

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

SECOND DECLARATION OF DR. GARY L. WOODS

TABLE OF CONTENTS

I.	INTRODUCTION AND SCOPE OF WORK	1
II.	EXPERIENCE AND MATERIALS CONSIDERED.....	2
III.	TECHNICAL DISCUSSION	2
IV.	CLAIM CONSTRUCTION	3
V.	Ground 1A: The Onishi-Flowerdew Combination Renders Obvious Claims 1-7, 9-10, and 13-14.....	9
	A. The Onishi-Flowerdew Combination Renders Obvious Element [1.4]	9
	B. The Onishi-Flowerdew Combination Renders Obvious Element [1.7] ...	15
	1. Onishi's transmission frequencies (f1, f2, and f3) are substantially different from the resonant frequency of the inductive couple	15
	2. Onishi's transmission frequencies f1 and f2 are substantially different from the characteristic resonant frequency of the inductive couple	23
	3. Onishi's transmission frequency f3 is substantially different from the characteristic resonant frequency of the inductive couple	25
	4. A POSITA would have understood Onishi's FIG. 4	28
	C. The Onishi-Flowerdew Combination Renders Obvious Claim 2	31
	D. Predictable Combination of Onishi and Flowerdew	32
VI.	Ground 1B: The Onishi-Flowerdew-Partovi Combination Renders Obvious Claims 11-13.....	33
VII.	Ground 2A: The Baarman392-Partovi Combination Renders Obvious Claims 1, 3-5, 7, and 9-14	36
	A. Baarman392-Partovi Combination Renders Obvious Element [1.7]	36
	B. Predictable Combination of Baarman392 and Partovi.....	40

VIII. Ground 2B: The Baarman392-Partovi-Tocci Combination Renders Obvious Claims 2, 6	42
IX. CONCLUSION.....	45

I, Dr. Gary L. Woods, declare as follows:

I. INTRODUCTION AND SCOPE OF WORK

1. On May 31, 2024, I submitted a First Declaration in IPR2024-00994. *See* EX1003. I submit this Second Declaration for purposes of responding to Patent Owner's Response to Petition (POR) submitted on March 4, 2024 and the declaration testimony of Dr. Mercier (EX2006). In this Second Declaration, I provide additional analysis regarding the claims of U.S. Patent Number 9,048,696 (the '696 Patent) and the relied-upon prior art references.

2. My analysis is based upon my education, training, and experience in the relevant field, including my professional experience and additional experience working with persons of ordinary skill in the art as of the earliest alleged priority date of the '696 patent. I am familiar with the technology described in the '696 patent, and I am also familiar with the knowledge of a person of ordinary skill in the art (POSITA) with respect to this technology as of the earliest alleged priority date of the '696 patent (March 17, 2008).

3. I am being compensated for my work in connection with this IPR proceeding at my standard hourly rate. My compensation is not in any way contingent on the substance of my opinions or the outcome of these proceedings.

II. EXPERIENCE AND MATERIALS CONSIDERED

4. My analysis set forth in this Second Declaration is based on my education, training, and experience as summarized in my First Declaration and detailed in my CV (*see* EX1003), as well as my review of the '696 patent, its prosecution history, and the prior art references relied-upon in this IPR proceeding. I have also reviewed the Patent Owner's Preliminary Response to the Petition (POPR), the Patent Owner's Response to Petition (POR), each of the accompanying exhibits submitted with the POPR and POR (Exhibits 2001-2009), the Board's Decision Instituting IPR ("Institution Decision"), and the deposition transcript of Dr. Mercier (EX1102).

III. TECHNICAL DISCUSSION

5. The analysis expressed in my First Declaration fully explains why each and every feature of the Challenged Claims of the '696 Patent is provided in the prior art. I understand that Patent Owner and Dr. Mercier have considered my analysis and offered their own proposals, some of which are inconsistent with my analysis. I will address some of those points below. The fact that I do not address all of Patent Owner and Dr. Mercier's opinions should not be interpreted as agreement with them.

