of the '531 patent requires the use of more than one switch, and each contains a limitation such that at some point a switch is closed. The parties dispute the meaning

of the term switch, and what it means for a switch to be closed within the context of the '531 patent.

AATI argues that neither the claims nor any other portion of the '531 patent specification modifies the plain meaning of the terms switch or switch is closed, and thus these terms should be given their ordinary dictionary meaning and their ordinary meaning in the general field of electronics. AATI illustrates the ordinary meaning of these terms by referring to a standard dictionary (New Webster Dictionary (1975)) and a common electronics dictionary (IEEE Standard Terms (2000)) to argue that a switch is a device that makes or breaks an electrical connection in a circuit, and that when a switch is closed the switch is conducting current. However, it is argued that the required switch is not like a binary logic element such that it is either fully ON or fully OFF, and when closed the maximum amount of current must be conducted. Rather, AATI argues that in the asserted claim language, the word switch is used in its broadest sense and is not restricted to a particular type of switch. AATI Post-Hearing Brief at 4-7.

Linear's arguments concerning the terms switch and switch is closed are closely linked to its arguments concerning infringement and validity, and are based on the accused products and prior art. Nevertheless, it is clear that Linear takes the position that the switches at issue should be understood to operate like binary logic elements in that they are required to be fully ON or fully OFF. It is argued that such a construction is supported by the types of transistors used in the specification and accused products, and by statements made by AATI's expert, Dr. Szepesi, in one of his own patents which uses switches and similar transistors. In particular, Linear argues that AATI's proposed construction leaves room for the so-called switch to be in a state other than

fully ON or fully OFF, thus attempting impermissibly to construe the required element to be two dissimilar things at the same time, i.e., a conventional switch and a variable resistor. *See, e.g.,* Linear Reply Brief at 20-21.

The Staff agrees with AATI that a switch as used in the asserted claims of the '531 patent should be defined broadly as a device that can make or break a connection in an electrical circuit, as opposed to Linear's restricted definition which proposes a simple binary switch that is fully open or fully closed. OUII Post-Hearing Brief at 12-13.

Further, the Staff observes that Linear argues the first switch recited in the claims must be fully closed (i.e., ON) during the discharge phase because claim 1 requires controlling the first and second switches to alternately charge the first capacitor from an input voltage and discharge the first capacitor to the output node. The Staff correctly points out that Linear's contention is not supported by citation to expert testimony, and that Linear has failed to explain why this claim limitation could not be met by a switch that permits varying amounts of current to pass through it in the ON state. OUII Reply Brief at 3.

The lay meaning of switch and switch is off can be used to support any of the parties' arguments, and is of little value in construing the asserted claim of the '531 patent. For example, it is well known that one can simply flip a switch to close a circuit fully and, e.g., thereby allow maximum current to flow to a light bulb to turn it fully on. Similarly, it is well known that one can open a switch fully, and thus stop all current in order to turn a light bulb completely off. Yet, it is also commonly known that many lights can be dimmed, and that in general switches can be used in states other than fully on or fully off. Consequently, the claim terms must be understood within the context of the claimed invention, as shown in the '531 patent specification.

Power conversion circuits, such as those described in the '531 patent specification, provide pathways for current, and are typically implemented by MOSFET transistors. Depending upon how the transistors are implemented, they can have associated resistances which may be varied for the purpose of adjusting the current flowing through the switch. Inasmuch as the amount of current conducted by a MOSFET can be varied, its use as a switch in power conversion circuits is well-known in the prior art, because MOSFET switches, when they are closed, can be used to control current to facilitate voltage regulation. Szepesi Tr. 1278-1283, 1286-1287. Indeed, this understanding of switch, which includes switches that can control the amount of current being conducted, is supported by the '531 patent specification itself. JX-1 ('531 patent), col. 3, lines 36-38, 54-56; Szepesi Tr. 1278:7-17, 1283-1286.

In particular, the specification explains that Switches S1-S4 (and all other switches discussed with respect to the present invention) may comprise FETs (such as MOSFETs) or BJTs (bipolar junction transistors).¹⁶ JX-1 ('531 patent), col. 3, lines 54-56. One of ordinary skill in the art would understand that FETs and BJTs can be operated such that they can either permit or prevent current flow, and when they are permitting current flow, they can control the amount of current that is flowing.¹⁷ Szepesi Tr. 1278-1285.

¹⁶ This sort of switching should not be confused with the operation of clock signals. See Szepesi Tr. 1291; JX-1 ('531 patent), Figure 3A. Nevertheless, even in the context of timing signals, the capitalized ON used in the specification does not mean that a transistor is fully ON and conducting maximum current. For example, the patent explains that the switching transistor in the current mirror element is ON when a clock signal is HIGH, but that transistor and the current mirror are controlling the amount of current passing through the transistor when it is on, such that the amount of current is less than the maximum current. Thus, ON and HIGH do not always indicate fully ON and a state of maximum current. Szepesi Tr. 1292-1293, 1493-1494.

¹⁷ In fact, a specific example of a prior art product made by Linear that uses a current-controlling switch is expressly cited in the specification of the '531 patent. The data
(continued...)

Linear's narrow construction of the term switch is closed which requires a switch to be fully, logically ON such that it is conducting maximum current is contrary to the patent specification. *See Szepesi Tr. 1277, 1290-1291.* For example, the specification uses the term closed to mean that the switch is simply conducting current, although not necessarily the maximum amount of current:

Switches S2/S4 are *closed (i.e., conducting current)* when V_{CLKB} is HIGH, for example, between times t1 and t2. Switches S2/S4 are *open (i.e., not conducting current)* when V_{CLKB} is LOW. Switches S1/S3 are *closed (i.e., conducting current)* when V_{CLK} is HIGH, for example, between times t3 and t4. Switches S1/S3 are *open (i.e., not conducting current)* when V_{CLKB} is LOW.

JX-1 ('531 patent), col. 4, lines 3-9 (emphases added); Szepesi Tr. 1289-1290.

A switch implemented by a MOSFET transistor can conduct current whenever the gate voltage is above the threshold voltage. Thus, the transistor need not be fully, logically ON to be conducting current. Szepesi Tr. 1278-1283.

While AATI's argument that the term switch should be construed in the broadest sense is somewhat vague, it is clear that the specific construction supported by both AATI and the Commission Investigative Staff should be adopted. Thus, the term switch is construed to mean a device that makes or breaks an electrical connection in a circuit. Further, when a switch is

¹⁷ (...continued)

sheet for Linear's LT1054 product, which discloses a switch implemented by a PNP bipolar junction transistor that modulates the amount of current that flows through it when closed. Szepesi Tr. 1283-1285; JX-1 ('531 patent), col. 3, lines 36-38.

Other prior art further supports the understanding that a charge pump switch can control the amount of current that flows when the switch is conducting current. Szepesi Tr. 1285-1288; Nork Tr. 741-743. Further, the inventors' own documents, such as lab notebooks and schematics, reflect their understanding that a charge pump switch is not simply binary in its operation because it can control the amount of current that flows when the switch is conducting. *See Szepesi Tr. 1288-1289; JX-61C (Walter Dep.) Tr. 76-77; Nork Tr. 743-744*

closed, according to the asserted claims of the '531 patent, the switch conducts current. There is no requirement that only maximum current must be conducted, or that the claimed switch must always be either fully ON or fully OFF.

3. controlling the current

Each asserted claim contains a limitation that uses the phrase controlling the current or a similar phrase.¹⁸ Although it appeared in pre-hearing briefs and during the hearing that there might be a dispute among the parties concerning this term, none was presented in the post-hearing briefs. *See, e.g.*, AATI Post-Hearing Brief at 7 (discussion of hearing testimony and AATI's proposed construction); OUII Post-Hearing Brief at 14-15 (discussion of hearing testimony, and OUII's agreement with AATI's Dr. Szepesi); Linear Reply Brief at 19-21 (section entitled Proper Claim Construction does not oppose AATI's or the Staff's proposed construction). To dispel any confusion that may yet exist, the Administrative Law Judge has determined to construe the term herein.

AATI's expert, Dr. Szepesi, construed the claim term controlling the current to mean influencing or purposefully affecting the current. Szepesi Tr. 1295. His construction is supported by the specification, which uses the term control in a variety of contexts involving current flow. *See* JX-1 ('531 patent), col. 3, lines 39-49; col. 4, lines 32-39; col 5, line 66 through col. 6, line 2; col. 6, lines 37-41. For example, the '531 patent uses the term control to describe reducing input current variations in order to reduce voltage fluctuations:

¹⁸ *See* JX-1 ('531 patent), col. 17, lines 20-34, 48-51; col. 18, lines 19-39; col. 20, lines 65 through col. 21, line 9; col. 21, line 24. For example, claim 4, which depends from claim 1, requires controlling the current through the first capacitor. Claim 9 requires controlling the current through the first capacitor. Claim 26, which depends from claim 23, requires a transistor that controls the current.

Charge pump DC/DC converters of the present invention may include control circuitry coupled to the input voltage *that reduces variations in the input current. The control circuitry controls the input current during each phase of a switching cycle in order to reduce voltage fluctuations* on the input voltage source that cause low frequency noise.

JX-1 ('531 patent), col. 3, lines 39-44 (emphases added).

However, the specification also teaches that reducing current spikes also constitutes controlling the current, as follows:

Adjustable resistor 38 reduces the input current spike at time t3 relative to circuit 20, so that variations in input current IIN are reduced between times t3 and t4 during the second half of each switching cycle, thereby reducing undesirable low frequency noise at the input voltage. Thus, adjustable resistor 38 controls the input current through capacitor 8 and all four switches during each phase of the clock cycle.

JX-1 ('531 patent), col. 4, lines 32-39 (emphases added).

In addition, the specification describes a control circuit that adjusts current:

A control circuit including an amplifier and a resistor divider coupled to the output voltage adjusts the current through the control circuitry so that the output current of the converter matches the load current and the output voltage remains at the regulated value.

JX-1 ('531 patent), col. 3, lines 44-49 (emphases added); col. 5, line 66 through col. 6, lines 2.

Inasmuch as the '531 patent specification uses the term control in a variety of contexts involving current flow, the phrase controlling the current may be properly construed as influencing or purposefully affecting the current, in accordance with the plain and ordinary meaning of the term and the specification.

IV. INFRINGEMENT DETERMINATION

In a section 337 investigation, as in a federal district court action, infringement must be

proven by a preponderance of the evidence. Complainants bear the burden of proving infringement of the asserted patent claims. *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 as follows: [D]oes the accused product or process contain 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*, 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, 122 F.3d 144, 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*, 125 S.Ct.

2829, 162 L.Ed.2d 865 (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*)).

In other circumstances, a patentee may obtain coverage of equivalents unforeseeable at the time of the amendment and beyond a fair interpretation of what was surrendered, or for aspects of the invention that have only a peripheral relation to the reason the amendment was submitted. *Festo*, 535 U.S. at 738. The patentee must show that at the time of the amendment, one skilled in the art could not reasonably be expected to have drafted a claim that would have literally encompassed the alleged equivalent. 535 U.S. at 741.

A. Products Accused Under the '258 Patent of Direct Infringement

Linear accuses AATI of both direct and indirect infringement of the '258 patent. Indirect infringement is discussed below in section III C.

As indicated above in background section I B of this Initial Determination, the parties have entered into a stipulation concerning devices that are representative of the nearly 70 accused AATI products at issue in this investigation. See CX-82C (Joint Stipulation Regarding Section of Representative Accused AATI Products Based on Structure and Operation of Respective

Circuitry (Nov. 3, 2006)). The AATI products that are representative of all products accused under the asserted claims of the ‘258 patent are designated: AAT1143, AAT1146, AAT1151 and AAT12165.¹⁹ Linear argues that the accused AATI products literally infringe claims 2, 3, 34 and 35 of the ‘258 patent or, in the alternative, under the doctrine of equivalents. *See, e.g.*, Linear Post-Hearing Brief at 4-11; CPFF 988-992.

AATI argues that its accused products do not infringe the asserted claim of the ‘258 patent, either literally or under the doctrine of equivalents. AATI Post-Hearing Brief at 25-32; AATI Reply Brief at 16.

The Commission Investigative Staff argues that the accused AATI products infringe the asserted claims of the 258 patent. *See, e.g.*, OUII Post-Hearing Brief at 39-42, 60.

In their filings, the parties have addressed either each asserted claim individually, or discussed the asserted sleep mode claims (claims 2, 3 and 34) separately from the asserted reverse current prevention claim (claim 35). The latter format is used below.

Claims 2, 3 and 34

As detailed above in connection with the issue of claim construction, claims 2 and 3 are dependent claims that incorporate all the limitations of independent sleep mode claim 1. Claim 34 is an independent sleep mode method claim for controlling a switching voltage regulator with many of the elements required by claims 1, 2 and 3.²⁰ It is undisputed that some of the

¹⁹ Simplified schematic representations of the relevant circuitry contained in certain accused products appear in FF section I A.

²⁰ It is uncontroverted that claim 34 contains disputed terms that are similar or identical to terms contained in the other asserted sleep mode claims. The parties have not for the most part made arguments directed specifically to claim 34, and similarly the determinations in this Initial (continued...)

limitations shared by claims 1, 2, 3 and 34 are present in some or all four of the AATI representative products. Nevertheless, AATI disputes the allegations of Linear and the Staff concerning several of the other limitations, and the analysis below concentrates primarily on those disputed claim limitations.

“switch . . . including a pair of synchronously switched switching transistors”

The preambles of independent claims 1 and 34 require a *switch* coupled to receive an input voltage, *including a pair of synchronously switched switching transistors*. The Administrative Law Judge has construed this portion of the claim preamble to be a claim limitation, and no party disputes the fact that the preamble places this limitation upon the claims.

Linear argues that this limitation requires only that the two transistors in question be driven out of phase (i.e., one ON and the other OFF, except for deadtime) to supply current at a regulated voltage to the load, without precluding a distinct state of operation (such as sleep mode) in which both transistors are OFF. It is argued that the AAT1143, AAT1146 and AAT1146 implement such a switch with essentially the same circuitry, and that a similar analysis applies to the AAT1265. Linear Post-Hearing Brief at 5; Linear Reply Brief at 1. The Staff also argues that the accused AATI products satisfy this claim limitation when it is properly construed. OUII Post-Hearing Brief at 39.

AATI argues that the switching transistors in each of the representative accused products do not satisfy this claim limitation because they are not connected for complementary switching and are not controlled as a single unit. It is argued that instead, the AATI products use

²⁰ (...continued)

Determination concerning claims 1, 2 and 3 also apply to corresponding elements in claim 34.

individually switched switching transistors with separate control circuitry for the top transistor and for the bottom transistor in a device. It is argued that there is one set of conditions that turns the top transistor on and off, and a separate set of conditions that turns the bottom transistor on and off, and the top and bottom transistors are never controlled as a single unit. AATI Post-Hearing Brief at 28.

The dispute among the parties is not centered on the details of the actual circuitry contained in the accused devices relevant to the transistors at issue, or how the relevant portions of the accused devices operate. Rather, the question of whether or not this claim limitation is satisfied by any of the accused AATI products hinges on the proper construction of this limitation.

As discussed in section III A 1, this claim limitation is properly construed to mean that the pair of switching transistors in the claimed invention are configured as a single switch. The term “single unit,” which was proposed by AATI as a way of describing the way in which the claimed switch must work, is indeed an accurate description of the way in which the transistors must be used given the claim limitation at issue. AATI’s proposed construction was, therefore, found to be essentially accurate.

The evidence shows that the switching transistors in the accused AATI products are not configured in a single switch, and that instead the switching transistors have separate control circuitry. They are not controlled as a single unit. Wei Tr. 1839-1842, 1868, 1878, 1882, 1892, 2142-2143; RDX-627; RDX-629; RDX-652; RDX-665.

Consequently, the AAT1143, AAT1146, AAT1151 and AAT12165 and the products they represent do not satisfy this claim limitation concerning a pair of synchronously switched

switching transistors.

“second circuit . . . third circuit”

Independent claim 1 requires a a first circuit for monitoring the output to generate a first feedback signal. A similar limitation is found in independent method claim 34. There does not appear to be a dispute among the parties concerning the fact that the accused AATI products contain such a circuit. However, claim 1 (and corresponding portions of claim 34) also requires a second circuit for generating a first control signal during a first state of circuit operation and a third circuit for generating a second control signal during a second state of circuit operation to cause both switching transistors to be OFF for a first period of time during which the output capacitor maintains the output substantially at the regulated voltage. There is a question as to whether or not any of the accused AATI products contained the required “second” and “third” circuits.

