

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ANKER INNOVATIONS LTD.,
Petitioner,

v.

POWERMAT TECHNOLOGIES LTD.,
Patent Owner.

Case IPR2024-00994
Patent No. 9,048,696

PETITIONER'S REPLY TO PATENT OWNER'S RESPONSE

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EXHIBITS

EX1001	U.S. Patent No. 9,048,696 to Azancot (“the ’696 Patent”)
EX1002	Excerpts from the Prosecution History of the ’696 Patent (“the Prosecution History”)
EX1003	Expert Declaration of Gary Woods, Ph.D.
EX1004	U.S. Pub. No. 2008/0197804 (“Onishi”)
EX1005	U.S. Pat. No. 7,211,986 (“Flowerdew”)
EX1006	U.S. Pub. No. 2007/0236169 (“Purdy”)
EX1007	U.S. Pub. No. 2007/0279002 (“Partovi”)
EX1008	U.S. Pub. No. 2008/0079392 (“Baarman392”)
EX1009	Excerpts from Ronald J. Tocci et al., Digital Systems: Principles and Applications, Pearson Education International, 10th Edition (2007) (“Tocci”)
EX1010	U.S. Pub. 2009/0212736 (“Baarman736”)
EX1011	Declaration of June Munford
EX1012	U.S. Provisional App. Serial No. 61/064,618 (March 17, 2008)
EX1013	U.S. Provisional App. Serial No. 61/071, 151 (April 15, 2008)
EX1014	U.S. Provisional App. Serial No. 61/129,526 (July 2, 2008)
EX1015	U.S. Provisional App. Serial No. 61/129,859 (July 24, 2008)
EX1016	U.S. Provisional App. Serial No. 61/129,970 (August 4, 2008)
EX1017	PCT Publication No. WO2006/031133 (“Malpas”)
EX1018	Complaint, Powermat Technologies Ltd. v. Anker Innovations Ltd., Case No. 5-23-cv-00052 (E.D. Tex.), June 5, 2023

EX1019	Waiver of Service, Powermat Technologies Ltd. v. Anker Innovations Ltd., Case No. 5-23-cv-00052 (E.D. Tex.), September 27, 2023
EX1020	Petitioner's Sotera Stipulation
EX1021-1100	[RESERVED]
EX1101	Second Expert Declaration of Gary Woods, Ph.D.
EX1102	Transcript of April 23, 2025 Deposition of Dr. Mercier

I. INTRODUCTION

The Patent Owner's Response (POR) fails to adequately rebut any of the obviousness grounds on which this IPR was instituted, which demonstrate a remarkable overlap between the cited references and the preferred embodiment of the '696 Patent. The POR attempts to distract from this overlap by excising out-of-context statements from the prior art while ignoring more fulsome explanations offered in the references and in expert testimony. The POR also contends that the prior art lacks a "substantially different" transmission frequency, but its arguments are premised on an unsupported and unduly narrow construction of the term "substantially different," along with an improper demand for even more explicit disclosure of a "substantially different" frequency in the prior art than the '696 Patent itself. Regardless, the substantial overlap between the prior art and the '696 Patent confirms that the instituted grounds provide a "substantially different" transmission frequency and render the Challenged Claims obvious under any of the proposed constructions. *Axonics, Inc. v. Medtronic, Inc.*, 75 F.4th 1374, 1380-84 (Fed. Cir. 2023); *Apple Inc. v. Andrea Elecs. Corp.*, 949 F.3d 697, 706-07 (Fed. Cir. 2020).

II. CLAIM CONSTRUCTION

PO erroneously seeks to import a limitation into the term "substantially different" that would not only require that (i) the transmission frequency fall within a linear/near-linear region of the frequency-amplitude graph, but that would further

require that (ii) the transmission frequency “allow for some incremental change (increase or decrease) in frequency while remaining in the near-linear regions of the frequency-amplitude graph.” POR, 23-29. Petitioner does not dispute that the term “substantially different” encompasses the first portion of the construction (i.e., frequencies that fall within the linear/near-linear regions). Pet., 7-9.

No legitimate basis exists, however, for further limiting “substantially different” to require an allowance for incremental change (i.e., a concept PO refers to as “linear control”). POR, 3-5, 28-29; EX1101, ¶¶7-15. The Board’s Institution Decision correctly rejected PO’s earlier attempt to inject a requirement for linear control in claim 1. Paper 7, 21-22. Here, the POR cites no new arguments or evidence that compel a different result. Indeed, the POR identifies nothing in the claims, specification, or file history that indicates any intention to narrowly define or disavow the scope of “substantially different” to only those frequencies that allow for incremental change in the near-linear region of the frequency-amplitude graph. *Home Diagnostics, Inc. v. LifeScan, Inc.*, 381 F.3d 1352, 1358 (Fed. Cir. 2004) (“Absent a clear disavowal or contrary definition in the specification or the prosecution history, the patentee is entitled to the full scope of its claim language.”); *Hill-Rom Servs. v. Stryker Corp.*, 755 F.3d 1367, 1371-73 (Fed. Cir. 2014); *Samsung Elecs. Co. v. Power2B, Inc.*, 2025 U.S. App. LEXIS 7354 (Fed. Cir. Mar. 31, 2025). *see also* EX1002, 69-72, 110-111 (file history including no discussion of

incremental change as a requirement for “substantially different” frequency); EX1001, 4:1-17 (“Preferably” “Optionally”), 21:16-23 (“of embodiments,” “Preferably”); 21:56-65 (“For example”), 22:45-64 (“One example”). EX1101, ¶¶7-15. In short, the Board should maintain its preliminary determination from the Institution Decision and reject PO’s attempt to import an additional unclaimed limitation in the term “substantially different.”

