

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

INTEL CORPORATION

Petitioner,

v.

QUALCOMM INCORPORATED

Patent Owner.

IPR2018-01240
U.S. Patent No. 8,698,558

PETITIONER'S NOTICE OF APPEAL

Pursuant to 35 U.S.C. §§ 141-144 and 319, and 37 C.F.R. § 90.2-90.3, notice is hereby given that Petitioner Intel Corporation appeals to the United States Court of Appeals for the Federal Circuit from the Final Written Decision entered February 20, 2020 (Paper 30) in IPR2018-01240, attached as Exhibit A, which was not modified by the Decision Denying Patent Owner's Request on Rehearing of Final Written Decision entered August 11, 2021 (Paper 33) in IPR2018-01240, attached as Exhibit B, and all prior and interlocutory rulings related thereto or subsumed therein.

In accordance with 37 C.F.R. § 90.2(a)(3)(ii), Petitioner indicates that the issues for appeal include the Patent Trial and Appeal Board's holding that claim 10 is not unpatentable, the construction of "a source that receives the boosted supply voltage or the first supply voltage," any finding or determination supporting or related to those issues, and all other issues decided adversely to Petitioner in any orders, decisions, rulings, and opinions.

Pursuant to 37 C.F.R. § 90.3, this Notice of Appeal is timely, having been duly filed within 63 days after the date of the Decision Denying Patent Owner's Request on Rehearing of Final Written Decision. A copy of this Notice of Appeal is being filed simultaneously with the Patent Trial and Appeal Board, the Clerk's

Office for the United States Court of Appeals for the Federal Circuit, and the
Director of the U.S. Patent and Trademark Office.

Respectfully submitted,

Dated: October 13, 2021

/David L. Cavanaugh/
David L. Cavanaugh
Registration No. 36,476

CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. §§ 90.2(a)(1) and 104.2(a), I hereby certify that, in addition to being filed electronically through the Patent Trial and Appeal Board's End to End (PTAB E2E) system, a true and correct original version of the foregoing PETITIONER'S NOTICE OF APPEAL is being filed by Express Mail on this 13th day of October, 2021, with the Director of the United States Patent and Trademark Office, at the following address:

Office of the General Counsel
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

Pursuant to 37 C.F.R. § 90.2(a)(2) and Federal Circuit Rule 15(a)(1), and Rule 52(a),(e), I hereby certify that a true and correct copy of the foregoing PETITIONER'S NOTICE OF APPEAL is being filed in the United States Court of Appeals for the Federal Circuit using the Court's CM/ECF filing system on this 13th day of October, 2021, and the filing fee is being paid electronically using pay.gov.

I hereby certify that on October 13, 2021, I caused a true and correct copy of the PETITIONER'S NOTICE OF APPEAL to be served via electronic mail, as previously agreed by the parties, on the following counsel for Patent Owner:

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EXHIBIT A

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

INTEL CORPORATION,
Petitioner,

v.

QUALCOMM, INC.,
Patent Owner.

Case IPR2018-01240
Patent 8,698,558 B2

Before TREVOR M. JEFFERSON, DANIEL N. FISHMAN, and
SCOTT B. HOWARD, *Administrative Patent Judges*.

JEFFERSON, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining Some Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

In this *inter partes* review, Intel Corporation (“Petitioner”) challenges claims 10 and 11 of U.S. Patent No. 8,698,558 B2 (“the ’558 patent,” Ex. 1301) which is assigned to Qualcomm Incorporated (“Patent Owner”). Paper 3 (“Petition” or “Pet.”).

We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision, issued pursuant to 35 U.S.C. § 318(a), addresses issues and arguments raised during the trial in these *inter partes* reviews. For the reasons discussed below, we determine that Petitioner has not demonstrated the unpatentability of claims 10 and 11.

A. Procedural History

Petitioner filed a Petition challenging claims 10 and 11 of the ’558 patent (Pet. 6, 50–51), Patent Owner filed a Preliminary Response (Paper 8). We instituted trial on all grounds of unpatentability. Paper 9 (“Dec. on Inst.”), 23–24. During trial, Patent Owner filed a Response (Paper 16, “PO Resp.”), Petitioner filed a Reply (Paper 19, “Pet. Reply”), and Patent Owner filed a Sur-reply (Paper 22, “PO Sur-reply”). A combined oral hearing for this *inter partes* review and IPR2019-01154 was held on October 28, 2019, a transcript of which appears in the record in each case. Paper 27.

B. Instituted Grounds of Unpatentability

We instituted *inter partes* review of claims 10 and 11 of the ’558 patent in on the following grounds:

Claim(s) Challenged	35 U.S.C. §	References
10	103(a) ¹	Chu, ² Choi 2010, ³ and Hanington ⁴
11	103(a)	Chu, Choi 2010, Hanington and Myers. ⁵

Dec. on Inst. 6, 20–22; *see* Pet. 6, 50–51.

In support of these grounds, Petitioner relies on the Declaration of Dr. Alyssa ApSEL (Ex. 1303), the Reply Declaration of Dr. Alyssa B. ApSEL (Ex. 1329), and the Deposition of Dr. Arthur Kelley (Ex. 1330) in support the Petition. Patent Owner relies on the Declaration of Dr. Arthur Kelley (Ex. 2002) and Depositions of Dr. Alyssa ApSEL (Ex. 2003; Ex. 2004).

C. Related Proceedings

Apple Inc. is identified as an additional real party-in-interest. Pet. 2. The parties inform us that the '558 patent was asserted against Petitioner in the litigation *Qualcomm Inc. v. Apple Inc.*, Case No. 3:17-cv-01375-DMS-MDD (S.D. Cal.) and against Apple in a proceeding before the International

¹ The Leahy-Smith America Invents Act (“AIA”) included revisions to 35 U.S.C. §§ 102, 103 that became effective on March 16, 2013. Because the '558 patent issued from an application filed before March 16, 2013, we apply the pre-AIA versions of the statutory bases for unpatentability.

² Wing-Yee Chu, et al., *A 10 MHz Bandwidth, 2 mV Ripple PA Regulator for CDMA Transmitters*, IEEE JOURNAL OF SOLID-STATE CIRCUITS 2809–2819 (2008) (Ex. 1304, “Chu”).

³ Jinsung Choi, et al., *Envelope Tracking Power Amplifier Robust to Battery Depletion*, MICROWAVE SYMPOSIUM DIGEST (MTT), 2010 IEEE MTT-S INTERNATIONAL 1074–1077 (2010) (Ex. 1307, “Choi 2010”).

⁴ Gary Hanington, et al., *High-Efficiency Power Amplifier Using Dynamic Power-Supply Voltage for CDMA Applications*, IEEE TRANSACTIONS ON MICROWAVE THEORY AND TECHNIQUES 47:8 (1999) (Ex. 1325, “Hanington”)

⁵ Myers, et al., U.S. Patent No. 5,929,702 (Ex. 1312, “Myers”).

