

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ANKER INNOVATIONS LTD.,
Petitioner,

v.

POWERMAT TECHNOLOGIES LTD.,
Patent Owner.

IPR2024-00995
Patent 9,083,204 B2

Before KEN B. BARRETT, PATRICK R. SCANLON, and
JOHN R. KENNY, *Administrative Patent Judges*.

BARRETT, *Administrative Patent Judge*.

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

I. INTRODUCTION

A. *Background and Summary*

Anker Innovations Ltd. (“Petitioner”)¹ filed a Petition requesting *inter partes* review of U.S. Patent No. 9,083,204 B2 (“the ’204 patent,” Ex. 1001). Paper 2 (“Pet.”). The Petition challenges the patentability of claims 1–6, 8, and 10–13 of the ’204 patent. Powermat Technologies Ltd. (“Patent Owner”)² filed a Preliminary Response to the Petition. Paper 6 (“Prelim. Resp.”).

An *inter partes* review may not be instituted “unless . . . the information presented in the petition . . . shows that 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). Having considered the arguments and evidence presented by Petitioner and Patent Owner, we determine that Petitioner has demonstrated a reasonable likelihood of prevailing on at least one of the challenged claims of the ’204 patent. Accordingly, we institute an *inter partes* review as to all the challenged claims of the ’204 patent on all the grounds of unpatentability set forth in the Petition.

B. *Related Proceedings*

Both parties identify, as matters involving or related to the ’204 patent, *Powermat Technologies Ltd. v. Anker Innovations Ltd.*, 5:23-cv-00052 (E.D. Tex.) and IPR2024-00994 (U.S. Patent No. 9,048,696 B2,

¹ Petitioner identifies Anker Innovations Ltd. as the real party in interest. Pet. 87.

² Patent Owner identifies Powermat Technologies Ltd. as the real party in interest. Paper 4, 1.

which also is involved in the related district court litigation). Pet. 87; Paper 4, 1. Petitioner also identifies, as a related matter, IPR2024-00996 (U.S. Patent No. 8,626,461 B2, which also is involved in the related district court litigation). *See* Pet. 88.

C. The '204 Patent

The '204 patent pertains to inductive electrical power transfer. Ex. 1001, 1:19–20. “Inductive power coupling, as known in the art, allows energy to be transferred from a power supply to an electric load without connecting wires.” *Id.* at 1:27–29. “A power supply is wired to a primary coil and an oscillating electric potential is applied across the primary coil, thereby inducing an oscillating magnetic field,” which induces an oscillating current in a secondary coil. *Id.* at 1:29–35. “When electrical energy is transferred from a primary coil to a secondary coil the coil pair are said to be inductively coupled.” *Id.* at 1:37–39.

Figure 6b is reproduced below.

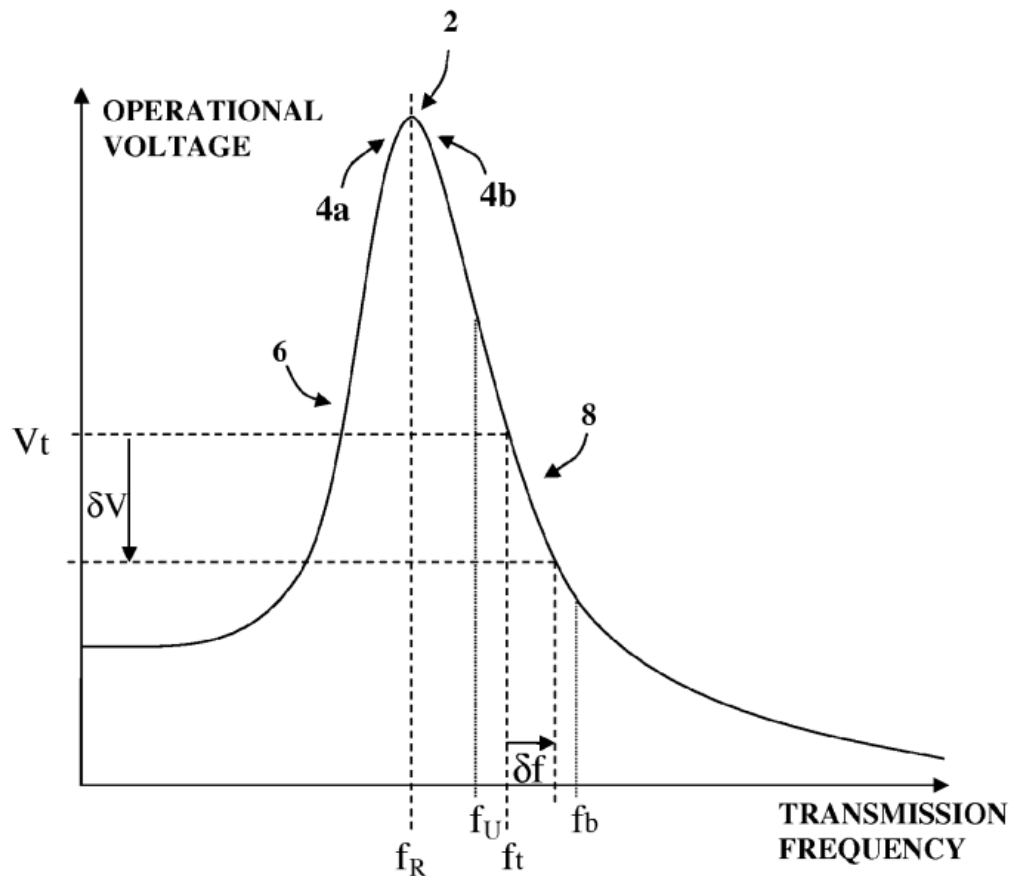


Fig. 6b

Figure 6b is “a graph showing how the amplitude of the operational voltage varies according to the transmission frequency.” *Id.* at 21:1–3. The induced voltage can be increased or decreased by a corresponding change in transmission frequency. *See id.* at 21:61–63. “For example, an increase in transmission frequency of δf produces a decrease in induced voltage of δV .” *Id.* at 21:63–65. As shown in the figure, the voltage is at its highest when the transmission frequency is equal to the resonant frequency f_R of the system, at resonance peak 2. *Id.* at 21:3–6. According to the ’204 patent, “the slope of the graph is steepest in the regions 4a, 4b to either side of the resonance peak 2,” and “a small variation in frequency results in a large

change in induced voltage.” *Id.* at 21:6–12. “For this reason prior art inductive transfer systems are typically very sensitive to small fluctuations in environmental conditions or variations in alignment between the induction coils.” *Id.* at 21:12–15; *see also id.* at 21:34–36 (“As a result of the changing alignment, the combined inductance of the coil pair changes which in turn changes the resonant frequency of the system.”).

The ’204 patent states,

It is a particular feature of embodiments of the current invention that the driver . . . is configured and operable to transmit a driving voltage which oscillates at a transmission frequency which is substantially different from the resonant frequency of the inductive couple. Preferably the transmission frequency is selected to lie within one of the near-linear regions 6, 8 where the slope of the frequency-amplitude graph is less steep.

Id. at 21:16–23; *see also id.* at 21:56–59 (“Referring back to FIG. 6*b*, the frequency of transmission is selected to be in the approximately linear region 8 of the curve between a lower frequency value of f_L , and an upper frequency value of f_U .”).

The Specification further states,

If the inductive power outlet . . . transmits power at the resonant frequency of the system, even a small lateral movement would reduce significantly the amplitude of the induced voltage. In contradistinction, according to embodiments of the present invention, the inductive power outlet . . . transmits power at a frequency in one of the regions 6, 8 to either side of the resonance peak 2 (FIG. 6*b*) where the slope of the resonance graph is much shallower. Consequently, the system has a much larger tolerance of variations such as lateral movement.

Id. at 21:37–46.

According to the '204 patent,

Another advantage of non-resonant transmission is that the transmission frequency may be used to regulate power transfer. In known inductive power transfer systems, power is typically regulated by altering the duty cycle of the transmission voltage provided by the driver. Thus, it will be appreciated that when the transmission frequency is not equal to the resonance frequency of the system, the driver . . . may be configured to adjust the transmission frequency in order to regulate the power transfer.

Id. at 21:47–55.

Reproduced below is Figure 6d, which depicts an “example of a power regulation method.” *Id.* at 22:45–46.

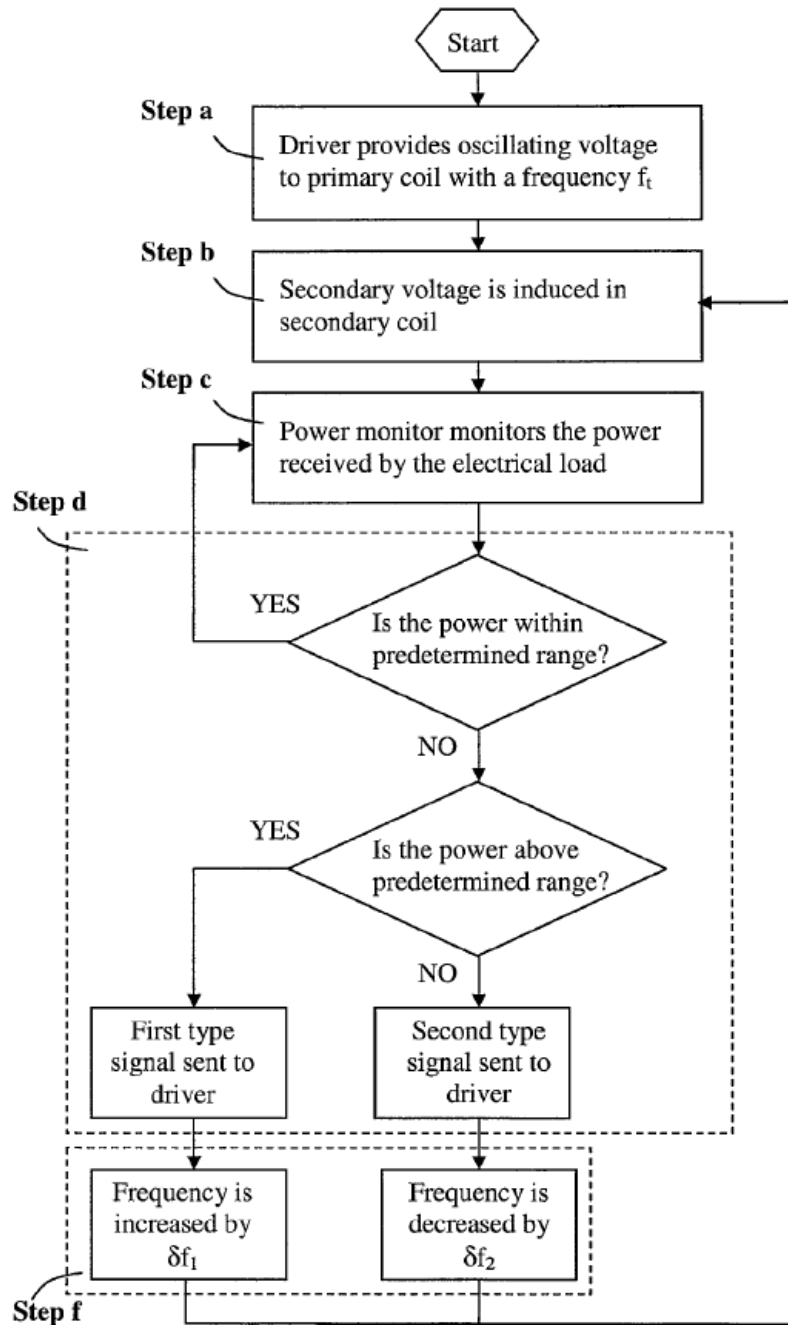


Fig. 6d

Figure 6d “is a flowchart showing a method for regulating power transfer by varying the power transmission frequency in an inductive power transfer system,” with the “method using simple feedback signals.” *Id.* at 8:40–42, 22:45–46.

The method involves the following steps: (a) The driver 6230 provides an oscillating voltage at a transmission frequency f_t which is higher than the resonant frequency f_r of the system; (b) A secondary voltage is induced in the secondary coil 6320; (c) A power monitor in the secondary unit 6300, monitors the power received by the electric load 6340; (d) If the power received by the electric load 6340 lies within a predetermined range then no action is taken. If the power received by the electric load E340 [sic] is below the predetermined range, then a feedback signal of a first type S_a is sent to the driver. If the power received by the electric load 6340 is above the predetermined range, then a feedback signal of a second type S_b is sent to the driver; (e) A feedback signal is received by the driver 6230; (f) If the received feedback signal is of the first type S_a , then the transmission frequency is increased by an incremental value $+\delta f_1$. If the received feedback signal is of the second type S_b , then the transmission frequency is decreased by an incremental value $-\delta f_2$.