III. GROUND 1A: THE ONISHI-FLOWERDEW COMBINATION RENDERS CLAIMS 1-7, 9-10, AND 13-14 OBVIOUS

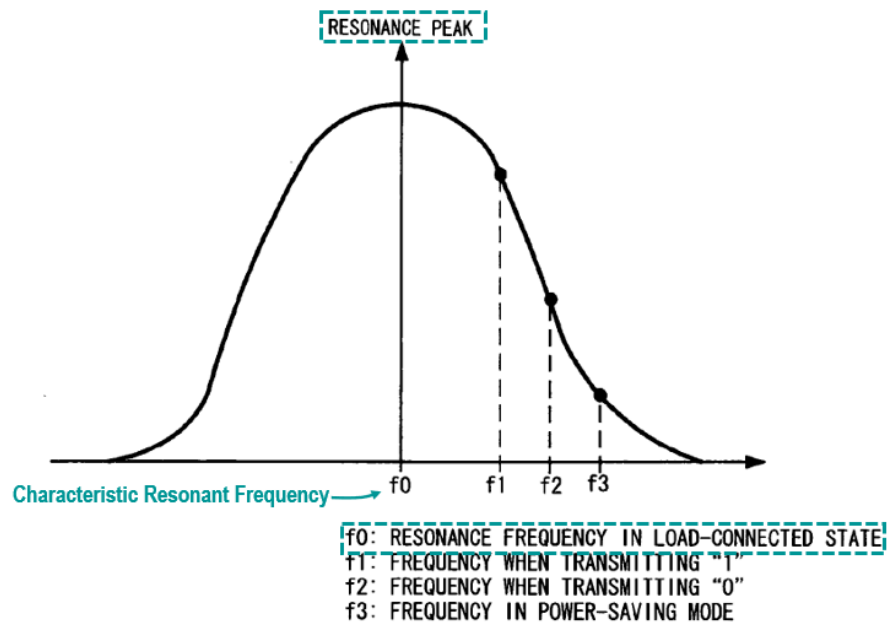
A. Element [1.4] – “... inductive couple having a characteristic resonant frequency”

PO first argues that that the Onishi-Flowerdew Combination fails to teach an “inductive couple having a characteristic resonant frequency” as recited in Element [1.4]. Not so. PO’s argument is premised entirely on a strained reading of a single sentence in paragraph [0180] of Onishi, but that reading is divorced of context and contradicted by the *next sentence* of Onishi’s disclosure. PO’s argument also cannot be correct because it fails to acknowledge that a characteristic resonant frequency is an inherent property of an inductively coupled system like Onishi’s. POR, 31-37; EX1101, ¶¶16, 21.

More specifically, PO’s argument begins with the first sentence of Onishi’s disclosure at paragraph [0180], which states that “FIG. 4 is a view showing the resonance characteristics of *the induction coil* and applications of frequencies.”

POR, 31-32; EX1004, [0180]. Based on the singular form of “coil” in this sentence, PO contends that Onishi’s discussion pertains only to “a *single* primary coil L1” as opposed to “the resonance characteristics of an inductive *couple* formed by a pair of induction coils (*i.e.*, primary coil L1 *and* secondary coil L2).” POR, 31-32 (emphasis in original).

FIG. 4



EX1004, FIG. 4 (as annotated in Petition, p. 22).

The notion that FIG. 4 does not represent the characteristics of a coupled system is wrong and belied by compelling evidence to the contrary. EX1101, ¶¶17-19. The next sentence in paragraph [0180] clarifies what FIG. 4 represents, namely “[t]he resonance characteristics of the primary coil L1 *and* the secondary coil L2

when the portable telephone 510 is placed on the charger 500 (cradle) (i.e., *when load exists* with respect to the power transmission device 10) (see FIG. 1A) have a symmetrical and broad mountain shape, *as shown in FIG. 4.*” EX1004, [0180] (emphasis added). Onishi is thus unambiguous that FIG. 4 does not illustrate the frequency-response of a single coil in isolation as PO avers, but instead illustrates the “resonance characteristics of the primary coil L1 *and* the secondary coil L2” when the coils are brought in electromagnetic proximity of each other for charging—i.e., in an *inductively coupled* state. EX1101, ¶¶17-18. The text of FIG. 4 itself even explicitly labels frequency f_0 as the “RESONANCE FREQUENCY IN LOAD-CONNECTED STATE.” EX1004, FIG. 4; *see also id.*, [0180]-[0182].

A POSITA also would have understood that a frequency-amplitude graph for even a single coil in a couple state would represent the resonance characteristics of the inductive system as a whole, including the characteristic resonant frequency of the inductive couple. EX1101, ¶¶19-20. This follows because the resonant frequency of a single coupled coil is the same as/indistinct from the resonant frequency of the inductive couple—even if the resonant frequency of the coil in isolation is different than the resonant frequency of the coil when coupled. EX1101, ¶¶19-20. There is therefore nothing inconsistent between Onishi’s mention of a single coil in the first sentence of paragraph [0180] and the understanding that FIG. 4 represents the resonance characteristics of the inductive couple. Even FIG. 6B of

the '696 Patent is identified as a frequency-amplitude graph of induced voltage in a *single* coil of a coupled system. EX1001, 21:1-65, FIG. 6b; EX1102, 18:21-19:6, 20:13-20:22, 24:5-21.