Trade Commission (“ITC”) captioned *In the Matter of Certain Mobile Electronic Devices and Radio Frequency and Processing Components Thereof*, Inv. No. 337-TA-1065. Pet. 2; Paper 5, 2.

D. The ’558 Patent and Illustrative Claims

The ’558 patent is titled “Low-Voltage Power-Efficient Envelope Tracker” and discloses “[t]echniques for efficiently generating a power supply for a power amplifier” used in communication system transmitters. Ex. 1301, 1:30–31, code (54). The ’558 patent discloses that a

transmitter typically includes a power amplifier (PA) to provide high transmit power for the output RF signal. The power amplifier should be able to provide high output power and have high power-added efficiency (PAE). Furthermore, the power amplifier may be required to have good performance and high PAE even with a low battery voltage.

Id. at 1:21–26. The ’558 patent also discloses that the power amplifier apparatus may include: (1) in one embodiment, an envelope amplifier and a boost converter; (2) in a second embodiment a switcher, an envelope amplifier, and a power amplifier; or (3) in a third embodiment, a switcher that may sense an input current and generate a switching signal to charge and discharge an inductor providing a supply current. *Id.* at 1:31–34, 1:51–52, 1:66–2:2.

Figure 3, below, shows an exemplary switcher and envelope amplifier. Ex. 1301, 4:39–42.

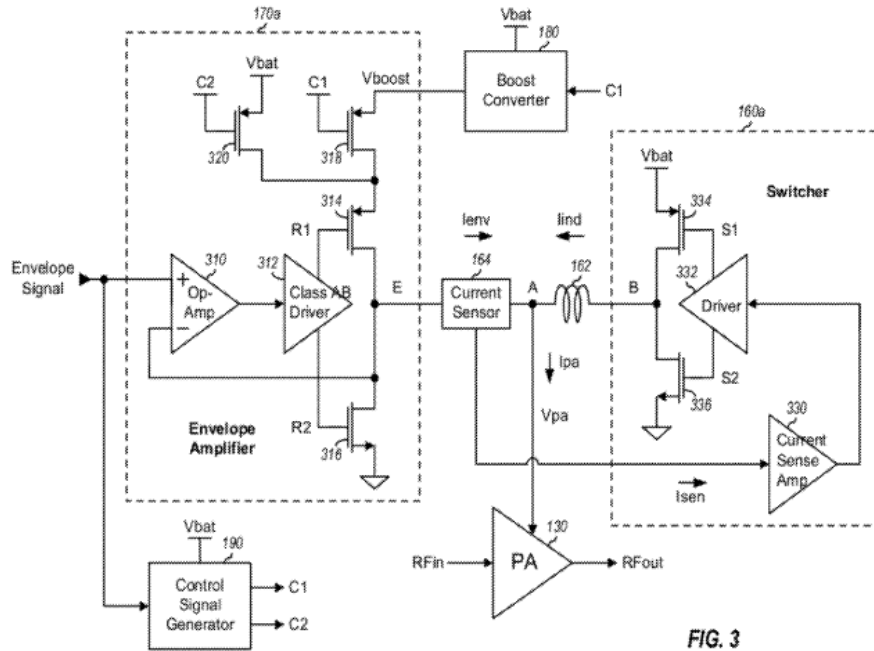


FIG. 3

Figure 3 shows switcher 160a and envelope amplifier 170a, which, in turn, includes operational amplifier (op-amp) 310 that receives the envelope signal. *Id.* at 4:41–63. Driver 312 has output (R1) coupled to the gate of P-channel metal oxide semiconductor (PMOS) transistor 314 and a second output (R2) coupled to N-channel MOS (NMOS) transistor 316. *Id.* PMOS transistor 318 in envelope amplifier 170a is connected to receive C1 control signal via Vboost voltage from Boost Converter 180. *Id.* PMOS transistor 320 in envelope amplifier 170 receives a C2 control signal and Vbat voltage. *Id.*

Within switcher 160a, current sense amplifier 330 has its input coupled to current sensor 164 and its output coupled to an input of switcher driver 332. *Ex.* 1301, 4:64–66. Vbat voltage of switcher 160a provides current to power amplifier 130 via inductor 162 when the switcher is ON, and inductor 120 provides stored energy to power amplifier 130 during the OFF state of the switcher circuit. *Id.* at 5:14–30. In the ON state, the switcher is joined with the current from the envelope amplifier 170a (I_{env})

to provide a combined current (I_{pa}) to PA 130. *See id.* at 3:21–27.

The '558 patent also discloses another embodiment for the switcher circuit of Figure 3—specifically a switcher that uses offset current to lower the Isen current from the current sensor, keeping the switcher in the ON state for a longer time and producing a larger Iind current provided to power amplifier 130. *Id.* at 1:5–48, Fig. 5.

Claims 10 is independent and claim 11 is dependent. Claims 10 and 11 are reproduced below (Ex. 1301, 12:25–50).

10. An apparatus for generating supply voltages, comprising:

means for generating a boosted supply voltage based on a first supply voltage, the boosted supply voltage having a higher voltage than the first supply voltage; and

means for generating a second supply voltage based on the envelope signal and the boosted supply voltage, wherein the means for generating the second supply voltage incorporates an envelope amplifier that produces the second supply voltage using an operational amplifier (op-amp) that receives the envelope signal and provides an amplified signal, a driver that receives the amplified signal and provides a first control signal and a second control signal, a P-channel metal oxide semiconductor (PMOS) transistor that receives the first control signal, a source that receives the boosted supply voltage or the first supply voltage, and a drain providing the second supply voltage and an N-channel metal oxide semiconductor (NMOS) transistor that receives the second control signal at a gate and provides a second supply voltage through a drain, and a source for circuit grounding.

11. The apparatus of claim 10, wherein the means for generating the second supply voltage comprises means for generating the second supply voltage based on an envelope signal and either the boosted supply voltage or the first supply voltage.

II. ANALYSIS

A. Level of Ordinary Skill in the Art

The parties do not materially dispute the level of ordinary skill in the art. *See* PO Resp. 10; Pet. 38–39. Petitioner argues a person of ordinary skill in the art related to the '558 patent at the time of filing, would have a Master's degree in electrical engineering, computer engineering, or computer science, and would also have at least two years of relevant experience, or a Bachelor's degree in one of those fields and four years of relevant experience, where relevant experience is "refers to experience with mobile device architecture as well as transmission and power circuitry for radio frequency devices." Pet. 49–50 (citing Ex. 1301, Abstract, 1:7–9, 30–31; Ex. 1303 ¶¶ 81–82).

Our Institution Decision adopted Petitioner's proposed level of skill. Dec. on Inst. 11. Patent Owner does not dispute this issue. PO Resp. 9-10.

We are persuaded by Petitioner's definition of the level of ordinary skill in the art and we find the work experience is commensurate with the level of ordinary skill in the art. *See In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995). Here, the '558 patent requires a degree of knowledge that is specific to mobile device architecture as well as transmission and power circuitry for radio frequency devices. *See* Pet. 49–50; Ex. 1301, Abstract, 1:7–9, 30–31.