Id. at 22:46–64.

The '204 patent further explains:

It is noted that by using the power regulation method described above, when the power received by the load is too high, a series of feedback signals of the first type S_a will be transmitted until the power is reduced into the acceptable range. Likewise when the power received by the load is too low, a series of feedback signals of the second type S_b will be transmitted until the power is increased into the acceptable range. It is noted that the positive incremental value δf_1 may be greater than, less than or equal to the negative incremental value δf_2 .

Id. at 22:65–23:7.

D. Illustrative Claim

Of the challenged claims of the '204 patent, claims 1 and 10 are independent claims. Claim 1, reproduced below with bracketed annotations³ inserted, is illustrative.

1. [1Pre] An inductive power transfer system comprising
[1.1] at least one inductive power outlet comprising at least one primary inductive coil wired to a power supply via a driver; [1.2] said primary inductive coil for forming an inductive couple having a characteristic resonant frequency with at least one secondary inductive coil wired to an electric load, [1.3] said secondary inductive coil associated with an inductive power receiver [1.4] wherein said driver is configured to provide a driving voltage across said primary inductive coil, [1.5] said driving voltage oscillating at a non-resonant transmission frequency substantially different from said characteristic resonant frequency of said inductive couple,
[1.6] wherein said inductive power outlet further comprises a signal detector adapted to detect a first signal and a second signal, and [1.7] said driver is configured to:
provide less power by increasing said non-resonant transmission frequency by an incremental value when said first signal is detected by the detector, and
[1.8] provide more power by decreasing said non-resonant transmission frequency by an incremental value when said second signal is detected by the detector.

Ex. 1001, 28:25–45.

E. Evidence

Petitioner relies on the following references:

Name	Reference	Exhibit No.
Onishi	US 2008/0197804 A1, filed Feb. 15,	1004

³ We utilize Petitioner's annotations for claim 1 but have retained the paragraph formatting from the issued patent.

Name	Reference	Exhibit No.
	2008, published Aug. 21, 2008	
Purdy	US 2007/0236169 A1, filed June 14, 2007, published Oct. 11, 2007	1005
Baarman392	US 2008/0079392 A1, filed Sept. 14, 2007, published April 3, 2008	1006
Tocci	RONALD J. TOCCI ET AL., DIGITAL SYSTEMS: PRINCIPLES AND APPLICATIONS (10th ed. 2007)	1009

Petitioner also relies on the declaration of Dr. Gary L. Woods (Ex. 1003) in support of its arguments, and Patent Owner relies on the declaration of Dr. Patrick Mercier (Ex. 2001) in support of its arguments. The parties also rely on other exhibits as discussed below.

F. Asserted Grounds of Unpatentability

Petitioner asserts that the challenged claims are unpatentable on the following grounds:

Claim(s) Challenged	35 U.S.C. § ⁴	Reference(s)/Basis
1–6, 8, 10–13	102(e)	Onishi
1–6, 8, 10–13	103(a)	Onishi, Purdy
1–6, 8, 10–13	103(a)	Baarman392, Tocci

II. 35 U.S.C. § 325(d)

Patent Owner contends that we should exercise discretion under 35 U.S.C. § 325(d) to deny the Petition, applying the Board’s precedential decision in *Advanced Bionics, LLC v. MED-EL Elektromedizinische Geräte*

⁴ For purposes of this Decision, we assume the challenged claims have an effective filing date prior to March 16, 2013, the effective date of the relevant aspects of the Leahy Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (“AIA”), and we apply the pre-AIA version of 35 U.S.C. § 103.

GmbH, IPR2019-01469, Paper 6 (PTAB Feb. 13, 2020) (precedential) (“*Advanced Bionics*”). Prelim. Resp. 28–37. For the reasons below, we do not exercise discretion to deny institution under § 325(d).

Section 325(d) provides that, in determining whether to institute an *inter partes* review, “the Director may take into account whether, and reject the petition or request because, the same or substantially the same prior art or arguments previously were presented to the Office.” 35 U.S.C. § 325(d). The Board uses a two-part framework in determining whether to exercise its discretion under § 325(d), specifically:

- (1) whether the same or substantially the same art previously was presented to the Office or whether the same or substantially the same arguments previously were presented to the Office; and
- (2) if either condition of [the] first part of the framework is satisfied, whether the petitioner has demonstrated that the Office erred in a manner material to the patentability of challenged claims.

Advanced Bionics, Paper 6 at 8. The art or arguments presented in the Petition are not “substantially the same” as those previously presented to the Office when there are differences between them that are material to the Office’s prior consideration of the art and arguments. *Wolfspeed, Inc. v. Trs. of Purdue Univ.*, IPR2022-00761, Paper 13 at 7–8 (Vidal Mar. 30, 2023).

A. Prosecution History

Independent system claim 1, calls for a “driver [that] is configured to provide a driving voltage . . . [with] said driving voltage oscillating at a non-resonant transmission frequency *substantially different* from said characteristic resonant frequency of said inductive couple.” Ex. 1001, 28:32–36 (emphasis added). Independent method claim 10 recites “providing an oscillating voltage . . . at an initial transmission frequency ft

substantially different from a characteristic resonant frequency f_R of the system.” *Id.* at 29:21–24 (emphasis added). During prosecution, as in this *inter partes* review, a dispositive issue was whether the prior art taught the “substantially different” aspect of that limitation.⁵

Original application claim 1 recited, for the corresponding limitation, “said driving voltage oscillating at a transmission frequency *significantly different* from said characteristic resonant frequency of said inductive couple.” Ex. 1002, 238 (emphasis added).⁶ The Examiner issued a non-final office action that, *inter alia*, rejected the original claims as being indefinite and as obvious over Malpas (WO 2006/031133, Ex. 1007). *Id.* at 117–128.

In response, the applicant amended claim 1 by, *inter alia*, replacing “significantly different” with “higher than,” thereby reciting a transmission frequency “higher than” the resonant frequency. *Id.* at 96. The applicant argued that “it is clear that Malpas describes systems at which the transmission frequency is selected to be as close as possible to the resonant natural frequency of the pick-up,” as opposed to the claimed invention where, according to the applicant, “transmission frequency is deliberately

⁵ Another issue in this *inter partes* review concerns the recited “incremental value,” which is a phrase added to independent claim 1 by amendment during prosecution. *See* Ex. 1002, 96. Patent Owner does not assert that that phrase is implicated by its Section 325(d) arguments.

⁶ Original application claim 10 used the phrase “substantially different,” rather than the “significantly different” of claim 1. Ex. 1002, 239. The amendments and arguments made during prosecution for claim 10 are the same as or similar to those for claim 1. *See, e.g.*, Prelim. Resp. 8 n.4 (Patent Owner asserting that “[a]ny arguments or explanations asserted by the Applicant [regarding claim 1] are equally applicable to claim 10.”).

selected to be higher than the characteristic resonant frequency of the inductive couple.” *Id.* at 104.

In the final rejection, the Examiner did not reiterate the indefiniteness rejection but maintained the Malpas obviousness rejection. *See id.* at 75–86.

An interview between the applicant and the Examiner was held where the “higher than” language was discussed, and it was “[a]greed that the ‘substantially different’ regarding the driving [voltage] per Figure 6B and the specification [0160+] would overcome the art of record.” *Id.* at 69 (first and second alterations added).

In response to the final office action, the applicant filed an amendment replacing “higher than” with “substantially different from.” *Id.* at 56. The applicant argued that “one having ordinary skill in the art would appreciate that the term ‘*substantially different from said characteristic resonant frequency*’ recited in claims 1 and 17 [sic⁷], in view of at least Fig. 6b, should be interpreted to mean that the frequency of the driving voltage is selected so as to lie within one of the near-linear regions of a frequency-amplitude graph associated with the inductive couple.” *Id.* at 62. The applicant further argued that, “[b]y contrast, Malpas describes systems at which the transmission frequency is selected to be as close as possible to the resonant natural frequency of the pick-up.” *Id.* at 63.

The Examiner subsequently issued a notice of allowability without including a statement of reasons for allowance. *See id.* at 39.

⁷ Application claim 17 was not amended. *See* Ex. 1002, 59. Patent Owner asserts that, “[b]ased on the context of the Applicant’s remarks, it appears the Applicant intended to refer to claim 10 and not claim 17.” Prelim. Resp. 10 n.6.

B. Discussion

Patent Owner agrees that Petitioner’s primary reference for the obviousness Ground 2, Baarman392, was not considered during prosecution, but argues that the reference is substantially the same as a reference that is listed on the face of the ’204 patent, Baarman263 (US 2009/0174263; Ex. 2002). *See* Prelim. Resp. 30–32. Patent Owner further argues that Onishi—Petitioner’s reference for the anticipation Ground 1A and primary reference of the obviousness Ground 1B—is cumulative of Baarman263. *See id.* at 32–34. Patent Owner asserts that secondary reference Purdy also is cumulative of Baarman263, and that Tocci is cumulative of Young (US 5,455,467; Ex. 2005), which was listed on an information disclosure statement (IDS). *See id.* at 34–35. Patent Owner does not allege that the Examiner discussed any of the purported substantially same references.

For Petitioner’s references Baarman392 and Onishi, Patent Owner compares Petitioner’s contentions regarding the “substantially different” limitation 1.5 made in the District Court and in the Petition. *See* Prelim. Resp. 30–34. Patent Owner asserts that Petitioner, in the District Court, contends that prosecution reference Baarman263 “discloses driving voltage oscillating at *a non-resonant transmission frequency substantially different* from said characteristic resonant frequency of said inductive couple.” *Id.* at 31 (citing Ex. 2004, 33) (emphasis added). Patent Owner notes that the Petition contends, “With reference to FIG. 3, Baarman392 explains that ‘[g]enerally, the inverter 10 is *operated between frequency A and frequency B.*’ . . . The evidence here demonstrates that Baarman392 inverter 10 . . . produces a driving voltage at *a non-resonant transmission frequency within a near-linear region of the power transfer curve.*” *Id.* (citing Pet. 67–68; alternations by Patent Owner; emphases ours). Thus, the Petition’s

contentions regarding Baarman³⁹² refer to specific, near-linear regions of the curve, whereas the District Court contention regarding Baarman²⁶³ is in terms of “substantially different.” Patent Owner also argues that the curves depicted in the Petition and prosecution references are almost identical. *Id.* at 32. However, Patent Owner does not assert that prosecution reference Baarman²⁶³ contains a discussion, like that of the Petition’s Baarman³⁹² reference, of the purportedly near-linear range between frequency A and frequency B. *See id.*; *see* Ex. 1006 ¶ 38 (Baarman³⁹² stating, “even if the inverter 10 is not operating at resonance, significant power transfer can occur when the inverter is operating off-resonance. Generally, the inverter 10 is operated between frequency A and frequency B. . . . Between frequency A and frequency B, the power transfer curve can be piece-wise linearized by a software lookup table located in the controller 20.”).

As discussed above, the applicant, in an After-Final Response, argued that “substantially different” means a frequency on the near-linear portion of the curve. *See* Ex. 1002, 62. The Examiner soon thereafter allowed the claims. We do not agree with Patent Owner’s argument that the two references are substantially the same because the reference not considered by the Examiner specifically discusses operation in what Petitioner contends is the near-linear portion of the curve.

For Petitioner’s Onishi reference and prosecution reference Baarman²⁶³, Patent Owner’s arguments are like those just discussed for Baarman³⁹². *See* Prelim. Resp. 32–34. Patent Owner impliedly argues that the references’ disclosed curves are similar and argues that the contentions regarding Onishi in the Petition and regarding Baarman²⁶³ in the District Court are similar. *Id.* Like above, Petitioner’s contentions and Onishi’s

disclosures pertain to operating at specific frequencies on the purported near-linear portion of the curve. *See* Pet. 23–24 (contending that “Onishi discloses that the driving voltage supplied by power transmission section 12 . . . oscillates at a non-resonant transmission frequency (e.g., frequencies f_1 , f_2 , or f_3) substantially different from said characteristic resonant frequency (e.g., frequency f_0) of said inductive couple,” and “each of frequencies f_1 , f_2 , and f_3 lie in a near-linear region of the frequency-response curve.”) (emphasis omitted); e.g., Ex. 1003 ¶ 59 (“According to Onishi, the frequency f_1 is a frequency used when transmitting ‘1’ during normal power transmission and is a basic frequency during power transmission. . . . [a] frequency F_3 is a frequency used in the power-saving mode.”) (some internal quotation marks omitted; alterations in original). And, again, Patent Owner does not assert that prosecution reference Baarman263 contains a discussion, like that of the Petition’s Onishi reference, of operating at points in the purportedly near-linear range. We do not agree with Patent Owner’s argument that Onishi is cumulative of Baarman263.

