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Paper 9
Entered: September 13, 2022

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.,
Petitioner,

v.

SCRAMOGE TECHNOLOGY LTD.,
Patent Owner.

IPR2022-00529
Patent 10,193,392 B2

Before BRIAN J. MCNAMARA, KRISTINA M. KALAN, and MICHELLE N. WORMMEESTER, *Administrative Patent Judges*.

KALAN, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

Apple Inc. ("Petitioner") filed a Petition (Paper 2, "Pet.") requesting *inter partes* review of claims 1–8 of U.S. Patent No. 10,193,392 B2 (Ex. 1001, "the '392 patent"). Scramoge Technology Ltd. ("Patent Owner") filed a Preliminary Response (Paper 6, "Prelim. Resp."). Pursuant to Board authorization, Petitioner filed a Reply to the Patent Owner Preliminary Response (Paper 7, "Reply") and Patent Owner filed a Sur-Reply to Petitioner's Reply (Paper 8, "Sur-Reply").

To institute *inter partes* review, we must determine that the information presented in the Petition shows "there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition." 35 U.S.C. § 314(a). For the reasons discussed below, after considering the parties' submissions and the evidence of record, we determine that Petitioner has demonstrated a reasonable likelihood of prevailing with respect to at least one claim of the '392 patent, and we institute *inter partes* review of all claims and all grounds asserted in the Petition.[1]

A. Related Proceedings

The parties identify the following district court litigation as related matters: *Scramoge Technology Ltd. v. Apple Inc.*, No. 6-21-cv-01071-ADA (W.D. Tex.) ("the parallel District Court litigation"); *Scramoge Technology Ltd. v. Belkin Intl., Inc.*, No. 2-21-cv-08035-DOC-ADS (C.D. Cal.); *Scramoge Technology Ltd. v. Anker Innovations Ltd.*, No. 5-21-cv-01712-

[1] *Guidance on the Impact of SAS on AIA Trial Proceedings* (Apr. 26, 2018), https://www.uspto.gov/patents-application-process/patent-trial-and-appeal-board/trials/guidance-impact-sas-aia-trial; *see also SAS Inst., Inc. v. Iancu*, 138 S. Ct. 1348, 1359–60 (2018).

DOC-ADS (C.D. Cal.); *Scramoge Technology Ltd. v. Morphie Inc.*, No. 2-21-cv-08004 (C.D. Cal.); *Scramoge Technology Ltd. v. Morphie Inc.*, No. 8-21-cv-01673-DOC-ADS (C.D. Cal.); *Scramoge Technology Ltd. v. Samsung Electronics Co., Ltd.*, No. 6-21-cv-00902-ADA (W.D. Tex.); and *Scramoge Technology Ltd. v. Google LLC*, No. 6-21-cv-01138-ADA (W.D. Tex.). Pet. 116; Paper 3, 3–4 (Patent Owner's Mandatory Notices).

B. Real Parties-in-Interest

Petitioner identifies Apple Inc. as the real party-in-interest. Pet. 116. Patent Owner identifies Scramoge Technology Ltd. as the real party-in-interest. Paper 3, 2.

C. The '392 Patent

The '392 patent is titled "Wireless Power Transfer Device and Wireless Power Transfer System" and is directed to "wireless power transfer technology." Ex. 1001, codes (54), (57), 1:19–20. A wireless power transfer system disclosed in the '392 patent includes "a receiving part for receiving power from a transmitting part, wherein the transmitting part comprises: a power conversion part comprising a full bridge inverter" and "a control part for controlling the power conversion part using a pulse width modulation (PWM) control signal." *Id.*, code (57). The disclosed wireless power transfer device can minimize current wasted or consumed, enhance a wireless power transfer efficiency, improve a harmonic distortion ratio, and provide a duty ratio that is capable of minimizing the harmonic components. *Id.* at 2:38–62.

Figure 8 of the '392 patent is reproduced below.

FIG. 8

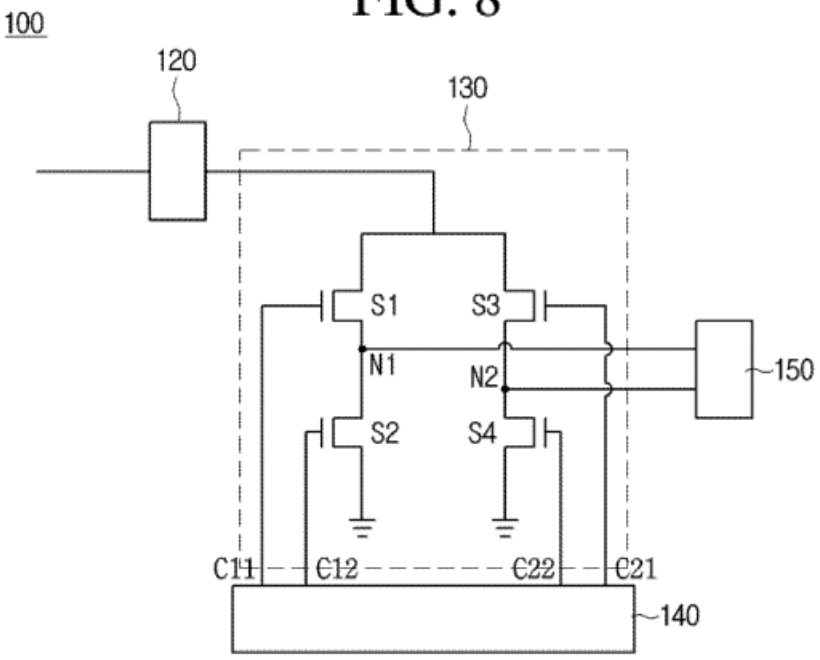

Figure 8 of the '392 patent illustrates a connection relationship and an operation method of power conversion part 130. *Id.* at 12:9–13. As shown in Figure 8, power conversion part 130 converts power provided from converter 120 into an AC power based on an AC power control signal provided from control part 140. *Id.* at 12:14–17. Power conversion part 130 includes first to fourth switching elements S1, S2, S3 and S4, which each conduct when a first to a fourth AC power control signals C11, C12, C21 and C22 provided from the control part 140 are in a high level, and are open when in a low level. *Id.* at 12:19–24. First switching element S1 is connected between a first node N1 and converter 120, and controlled by a first AC power control signal C11 of control part 140. *Id.* at 12:25–27. Second switching element S2 is connected between the first node N1 and a ground and is controlled by a second AC power control signal C12 of control part 140. *Id.* at 12:28–30. Third switching element S3 is connected between the second node N2 and converter 120, and is controlled by a third

AC power control signal C21 of control part 140. *Id.* at 12:31–34. Fourth switching element S4 is connected between the second node N2 and ground, and is controlled by a fourth AC power control signal C22 of control part 140. *Id.* at 12:34–37.

Figure 12 of the '392 patent is reproduced below.