B. Claim Interpretation

In an *inter partes* review for a petition filed before November 13, 2018, a claim in an unexpired patent shall be given its broadest reasonable construction in light of the specification of the patent in which it appears. 37 C.F.R. § 42.100(b) (2018); *see* Changes to the Claim Construction

Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board, 83 Fed. Reg. 51,340 (Oct. 11, 2018) (amending 37 C.F.R. § 42.100(b); effective November 13, 2018). The Petition was accorded a filing date of June 28, 2018, and therefore, the broadest reasonable interpretation standard for claim interpretation applies. *See* Paper 7 (Notice of Filing Date Accorded to Petition).

In applying a broadest reasonable interpretation, claim terms generally are given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *See In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). This presumption may be rebutted when a patentee, acting as a lexicographer, sets forth an alternate definition of a term in the specification with reasonable clarity, deliberateness, and precision. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994).

1. “envelope signal” (claim 11)

Petitioner offers a claim construction for “envelope signal” (claim 11) to mean a “signal indicative of the upper bound of the output RF signal,” which is the ALJ’s construction in the ITC proceeding. Pet. 39; Ex. 1323, 13–14. Patent Owner argues that this term does not require construction, but does not contest Petitioner’s contention or our adoption of this construction in the Institution Decision. PO Resp. 8.

Based on the full record and for the reasons given by the ALJ (Ex. 1323, 13–14), we adopt the ITC construction for “envelope signal” to mean a “signal indicative of the upper bound of the output RF signal.”

2. Means-Plus-Function Limitations (claim 10).

Petitioner identifies “means for generating a boosted supply voltage based on a first supply voltage” (claim 10), “means for generating a second supply voltage based on the envelope signal and the boosted supply voltage” (claim 10), and “means for generating the second supply voltage based on an envelope signal and either the boosted supply voltage or the first supply voltage” (claim 11) as means-plus-function limitations under 35 U.S.C. § 112 ¶ 6. Pet. 40–47.

With respect to “means for generating a boosted supply voltage” in claim 10, Petitioner identifies “generating a boosted supply voltage based on a first supply voltage” as the function and the structure that performs this function as boost converter 180, as shown in Figures 3, 5, and 6 of the ’558 patent. Pet. 40–42 (citing Ex. 1301, 3:19–21; Ex. 1303 ¶¶ 85–86). For the means for generating a second supply voltage of claim 10, Petitioner identifies the claimed function in this limitation is “generating a second supply voltage based on the envelope signal and the boosted supply voltage” and the structure is envelope amplifier 170, as depicted in Figs. 3 and 5 of the ’558 patent. Pet. 43–45 (citing Ex. 1301, Fig. 3, 3:21–29, 8:46–50; Ex. 1303 ¶¶ 89–90).

Finally, for the means limitations of claim 11, Petitioner identifies the claimed function in this limitation is “generating the second supply voltage based on an envelope signal and either the boosted supply voltage or the first supply voltage” and the structure performing the function is envelope amplifier 170, as shown in Figures 3 and 5. Pet. 46–49 (citing Ex. 1301, Fig. 3, 3:27–29, 8:55–62; Ex. 1303 ¶¶ 93–94).

Patent Owner does not challenge or contest Petitioner's identification of the limitations of claims 10 and 11 as means-plus-function limitations nor the structures that perform the identified functions. PO Resp. 8–9. Based on the full record, we agree and adopt Petitioner's identified functions and structures for the means-plus-function limitations of claims 10 and 11.

3. *“a source that receives the boosted supply voltage
or the first supply voltage” (claim 10)*

Claim 10 recites “a P-channel metal oxide semiconductor (PMOS) transistor [having] . . . a source that receives the boosted supply voltage or the first supply voltage.” Patent Owner argues that “the only reasonable interpretation of this claim element, properly read within the context of the claim as a whole, is that the source of the PMOS transistor [of claim 10] must be able to receive, selectively, either the boosted supply voltage or the first supply voltage (referred to herein as a ‘selective boost’).” PO Resp. 21 (citing Ex. 2002 ¶¶ 51–65). Patent Owner argues that Petitioner implicitly construes this limitation based on the use of the term “or” as requiring only one of the enumerated supply voltages, but not requiring both supply voltages to be available at the source. PO Resp. 22.

Patent Owner argues that

claim 10 requires “means for generating a boosted supply voltage . . . having a higher voltage than the first supply voltage,” and further requires “means for generating a second supply voltage based on the envelope signal and the boosted supply voltage.” That is, the means for generating a boosted supply voltage must generate “a boosted supply voltage.” Otherwise, the “means for generating a second supply voltage” limitation is meaningless.

PO Resp. 24. Petitioner acknowledges that claim 11 which depends from claim 10 requires the selective boost, as it recites “wherein the means for

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generating the second supply voltage comprises means for generating the second supply voltage based on an envelope signal and either the boosted supply voltage or the first supply voltage.” *See* Pet. 73–74 (noting that the amplifier would be able to operate “selectively” to choose either the boosted voltage or the battery supply voltage). Patent Owner argues that the claim language of claims 10 and 11 and the specification expressly refer to the boosted supply voltage or first supply voltage. PO Resp. 23–24, 26–30.

Our combined Final Decision in related cases IPR2018-01152 and IPR2018-01153 construed terms in claims 6, 8, and 13 of the ’558 patent that are closely related to the disputed limitation of claim 10. *See Intel Corp. v. Qualcomm Inc.*, IPR2018-01152, Paper 30 (“1152 Final Dec.”), 12–21 (PTAB Jan 15, 2020). Petitioner and Patent Owner assert substantially similar arguments and evidence in arguing that claims 10 recites a selective boost. *Compare* 1152 Final Dec. 12–21 *with* PO Resp. 21–30; Pet. Reply 3–8; PO Sur-reply 2–11. In IPR2018-01152 and IPR2018-01153, we determined that “that the specification and context of the claims support the broadest reasonable interpretation that claims 6, 8, and 13 require that both a first supply voltage and second supply voltage be available at the amplifier (claim 13) and PMOS transistor source (claims 6 and 8).” 1152 Final Dec. 21. In sum, we agreed with Patent Owner’s arguments based on the context of the entire ’558 patent disclosure that claims 6, 8, and 13 recite limitations requiring selective voltages. 1152 Final Dec. 12–21.

As we discussed in IPR2018-01152 and IPR2018-01153, and incorporated herein (1152 Final Dec. 12–21), the broadest reasonable interpretation is what would be understood by one of ordinary skill in the art in the context of the entire disclosure. *See Translogic*, 504 F.3d at 1257.