Linear argues that the second circuit of the AAT1143 consists of several components and portions of the product’s circuitry, including the current sense and load circuitry, the transconductance amplifier block, a set of comparators, an oscillator, reference and voltage differences, reference generators, and the digital clock driver. It is argued that within the AAT1143 there is [

]is the first control signal as

recited by Claims 2, 3 and 34. Linear makes similar arguments with respect to the accused

representative products AAT1146, AAT1151 and AAT1265.²¹ Linear Post-Hearing Brief at 5-6; *see* Linear Reply Brief at 4.

The Commission Investigative Staff also argues that the accused products contain the required second circuit, and makes many arguments similar to those of Linear, including the argument that [

]See OUII Post-Hearing Brief at 40

(citations omitted).

The claims also require a third circuit to generate a second control signal during a second state of circuit operation to cause both switching transistors to be OFF, during which time the output capacitor maintains the output substantially at the regulated voltage. Linear argues that in the AAT1143, the second state of circuit operation occurs during light (i.e., low) load current conditions. In particular, [] [

²¹ Linear provides further details of its argument, as follows:

[

Linear Post-Hearing Brief at 6.

[

] ²² Linear Post-Hearing Brief at 6-7.

Linear argues that [

] *See Id.* at 7 (citing

CX-115C at AAT17237 (a depiction of the [

])).

According to Linear, the AATI1143 has [

] □

²² Linear details the operation of the PWM comparator as follows:

[

] Linear Post-Hearing Brief at 7.

[

]

Linear argues that the second control signal is [

]The patent claims require the output voltage to remain substantially at the regulated voltage. Linear argues that by providing the necessary charge required by the load during the sleep state, the claim limitation concerning a substantially regulated voltage is satisfied. Linear applies a similar analysis to other AATI products accused under the '258 patent. *See* Linear Post-Hearing Brief at 8.

The Commission Investigative Staff sets forth arguments concerning the required third circuit that are similar to those made by Linear. For example, the Staff argues that according to the evidence all of the accused products can reach a state at low load currents during which both transistors are off and the output capacitor maintains the output voltage at the regulated level. The Staff also argues that at low load currents, the CMP signal in the AAT1143 (or a similar signal in the other accused representative products), is the second control signal required by the claims. In particular, it is argued that[

][

[

]It is argued that having reached the state with both transistors OFF, both transistors will remain OFF as long as the CMP signal remains low. OUII Post-Hearing Brief at 40-41.

AATI argues that all parties appear to agree that the second circuit and the third circuit must be distinct, and moreover such an interpretation is consistent with the claim language, the District Court's claim construction in the prior *Impala* litigation, and with the embodiments of the specification. Nevertheless, AATI argues, Linear has failed to prove that distinct second and third circuits exist in the accused products, and has relied on only one component unique to the alleged third circuit, which is the ZC comparator. *See* AATI Post-Hearing Brief at 27. AATI argues that even the ZC comparator cannot be properly considered part of a third circuit because it has nothing to do with generating a required second control signal, the function that defines the third circuit according to the claims. *Id.* at 27-28; AATI Reply Brief at 12.

The evidence confirms that the portions of each of the accused devices alleged to constitute the second circuit and the third circuit are the same, with the exception of the ZC comparator. *See* Wei Tr. 1868; RDX-652. However, according to the plain claim language, "generating a first control signal during a first state of circuit operation" is the function of the claimed "second circuit," and "generating a second control signal during a second state of circuit operation to cause both switching transistors to be OFF for a first period of time . . ." is the functions of a separately claimed "third circuit." The requirement that the "second" and "third" circuit be distinct originates in the terms "second circuit" and "third circuit," and the different operations ascribed to each in the claim language. Further, the specification does not support any

other type of device. Yet, in this investigation it has not been established that a “third circuit” is created merely by adding a single component to the circuitry identified as the “second circuit.”

In addition, when one examines the [

] in order to fulfill the required operations of the third circuit. With reference to RDX-650 (*see* FF 9) and RDX-651, Dr. Wei explained this portion of the AAT1143 circuitry, as follows:

[

]

[

Wei Tr. 1865-1868; RDX-650; RDX-651.]

Consequently, it has not been shown that the accused AATI products satisfy the limitations of independent claim 1 of a second circuit for generating a first control signal during a

first state of circuit operation, and third circuit for generating a second control signal during a second state of circuit operation to cause both switching transistors to be OFF. Nor has it been shown that the accused AATI products satisfy the similar limitations in independent claim 34.

“first state of circuit operation . . . second state of circuit operation”

As detailed in the preceding discussion, the claims associate the “second circuit” and “third circuit” with the “first state of circuit operation” and the “second state of operation.” Inasmuch as the accused AATI products do not have the requisite second and third circuits, it would be difficult to conceive of a way in which the accused products could have “first” and “second” states of operation that genuinely meet the distinct limitations required by the plain claim language. In any event, even if one could divorce the first and second states of circuit operations from the claimed circuitry, it has not been demonstrated that the accused products exhibit the required states of circuit operation.

As discussed in detail in section III A 3 (claim construction), under claims 2, 3, and 34 of the ‘258 patent, the first state of circuit operation is associated with a high load current condition, and the second state of circuit operation is associated with a low load current condition. However, at least the AAT1143, AAT1146 and AAT1151 representative products do not depend on states of operation with the requisite high or low load currents. The accused products have one control loop that operates to maintain the output at a regulated voltage regardless of load conditions. Wei Tr. 1973-1974, 1882, 1892-1893. Thus, the accused products are designed to operate in a way that differs substantially from the operation of the claimed circuits which can only switch between the first and second states when the load current changes.

Accordingly, at least three of the four representative AATI products accused under the '258 patent lack the required "first state of circuit operation" and "second state of circuit operation"

"first control signal . . . second control signal"

The claims also require a "first control signal" and a "second control signal." As discussed above in this infringement analysis, Linear argues that the second control signal is the CMP signal in the AAT1143. However, even if the CMP signal performed the function of the second control signal, which it does not, the CMP could not satisfy the claim requirements because it is not distinct from the first control signal.

In the claimed invention, the first control signal varies the duty cycle of the switching transistors during normal switching operations. The second control signal causes both of the switching transistors to be OFF during the sleep state. *See* Wei Tr. 1868. In a representative accused product, Linear identifies [

] *See* Linear Post-Hearing Brief at 6-7.

Similarly, the Staff correctly observes that [

] OUII Post-Hearing Brief at 40

n.34. In fact, in the accused devices, [] *See* Wei Tr. 1855-1863.

Accordingly, in the accused products PMOS and CMP are not two distinct signals, and the accused products do not contain the required limitation.

“a second control signal during a second state of circuit operation to cause both switching transistors to be OFF”

Independent claim 1 (and thus dependent claims 2 and 3) a “second control signal . . . to cause both switching transistors to be OFF.” Similarly, claim 34 requires the step of turning both switching transistors OFF. However, the AATI 1143, 1146, and 1151 products do not contain any control signal that causes both transistors to be OFF and do not perform any step that turns both transistors OFF. *See Wei Tr. 1838, 1882.*

As Dr. Wei explained, the AATI products use [

]Wei Tr. 1864, 1859-1864, 1882, 1944,

1949; *see Pedram Tr. 478.* Accordingly, there is no second control signal that causes both transistors to be OFF.

Although Linear identifies [

] Linear

Post-Hearing Brief at 7; *see Pedram Tr. 465.* Accordingly, CMP cannot be the required “second control signal.” Linear attempts to conform CMP to the required claim limitation by arguing that the “second control signal” can operate on the transistors either directly or through one or more intermediate signals. However, Linear has failed to show that CMP is the cause of both

transistors being off either directly or through any intermediate signals. As Linear has admitted, [

[]

Linear Post-Hearing Brief at 7-8; *see Pedram Tr. 478.* Further, []

[

]Wei Tr. 1838, 1863-1864, 1868. Linear has failed to show that the CMP signal is the cause of the bottom transistor being OFF.

Linear and the Staff also argue that the CMP signal performs more than one function. *See* OUII Post-Hearing Brief at 40-41 n.35; SPFF460; Linear Post-Hearing Brief at 9-10. In particular, they assert that[

]

Accordingly, the accused products do not satisfy the “second control signal” limitation of claims 2 and 3.

In addition, it is undisputed that claim 34 is a method claim that is largely similar to apparatus claim 3. *See, e.g.*, OUII Post-Hearing Brief at 42. Claim 34 requires the step of turning both transistors OFF. Inasmuch as the accused products do not have a signal that causes both transistors to be OFF, the accused products cannot satisfy the limitation of claim 34.

“substantially at the regulated voltage”

Claims 2, 3, and 34 require that the output capacitor maintain the output substantially at the regulated voltage in the second state, although the output is maintained at the regulated

voltage in the first state. As discussed in section III A 2 (claim construction), the phrase “substantially at the regulated voltage” requires operation at a different voltage in the first and second states, and one of ordinary skill would understand that to encompass average voltages. As explained previously, all of the disclosed embodiments operate at a different average voltage in the first and second states. Further, the disclosed embodiments would not operate without this difference in average voltage. *See* Wei Tr. 1713-1719.

Linear and the Staff propose constructions of “substantially at the regulated voltage” that fail to require a different average voltage than the phrase “at the regulated voltage.” Moreover, it is not disputed that the accused products operate at the same average voltage in both the alleged first and second states.

Indeed, the evidence shows that the AATI1143, AATI1146, AATI1151 and AATI1265 accused products do not infringe the limitation in question because they maintain the same average voltage in both the alleged first and second states of operation. Wei Tr. 1852, 1973-1974, 1869, 1879, 1882, 1893, 1919. The ability to maintain the same average voltage in both states results from the fundamental difference between the designs of the accused products and the ‘258 patent. Inasmuch as the accused AATI products do not maintain the output at a different voltage in the first and second states, the accused products do not satisfy this claim limitation.

Claim 35

Linear presents arguments that the AATI1143 and AATI1146 infringe claim 35 of the ‘258 patent. *See* Linear Post-Hearing Brief at 10-11; Linear Reply Brief at 7-8. The Commission Investigative Staff provides scant briefing concerning claim 35, although the Staff supports a

determination that the AAT1143 and AAT1146 infringe. *See* OUII Post-Hearing Brief at 42; OUII Reply Brief at 8-9. AATI argues that neither the AAT1143 nor the AAT1146 infringes claim 35. *See* AATI Post-Hearing Brief at 29-31; AATI Reply Brief at 14-15.

As explained below, neither the AAT1143, the AAT1146, nor any AATI product accused under the '258 patent contains all the required limitations of claim 35.

“ a switch . . . including a pair of synchronously switched switching transistors”

Independent claim 35, like independent claim 1, claims a particular circuit for controlling a switching voltage regulator. As in all asserted claims of the '258 patent, claim 35 requires “a switch” that includes “a pair of synchronously switched switching transistors.” It is undisputed that this terminology refers to the same claim limitation contained in the other asserted claims. This limitation was construed in section III A 1 (claim construction) to require the pair of transistors to be part of a single switch. As discussed above, this limitation is not satisfied by the AAT1143, the AAT1146 or any accused AATI product. Indeed, in the AATI products the switching transistors have separate control circuitry, and thus they implement switching transistors in a way that deviates substantially from the claim limitation. Thus, no product accused under the '258 patent can be found to infringe claim 35.

The AAT1143 and AAT1146 Products Do Not Monitor Current to the Load

Claim 35 requires “a third circuit for monitoring the current to the load” However, both Linear and the Staff appear to concede that the circuitry they identify as corresponding to

this limitations monitors instantaneous inductor current, rather than current to the load.²³ See Linear Post-Hearing Brief at 11; CPFF1585 [

](Pedram – Hearing Tr. at

609:18-23)”; OUII Post-Hearing Brief at 42 [

] Neither

Linear nor the Staff explain how the monitoring of instantaneous inductor current can constitute monitoring of current to the load.

Furthermore, instantaneous inductor current is not indicative of load current because the inductor current ramps up and down while the load current stays constant. See Wei Tr. 1939.

Nor is a reversal of instantaneous inductor current indicative of an impending load current reversal because the output capacitor will continue supplying steady current to the load even if the inductor current reverses.²⁴ Wei Tr. 1830, 1939.

Accordingly, it has not been established that any accused product satisfies this claim limitation.

The AAT1143 and AAT1146 Products Do Not Monitor Current or Compare Current with a Current Threshold

The relevant claim element provides: “a third circuit for monitoring the current to the

²³ Linear’s expert, Dr. Pedram, admitted that[

]

²⁴ The Staff relies in part on Figure 8 of the patent and concludes erroneously that this Figure necessarily requires monitoring of instantaneous inductor current. However, as Dr. Wei explained, Figure 8 and the written description do not indicate whether the circuit monitors instantaneous or average inductor current. See Wei Tr. 1931-1932.

load to generate a second control signal during a second state of circuit operation to cause one of said switching transistors to be maintained OFF when the magnitude of the monitored current falls below a current threshold.” Thus, claim 35 requires that the third circuit monitor current and generate a second control signal when the magnitude of the monitored current falls below a current threshold. However, Linear admits that the accused products compare the monitored voltage to a voltage threshold, not to a current threshold as required by claim 35. Specifically, Linear acknowledges that the accused products compare the voltage at the LX node with the voltage at ground (i.e., 0). *See* Linear Post-Hearing Brief at 11; Pedram Tr. 489-490. Yet, Linear fails to explain how a comparison to a voltage threshold can satisfy the claim requirement of a current threshold. It has not been established that this claim limitation is satisfied by the accused products.

Doctrine of Equivalents

In its post-hearing briefing, Linear alleges that AATI’s accused products infringe under the doctrine of equivalents. *See* Linear Post-Hearing Brief at 11. However, Linear fails to cite evidence in support of this allegation, and the briefing of all parties concerning the doctrine of equivalents is scant. Indeed, Linear’s expert witness, Dr. Pedram provided no evidence or opinion during the hearing concerning the doctrine of equivalents.²⁵ Further, as detailed above,

²⁵ During the hearing, AATI counsel clarified Linear’s position on the doctrine of equivalents:

JUDGE HARRIS: No, let’s go on. I don’t want to take up time dealing with his first report, when that is no longer his report.

BY MR. BEDI:

(continued...)

the record evidence shows that the accused representative devices achieve voltage regulation in ways that differ substantially from the claimed devices and method, for example in their use of switching transistors.

Consequently, it has not been shown that any accused product infringes any asserted claim of the '258 patent under the doctrine of equivalents.

Conclusion Concerning Direct Infringement of the Asserted Claims of the '258 Patent

Inasmuch as no accused product contains all limitations of any asserted claim of the '258 patent, either literally or under the doctrine of equivalents, it has not been demonstrated that AATI could infringe claim 2, 3, 34 or 35 of the patent.

B. Products Accused Under the '531 Patent of Direct Infringement

Linear accuses AATI of both direct and indirect infringement of claims 4, 9 and 26 of the '531 patent. Indirect infringement is discussed below in section III C.

With respect to direct infringement, Linear argues that the accused AATI products

²⁵ (...continued)

Q. Dr. Pedram, your opening report makes no mention of any reliance on the doctrine of equivalents, does it?

A. Not as I recall.

Q. And your rebuttal and your supplemental reports don't make any mention of doctrine of equivalents, does it? Do they?

A. Not that I recall. Again, so I am trying to refresh also my mind, the doctrine of equivalents, exactly what it means, but I don't know. Not to the best of my recollection.

Q. Thank you, Dr. Pedram.

Pedram Tr. 603.

literally infringe each asserted claim. Linear also argues that in the alternative, the accused products should be found to infringe under the doctrine of equivalents. Linear's infringement arguments are based in large part on laboratory tests performed by its expert, Dr. Pedram, which, according to Linear, confirm infringement by the accused products. The AATI products that are representative of all AATI products accused under the asserted claims of the '531 patent are designated as follows: AAT3113, AAT3119, AAT3141 and AAT3151. *See, e.g.*, Linear Post-Hearing Brief at 4, 12-20; CPFF 993-1001.

OUII argues that the AAT3119 would infringe claims 4 and 26 of the '531 patent if it were valid, and that the other accused products do not practice any asserted claim of the patent. It is argued that to the extent that any AATI product directly infringes an asserted claim, AATI should be found to induce infringement under 35 U.S.C. § 271(b), and to contribute to infringement under 35 U.S.C. § 271(c). *See, e.g.*, OUII Post-Hearing Brief at 37-39, 60.