6. I have noted that the POR does not address, much less rebut, much of the analysis I provided in my First Declaration. Indeed, rather than squarely confronting the substantial evidence of unpatentability offered in my First

Declaration, Patent Owner and Dr. Mercier sometimes mischaracterize my testimony, the disclosure of the '696 patent, and the cited prior art. As I previously explained with reference to the applied prior art, each of Grounds 1A-2B render obvious the Challenged Claims. I need not repeat that analysis here. Rather, my Second Declaration is intended to be responsive to particular arguments presented in the POR and the testimony of Dr. Mercier including his declarations (EX2001 and EX2006) as well as his deposition (EX1102)).

IV. CLAIM CONSTRUCTION

7. I understand that Patent Owner has proposed a construction for the phrase “transmission frequency substantially different from said characteristic resonant frequency of said inductive couple” to further require the transmission frequency to “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; EX2006, ¶¶94-112; *see also* EX1003, ¶¶36-43.

8. I also understand that during prosecution, PO and the Examiner addressed the scope of “substantially different” without requiring this additional substitute language. EX1002, 69-72. Specifically, PO represented to the examiner during prosecution that:

[O]ne 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 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.

EX1002, 70. During prosecution PO also stated that “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.”

EX1002, 110-111. I also understand that PO never argued during prosecution that “substantially different” required incremental change or linear control.

9. I understand that PO and Dr. Mercier have proposed constructions for the term “substantially different” using different articulations in this IPR. The following table summarizes the constructions proposed by PO and Dr. Mercier:

September 13, 2024:	In the POPR, PO proposes the following construction citing <i>paragraph 59 of Dr. Mercier’s first declaration (EX2001)</i>: “a POSITA would define the ‘transmission frequency [that is] substantially different from the characteristic resonant frequency,’ as recited in claim 1, to: (1) lie within the linear or [near]-linear regions of a frequency-amplitude graph, and (2) allow for some incremental change (increase or decrease) in frequency while remaining in the near-linear/linear regions of the frequency-amplitude graph.” POPR, 25. <i>Paragraph 59 of Dr. Mercier’s first declaration</i> does not use the same language as the POPR: “the transmission frequency <i>may be incrementally adjusted</i> (increased or decreased)
----------------------------	--

	while remaining in the near-linear/linear regions of a frequency-amplitude graph.” EX2001, ¶59 (emphasis added). Here, Dr. Mercier’s definition uses the term “may be incrementally adjusted” in place of “allow for some incremental change,” as proposed by PO in the POPR. Dr. Mercier appears to offer other definitions in his first declaration none of which are the same as PO’s proposed construction in the POPR and it is not clear which one, if any, he relies on in his analysis: “the transmission frequency f_t should be selected such that (1) it lies within a linear or near-linear region of an associated frequency-amplitude graph, and (2) such that there is <i>some room for the incremental fluctuation of the transmission frequency (δf) without incurring large unpredictable fluctuations of induced voltage.</i>” EX2001, ¶64 (emphasis added). “it is my opinion that claim 1’s ‘transmission frequency [which is] substantially different from the resonant frequency of the inductive couple’ is limited to transmission frequencies that fall within the linear or near-linear regions of the frequency-amplitude graph.” EX2001, ¶72.
March 4, 2025:	For the POR, Patent Owner and Dr. Mercier offer yet another definition: “to further allow for some incremental change (increase or decrease) in frequency while remaining in <i>one of the near-linear regions</i> of the frequency-amplitude graph.” POR, 29 (Emphasis added to highlight a change from the proposed construction in the POPR). “to: (1) encompasses frequencies that lie within <i>one of the near-linear regions</i> of a frequency-amplitude graph <i>associated with the inductive</i>