The '558 specification and the context of claims 6, 8, and 13 and the related language of claim 10 support that the “source” must be able to receive both the boosted supply voltage and the first supply voltage (a selective boost). PO Resp. 35–38; Ex. 1201, 1:42–50, 5:31–49, 8:55–62, 8:62–9:17, 9:21–36, 10:19–29, Figs. 3 and 5. Accordingly, we do not agree with Petitioner that the use of a conditional “or” in claim 10 indicates that only one voltage is necessary to meet the claims. Pet. Reply 3–9. We credit Patent Owner’s evidence and arguments that the language of claims 10 and 11 and the '558 patent specification support that claim 10, like dependent claim 11, require a selective boost. *See* PO Resp. 26–29.

Petitioner’s arguments assert both that Patent Owner improperly limits the construction to one disclosed embodiment and that the Patent Owner’s construction improperly excludes a disclosed embodiment. Pet Reply 6–8. We are not persuaded by Petitioner’s argument that Patent Owner’s construction should be rejected because it excludes an embodiment. Pet. Reply 6 (citing *EPOS Techs. Ltd. v. Pegasus Techs. Ltd.*, 766 F.3d 1338, 1347 (Fed. Cir. 2014); *Anchor Wall Sys., Inc. v. Rockwood Retaining Walls, Inc.*, 340 F.3d 1298, 1308 (Fed. Cir. 2003); *Dow Chem. Co. v. Sumitomo Chem. Co.*, 257 F.3d 1364, 1378 (Fed. Cir. 2001)). The cases Petitioner cites refer to constructions that read out *preferred* embodiments. *See EPOS Techs.*, 766 F.3d at 1347; *Dow Chem. Co.*, 257 F.3d, at 1378; *Anchor Wall Sys.*, 340 F.3d at 1308. Petitioner provides no persuasive evidence that the embodiment they identify as being excluded is the preferred embodiment of the '558 patent. Further, Petitioner cites no support that claims 10 or 11 must be construed to cover all embodiments. *See Baran v. Med. Device Techs., Inc.*, 616 F.3d 1309, 1316 (Fed. Cir. 2010).

The Federal Circuit has stated that the broadest reasonable construction is not required to cover the most embodiments in a patent specification, but “must be *reasonable* in light of the claims and specification. The fact that one construction may cover more embodiments than another does not categorically render that construction reasonable.” *PPC Broadband, Inc. v. Corning Optical Commc’ns RF, LLC*, 815 F.3d 747, 755 (Fed. Cir. 2016). We are not persuaded by Petitioner’s argument that exclusion of a single embodiment renders Patent Owner’s claim construction improper.

We are also not persuaded by Petitioner’s contention that in related proceedings before the United States District Court for the Southern District of California, the court issued a claim construction for a related term in claim 7 of the ’558 patent that construed “or” in the manner Petitioner proposes. Pet. Reply 4–5 (citing Ex. 1328, 5–6). The district court was faced with assessing whether “based on” in claim 7 of the ’558 patent was indefinite or should be construed according to its plain meaning. Ex. 1328, 5. The court found that because dependent claim 7 acted to expand the scope of a dependent claim to include another possible combination not claimed in the claim from which it depended, the term “based on” in claim 7 was indefinite. *Id.* at 6. The court’s discussion of indefiniteness does not construe the term “or” as recited in claim 19. We do not agree with Petitioner that the court addressed the scope of claim 19 or construed the word “or” the claim by implication. *Id.* at 5–6. Petitioner’s reliance on the district court’s discussion is unpersuasive.

We are also not persuaded by the extrinsic cross-examination testimony. Neither Petitioner nor Patent Owner cites compelling testimony

regarding the interpretation of claim 19 or related limitations in claims 6, 8, and 13. *See* Pet. Reply 8–9; PO Sur-reply 7–11.

Based on the full record, we find that claim 10, in the context of the claims 6, 8, and 13 (1152 Final Dec. 20–21), and the '558 specification (Ex. 1301, 1:42–50, 5:31–49; 8:55–62), requires that the source be capable of operating, selectively, based on the first supply voltage or the boosted supply voltage. PO Resp. 23–31. Accordingly, we interpret “a P-channel metal oxide semiconductor (PMOS) transistor [having] . . . a source that receives the boosted supply voltage or the first supply voltage” in claim 10 to require a selective boost. We apply this interpretation in our analysis of the teachings of the prior art below. *See* Section II.D..

C. Principles of Law

A patent claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter 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. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) any secondary considerations, if in evidence.⁶ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

⁶ Patent Owner does not present any objective evidence of nonobviousness (i.e., secondary considerations) as to any of the challenged claims.

D. Obviousness by Chu, Choi 2010, and Hanington

1. Overview of Chu (Ex. 1304)

Chu is a 2008 paper titled, “A 10 MHz Bandwidth, 2 mV Ripple PA Regulator for CDMA Transmitters” that discloses a power amplifier that contains a master-slave linear and switch-mode supply modulator with fast dynamic transient response. Ex. 1304, 2809. Chu discloses “[a] combined class-AB [linear amplifier] and switch-mode regulator based supply modulator with a master-slave architecture achieving wide bandwidth and low ripple.” *Id.* Figure 4 of Chu, below, shows the block diagram of the master-slave linear and switch-mode combined supply modulator loaded with a PA. *Id.* at 2811.

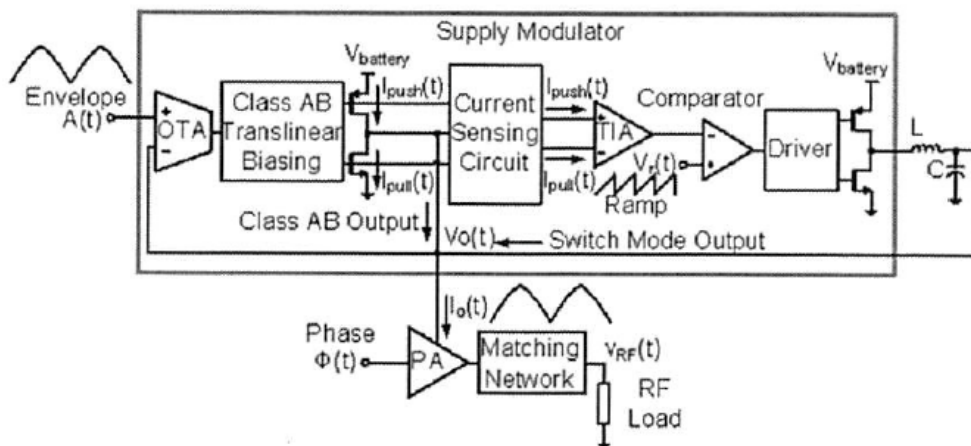


Figure 4 depicts the proposed master-slave linear and switch-mode PA regulator block diagram

Figure 4 shows a current sensing circuit, high gain transimpedance amplifier, and switch-mode regulator that form a feedback control loop that suppresses the current output from the linear amplifier within the switch-mode regulator bandwidth. *Id.* at 2811.

2. *Overview of Choi 2010 (Ex. 1306) and Hanington (Ex. 1325)*

Choi 2010 is a paper titled “Envelope Tracking Power Amplifier Robust to Battery Depletion” that describes “[a] wideband envelope tracking power amplifier” with an integrated boost converter to keep a stable operation of the power amp supply modulator. Ex. 1306, 1074.