AATI argues that none of its accused products sold as "charge pumps" directly infringes any asserted claim of the '531 patent, and in particular that the AT3113, AAT3141 and AAT3152 were necessarily designed to provide constant current (not voltage) to white LEDs in order to maintain consistent brightness for displays such as those used on cell phone screens. *See, e.g.*, AATI Post-Hearing Brief at 7-10; Reply Brief at 1-4. Nowhere in AATI's post-hearing or reply briefs is there an express admission that the accused AT3119 products practices any asserted claim of the '531 patent. However, AATI does not present any arguments challenging the allegation that the AAT3119 satisfies all limitations of at least claims 4 and 26. *See Id.*; OUII Reply Brief at 5 n.2 ("AATI does not contest the Staff's position that the AT3119 infringes claims 4 and 26 of the '531 patent.").

1. Literal Infringement

As seen in the parties' briefs, a determination of whether or not the accused products practice the asserted claims of the '531 patent centers around relatively few, although crucial, claim limitations, i.e., "voltage regulator," "variable resistance," and "monitoring the voltage at the output node." First, all claim elements, or limitations, are essential. *London*, 946 F.2d at 1538. Additionally, the limitations at issue highlight the fundamental disagreements among the parties as to the use and operation of the AAT3113, 3141 and 3151.

"voltage regulator"

Each of the asserted claims (i.e, both the apparatus and method claims) is either an independent claim, or depends from an independent claim that requires a "voltage regulator." As discussed in detailed in section III B 1, the "voltage regulator" limitation is found in the preambles of the independent claims at issue, and is construed as a device that "continuously maintains a constant output voltage at a predetermined, specified target value regardless of changes in input voltage or load current, so long as the input voltage and load current are within the specified operating range for the device." It is also found that a tolerance of approximately five percent gives meaning to the terms "regulate" and "regulator," and is in accordance with current industry standards.

The AAT3113, AAT3141 and AAT3151 products were designed to provide a constant current to white LEDs in order to maintain a consistent brightness for a display such as a cell phone screen.²⁶ However, AATI's arguments and the record evidence, do not pertain strictly to

²⁶ Mr. Nork, a named inventor of the '531 patent, acknowledged that white LEDs do not require a constant voltage to achieve constant brightness, and thus a white LED driver need not
(continued...)

the intended use of the accused products, Rather, the evidence shows that the AAT3113, AAT3141 and AAT3151 do not provide the required voltage regulation. *See* Szepesi Tr. 1297, 1314-1315, 1323. The evidence shows that AAT3113, AAT3141, and AAT3151 have output voltages that vary greatly with changes in input voltage and load current, as shown by test evidence of record.²⁷ *See* Szepesi Tr. 1299-1305, 1314-1319, 1327-1327; Nork Tr. 690.

For example, with respect to the AAT3141, tests conducted by Dr. Szepesi show that the voltage at the output pin is not constant and, in fact, varies from 0 volts (V) to 5.2V as the input voltage changes over its specified operating range. Moreover, for any given input voltage the output voltage will change dramatically (up to 100%) if the load current (i.e., the current through the LEDs) changes.²⁸ Szepesi Tr. 1299-1319; RX-952. Further, the feedback loop in the AAT3141 is not a voltage regulation loop. Rather, it is a clamp loop that is active only when the output voltage must be clamped to prevent circuit damage in an over voltage condition. Szepesi Tr. 1317. Thus, the output voltage of the AAT3141 is not “predetermined” or “constant” over the specified operating range of the part. Szepesi Tr. 1298-1319; RX-952. Accordingly, the AAT3141 is not a voltage regulator.

Tests of the AAT3151 by Dr. Szepesi show that the voltage at its output pin varies

²⁶ (...continued)
be a voltage regulator. Nork Tr. 766-767.

²⁷ The reliability of Linear’s test data is unclear. In at least some instances, tests of the accused charge pump products were not conducted in their recommended configurations and appeared to yield inconsistent data. *See* Pedram Tr. 974-998, 1001-1007, 1023-1028, 1040-1044; Szepesi Tr. 1316, 1319.

²⁸ Data obtained by Dr. Pedram appears to confirm that the output voltage varies greatly with changes in input voltage and load current. *See* Pedram Tr. 983-984; CDX-433 at 2; RX-1014.

significantly (e.g., from 3.2V to 5.5V) with changes in input voltage and load current. For any given input voltage, the output voltage varies with changes in the LED load current. Szepesi Tr. 1325-1327; RX-955.²⁹ Thus, the AAT3151 is not a voltage regulator as required by the claims.

With respect to the AAT3113, Dr. Szepesi's tests show that the output voltage varies as much as 30% (e.g., approximately 3.6V to 5.2V) over the specified input voltage range.³⁰ The output voltage can also vary with changes in load current. Szepesi Tr. 1304-1305; RX-949. Although Linear has argued that at a high input voltage the AAT3113 has a constant output voltage, the output voltage level is not a regulated voltage because [

]See Szepesi Tr.

1297-1309; D'Angelo Tr. 799-802; CX-119C at AATI0018883; CX-127. Inasmuch as the output voltage of a single AAT3113 part is not constant and varies with changes in input voltage and load current, and because the output voltage of any given AAT3113 part is neither specified

²⁹ Dr. Pedram's measurements show similar variations in the output voltage. See Pedram Tr. 1035, 1040; RX-1063.

³⁰ Dr. Pedram's tests show significant variation in output voltage. See Pedram Tr. 1044; RX-1013.

nor predetermined, the AAT3113 is not a voltage regulator.

Accordingly, the “voltage regulator” limitation is not satisfied by at least the AAT3113, AAT3141 and AAT3151.

“monitoring the voltage at the output node”

Claims 4 and 9 require “monitoring the voltage at the output node” of the boost voltage regulator to generate a control signal, and claim 26 includes a similar limitation. *See* JX-1 (‘351 patent); Szepesi Tr. 1330. In the ‘531 patent, the “output node” is identified as a node that is located after the charge pump circuitry but before the load. *See* JX-1 (‘531 patent), col. 3, lines 57-60, Fig. 3A (V_{OUT}). For the AAT3151, Linear has not identified any circuitry that monitors the voltage at the output node to generate the control signal. *See* Szepesi Tr. 1330. Rather the control signal that Linear has identified is not generated from monitoring the output node of the AAT3151. It is generated from [

]Pedram Tr. 897, 1031; Szepesi Tr. 1332-1333, 1351. Thus, for this additional reason, the AAT3151 cannot infringe the asserted claims.

“variable resistance”

Claim 9 requires that the “controlling the current” step be achieved “by providing a variable resistance in series between the input voltage and the first capacitor when the second switch is closed.” Linear argues that the AAT3119 provides a variable resistance in series between the input voltage and the first pass capacitor when the second switch is closed. In particular, it is argued that the pass transistor MP_3 acts as a variable resistance and controls the flow of current when the second switch is closed (i.e., during the charging phase) as the gate voltage of this transistor is changed. It is argued that a similar analysis applies to the AAT3113,

AT3141 and AAT3151. Linear Post-Hearing Brief at 18. AATI argues that none of the accused products satisfy this limitation. *See* AATI Post-Hearing Brief at 9-10.

None of AATI's accused charge pump products infringes claim 9 because they do not include a "variable resistance" between the input voltage and the flying capacitor. *See* CX-119C at AATI0018890; Szepesi Tr. 1313, 1320, 1333-1334, 1339-1341. Linear has provided little evidence that each of the MOSFET transistors it has identified in each of the accused devices acts as a "variable resistance" that controls current through a flying capacitor. As Dr. Szepesi testified, each of those transistors is not designed to operate, and does not operate, in the linear region as a "variable resistance." CX-119C at AATI0018890; CX-120C at AATI0018985; CX-121C at AATI0019677; CX-122C at AATI0019841; Szepesi Tr. 1278-1282, 1311-1312, 1320, 1333-1334, 1339-1340.

It has not been shown that the accused products satisfy the "variable resistance" limitation of claim 9.

2. Doctrine of Equivalents

Linear makes only one argument concerning the doctrine of equivalents and the '531 patent.³¹ Specifically, Linear argues that even if it is found that a transistor operated as a variable resistor does not literally meet the "variable resistance" element of claim 9, the '531 accused products nevertheless infringe under the doctrine of equivalents because in practice, utilization of a modulated gate voltage on a transistor implements a variable resistance. It is argued that AATI has admitted that a transistor whose gate voltage is modulated such that the transistor is operating

³¹ The Commission Investigative Staff makes no argument concerning the doctrine of equivalents for the '531 patent.

in its linear range is a variable resistance element. Linear Post-Hearing Brief at 18 (citing JX-30 (Blattner Dep.) Tr. 17). Further, it is argued that “modulating the gate voltage applied to MP_3 directly controls the resistance between the source and drain terminals of MP_3 (which then controls the current flowing through the series path of VIN, MP_3, Mp_2, CFLY, and MN_1). Thus controlling the GATE voltage applied to MP_3 changes the resistance between the source and drain terminals of MP_3.” *Id.* at 19 (citing CX-120C at AATI0018985).

AATI argues that Linear’s argument fails for lack of proof because as there is no evidence or testimony to support an argument that a transistor operating in its saturation region is “insubstantially different” from a variable resistance. AATI Reply Brief at 3 (citing, *inter alia*, *Hewlett-Packard Co. v. Mustek Systems, Inc.*, 340 F.3d 1314, 1322-23 (Fed. Cir. 2003)(holding that conclusory evidence regarding infringement under the doctrine of equivalents “falls far short of the long-standing evidentiary requirements for proof of infringement under the doctrine of equivalents”).

The cursory argument presented by Linear in its post-hearing brief was not presented during the hearing, and it is not possible to determine its merit without further evidence (and perhaps further exposition by the parties). The argument is not sufficient to determine whether the doctrine of equivalents would apply, e.g., whether the “variable resistance” element of method claim 9 is satisfied because the accused products perform substantially the same function in substantially the same way to obtain substantially the same result as that required by the claim language. Accordingly, it has not been established that any accused product infringes any asserted claim of the ‘531 patent under the doctrine of equivalents

3. Conclusion Concerning Direct Infringement of the Asserted Claims of the '531 Patent

AATI has not contested the fact that its accused AT3119 product practices all required elements, or limitations, of claims 4 and 26 of the '531 patent, and thus that product should be found to infringe if the those claims are valid and enforceable. However, it has not been established that the AT3119 or any other AATI product accused under the '531 patent (i.e., the AAT3113, AAT3141 and AAT3151) practices any other asserted claim of the patent, either literally or under the doctrine of equivalents.

C. Indirect Infringement

Only a small portion of the parties' briefs concern the question of indirect infringement. Nevertheless, as indicated above, Linear alleges that AATI actively induces infringement of both suit patents, and is also liable for contributory infringement of both patents. *See, e.g.*, Linear Post-Hearing Brief at 19-20. OUII argues that to the extent that a typical use of the accused product is determined to constitute direct infringement "of the asserted method claims by a user," the evidence shows that AATI actively induces infringement under 35 U.S.C. § 271(b) and constitutes such infringement under 35 U.S.C. § 271(c). *See, e.g.*, OUII Post-Hearing Brief at 42. AATI argues that Linear has failed to establish indirect infringement of any asserted claim of either suit patent. *See, e.g.*, AATI Post-Hearing Brief at 10-11, 32.

"Indirect infringement, whether inducement to infringe or contributory infringement, can only arise in the presence of direct infringement . . ." *Dynacore Holdings Corp. v. U.S. Philips Corp.*, 363 F.3d 1263, 1272 (Fed. Cir. 2004). As detailed throughout this section, due to a failure of the accused products to practice all required claim limitations, there can be no direct

infringement of any claim of the '258 patent by any accused AATI product. Similarly, with one exception (the AAT3119), the accused products do not practice the asserted claims of the '531 patent. Thus, indirect infringement is for the most part an impossibility in this investigation.

However, as discussed above, it has been found that if claims 4 and 26 of the '531 patent were valid and enforceable then the accused AT3119 would directly infringe. Nevertheless, the required elements of indirect infringement have not been established in this investigation.

In particular, the Federal Circuit has held that even when a party sells a large number of components in the United States, it is improper to infer indirect infringement without direct evidence of direct infringement. *See DSU Med. Corp. v. JMS Co.*, 471 F.3d 1293, 1306 (Fed. Cir. 2006). Thus, without direct proof of direct infringement, Linear cannot establish indirect infringement. In this instance, there is contrary evidence which appears to show that AATI's accused products are not completed circuits. Rather, they are individual, loose chips. *See* CX-127 at 7-10; CX-127 at 7-10; CX-129 at 1, 11, 13; CX-130 at 11. It appears that Linear did not take any discovery to establish facts such as how those chips are connected in an actual final product, what external components are connected, how any such final circuit is operated, and at which input voltage ranges or load currents any such circuit is operated. No such evidence was presented during the hearing.

Further, inducement requires evidence of culpable conduct that is directed to encouraging another's infringement. It is not adequate to show that an accused inducer had knowledge of the direct infringer's activities. *DSU*, 471 F.3d at 1306. Yet, no party has proven that AATI intended to encourage another's infringement. Indeed, the evidence shows that AATI parts can be used under conditions in which the output voltage varies. *See, e.g., Pedram Tr.* 983-984,

1035, 1040-1044; RX-1013; RX-1063. Although the burden is not on AATI to prove non-infringing uses, the record nonetheless contains substantial evidence of such uses for many if not all of the AATI products accused of infringing Linear's voltage regulation claims.³² See Szepesi Tr. 1296:11-1302, 1314:23-1318, 1323-1327; D'Angelo Tr. 796-797; Pedram Tr. 984-986, 1035; RX-947 through RX-952; RX-955; CX-127; CX-129; CX-130.

Accordingly, it is not found that indirect infringement has occurred in connection with any asserted claim of the '258 or '531 patent.

V. VALIDITY

AATI argues as affirmative defenses that all asserted claims of the '258 and '531 patent are invalid. The Commission Investigative Staff supports AATI in some of its invalidity arguments. Linear opposes all the invalidity arguments.

One cannot be held liable for practicing an invalid patent claim. See *Pandrol USA, LP v. Airboss Railway Products, 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 the presumption of validity in the way that a plaintiff can rely on the presumption in a district court proceeding. A respondent must overcome the presumption by providing clear and convincing evidence of invalidity in the way that a defendant must provide clear and convincing

³² See *Alloc, Inc. v. U.S. Int'l Trade Comm'n*, 342 F.3d 1361, 1374 (Fed. Cir. 2003) (affirming an Administrative Law Judge's finding of no contributory infringement when an imported accused product had substantial non-infringing uses and its installation instructions described a non-infringing method).

evidence in a court case. *Checkpoint Systems, Inc. v. United States Int'l Trade Comm'n*, 54 F.3d 756, 761 (Fed. Cir. 1995).

The introduction of prior art that was not before the Examiner may facilitate the challenger's burden of proving patent invalidity. However, the presumption of validity remains intact. The burden of proving invalidity remains on the challenger throughout a case, and the clear and convincing standard does not change. *Hybritech, Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1375 (Fed. Cir. 1986); *cf KSR Int'l Co. v. Teleflex Inc.*, No. 04-1350, slip op. at 16 (Sup. Ct. April 30, 2007)(The Supreme Court stated in dicta that the presumption of validity usually afforded an issued patent (i.e., "that the PTO, in its expertise, has issued the claim") might be diminished if the applicant failed to disclose important prior art during patent prosecution.).

AATI and the Staff briefed their invalidity arguments with respect to specific items of prior art, in some cases combining the legal bases for alleged invalidity in the same section. A similar format is used herein. All but one of AATI's and the Staff's arguments are based on alleged "anticipation" or "obviousness" in view of the prior art. AATI also alleged "double patenting," which is addressed in a separate section.

The grounds for finding a patent claim to be invalid due to anticipation are set forth in 35 U.S.C. § 102. Prior art, such as a printed publication, anticipates if it discloses every limitation of an asserted claim. *See Novo Nordisk Pharm., Inc. v. Bio-Tech Gen'l Corp.*, 424 F.3d 1347, 1354 (Fed. Cir. 2005). The Federal Circuit has observed, "that which would literally infringe if later anticipates if earlier." *Bristol-Myers Squibb Co. v. Ben Venue Labs., Inc.*, 246 F.3d 1368, 1378 (Fed. Cir. 2001).