	<i>couple, and (2) allow for some incremental change</i> (increase or decrease) in frequency while remaining in one of the near-linear regions of the frequency-amplitude graph.” EX2006, (Emphasis added to highlight changes in the proposed definitions from the Dr. Mercier’s first declaration (EX2001)).
--	--

10. The specification of the ’696 Patent explains that “substantially different from said characteristic resonant frequency” can include a “transmission frequency [that] lies within a range in which induced voltage varies approximately linearly with frequency.” EX1001, 4:1-17. Similarly, the ’696 Patent explains that “[p]referably 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” and “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 .”¹ EX1001, 21:16-23, 21:56-65. None of these descriptions for “substantially different,” nor any other teachings in the ’696 Patent, include the exact substance of PO’s construction. In other words, based on my review, the

¹ I note that “ f_b ” is used in FIG. 6b instead of “ f_L .” A POSITA would have understood that these values are referring to the same thing and may be used interchangeably. *See also* EX2006, ¶100.

specification of the '696 never defines the phrase “transmission frequency substantially different from said characteristic resonant frequency” to further require that 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.”

11. Even if these teachings were to support PO's and Dr. Mercier's construction, which they do not for at least the reasons I discussed above, these teachings would only describe example embodiments of the '696 Patent, which I understand should not be imported into the claims. *See* EX1001, 4:141-17 (“Preferably,” “Optionally”), 21:16-23 (“of embodiments,” “Preferably”); 21:56-65 (“For example”), 22:45-64 (“One example”).

12. I understand that nothing in claim 2 requires linear control nor even “some incremental change.” I also understand that the features of a dependent claim should not be imputed to the independent claim. Accordingly, even if claim 2 did require linear control or PO's construction, such a limitation would not be required for independent claim 1.

13. I also note that PO's construction provides no further clarity on the scope of “substantially different” beyond that “substantially different” encompasses frequencies in the linear or near-linear region of the frequency-amplitude graph. For example, the POR emphasizes applicant's representation during prosecution that

claim 1 “recites *two* different frequencies,” namely “1) a ‘*transmission frequency*’ ... and 2) a ‘*characteristic resonant frequency*.’”. POR, 8 (citing EX1002, 112) (emphasis added). However, the construction PO now relies upon would import a requirement that the “substantially different” frequency allow for *additional*, incrementally different frequencies. This introduces further ambiguity in the claim scope for the scope of “substantially different.”

14. To reiterate my opinion from my First Declaration, the specification and file history confirm that “a transmission frequency substantially different from [a] characteristic resonant frequency of [an] inductive couple” must at least encompass the frequencies within one of the linear or near-linear regions of the frequency-amplitude graph. EX1003, ¶41. For example, the frequencies indicated by reference numerals 6 and 8 in FIG. 6b of the ’696 patent are non-resonant transmission frequencies “substantially different” from the characteristic reference frequency. EX1003, ¶41. Each of Grounds 1A-2B include prior art teachings 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. EX1003, ¶42. Accordingly, PO’s further construction is not needed here.

15. Finally, as I will also address below, even under PO’s and Dr. Mercier’s proposed construction, Grounds 1A-2B render obvious the Challenged Claims. *See below* Sections V.B and VII.A *see also* EX1003, ¶43.