FIG. 12

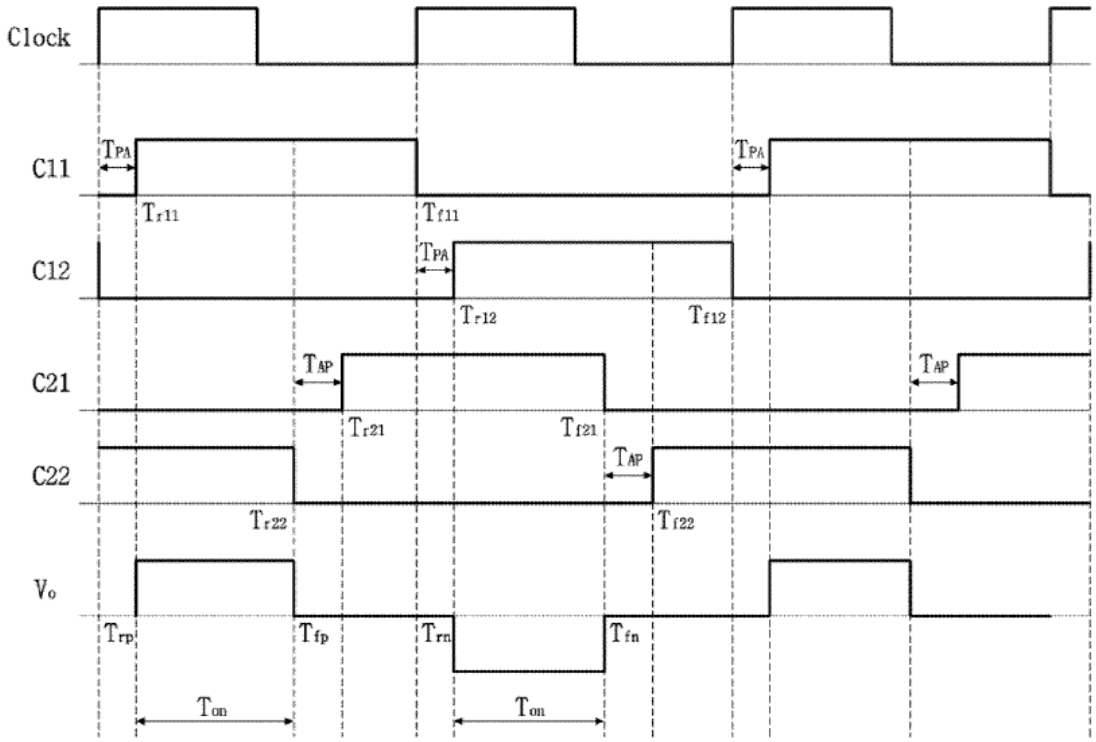

Figure 12 of the '392 patent illustrates waveform diagrams to control a duty ratio of an AC voltage by controlling a blank interval. *Id.* at 5:29–31. In particular, Figure 12 illustrates waveform diagrams of the first to fourth AC power control signals that are PWM signals to generate an AC power having an AC voltage of 50% duty ratio. *Id.* at 13:53–56. As shown in Figure 12, a duty ratio of the first to fourth AC power control signals C11, C12, C21 and C22 that are PWM signals provided from the control part 140 may be changed. *Id.* at 13:31–49. For example, rising times Tr11, Tr12, Tr21, and

Tr22, and falling times Tf11, Tf12, Tf21, and Tf22 of high levels of the first to fourth AC power control signals C11, C12, C21 and C22 that are PWM signals provided from control part 140 may be changed. *Id.* In response to the first to fourth AC power control signals C11, C12, C21 and C22 that are changed, conduction times of the first to fourth switching elements S1, S2, S3 and S4 are changed, and resultantly, a duty ratio Ton of the AC voltage Vo of the AC power supplied to the transmitting antenna system 102 may be changed. *Id.*; *see also id.* at 14:65–15:8 (explaining that a "high level overlapping interval of the first and fourth AC power control signals C11 and C22 is a power transfer interval, which may be defined as a duty ratio (Ton)," such that the "duty ratio (Ton) is an interval where a power may be transferred for a cycle, the maximum being set 50%"; in addition, "an overlapped high level interval of the second and third AC power control signals C12 and C21 is a power transfer available interval, which may be defined as a duty ratio (Ton)"). This enables receiving part 200 to receive a constant power by differing a duty ratio Ton of the AC voltage Vo of the AC power depending on a status of the receiving part 200, for example, a charging status and/or a receiving status. *Id.* at 13:31–49.

D. Illustrative Claim

Claim 1, the only independent claim in the '392 patent, is reproduced below.

> 1. [1.0] A transmitter for generating a wireless power transmitted to a receiver, the transmitter comprising:
>
> [1.1] a control part for generating first to fourth AC power control signals; and
>
> [1.2] a power conversion part for generating an AC power including a positive polarity output voltage and a negative polarity output voltage in response to the first to fourth AC power

> control signals, [1.3.0] wherein the power conversion part includes:
>
> [1.3.1] a first switching element connected between a first node and a second node and controlled in response to the first AC power control signal;
>
> [1.3.2] a second switching element connected between the second node and a ground and controlled in response to the second AC power control signal;
>
> [1.3.3] a third switching element connected between the first node and a third node and controlled in response to the third AC power control signal; and
>
> [1.3.4] a fourth switching element connected between the third node and the ground and controlled in response to the fourth AC power control signal,
>
> [1.7] wherein when the first and fourth switching elements are turned on in response to the first and fourth AC power control signals, the positive polarity output voltage is generated, and [1.8] when the second and third switching elements are turned on in response to the second and third AC power control signals, the negative polarity output voltage is generated,
>
> [1.9] wherein a duty ratio of the positive polarity output voltage is determined by a falling time of the fourth AC power control signal, and
>
> [1.10] wherein a duty ratio of the negative polarity output voltage is determined by a falling time of the third AC power control signal.

Ex. 1001, 20:9–42 (bracketed designations added by Petitioner (*see* Pet. 28–53)).

E. Asserted Grounds of Unpatentability

Petitioner asserts the following grounds of unpatentability.

Claims Challenged	Reference(s)	Basis[2]
1, 6	Hui[3] (Embodiment of Figs. 1a and 5b)	§ 103
2–4	Hui (Embodiment of Figs. 1a and 5b), Taylor[4]	§ 103
1, 5, 7, 8	Hui (Embodiment of Figs. 1b and 2a)	§ 103

In support of its unpatentability arguments, Petitioner relies on the declaration of Joshua Phinney, Ph.D. Ex. 1003.

II. ANALYSIS

A. Claim Construction

We apply the claim construction standard articulated in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005). 37 C.F.R. § 42.100(b) (2021). Under *Phillips*, claim terms are afforded "their ordinary and customary meaning." *Phillips*, 415 F.3d at 1312. The "ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention." *Id.* at 1313. Only terms that are in controversy need to be construed, and then only to the extent necessary to resolve the controversy. *Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019) ("The Board is required to construe 'only those terms . . . that are in controversy, and only to the extent necessary to resolve the controversy.'" (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

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[2] The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) ("AIA"), amended 35 U.S.C. § 103. Because the '392 patent has an effective filing date after the effective date of the applicable AIA amendments, we refer to the AIA version of § 103.
[3] US 2011/0199045 A1, published August 18, 2011 (Ex. 1005).
[4] US 10,250,083 B2, issued April 2, 2019 (Ex. 1011).