Anticipation is a question of fact. *SmithKline Beecham Corp. v. Apotex Corp.*, 403 F.3d 1331, 1343 (Fed. Cir. 2005) (quotation omitted). “However, without genuine factual disputes underlying the anticipation inquiry, the issue is ripe for judgment as a matter of law.” *Id.*

Obviousness is grounded in 35 U.S.C. § 103. Section 103 of the Patent Act 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 negated by the manner in which the invention was made.

35 U.S.C. § 103(a).

Alleged obviousness is evaluated under the so-called *Graham* factors: (1) the scope and content of the prior art; (2) the differences between the prior art and the claims at issue; (3) the level of ordinary skill in the art; and (4) objective evidence of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 13-17 (1966).

“One of the ways in which a patent’s subject matter can be proved obvious is by noting that there existed at the time of invention a known problem for which there was an obvious solution encompassed by the patent’s claims.” *KSR Int’l*, No. 04-1350, slip op. at 16. “[A]ny need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed.” *Id.* Specific teachings, suggestions or motivations to combine prior art may provide helpful insights into the state of the art at the time of alleged invention. *Id.* at 2, 25. Nevertheless, “an 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.” *Id.* at 15. A “person of ordinary skill is also a person of ordinary creativity” *Id.* at 17.

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).

A. The Asserted Claims of the ‘258 Patent

1. Objective Evidence of Nonobviousness

As indicated above, one of the *Graham* factors, which 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 an analysis of the prior art. *See KSR Int’l*, slip op at 9, 22 (commercial success did not alter conclusion of obviousness in the trial court or the Supreme Court).

Linear argues that one indication of nonobviousness of the ‘258 patent claims is that AATI copied the claimed invention. *See Linear Post-Hearing Brief* at 44-45. However, as determined above in the infringement discussion, Linear has not shown that any AATI product practices the claimed invention.

Linear also argues that its products which practice the claimed invention have had commercial success with sales in excess of []. *See Id.* at 45. No party has contested the fact that Linear has sold products that practice one or more claims of the ‘258 patent as properly construed or that those products have been commercially successful. While not dispositive of the obviousness issue, the fact that products practicing the ‘258 patent have been successful is a factor to be considered when determining whether or not the claimed invention was obvious in view of the prior art discussed below. However, commercial success, like other so-called objective indicia or secondary considerations, is not a factor in making a determination on the question of invalidity due to anticipation.

2. The “Sleep Mode Claims” (Claims 2, 3 and 34)

AATI argues that several items of alleged prior art render claims 2, 3 and 34 invalid either independently or in combination.³³ However, most of the art in question is asserted against the claims only under Linear’s proposed claim constructions. As detailed in sections III A and IV A, Linear’s proposed constructions have not been adopted, and the Administrative Law Judge has determined that the proper constructions differ materially from Linear’s proposals. Only one item of asserted prior art, the Siliconix Si9150, is alleged to invalidate the claims under the proposed claim constructions of each party, and could be material under the claims as properly construed. *See* AATI Post-Hearing Brief at 32 n.12.

³³ The range of possible art consists of the Si9150 which is alleged to be a device made or at least designed by a company named Siliconix, Linear Application Notes 35 and 19, and the “admitted prior art Figure 1 in the ‘258 patent.” *See* AATI Post-Hearing Brief at 32.

a. The Siliconix Si9150

AATI argues that the claims are “invalid based on activities surrounding Siliconix’s development of a product called the Si9150 in 1991.” AATI Post-Hearing Brief at 32. AATI is not basing its argument on sales of actual Si9150 devices in 1991, or at any time before the critical date of the ‘258 patent. Rather, AATI’s arguments are based on the disclosure of three viewgraphs (projector transparencies) showing a so-called [

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]. It also is alleged that a copy of [

] . Certain aspects of these disclosures are allegedly confirmed by notes taken by Siliconix personnel at the time. It is argued that the viewgraphs constitute printed publications under 35 U.S.C. § 102(b), and that the presentations made the claimed invention of the ‘258 patent “known in this country” under 35 U.S.C. § 102(a). In the alternative, it is argued that the viewgraphs would make the claimed invention obvious under section 103 to one of ordinary skill in the art, and also that Siliconix reduced the claimed invention to practice thereby invalidating the invention pursuant to section 102(g). *See Id.* at 15-18; AATI Reply Brief at 37-39.

AATI’s arguments are opposed by Linear and the Commission Investigative Staff. *See* Linear Post-Hearing Brief at 26-29; Linear Reply Brief at 8-12; OUII Post-Hearing Brief at 49-5; OUII Reply Brief at 11-13.

The first barrier to accepting AATI’s arguments lies in the fact that it has not been shown

³⁴ [

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by clear and convincing evidence that the viewgraphs are prior art to the claimed invention. In *In re Klopfenstein*, 380 F.3d 1345 (Fed. Cir. 2004), the Federal Circuit held that in some cases documents can constitute “printed publications” without any actual distribution to the public or indexing in a database, catalog, or library. *See* 380 F.3d at 1346, 1351 (documents in question were displayed on a bulletin board for several days at a conference attended by persons of ordinary skill in the relevant art). However, such a determination requires a fact-specific, case-by-case analysis, and the “key inquiry is whether or not a reference has been made ‘publically accessible.’” 380 F.3d at 1348, 1350.

In this case, there is a lack of evidence that the Siliconix Sales Package containing the viewgraphs was sufficiently “publically accessible” to qualify as a printed publication. The persons to whom the documents were made available might have been in some instances persons of ordinary skill in the relevant art, yet there is no evidence that the public or others of ordinary skill had any access to the viewgraphs or the sales package. *Cf. Klopfenstein*, 380 F.3d at 1350 (“the reference was shown to a wide variety of viewers”). The record shows that it is possible that the Siliconix information may have been disseminated under a confidentiality agreement with potential customers. *See* Blanc Tr. 1637-1639. Certainly during the hearing, Siliconix requested and received confidential treatment for its information, even when faced with skepticism expressed by the Administrative Law Judge that at this late date the materials would still be worthy of secrecy. Tr. 1724-1727; RX-455. Consequently, it has not been demonstrated by clear and convincing evidence that the Siliconix materials are prior art to the ‘258 patent.

For the purposes of section 102(g), there is a lack of evidence that a Si9150 device, whose design is reflected in the viewgraphs, was ever made in this country. It appears that the

Si9150 viewgraphs are alleged by AATI to comprise the entire conception of the asserted claims. Pertinent to both alleged anticipation and obviousness is the fact Siliconix dropped ripple regulation from its datasheets after a design review document issued on September 13, 1991 because Siliconix could never get ripple regulation to work properly.³⁵ Blanc Tr. 1646-1647.

Indeed, there are technical aspects of the Siliconix viewgraphs that prevent them from invalidating any asserted claim of the '258 patent. For example, the Federal Circuit has held that "even if the claimed invention is disclosed in a printed publication, that disclosure will not suffice as prior art if it was not enabling." *Paperless Accounting, Inc. v. Bay Area Rapid Transit System*, 804 F.2d 659, 665 (Fed. Cir. 1986), *citing In re Borst*, 345 F.2d 851, 855 (C.C.P.A. 1965); *cert. denied*, 382 U.S. 973 (1966). AATI's expert presented only conclusory testimony that the Siliconix Sales Package would enable a person of ordinary skill in the art to build a circuit which practices claims 2, 3, and 34 of the '258 patent without undue experimentation. *See Wei Tr. 1731-1732*. Moreover, in designing a hypothetical circuit purportedly within the scope of the '258 patent's claims, AATI's expert relied on other Siliconix documents that were not part of the Siliconix Sales Package (and even then, his circuit included connections not explicitly disclosed in those documents). *See Wei Tr. 2030-2054; Pedram Tr. 2206-2207*.

³⁵ While AATI argues that Siliconix worked on a ripple regulator as late as 1992, there is no evidence of any work thereafter. *See AATI Post-Hearing Brief at 39*. One is reasonably led to conclude that Siliconix abandoned the work, and thus it cannot constitute invalidating prior art under section 102(g). *See 35 U.S.C. § 102(g)* (invalidating art cannot be "abandoned, suppressed or concealed"); *see also Oddzon Products, Inc. v. Just Toys, Inc.*, 122 F.3d 1396, 1402 (Fed. Cir. 1997) (When "the invention has been abandoned without public disclosure, suppressed, or concealed, and a subsequent inventor . . . obtains a patent, the policy of the law is for the subsequent inventor to prevail.").

The Administrative Law Judge does not find that the Siliconix materials render invalid claim 2, 3 or 34 of the '258 patent.

3. The “Reverse Current Prevention” Claim (Claim 35)

a. The MAX782 Evaluation Board

AATI argues that a device made by Maxim Integrated Products, Inc. (“Maxim”) called the MAX782 anticipated claim 35 of the '258 patent pursuant to 35 U.S.C. § 102(a).³⁶ See AATI Post-Hearing Brief at 43-44; AATI Reply Brief at 20-21. The Commission Investigative Staff supports a finding of invalidity due to anticipation. See OUII Post-Hearing Brief at 52-53; OUII Reply Brief at 14-15. Linear argues that it has not been shown that the MAX782 invalidates claim 35. See Linear Post-Hearing Brief at 31-32; Linear Reply Brief at 14.

The MAX782 is a voltage regulator that Maxim offered for sale as early as 1993. In 1993, evaluation boards were provided to potential customers, and the MAX782 EV Kit document was provided with the boards. Datasheets on the MAX782 were also available. See Flatness Tr. 388-392; Wei Tr. 1814-1816. Linear provided some information concerning the MAX782 dating from 1993 to the PTO in connection with the prosecution of the '258 patent and also in connection with its parent application. The device has been raised in prior litigation

³⁶ Section 102(a) of the Patent Act provides:

A person shall be entitled to a patent unless—

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

35 U.S.C. § 102(a).

concerning patent invalidity, apparently without resolution by any court. *See, e.g.*, JX-4 at LTC00362-63, LTC00368, LTC00372; CPFF 3514; CPFF 4684.

The record shows that Maxim is now licensed under the '258 patent as part of a litigation settlement.³⁷ It is, however, unclear whether Maxim took the license specifically because it thought that it might practice claim 35 and the claim was valid, or whether Maxim agreed to a license for another reason such as a perceived need for indemnity for practicing another claim of the patent. *See* OUII Post-Hearing Brief at 53; CX-13C. In any event, no party disputes that the MAX782, as described during the hearing, contains all the elements or limitations of claim 35,³⁸ and that an evaluation board, kit or datasheet would disclose the claimed invention. The parties' arguments concerning the MAX782 and the question of anticipation are not technical in nature.

Rather, Linear defends against the attack on the claim's validity by arguing that the inventors of the '258 patent conceived of all their claims by August 19, 1991, and reduced them to practice by August 22, 1991, yet AATI has failed to prove by clear and convincing evidence that the MAX782 was publically known or used before the reduction to practice date of August 22, 1991. Further, it is argued that because MAX782 datasheets and other materials were provided to the PTO during prosecution, AATI's burden of showing invalidity is heightened.³⁹

³⁷ Maxim was involved in the *Impala* litigation which was discussed at length in section III in connection with claim construction.

³⁸ Technical information concerning the MAX782 in relation to the limitations of claim 35 is found in FF 16-37.

³⁹ Although Linear relies in part on this presumption, dicta in a recent Supreme Court opinion has called into question the applicability of such heightened scrutiny in some cases. *KSR Int'l*, No. 04-1350, slip op. at 16 (expertise of examiner might not be presumed if important art was withheld during prosecution).

Thus, a determination of whether or not claim 35 is invalid in view of the MAX782 and information detailing its elements hinges of one or possibly two questions.

First, the legal conception date for claim 35 must be determined. If Linear is correct that the evidence shows that the date is no later than August 22, 1991, then AATI and the Staff cannot prevail with their invalidity arguments because they point to no evidence concerning the MAX782 that predates 1993. If the evidence does not show a reduction to practice before the patent's filing date, then Linear is entitled only to the patent's March 23, 1993 filing date, which in this case is the priority filing date based on the parent application.⁴⁰ Second, if the 1993 materials relied upon by AATI and the Staff are potentially invalidating prior art, then it must be determined whether or not they were available to the public.⁴¹

Conception and Reduction to Practice

It is largely undisputed that although the parent application was not filed until 1993, the named inventors were working toward the claimed invention of the '258 patent during 1991. Linear's arguments concerning the inventors' work in 1991 are corroborated in several respects by contemporaneous documents and the testimony of witnesses in this investigation. *See, e.g.*, CX-136C at LLTC6611, LTC6622, LTC6624 and CX-135C at LLTC6456. Nevertheless, while it is ultimately AATI's and the Staff's burden to show that claim 35 is invalid, Linear is not automatically entitled to a 1991 date for conception and reduction to practice (in lieu of the 1993

⁴⁰ *See Loral Fairchild Corp. v. Matsushita Elec. Indus. Corp.*, 266 F.3d 1358, 1361 (Fed. Cir. 2001).

⁴¹ Section 102(a) should be understood to refer to publicly known publications (including patents) or other prior art in public use or on sale. *See Kimberly-Clark Corp. v. Johnson & Johnson*, 745 F.2d 1437, 1453 (Fed. Cir. 1984).

priority filing date) to insulate the '258 patent to a validity challenge. *See Loral*, 266 F.3d at 1361. In this instance, there are serious questions as to whether the named inventors conceived or reduced to practice all limitations of claim 35 by August of 1991, or indeed whether it can be determined that claim 35 is entitled to any date in advance of the priority filing date in 1993.

In particular, AATI argues that as Linear's expert acknowledged, the [

] This raises a problem for the

'258 patent in view of Linear's own prior art. In fact, AATI argues that to avoid an absolute on-sale bar during prosecution of its foreign counterpart application to the '258 patent, Linear stated to the European Patent Office that the reverse current prevention claims (similar to claim 35) did not cover the LTC1148 because that earlier Linear part did not monitor the inductor current. [

] AATI Post-Hearing Brief at 43-44 (quoting *Tanabe Seiyaku Co. v. United States Int'l Trade Comm'n*, 109 F.3d 726, 733 (Fed. Cir. 1997) ("representations to foreign patent offices should be considered . . . when [they] comprise relevant evidence."); *Gallant v. Telebrands Corp.*, 35 F. Supp.2d 378, 400 (D.N.J. 1998) (plaintiff may not take a position contrary to an admission made to the EPO)). Accordingly, AATI argues that in this investigation Linear cannot show that it is entitled to an earlier date than the 1993 filing date.

The Staff argues that from a technical perspective the earlier Linear materials do not show that claim 35 is entitled to a date prior to the MAX782 Evaluation Kit because [

] See OUII Post-Hearing Brief at 53.

In its briefs, Linear provides only a cursory treatment of this pivotal issue. In its main post-hearing brief, Linear relegated the discussion of conception and reduction to practice to little more than a footnote. See Linear Post-Hearing Brief at 31 (citing footnote 21). Linear did not address the issue in its reply on the MAX782. See Linear Reply Brief at 14. Linear's proposed findings are only slightly more illuminating. See, e.g., CPFF 697-700.

Perhaps the scarcity of information or argument from Linear is rooted in the situation described by AATI, in which potentially conflicting representations have been made to the European Patent Office. In any event, "a third circuit for monitoring the current to the load" is a limitation of the express, plain language of claim 35 and, as discussed above, the limitation has already played an important role in the infringement analysis in this investigation. See Sections III A (claim construction) and IV A (infringement). [

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Claim 35 is entitled to the '258 patent's priority filing date of March 23, 1993.

The MAX782 Prior Art

The earliest materials relied upon by AATI and the Staff to argue invalidity of claim 35 date back to 1993, while the priority filing date for claim 35 is March 23, 1993. Nevertheless, the evidence clearly shows that disclosure of the MAX782 took place before March 23, 1993. For example, an Advance Information Data Sheet describing the MAX782 was published in February 1993. *See* RX-523 at 1. The Advance Information Data Sheet was in the public domain and in fact was publicly distributed by Maxim through its fax-back service in which Maxim would send a copy of the datasheet to potential customers upon request. *See* Flatness Tr. 393. Also, the MAX782 evaluation kits were distributed to Maxim customers (including one who was also a Linear customer) before the March 23, 1993 invention date of claim 35. Flatness Tr. 392. Linear received a MAX782 evaluation kit on March 23, 1993 from a customer who had previously obtained it. Flatness Tr. 388-389. Further, the distribution of evaluation kits and datasheets to Maxim customers shows that the MAX782 was publically available before March 23, 1993 because the product was on sale. There is, thus, clear and convincing evidence that the statutory requirements for invalidity under section 102(a) are satisfied.⁴²

Conclusion

It is found by clear and convincing evidence that claim 35 of the '258 patent is invalid due to anticipation.