V. Ground 1A: The Onishi-Flowerdew Combination Renders Obvious Claims 1-7, 9-10, and 13-14

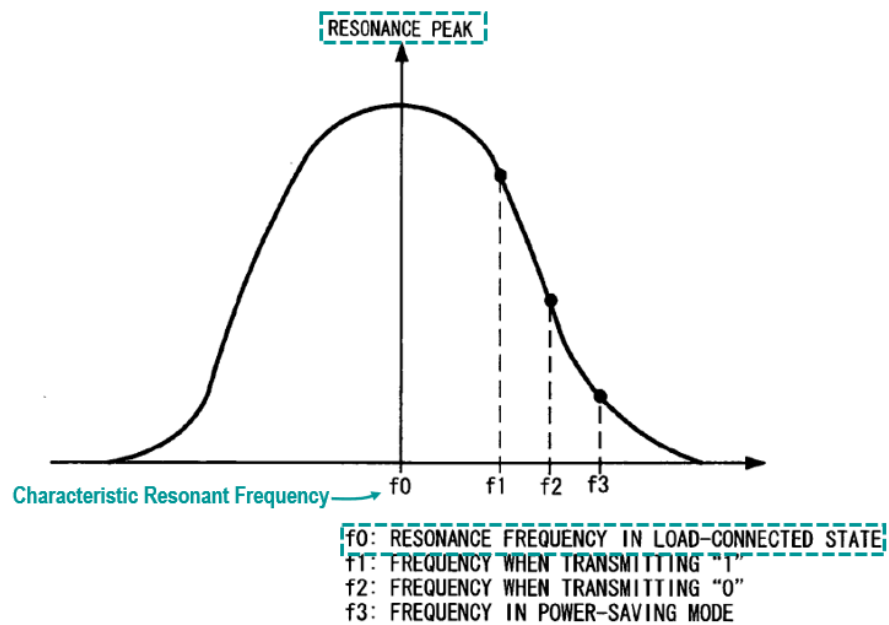
A. The Onishi-Flowerdew Combination Renders Obvious Element [1.4]

16. The Onishi-Flowerdew Combination renders obvious Element [1.4]. PO's argument is based on a strained reading of a single sentence in paragraph [0180] of Onishi, that ignores or misinterprets the context and is contradicted by the *next sentence* of Onishi's disclosure. *See* EX1004, [0180], FIG. 4; *see also* EX1003, ¶¶61-62, EX2006, ¶¶115-122; POR, 31-37. PO's argument also fails to acknowledge that a characteristic resonant frequency is an inherent property of an efficient inductively coupled system such as the one disclosed in Onishi. EX2006, ¶¶115-122; POR, 31-37. Additionally, a POSITA would have readily understood that a system wirelessly transmitting power via an inductive couple would include the presence of a characteristic resonance frequency for the inductive couple. *See* EX1001, 19:65-66 (acknowledging that "[k]nown inductive power transfer systems typically transmit power at the resonant frequency of the inductive coupling."), 20:4-34.

17. The POR and Dr. Mercier incorrectly contend that the frequency f_0 is the "characteristic resonance frequency" merely for the primary coil rather than the inductive couple based on 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.” EX1004, [0180]; EX2006, ¶¶115-122; POR, 31-37. 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



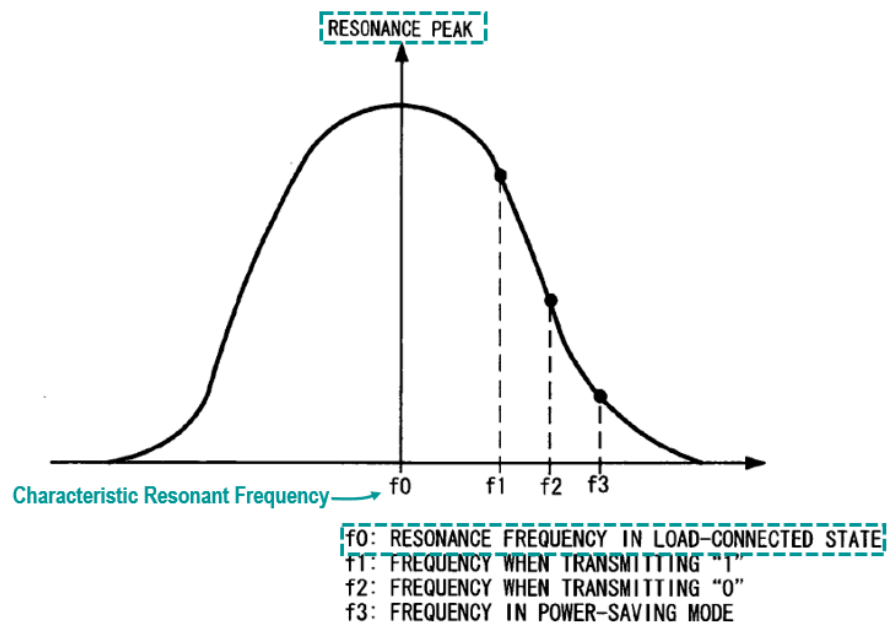
EX1004, FIG. 4 (as annotated in my first declaration (EX1003) at paragraph 62);

See also Pet., page 22.