Petitioner states that "for the purposes of this proceeding, the terms of the Challenged Claims should be given their plain and ordinary meaning, and no terms require specific construction." Pet. 16–17. Patent Owner does not dispute Petitioner's statement regarding claim construction. *See generally* Prelim. Resp. We determine we need not explicitly construe any claim terms at this stage of the proceeding. *See Realtime Data*, 912 F.3d at 1375.

B. Level of Ordinary Skill in the Art

Petitioner asserts:

> A Person of Ordinary Skill in The Art ("POSITA") in January of 2014 would have had a working knowledge of the wireless charging art that is pertinent to the '392 patent. That person would have a bachelor's degree in electrical engineering, or equivalent training, and approximately two years of experience working in the field of electric circuits and wireless charging. Lack of work experience can be remedied by additional education, and vice versa.

Pet. 15–16 (citing Ex. 1003 ¶¶ 18–20). Patent Owner does not dispute Petitioner's definition of level of ordinary skill. *See generally* Prelim. Resp. Accordingly, for the purposes of this Decision, we adopt Petitioner's proposal regarding the level of one of ordinary skill in the art. The level of ordinary skill in the art is also reflected by the prior art of record. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001).

C. Discretion under 35 U.S.C. § 314(a)

Patent Owner argues the Board should exercise its discretion under 35 U.S.C. § 314(a) and deny institution in light of the parallel District Court litigation involving the '392 patent. Prelim. Resp. 27–36; Sur-Reply 1–5. Petitioner argues the opposite. Pet. 17–20; Reply 1–5.

In assessing whether to exercise such discretion, the Board weighs six non-exclusive factors, known as the *Fintiv* factors. *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 at 6 (PTAB Mar. 20, 2020) (precedential) ("*Fintiv*"). Recognizing that "there is some overlap among these factors" and that "[s]ome facts may be relevant to more than one factor," the Board "takes a holistic view of whether efficiency and integrity of the system are best served by denying or instituting review." *Id.* On June 21, 2022, the Director of the USPTO issued several clarifications concerning the application of the *Fintiv* factors. *See Interim Procedure For Discretionary Denials In AIA Post-Grant Proceedings With Parallel District Court Litigation,* issued June 21, 2022 ("Guidance Memo").[5] The Guidance Memo clarifies "the PTAB's current application of *Fintiv* to discretionary denial where there is parallel litigation." *Id.* at 2.

We have considered Patent Owner's arguments in light of the *Fintiv* factors, together with Petitioner's opposition, and we decline to exercise our discretion to deny the Petition as explained further below.

1. Factor 1: Whether a Stay Exists or Is Likely to Be Granted if a Proceeding Is Instituted

Petitioner argues that "[n]o motion to stay has been filed, so the Board should not infer the outcome of such a motion." Pet. 18; Reply 1. Patent Owner notes that the "district court is aware of Petitioner's pending IPR petition,[] but has not stayed the case. Nor is there any evidence that the case will be stayed"; instead, "the district court has entered a scheduling

[5] Available at https://www.uspto.gov/sites/default/files/documents/interim_proc_discretionary_denials_aia_parallel_district_court_litigation_memo_20220621_.pdf.

order and the case is set for trial on July 31, 2023." Prelim. Resp. 29–30; Sur-Reply 1.

There is no evidence that a stay has been requested in the parallel District Court litigation. We decline to speculate on how the district court would rule on a stay, if one were requested. *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 15 at 12 (PTAB May 13, 2020) (informative) (explaining that factor 1 generally "does not weigh for or against discretionary denial" when neither party has requested a stay). Accordingly, this factor is neutral.

2. *Factor 2: Proximity of the Court's Trial Date to the Board's Projected Statutory Deadline*

The projected statutory deadline for this proceeding would be in September 2023. According to Patent Owner, a jury trial in the parallel District Court litigation is scheduled to begin on July 31, 2023. Prelim. Resp. 31–32; Sur-Reply 1–3. According to Petitioner, "the projected trial date—based on median time-to-trial statistics—is in January of 2024, four months *after* the Board's Final Written Decision due September of 2023." Reply 1–2.

In weighing factor two, we follow the Guidance Memo, which states that a "court's scheduled trial date . . . is not by itself a good indicator of whether the district court trial will occur before the statutory deadline for a final written decision," and directs us to consider "the most recent statistics on median time-to-trial for civil actions in the district court in which the parallel litigation resides." Guidance Memo 8–9, 9 n.12 ("the most recent statistics on median time-to-trial for civil actions" in district court are available at: https://www.uscourts.gov/statistics/table/na/federal-court-management-statistics/2022/03/31-1). Applying the principles articulated in

the Guidance Memo, we find that this factor weighs against exercising discretion to deny institution.[6]

3. Factor 3: Investment in the Parallel Proceeding by the Court and Parties

Patent Owner submits that the following events have occurred in the parallel District Court litigation: the district court has entered a scheduling order that includes all the deadlines leading up to trial; the parties have exchanged preliminary infringement and invalidity contentions; Apple has filed its opening claim construction brief; the Markman hearing is set for August 3, 2022; claim construction briefing will be completed in a matter of days (from the filing date of the Sur-Reply); and discovery will open in a matter of weeks. Prelim. Resp. 32–34; Sur-Reply 3–4.

Petitioner, on the other hand, asserts that the "co-pending litigation is in its very early stages, and the investment in it has been minimal," as "much of the district court's investment relates to ancillary matters untethered to the validity issue itself" and more particularly, "ancillary to the invalidity issues raised in the Petition." Pet. 18–19; Reply 3–4 (citing *Sand Revolution II, LLC v. Continental Intermodal Group – Trucking LLC*, IPR2019-01393, Paper 24 at 10–11 (June 16, 2020) (informative) ("*Sand*")).

We agree with Petitioner. Under these circumstances, we determine that this factor weighs against exercising our discretion to deny institution.

[6] The parties informed us by email that "[o]n Friday, September 9, the district court issued a new scheduling order. The trial date has been moved from July of 2023 to Oct 31, 2023." Ex. 3001. This supports our determination that Factor 2 weighs against exercising discretion to deny institution.

4. Factor 4: Overlap Between Issues Raised in the Petition and in the Parallel Proceeding

Petitioner states: "There is no present overlap of prior art issues due to the early stage of district court litigation" (Pet. 19) and Petitioner "stipulates that it will not pursue in the parallel district court proceeding (WDTX-6-21-cv-01071) the prior art obviousness combinations on which trial is instituted for the claims on which trial is instituted" (Reply 4).