⁴² The Administrative Law Judge is mindful of the fact that information about the MAX7682 is included in the prosecution history of the '258 patent. Linear repeatedly seeks to invoke the higher level of scrutiny that prior art is to receive when it was already before the PTO examiner during prosecution. However, Linear provides no explanation of the substantive issues before the examiner, and how prosecution of the '258 patent should affect the anticipation analysis in this investigation.

b. The Ron Vinsant Laptop Switcher Proposal

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Accordingly, it is found that AATI has failed to show by clear and convincing evidence that claim 35 of the '258 patent is invalid under 35 U.S.C. § 102(f).

c. The ML4861 Datasheet

AATI argues that the ML4861 was a voltage regulator chip with reverse circuit prevention that was distributed by Micro Linear Corp. It is further argued that in July 1992, Micro Linear published a datasheet that described the structure and operation of the chip, and constituted anticipatory prior art under 35 U.S.C. § 102(a) because it was published before Linear's March 23, 1993 conception date and disclosed all limitations of claim 35 of the '258 patent. *See* AATI Post-Hearing Brief at 45-46; AATI Reply Brief at 21-22. As discussed below, AATI also includes the ML4861 datasheet in its obviousness arguments.

Linear and the Staff argue that AATI has failed to prove a July 1992 publication date for the ML4861 datasheet, and also that the datasheet fails to disclose all limitations of claim 35. *See* Linear Post-Hearing Brief at 32-33; Linear Reply Brief at 14-15; OUII Post-Hearing Brief at 54; OUII Reply Brief at 15.

As discussed above in connection with the MAX782 evaluation board and related documentation, the record does not support a conception or critical date for claim 35 prior to the March 23, 1993 filing of the parent application for the '258 patent. Nevertheless, AATI provided

little evidence that the ML4861 datasheet was in fact published and made available in July 1992. *See* AATI Post-Hearing Brief at 21 (citing only RPPF 1958 which concerns a “preliminary” datasheet). Although the document in question appears on its face to indicate a July 1992 publication date, it is remarkable that AATI did not present additional evidence concerning this crucial and contested issue, and further that AATI was not able to show that the datasheet was actually made available as early as July 1992, only nine months before the 1993 filing date for the ‘258 parent application. While the preponderance of the record evidence is that the datasheet was in fact published in July 1992, AATI has not clearly and convincingly established that it is prior art to claim 35 of the ‘258 patent. That lack of evidence affects the ability of the ML4861 to serve as invalidating prior art with respect to issues of alleged anticipation and obviousness.

In addition, it has not been shown that the ML4861 datasheet contained all the elements or limitations of claim 35 of the ‘258 patent. The ML4861 datasheet concerns a boost regulator rather than a step down converter. *Wei Tr.* 1823; *RX-533*. A boost regulator requires a different type of circuit topology. *Pedram Tr.* 2228-2229. Moreover, the ML4861 datasheet does not disclose duty cycle variation in response to a feedback signal, which is a requirement of claim 35. *Pedram Tr.* 2225-2228.

Accordingly, it is not found that the ML4861 datasheet anticipated claim 35 of the ‘258 patent.

d. The Ziermann Patent (U.S. Patent No. 5,237,606)

There is no dispute that United States Patent No. 5,237,606 to Ziermann is prior art to the ‘258 patent. Indeed, there is no dispute that the ‘606 patent was cited to the PTO during patent prosecution.

AATI argues that the '606 Ziermann patent disclosed all elements of claim 35 of the '258 patent, and thus anticipated the claim pursuant to 35 U.S.C. § 102(e). Linear and the Staff argue that the '606 patent did not anticipate claim 35. *See* AATI Post-Hearing Brief at 46-47; AATI Reply Brief at 22-23; Linear Post-Hearing Brief at 33; Linear Reply Brief at 15-16; OUII Post-Hearing Brief at 53-54; OUII Reply Brief at 15.

The '606 patent to Ziermann was discussed in section III (claim construction). In particular, the circuit described in the Ziermann patent operates on a different set of principles than the circuit of the '258 patent. Pedram Tr. 2213-2214. Ziermann lacks synchronously switched switching transistors, which are required by claim 35. AATI's expert identified transistors Q1 and Q2 as the two switching transistors of Ziermann. Wei Tr. 1831. However, while the control circuitry of Ziermann can cause the two transistors Q1 and Q2 to be partially synchronized with each other during "synchronized mode operation," even in this mode of operation the transistors are both OFF at the same time during every switch cycle for a period of time in excess of the "deadtime" that is typically built into any synchronously switched switch. Wei Tr. 2094-2097; Pedram Tr. 2213; RX-96 ('606 patent), Figure 3. Ziermann does not disclose any mode of operation in which transistors Q1 and Q2 are fully synchronized (i.e., one ON and one OFF, at all times except for deadtime).

Accordingly, it is not found by clear and convincing evidence that the '606 patent to Ziermann anticipated claim 35 of the '258 patent.

e. The MAX782 and ML4861 References

Inasmuch as the MAX782 anticipates claim 35 of the '528 patent, it is not necessary to conduct a separate analysis of whether the MAX782 in combination with the ML4861 would

render the claim obvious. *See In re Baxter Travenol Labs.*, 952 F.2d 388, 391 (Fed. Cir. 1991)([S]ince anticipation is the ultimate of obviousness, the subject matter of these claims is necessarily obvious and we need not consider them further. (citation omitted)).

4. The Issue of Double Patenting

AATI argues that independent claim 1 of the '258 patent (from which asserted claims 2 and 3 depend) and claim 1 of its parent, U.S. Patent No. 6,304,066, have identical scope, and “[a]s a result, the '258 patent is invalid under the statutory double patenting doctrine.” It is argued that although there are some slight differences in claim language, those differences do not create a substantive difference in claim scope.” AATI Post-Hearing Brief at 48 (citing *In re Lonardo*, 119 F.3d 960, 965 (Fed. Cir. 1997)). Linear opposes this argument. *See* Linear Reply Brief at 16.

The issue of double patenting was not addressed during the hearing, or at least not to the extent that any testimony from the hearing is relied upon by AATI or any other party. In its post-hearing brief and related proposed findings of fact, AATI relies instead on some exhibits of record and mostly a motion for summary determination that was filed during the prehearing phase of the investigation. There is a lack of clear and convincing evidence of patent invalidity.

Consequently, it is not found that any claim of the '258 patent is invalid due to double patenting.

5. Conclusion Concerning the Validity of the '528 Patent

It has been shown by clear and convincing evidence that claim 35 of the '528 patent is invalid due to anticipation by the MAX782 Evaluation Board and supporting documentation. No other claim of the '528 patent has been shown by clear and convincing evidence to be invalid.

B. The Asserted Claims of the '531 Patent

1. Objective Evidence of Nonobviousness

As detailed above in section V A 1, the objective indicia or secondary considerations of non-obviousness would be factors in making a determination as to the alleged obviousness of the claimed invention. Linear argues that one indication of nonobviousness of the '531 patent claims is that AATI copied the claimed invention. *See* Linear Post-Hearing Brief at 44-45. However, as determined in the infringement discussion, Linear has not shown that any AATI product practices the claimed invention.

Linear also argues that its products which practice the claimed invention have had commercial success, specifically the LTC3202, with sales in excess of []. *See Id.* at 45. However, as discussed below in the section on the domestic industry requirement, it has not been shown that Linear's products, including the LTC3202, practice any claim of the '531 patent.

Consequently, there is little or no record evidence constituting objective indicia (or secondary considerations) of nonobviousness of the claimed invention of the '531 patent.

2. The Kase '895 Patent

United States Patent No. 5,132,895, entitled "Variable Charge Pumping DC-to-DC Converter," issued to Kase on July 21, 1992 from an application filed on December 11, 1990. RX-149. It is undisputed that the Kase '895 patent is prior art to the '531 patent under 35 U.S.C. § 102(b). *See, e.g.*, SPFF 540 (undisputed prior art).

AATI argues that the Kase patent invalidates every asserted claim of the '531 patent through anticipation or, in the alternative, due to obviousness. *See* AATI Post-Hearing Brief at 12-13; AATI Reply Brief at 4-5. The Commission Investigative Staff also argues that every

asserted claim is anticipated. *See* OUII Post-Hearing Brief at 45-46; OUII Reply Brief at 9-10. Linear argues that the Kase patent neither anticipates nor makes obvious any asserted claim. *See* Linear Post-Hearing Brief at 33-36; Linear Reply Brief at 24-25.

The Kase '895 patent discloses a charge pump voltage regulator with a controllable current source that controls the flow of current through flying capacitors. RX-149 ('895 Patent), col. 2, line 41 through col. 3, line 23. Figure 1 shows a boost voltage regulator that includes a "controllable current source," which can be implemented by a transistor, that is in series with the flying capacitors during both the charging and discharging phases.⁴³ Szepesi Tr. 1355-1357; FF 38 (Figure 1 of the '895 patent).

During the hearing, Linear's expert opined that Figure 1 represents an inverting charge pump in which the current source is not in series with the flying capacitors during discharge. *See* Pedram Tr. 2381-2382. When it was pointed out that Figure 1 was a tripler boost charge pump rather than an inverting charge pump, Linear's expert stated that Figure 1 was merely a conceptual drawing rather than an embodiment of the Kase invention. He also drew attention to the patent's Figure 3 which, he testified, is the only illustrated embodiment. *See* Pedram Tr. 2383-2384. However, an examination of the specification provides no support for these statements by Linear's expert. Indeed, the '895 patent describes Figure 1 as "embodying the present invention" and Figure 3 as "another embodiment." RX-149, col. 2, lines 27-35.

In the opinion of AATI's expert, one of ordinary skill examining Figure 1 and the text of the '895 patent would understand that the controllable current source is in series with the flying

⁴³ A limitation-by-limitation analysis is contained in RDX-129, which is a claim chart prepared by AATI's expert.

capacitors during the discharge phase, and thus necessarily controls the current through the capacitors when the first switch is closed. Szepesi Tr. 1360, 1367-1370, 1478-1479.

In its post-hearing briefing, Linear also argued that the Kase '895 patent does not disclose control of the current during the discharge phase, and relies to some extent on the testimony of AATI's expert. Yet, Linear misreads the '895 patent and mischaracterizes the testimony of AATI's expert on this point. In fact, AATI's expert Szepesi testified that Figure 1 of the Kase '895 patent, when read in light of the text, discloses a control signal with an arrow "signifying that this signal is controlling the current source." Szepesi Tr. 1477. Moreover, he explained that although the text of the Kase '895 patent does not explicitly state that the current source controls current during the discharge phase, one of ordinary skill would understand that the controllable current source controls current through the flying capacitors during the discharge phase, especially in view of the circuit disclosed in Figure 1. Indeed, the text and Figure show the controllable current source in series with the flying capacitors and the output node during the discharge phase (i.e., when the "first switch" is closed). It must therefore control current through the capacitors during discharge.⁴⁴ *See* Szepesi, Tr. 1360, 1367, 1478-1479.

Linear misreads the '895 patent to indicate that current control during discharge should be avoided. *See* Linear Post-Hearing Brief at 35 (citing RX-149, col. 2, lines 6-10. However, the cited text relied upon by Linear suggests that illustrated current source 12 controls current during discharge so that extra circuitry is "not required in the output." *See* RX-149, col. 2, lines 6-10. Further, contrary to Linear's characterization of AATI's expert witness testimony, Dr. Szepesi

⁴⁴ In fact, the feedback loop of Figure 1 is described in the text of the patent and discloses to one of ordinary skill how to control the current source during the discharge phase. Szepesi, Tr. 1356-1358; RX-149, col. 2, lines 49-65.

unambiguously explained that the Kase '895 patent does disclose a voltage regulator and that one of ordinary skill reviewing the patent could design the circuit to have a predetermined output voltage. *See Szepesi Tr. 1474.*

AATI and the Staff have presented clear and convincing evidence to show that the Kase patent disclosed all elements of the asserted claims of the '531 patent, yet Linear has failed to rebut their arguments and the evidence upon which they rely. Accordingly, AATI and the Staff have established that the Kase '895 patent anticipated the asserted claims of the '531 patent, and thus the asserted '531 patent claims are found to be invalid.

3. The Szepesi '300 Patent

United States Patent No. 5,680,300, entitled "Regulated Charge Pump DC/DC Converter" issued to Szepesi on October 21, 1997. RX-1076 ('300 Patent). There is no dispute that the Szepesi '300 patent is prior art to the '531 patent.

AATI argues that the Szepesi '300 patent anticipated, or in the alternative rendered obvious, every asserted claim of the '531 patent. *See AATI Post-Hearing Brief at 13-15; AATI Reply Brief at 6.* The Staff also argues that the asserted claims are anticipated and thus invalid. *See OUII Post-Hearing Brief at 46-47; OUII Reply Brief at 10.* Linear opposes the arguments of AATI and the Staff. *See Linear Post-Hearing Brief at 36-41; Linear Reply Brief at 25.*

The Szepesi '300 patent discloses "a self-regulating step-up converter charge pump" that includes all of the elements of the asserted claims. RX-1076, col. 3, lines 65-67 and Figure 3 (reproduced in FF 40); Szepesi Tr. 1373-1374. Specifically, the '300 patent discloses a charge pump circuit with four switches and a flying capacitor, where one or more of the switches can act as a variable resistance in response to feedback to control the current flowing through the

capacitor in order to regulate the output voltage.⁴⁵ See Szepesi Tr. 1372-1377.

Much of the dispute among the parties concerning the Szepesi patent revolves around the narrow meaning of the term “switch” that Linear proposed for the ‘531. In the device disclosed in the Szepesi ‘300 patent, current is controlled by a switch that meets the claim limitations of the asserted claims of the ‘531, as construed in section III B 2 (claim construction of “switch” and “switch is closed”). The text of the ‘300 patent identifies “switch sw4” depicted in the specification as a switch that acts as a variable resistance to control current that flows through the capacitor. For example, the specification provides:

[T]he switch sw4 acts as variable resistor, thus controlling the amount of charge which flows into the reservoir capacitor 26 from the pump capacitor 28 during each Θ_2 half-cycle. Thus, the switch sw4 acts simultaneously as a charge pump switch and as a linear regulator’s pass transistor.

RX-1076, col. 5, lines 12-17. See Szepesi Tr. 1374-1375 (concerning the switch).

Contrary to Linear’s arguments, the Szepesi patent also discloses that two switches can be used to control current in both the discharge and charge phases. The specification states that “any of the switches sw1, sw2, sw3 or sw4 may be driven in response to feedback from the output” in order to control current, and sw2 and sw3 are in the charging path. RX-1076, col. 7, lines 31-36; Szepesi Tr. 1377-1378. Further, the Szepesi ‘300 patent specification explicitly states that additional switch drivers could be employed during any of the clock phases to provide additional modulated drive signals in order to control current during the different phases. The specification explains that the embodiments described in the other Figures of the patent show

⁴⁵ A detailed claim chart that was adopted by Dr. Szepesi as summarizing his opinions on invalidity in light of the ‘300 patent can be found at RDX-130 and is reproduced at RPF 563.

control in only one phase “for the sake of clarity.” RX-1076, col. 4, lines 43-49; col. 5, lines 18-27; col. 7, lines 31-36. *See* Szepesi Tr. 1373-1378.

Accordingly, it has been established by clear and convincing evidence that the Szepesi ‘300 patent anticipated, and thus rendered invalid, the asserted claims of the ‘531 patent.

4. The Mukainakano ‘862 Patent

United States Patent No. 6,107,862, entitled “Charge Pump Circuit” issued to Mukainakano et al., from an application filed on February 28, 1997. RX-151 (‘862 Patent).

AATI devoted only a small portion of its briefs to the Mukainakano ‘862 patent, yet nonetheless argues that it is prior art to the ‘531 patent under at least 35 U.S.C. § 102(e)(2), and renders each asserted claim of the 531 patent invalid as anticipated and/or obvious. Although it is undisputed that the Mukainakano patent is prior art to the ‘531 patent, AATI’s invalidity arguments are opposed by Linear and the Staff. *See* AATI Post-Hearing Brief at 15; AATI Reply Brief at 6; OUII Post-Hearing Brief at 47-48; OUII Reply Brief at 10-11; Linear Post-Hearing Brief at 41-43; Linear Reply Brief at 25-26.