Patent Owner argues that Petitioner’s Purdy reference also is cumulative of prosecution reference Baarman263. Prelim. Resp. 34–35. As Patent Owner notes, Petitioner relies on Purdy as a secondary reference and contends that “Purdy provides additional detail about *feedback signals* that were well-known in battery charging systems” and that Purdy discloses “*feedback signals that carry specific operational parameters* for the device or battery inductively connected thereto, and to receive *feedback* that carry data allowing the charger to lookup and apply known parameters for charging the particular device/batter[y] inductively connected to the

charger.” *Id.* (quoting Pet. 48; internal quotation marks omitted) (emphasis added). Although Patent Owner argues that Petitioner relies on Purdy and Baarman263 for the same limitations in this IPR and in the District Court, respectively, Patent Owner does not assert that Petitioner relies on prosecution reference Baarman263 for feedback signals that carry specific parameters and Patent Owner does not assert that Baarman263 contains a discussion regarding the same. We do not agree with Patent Owner’s argument that Purdy is cumulative of Baarman263.

Petitioner’s Tocci reference pertains to Petitioner’s contention that expressing binary conditions as Boolean variables were well known. *See, e.g.*, Pet. 58–61, 70–73, 80–81; Prelim. Resp. 35 (Petitioner relies on Tocci only in Ground 2 . . . for the limited purpose of its purported disclosure of Boolean logic signals.”). This teaching—which is relied on for “first signal,” “second signal,” and “feedback signal” limitations—is not alleged to have been material issues during prosecution. Rather, the value of this reference to an obviousness analysis is its combination with a reference directed to the “substantially different” limitation.

Although we have considered Patent Owner’s request for our exercise of discretion to deny institution under 35 U.S.C. § 325(d), on the record before us, we determine that § 325(d) is not sufficiently implicated such that its statutory purpose would be undermined by institution of a review. We, therefore, decline to deny the Petition under § 325(d).

III. ANALYSIS OF PETITIONER’S CHALLENGES

A. Principles of Law

Petitioner bears the burden of persuasion to prove unpatentability of the claims challenged in the Petition, and that burden never shifts to Patent

Owner. *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015).

“A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros., Inc. v. Union Oil Co. of Cal.*, 814 F.2d 628, 631 (Fed. Cir. 1987); *see also Finisar Corp. v. DirecTV Group, Inc.*, 523 F.3d 1323, 1334 (Fed. Cir. 2008) (to anticipate a patent claim under 35 U.S.C. § 102, “a single prior art reference must expressly or inherently disclose each claim limitation”). Moreover, “[b]ecause the hallmark of anticipation is prior invention, the prior art reference—in order to anticipate under 35 U.S.C. § 102—must not only disclose all elements of the claim within the four corners of the document, but must also disclose those elements ‘arranged as in the claim.’” *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1369 (Fed. Cir. 2008) (quoting *Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542, 1548 (Fed. Cir. 1983)). Whether a reference anticipates is assessed from the perspective of one of ordinary skill in the art. *See Dayco Prods., Inc. v. Total Containment, Inc.*, 329 F.3d 1358, 1368–69 (Fed. Cir. 2003) (“‘[T]he dispositive question regarding anticipation [i]s whether *one skilled in the art* would reasonably understand or infer from the [prior art reference’s] teaching’ that every claim element was disclosed in that single reference.” (second and third alterations in original) (quoting *In re Baxter Travenol Labs.*, 952 F.2d 388, 390 (Fed. Cir. 1991))).

Additionally, “[u]nder the principles of inherency, if the prior art necessarily functions in accordance with, or includes, the claimed limitations, it anticipates.” *MEHL/Biophile Int’l Corp. v. Milgram*, 192

F.3d 1362, 1365 (Fed. Cir. 1999); *see In re Cruciferous Sprout Litig.*, 301 F.3d 1343, 1349–50 (Fed. Cir. 2002).

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 skill in the art; and (4) if present, any objective evidence of obviousness or non-obviousness.⁸ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

B. The Level of Ordinary Skill in the Art

In determining the level of ordinary skill in the art, various factors may be considered, including the “type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field.” *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (quoting *Custom Accessories, Inc. v. Jeffrey–Allan Indus., Inc.*, 807 F.2d 955, 962 (Fed. Cir. 1986)).

Petitioner contends that:

[A] person of ordinary skill in the art at the time of the alleged invention (“POSITA”) would have had a bachelor’s degree or higher in electrical engineering, at least 3 years of experience

⁸ The parties have not directed our attention to any objective evidence of obviousness or non-obviousness.

designing or researching electronic circuits, and familiarity with power electronics and inductive power transfer circuits.

Pet. 6 (citing Ex. 1003 ¶ 20).

Patent Owner, at this stage, does not disagree or propose a different definition of the person of ordinary skill in the art. However, Patent Owner's declarant, Dr. Mercier, opines that

[A]t the time of the '204 Patent, a POSITA would have a working knowledge of wireless charging and inductive charging. The person would have gained this knowledge through an undergraduate Bachelor of Science degree in electrical engineering, computer engineering, computer science, or a related field, with at least two years of experience working in the field of wireless or inductive charging device design, or testing of such wireless or inductive charging device testing, or an equivalent combination of academic study and work experience. More education (e.g., a Master's degree) or work experience any relevant field may compensate for a deficit in one of the relevant qualifications stated above.

Ex. 2001 ¶ 27.

We observe that, in Dr. Mercier's definition, the undergraduate degree categories are a bit broader and the experience possibly a bit more specific than in Petitioner's definition. However, at this stage and absent argument to the contrary by the parties, we discern no material difference between the parties' definitions. Petitioner's definition is consistent with the level of ordinary skill reflected in the prior art references of record. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (recognizing that the prior art itself may reflect an appropriate level of skill in the art). For purposes of this decision, we apply Petitioner's definition of the person of ordinary skill in the art. We note, however, that were we to adopt Dr. Mercier's assessment, the outcome of this Decision would be the same.

C. Claim Construction

We apply the same claim construction standard used in district court actions under 35 U.S.C. § 282(b), namely that articulated in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). *See* 37 C.F.R. § 42.100(b). In applying that standard, claim terms generally are given their ordinary and customary meaning as would have been understood by a person of ordinary skill in the art at the time of the invention and in the context of the entire patent disclosure. *Phillips*, 415 F.3d at 1312–13. “In determining the meaning of the disputed claim limitation, we look principally to the intrinsic evidence of record, examining the claim language itself, the written description, and the prosecution history, if in evidence.” *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 469 F.3d 1005, 1014 (Fed. Cir. 2006) (citing *Phillips*, 415 F.3d at 1312–17). “[W]hile extrinsic evidence can shed useful light on the relevant art, . . . it is less significant than the intrinsic record in determining the legally operative meaning of claim language.” *Phillips*, 415 F.3d at 1317 (internal quotation marks omitted).

Petitioner contends that, “[g]iven the noticeable overlap between the preferred embodiment of the ’204 patent and the prior art/predictable combinations articulated in Grounds 1A–2, Petitioner submits that most claim elements do not require a formal construction for purposes of resolving controversies in this proceeding.” Pet. 6. Petitioner addresses the meaning of the recited “substantially different” transmission frequency. *See id.* at 6–9.

Patent Owner states, “it is undisputed that ‘most claim elements do not require a formal construction for purposes of resolving the controversies in this proceeding.’” Prelim. Resp. 21 (quoting Pet. 6). Patent Owner asserts that, “[h]owever, context is required to understand the scope and

meaning of some of the terms, even if the Board does not formally engage in claim construction.” *Id.* Patent Owner also addresses the meaning of “substantially different” and “incremental value.” *Id.* at 21–27.

1. Substantially Different

Independent claim 1 recites that the “said driver is configured to provide a driving voltage across said primary inductive coil, said driving voltage oscillating at a non-resonant transmission frequency *substantially different* from said characteristic resonant frequency of said inductive couple.” Ex. 1001, 28:32–36 (emphasis added); *see also id.* at 29:30:19–22 (Independent method claim 10 similarly reciting, “providing an oscillating voltage to said primary inductive coil at an initial transmission frequency f_t substantially different from a characteristic resonant frequency f_R of the system.”).

The parties do not direct our attention to any claim language that further indicates the scope of “substantially different.”

The Specification, discussing Figure 6b (reproduced above), states that the slope of the frequency-amplitude graph is steepest in the regions 4a, 4b to either side of the resonance peak, and “[t]hus in inductive transfer systems, which operate at or around resonance, a small variation in frequency results in a large change in induced voltage.” Ex. 1001, 21:6–10. The Specification further states, “[f]or this reason prior art inductive transfer systems are typically very sensitive to small fluctuations in environmental conditions or variations in alignment between the induction coils.” *Id.* at 21:12–15; *see* Prelim. Resp. 22–23 (citing the same). According to the ’204 patent, “[i]t is a particular feature of embodiments of the current invention that the driver . . . is configured and operable to transmit a driving voltage which oscillates at a transmission frequency which is substantially

different from the resonant frequency of the inductive couple.” Ex. 1001, 21:16–20. The Specification then states the following: “Preferably the transmission frequency is selected to lie within one of the near-linear regions 6, 8 [of Figure 6b] where the slope of the frequency-amplitude graph is less steep.” *Id.* at 21:20–23; *see also id.* at 21:56–59 (“Referring back to FIG. 6b, the frequency of transmission is selected to be in the approximately linear region 8 of the curve between a lower frequency value of f_L and an upper frequency value of f_U .”⁹); Pet. 8 (citing the same).

Both parties note that the meaning of “substantially different” was discussed in the prosecution history. *See* Pet. 8–9; Prelim. Resp. 21–22. During prosecution, the Examiner maintained in the Final Rejection that independent claims 1 and 10, along with others, would have been obvious over Malpas. Ex. 1002, 79. An interview was conducted after this Final Rejection, and it was “[a]greed that the ‘substantially different’ regarding the driving [voltage] per Figure 6B and the specification [0160+] would overcome the art of record.” *Id.* at 69 (first and second alterations added).

In a response to the final Office Action, the applicant quoted paragraph 161 of the application (corresponding to column 21, lines 16–23 in the issued patent), and argued:

The claims must be interpreted in light of the specification as they would be understood by one of ordinary skill in the art. As such, one having ordinary skill in the art would appreciate that the term ‘*substantially different from said characteristic resonant frequency*’ recited in claims 1 and 17, in

⁹ The parties are encouraged to discuss further this description of this “approximately linear region 8,” including their respective understandings of the location of a lower frequency value of f_L and the significance of the point identified on Figure 6b as frequency f_b .

view of at least Fig. 6b, should be interpreted to mean that the frequency of the driving voltage is selected so as to lie within one of the near-linear regions of a frequency-amplitude graph associated with the inductive couple.

Ex. 1002, 62. The applicant continued, arguing that the claims are distinguishable over Malpas.

A person having ordinary skill in the art, upon reading Malpas, would have understood that in order to transmit power to a remote pick-up, it would be necessary to use a transmission frequency ***at or near to the resonant frequency of the pick-up*** (as opposed to the invention recited in instant claim 1, wherein the transmission frequency is selected to be ***different*** from the characteristic frequency of the inductive couple formed between the primary and secondary coils).

Id. at 63; *see also id.* (“By contrast Malpas describes systems at which the transmission frequency is selected to be as close as possible to the resonant natural frequency of the pick-up.”).

Petitioner contends that, “regardless of the outermost boundaries of the scope of a transmission frequency ‘substantially different’ from a characteristic resonant frequency as claimed, the specification plainly establishes that it must at least encompass the frequencies within one of the near-linear regions of the frequency-amplitude graph.” Pet. 9 (citing Ex. 1003 ¶¶ 35–40). According to Petitioner, “[w]here, as here, the prior art aligns with the preferred embodiment of a patent and the patent’s claim scope encompasses the preferred embodiment, the Board is equipped to compare that patent’s vague claim language to the prior art for purposes of considering unpatentability.” *Id.* at 7 (citing *Chicago Mercantile Exchange, Inc. v. 5th Market, Inc.*, CBM2013-00027, Paper 33, 3 (PTAB 2014); *SAP America, Inc. v. Lakshmi Arunachalam*, CBM2013-00013, Paper 61, 29 (PTAB 2014)). Petitioner further contends that “the Board need not

formally construe this claim phrase” because “[a]ll grounds [in the Petition] include references that expressly disclose and/or align with FIG. 6b’s preferred embodiment of a transmission frequency that is ‘substantially different’ from a characteristic resonant frequency,” and that the grounds “anticipate or render obvious the Challenged Claims under any construction that is consistent with the specification of the ’204 patent.” *Id.* at 9 (citing Ex. 1003 ¶ 41).