Patent Owner argues that there "is complete overlap between this IPR and the district court proceedings." Prelim. Resp. 34–35. Patent Owner notes that "Petitioner's invalidity contentions in the district court case expressly 'incorporate[] by reference any invalidity contentions, invalidity charts, and invalidity positions in . . . *Apple Inc. v. Scramoge Technology Limited*, PTAB-IPR2022-00529.'" *Id.* at 35 (emphasis omitted). Patent Owner also asserts that Petitioner's "narrow stipulation is insufficient, only concerning the obviousness combinations directed to particular claims for which trial is instituted," and "Petitioner would still be free to raise anticipation arguments or other combinations based on the same references, or even the same combinations directed to different claims." Sur-Reply 4.

Concerns about the degree of overlap may be mitigated where a petitioner agrees not to pursue in the parallel district court litigation the grounds advanced in the petition. *Sand*, Paper 24 at 11–12, 12 n.5. A petitioner stipulating not to pursue "any ground raised or that could have been reasonably raised" weighs strongly in favor of not exercising discretionary denial. *Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019, Paper 12 at 18–19 (PTAB Dec. 1, 2020) (precedential as to § II.A).

Petitioner's stipulation mitigates some of the concerns of inefficiency and the possibility of conflicting decisions with respect to the parallel

District Court litigation, and would somewhat simplify issues at trial. Thus, we determine that the fourth *Fintiv* factor weighs slightly against discretionary denial of institution.

5. *Factor 5: Whether the Petitioner and the Defendant in the Parallel Proceeding Are the Same Party*

Although Petitioner and Patent Owner are the same parties as those in the parallel District Court litigation, in the context of this proceeding we find this factor is neutral.

6. *Factor 6: Other Circumstances that Impact the Board's Exercise of Discretion, Including the Merits*

Petitioner contends that the "merits of Petitioner's arguments are strong" and "the petition plainly shows that the '392 patent claims no more than a well-known full bridge inverter." Pet. 20; Reply 5. Patent Owner contends the Petition is "not compelling" and "unlikely to succeed," and notes that "Patent Owner has identified the Petition's substantial weakness in challenging the sole independent claim of the '392 patent"—which is that "neither the Petition nor Dr. Phinney's declaration explain how Hui teaches the duty ratio limitations." Prelim. Resp. 36 (emphasis omitted); Sur-Reply 5.

As in *Fintiv*, we consider this factor as "part of a balanced assessment of all the relevant circumstances in the case." *Fintiv*, 14. The assessment requires consideration of the "strengths or weaknesses regarding the merits," but this "is not to suggest that a full merits analysis is necessary to evaluate this factor." *Id.* at 15–16. We discuss the merits of this case below, finding Petitioner's evidence and arguments are sufficient to meet our standard for instituting *inter partes* review, and, thus, we determine that this factor is neutral.

7. Balancing the Fintiv Factors

We have considered the circumstances and facts before us in view of the *Fintiv* factors, taking "a holistic view of whether efficiency and integrity of the system are best served by denying or instituting review." *Fintiv*, 6. Having evaluated all of the factors, we determine that the circumstances presented here do not warrant exercising our discretion under § 314(a) to deny institution.

D. Reasonable Likelihood under 35 U.S.C. § 314(a)

"In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable." *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (requiring *inter partes* review petitions to identify "with particularity . . . the evidence that supports the grounds for the challenge to each claim")); *see also* 37 C.F.R. § 42.104(b) (requiring a petition for *inter partes* review to identify how the challenged claim is to be construed and where each element of the claim is found in the prior art patents or printed publications relied upon).

A patent claim is unpatentable under 35 U.S.C. § 103 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 based on 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) when presented, objective evidence of

nonobviousness, i.e., secondary considerations.[7] *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). Petitioner cannot satisfy its burden of proving obviousness by employing "mere conclusory statements," but "must instead articulate specific reasoning, based on evidence of record, to support the legal conclusion of obviousness." *In re Magnum Oil Tools Int'l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016). A reason to combine or modify the prior art may be found explicitly or implicitly in market forces; design incentives; the "'interrelated teachings of multiple patents'"; "'any need or problem known in the field of endeavor at the time of invention and addressed by the patent'"; and the background knowledge, creativity, and common sense of the person of ordinary skill. *Perfect Web Techs., Inc. v. InfoUSA, Inc.*, 587 F.3d 1324, 1329 (Fed. Cir. 2009) (quoting *KSR*, 550 U.S. at 418–21).

E. Ground 1

Petitioner argues that the embodiment illustrated in Figures 1a and 5b of Hui renders obvious claims 1 and 6. Pet. 23–58. Patent Owner disagrees. PO Resp. 24–25.

1. Hui

Hui is a U.S. patent publication titled "Power Transfer Device and Method" and is directed to "power transfer devices for wirelessly charging loads," such as "power transfer devices that wirelessly charge the batteries of portable wireless communication devices." Ex. 1005, codes (54), (57), ¶ 2. Petitioner's annotated version of Hui's Figure 1a is reproduced below.

[7] At this stage, Patent Owner does not present any objective evidence of nonobviousness (i.e., secondary considerations) as to any of the challenged claims.