The POR's citations to Dr. Woods' deposition testimony is non-availing. *See* POR, 32-34. Contrary to characterizations in the POR, Dr. Woods offered no "admissions" that support PO's position. Dr. Woods instead correctly acknowledged that Onishi's primary coil L1 and secondary coil L2 may have different characteristic resonant frequencies in isolation (uncoupled), and also correctly observed that the characteristic resonant frequency of an inductive couple formed between L1 and L2 may be different from their respective resonant frequencies in isolation (uncoupled). EX2007, 8:22-10:14, 9:10-21. None of these facts imply that there is anything deficient about Onishi's system or about FIG. 4 in particular. EX2007, 11:9-13:6. As discussed, the resonance characteristics of even a single couple coil are representative of the resonance characteristics of the inductively coupled system, especially since the resonant frequencies of the two coils when coupled converge to a common resonant frequency of the inductive couple. EX1101, ¶¶19-20; EX2007, 11:9-13:6.

Even apart from its erroneous interpretation of Onishi's straightforward disclosure, PO's argument fails for the additional reason that a characteristic resonant frequency is an inherent physical property of any inductive couple like that

disclosed in Onishi's. EX1101, ¶21. Both parties' experts agree. *Id.*; EX1102, 29:18-30:23 (testifying that "there is a characteristic resonant frequency in all cases" of a coupled system with a parabolic-shaped curve), 33:15-41:15 ("the resonant frequency of the primary coil in a coupled system would be the same as the resonant frequency of the primary coil in isolation"). Onishi discloses one such inductively coupled system. EX1004 ("The primary coil L1 ... is electromagnetically coupled with the secondary coil L2 ..."); EX1101, ¶21.

Finally, PO's citations to the *Wasica* and *W.L. Gore* cases miss the mark for multiple reasons. POR, 36-37. As addressed above, Onishi's disclosure is not "ambiguous" nor is it "unacceptably vague." Paragraph [0180] is clear that FIG. 4 illustrates the frequency response when coils L1 and L2 are coupled in the "load-connected state." EX1004, [0180], FIG. 4. Moreover, as discussed, the claimed characteristic resonant frequency of an inductive couple is an inherent property of Onishi's system regardless of the interpretation of FIG. 4. EX1101, ¶¶21.

B. Element [1.7] – “wherein said driving circuit is configured and operable to produce said oscillating driving voltage at a transmission frequency substantially different from said characteristic resonant frequency of said inductive couple”

The POR next fails to refute the Petition's showing that Onishi provides a transmission frequency "substantially different" from "the characteristic resonant frequency of said inductive couple." As discussed further below, the POR's

critiques of Onishi are not credible, particularly in light of the substantial overlap between Onishi and the preferred embodiment in the '696 Patent. POR, 37-48.

1. Onishi Discloses and Renders Obvious Transmission Frequencies f_1 , f_2 , and f_3 Substantially Different from the Characteristic Resonant Frequency of the Inductive Couple

Onishi and the '696 Patent both describe transmission frequencies in essentially the same region of a frequency-amplitude graph. EX1101, ¶22-29. In the preferred embodiment of the '696 Patent, the transmission frequency is selected between f_U and f_b as illustrated in FIG. 6b below. During prosecution, PO described the region between f_U and f_b as “near-linear,” although though the patent offers no more specific or quantitative guidance about this region, including how linear the region must be.

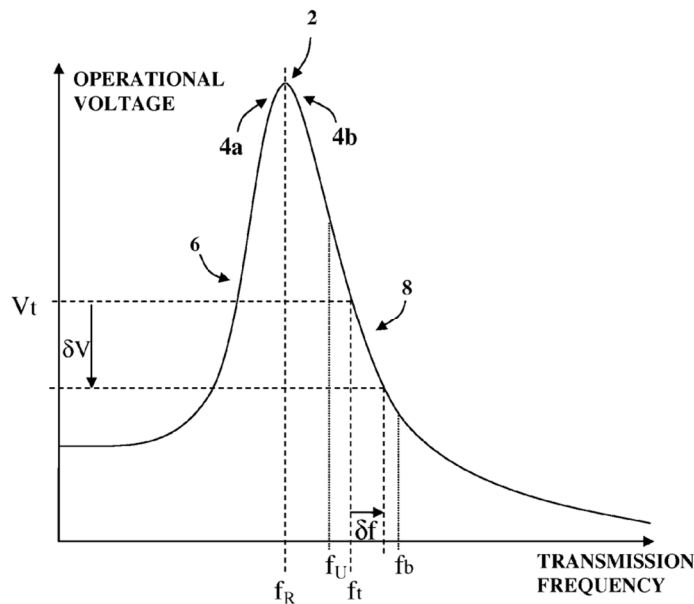
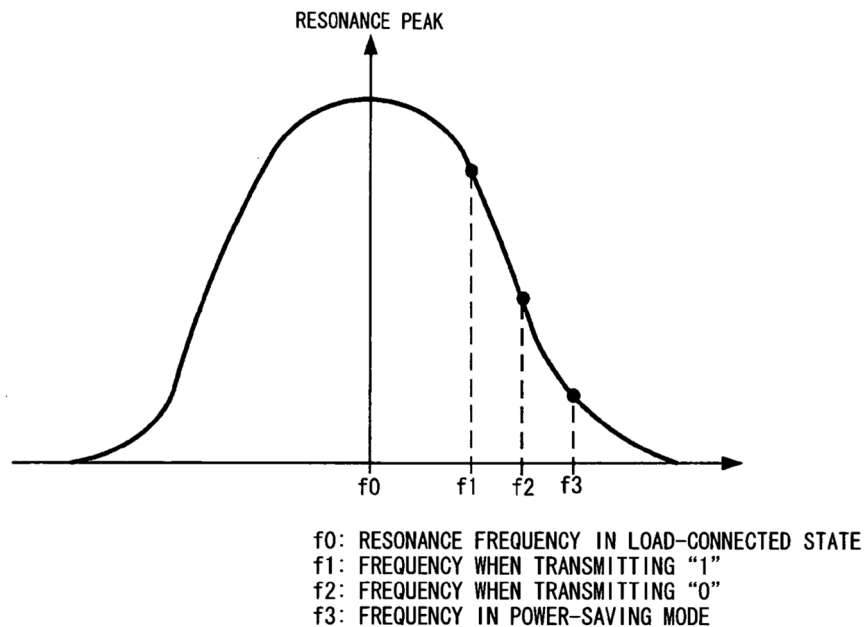