Patent Owner points to the above-discussed applicant’s argument during prosecution regarding the meaning of “substantially different” and to the Specification’s statement that, in prior art systems that operate at or around the resonance frequency, a small variation in frequency results in a large change in induced voltage. Prelim. Resp. 21–23. Patent Owner further argues that “[a]n additional benefit to transmitting at a non-resonant frequency substantially different from the resonant frequency is the ability to linearly regulate power transfer, for example, by adjusting transmission frequency to change the induced voltage.” *Id.* at 23 (citing Ex. 1001, 21:61–63; Ex. 2001 ¶¶ 38–40). Patent Owner then argues:

Accordingly, and as explained by Dr. Mercier, a POSITA would define the “transmission frequency [that is] substantially different from [said/a] characteristic resonant frequency,” as recited in claims 1 and 10, to: (1) lie within the linear or non-linear regions of a frequency-amplitude graph, and (2) allow for some incremental change (increase or decrease/reductions) in frequency while remaining in the near-linear/linear regions of the frequency-amplitude graph.

Id. (alteration in original) (citing Ex. 2001 ¶ 63).

As to the first part, we understand Patent Owner to mean the linear or *near*-linear region—consistent with the quoted applicant’s use of the term “near-linear”—rather than a linear or *non*-linear region, which seemingly

would encompass the entire curve. As to the second part, we understand Patent Owner to be referring to the purported benefit of linear control, and we determine that Patent Owner has not explained adequately why such a benefit should be read into the claim term “substantially different,” particularly where the quoted Specification support does not explicitly mention linear regulation.¹⁰ *See* Ex. 1001, 21:61–63 (“The induced voltage can be increased by reducing the transmission frequency and can be reduced by increasing the transmission frequency.”).

On this record and for purposes of this decision, we determine that—consistent with the Specification’s description of the frequency that is “[p]referably . . . selected” and applicant’s argument regarding the same during prosecution—“a non-resonant transmission frequency *substantially different* from said characteristic resonant frequency of said inductive couple” encompasses frequencies that lie within one of the near-linear regions of a frequency-amplitude graph associated with the inductive couple. *See* Ex. 1001, 21:20–24; Ex. 1002, 62. At this time and for purposes of this Decision, we need not and do not reach the issue of the outer bounds of the scope of “substantially different.”

We also note that independent claim 1 is an apparatus (system) claim and the subject limitation 1.5 further defines the “driver” recited in

¹⁰ To the extent that Patent Owner relies on its declarant’s testimony as an explanation of Patent Owner’s claim construction position, we remind Patent Owner about the prohibition on incorporation by reference. *See* 37 C.F.R. § 42.6(a)(3); Consolidated Trial Practice Guide, November 2019, 35–36 (available at <https://www.uspto.gov/TrialPracticeGuideConsolidated>) (“[P]arties that incorporate expert testimony by reference in their petitions, motions, or replies without providing explanation of such testimony risk having the testimony not considered by the Board.”).

limitations 1.1 and 1.4. Specifically, limitations 1.4 and 1.5 require a driver that is “configured to provide a driving voltage . . . oscillating at a non-resonant transmission frequency” that is “substantially different” from the inductive couple’s characteristic resonant frequency. Ex. 1001, 28:32–36. In future briefing, the parties’ arguments regarding the prior art references and the apparatus claims should focus on that recited structure, i.e., a driver that is configured to provide the recited frequency.

2. *Incremental Value*

Independent system claim 1 recites:

said driver is configured to:
provide less power by increasing said non-resonant transmission frequency by *an incremental value* when said first signal is detected by the detector, and
provide more power by decreasing said non-resonant transmission frequency by *an incremental value* when said second signal is detected by the detector.

Ex. 1001, 28:39–45 (emphasis added). Independent method claim 10 does not contain the “incremental value” phrase, but its dependent claim 13 does. *See, e.g., id.* at 29:47–49 (dependent claim 13 reciting, “said driver reducing said non-resonant transmission frequency by an incremental value df_1 when the received feedback signal is of the first type S_a ”); *cf. id.* at 29:30–32 (independent claim 10: “said driver receiving said feedback signal; and said driver adjusting said non-resonant transmission frequency.”).

Patent Owner argues:

[The claim phrase] “provide [less/more] power by [increasing/decreasing] said non-resonant transmission frequency by an incremental value” and “[reducing/increasing] said non-resonant transmission frequency by an incremental value [df_1 / $+df_2$]” should be interpreted consistent with their plain and ordinary meanings. *See* [Ex. 2001] Mercier Dec. at ¶¶ 78-86. That is, a POSITA would understand that

incremental adjustments to a transmission frequency excludes simply selecting a discrete transmission frequency value. *See* Mercier Dec. at ¶ 85.

Prelim. Resp. 26–27 (alterations in original)). In support of its position, Patent Owner points to the Specification’s discussion of Figure 6d and Dr. Mercier’s characterizations of that discussion. *Id.* at 25 (citing Ex. 1001, 22:60–64; Ex. 2001 ¶ 84).

The cited portion of the Specification explains that the flowchart of Figure 6d depicts “[o]ne example of a power regulation method using simple feedback signals.” Ex. 1001, 22:45–46. The Specification states—for the condition where the load power is too high—that, “[i]f the power received by the electric load 6340 is above the predetermined range, then a feedback signal of a second type S_b is sent to the driver” and, “[i]f the received feedback signal is of the second type S_b , then the transmission frequency is decreased by an incremental value $-\delta f_2$.” *Id.* at 22:54–64¹¹; *see id.* (similar language for operation when the power is too low). The Specification’s description for this power-too-high condition continues: “It is noted that by using the power regulation method described above, when the power received by the load is too high, a series of feedback signals of the first type S_a will be transmitted until the power is reduced into the acceptable range.” *Id.* at 22:65–23:2; *see id.* at 23:2–5 (operation when the power is too low).

Dr. Mercier, referring to the Specification’s example, testifies that Figure 6d has a feedback loop and that “[t]his process repeats itself, per Fig. 6d, until the monitored power is within ‘the acceptable range.’”

¹¹ We note that, in Figure 6d, when the power is above a predetermined range, a *first* type signal is sent and the frequency is *increased*. *See* Ex. 1001, Fig. 6d.

Ex. 2001 ¶¶ 82, 85. Patent Owner argues that, “[i]n other words, and as characterized by Dr. Mercier, a series of feedback signals (S_a or S_b) is sent to the driver, resulting in **a series of incremental increases/decreases** in transmission frequency, until the power has been adjusted to be within the acceptable range.” Prelim. Resp. 25 (quoting Ex. 2001 ¶ 83) (internal quotation marks omitted); *see also id.* at 43 (Patent Owner arguing that the proper interpretation of the claim is that “the incremental changes to the non-resonant transmission frequency must be related to a series of feedback signals (S_a or S_b) [that are] sent to the driver, resulting in a series of incremental increases/decreases in transmission frequency, until the power has been adjusted to be within the acceptable range.”) (internal quotation marks omitted; alteration in original).

Thus, according to Patent Owner, “the specification uses ‘incremental’ consistent with its plain and ordinary meaning, which ‘connotes a series of small adjustments (*e.g.*, $+\delta f_1$ or $-\delta f_2$) for reaching a particular value (or frequency range in this instance), as opposed to outright selection of that value,’” and that “this would exclude the selection of discrete frequency values.” *Id.* at 25–26 (quoting Ex. 2001 ¶¶ 84–85). Patent Owner, quoting from the opinion of Dr. Mercier, impliedly argues that this series of incremental changes must be to gradually adjust the transmission frequency to the acceptable range. *See id.* at 26 (quoting Ex. 2001 ¶ 85).

Patent Owner asserts that its proposed claim construction is consistent with dictionary definitions of the noun “increment”—quoting the following: “A small positive or negative change in the value of a variable”; “an increase or addition, esp one of a series”; “The process of gradually increasing a

quantity or variable.” *Id.* at 26 (citing and parenthetically quoting Exs. 2006, 2007, 2008).

Patent Owner further asserts that “the use of the term ‘incremental’ in relation to the adjusted transmission frequency is presumed to have meaning.” *Id.* at 24 (citing *Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1119 (Fed. Cir. 2004)). As discussed below, Petitioner contends, for example, that Onishi discloses decreasing the transmission frequency by an incremental value from the power-saving state at frequency f_3 to the high-load state at frequency f_1 . *See* Pet. 35–36. Patent Owner argues that “Petitioner’s interpretation of claim 1 effectively reads out ‘incremental’ from the claims” and renders it superfluous. Prelim. Resp. 42.

Patent Owner further impliedly argues that the claim excludes “preset frequencies,” Prelim. Resp. 38, and requires a “functionality” that “allows any frequency f_U and f_b to be selected in the linear region, for example by using different incremental values,” *id.* at 40. Patent Owner also appears to argue that the claimed invention requires an addition/subtraction step. *See id.* at 39 (“[E]ven if a difference . . . between [Onishi’s] frequencies [f_1 , f_2 , and f_3] were interpreted as an incremental value, Onishi does not disclose transitioning from one of frequencies f_1 , f_2 , or f_3 by adding or subtracting such a difference to any one of f_1 , f_2 , and f_3 .”).

As shown by Patent Owner’s arguments, the context in which the term “incremental” is used may shed light on its meaning. However, Patent Owner relies on an exemplary method discussed in the Specification and Dr. Mercier’s opinions rather than the claim language to provide that context. Patent Owner does not identify any claim of the ’204 patent that

recites the relied-on contextual aspects of the Specification’s exemplary embodiment—a feedback loop with a repeating process of gradual increases or decreases until a desired range is reached. Independent system (apparatus) claim 1 recites only one adjustment of an incremental value, not a series of adjustments, and does not recite the term “feedback.” *See, e.g.,* Ex. 1001, 28:39–42 (“said driver is configured to: provide less power by increasing said non-resonant transmission frequency by an incremental value when said first signal is detected by the detector”); *see also id.* at 28:46–48 (dependent claim 2 introducing the general concept of “feedback” to the claimed subject matter). Although independent method claim 10 does recite the sending and receiving of a feedback signal, it does not contain the “incremental value” phrase. *See id.* at 29:28–32. Dependent method claim 13 recites adjusting the transmission frequency “by an incremental value” when a specified feedback signal is received but, like claim 1, only explicitly recites a single adjustment. *See, e.g., id.* at 29:47–49 (“said driver reducing said non-resonant transmission frequency by an incremental value df1 when the received feedback signal is of the first type Sa.”).

Thus, even if a given construction would result in the term “incremental” having little patentable weight, that appears, at this preliminary stage and on the current limited record, to be due to how the claim is drafted rather than as a result of reading out the term, as Patent Owner implies. *SimpleAir, Inc. v. Sony Ericsson Mobile Commc’ns AB*, 820 F.3d 419, 429 (Fed. Cir. 2016) (“The preference for giving meaning to all terms . . . is not an inflexible rule that supersedes all other principles of claim construction.”). At this early stage of the proceeding, we do not agree with Patent Owner’s interpretation of “incremental value” and we decline to

read into the claim concepts such as a repeating feedback loop, a series of adjustments, and the exclusion of the selection of “discrete frequency values.” *See Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 913 (Fed. Cir. 2004) (“[I]t is improper to read limitations from a preferred embodiment described in the specification—even if it is the only embodiment—into the claims absent a clear indication in the intrinsic record that the patentee intended the claims to be so limited.”).

To establish a clear record, the parties should discuss the meaning of “incremental value” in further briefing authorized in the Scheduling Order, and should focus primarily on intrinsic evidence. If either party contends that the term should have its plain and ordinary meaning, the party shall clearly indicate what it contends is that plain and ordinary meaning. *Cf. O2 Micro Int’l Ltd. v. Beyond Innovation Tech. Co.*, 521 F.3d 1351, 1361 (Fed. Cir. 2008) (“A determination that a claim term ‘needs no construction’ or has the ‘plain and ordinary meaning’ may be inadequate when a term has more than one ‘ordinary’ meaning or when reliance on a term’s ‘ordinary’ meaning does not resolve the parties’ dispute.”).

D. The Alleged Anticipation of Claims 1–6, 8, and 10–13 by Onishi (Ground 1A)

Petitioner alleges that claims 1–6, 8, and 10–13 of the ’204 patent are anticipated by Onishi. *See* Pet. 13–36 (addressing claim 1). Patent Owner argues that Onishi fails to disclose the “incremental value” limitations 1.7 and 1.8, the “substantially different” frequency recited in limitation 1.5, and the “inductive couple having a characteristic resonant frequency” of limitation 1.2. *See* Prelim. Resp. 37–54.