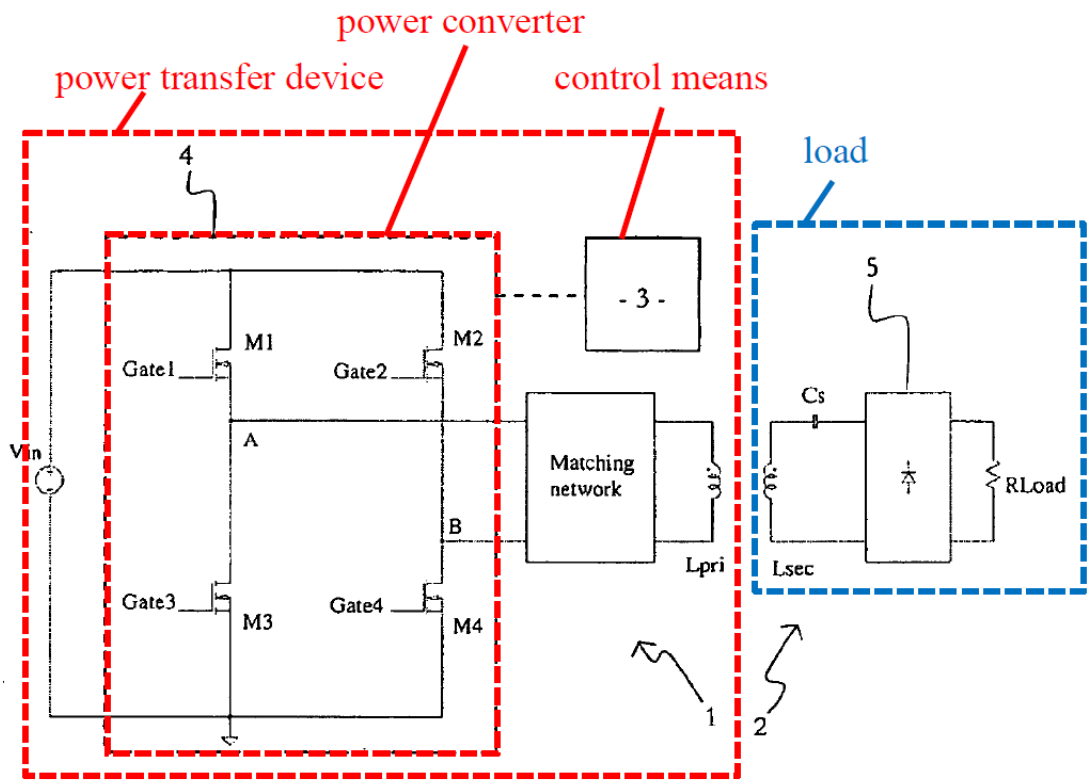
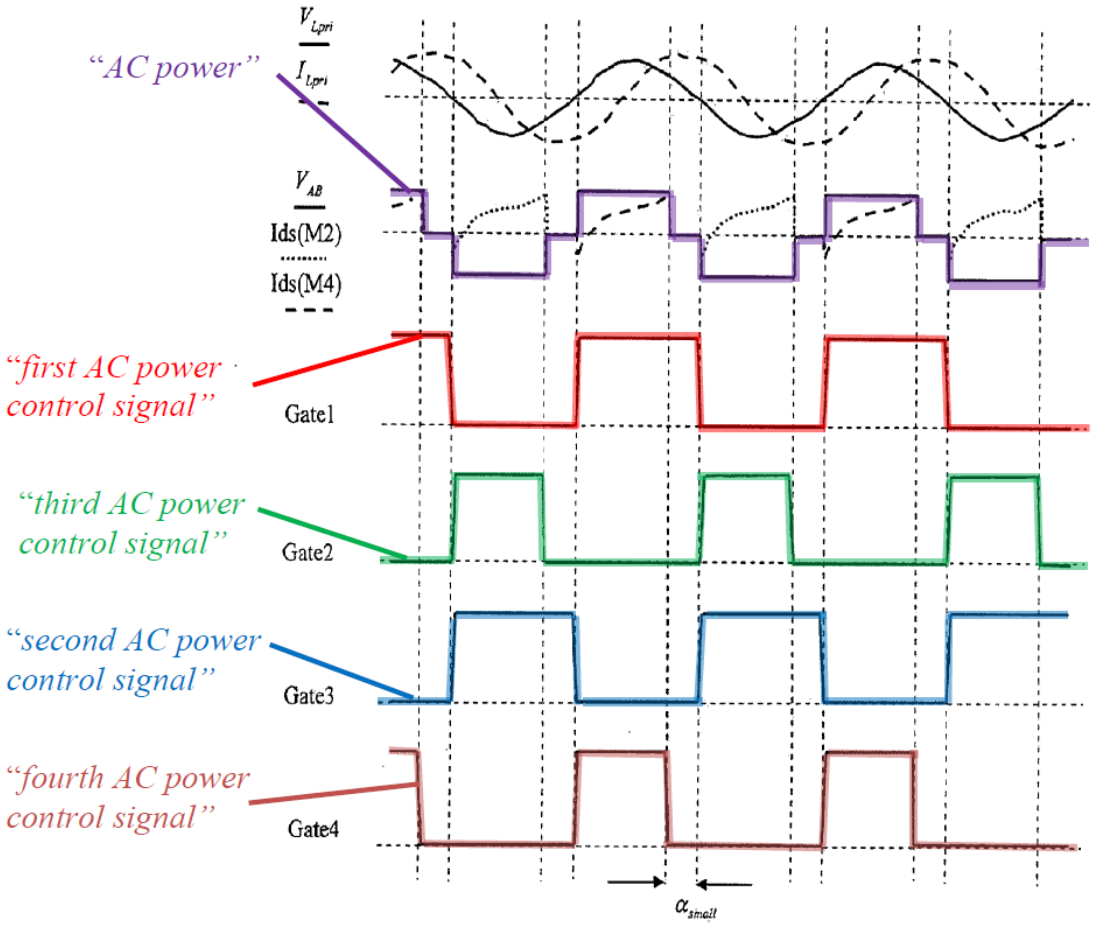


Fig.1a

Pet. 24 (citing Fig. 1a (annotated)). As shown in Figure 1a, "the DC-AC power converter 4 includes two pairs of switches M1, M2, M3, and M4. The off-diagonal switches work as a pair, that is, switches M1 and M4 are one pair and switches M2 and M3 are the other pair." Ex. 1005 ¶ 36.

Petitioner's annotated version of Hui's Figure 5b is reproduced below.



Pet. 27 (citing Fig. 5b (annotated)). Figure 5b is a diagram showing the waveforms of Hui's Figure 5a inverter "operated under phase-shift control with a small phase-shift angle." Ex. 1005 ¶ 26.

2. Petitioner's Arguments

Petitioner asserts that every element of claim 1 is taught or suggested by the embodiment illustrated in Figures 1a and 5b of Hui, as follows:

[1.0] *A transmitter for generating a wireless power transmitted to a receiver, the transmitter comprising* (Pet. 28–29 (relying on Ex. 1003 ¶¶ 47–49; Ex. 1005 ¶¶ 32, 33, 49, Figs. 1a, 5b)),[8]

[8] We express no opinion on whether the preamble is limiting.

[1.1] *a control part for generating first to fourth AC power control signals;* in the form of phase shift control means 3; in that "Hui's power transfer device includes a phase shift control means that produces gating signals for controlling transistors of the power converter" and "the waveforms in Fig. 5b illustrate the signals applied to the gates of each of the four transistors illustrated in Fig. 1a" (Pet. 29–32 (relying on Ex. 1003 ¶¶ 50–54; Ex. 1005 ¶¶ 26, 33, 36, Figs. 1a, 5b)), *and*

[1.2] *a power conversion part for generating an AC power including a positive polarity output voltage and a negative polarity output voltage in response to the first to fourth AC power control signals* (Pet. 32–36 (relying on Ex. 1003 ¶¶ 55–59; Ex. 1005 ¶ 33, Figs. 1a, 5b)),

[1.3.0] *wherein the power conversion part includes:* (Pet. 36 (relying on power converter 4 (Ex. 1003 ¶ 60; Ex. 1005 ¶ 33))),

[1.3.1] *a first switching element connected between a first node and a second node and controlled in response to the first AC power control signal* in the form of transistor M1 and a control signal applied to Gate 1 (Pet. 36–38 (relying on Ex. 1003 ¶¶ 61–63; Ex. 1005, Figs. 1a, 5b)),

[1.3.2] *a second switching element connected between the second node and a ground and controlled in response to the second AC power control signal* in the form of transistor M3 and a control signal applied to Gate 3 (Pet. 38–41 (relying on Ex. 1003 ¶¶ 64–66; Ex. 1005, Figs. 1a, 5b)),

[1.3.3] *a third switching element connected between the first node and a third node and controlled in response to the third AC power control signal* in the form of transistor M2 and a control signal applied to Gate 2 (Pet. 41–43 (relying on Ex. 1003 ¶¶ 67–69; Ex. 1005, Figs. 1a, 5b)), *and*