There was little hearing testimony concerning the Mukainakano patent, and a number of questions concerning the patent remain. For example, the record is unclear how the disclosed output of error amplifier is used by the control circuit, and how the control circuit functions. *See* OUII Post-Hearing Brief at 47-48.

It has not been established by clear and convincing evidence that the ‘862 Mukainakano patent renders invalid any asserted claim of the ‘531 patent.

5. The Nork ‘944 Patent

United States Patent No. 5,973,944 entitled “Inductorless Step-Up And Step-Down

Converter With Inrush Current Limiting” issued on October 26, 1999 to Samuel H. Nork.

RX-130. Mr. Nork is also a named co-inventor of the ‘531 patent. *See* JX-1. It is undisputed that at least as a procedural matter the ‘944 patent is prior art to the ‘531 patent.

AATI argues that the ‘944 patent disclosed a regulated charge pump DC/DC converter that can operate as a boost voltage regulator, and that it disclosed every limitation of the asserted claims of the ‘531 patent. AATI Post-Hearing Brief at 15-16; AATI Reply Brief at 6-7. Linear argues that the ‘944 patent has nothing to do with reducing noise by maintaining a substantially constant input current,⁴⁶ and that it did not anticipate (or render obvious) any claim of the ‘531 patent. Linear Post-Hearing Brief at 43-44; Linear Reply Brief at 26. The Staff argues that it has not been established clearly and convincingly that the ‘944 patent disclosed all limitations of the asserted ‘531 patent claims. OUII Post-Hearing at 48; OUII Reply Brief at 11.

During the hearing, AATI’s expert identified signal **224** of Figure 2 of the ‘944 patent as the “control signal” of claim 1 of the ‘531 patent. *See* Szepesi Tr. 1391; RDX-132. According to the Nork ‘944 specification, signal **224** in Figure 2 is generated from the circuit element identified as Mode/R_{out} Control **220** which controls the operation of switches S1-S4 in Figure 2. *See* RX-130, col. 6, lines 7-9. The ‘944 patent does not expressly state that the box identified in Figure 2 as Mode/R_{out} Control **220** generates signal **224** based on or in response to monitoring of the output voltage, a necessary claim limitation. RX-130, col. 6, lines 7-27; Szepesi Tr.

⁴⁶ The asserted ‘531 patent is entitled “Charge Pump DC/DC Converters with Reduced Input Noise.” JX-1. “Noise” may be induced, for example, on an input voltage source when there are fluctuations or variations in the current drawn by a converter power supply. The concept of “noise” is discussed at length in the ‘531 specification, and also in section III, and especially subsection III B, which addresses the proper construction of the asserted ‘531 patent claims.

1389-1390; Pedram Tr. 2265-2266. AATI argues that Linear admits that the Mode/ R_{out} block 220 monitors the output voltage through connection 226 along with the input voltage through 222, and then adjusts the resistance of R_{out} 260 through control signal 224. AATI Reply Brief at 7. However, it appears that AATI has misread Linear's statements because Linear's explanations of the operation of this circuit do not constitute clear admissions on this point. *See* CPFF 4921 (cited by AATI) and 4922 ("R_out in the figure on the first page of the Nork '944 patent has nothing to do with the function of regulating the output voltage").

In addition, it appears that as depicted in Figure 2 of the '944 patent, variable resistor R_{out} 260 would control current only during the discharging phase. AATI's expert cites only to '944 patent claim language indicating that "at least one" switch can be used to provide a variable resistance to support his contention that the patent discloses control of the current during both the charging and discharging phases. *See* Szepesi Tr. 1385-1386; RDX-132. The record contains only cursory evidence on this point, and thus it is unclear whether or not the '944 Nork patent discloses control of the current during both the charging and discharging phases.

Consequently, it has not been demonstrated by clear and convincing evidence that the '944 patent to Nork et al. anticipates any asserted claim of the '531 patent. Although Linear expected that AATI might raise obviousness in its briefs, that does not appear to be the case. In any event, the record is also unclear as to how the '944 patent might render obvious any asserted claim of the '531 patent, given the fact that evidence is lacking for at least two claim limitations.

6. The Hypothetical LDO-Boost Charge Pump Combination

AATI argues that the idea of reducing noise and regulating the output voltage of a charge pump by having a low dropout regulator or "LDO" placed in the circuit between the voltage

source and the charge pump was known in the prior art. To document the prior art, AATI relies on the 1993 *Power ICs Databook* from National Semiconductor Corp., which contains datasheets for an LDO and charge pump. It is argued that the datasheets describe how those circuits could be placed in a larger circuit to achieve a regulated output voltage. It is argued, based on the recent Supreme Court opinion in *KSR Int'l* and a prior holding of the Federal Circuit that one of ordinary skill could have combined an LDO and a charge pump so as to render all of the asserted claims of the '531 patent invalid due to obviousness. It is argued that the addition of a capacitor, which Linear and the AATI argue is necessary for such a circuit, is "superfluous" because such a capacitor is not a necessary claim element of the '531 patent. AATI Post-Hearing Brief at 16-17; AATI Reply Brief at 7-8.

Linear argues that AATI's expert modified the circuitry shown in the 1993 National Semiconductor data book in several ways to derive a circuit that he contends would read on the asserted claims of the '531 patent, yet the evidence shows that it would not have been obvious to make such modifications. Further, it is argued that the modified circuit designed by AATI's expert would not work properly without that addition of a capacitor. It is argued that the drawings relied upon by AATI's expert, allegedly created by AATI lawyers right before his testimony, show a fictitious circuit that is untested, and does not constitute clear and convincing evidence of patent invalidity. Linear Post-Hearing Brief at 46-47; Linear Reply Brief at 26.

The Commission Investigative Staff argues that the 1993 National Semiconductor data book discloses an LDO with an unregulated inverting charge pump. The Staff agrees with Linear, that AATI's expert had to make several modifications to the circuitry shown in the data book to derive a circuit that still would not work properly. OUII Post-Hearing at 49; OUII Reply

Brief at 11.

There is no question that the disclosures made in the 1993 National Semiconductor data book do not contain every element or limitation of the '531 patent. Nevertheless, as the Supreme Court held in *KSR Int'l*, a “person of ordinary skill is also a person of ordinary creativity” No. 04-1350, slip op. at 17. Therefore, the approach taken by AATI of showing how one might have combined elements in a data book with ordinary knowledge was generally instructive.

However, the circuitry designed by AATI's expert and related expert testimony leave material questions unanswered. *See* Pedram Tr. 2241-2248, 2343-2344. While the addition of a capacitor to the circuit designed by AATI might not represent the addition of a required claim element *per se*, such a capacitor (or similar capacitance function) must be present in the circuit designed by AATI in order for it to work. *See* Pedram Tr. 2234-2238. It is unclear from the record evidence how one of ordinary skill would have addressed the problem. The suggestions made by AATI concerning how one might have taken information contained in the 1993 data book and transformed it into the claimed invention of the '531 patent are speculative, and as argued by Linear and the Staff, do not necessarily arrive at a functional circuit.

Accordingly, it has not been shown by clear and convincing evidence that an LDO and charge pump combination rendered the asserted claims of the '531 patent obvious.

7. Conclusion Concerning Validity of the Asserted Claims of the '531 Patent

As discussed above, it has been found by clear and convincing evidence that each asserted claim of the '531 patent was anticipated, and is therefore invalid, in view of the Kase

and Szepesi patents.

VI. UNENFORCEABILITY

A patent is unenforceable on grounds of inequitable conduct if the patentee made affirmative misrepresentations of material fact to the Patent and Trademark Office, failed to disclose material information, or submitted false material information, coupled with an intent to deceive. *GFI, Inc. v. Franklin Corp.*, 265 F.3d 1268, 1273 (Fed. Cir. 2001); *Purdue Pharma L.P. v. Boehringer Ingelheim GmbH*, 237 F.3d 1359, 1366 (Fed. Cir. 2001); *Labounty Mfg., Inc. v. United States Int'l Trade Comm'n*, 958 F.2d 1066, 1070 (Fed. Cir. 1992). Both materiality and intent must be proven by clear and convincing evidence. *Kingsdown Med. Consultants, Ltd. v. Hollister, Inc.*, 863 F.2d 867, 872 (Fed. Cir. 1988) (en banc); *see also, Intirtool, Ltd. v. Texar Corp.*, 369 F.3d 1289, 1296 (Fed. Cir. 2004). If materiality and intent are shown, then one must determine whether the equities warrant a conclusion that the patentee has engaged in inequitable conduct. *Hoffman-La Roche, Inc v. Promega Corp.*, 323 F.3d 1354, 1359 (Fed. Cir. 2003).

The Federal Circuit has rejected a but for standard of materiality, i.e., that the examiner would not have allowed the patent but for the fact the information at issue was withheld. *Merck & Co. v. Danbury Pharmacal, Inc.*, 873 F.2d 1418, 1421 (Fed. Cir. 1989). Instead, information is deemed material if 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. *Brasseler, U.S.A. I, L.P. v. Stryker Sales Corp.*, 267 F.3d 1370, 1380 (Fed. Cir. 2001); *see also, Hoffman-La Roche, Inc.*, 323 F.3d at 1367. Moreover, when the 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. 1984); *see also Brasseler*, 267

F.3d at 1381. In addition, the Federal Circuit has noted that although direct proof of intent is rarely available, intent may be inferred from clear and convincing evidence of the surrounding circumstances. *Critikon, Inc. v. Becton Dickinson Vascular Access, Inc.*, 120 F.3d 1253, 1256 (Fed. Cir. 1997); *Brasseler*, 267 F.3d at 1380-81; *Labounty Mfg., Inc.*, 958 F.2d at 1076.

A. The '258 Patent

AATI argues that Linear committed inequitable during during prosecution of the '178 parent application and/or during the '258 patent prosecution by not initially producing the so-called Vinsant laptop switcher proposal, and by later mischaracterizing the *Impala* court's consideration of the Vinsant circuit and obfuscating the *Impala* record when it was submitted to the PTO. See AATI Post-Hearing Brief at 49-52, 55-56; AATI Reply Brief at 25-26. These arguments are opposed by both Linear and the Staff. See Linear Post-Hearing Brief at 50-51; Linear Reply Brief at 17-18 ; OUII Post-Hearing Brief at 56-57; OUII Reply Brief at 15.

It appears that after the circuit attributed to Vinsant was raised in the *Impala* litigation, it was provided to the PTO in connection with the prosecution of the '258 patent. See Dobkin, Tr. 313-14; Flatness, Tr. 364, 413-14; JX-3 ('258 Patent). However, as discussed above in section V (validity), it has not been shown that the circuit has any relation to the development of the claimed invention, and overall there is little evidence concerning the circuit. It has not been established by clear and convincing evidence that the circuit was material to the prosecution of the '258 patent or its parent application.

AATI also argues that Linear intentionally withheld the MAX782 evaluation board and other important, related documentation during prosecution of the '178 parent application, which therefore renders the '258 patent unenforceable. AATI Post-Hearing Brief at 52-55; AATI Reply

Brief at 23-25. Linear and the Staff oppose AATI's arguments, albeit for different reasons. *See* Linear Post-Hearing Brief at 47-49; Linear Reply Brief at 18-19; OUII Post-Hearing Brief at 56-58; OUII Reply Brief at 15.

Contrary to the position taken by Linear, the MAX782 was highly material to the prosecution of the '258 patent and its parent application. As discussed in detail above in section V (validity), the MAX782 evaluation board and related documentation anticipated claim 35 of the '258 patent. Further, a fuller explanation of the features of the MAX782 could have been provided to the PTO once the evaluation board and revised datasheets were available. *See* Flatness Tr. 394, 400-401; JX-45C (Flatness Dep.) Tr. 383. Thus, the materiality prong of inequitable conduct is clearly established.

However, the circumstances surrounding intent are much less clear. First, it is undisputed, and the record confirms, that documentation concerning the MAX782 was in fact submitted to the PTO during prosecution of the '178 parent. *See* JX-3 ('258 Patent). The named inventors and others at Linear discussed the prior art, and testified that they submitted to their attorneys the art they believed to be closest to the claimed invention. *See, e.g.,* Dobkin Tr. 272-274. That is the process by which the advance datasheet for the MAX782 chip was forwarded to the PTO. Second, Linear did not receive an actual MAX782 evaluation board until March 23, 1993, the exact day on which the parent application was filed. Dobkin Tr. 241-242; Flatness Tr. 389. It appears that at first Linear thought that the evaluation board might present patentability problems for its pending patent application. However, Linear personnel testified that after studying the evaluation board more thoroughly, they concluded that the MAX782 was not invalidating prior art to their claimed invention, and thus they did not supplement their

disclosure with additional information concerning the Maxim chip. *See* Dobkin Tr. 242, 294-295; Flatness Tr. 362-364, 404, 413.

In view of the fact that Linear initially provided MAX782 documentation to the PTO, and did not obtain an evaluation board until later, and also in view of the fact that the testimony of Linear personnel appears credible with respect to examination of the evaluation board, it cannot be found by clear and convincing evidence that Linear intended to deceive the PTO by failing to provide additional information concerning the MAX782.

Accordingly, it is not found that the '528 patent is unenforceable due to inequitable conduct.

B. The '531 Patent

AATI argues that Linear committed inequitable conduct by not disclosing the '944 Nork patent, an article about the patent's claimed invention, and Linear products based on the invention, to the PTO during prosecution of the '531 patent application. It is argued that the applicants successfully traversed a rejection by arguing that prior art did not teach controlling current during the discharge phase, yet that is precisely what is disclosed in the '944 patent. *See* AATI Post-Hearing Brief at 17-19; AATI Reply Brief at 9-10.

Linear argues that AATI attempts to substitute Mr. Nork's knowledge of his '944 patent with intent to deceive the PTO, and has failed to make even a threshold showing of materiality of the '944 patent to the '531 patent application. Linear Post-Hearing Brief at 51-52; Linear Reply Brief at 27-28.

The Commission Investigative Staff argues that the '944 Nork patent, the article and the products all disclose the same elements which, while material to the prosecution of the '531

patent, were not withheld with an intent to deceive. It argued that Mr. Nork did not consider his '944 patent to be relevant to the invention he claimed in his '531 patent because they are directed to different types of charge pumps. *See* OUII Post-Hearing Brief at 55-56; OUII Reply Brief at 15.

As discussed in section V B 5, important questions remain about the disclosures made in the Nork '944 patent about controlling current. It is not clear that the Nork patent and related prior art would have been material to the '531 patent prosecution. Moreover, Mr. Nork's testimony concerning the prosecution of the '531 patent was credible when he testified that he submitted all the information that he thought was relevant to the patentability of the inventions claimed in the '531 patent. *See* Nork Tr. 670-671. He did not consider his '944 patent to be relevant prior art to the '531 patent application because it was directed to a different type of charge pump, which is similar to that shown in prior art Figure 1A. *See* Nork Tr. 671-675, 707-708, 776-777.⁴⁷

⁴⁷ Mr. Nork explained his state of mind at least two or three times during the hearing, including during cross-examination, as follows:

Q. Now, this morning you came up with an explanation for why you didn't provide this patent to the patent examiner. Do you recall that?

A. Yes.

Q. Now, that's a litigation-induced explanation. Isn't that true?

MR. SHAHIDA: Objection.

THE WITNESS: No.

JUDGE HARRIS: What was the explanation, Mr. Nork? I am going to ask you. What was the explanation?

(continued...)

Accordingly, it has not been shown by clear and convincing evidence that the '531 patent is unenforceable due to inequitable conduct.

VII. EQUITABLE ESTOPPEL

AATI argues that Linear must be “precluded from seeking any relief against AATI for the two patents at issue in this investigation” due to equitable estoppel. *See* AATI Post-Hearing Brief at 56-57; AATI Reply Brief 59. Both Linear and the Commission Investigative Staff oppose this argument. *See* Linear Post-Hearing Brief at 52-53; Linear Post-Hearing Reply Brief at 28; OUII Post-Hearing Brief at 59.