Fig. 6b

EX1001, FIG. 6B; *see also id.*, 21:16-23, 21:56-65.

Onishi similarly discloses three transmission frequencies (f_1 , f_2 , f_3) that each lie within substantially the same region of the frequency-amplitude graph as the region identified in FIG. 6b of the '696 Patent:



EX1004, FIG. 4, [0180]-[0181]. As Dr. Woods observed in his first declaration, “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 '696 specification confirms that Onishi provides transmission frequencies that are ‘substantially different’ from the characteristic resonant frequency ... ” at least to the same extent as the '696 Patent. EX1003, ¶68; EX1101, ¶¶22-23.

Despite the clear overlap between Onishi’s disclosure and the '696 Patent, PO nonetheless contends that none of f_1 , f_2 , nor f_3 qualifies as a frequency that is

“substantially different.” This is demonstrably false. For instance, as to f_1 and f_2 , PO argues that these frequencies “are at or near the resonance frequency” and therefore not “substantially different.” POR 38-39. The primary support PO draws for this argument comes from paragraph [0053] of Onishi, which explains that “[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[]”¹ EX1004, [0053]; POR, 38-39. But this sentence only addresses the *relative* positions of the transmission frequencies during normal power transmission (f_1 , f_2) and during power-saving power transmission (f_3). EX1004, [0053] (“*as compared with*”). Nothing in paragraph [0053] or elsewhere in Onishi implies that f_1 and f_2 “are at or near the resonance frequency” as alleged. Frequencies f_1 and f_2 are merely positioned closer to resonance than f_3 , much like f_U is relatively closer to resonance than f_b in FIG. 6b of the ’696 Patent. EX1101, ¶¶31-34; *see also id.* ¶¶24-25, 27, 29-30.

PO’s contention that f_1 and f_2 are necessarily at or near resonance merely because f_3 is even farther from resonance is illogical and contrary to the clear

¹ Frequencies f_1 and f_2 are used during normal power transmission while frequency f_3 is used during power-saving power transmission. EX1004, [0134], [0162], [0181], [0211], [0214]-[0215].

disclosure in FIG. 4, which shows f_1 and f_2 set significantly apart from f_0 . EX1004, FIG. 4. If Onishi had intended f_1 and f_2 to be at or near resonance, f_0 , f_1 , and f_2 would be depicted closer toward resonance than they are in FIG. 4. EX1101, ¶¶31-32. The substantial separation between the frequencies f_0 , f_1 , and f_2 would have been understood by a POSITA as a clear indication that f_1 and f_2 are substantially different from the resonant frequency f_0 . EX1101, *Id.*; *see also* [0181] (“the relationship ‘ $f_1 > f_2 > f_3$ ’ is satisfied”); *cf.* EX1102 42:2-44:1 (acknowledging in the ’696 Patent that the near-linear region includes frequencies that are closer to the resonance frequency as compared to other frequencies in the near-linear region); *see also id.*, 18:21-19:6, 20:13-22, 24:5-21, 29:17-30:23, 34:7-16, 36:6-9, 40:20-41:11, 48:6-49:13, 65:17-66:2. PO’s related criticisms of the “broad mountain shape” of Onishi’s graph are also baseless since, as shown in FIG. 4, frequencies f_1 and f_2 both fall well outside the broad cap of the curve and are instead positioned on the near-linear slope to the side of the broad cap. EX1004, [0180], FIG. 4; EX1101, ¶33.