[1.3.4] *a fourth switching element connected between the third node and the ground and controlled in response to the fourth AC power control*

signal in the form of transistor M4 and a control signal applied to Gate 4 (Pet. 43–46 (relying on Ex. 1003 ¶¶ 70–73; Ex. 1005, Figs. 1a, 5b)),

[1.7] *wherein when the first and fourth switching elements are turned on in response to the first and fourth AC power control signals, the positive polarity output voltage is generated,* i.e., at Time A both the first and fourth gate signal are high, turning on the corresponding transistors and causing V_{AB} to change to a positive polarity (Pet. 46–48 (relying on Ex. 1003 ¶¶ 74–75; Ex. 1005, Fig. 5b)), *and*

[1.8] *when the second and third switching elements are turned on in response to the second and third AC power control signals, the negative polarity output voltage is generated* i.e., at Time B both the second and third gate signals are turned to high, turning on the corresponding transistors and causing V_{AB} to change to a negative polarity (Pet. 48–50 (relying on Ex. 1003 ¶¶ 76–77; Ex. 1005, Figs. 1a, 5b)),

[1.9] *wherein a duty ratio of the positive polarity output voltage is determined by a falling time of the fourth AC power control signal, and* (Pet. 50–53 (relying on Ex. 1003 ¶¶ 78–82; Ex. 1005, Fig. 5b)), and

[1.10] *wherein a duty ratio of the negative polarity output voltage is determined by a falling time of the third AC power control signal.* (Pet. 53–55 (relying on Ex. 1003 ¶¶ 83–85; Ex. 1005, Fig. 5b)).

As to limitations [1.9] and [1.10], Petitioner argues that "a POSITA would have interpreted the term 'duty ratio' in the '392 patent to have the commonly known meaning—the ON time of a period versus the total time of the period." *Id.* at 50 (citing Ex. 1003 ¶ 78). Petitioner argues that, for limitation [1.9], "the falling time of the gating signal for Gate 4 [of Hui] corresponds to the end of the output voltage being in positive polarity and thus the duty ratio of the positive polarity portion of the signal is determined

by that falling edge." *Id.* at 52. Similarly, for limitation [1.10], Petitioner argues that "because the falling time of the gating signal for Gate 2 ("*third AC power control signal*") corresponds to the end of the output voltage being in negative polarity, the duty ratio of the positive polarity portion of the signal is determined by that falling edge." *Id.* at 55. Petitioner presents similar arguments for claim 6. *Id.* at 55–58.

Regarding its obviousness challenge generally, Petitioner argues: "Different embodiments of Hui teach different aspects of full-bridge inverter control signals," and Ground 1 relies "on Hui's phase-shift control embodiment as illustrated in Figs. 1a and 5b and described in accompanying text." *Id.* at 21–22. More particularly, Petitioner argues that "Hui describes various control schemes to control its four transistors, including a phase-control scheme," and an "example of the control signals for the phase control scheme and the corresponding output Vab" is shown in Figure 5b. *Id.* at 26.

3. Patent Owner's Arguments

Patent Owner argues that Petitioner's Ground 1 challenge fails because Hui does not disclose or render obvious limitations [1.9] and [1.10]. Prelim. Resp. 24–25. Patent Owner also argues that Petitioner fails to propose any combination of references or modifications to Hui in order to satisfy the challenged claims' limitations, and fails to provide any motivation to combine or reasonable expectation of success for any obviousness theory for these limitations. *Id.* at 25.

4. Analysis

We have reviewed the parties' arguments and evidence, and we determine that, for purposes of institution, Petitioner has shown sufficiently that the embodiment described in Figures 1a and 5b of Hui teaches or

suggest all the elements of claim 1 and 6. More particularly, although Patent Owner disputes that Petitioner demonstrates that Hui discloses the claim 1 "duty ratio" limitations [1.09] and [1.10] (Prelim. Resp. 24–25), Patent Owner does not address Petitioner's specific contentions that Hui's correspondence of the falling times of the fourth and second gating signals with the end of the positive and negative polarity, respectively, determine the respective duty ratios. Petitioner provides sufficient evidence and argument, supported by declarant testimony, that the embodiment shown in Figures 1a and 5b discloses the duty ratios of limitations [1.09] and [1.10]. Pet. 52–55 (citing Ex. 1003 ¶¶ 78–85); *see also Realtime Data*, 912 F.3d at 1373 (although use of a single reference might have been more properly raised under § 102, "it is well settled that 'a disclosure that anticipates under §102 also renders the claim invalid under § 103, for "anticipation is the epitome of obviousness.'"). On this record, we are persuaded that Petitioner has made an adequate showing as to those limitations and the other limitations challenged under this ground.

In summary, Petitioner provides a reasonable likelihood of prevailing on its contentions that claim 1 and claim 6 of the '392 patent would have been obvious over Hui's Figure 1a and 5b embodiment.

F. Ground 2

Petitioner argues the combination of the embodiment illustrated in Figures 1a and 5b of Hui and Taylor renders obvious claims 2–4. Pet. 22, 59–75. Patent Owner disagrees. Prelim. Resp. 25–26.

1. Taylor

Taylor is a U.S. patent titled "System and Method for Communication in Wireless Power Supply Systems" and is directed to "wireless power supplies adapted to supply power and communicate with one or more remote

devices." Ex. 1011, codes (54), (57). Taylor discloses use of a "communication system that allows the remote device to communicate with the power supply." *Id.* at 1:46–49. Taylor describes one "efficient and effective method for providing communication in a wireless power supply that transfers power using an inductive field," namely, "to overlay the communications on the inductive field." *Id.* at 2:4–8. Backscatter modulation is one way to transmit data through the inductive field. *Id.* at 2:8–14.

2. Analysis

Petitioner argues that every element of claims 2–4 is met by the combination of Hui's Figure 1a and 5b embodiment and Taylor. Pet. 59–75. Petitioner argues that it would have been "obvious, beneficial, and predictable to utilize commonly known and standard techniques to optimize power transfer efficiency (such as the examples in Taylor) and achieve Hui's stated goal of maximizing power transfer efficiency." *Id.* at 61 (citing Ex. 1003 ¶ 96). Although "Hui omits the implementation details of maximizing energy transfer," Petitioner argues that "a POSITA would have naturally looked to known and standardized techniques for doing so," such as the techniques in Taylor. *Id.* at 61 (citing Ex. 1005 ¶ 82; Ex. 1003 ¶ 97). "A POSITA would have been motivated to apply [the] conventional feedback technique" disclosed in Taylor "to Hui's system to achieve the same benefits," namely, "having a communication channel from the remote device to the wireless power supply," recognizing this feedback technique "as being part of the Qi standard." *Id.* at 62–63 (citing Ex. 1003 ¶¶ 99–100). According to Petitioner, the combination would have been "straightforward and predictable" with a "reasonable expectation of success." *Id.* at 63–64 (citing Ex. 1003 ¶¶ 101–102).

Patent Owner argues that the "Petition does not cite Taylor for any of the independent claim limitations" and, thus, "fails for the same reasons discussed above for the independent claims." Prelim. Resp. 25–26.