Hanington is an IEEE article entitled “High-Efficiency Power Amplifier Using Dynamic Power-Supply Voltage for CDMA Applications.” Ex. 1325 at 1471. Hanington is referenced in Choi 2010 (Ex. 1304, 1077 (citing Hanington as reference [3])) as a type of boost converter used “[t]o prevent the degradation of the output power” for the envelope amplifier disclosed in Choi 2010 (Ex. 1304, 1074 (col. 1)). Hanington discloses an RF amplifier configuration that is described as “a high-efficiency power amplifier topology for use in a portable microwave communications system.” Ex. 1325 at 1471.

3. *Analysis*

Petitioner argues that claim 10 would have been obvious over Chu, Choi 2010, and Hanington. Pet. 51–72 (citing Ex. 1303 ¶¶ 99–131). Petitioner’s arguments and evidence do not address whether claim 10 requires a selective boost to teach limitation for “a source that receives the boosted supply voltage or the first supply voltage.” *See id.* With respect to this limitation, Petitioner alleges that the limitation “a P-channel metal oxide semiconductor (PMOS) transistor [having] . . . a source that receives the boosted supply voltage or the first supply voltage” is met by Choi 2010’s disclosure of “a boost converter to generate a boosted supply voltage that can be supplied to the envelope amplifier instead of a battery voltage.” Pet. 69. Petitioner does not address whether this PMOS transistor source is

capable of receiving selectively the boosted supply voltage or the first supply voltage. *Id.*; see Pet. Reply 3–10 (addressing claim construction).

Patent Owner also asserts that Petitioner fails to establish a motivation to combine Chu and Choi 2010. PO Resp. 31–38. We do not reach this argument.

Because we determined above that claim 10, like dependent claim 11, requires a selective boost, Petitioner fails to provide sufficient or persuasive evidence that Chu, Choi 2010, and Hanington teach the claim 10 limitation for “a source that receives the boosted supply voltage or the first supply voltage.” Accordingly, we determine that Petitioner has not proven by a preponderance of the evidence that claim 10 the ’558 patent is unpatentable under 35 U.S.C. § 103(a) as obvious over Chu, Choi 2010, and Hanington.

E. Obviousness over Chu, Choi 2010, Hanington, and Myers

1. Overview of Myers (Ex. 1312)

Myers is a United States patent that discloses “[a] method and apparatus for efficient power amplification of a high dynamic range signal” using an envelope detector, multi range modulator, and power amplifier. Ex. 1312, code (57). Myers discloses that “multi-range modulator (270) efficiently amplifies the envelope of the input signal by selecting a power source as a function of the amplitude of the input signal.” *Id.* “When the amplitude of the input signal rises above a reference, the duty cycle and the amplitude are modified so as to keep the multi-range modulator in an operating region of high efficiency.” *Id.*

2. *Analysis*

Petitioner contends that claim 11 would have been obvious in view of Chu, Choi 2010, Hanington, and Myers.⁷ Pet. 72–82; Ex. 1303 ¶¶ 132–157. Petitioner maps the limitations of the claim to Chu, Choi 2010, Hanington, and Myers. Petitioner identifies the structures performing the identified functions for claim 10 and 11. Pet. 51–70, 72–73. Petitioner provides sufficient and persuasive evidence mapping the structures and functions of Chu, Choi 2010, and Hanington to the apparatus and means-plus-function limitations of claim 10. Pet. 51–70. With respect to claim 11, Petitioner states that

The claimed this means-plus-function for this limitation is “generating the second supply voltage based on an envelope signal and either the boosted supply voltage or the first supply voltage.” The structure performing the function is envelope amplifier 170, including having an operational amplifier 310; a driver amplifier 312; three PMOS transistors, wherein the first PMOS transistor 314 has its source coupled to the drains of the second and third PMOS transistors and its drain providing the second supply voltage; the second PMOS transistor 318 has a source receiving the boosted supply voltage, the third PMOS transistor 320 has a source receiving the first supply voltage; and an NMOS transistor 316 with its drain providing the second supply voltage and its source coupled to circuit ground. Ex. 1303 at ¶134.

Pet. 72–73. Petitioner argues that the envelope amplifier in Chu modified with Choi 2010 and Myers would be equivalent to the envelope amplifier

⁷ Petitioner’s ground challenges dependent claim 11 under 35 U.S.C. § 103, but did not challenge claim 10 from which claim 11 depends. Petitioner’s ground directed at claim 10 also did not advance the same prior art and evidence as asserted against dependent claim 11. Our Final Decision addresses claims 11 as specified in the Petition.

170 of the '558 patent. *Id.* at 73. Chu and Choi 2010 combined with Myers discloses an

envelope amplifier [that] would also be able to operate selectively to choose either the boosted voltage generated by the boost converter provided by Choi 2010 or the battery supply voltage already disclosed in Chu and generate the second supply voltage based on an envelope signal and on either of those voltages, as circumstances warrant. Ex. 1303 at ¶135.

Pet. 72–73.

Patent Owner does not contest the mapping of the limitations of claims 10 and 11 to the asserted prior art. *See* PO Resp. 31–50. Based on the full record, Petitioner provides persuasive and sufficient evidence, by a preponderance of the evidence, that the combination of Chu, Choi 2010, Hanington, and Myers teaches the limitations, structures, and functions of claims 10 and 11.

Motivation to Combine

Petitioner asserts a motivation to combine Chu with Choi 2010 and Hanington, and a motivation to combine Chu with Myers and Choi 2010. Pet. 57–61 (motivations to combine Chu, Choi 2010, and Hanington), 77–82 (motivation to combine Chu, Choi 2010, and Myers); Ex. 1303 ¶¶ 107–113, 141–147. Petitioner provides testimony and citations for a motivation to modify Chu to incorporate the boost converter of Choi 2010 and Hanington to prevent distortion as the battery voltage falls, based on teachings within Choi 2010. Pet. 58–59 (citing Exs. 1306, 1074, 1077); Ex. 1303 ¶¶ 107–108. In addition, Petitioner cites contemporary references in the art regarding preventing distortion of the amplified signal. Pet. 59–60 (citing Ex. 1318, Abstract; Ex. 1315, 8); Ex. 1303 ¶¶ 109–111.

With respect to Myers, Petitioner argues that adding the power selection functions of Myers would have promoted efficiency in operation and improve batter depletion as evidenced directly from Myers. Pet. 77–80 (citing Ex. 1012, 1:19–23, 3:47–59, 9:18–21); Ex. 1203 ¶¶ 142–143. Petitioner asserts that “[m]odifying Chu to selectively use either the battery or boosted voltages as taught by Myers would have been a particularly obvious approach in view of the well known state of battery technology” not operating at a fixed output voltage over time. Pet. 81; Ex. 1303 ¶ 146.