1. Onishi (Ex. 1004)

Onishi pertains to “a power transmission control device provided in a power transmission device of a non-contact power transmission system.”

Ex. 1004 ¶ 10. “[T]he non-contact power transmission system transmit[s] power from the power transmission device to a power reception device by electromagnetically coupling a primary coil and a secondary coil to transmit the power to a load of the power reception device.” *Id.*

[W]hen the power transmission device has detected that a battery included in the load has been fully charged, the power-transmission-side control circuit stop[s] normal power transmission to the power reception device and perform[s] power-saving power transmission that transmits a small amount of power as compared with the normal power transmission.

Id. ¶ 12. “The transmission frequency during power-saving power transmission is set at a frequency apart from the resonance frequency (resonance peak) as compared with the frequency during normal power transmission, for example.” *Id.* ¶ 53.

Onishi's Figure 4 is reproduced below.

FIG. 4

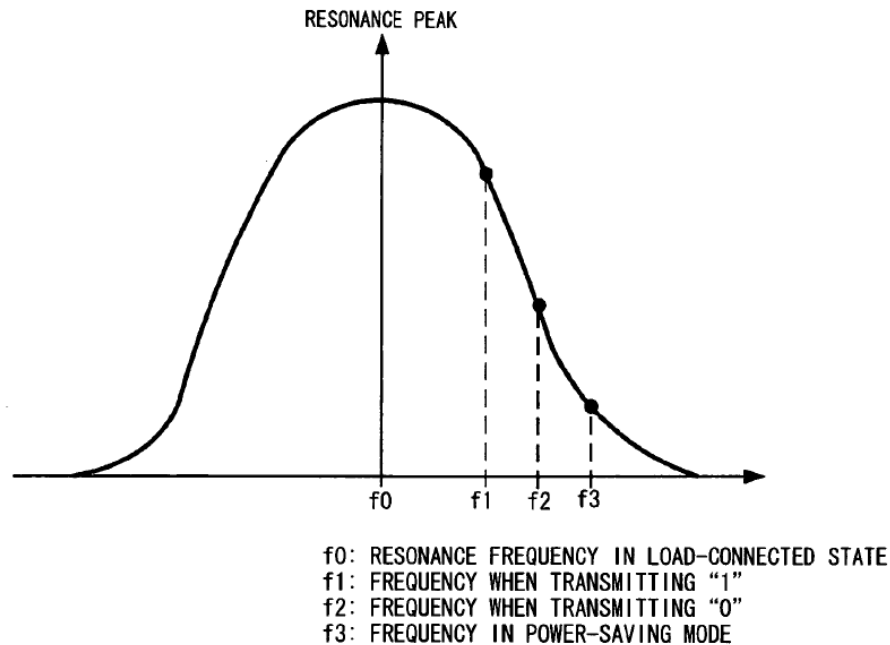


Figure 4 depicts the resonance characteristics of induction frequencies with the horizontal axis indicating the frequency, and the vertical axis indicating the resonance peak value. *Id.* at 1004 ¶ 180.¹² “The resonance characteristics of the primary coil L1 and the secondary coil L2 when the portable telephone . . . is placed on the charger . . . (i.e., when load exists with respect to the power transmission device 10) . . . have a symmetrical and broad mountain shape, as shown in FIG. 4, for example.” *Id.* “[T]he frequency f1 is a frequency used when transmitting ‘1’ during normal power transmission” and “is a basic frequency during power transmission.” *Id.*

¹² We acknowledge Patent Owner's argument that Onishi's Figure 4 depicts the characteristics of only the primary coil and not the inductive couple. *See* Prelim. Resp. 53–54. Whether that is correct is an issue for trial.

¶ 181. “The frequency f2 is a frequency used when transmitting ‘0’ (see FIGS. 3A and 3B),” and “[a] frequency f3 is a frequency used in the power-saving mode.” *Id.*

2. *The Alleged Anticipation of Independent Claim 1 by Onishi*

a. *[1Pre] An inductive power transfer system comprising*

Petitioner contends that, “[t]o the extent the preamble is a limitation, Onishi discloses the recited ‘**inductive power transfer system.**’” Pet. 13 (citing Ex 1003 ¶ 46). According to Petitioner, “Onishi’s inductive power transfer system includes a ‘power transmission device 10’ and a ‘power reception device 40.’” *Id.* (citing Ex. 1004 ¶¶ 124–131, Figs. 1A, 2, 5; Ex. 1003 ¶ 46); *see also id.* at 14–15 (Petitioner’s further contentions regarding the preamble).

Patent Owner does not raise any arguments regarding these contentions. *See* Prelim. Resp. 37–54; *cf. id.* at 37 (“Onishi fails to disclose at least claim limitations [1.2], [1.5], [1.7], [1.8], [10.1], and [13]. (brackets in original)). We determine that Petitioner has shown sufficiently for purposes of institution that Onishi discloses the preamble.

b. *[1.1] at least one inductive power outlet comprising at least one primary inductive coil wired to a power supply via a driver;*

Petitioner contends that “Onishi discloses that its inductive power transmission system includes a power transmission device 10 (**inductive power outlet**)” and that “[t]he power transmission device 10 includes a primary coil L1 (**primary inductive coil**) wired to a power adapter 502 (**power supply**) via a power transmission section 12 (component of the **driver**).” Pet. 15–16 (citing Ex. 1004 ¶¶ 125–168, Figs. 1A, 2, 5; Ex. 1003 ¶ 48) (footnote omitted); *see also, e.g., id.* at 17 (annotated Figure 5

indicating the components mapped to the inductive power outlet, driver, and primary inductive coil).

Patent Owner does not raise any arguments regarding these contentions. *See* Prelim. Resp. 37–54. We determine that Petitioner has shown sufficiently for purposes of institution that Onishi discloses limitation 1.1.

c. [1.2] said primary inductive coil for forming an inductive couple having a characteristic resonant frequency with at least one secondary inductive coil wired to an electric load,

Petitioner contends that “Onishi . . . discloses that the inductive couple between primary coil L1 and secondary coil L2 has a characteristic resonant frequency ‘f0’, indicated by the ‘RESONANCE PEAK’ in FIG. 4.” Pet. 19 (citing Ex. 1004 ¶¶ 53, 171, 180, Fig. 4; Ex. 1003 ¶ 54). Petitioner additionally contends that “Onishi’s secondary coil L2 (***secondary inductive coil***) is wired to a load 90 (***electric load***), as illustrated in FIG. 2.” *Id.* at 18–19 (citing Ex. 1004 ¶¶ 128, 131, 137–138, 165–168, Figs. 2, 5; Ex. 1003 ¶ 53).

Patent Owner argues that “Onishi does not disclose that the primary coil L1 and the secondary coil L2 share a characteristic resonant frequency.” Prelim. Resp. 51. Specifically, Patent Owner argues that Onishi’s discussion of the resonance frequency is only in the context of the primary coil L1, and not in the context of an inductive couple formed by the two coils. *See id.* at 51–52 (citing Ex. 1004 ¶¶ 135, 171, 180). According to Patent Owner, “Figure 4 only illustrates ‘a view showing the resonance characteristics of the induction coil.’” *Id.* at 53 (quoting Ex. 1004 ¶ 180).

Patent Owner, for example, points to the recitation of a coil (singular) in the first sentence of Onishi’s paragraph 180. *See id.* at 51–52. That

sentence states, “FIG. 4 is a view showing the resonance characteristics of the induction coil and applications of frequencies.” Ex. 1004 ¶ 180.

However, the next sentence in Onishi refers to both coils, stating, “[t]he resonance characteristics of the primary coil L1 and the secondary coil L2 [when under load] . . . have a symmetrical and broad mountain shape, as shown in FIG. 4, for example.” *Id.* Patent Owner acknowledges this latter sentence but argues that, “in view of the preceding sentence that emphasizes ‘the resonance characteristics of [only] the induction coil’ (i.e., primary coil L1), it is unclear if this disclosure is referring to the resonance characteristic frequency of an inductive couple or to the resonance characteristic frequency of only the primary coil L1.” Prelim. Resp. 52 n.10 (alteration in original).

Patent Owner does not cite to testimony of Dr. Mercier in support of its interpretation of Onishi. *See id.* at 51–54; *see* Ex. 2001, ii (the table of contents for Dr. Mercier’s declaration indicating that the testimony primarily pertains to the background of the technology and claim construction). Petitioner’s declarant, Dr. Woods, on the other hand, testifies that that inductive couple between the two coils has a characteristic resonant frequency f_0 . Ex. 1003 ¶ 54 (“Onishi further discloses that the inductive couple between primary coil L1 and secondary coil L2 has a characteristic resonant frequency ‘ f_0 ’, indicated by the ‘RESONANCE PEAK’ in FIG. 4.”). That testimony is, at this stage, unrebutted.

We determine, based on the current record, that Petitioner has shown sufficiently for purposes of institution that Onishi discloses limitation 1.2.

d. [1.3] said secondary inductive coil associated with an inductive power receiver

Petitioner contends that “Onishi discloses that secondary coil L2 (*secondary inductive coil*) is associated with the power reception device 40

(**inductive power receiver**).” Pet. 20–21 (citing Ex. 1004 ¶¶ 137–138, 147, 180, Figs. 2, 5; Ex. 1003 ¶ 55).

Patent Owner does not raise any arguments regarding this contention. See Prelim. Resp. 37–54. We determine that Petitioner has shown sufficiently for purposes of institution that Onishi discloses limitation 1.3.

e. [1.4] wherein said driver is configured to provide a driving voltage across said primary inductive coil,

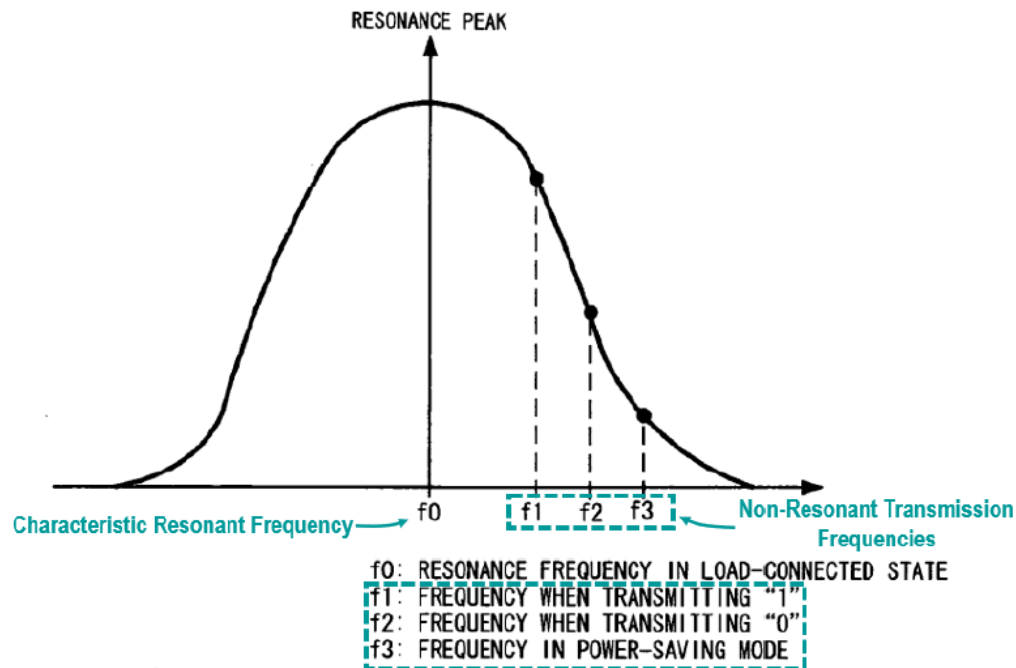
Petitioner contends that “Onishi discloses that the power transmission section 12 (component of the **driver**) provides a driving voltage across primary coil L1 (**primary inductive coil**).” Pet. 21–22 (citing Ex. 1004 ¶¶ 132–136, 143, 197, Figs. 2, 5; Ex. 1003 ¶ 57) (footnote omitted).

Patent Owner does not raise any arguments regarding this contention. See Prelim. Resp. 37–54. We determine that Petitioner has shown sufficiently for purposes of institution that Onishi discloses limitation 1.4.

f. [1.5] said driving voltage oscillating at a non-resonant transmission frequency substantially different from said characteristic resonant frequency of said inductive couple,

Petitioner contends that “Onishi discloses that the driving voltage supplied by power transmission section 12 (component of the **driver**) to primary coil L1 (**primary inductive coil**) oscillates at a non-resonant transmission frequency (e.g., frequencies f1, f2, or f3) substantially different from said characteristic resonant frequency (e.g., frequency f0) of said inductive couple.” Pet. 23 (citing Ex. 1003 ¶ 58). Petitioner provides an annotated version of Onishi’s Figure 4, which we reproduce below.