PO’s efforts to dismiss Onishi’s frequency f_3 as not “substantially different” from the characteristic resonant frequency are also non-availing. EX1101, ¶¶35-38, *see also id.* ¶¶24, 26-30. Onishi expressly describes f_3 as a “transmission frequency during power-saving power transmission” that “is set at a frequency *apart* from the resonance frequency (resonance peak).” EX1004, [0053] (emphasis added);

EX1101, ¶36. As shown in FIG. 4, frequency f_3 is “substantially different” from resonant frequency f_0 under any reasonable understanding of Onishi’s figure and under any reasonable interpretation of the claim term “substantially different.” EX1004, [0181], [0214]-[0215], [0226], FIG. 4. Indeed, f_3 must be set substantially off-resonance to achieve the lower power transmission levels that are desired and characteristic of Onishi’s power-saving power transmission mode. *Id.* Onishi’s frequency f_3 is also not located far out on the tail of the graph instead lies to the side of the peak in a similar position to frequencies near the boundary f_b in FIG. 6b of the ’696 Patent. EX1004, FIG. 4 (position of f_1 , f_2) *cf.* EX1001, FIG. 6b; EX1101, ¶36.

Onishi explains that f_3 “is a frequency used in the power-saving mode” and is selected such that “the power transmission device can reliably detect a change in load state by determining a change in amplitude using the threshold value.” EX1004, [0181], [0064]. These teachings, in view of FIG. 4 of Onishi, indicate that the position of f_3 is not only set sufficiently apart from resonance to achieve lower power transfer, but also would not be so far from resonance that the power transmission device could not reliably detect the change in load state. EX1101, ¶37. A POSITA would have understood that frequencies at the far end of the near-linear region of the frequency amplitude graph would meet these criteria and that frequency f_3 would thus be set in the near-linear region of the graph. *Id.* This would allow for some incremental change (e.g., increase) without incurring a large unpredictable

fluctuation of induced voltage in order to “reliably detect a change in load state by determining a change in amplitude using the threshold value.” EX1004, [0064], EX1101, ¶ 37. Contrary to PO’s argument, f3 being positioned in a region where a small amount of power transmitted is consistent with positioning f3 at the lower boundary of the near-linear region as shown in FIG. 4. EX1101, ¶38; EX1004, [0064], [0180]-[0181], FIG. 4.

2. A POSITA Would Have Understood Onishi’s FIG. 4

The POR’s attacks on FIG. 4 of Onishi as allegedly lacking sufficient detail do not withstand scrutiny. POR, 37-49; EX1101, ¶¶39-45. PO argues that FIG. 4 does not disclose the “the actual locations” of f1, f2, and f3 on the frequency-amplitude graph, but the Petition does not address FIG. 4 in isolation. The Petition instead analyzes FIG. 4 in the context of Onishi’s detailed description of the figure and its explanation of the relationship between f1, f2, and f3 in FIG. 4. *See Supra* §III.V.1. Onishi expressly discloses that these frequencies correspond to actual frequencies used by the system in operation. EX1004, [0180]-[0181] (“applications of frequencies” and “f1 is a frequency used... f2 is a frequency used... f3 is a frequency used”), FIG. 4, *see also* [0134], [0162], [0180], [0211]-[0212], [214]-[0215], [0226], [0230], [0232], [0234], FIG. 3A. Noticeably, Onishi’s frequencies are positioned nearly identically to the transmission frequencies shown in the ’696 Patent. *Compare* EX1004, FIG. 4 *with* EX1001, FIG. 6B; EX1101, ¶¶39-40.

PO also argues that Onishi's FIG. 4 is deficient because of its lack of dimensions, vertical-axis labels, and quantitative values. POR, 40-41. These details, however, would not have been necessary for a POSITA to understand whether a transmission frequency is "substantially different" from the resonant frequency of an inductive couple or whether a transmission frequency lies in a linear/near-linear region of the frequency-amplitude graph. EX1101, ¶¶41-45. This is evident from the '696 Patent itself, which similarly lacks any express dimensions or scale with respect to the representative frequency-amplitude graph of FIG. 6B. *See* EX1001, FIG. 6B. The '696 Patent provides no dimensions or quantitative values to define a "substantially different" transmission frequency at all—i.e., a fact specifically recognized by the Examiner during prosecution. EX1002, 129-130 (lamenting lack of "numerical guidance"). PO's arguments improperly demand more detail from the prior art than the '696 Patent itself. If a POSITA would have understood where the near-linear region is based on the disclosure of the '696 Patent without "numerical guidance," they would also know how to interpret FIG. 4 in Onishi. *In re Epstein*, 32 F.3d 1559, 1568 (Fed. Cir. 1994); *Uber Techs., Inc. v. XOne, Inc.*, 957 F.3d 1334, 1339 (Fed. Cir. 2020) ("specification ... is entirely silent ... suggesting that a [POSITA] was more than capable"); *In re Publicover*, 813 F. App'x 527, 532 (Fed. Cir. 2020) (rejecting argument that a POSITA would not know how to implement the prior art since the patent's "specification is just as sparse"). Moreover, Dr.

Woods explains how a POSITA would have understood FIG. 4 to represent power transfer in Onishi's coupled system across a range of frequencies. EX1101, ¶¶41-45.