On this record, Petitioner has put forth sufficient argument and evidence that the limitations of claims 2–4 are met by the combination of Hui's Figure 1a and 5b embodiment with Taylor, and that one of ordinary skill in the art would have been motivated to make the combination with a reasonable expectation of success. Pet. 59–75 (citing Ex. 1003 ¶¶ 91–118). Patent Owner does not challenge Petitioner's analysis for these claims. *See generally* Prelim. Resp. In view of the foregoing, we determine that Petitioner has demonstrated a reasonable likelihood of showing that claims 2–4 would have been obvious over the combination of Hui's Figures 1a and 5b embodiment with Taylor.

G. Ground 3

Petitioner argues the embodiment illustrated in Figures 1b and 2a of Hui renders obvious claims 1, 5, 7, and 8. Pet. 22, 75–115. Patent Owner opposes. Prelim. Resp. 26–27.

1. Hui (Figures 1b and 2a)

Petitioner relies on Figures 1b and 2a of Hui to support its Ground 3 obviousness arguments. Hui's Figure 1b is reproduced below.

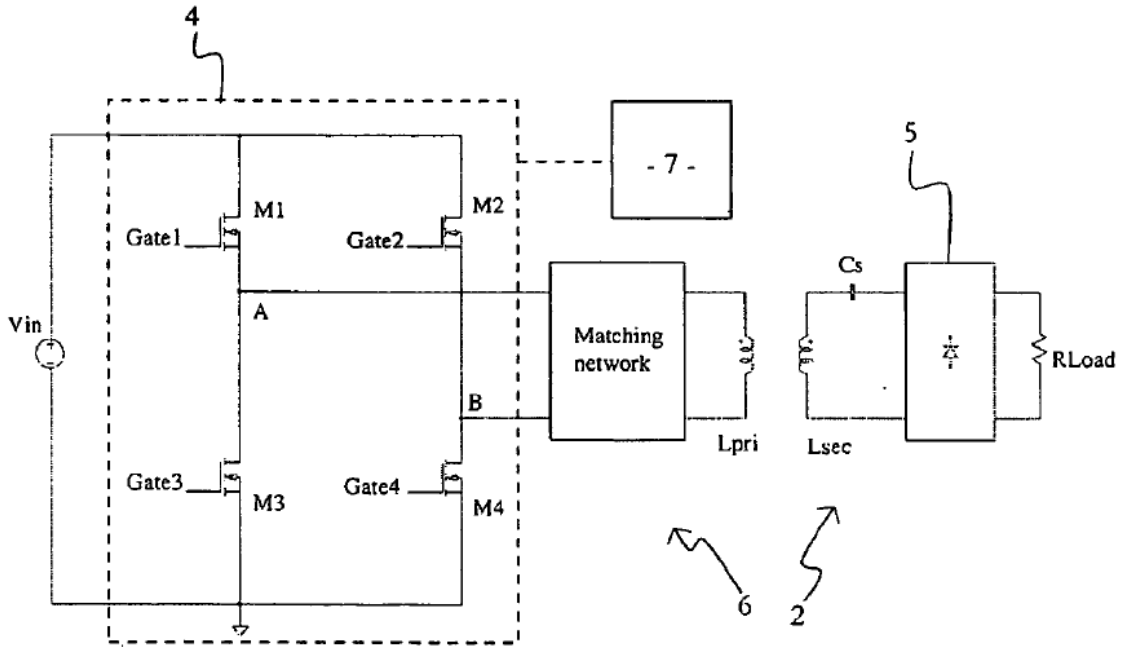
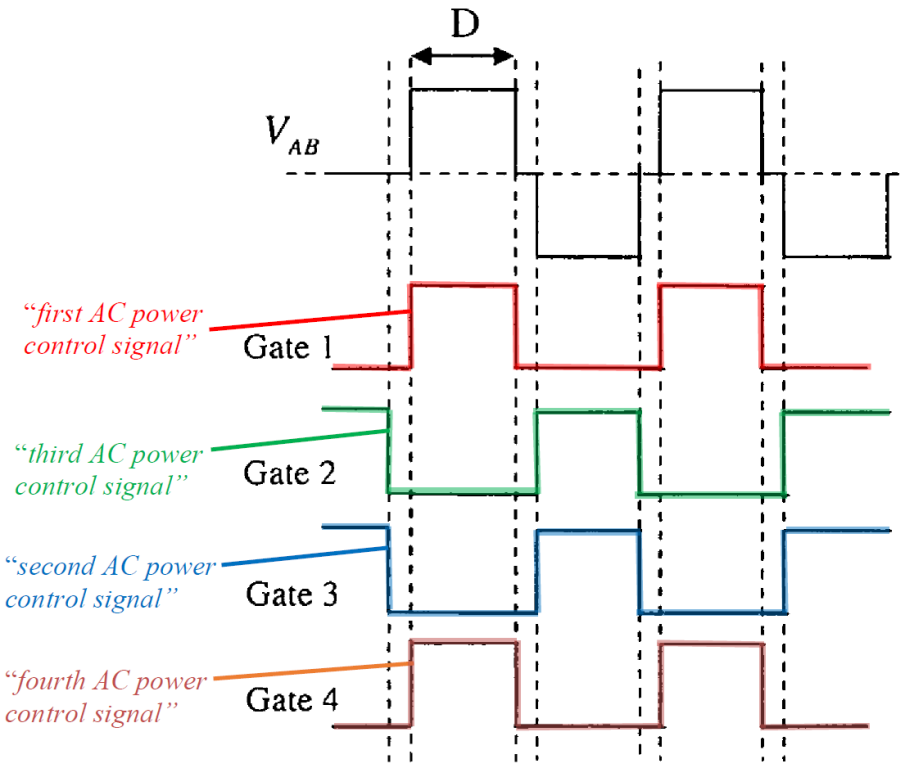


Fig.1b

Hui's Figure 1b is a schematic diagram of circuits of another wireless power transfer system. Ex. 1005 ¶ 15. Petitioner's annotated version of Hui's Figure 2a is reproduced below.



Pet. 76 (citing Ex. 1005, Fig. 2a (annotated)). Figure 2a is a timing diagram showing the typical waveforms of an inverter operated under an embodiment of duty-cycle control. Ex. 1005 ¶ 16.

2. Petitioner's Arguments

Petitioner argues that every element of claims 1, 5, 7, and 8 is taught or suggested by the embodiment illustrated in Figures 1b and 2a of Hui. Pet. 75–115. Figure 1b differs from Figure 1a discussed above in the control element: unlike "phase-shift control means 3" in Figure 1a, "control means 7 can implement one of" methods (i), (ii), and (iv), which are identified by Hui as (i) duty-cycle control, (ii) frequency control, and (iv) voltage control. Ex. 1005 ¶¶ 33, 36, 44–49.