FIG. 4



Id. at 24. Above is Onishi's Figure 4, depicting the resonance characteristics of induction frequencies, with Petitioner's annotations indicating Petitioner's contentions that the figure depicts non-resonant transmission frequencies and the characteristic resonant frequency. Petitioner asserts that Onishi describes operating at the three transmission frequencies. *Id.* at 23–24 (citing Ex. 1004 ¶¶ 53, 171, 181, Fig. 3A, Ex. 1003 ¶ 59). Petitioner contends that "each of frequencies f_1 , f_2 , and f_3 lie in a near-linear region of the frequency-response curve and thus, as noted during prosecution . . . fall within the scope of being 'substantially different' from the characteristic resonant frequency f_0 ." *Id.* at 24–25 (citing the claim construction section of the Petition (Section IV) and Ex. 1002, 62). According to Petitioner, "the strikingly similar positions of Onishi's frequencies f_1 , f_2 , and f_3 in the frequency-response curve as the transmission frequency (e.g., f_t in FIG. 6B)

identified as ‘substantially different’ in the ’204 specification confirms that Onishi discloses and renders obvious a transmission frequency that is ‘substantially different’ from the characteristic resonant frequency regardless of the outermost scope of this claim term.” *Id.* at 25 (citing Ex. 1001, 21:16–23, 21:56–65, Fig. 6b; Ex. 1002, 62; Ex. 1003 ¶ 59).

Patent Owner argues that “none of f_1 , f_2 , and f_3 are described, shown, or otherwise disclosed as occurring within the near-linear regions of a frequency-amplitude graph associated with the inductive couple, as required by claim 1,” and that “they [are not] otherwise disclosed as substantially different from the characteristic resonant frequency of the inductive couple.” Prelim. Resp. 44.

For frequencies f_1 and f_2 , Patent Owner (Prelim. Resp. 45) quotes from Onishi’s paragraph 53, which states, “[t]he transmission frequency during power-saving power transmission is set at a frequency apart from the resonance frequency (resonance peak) as compared with the frequency during normal power transmission, for example.” Ex. 1004 ¶ 53. Based on this statement comparing the normal power frequencies f_1 and f_2 with the power-saving power frequency f_3 that is “set . . . apart” from the resonance peak, Patent Owner argues that “Onishi describes frequencies f_1 and f_2 as being at or near resonant frequency (f_0 in Onishi)—similar to the Malpas reference distinguished by Applicant during prosecution, and contrary to claim 1.” Prelim. Resp. 45 (citing Ex. 2001 ¶¶ 49–57 (Dr. Mercier describing Malpas and the applicant’s arguments during prosecution)).

For power-saving mode frequency f_3 , Patent Owner argues that being described as “apart” from resonance frequency f_0 is not enough to qualify as being “significantly different.” *Id.* at 46. Patent Owner further argues that

Onishi's Figure 4 "is at best unclear as to whether frequency f_3 lies within a near-linear or non-linear region of the resonance curve, the latter being in direct contravention of the stated location of the transmission frequency on a frequency-amplitude graph." *Id.* at 47 (citing Ex. 1002 ¶ 62 (the applicant's argument that "substantially different" means on one of the near-linear regions of the curve)); *see also id.* at 48 (Patent Owner arguing that "operating in the non-linear region" would undermine the system predictability, which would be contrary to the purported "stated intent" of the '204 patent). Patent Owner also argues that, "[i]n essence, the power-saving mode frequency [f_3] falls within the range of frequencies that result in an operation voltage that is near zero or approaching zero non-linearly, thus the power-saving mode frequency is outside the linear and near-linear regions of the resonance curve." *Id.* at 49.

Dr. Woods, however, testifies that the three frequencies (f_1 , f_2 , and f_3) are in the near-linear region of the curve and are "substantially different" than the characteristic resonant frequency. *See* Ex. 1002 ¶ 59 ("each of frequencies f_1 , f_2 , and f_3 lie in a near-linear region of the frequency-response curve and thus, as noted during prosecution . . . , fall within the scope of being 'substantially different' from the characteristic resonant frequency f_0 "). At this stage, that testimony is unrebutted. *Cf.* Prelim. Resp. 45–48 (citing Dr. Mercier's declaration for topics such as the prosecution history and linear control, but not for an interpretation of Onishi's disclosure).

Lastly, Patent Owner argues that Petitioner cannot use any similarities between the curves depicted in the challenged patent's Figure 6B and Onishi's Figure 4 to prove that Onishi's frequencies f_1 , f_2 , and f_3 are

“substantially different” from the resonance frequency. *See* Prelim. Resp. 49–51. Patent Owner argues that Onishi’s figure is not drawn to scale and, “[d]espite any similarities that may exist between the ‘strikingly similar positions of Onishi’s frequencies f_1 , f_2 , and f_3 in the frequency-response curve’ and the ’204 Patent’s ‘transmission frequency (e.g., f_t in FIG. 6B),’ . . . absent quantitative values any similarities are merely speculative.” *Id.* at 50 (quoting Pet. 25; citing, *inter alia*, *Hockerson-Halberstadt, Inc. v. Avia Group Int’l Inc.*, 222 F.3d 951, 956 (Fed. Cir. 2000)).

While patent drawings not designated as being drawn to scale cannot be relied upon to define precise proportions of elements if the specification is completely silent on the issue, *Hockerson-Halberstadt, Inc.*, 222 F.3d at 956, that does “not mean that things patent drawings show clearly are to be disregarded.” *In re Mraz*, 455 F.2d 1069, 1072 (CCPA 1972) (emphasis omitted). A drawing teaches all that it reasonably discloses and suggests to a person of ordinary skill in the art. *In re Aslanian*, 590 F.2d 911, 914 (CCPA 1979). Based on the current record, we disagree with Patent Owner’s argument that Petitioner’s reliance on Onishi’s Figure 4 is “improper and misguided.” Prelim. Resp. 50–51.

We determine that Petitioner has shown sufficiently for purposes of institution that Onishi discloses limitation 1.5.

g. [1.6] wherein said inductive power outlet further comprises a signal detector adapted to detect a first signal and a second signal, and

Petitioner contends that “Onishi’s power transmission device 10 (***inductive power outlet***) includes a waveform detection circuit 28 that, in connection with power transmission-side control circuit 22, provides a

‘signal detector’ adapted to detect the claimed first and second signals.” Pet. 25 (citing Ex. 1003 ¶ 60; Ex. 1004, Fig. 5); *see also id.* at 25–26 n.5 (Petitioner asserting, in addition to the contention that “the components of Onishi treated as the claimed **‘signal detector’** are distinct from the components treated as the claimed **‘driver,’**” “Onishi also anticipates the Challenged Claims when the claimed **‘signal detector’** is taken as part of the claimed **‘driver,’** as also permitted by the claims.”).

As to the recited “first signal,” Petitioner contends that, “[t]o cause the power transmitting device 10 to switch from normal power transmission mode to the power-saving power transmission mode (e.g., when the battery 94 completes charging), power reception device 40 transmits over the inductive channel a ‘save command’ (**first signal**) that results in corresponding change(s) in the voltage induced in primary coil L1.” *Id.* at 29–30 (citing Ex. 1004 ¶¶ 28, 59–60, 71, 76–79, 99–100, 144–146, 151–153, 192, 215; Ex. 1003 ¶ 65).

As to the recited “second signal,” Petitioner contends that, “[t]o cause the power transmitting device 10 to switch from power-saving power transmission mode to the normal power transmission mode, power reception device 40 transmits over the inductive channel an indication of a change to a ‘high-load state’ (**second signal**) that results in corresponding change(s) in the voltage induced in primary coil L1.” *Id.* at 31 (citing Ex. 1004 ¶¶ 27, 63–64, 101, 144–146, 151–153, 186–187, 225; Ex. 1003 ¶ 66).

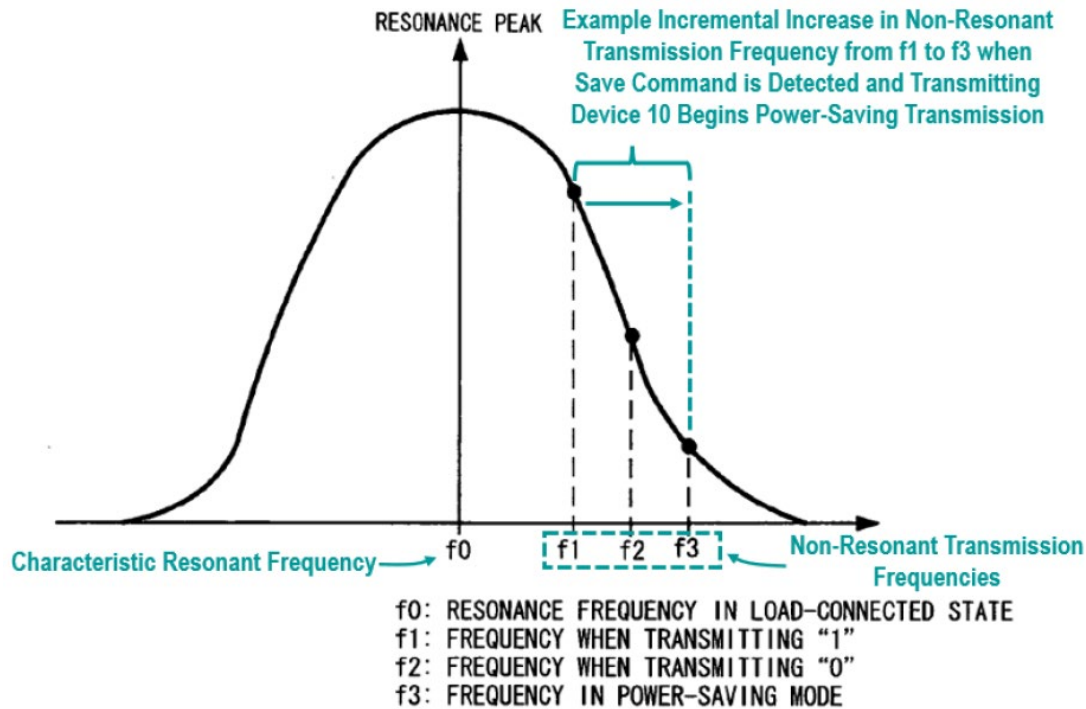
According to Petitioner, “Onishi’s ‘save command’ and indication of a change to a ‘high-load state’ are noticeably similar to the preferred embodiments of the feedback signals disclosed in the specification of the ’204 patent.” *Id.* at 33 (citing Ex. 1001, 22:40–44; Ex. 1003 ¶ 67).

Patent Owner does not raise any arguments regarding these contentions. *See* Prelim. Resp. 37–54. We determine that Petitioner has shown sufficiently for purposes of institution that Onishi discloses limitation 1.6.

- h. [1.7] said driver is configured to:*
provide less power by increasing said non-resonant transmission frequency by an incremental value when said first signal is detected by the detector, and
[1.8] provide more power by decreasing said non-resonant transmission frequency by an incremental value when said second signal is detected by the detector.

Petitioner contends, regarding the “provide less power” limitation 1.7, that Onishi discloses power transmitting device 10 switching from normal power transmission to power-saving power transmission due to a “save command” (mapped to the “first signal”) from power reception device 40. Pet. 33 (referring to the Petition’s discussion of limitation 1.6; citing, *inter alia*, Ex. 1003 ¶ 68). Petitioner further contends that, “[w]hen initiating power-saving power transmission, power transmission section 12 (component of the **driver**) provides less power by increasing the non-resonant transmission frequency by an incremental value from ‘f1’ or ‘f2’ to ‘f3,’ as shown in FIG. 4.” *Id.* at 34 (citing, *inter alia*, Ex. 1003 ¶ 68). Petitioner’s annotated version of Onishi’s Figure 4 is reproduced below.

FIG. 4



Id. Above is Onishi's Figure 4 with Petitioner's annotations: "Characteristic Resonant Frequency" (f_0), "Non-Resonant Transmission Frequencies" (f_1 , f_2 , f_3), and "Example Incremental Increase in Non-Resonant Transmission Frequency from f_1 to f_3 when Save Command is Detected and Transmitting Device 10 Begins Power-Saving Transmission" (bracket and arrow from f_1 to f_3).