PO's cited case law is also distinguishable and does not support the criticisms levied against Onishi's illustration in FIG. 4. POR, 40. For example, *Hockerson* observes that "patent drawings [that] do not define the precise proportions of the elements ... may not be relied on to show particular sizes," but the Petition does not rely on FIG. 4 to show "particular sizes" or even a particular frequency. The frequency-amplitude graph in FIG. 4 instead shows illustrates a broad range of frequencies comparable to FIG. 6B of the '696 Patent. *See* EX1002, 110-111 ("the claims interpreted in light of the specification, at least with respect to Fig. 6b teach one of ordinary skill in the art what is meant by 'substantially Different' as disclosed and claimed by Applicant."). Onishi is further distinguishable from the cited case law because, as discussed above, Onishi is not silent on the position of the frequencies f_1 , f_2 , f_3 relative to the frequency amplitude graph. EX1004, [0134], [0162], [0181], [0211]-[0212]; [0226], FIG. 5; *supra* §III.B.1; *see also IQRIS Techs. LLC v. Point Blank Enters.*, 130 F.4th 998, (Fed. Cir. Mar. 7, 2025) ("To restrict each reference's teachings to the particular way ... , as [Patent Owner] insists we should do, would improperly fail to read these references for all that they disclose"); *In re Mraz*, 455 F.2d 1069, 1072 (CCPA 1972) (that which "patent drawings show

clearly” should not be “disregarded”).

C. The Onishi-Flowerdew Combination Renders Claim 2 Obvious

For claim 2, Patent Owner again relies on its arguments that the frequencies disclosed in Onishi (e.g., f_1 , f_2 , f_3) are not substantially different. POR, 49-51. These arguments are deficient for at least the same reasons addressed above with respect to Element [1.7]. *See supra* §III.B. Accordingly, all changes in Onishi’s transmission frequencies, whether increasing from f_1 to f_2 , f_1 to f_3 , or f_2 to f_3 or decreasing from f_3 to f_2 , f_3 to f_1 , or f_2 to f_1 , will result in a substantially linear change in transmission power and induced voltage. *See supra* §III.B; Pet., 28-38. Moreover, claim 2 never recites that the transmission frequency *after* the increase/decrease must also be substantially different from the resonant frequency of the inductive couple, or that the transmission frequency must remain in the linear/near-linear region of the graph. EX1001, 28:47-54. Nonetheless, Onishi would still meet these features even if claim 2 was narrowly interpreted to require them, especially since f_1 , f_2 , and f_3 all lie in the linear/near-linear region of the graph as discussed above.² EX1101, ¶¶46-47. For each of these reasons, and those

² For these same reasons, Onishi likewise meets the additional requirement for an allowance for incremental change that PO seeks to inject in “substantially different” as recited in claim 1.

discussed in further detail in the Petition, claim 2 would have been obvious based on Onishi-Flowerdew. *Id.*.

D. Onishi-Flowerdew Combination

PO's arguments against the predictable Onishi-Flowerdew combination are rooted in an erroneous premise that the combination bodily incorporates Flowerdew's specific charging structures and alignment mechanisms in Onishi's charging system. POR, 51-52. Indeed, the core of PO's non-combinability argument is that Flowerdew's horizontal coupling and long solenoidal coil would be incompatible with Onishi's charging system. *Id.* But this is not how the Petition proposed to combine Onishi and Flowerew, nor is it what the law requires. *In re Mouttet*, 686 F.3d 1322, 1332 (Fed. Cir. 2012); *In re Keller*, 642 F.2d 413, 425 (CCPA 1981).

Instead, the Petition properly addressed the obviousness of applying Flowerdew's suggestion for a conventional alignment mechanism in Onishi's charger—without ever proposing bodily incorporation of a specific coil configuration or alignment mechanism that would not be equally suitable to Onishi's charger. Pet., 15-17. The Petition cited evidence that a POSITA would have had multiple motivations to implement Onishi's charger in accordance with Flowerdew's suggestion and explained why a POSITA would have reasonably expected success. Pet., 14-17; EX1003, ¶¶49-55; EX1101, ¶¶48-50. The POR does

not refute any of the specific motivations identified in the Petition, nor does the POR address the simple matter of whether a POSITA would have reasonably expected success implementing a conventional alignment mechanism in Onishi (as opposed to bodily incorporating Flowerdew's structure). A POSITA would have been more than capable of implementing such conventional features in Onishi's system. *Intel Corp. v. PACT XPP Schweiz AG*, 61 F.4th 1373, 1379 1379-81 (Fed. Cir. 2023) ("a person of ordinary creativity, not an automaton"); Pet., 14-17; EX1003, ¶¶49-55; EX1101, ¶¶48-50.

IV. GROUND 1B: THE ONISHI-FLOWERDEW-PARTOVI COMBINATION RENDERS OBVIOUS CLAIMS 11-13

PO's assumption that a magnetic alignment mechanism like Partovi's would only be useful for resonant power transmission is false and contradicted by Partovi's own disclosure that "the frequency of the switch can be changed to move the circuit into, *and out of, resonance to create the appropriate voltage in the receiver.*" EX1007, [0078]. Accordingly, Partovi expressly contemplates use of the magnetic alignment mechanism in a system that drives a frequency "out-of" resonance similar to Onishi's operation at frequencies f_1 , f_2 , and f_3 . EX1101, ¶¶51-54.

The POR's citations to Partovi are also taken out of context and do not support the assertion that "Partovi is specifically directed to the use of magnetic alignment to facilitate operation at resonance." Specifically, PO relies on paragraph [0118] and

[0147] to support its position. POR, 53-54. Partovi is clear that the solution in cited paragraph [0118] is a mere “embodiment” of Partovi and [0047] states “power transfer efficiency between the primary coil and the secondary should be maximized” to support a conclusion that “methods where the entire pad is energized are not as attractive.” Accordingly, nothing in Partovi requires the wireless charger to operate a resonance. In fact, as discussed above Partovi expressly recognizes that there are systems which should operate off-resonance to “to create the appropriate voltage in the receiver” EX1007, [0078]; EX1101, ¶¶51-54. The notion that a non-resonant transmission system would be incompatible with a magnetic alignment mechanism is also belied by the ’696 Patent’s disclosure of the same. EX1001, 10:3-12.