Patent Owner asserts that Petitioner’s arguments are based on hindsight reconstruction as the references address different problems with different solutions that are at tension with each other. PO Resp. 31–32. Patent Owner does not contest that efficiency, output distortion, or robustness problems Petitioner identifies were generally known in the art, but argues that in a person of ordinary skill in the art looking to maximize efficiency and minimize output power degradation in a cellular receiver had to make a trade-off: either maximize efficiency at the cost of output power degradation (like in Chu), or minimize the output power degradation at the cost of reducing efficiency (like in Choi 2010). *Id.* at 32–33. Patent Owner argues that Petitioner ignores the problem of “how” to solve the conflicting objectives in the art and fails to advance how these solutions will be applied in the combination of Chu and Choi 2010. *Id.* at 33–35. Patent Owner also dismisses the related references Petitioner relies on (Ex. 1018, Ex. 1015) because their technology is not relevant to the linear amplifier used in the applications of Chu and Choi 2010 and contains material differences in how the amplifier designs function. PO Resp. 24–36; Ex. 2002 ¶¶ 94–98.

Patent Owner's arguments regarding motivation to combine are not persuasive. We credit Petitioner's argument and evidence regarding the Chu and Choi 2010 concerns with power degradation and efficiency, which Patent Owner's declarant testified were common concerns known before the '558 patent. Pet. Reply 11–12 (citing Ex. 1330, 13:12–20, 13:21–14:2, 259:7–18); Ex. 1027 ¶ 18. We find that Petitioner presents persuasive evidence and argument that the issues of power degradation and efficiency were known in the art and within the knowledge and skill of a person of ordinary skill in the art. *See id.*; *see also* PO Resp. 32–33 (noting that “Patent Owner does not contest that efficiency and output distortion/robustness problems were generally known in the art.”).

We also find that Petitioner identifies persuasive motivations to combine from the references themselves, identifying specific teachings in Choi 2010 in reference to boost converter systems like those in Chu. Pet. 57–58 (citing Ex. 1306, 1074, 1077). Indeed, Patent Owner's declarant, Dr. Kelley, agreed that Choi 2010 teaches the use of boost converters to address battery degradation. Ex. 1030, 105:20–106:4, 156:3–6. Finally, Petitioner provides evidence that degrading battery performance affecting operation further motivates the combination of Chu and Choi 2010. Ex. 1030, 165:17–22; Pet. 57–61.

We are also persuaded by Petitioner's citation to secondary references of examples that use a boost converter to prevent distortion provides further support that a person of ordinary skill in the art would have been motivated to combine Chu with Choi 2010 and Hanington. *See* Pet. 58–60 (citing Ex. 1318, code (57); Ex. 1315, 8); Ex. 1303 ¶¶ 109–111. Patent Owner's arguments regarding the secondary references attempts to bodily incorporate

the teachings from these references into Chu and Choi 2010. Patent Owner also fails to address persuasively the support for the teachings these secondary references provide for modifying Chu's supply modulator to incorporate a boost converter as disclosed in Choi 2010 and Hanington. Pet. 58–60 (citing Ex. 1318, code (57); Ex. 1315, 8); Ex. 1303 ¶¶ 109–111. Indeed, Patent Owner's declarant agrees extending battery life, which is discussed in Exhibit 1315 and cited by Petitioner as a motivation to combine Chu and Choi 2010 (Pet. 58–60), would be achieved by the combination of Chu and Choi 2010 and was within the ordinary skill of an artisan. Ex. 1330, 281:6–282:2, 284:6–12.

We also disagree with Patent Owner that the Petition fails to show how to combine the references to solve the conflicting problems that Petitioner alleges as motivation—efficiency and degradation. PO Resp. 33–35. First, we credit Dr. Kelley's testimony that the result of the combination was within the knowledge and skill of an artisan. Ex. 1330, 105:20–106:4, 156:3–6, 281:6–282:2, 284:6–12. Second, we find that the evidence and argument in the Petition explain sufficiently how Chu would have been modified to incorporate the boost supply voltage of Choi 2010 and Hanington and that such modifications involve typical and well known components widely used in boost converters. *See* Pet. 68–70; Ex. 1303 ¶¶ 112–113, 126–127; Ex. 1329 ¶ 24.

With respect to combining the selective power supply of Myers with Chu, Choi 2010, and Hanington, Patent Owner argues that Choi 2010 teaches away from selective boost and that the 1997 technology of Myers is very different from the 2008-2010 technology of Chu and Choi 2010. PO Resp. 38–34, 43–44; Ex. 2003 ¶¶ 104, 111–112. In particular, Patent

Owner argues “Choi 2010’s boost is a constant boost applied to the linear amplifier, and thus teaches away from a selective boost.” PO Resp. 39. Patent Owner further argues combining Myers’ selective boost with Choi 2010’s constant boost would destroy the purpose and benefits of Choi 2010’s design. *Id.* at 43.

We do not find that Choi 2010’s use of a constant boost teaches away from selective boost in Myers. Patent Owner’s evidence and argument do not persuade us that Choi 2010’s teachings of boost exclude or discourage the use of selective boost. The portion of Choi 2010 Patent Owner cites does not criticize or discourage the use of selective boost, but applies boost generally to achieve its goals. *See* Ex. 1306, 1333–1334. We do not find that the teachings in Choi 2010 discourage a person of ordinary skill in the art from working with boosted voltage to achieve battery efficiencies. *See Galderma Labs., L.P. v. Tolmar, Inc.*, 737 F.3d 731, 738 (Fed. Cir. 2013). Choi 2010 does not discredit or criticize selective boost to improve efficiency.

Patent Owner contends that Chu and Choi 2010/Hanington in combination with Myers is impermissible hindsight that culls components to fit the parameters of the challenged claims. PO Resp. 44–46. Further, Patent Owner asserts that Myers is limited to its disclosure of older technology for switching power supply but operates in a context that differs materially from Chu and Choi 2010/Hanington. *Id.*

Patent Owner also argues that the ALJ in the related ITC investigation rejected the rationales offered to combine the envelope trackers of Chu and Choi 2010—which had no disclosure of average power tracking—with the average power tracking device of Myers. PO Resp. 47–42; Ex. 2001, 36–37;

Ex. 2002 ¶ 116. Patent Owner further notes that Chu describes technology that has evolved past the envelope tracking of Myers. Ex. 2002 ¶ 117; Ex. 1304, 2809.

Unlike the combination of Chu, Choi 2010, and Myers advanced in the ITC investigation (*see* Ex. 2001, 36–37), Petitioner does not assert the direct incorporation of Myers technology into the combination of Chu and Choi 2010/Hanington. Instead, Petitioner asserts that Myers teaches a method of choosing a power source to improve operation efficiency. Pet. Reply 22–23; Pet. 72–76; Ex. 1312, 9:18–21, 1:19–23. Furthermore, Patent Owner’s declarant, Dr. Kelley, acknowledges this teaching. Ex. 1330, 270:13–271:5. Petitioner’s arguments and evidence differ materially from those cited in the ITC investigation. *See* Ex. 2001, 36–37.