Petitioner additionally contends, regarding the "provide more power" limitation 1.8, that Onishi discloses power transmitting device 10 switching from power-saving power transmission to normal power transmission due to a "high-load state" (mapped to the "second signal") from power reception device 40. Pet. 35 (referring to the Petition's discussion of limitation 1.6; citing, *inter alia*, Ex. 1003 ¶ 69). Petitioner further contends that, "[w]hen

beginning normal power transmission, power transmission section 12 (component of the *driver*) provides more power by decreasing the non-resonant transmission frequency by an incremental value from ‘f3’ to ‘f1’ or ‘f2’, as shown in FIG. 4.” *Id.* (citing, *inter alia*, Ex. 1003 ¶ 69).

Patent Owner asserts that “Petitioner fails to identify any actual disclosure in Onishi of an *incremental* adjustment to a non-resonant transmission frequency, or any frequency for that matter.” Prelim. Resp. 38. Patent Owner argues, for example, that, rather than being the result of an incremental adjustment, “Petitioner’s cited disclosure identifies three *preset* frequencies—f1, f2, and f3,” and “each is a *discrete* frequency having a distinct purpose.” *Id.* at 38 (emphasis added); *see also id.* at 39 (“Onishi does not disclose any intervening frequencies . . . [and] appears to preclude any other operating frequencies,¹ suggesting that these discrete values are selected, rather than reached through incremental adjustments.” (footnote omitted)). Patent Owner also argues that, even if the difference between Onishi’s frequencies “were interpreted as an incremental value, Onishi does not disclose transitioning from one of frequencies f1, f2, or f3 by adding or subtracting such a difference to any one of f1, f2, and f3.” *Id.* at 39. According to Patent Owner, “the incremental changes to the non-resonant transmission frequency must be related to a series of feedback signals . . . sent to the driver, resulting in **a series of incremental increases/decreases** in transmission frequency, until the power has been adjusted to be within the acceptable range.” *Id.* at 43 (internal quotation marks omitted).

Patent Owner’s arguments are based on a claim construction of “incremental value” with which we do not agree for the reasons discussed above in the claim construction section. *See supra* Section III.C.2.

Petitioner's declarant, Dr. Woods, testifies that the difference between one of Onishi's frequencies for normal power transmission states (f_1 and f_2) and the frequency for power-saving power transmission (f_0) is an "incremental value." *See* Ex. 1003 ¶¶ 68–69 ("power transmission section 12 . . . provides less power by increasing the non-resonant transmission frequency by *an incremental value from 'f1' or 'f2' to 'f3,'* as shown in FIG. 4" and "provides more power by decreasing the non-resonant transmission frequency by *an incremental value from 'f3' to 'f1' or 'f2.'*" (emphasis added)). That testimony is, at this stage, unrebutted.

We determine that Petitioner has shown sufficiently for purposes of institution that Onishi discloses limitations 1.7 and 1.8.

i. Conclusion as to Independent Claim 1

Having considered the parties' arguments and evidence, we determine that Petitioner has demonstrated a reasonable likelihood of prevailing in its challenge to claim 1 as anticipated by Onishi.

3. The Alleged Anticipation of Independent Claim 10 and Dependent Claims 2–6, 8, and 11–13 by Onishi

Claim 10 is an independent method claim. The remaining claims in this ground are dependent claims. Petitioner, with the support of the testimony of Dr. Woods, addresses the limitations of these claims. *See* Pet. 37–47. Patent Owner does not present arguments regarding Petitioner's contentions beyond those already addressed. *See* Prelim. Resp. 54–55 (arguing that Petitioner has not met its burden for the "substantially different" limitation of independent claim 10 "for at least the reasons explained above," and, "[a]s explained above in Section VI.A.1, Onishi does not disclose an incremental change [of dependent claim 13]").

Having considered the parties' arguments and evidence, we determine that Petitioner has demonstrated a reasonable likelihood of prevailing in its challenge to claims 2–6, 8, and 10–13 as anticipated by Onishi.

E. The Alleged Obviousness of Claims 1–6, 8, and 10–13 over Onishi and Purdy (Ground 1B)

Petitioner alleges that all of the challenged claims (claims 1–6, 8, and 10–13) would have been obvious over Onishi and Purdy. *See* Pet. 47–52. Petitioner asserts this ground in the alternative to the Onishi anticipation ground discussed above. Petitioner contends that,

[E]ven if the “first signal” and “second signal” of claim 1 . . . and the “feedback signal” of claim 10 . . . were narrowly viewed to import particular embodiments from the '204 patent specification to require that the signals communicate specific operational parameters, Purdy demonstrates that the use of such feedback signals was commonly implemented in similar battery charger systems before the '204 Patent.

Id. at 49–50 (citing Ex. 1005 ¶¶ 12, 13, 36, 37, 45, 46, Fig. 3; Ex. 1003 ¶ 95) (brackets in original).

Petitioner, with the support of the testimony of Dr. Woods, addresses the limitations of the challenged claims when Purdy's parameter teachings are applied to Onishi's teachings. *See* Pet. 47–52. Patent Owner does not present arguments regarding Petitioner's contentions beyond those already addressed. *See* Prelim. Resp. 55–56 (arguing that “Purdy fails to cure the above described deficiencies of Onishi, nor has Petitioner made such an allegation.”).

Having considered the parties' arguments and evidence, we determine that Petitioner has demonstrated a reasonable likelihood of prevailing in its challenge to claims 1–6, 8, and 10–13 as being obvious over Onishi and Purdy.

F. The Alleged Obviousness of Claims 1–6, 8, and 10–13 over Baarman392 and Tocci (Ground 2)

Petitioner alleges that independent claims 1 and 10 and dependent claims 2–6, 8, and 11–13 would have been obvious over Baarman392¹³ and Tocci. *See* Pet. 52–73 (addressing claim 1 and the proposed combination). Patent Owner argues that Petitioner has failed to show how the proposed combination would have rendered obvious limitations 1.5, 1.7, 1.8, and 10.1 and dependent claim 13, and argues that “a POSITA would not be motivated to combine Baarman392 and Tocci.” Prelim. Resp. 56¹⁴; *see also id.* at 56–61.

1. Baarman392 (Ex. 1006)

Baarman392 discloses “[a]n inductive charging system for recharging a battery,” with the system including a charger circuit and a secondary circuit. Ex. 1006, code (57) (Abstract).

¹³ For Baarman392, Petitioner cites to Exhibit 1008, which is a different Baarman reference, namely Baarman736. We, like Patent Owner, understand Petitioner to be referring to Exhibit 1006. *See* Pet. 1–2 (tables of grounds and references); *see, e.g.*, Prelim. Resp. 56 (citing to Exhibit 1006).

¹⁴ This quoted material is from Patent Owner’s summary of its arguments regarding Ground 2. We are unable to locate in the Preliminary Response any further argument regarding a motivation to combine Baarman392 and Tocci.

Figure 2 of Baarman392 is reproduced below.

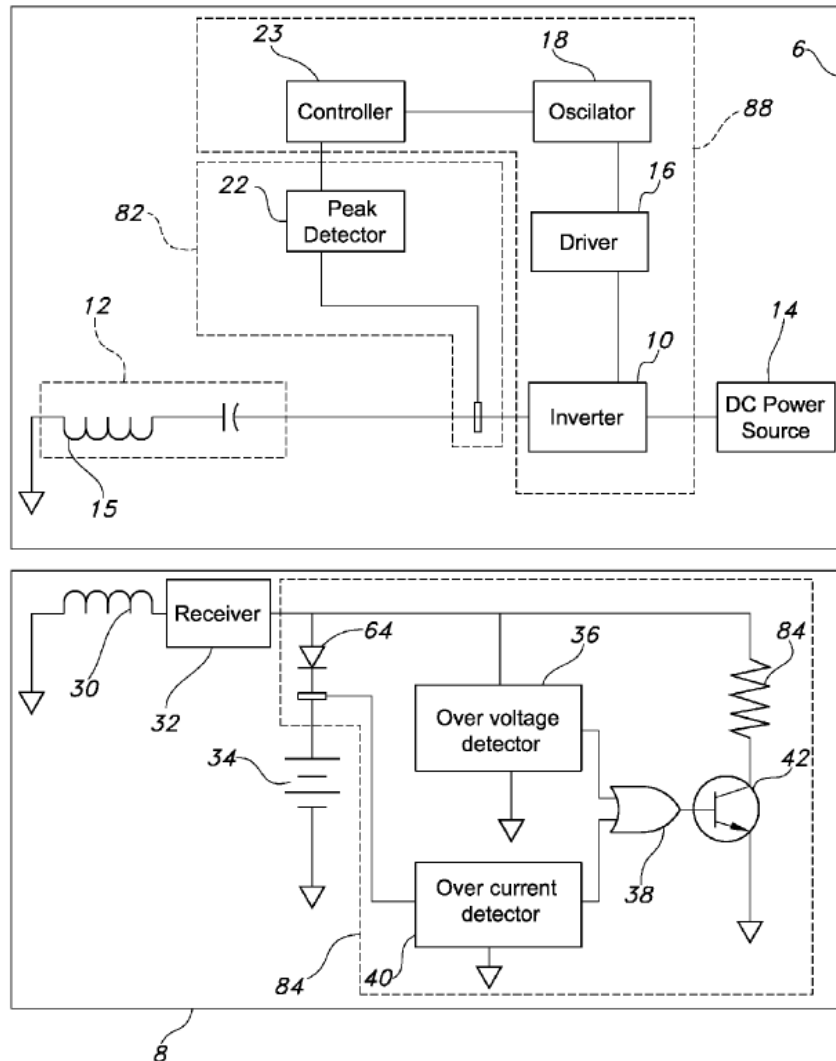


FIG. 2

Figure 2 depicts “a system for inductive charging of a battery.” *Id.* ¶ 26.

The system includes charger circuit 6 and secondary circuit 8. *Id.* ¶ 32. “The charger circuit 6 generally includes a primary coil 15, a frequency controller 80 for applying power to the primary coil at a desired frequency and a feedback detector 82 for receiving feedback from the secondary circuit 8.” *Id.* “The secondary circuit 8 generally includes a secondary coil 30 for receiving inductive power from the charger circuit 6 and a

feedback mechanism 84 for providing feedback to the charger circuit 6 indicative of the voltage or current in the secondary circuit 8.” *Id.* “The frequency controller 80 varies the frequency of the power applied to the primary coil 15 as a function of the feedback from the secondary circuit 8.” *Id.*

Figure 3 of Baarman392 is reproduced below.

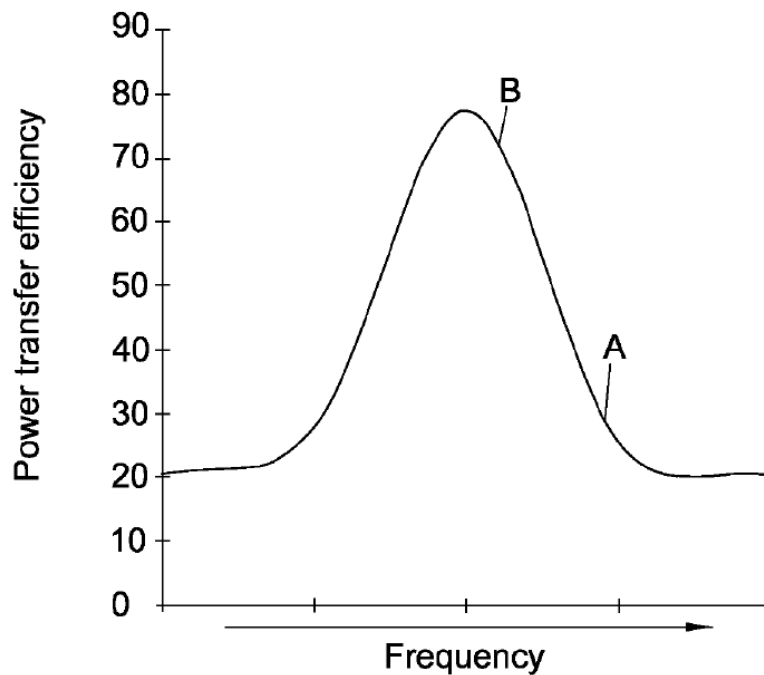


FIG. 3

Figure 3 depicts an exemplary power transfer curve for primary coil 15 and secondary coil 30. *Id.* ¶ 38.