V. GROUND 2A: THE BAARMAN392-PARTOVI COMBINATION RENDERS OBVIOUS CLAIMS 1, 3-5, 7, AND 9-14 OBVIOUS

A. Element [1.7] – “wherein said driving circuit is configured and operable to produce said oscillating driving voltage at a transmission frequency substantially different from said characteristic resonant frequency of said inductive couple”

The POR fails to refute the Petition’s showing that Baarman392 discloses a “transmission frequency substantially different from said characteristic resonant frequency” as recited in claim 1. POR, 55-60; EX1101, ¶¶55-61.

The POR correctly acknowledges that Baarman392 expressly describes an inverter that drives a primary charging coil at “off-resonance” frequencies—

including frequencies that are “relatively far from resonance.” EX1008, [0038], [0056]; POR, 55-56. Such plain disclosure certainly would have suggested to a POSITA that Baarman392’s transmission frequencies include a frequency “substantially different” from the resonant frequency. EX1101, ¶¶55-61. Notwithstanding these disclosures, PO contends that Baarman’s “off-resonance” frequencies, which are shown to be located on the side of the frequency-amplitude graph in FIG. 3, include no “substantially different” transmission frequency as recited in claim 1. POR, 55-56; EX1008, FIG. 3. But this argument again ignores the substantial similarity between the transmission frequencies illustrated in FIG. 3 of Baarman392 and FIG. 6b of the ’696 Patent. It also overlooks Baarman392’s explanation that operating off resonance allows for a “generally predictable” increase in power transfer when the transmission frequency is changed. EX1008, [0038] (emphasis added), *see also* [0056] (explaining that the charger circuit can “operat[e] relatively far from resonance”). Such a predictable change in power transfer would have indicated to a POSITA that the operating frequency lies in the linear/near-linear region of a resonance curve. EX1101, ¶56.

PO also ignores the full range of operating frequencies disclosed by Baarman392. EX1101, ¶57. Specifically, Baarman392 in FIG. 3 shows a range of frequencies from A to B in which the system operates. EX1008, [0038] (“[g]enerally, the inverter 10 is operated between frequency A and frequency B”).

Even under PO's construction, the claim requirement for a "substantially different" transmission frequency is satisfied if *any* frequency between A and B is in the near-linear portion of the frequency amplitude graph. EX1101, ¶57. Here, the evidence is compelling that the operating frequencies bounded by A and B in Baarman392 encompass the linear/near-linear region of the curve, and therefore includes frequencies that are "substantially different" from the characteristic resonant frequency as claimed. EX1101, ¶57; EX1008, [0056] (disclosing operating frequencies that extend from "near the resonant frequency" to "far from resonance"). Even Dr. Mercier—Patent Owner's declarant—conceded that the linear/near-linear region is an inherent feature of all parabolic resonance curves for an inductive couple. EX1102, 29:17-30:23. In this context, there can be no reasonable dispute that Baarman's operating frequencies include frequencies in the linear/near-linear region. EX1101, ¶¶55-57.

The POR also points to Baarman392's discussion of applying "piece-wise lineariz[ation]" to the control loop between frequencies A and B as alleged evidence that these frequencies are not in a linear/near-linear region of the frequency-amplitude graph. POR, 58-59 (citing EX1008, [0038]). But this argument is misguided for at least two reasons. First, both parties agree that a "substantially different" frequency need not lie in a perfectly linear region of the resonance curve. "Substantially different" also encompasses frequencies in a *near*-linear region.

POR, 4, 24-25. A “near-linear” curve can still be piecewise linearized to achieve even tighter control and greater linearity, if desired. EX1101, ¶¶58-60. Second, the option of linearizing the entire frequency range between A and B does not mean there is no linear/near-linear region within this range. *Id.* In fact, a POSITA would have understood and found obvious it obvious to linearize the entire frequency range in Baarman392’s system between A and B—especially if the range of operating frequencies between A and B included but extended beyond the linear/near-linear region of the curve. *Id.*; EX1006, [0038], [0056], FIG. 3. PO’s assumption that piecewise linearization is inconsistent with operating in the linear/near-linear region of the resonance curve is wrong. *Id.*

B. Baarman392-Partovi Combination

PO’s next argument that a POSITA would not have been motivated to combine because Baarman392 and Partovi ignores the express teachings in both Baarman392 and Partovi. POR, 60-64; EX1101, ¶¶62-66.

First, as discussed above, Partovi is clear that the wireless charger can operate such that “the frequency of the switch can be changed to move the circuit into, *and out of, resonance to create the appropriate voltage in the receiver.*” EX1007, [0078]. *Supra* V.A. Therefore, nothing about Partovi’s alignment mechanism precludes it from being used in a system that transmits power at a frequency substantially different from the resonant frequency of the couple. EX1101, ¶63.

Second, while Baarman392 discloses an example with loose coupling, this example does not preclude the system from being operable in highly coupled scenario. EX1101, ¶64. A POSITA would have recognized that the solution in Baarman392 would function even in a tightly coupled scenario. *Id.* PO's assertion that Baarman392 "expressly state[s]" that "a tightly coupled charging system like Partovi would cause the slope of the power transfer curve to become too steep to achieve the behavior desired" is not supported anywhere in Baarman392 let alone expressly. *See* EX1008, [0038].