There appears to be no dispute that in some cases, the misleading conduct or silence of one party with knowledge of the true facts combined with the reasonable reliance of another could lead to an estoppel that would prevent the party who committed the misleading conduct from obtaining a judgment, provided that the party who reasonably relied upon the misleading

⁴⁷ (...continued)

THE WITNESS: The explanation was that in my mind any part that practiced the '944 patent is a burst mode part. And we disclosed the architecture for a burst mode part in figure 1A. And the purpose and intent of the variable resistor in the '944 patent has nothing at all to do with the output regulation, which is the purpose of variable resistor 38 in the '531. It just never dawned on me that it was any different than what was shown in figure 1A.

BY MR. THOMASES:

Q. Isn't the purpose of the adjustable resistor in the '531 patent to reduce the input current spike?

A. The words are exactly the same, but the function and the purpose and the context are completely different.

Nork Tr. 707-708.

conduct would be materially harmed. See AATI Post-Hearing Brief at 56 (quoting *A.C. Aukerman Co. v. R.I. Chaides Construction Co.*, 960 F.2d 1020, 1041 (Fed. Cir. 1992)). This is a formula from the common law of reliance that is familiar to nearly all attorneys. In this instance, AATI relies on scant evidence that fails to prove the required elements of the estoppel. The parties devoted only a small portion of the hearing time to this estoppel issue, and the Administrative Law Judge took little evidence on the subject. Nevertheless, this issue was raised in the parties' post-hearing arguments, however briefly.

AATI's argument is based on a lunch meeting between officers of AATI and Linear in July of 2003. The most favorable characterization of that meeting to AATI comes from AATI's post-hearing brief. It is alleged that AATI explained that "all of its accused parts were made in Asia and nearly all of its products were then sold to customers in Asia who may or may not import finished products to the United States." AATI Post-Hearing Brief at 57. It is further alleged that Linear's President and Chief Technology Officer concluded the meeting by saying that as long as AATI maintained its then-current business model, AATI had a "Get Out of Jail Free Card." AATI argues that Linear supposedly reinforced its promise by not suing AATI for another two and one-half years during which time AATI expended millions of dollars to expand its business. *Id.*

It is unreasonable that any company would expand its business and incur great expense over an extended period of time based on the type of informal communication that is alleged to have occurred. For that reason alone, AATI's defense of alleged equitable estoppel must fail.

In addition, even when viewed in a light most favorable to AATI, there was not a written covenant not to sue, or even a verbal promise to sue. It is a mystery as to why Linear's president

or any other officer would make such a promise, or why AATI might have thought such a promise to be believable. It has never been shown that there was any benefit to Linear in allowing AATI to practice the claimed inventions of the suit patents without at least paying royalties to Linear. The alleged remarks of Linear's president, as recounted by AATI, would have reflected the fact there is indeed not much that he could do about a company that conducted all of its manufacturing and other business overseas with little or no evidence of importation or sale for importation into the United States. It is not clear that Linear's president understood at that time what section 337 remedies might be available under certain circumstances and what the threshold requirements are for Commission jurisdiction, nor would any reasonable person have expected him to have such knowledge.

It is also noteworthy that Linear's president is alleged to have used the term "Get Out of Jail Free Card." Given the meaning of that term in common parlance, use of that term likely would have implied that Linear's president thought that AATI was doing something against the law, but that AATI had so far managed to evade liability.⁴⁸ Even if Linear's president made the remarks attributed to him, it is clear that he never assented to AATI's conduct, and never promised to refrain from legal action. He simply expressed the fact that he felt at that time powerless to do anything to stop AATI from infringing.

Consequently, it has not been established that Linear is estopped from seeking a remedy under section 337 directed toward AATI.

⁴⁸ In Linear's version of the lunch meeting, Linear's president is alleged to have said that AATI had a "get out of jail card for now," thus reinforcing the idea that the lack of litigation was based on circumstances at that time. *See* CFFF 5033.

VIII. DOMESTIC INDUSTRY

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.⁴⁹ 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, Commission Opinion 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, Commission Opinion at 34-35, USITC Pub. 2390 (June 1991).

Thus, in this investigation Linear must prove that it satisfies both the technical and economic prongs of the domestic industry requirement with respect to each of the patents asserted against AATI.

A. Technical Analysis

1. The '258 Patent

No party presented evidence during the hearing to suggest that Linear fails to practice at least one claim of its '258 patent, while Linear's expert presented evidence to show that the

⁴⁹ There is no requirement that the domestic industry be based on the same claim or claims alleged to be infringed.

company has products that do practice the patent (at least under Linear's proposed claim construction). In the post-hearing briefs, no party contested the technical prong of the domestic industry issue with respect to the '258 patent. Consequently, that Administrative Law Judge has determined that the technical prong of the domestic industry requirement is satisfied with respect to the '258 patent.

2. The '531 Patent

Linear argues that its LTC3202 products, when used as described in Linear's datasheet and other documents, practices all the steps required by claims 4, 12 and 14 of the '531 patent, and that is confirmed by laboratory tests performed by its expert, Dr. Pedram. In its main post-hearing brief and proposed findings of fact, Linear provides analysis of the LTC3202 with respect to many of the limitations of those claims. Linear's analysis is based for the most part on its own proposed claim constructions, although in some cases Linear does make alternative arguments. *See* Linear Post-Hearing Brief at 21-25.

In its reply brief, Linear argues that AATI and the Commission Investigative Staff dispute the technical prong for the '531 patent solely upon the assertion that the LTC3202 is not a voltage regulator. Linear argues that the LTC3202 is in fact a voltage regulator. It is argued that the '531 patent is based on the LTC3202, and according to the datasheet the device produces a "regulated voltage." It is argued that when driving white LEDs, the LTC3202 monitors voltage at an output node to maintain a constant current to the LEDs, and when used as a constant current source, the device provides a constant output voltage, and that there is no support for the contention that constant current and regulated voltage are mutually exclusive. According to Linear, Dr. Pedram's laboratory test confirm that the LTC3202, when operated to drive white

LEDs, provides a constant, regulated voltage. *See* Linear Reply Brief at 24 (citing, *inter alia*, CX-114C).

AATI argues that the LTC3202, around which Linear has presented its domestic industry case, is not a voltage regulator as required by the claims of the '531 patent. In its main post-hearing brief, AATI argues that Linear's expert took measurements of the LTC3202 at different load currents such that the output voltage changed significantly, i.e., in the order of 20%. It is argued that AATI's expert, Dr. Szepesi, took more extensive measures which established that over the full load range specified for the LTC3202, its output drops by as much as 1.3V or nearly 30%. With respect to the Linear documentation, AATI argues that Linear's website does not classify the LTC3202 as a voltage regulator, rather as a white LED driver that supplies constant current to the LEDs. Further, it is argued that a constant current white LED driver is the application shown as the "Typical Application" in the LTC3202 datasheet. Finally, AATI argues that Linear's internal documents and admissions by the designers of the LTC3202 state that the device is not a voltage regulator, and they distinguish the LTC3202 from voltage regulators. AATI Post-Hearing Brief at 11.

In its reply brief, AATI argues that Linear's tests on the LTC3202 included only three data points, and even they showed different output voltages. Further, it is argued that although one of the named inventors, Mr. Nork, testified that the LTC3202 is a voltage regulator, his testimony was belied by his own documents created before litigation commenced and by those of his co-inventor. *See* AATI Reply Brief at 4.

The Commission Investigative Staff also argues that Linear's website lists the LTC3202 as a white LED driver and not a voltage regulator, and also that the typical application for the

devices is as an LED power supply in which the circuit does not monitor the voltage at the output node but instead provides a constant output current. It is argued that the LTC3202 supposedly can be configured in a “voltage control mode,” although no specific evidence was presented that any Linear customer does so. Moreover, it is argued, Dr. Szepesi’s testing showed that even when configured in the so-called “voltage control mode,” the LTC3202 does not provide even a roughly constant output voltage. It is argued that the evidence shows that the device is not capable of maintaining a fixed output voltage over the entire range of the part, and that in sum the LTC3202 was not shown to be a “voltage regulator” as required by the claims of the ‘531 patent. OUII Post-Hearing Brief at 43-44; OUII Reply Brief at 9.

As detailed in section III B, the plain language of the claims and other intrinsic and extrinsic evidence shows that the claims of the ‘531 patent are limited to a “method for regulating a voltage at an output node.”⁵⁰ Further, the device that practices the claimed invention must continuously maintain a constant output voltage at a predetermined, specified target value regardless of changes in input voltage or load current, so long as the input voltage and load current are within the specified operating range for the device.

Linear has failed to establish that the LTC3202 is a voltage regulator as required by the claims. In fact, the record evidence shows this device does not meet the claim limitation.

Linear’s own documentation shows that, as argued by AATI and the Staff, a “Typical Application” for the LTC3202 is as a driver for constant current to white LEDs, rather than as a

⁵⁰ Linear argues that its LTC3202 practices claims 1, 12 and 14 of the ‘531 patent. Linear does not assert against AATI either independent claim 12, or claim which depends therefrom. Nevertheless, both claims contain voltage regulation language similar to that of claim 1, and no party has argued that the claim limitation is absent from claims 12 and 14 even if it is present in claim 1.

voltage regulator. *See* CX-114 at 1; Szepesi Tr. 1349. Moreover, the testing performed on LTC3202 devices shows that it does not function as a voltage regulator.

The test performed by Dr. Pedram recorded only three data points, all at a constant input voltage. Pedram Tr. 1059; RX-521 at 71. Yet, even that test showed that LTC3202 does not provide a constant, regulated output voltage for different load currents. *See* Pedram Tr. 1059. Dr. Pedram's measurements reveal that the output voltage of the LTC3202 drops from 4.83V to 3.93V. According to Dr. Szepesi, that is a "huge drop" when the load current is increased from 30mA to 186mA. Szepesi Tr. 1346-1347. Based on that testing, Dr. Szepesi decided to conduct further testing on the LTC3202. Szepesi Tr. 1346.

Dr. Szepesi took measurements of the LTC3202 in the "Voltage Control Mode" illustrated in the LTC3202 datasheet. He measured the output voltage as a function of the load current over the specified range of operation of the LTC3202.⁵¹ Based on that testing, he concluded that LTC3202 established that the LTC3202 is not a voltage regulator. Szepesi Tr. 1345-1347; CX-114 at 7. In particular Dr. Szepesi's test results show that the output voltage drops by as much as 1.3V, or almost 30%.

Consequently, it has not been established that Linear satisfies the technical prong of the domestic industry requirement with respect to the '531 patent.

B. Economic Analysis

A domestic industry 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

⁵¹ Dr. Szepesi's data from his test of the LTC3202, including a graphic representation of the results, is admitted as RX-977 and RX993. *See* Szepesi Tr. 1347-1349.

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.

The record evidence shows that Linear is incorporated in Delaware, and has over 1,400 employees in the United States. *See* Bell Tr. 87. Further, Linear filed a motion for summary determination that the economic prong of the domestic industry is satisfied in which it argued, among other things, that the products upon which it relies to prove the technical prong of the domestic industry requirement were designed in the United States. *See* Motion Docket No. 564-15. Linear's motion for summary determination was not opposed by any party, and all parties have consented to a finding that the economic prong is satisfied. *See* Tr. 69-70; *see also* 19 C.F.R. § 210.15(c) (nonmoving party shall respond to a motion or may be deemed to have consented to requested relief). Indeed, in the post-hearing briefs no party has argued against a finding that Linear satisfies the economic prong of the domestic industry requirement.

Consequently, it is found that the economic prong of the domestic industry requirement is satisfied.

C. Conclusion with Respect to the Domestic Industry Requirement

For the reasons stated above, it is found that Linear has satisfied the domestic industry requirement with respect to the '258 patent. Linear has not, however, satisfied that domestic industry requirement with respect to the '531 patent.

FINDINGS OF FACT

I. INFRINGEMENT DETERMINATION

A. Products Accused Under the '258 Patent

1. RX-622C is a top-level schematic of the AAT1143. Wei Tr. 1851; AATI0004983.
RDX-640 is a color-coded version of RX-622C.
2. RDX-641 shows a simplified block diagram of the AAT1143 device. Wei Tr. 1852-1853.

3. AATI's expert for the '258 patent, Dr. Wei, adopted RDX-652 as a summary of his testimony regarding the reasons that the AAT1143 does not infringe claims 2, 3, 34 and 35. Wei Tr. 1869; RDX-652.
4. RDX-653 shows the top level schematic for the AAT1146 device. Wei Tr. 1877-1878; AATI0004962; RDX-653.
5. RFF1136. RDX-655 shows the top switch and bottom switch logic for the AAT1146. Wei Tr. 1880; RDX-655; RX-626.

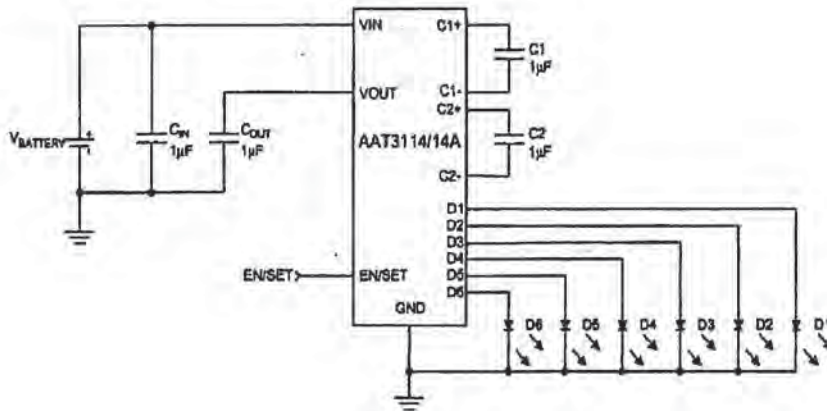
6. RDX-656 shows the top level schematic of the AAT1151 device. Wei Tr. 1880; RDX-656; RX-1506; AATI00174012.
7. RDX-657 shows a simplified block diagram of the AAT1151. Wei Tr. 1882-1883.

8. RDX-658 shows the top switch logic of the AAT1151. Wei Tr. at 1884:17-1885:5.
9. RDX-650, which was used during the testimony of AATI expert witness Dr. Wei, shows the following:

B. Products Accused Under the '531 Patent

- 10. The AAT3113 is a fractional 1.5X charge pump DC/DC converter designed to provide a constant output current for driving white LEDs. CX-127 at 1; RDX-65; Szepesi Tr. 1297.
- 11. The typical application of the AAT3113 is shown below:

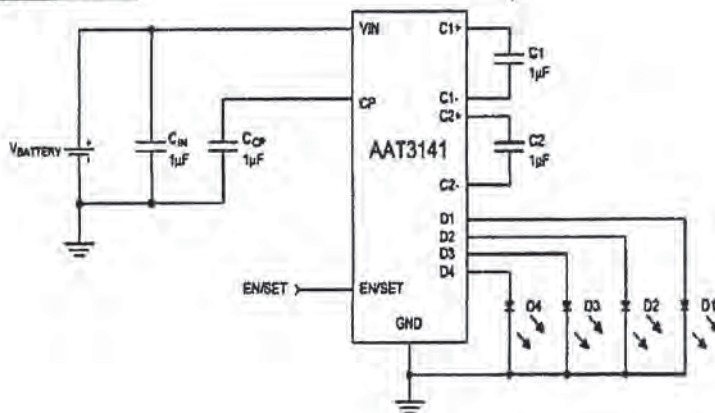
Typical Application



CX-127 at 1.

- 12. The typical application of the AAT3141 is shown below:

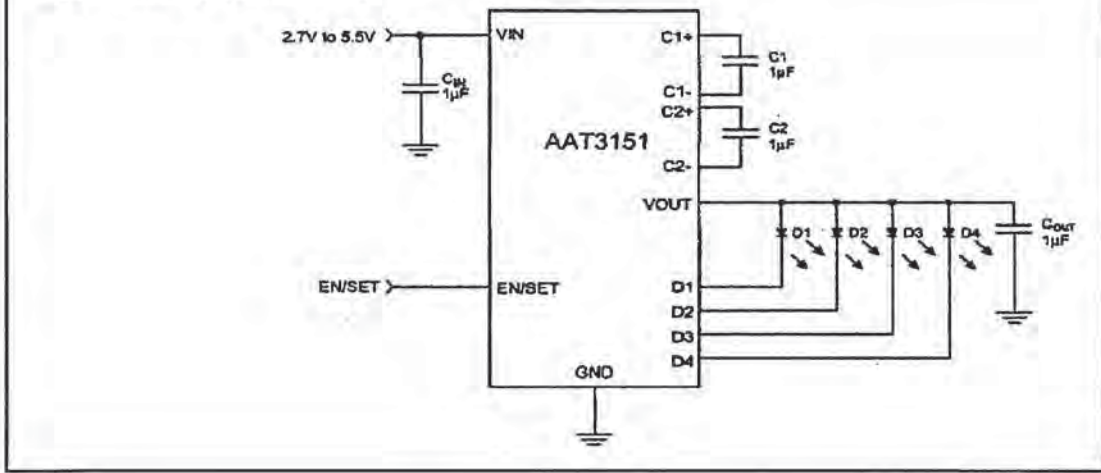
Typical Application



CX-129 at 1.