Petitioner asserts that every element of claim 1 is taught or suggested by the embodiment illustrated in Figures 1b and 2a of Hui, as follows:

[1.0] *A transmitter for generating a wireless power transmitted to a receiver, the transmitter comprising* (Pet. 77–78 (relying on Ex. 1003 ¶¶ 121–123; Ex. 1005 ¶ 49, Fig. 1b)),

[1.1] *a control part for generating first to fourth AC power control signals* in the form of control means 7 shown in Figure 1b that controls the duty cycle D of switches M1, M2, M3, and M4 using gate signals shown in Figure 2a (Pet. 78–81 (relying on Ex. 1003 ¶¶ 124–128; Ex. 1005 ¶¶ 49, 51, Figs. 1b, 2a, 6)), *and*

[1.2] *a power conversion part for generating an AC power including a positive polarity output voltage and a negative polarity output voltage in response to the first to fourth AC power control signals* (Pet. 81–85 (relying on Ex. 1003 ¶¶ 129–133; Ex. 1005 ¶ 49, Figs. 1b, 2a, 6)),

[1.3.0] *wherein the power conversion part includes:* (Pet. 85 (relying on Ex. 1003 ¶ 134)),

[1.3.1] *a first switching element connected between a first node and a second node and controlled in response to the first AC power control signal* (Pet. 85–88 (relying on Ex. 1003 ¶¶ 135–137; Ex. 1005, Figs. 1b, 2a)),

[1.3.2] *a second switching element connected between the second node and a ground and controlled in response to the second AC power control signal* (Pet. 88–90 (relying on Ex. 1003 ¶¶ 138–140; Ex. 1005, Figs. 1b, 2a)),

[1.3.3] *a third switching element connected between the first node and a third node and controlled in response to the third AC power control signal; and* (Pet. 90–92 (relying on Ex. 1003 ¶¶ 141–143; Ex. 1005, Figs. 1b, 2a)),

[1.3.4] *a fourth switching element connected between the third node and the ground and controlled in response to the fourth AC power control*

signal (Pet. 92–95 (relying on Ex. 1003 ¶¶ 144–147; Ex. 1005, Figs. 1b, 2a)),

[1.7] *wherein when the first and fourth switching elements are turned on in response to the first and fourth AC power control signals, the positive polarity output voltage is generated, and* (Pet. 95–97 (relying on Ex. 1003 ¶¶ 148–149; Ex. 1005, Figs. 1b, 2a)),

[1.8] *when the second and third switching elements are turned on in response to the second and third AC power control signals, the negative polarity output voltage is generated* (Pet. 97–99 (relying on Ex. 1003 ¶¶ 150–151; Ex. 1005, Figs. 1b, 2a)),

[1.9] *wherein a duty ratio of the positive polarity output voltage is determined by a falling time of the fourth AC power control signal, and* (Pet. 99–102 (relying on Ex. 1003 ¶¶ 152–155; Ex. 1005, Figs. 1b, 2a)), and

[1.10] *wherein a duty ratio of the negative polarity output voltage is determined by a falling time of the third AC power control signal.* (Pet. 102–105 (relying on Ex. 1003 ¶¶ 156–158; Ex. 1005, Figs. 1b, 2a)).

In particular, regarding limitations [1.9] and [1.10], Petitioner argues that "a POSITA would have interpreted the term 'duty ratio' in the '392 patent to have the commonly known meaning—the ON time of a period versus the total time of the period." *Id.* at 99 (citing Ex. 1003 ¶ 152). Petitioner argues that, for limitation [1.9], "the falling time of the gating signal for Gate 4 [of Hui] corresponds to the end of the output voltage being in positive polarity and thus the duty ratio of the positive polarity portion of the signal is determined by that falling edge." *Id.* at 101. Similarly, for limitation [1.10], Petitioner argues that "the falling time of the gating signal for Gate 2 ('*third AC power control signal*') corresponds to the end of the output voltage being in negative polarity, the duty ratio of the positive

polarity portion of the signal is determined, at least in part, by that falling edge." *Id.* at 104.

Regarding its obviousness challenge generally, Petitioner argues: "Different embodiments of Hui teach different aspects of full-bridge inverter control signals," and Ground 3 relies on a second embodiment of Hui "in which the output power is controlled by adjusting the duty cycle of the switch control signals (rather than the phase angle between control signals)." *Id*. at 21–22, 75. More particularly, Petitioner argues that Hui's control signals in the Figure 1b/2a embodiment, and their relation to the output voltage, render obvious the limitations in claims 1, 7, and 8, because "the falling time of Hui's fourth signal corresponds to when the output voltage drops from positive polarity to zero" and "the falling time of Hui's third control signal corresponds to when the output voltage rises from negative polarity to zero." *Id.* at 76. Petitioner presents additional arguments for claim 5, 7, and 8. *Id*. at 105–115.

3. Patent Owner's Arguments

Patent Owner argues that Petitioner's Ground 3 challenge fails because Hui does not disclose or render obvious limitations [1.9] and [1.10]. Prelim. Resp. 26. Patent Owner also argues that Petitioner fails to propose any combination of references or modifications to Hui in order to satisfy the challenged claims' limitations, and fails to provide any motivation to combine or reasonable expectation of success for any obviousness theory for these limitations. *Id*.

4. Analysis

We have reviewed the parties' arguments and evidence, and we determine that, for purposes of institution, Petitioner has shown sufficiently that the embodiment described in Figures 1b and 2a of Hui teaches or

suggests all the elements of claim 1, 5, 7, and 8. More particularly, although Patent Owner disputes that Petitioner demonstrates that Hui discloses the claim 1 "duty ratio" limitations [1.09] and [1.10] (Prelim. Resp. 26), Patent Owner does not address Petitioner's specific contentions that Hui's correspondence of the falling times of the fourth and second gating signals with the end of the positive and negative polarity, respectively, determine the respective duty ratios. Petitioner provides sufficient evidence and argument, supported by declarant testimony, that the embodiment shown in in Figures 1b and 2a discloses a duty ratios of limitations [1.09] and [1.10]. Pet. 99–105 (citing Ex. 1003 ¶¶ 152–158). On this record, we are persuaded that Petitioner has made an adequate showing as to those limitations and the other limitations challenged under this ground.

In summary, Petitioner provides a reasonable likelihood of prevailing on its contentions that claims 1, 5, 7, and 8 of the '392 patent would have been obvious over Hui's Figure 1b and 2a embodiment.

III. CONCLUSION

For the reasons set forth above, we determine that Petitioner has demonstrated a reasonable likelihood of prevailing with respect to at least one challenged claim of the '392 patent, and we institute *inter partes* review on all challenged claims and on all grounds presented.

At this preliminary stage of the proceeding, we have not made a final determination as to the patentability of any challenged claim or any factual or legal issue underlying the patentability inquiry. Any final determination will be based on the record developed during trial. We place Patent Owner on express notice that any argument not asserted in a timely-filed Response to the Petition, or in another manner permitted during trial, shall be deemed waived, even if that argument was presented in the Preliminary Response.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that *inter partes* review is instituted on each of the grounds asserted in the Petition; and

FURTHER ORDERED that, pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is hereby given of the institution of a trial, which shall commence on the entry date of this decision.

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