Baarman392 states

In the illustrated embodiment, the primary coil 15 and the secondary coil 30 are loosely coupled. Because the two are loosely coupled in this embodiment, the slope of the power transfer curve about the resonant frequency is not as steep as if the coils 15, 30 were tightly coupled. An exemplary power transfer curve for the coils 15, 30 is shown in FIG. 3. In this embodiment, the power transfer is highest when the inverter 10

is operating at resonance. However, even if the inverter 10 is not operating at resonance, significant power transfer can occur when the inverter is operating off-resonance. Generally, the inverter 10 is operated between frequency A and frequency B. Frequency B is somewhat less than the resonant frequency. Between frequency A and frequency B, the power transfer curve can be piece-wise linearized by a software lookup table located in the controller 20. Thus, a decrease in the operating frequency of the inverter 10 will result in a generally predictable increase in the power transferred from the primary coil 15 to the secondary coil 30. As can be seen by the graph, it would be equally effective to use an operating frequency less than the resonant frequency. If so, then an increase in the operating frequency would lead to an increase in the power transfer, and vice-versa.

Id. ¶ 38.

2. *Tocci (Ex. 1009)*

Tocci is a textbook directed to the principles of digital systems. *See* Ex. 1009, 1. Tocci contains a discussion of Boolean algebra including the use of Boolean algebra to describe and analyze logic gates such as OR, AND, and NOT. *See, e.g., id.* at 18.

3. *Discussion*

Petitioner contends that Baarman392 discloses and teaches much of the subject matter of independent claim 1. *See* Pet. 61–73. Petitioner further contends that, “[a]lthough Baarman392 frames the description of its charger circuit 6 as either receiving feedback indicating an abnormal charging condition or not receiving such feedback, Baarman392 does not expressly describe the underlying logic/form of such feedback.” *Id.* at 57–58. According to Petitioner, a person of ordinary skill in the art, “however, would have immediately recognized conventional techniques for expressing binary conditions like binary feedback options disclosed in Baarman392,”

and “Tocci teaches the then-popular and well-established concept of expressing binary conditions as Boolean variables.” *Id.* at 58 (citing Ex. 1003 ¶ 105; Ex. 1009, 57). Petitioner provides contentions as to several reasons why a person of ordinary skill in the art would have made the proposed combination. *See id.* at 60–61. Petitioner, for example, contends that a person of ordinary skill in the art “would have been motivated to implement Baarman392’s charging condition feedback using a conventional Boolean variable because Tocci expressly suggests that it would advantageously enable ‘relatively easy’ Boolean algebra to be performed with the detected logic levels (e.g., at Baarman392’s feedback detector 82).” *Id.* at 60 (citing Ex. 1009, 57; Ex. 1003 ¶ 108).

For the “substantially different” limitation 1.5, Petitioner provides an annotated version of Figure 3 of Baarman392, which we reproduce below.

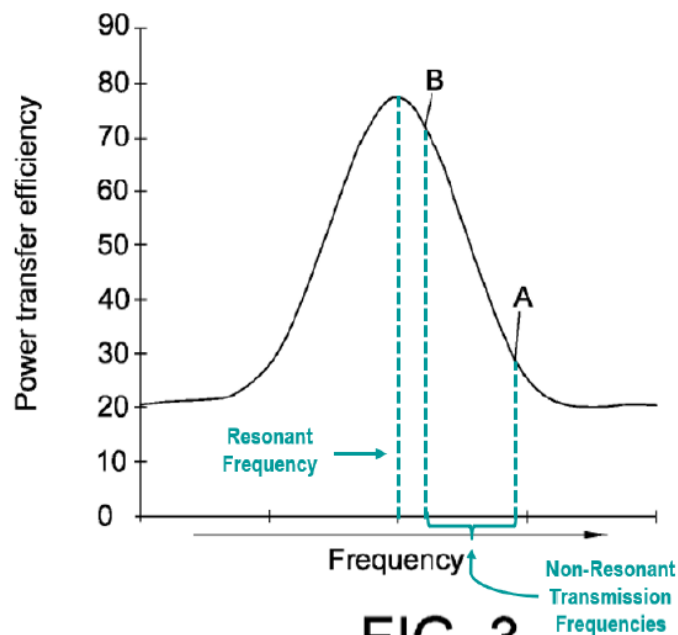


FIG. 3

Above is Figure 3 of Baarman392, depicting a power transfer curve (Ex. 1006 ¶ 38) with Petitioner’s annotations including labels indicating the resonant frequency and the range of non-resonant transmission frequencies

in the range from point A to point B on the curve. Pet. 67. Petitioner asserts that Baarman392 teaches “inverter 10 (in connection with driver 16) produces a driving voltage at a non-resonant transmission frequency within a near-linear region of the power transfer curve.” *Id.* at 68 (citing Ex. 1003 ¶ 120). Petitioner additionally asserts that the positions of “Baarman392’s transmission frequencies between A and B in the frequency-response curve” are “strikingly similar” to “the transmission frequency (e.g., f_i in FIG. 6B)” that is identified as “substantially different” in the ’204 patent. *Id.*

For limitation 1.7, concerning increasing the transmission frequency by an “incremental value,” Petitioner contends that Baarman392 discloses “provid[ing] less power by increasing the non-resonant transmission frequency by an incremental value when a feedback signal is detected that indicates an abnormal charging condition (e.g., an over-current or overvoltage situation).” Pet. 71–72 (citing Ex. 1006¹⁵ ¶¶ 15, 19, 33, 38, 56, 59, Figs. 3, 7; Ex. 1003 ¶ 125). Petitioner further contends that the combination of Baarman392 and Tocci “would have been implemented so that an abnormal charging condition would be represented by a first Boolean logic signal (***first signal***) such as LOW,” and that, “[i]n this context, Baarman392-Tocci’s driver would have predictably provided less power by increasing the non-resonant transmission frequency by twice the value of $\Delta FREQ$ when the first Boolean logic signal is detected by the peak detector 22 and controller 20 (collectively, the claimed signal detector).” *Id.* at 72 (citing Ex. 1009, 57; Ex. 1003 ¶ 126). Petitioner makes similar

¹⁵ Petitioner cites to Exhibit 1004, which is Onishi. We understand this to be a typographical error, and that it should be Exhibit 1006.

contentions for limitation 1.8, which pertains to decreasing the transmission frequency by an “incremental value.” *See id.* at 72–73.

Patent Owner makes an argument regarding a chronological aspect of limitation 1.8. *See* Prelim. Resp. 57–58. The limitation calls for a driver configured to decrease the transmission frequency “when said second signal is detected by the detector.” Ex. 1001, 28:43–45. Patent Owner argues that a person of ordinary skill in the art would interpret this language such that detection of the second signal is “effectively triggering the decrease in frequency, which Baarman392 does not disclose.” *Id.* at 57–58 (citing Ex. 2001 ¶ 83). Patent Owner asserts that “Petitioner alleges that Baarman392 discloses a frequency controller that ‘is configured to provide more power by decreasing the non-resonant transmission frequency by an incremental value when a feedback signal is detected that *indicates an abnormal charging condition.*’” *Id.* at 57 (citing Pet. 72–73) (emphasis added). Patent Owner then argues that Baarman392 uses a particular feedback signal to *stop* decreasing the frequency, rather than triggering the start. *See id.* at 57–58 (citing, *inter alia*, Ex. 1006 ¶ 19, Fig. 7).

It is not clear that Patent Owner is addressing a contention made by Petitioner. We are unable to locate, on the cited pages 72–73 of the Petition, Patent Owner’s quoted language regarding triggering a frequency decrease on a feedback signal indicating the existence of an abnormal condition. The sentence in the Petition that is similar to Patent Owner’s purported quote states the contention that the frequency controller of Baarman392 is configured to provide more power by decreasing the frequency “when there is *no* indication of an abnormal charging condition.” Pet. 72 (emphasis

added); *see id.* at 73 (Petitioner associating the triggering “second signal” to a *normal charging condition*).

Regarding limitation 1.5 (“substantially different”), Patent Owner notes that Baarman392 states that frequency B on the curve is “is somewhat less than the resonant frequency.” Prelim. Resp. 59 (quoting Ex. 1006 ¶ 38) (emphasis omitted). Patent Owner argues that, “[h]owever, frequencies ‘*somewhat less than* the resonant frequency’ are—by definition—not *substantially different from* the resonant frequency, as claimed.” *Id.* Patent Owner further argues that independent claims 1 and 10 require a transmission frequency “‘meaningfully different from [the] characteristic resonant frequency’ in order ‘to mitigate against large unintended fluctuations in induced voltage,’” and therefore require the frequency to be in the near-linear/linear region of a frequency-amplitude graph. *Id.* (quoting Ex. 2001 (Dr. Mercier’s Declaration) ¶ 66; citing Ex. 2001 ¶¶ 63, 67, 68).

Patent Owner then argues

Baarman392 does not describe or conclusively show either of frequencies A or B as lying within such a region, and if anything, suggests a system lacking in *the stability and predictability that the claims of the ’204 Patent attempt to achieve* due to the express inclusion of a near (or “somewhat less than”) resonant frequency within the operable transmission frequency range. Accordingly, Baarman392 suggests operation at or near resonant frequency

Id. at 59–60 (emphasis added).

To the extent that Patent Owner argues that stability and predictability are required, we note that the claims do not expressly recite such language, and Patent Owner has not explained adequately why the claims should be so limited. Additionally, we note that Patent Owner’s argument is in terms of the discrete points A and B, whereas Baarman392 discloses that,

“[g]enerally, the inverter 10 is operated between frequency A and frequency B,” i.e., a range from frequency A and frequency B. Ex. 1006 ¶ 38.

Relatedly, Patent Owner refers to Petitioner’s contentions for limitation 1.7 and argues that “[t]his alleged increase of the transmission frequency—from frequency B to frequency A in Figure 3—would occur at or near the resonant frequency,” and “this adjustment is not an incremental increase *to a non-resonant transmission frequency* as required by claim element [1.7].” Prelim. Resp. 56–57 (citing, *inter alia*, Pet. 71–72) (brackets in original; emphasis added). It is not clear that Patent Owner is properly characterizing Petitioner’s contentions, which, for limitation 1.7, do not mention an adjustment applied to the specific, discrete points A or B. *See* Pet. 71–72.

Patent Owner asserts that “Baarman392 describes its power transfer curve for this range [between frequency A and frequency B] as ‘piece-wise linearized by a software lookup table,’” and argues that, “[a]ccordingly, the requirement for approximation by a piece-wise linear function demonstrates that the graph in Figure 3 of Baarman392 does not disclose ‘the near-linear regions of a frequency-amplitude graph associated with the inductive couple’ . . . as a piece-wise linear function is specifically used here to approximate a non-linear curve.” Prelim. Resp. 60 (citing Ex. 1006 ¶ 37; Pet. 8–9). On the present record, we do not agree with Patent Owner’s argument. The construction for “substantially different” frequencies we apply for purposes of this Decision is not limited to points on a *linear* portion of the curve. Even if Patent Owner’s interpretation of Baarman392 is correct, Patent Owner does not explain why the “non-linear curve” prior to being subjected to a piece-wise linear function is not indicative of a

near-linear region of the curve, which would fall within the scope of “substantially different.”

Patent Owner argues that Petitioner cannot rely on the purported similarities between the challenged patent’s Figure 6b and Figure 3 of Baarman392 because they utilize different variables on the y-axis (“Operational Voltage” and “Power transfer efficiency,” respectively). *See* Prelim. Resp. 60–61. This issue raised by Patent Owner would benefit from further development at trial.

For the reasons discussed above, we determine that the Petition does demonstrate a reasonable likelihood of prevailing on its Onishi-based grounds (Grounds 1A and 1B) as to all the challenged claims. Therefore, we institute an *inter partes* review on all challenged claims on all asserted grounds. *See SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348, 1354, 1359–60 (2018); 37 C.F.R. § 42.108(a) (“When instituting *inter partes* review, the Board will authorize the review to proceed on all of the challenged claims and on all grounds of unpatentability asserted for each claim.”). During trial, the parties will have the opportunity to further discuss their respective positions on the Baarman392-Tocci Ground 2.

IV. CONCLUSION

Petitioner has demonstrated a reasonable likelihood of prevailing in showing the unpatentability of at least one of the challenged claims of the ’204 patent. Further, we decline to discretionarily deny *inter partes* review. Accordingly, we institute an *inter partes* review on all challenged claims on all asserted grounds. *See SAS Inst. Inc.*, 138 S. Ct. at 1354, 1359–60; 37 C.F.R. § 42.108(a). At this stage of the proceeding, we have not

made a final determination with respect to the patentability of any of the challenged claims.

V. ORDER

For the foregoing reasons, it is

ORDERED that, pursuant to 35 U.S.C. § 314(a), an *inter partes* review of claims 1–6, 8, and 10–13 of the '204 patent is instituted with respect to all grounds of unpatentability set forth in the Petition; and

FURTHER ORDERED that, pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4(b), *inter partes* review of the '204 patent shall commence on the entry date of this Order, and notice is hereby given of the institution of a trial.

IPR2024-00995
Patent 9,083,204 B2

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