In the case before us, Petitioner does not directly incorporate Myers hardware into Chu or Choi 2010 and Hanington, but asserts that Myers—particularly Figure 7 that discloses the technique of switching between two different power sources—teaches a technique that would have been within the level of skill of an artisan at the time of patenting. Pet. Reply 23; *see* Pet. 72–76; Ex. 1330, 283:16–284:1; *see also* Ex. 1330, 152:21–153:4 (agreeing that a person of ordinary skill would have known how to select between two power sources). Contrary to the combination of the envelope elimination and restoration (EER) circuits of Myers into the linear amplifiers of Chu and Choi 2010 argued at the ITC, Petitioner has provided testimony and citations to the record that Myers’s selection functionality is applicable to the combination of Chu and Choi 2010. We credit Petitioner’s argument and evidence that a person of ordinary skill in the art would have been motivated to combine Chu, Choi 2010, and Hanington with the technique

from Myers and would have had a reasonable expectation of success in doing so. Pet. 79–81 (providing supporting argument and testimony regarding battery and boosted voltage efficiency as taught by Myers). We find that Petitioner’s argument and evidence provide sufficient rationales with articulated reasoning to support the application of the Myers selection technique with the amplifiers of Chu and Choi 2010 to achieve battery efficiency during described operating modes. Pet. 57–61 77–82. Indeed, Dr. Kelley’s testimony supports the applicability of the techniques in Myers. *See* Ex. 1330, 270:13–271:5, 281:6–282:2, 284:6–12; Ex. 1312, 9:18–21 (discussing Myers’ teaching of choosing power source for operation efficiency).

Based on our review of the full record, Petitioner demonstrates by a preponderance of the evidence an articulated rationale with articulated reasons to combine Chu, Choi 2010, Hanington, and Myers. In addition, Petitioner demonstrated by a preponderance of the evidence that Chu, Choi 2010, Hanington, and Myers teach the limitations of dependent claim 11.

Based on the foregoing, we find that Petitioner has demonstrated by a preponderance of the evidence that Chu, Choi 2010, Hanington, and Myers teach the limitations of claim 11.

III. CONCLUSION⁸

For the reasons discussed above, we conclude that Petitioner has not demonstrated by a preponderance of the evidence that claim 10 of the ’558

⁸ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner’s attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. *See* 84 Fed. Reg.

patent is unpatentable as obvious over Chu, Choi 2010, and Hanington. We further conclude that Petitioner has demonstrated, by a preponderance of the evidence, that claim 11 of the '558 patent is unpatentable as obvious over Chu, Choi 2010, Hanington, and Myers. The table below summarizes our conclusions:

Claim(s)	35 U.S.C. §	Reference(s)	Claims Shown Unpatentable	Claims Not Shown Unpatentable
10	102(b)	Chu, Choi 2010, and Hanington		10
11	103(a)	Chu, Choi 2010, Hanington, Myers	11	
Overall Outcome			11	10

IV. ORDER

In consideration of the foregoing, it is:

ORDERED that claim 11 of the '558 patent has been shown to be unpatentable; and

FURTHERED ORDERED that Petitioner has not shown by preponderance of the evidence that claim 10 is unpatentable; and

FURTHERED ORDERED that, because this is a Final Written Decision, parties to the proceeding seeking judicial review of the Decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. § 42.8(a)(3), (b)(2) (2019).

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EXHIBIT B

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

INTEL CORPORATION,
Petitioner,

v.

QUALCOMM, INC.,
Patent Owner.

IPR2018-01240
Patent 8,698,558 B2

Before TREVOR M. JEFFERSON, SCOTT B. HOWARD, and
AARON W. MOORE, Administrative *Patent Judges*.

JEFFERSON, *Administrative Patent Judge*.

DECISION
Denying Patent Owner's Request on
Rehearing of Final Written Decision
37 C.F.R. § 42.71(d)

I. INTRODUCTION

In our Final Written Decision, the Board held that, based on a preponderance of the evidence, Petitioner had not shown that independent claim 10 of U.S. Patent No. 8,698,558 B2 (“the ’558 patent,” Ex. 1301) is unpatentable as obvious over Chu,¹ Choi 2010,² and Hanington,³ but had shown that dependent claim 11 (which depends from claim 10) is unpatentable as obvious over Chu, Choi 2010, Hanington, and Myers.⁴ Paper 30 (“Dec.”), 25–26

Qualcomm Incorporated (“Patent Owner”) filed a rehearing request arguing that the ground for obviousness for dependent claim 11 was not properly advanced in the Petition. Paper 31 (“Req. Reh’g”) 1. For the reasons discussed below, we deny Patent Owner’s Request for Rehearing.

II. LEGAL STANDARDS

“The burden of showing a decision should be modified lies with the party challenging the decision,” and the challenging party “must specifically identify all matters the party believes the Board *misapprehended or*

¹ Wing-Yee Chu, et al., *A 10 MHz Bandwidth, 2 mV Ripple PA Regulator for CDMA Transmitters*, IEEE JOURNAL OF SOLID-STATE CIRCUITS 2809–2819 (2008) (Ex. 1304, “Chu”).

² Jinsung Choi, et al., *Envelope Tracking Power Amplifier Robust to Battery Depletion*, ” MICROWAVE SYMPOSIUM DIGEST (MTT), 2010 IEEE MTT-S INTERNATIONAL 1074–1077 (2010) (Ex. 1307, “Choi 2010”).

³ Gary Hanington, et al., *High-Efficiency Power Amplifier Using Dynamic Power-Supply Voltage for CDMA Applications*, IEEE TRANSACTIONS ON MICROWAVE THEORY AND TECHNIQUES 47:8 (1999) (Ex. 1325, “Hanington”)

⁴ Myers, et al., U.S. Patent No. 5,929,702 (Ex. 1312, “Myers”).

overlooked, and the place where each matter was previously addressed” in a paper of record. 37 C.F.R. § 42.71(d) (2020) (emphasis added). When rehearing a decision on petition, the Board will review the decision for an abuse of discretion. *See* 37 C.F.R. § 42.71(c). An abuse of discretion may be found if a decision: (1) is clearly unreasonable, arbitrary, or fanciful; (2) is based on an erroneous conclusion of law; (3) rests on clearly erroneous fact findings; or (4) involves a record that contains no evidence on which the Board could rationally base its decision. *Redline Detection, LLC v. Star Envirotech, Inc.*, 811 F.3d 435, 442 (Fed. Cir. 2015) (internal citations omitted).

III. ANALYSIS

Patent Owner argues that the Board erred by applying findings for dependent claim 11 that directly contradict the findings for independent claim 10. Req. Reh’g 1–2. Specifically, Patent Owner argues the Board found that Petitioner failed to show that Chu, Choi 2010, and Hannington would have rendered claim 10 obvious, but with respect to claim 11 erroneously concluded that “Petitioner provides sufficient and persuasive evidence mapping the structures and functions of Chu, Choi 2010, and Hanington to the apparatus and means-plus-function limitations of claim 10.” Req. Reh’g 2 (quoting Dec. 18). Patent Owner argues that, contrary to the Board’s Decision, Patent Owner directly contested Petitioner’s mapping of claim 10 to the asserted prior art. Req. Reh’g 2.