Third, while the alignment mechanism in Partovi would improve coupling between the primary and secondary coils, tight coupling is not necessary as demonstrated in Baarman392's example. EX1101, ¶65. In other words, while improved, the resulting coupling from Partovi's alignment mechanism could still result in a loose couple between a primary and secondary analogous to the example demonstrated in Baarman392. *Id.* For example, a POSITA would have understood that the couple relies on several factors including those which would not be eliminated via alignment alone, such as the type of secondary device or the current load of the secondary device. *Id.*; *see also* EX1102, 31:7-33:13 (stating other factors that affect the steepness of the curve in addition to the alignment of the coils).

Finally, PO's assertion that the Petition somehow mixes embodiments of Baarman392 for teaching [1.7] is false. POR, 63-64. Based on the corresponding

heading “DESCRIPTION OF THE CURRENT EMBODIMENT” it is clear that the citations to FIGs. 3, 7 and paragraphs [0038], [0055]-[0057] all correspond to the “current embodiment.” *See* EX1008, between [0024] and [0025] (“DESCRIPTION OF THE CURRENT EMBODIMENT”); [0038] (“the illustrated embodiment”); [0055]-[0057]. The only other citations for Element [1.7] are “*see also*” cites to the Baarman392’s summary. The “CURRENT EMBODIMENT” of Baarman392, as modified by the additional references in the petition, provides all elements of the Challenged Claims. *See also* EX1101, ¶66.

VI. GROUND 2B: THE BAARMAN392-PARTOVI-TOCCI COMBINATION RENDERS OBVIOUS CLAIMS 2 AND 6 OBVIOUS

PO’s argument that Baarman392-Partovi-Tocci fails to render claim 2 obvious ignores the express teachings in Baarman392, which render claim 2 obvious for multiple reasons. POR, 64-66; EX1101, ¶¶67-69.

For example, as with its arguments for Element [1.7], PO fails to address Baarman392’s teachings that modifying the frequency between A and B results in a “generally predictable” change in power. EX1008, [0038] (“a decrease in the operating frequency of the inverter 10 will result in a generally predictable increase in the power transferred.”). This means Baarman392 expressly disclose operating in the near-linear region of a frequency amplitude graph (e.g., as shown in FIG. 3) because this is the region where the response to a change in frequency would be

“generally predictable.” EX1008, [0038], EX1101, ¶68. It is undisputed that Baarman392 discloses increasing and decreasing the operating frequency along the resonant curve between A and B. Baarman392’s teachings, in combination with those of Partovi and Tocci as discussed in the Petition, would have rendered claim 2 obvious. Pet., 75-80; EX1003, ¶¶147-155; EX1101, ¶68.

Moreover, even if there were any doubt as to whether frequencies A and B themselves lie in the near-linear region—which again would contradict Baarman392’s express teachings for “generally predictable”—Baarman392 would still render the additional features recited in claim 2 obvious. EX1101, ¶69. Baarman392 expressly teaches that the transmission frequency is repeatedly decreased by “ Δ FREQ” to increase the power until a feedback signal is received or the frequency is less than a minimum operating frequency.³ EX1008, FIG. 7, [0055]-[0056]. In other words, the frequency is decreased by “ Δ FREQ” from B until it would reach an operating frequency is less than A as shown in FIG. 3. *Id.*, see also [0038], [0056], FIG. 3; EX1101, ¶69. A POSITA would have recognized that this would include at least one decrease in frequency, but more commonly multiple

³ A POSITA would have understood that the Min_FREQ corresponds to “B” and the Max_FREQ corresponds to “A” in FIG. 3. EX1101, ¶69; see also EX1008, [0038], [0057], [0059]; FIGs. 3, 7.

decreases in frequency, that is within a portion of the curve between B and A that is near-linear to meet Element [2.2]. EX1101, ¶69. Similarly, Baarman³⁹² discloses repeatedly increasing the transmission frequency (twice the value of ΔFREQ) until the operating frequency exceeds a maximum frequency. EX1008, FIG. 7, [0059]. In other words, in at least some instances the frequency is increased by “twice the value of ΔFREQ ” from A until the operating frequency would be greater than B as shown in FIG. 3. *Id.*, *see also* [0038], FIG. 3; EX1101, ¶69. A POSITA again would recognize that this also would include at least one increase in frequency, but more commonly multiple increases in frequency, within the near-linear portion of the resonant curve. EX1101, ¶69; Pet., 75-80; EX1003, ¶¶147-155.

VII. CONCLUSION

The Challenged Claims are unpatentable based on Grounds 1A-2B for each of the reasons set forth in the Petition and this Reply.

Respectfully submitted,

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CERTIFICATION UNDER 37 CFR §42.24

Under the provisions of 37 CFR § 42.24(d), the undersigned hereby certifies that the word count for the foregoing Petitioner's Reply to Patent Owner's Response totals 5,570 words, which is less than the 5,600 allowed under 37 CFR § 42.24(c)(4).

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CERTIFICATE OF SERVICE

Pursuant to 37 CFR § 42.6(e)(4), the undersigned certifies that on May 27, 2025, a complete and entire copy of this Petitioner's Reply to Patent Owner's Response and associated exhibits, are provided via email, to the Patent Owner by serving the email correspondence addresses of record as follows:

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