- 13. The typical application of the AAT3151 is shown below:

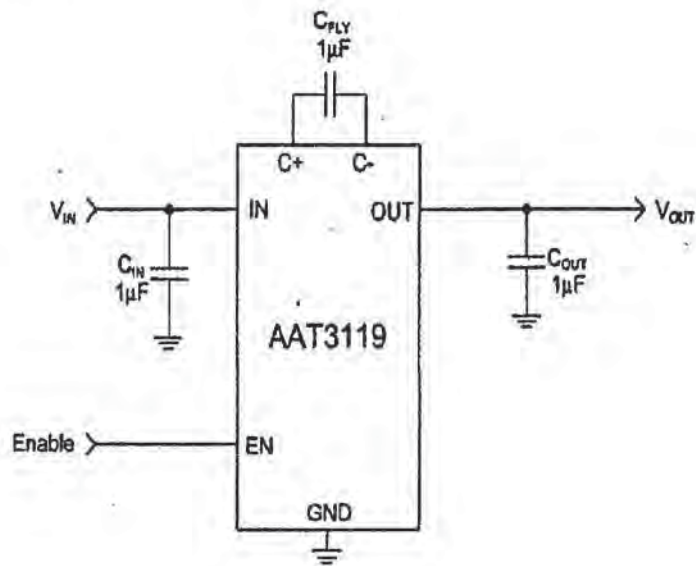
Typical Application



CX-130 at 1.

14. The typical application of the AAT3119 is shown below:

Typical Application



CX-128 at 1.

15. The AAT3119 datasheet provides in its “Electrical Characteristics” section an industry-standard “box specification” typically associated with commercial voltage regulators, which specifies the output voltage and the tolerance:

Electrical Characteristics¹

$V_{IN} = 3.3V$; $C_{IN} = C_{OUT} = C_{FLY} = 1.0\mu F$; $T_A = -40^{\circ}C$ to $85^{\circ}C$, unless otherwise noted. Typical values are $T_A = 25^{\circ}C$.

Symbol	Description	Conditions	Min	Typ	Max	Units
AAT3119-5.0						
Power Supply						
V_{IN}	Input Voltage Range		2.7		5.5	V
V_{OUT}	Output Voltage Tolerance	$2.7V < V_{IN} < 5V, I_{OUT} = 50mA$		± 4		%
	Output Voltage	$3.0V < V_{IN} < 5V, I_{OUT} = 100mA$	4.8	5.0	5.2	V

1. The AAT3119 is guaranteed to meet performance specifications from $0^{\circ}C$ to $70^{\circ}C$. Specification over the $-40^{\circ}C$ to $+85^{\circ}C$ operating temperature range is assured by design, characterization, and correlation with statistical process controls.

CX-128 at 4; Szepesi Tr. 1335-1338.

II. VALIDITY

A. The ‘258 Patent

16. The MAX782 EV Kit Document discloses a circuit for controlling a switching voltage regulator. Wei Tr. 1817.
17. RDX-603 and RDX-605 are color-coded versions of the first page of the MAX782 EV Kit document, showing the MAX782 3.3-volt switching regulator circuit in the document’s original size and orientation, then expanded and re-oriented for ease of reference. Wei Tr. 1815-1816.
18. The MAX782 EV Kit Document shows a switching regulator and the MAX782 integrated circuit for controlling the switching regulator. Wei Tr. 1815-1816.

19. The regulator has a switch that is coupled to receive input voltage BATT IN at the top right of RDX-603. RX-522 at LLTC 00152830.
20. The switch includes a pair of synchronously switched switching transistors, N1 and N2. RX-522 at LLTC 00152830; Wei Tr. 1815-1816.
21. The regulator has an output for supplying current at a regulated voltage of +3.3 V to a load. RX-522 at LLTC 00152830; Wei Tr. 1816.
22. Inductor L1 is the output inductor. RX-522 at LLTC 00152830.
23. Capacitor C7 is the output capacitor. RX-522 at LLTC 00152830; Wei Tr. 1816.
24. Resistor divider R1/R18 and capacitor C14 comprise a first circuit for monitoring the output and generating a first feedback signal. RX-522 at LLTC 00152830; Wei Tr. 1816.
25. The first feedback signal is the output of resistor divider R1/R18, denoted FB3 in the external diagram at LLTC 00152830 and FB in the internal block diagram at LLTC 00152832. RX-522 at LLTC 00152830; Wei Tr. 1816.
26. RDX-607 is a color-coded version of the MAX782 internal block diagram at LLTC 000152382 that also incorporates the external components of the 3.3-volt switching regulator from LLTC 000152380. Wei Tr. 1817.
27. The Main Comparator compares feedback signal FB to a reference voltage and generates an error signal to the switch control circuitry. RX-522 at LLTC 00152832.
28. The switch control elements vary the duty cycle of the switching transistors in response to the error signal. RX-522 at LLTC 00152832.
29. Therefore the Main Comparator and switch control circuitry comprise a second circuit for generating a first control signal that is responsive to the first feedback signal to vary the

duty cycle of the switching transistors to maintain the output at the regulated voltage.

RX-522 at LLTC 00152832.

30. Comparator 1 and the Synchronous Switch Control comparator comprise a third circuit for monitoring the current to the load and generating a second control signal. RX-522 at LLTC 00152832; Wei Tr. 1817-1818.
31. The Synchronous Switch Control comparator can be characterized as a reverse current comparator. Wei Tr. 1818.
32. The Synchronous Switch Control comparator compares the monitored value to a zero reference. RX-522 at LLTC 00152832; Wei Tr. 1818.
33. The output of the Synchronous Switch Control comparator feeds into an RS latch that controls the drive signal for the lower or NMOS transistor N3. RX-522 at LLTC 00152832.
34. When the current monitored by the Synchronous Switch Control comparator falls below zero, the comparator trips, which resets the RS latch and turns off the bottom or NMOS transistor N3. RX-522 at LLTC 00152832; Wei Tr. 1818-1819.
35. The output of the Synchronous Switch Control comparator is the second control signal. RX-522 at LLTC 00152832; Wei Tr. 1819.
36. The second control signal turns off the lower or NMOS transistor N3. RX-522 at LLTC 00152832; Wei Tr. 1819.
37. Therefore, the MAX782 EV Kit Document teaches a third circuit for monitoring the current to the load and generating a second control signal to cause one of the switching

transistors to be maintained OFF when the monitored current falls below a current threshold. RX-522 at LLTC 00152832; Wei Tr. 1817-18191.

B. The '531 Patent

38. Figure 1 of the Kase '895 patent shown below:

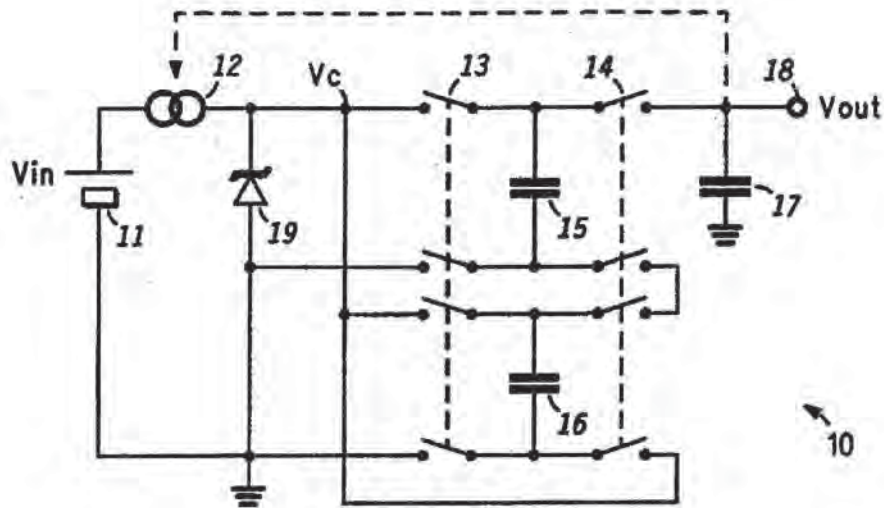
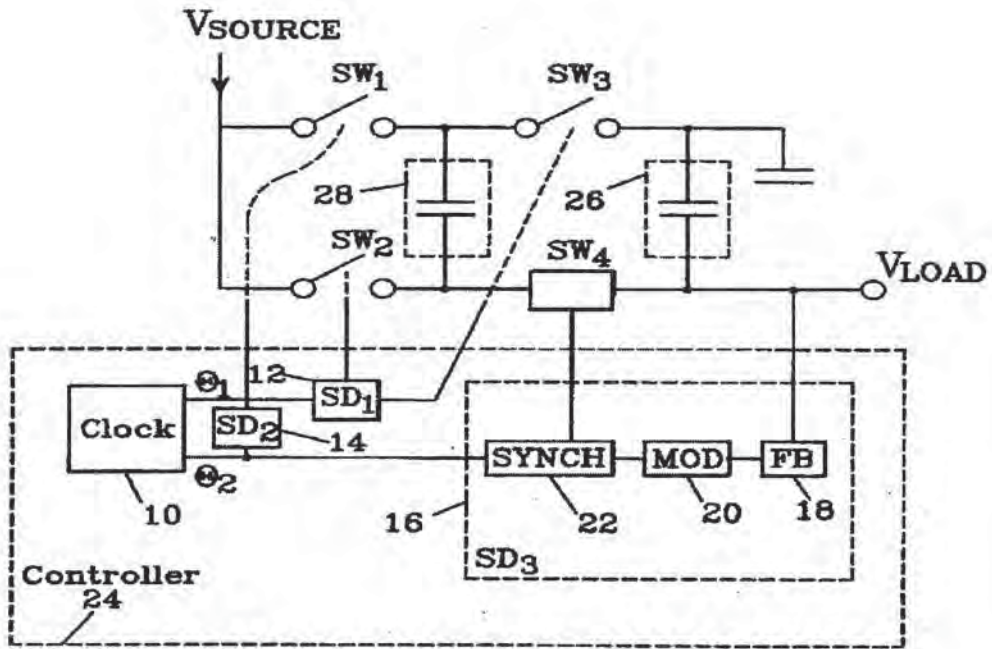


Figure 1 of the Kase '895 Patent

RX-149, Fig. 1.

39. Figure 3 of the Szepesi '300 patent discloses "a block diagram of a self-regulating step-up voltage converter charge pump which employs the new switch controller," wherein the switch controller SD3 is part of the feedback loop that monitors the output voltage in order to control switch SW4 (which is a variable resistance switch) to provide a regulated output voltage. Szepesi Tr. 1373-1374.

40. Figure 3 of the Szepesi '300 patent (RX-1076, Fig. 3) is as follows:



CONCLUSIONS OF LAW

1. The Commission has personal jurisdiction over the parties, and subject matter jurisdiction over this investigation. *See Op. at 3.*
2. The AATI products at issue in this investigation have not been found to infringe, either directly or under the doctrine of equivalents, claim 2, 3, 34 or 35 of the '258 patent. *See Op. at 63.*
3. AATI's AT3119 product practices all required elements, or limitations, of claims 4 and 26 of the '531 patent. *See Op. at 70-71.*
4. It has not been established that the AT3119 or any other AATI product accused under the '531 patent (i.e., the AAT3113, AAT3141 and AAT3151) practices any other asserted claim of the patent, either literally or under the doctrine of equivalents. *See Op. at 71.*
5. It is not found that indirect infringement has occurred in connection with any asserted claim of the '258 or '531 patent. *See Op. at 73.*
6. It has not been established by clear and convincing evidence that claim 2, 3 or 34 of the '258 patent is invalid. *See Op. at 77-81, 91.*
7. It is found that claim 35 of the '258 patent is invalid due to anticipation. *See Op. at 86, 91.*
8. It is not found that any claim of the '258 patent is invalid due to double patenting. *See Op. at 91.*
9. It has been found by clear and convincing evidence that each asserted claim of the '531 patent was anticipated, and is therefore invalid, in view of the Kase and Szepesi patents. *See Op. at 101.*

10. It is not found that the '258 patent is unenforceable due to inequitable conduct. *See Op. at 105.*

11. It has not been shown by clear and convincing evidence that the '531 patent is unenforceable due to inequitable conduct. *See Op. at 107.*

12. It has not been established that Linear is estopped from seeking a remedy under section 337 directed toward AATI. *See Op. at 109.*

13. The technical prong of the domestic industry requirement is satisfied with respect to the '258 patent. *See Op. at 110.*

14. It has not been established that Linear satisfies the technical prong of the domestic industry requirement with respect to the '531 patent. *See Op. at 114.*

15. It is found that the economic prong of the domestic industry requirement is satisfied. *See Op. at 115.*

16. It is found that Linear has satisfied the domestic industry requirement with respect to the '258 patent. Linear has not, however, satisfied that domestic industry requirement with respect to the '531 patent. *See Op. at 115.*

INITIAL DETERMINATION AND ORDER

Based on the foregoing opinion, findings of fact, conclusions of law, the evidence, and the record as a whole, and having considered all pleadings and arguments, including the proposed findings of fact and conclusions of law, it is the Administrative Law Judge's INITIAL DETERMINATION ("ID") that no violation of section 337 of the Tariff Act of 1930, as amended, has occurred in the importation into the United States, the sale for importation, or the sale within the United States after importation, of certain voltage regulators, components thereof and products containing same by reason of infringement of claims 1- 14 or 23-35 of United States Patent No. 6,411,531, or claims 1-19, 31, 34 or 35 of United States Patent No. 6,580,258.

The Administrative Law Judge hereby CERTIFIES to the Commission this ID, together with the record of the hearing in this investigation consisting of the following:

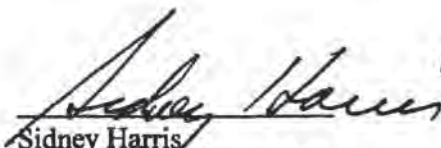
1. The transcript of the hearing, with appropriate corrections as may hereafter be ordered by the Administrative Law Judge; and further,
2. The exhibits accepted into evidence in this investigation as listed in the attached exhibit lists.

In accordance with 19 C.F.R. § 210.39(c), all material found to be confidential by the Administrative Law Judge 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 by the Administrative Law Judge in this investigation, and upon the Commission investigative attorney.

To expedite service of the public version, each party is hereby ORDERED to file by no later than May 30, 2007 a copy of this ID with brackets that show any portion considered by the party (or its suppliers of information) to be confidential, accompanied by a list indicating each page on which such a bracket is found. At least one copy of such a filing shall be served upon the Administrative Law Judge, and the brackets shall be marked in red. If a party (and its suppliers of information) consider nothing in the ID to be confidential, and thus make no request that any portion be redacted from the public version of this ID, then a statement to that effect shall be filed in lieu of a document with brackets.

Pursuant to 19 C.F.R. § 210.42(h), this ID shall become the determination of the Commission unless a party files a petition for review pursuant to § 210.43(a) or the Commission, pursuant to § 210.44, orders on its own motion a review of the ID or certain issues herein.


Sidney Harris
Administrative Law Judge

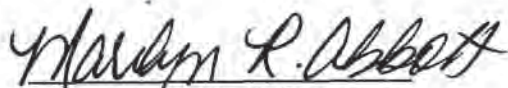
Issued: May 22, 2007

**CERTAIN VOLTAGE REGULATORS,
COMPONENTS THEREOF AND PRODUCTS
CONTAINING SAME**

INV. NO. 337-TA-564

CERTIFICATE OF SERVICE

I, Marilyn R. Abbott, hereby certify that the attached **Order** has been served on upon David H. Hollander, Esq. and upon the following parties via first class mail, and air mail where necessary on June 11, 2007.



Marilyn R. Abbott, Secretary
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**CERTAIN VOLTAGE REGULATORS,
COMPONENTS THEREOF AND PRODUCTS
CONTAINING SAME**

INV. NO. 337-TA-564

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