We disagree with Patent Owner’s contention. Our determination with respect to claim 10 was based on the claim interpretation for “a P-channel metal oxide semiconductor (PMOS) transistor [having] . . . a source that

receives the boosted supply voltage or the first supply voltage” in claim 10, which we construed as requiring a selective boost. Dec. 13–14 (finding selective boost). Petitioner’s evidence and argument for claim 10 showed the availability of either a boosted voltage or a first supply voltage (*see* Dec. 11–14), but failed to “address whether the PMOS transistor source of the prior art is capable of receiving selectively the boosted supply voltage or the first supply voltage.” Dec. 16–17.

Our determination was based on the Petition’s failure to address the selective boost claim construction at all with respect to claim 10. *Id.* Petitioner failed to address this construction because Petitioner asserted that claim 10 alone contained a conditional “or” in the source limitation such that only one voltage was required to meet claim 10 and not a selective choice between two voltages. Dec. 12 (citing Paper 19 (“Pet. Reply”) 3–9). With respect to claim 11, however, Petitioner addressed the specific selective boost requirement by claim 11, arguing that Myers in combination with Chu and Choi 2010 taught the selective operation to choose either the boosted or battery voltages. Dec. 18–19; Paper 3 (“Petition” or “Pet.”) 72–74; Ex. 1303 ¶ 135 (Declaration of Dr. Alyssa Apsel).

Patent Owner’s challenge to the mapping of Chu, Choi 2010, and Hannington to claim 10 addressed the failure to address whether these references taught a selective boost. *See* Req. Reh’g 2 (citing PO Resp. 21–31). In contrast to claim 10, claim 11 expressly introduced the capability that “either the boosted supply voltage of the first supply voltage” be selectively available to generate the second voltage which Petitioner addressed directly. Ex. 1301, 12:46–50. On the full record, our Decision

found Petitioner’s evidence and argument mapped the limitations and persuasively asserted that Myers combined with Chu and Choi 2010 taught the selective choice between voltages as recited in dependent claim 11. Dec. 18–19; Pet. 73–74; Ex. 1303 ¶ 135. In sum, Petitioner’s arguments with respect to Myers in view of the selective voltage limitations of claim 11 and limitations of claim 10 demonstrated that Myers addressed the selective boost limitation missing from the claim 10 analysis.

We disagree with Patent Owner’s argument that the Board’s finding with respect to claim 11 cannot be squared with the opposite finding for claim 10. Req. Reh’g 2. The Petition guides the proceeding. *See Koninklijke Philips N.V. v. Google LLC*, 948 F.3d 1330, 1335–36 (Fed. Cir. 2020). In the present case, Petitioner argued that claim 10 did not require a selective boost and the Petition failed to set forth sufficient analysis to support that Chu, Choi 2010, and Hanington met the selective boost requirement for claim 10. Dec. 12–14, 16–17; Pet. Reply 3–9. This same deficiency was not present in the ground addressing claim 11, as the Petition persuasively argued that the voltage selection was required in claim 11 and applied additional art, Myers, to support this limitation. *See* Dec. 18–19; Pet. 73–74; Ex. 1303 ¶ 135.

We also disagree with Patent Owner that “the Board is applying [an] analysis of the combination of Myers with Chu and Choi 2010 to the selective boost limitation of independent claim 10, [and] this is a different legal theory that was never advanced by Petitioner.” Req. Reh’g 3. Petitioner argued independent claim 10 differently from claim 11, asserting that claim 10 did not require a selective boost. Dec. 10–14, 16–17; Pet. 51–

72. For claim 11, the record shows that Petitioner asserts that claim 10 as modified by dependent claim 11 expressly requires a selective boost and provides evidence that Myers in combination with Chu and Choi 2010 teach the selective voltage limitation. Dec. 18–19; Pet. 51–70, 72–74; Ex. 1303 ¶¶ 134–135.

Patent Owner further contends that

Petitioner unequivocally advanced the position that “regarding claim 10, Chu combined with Choi 2010 and Hanington discloses the apparatus of claim 10.” (Petition at 72). Petitioner’s obviousness theory did not include Myers for the “means for generating the second supply voltage” limitation. Thus, to the extent the Board relied upon Myers for the “means for generating the second supply voltage” limitation, the Board misapprehended Petitioner’s obviousness theory

Req. Reh’g 4. We do not agree. First, the Petition’s deficiency with respect to the claim 10 ground was not based on the “means for generating a second supply voltage based on the envelope signal and the boosted supply voltage” limitation of claim 10, but the failure to address whether or how Chu, Choi 2010 and Hanington taught or suggested the selective boost construction based on the source limitation claim construction for claim 10. Dec. 10–14, 16–17. Second, our Final Written Decision did not rely on the Petition demonstrating that Myers taught the generating the second supply voltage limitation, but found instead that Chu, Choi 2010, and Hanington combined with Myers teaches an amplifier that would selectively choose either the boosted voltage in Choi 2010 or the battery supply voltage in Chu and generate the second supply voltage based on either of those voltages. Dec. 18–19; Pet. 73–74; Ex. 1303 ¶ 135.

Finally, we are not persuaded that the Board’s determination with respect to the obviousness of claim 11 deprived Patent Owner of sufficient notice and an opportunity to address the theory. Req. Reh’g 4–5 (citing *Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1080 (Fed. Cir. 2015)). As discussed above, the Petition addressed the claim 11 using the selective boost construction applied to claim 10. The Petition and supporting testimony presented evidence and argument that claim 11 required a selection function, and that the additional reference, Myers, introduced this feature in conjunction with the voltages disclosed in Chu and Choi 2010. Pet. 73–74; Ex. 1303 ¶ 135. Accordingly, we do not agree with Patent Owner that Petitioner did not provide any argument or analysis directed to the combination with Myers in its Petition in relation to claim 11. Thus, we are persuaded that Patent Owner had sufficient notice of Petitioner’s obviousness position regarding claim 11.

IV. CONCLUSION

Patent Owner has not persuaded us that the Decision was contrary to governing law, or that we misapprehended or overlooked any matter. Accordingly, we see no reason to modify our Final Written Decision.

Outcome of Decision on Rehearing:

Claims	35 U.S.C §	Reference(s)/Basis	Denied	Granted
11	103(a)	Chu, Choi 2010, Hanington, Myers	11	

Final Outcome of Final Written Decision after Rehearing:

Claims	35 U.S.C. §	Reference(s)/Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
10	102(b)	Chu, Choi 2010, Hanington,		10
11	103(a)	Chu, Choi 2010, Hanington, Myers	11	
Overall Outcome			11	10

V. ORDER

Accordingly, it is:

ORDERED that Patent Owner's Request for Rehearing is *denied*.

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