18. PO’s and Dr. Mercier’s position is contradicted by further disclosure in paragraph [0180] and FIG. 4 of Onishi. Specifically, the next sentence in paragraph [0180] clarifies what FIG. 4 represents, that is “[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). Paragraph [0180] is unambiguous that FIG. 4 does not illustrate the frequency-response of a single coil in isolation, 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. 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].

FIG. 4



EX1004, FIG. 4 (annotated).

19. I also note that the features described in reference to FIG. 4 are used to provide communication between the charger and the receiver. EX1004, [0180]-[0182]. Such a feature would only be operable when the primary and secondary coil are coupled. Additionally, a POSITA would have understood that a frequency-amplitude graph for an inductive couple is calculated using the frequency driving the primary coil and a measured power, voltage, or current across the secondary coil, as explained by the '696 Patent and Dr. Mercier in his deposition. EX1001, 21:56-65 (explaining that the y-axis, V_t is the measured “induced voltage” (i.e., the voltage across the secondary coil); EX1102, 17:14-24:3 (“It's the voltage at the output of the secondary inductor when it's coupled to the primary inductor.”). A POSITA would understand that the graph in both FIG. 4² in Onishi and FIG. 6b in the '696 would be generated using the same values: (1) driving frequency applied to the primary

² A POSITA would have readily known that the y-axis relates to a measurement (e.g., voltage, current, or power) in the system indicative of power transferred via the inductive couple in view of Onishi's disclosure. *See* EX1004, [0171] (the “power value of the resonant circuit becomes a maximum at the resonance peak, and decreases as the resonance frequency moves away from the resonance peak”), [0053].

coil, and (2) observed power/voltage/current measured in the system while the primary and secondary coils are in the load-connected/“coupled state.” A POSITA would also appreciate that the features in the frequency-amplitude graph for an inductive couple could be conveyed in the same manner for representing the power transmitted from the primary coil to the secondary coil when the power/voltage/current is measured at either the primary or secondary coil. To a POSITA there would have been no meaningful difference between the frequency “ f_0 ” in Onishi and frequency “ f_R ” in the ’696 Patent.

20. The cited portions of my deposition testimony in the POR and Dr. Mercier’s declaration are taken out of context and do not support the conclusion that Onishi’s system either lacks a characteristic resonant frequency of the inductive couple or that f_0 in FIG. 4 is not the characteristic resonant frequency of the inductive couple. *See* POR, 32-34; EX2006, ¶¶118, 120. In my deposition, I correctly acknowledged fundamental properties of the disclosed wireless power transmission technology including that the primary coil L1 and the secondary coil L2 can have different characteristic resonant frequencies when they are not coupled (e.g., due to different inductances or capacitances in their respective circuits), and that the characteristic resonant frequency of an inductive couple comprising these two coils can be different. EX2007, 8:22-10:14, 9:10-21. Reading my comments in full context, it is clear that while these fundamental properties are true, they do not

change what Onishi actually teaches in paragraph [0180] and FIG. 4. EX2007, 11:9-13:6. When my analysis turns to FIG. 4 and paragraph [0180], my testimony was repeatedly clear that a POSITA would have understood that “resonance characteristics of the induction coil” can be shown in a power transfer curve of the inductive couple, and that Onishi in fact discloses such when reading paragraph [0180] in its entirety. *See* EX2007, 11:9-13:6 (“it's not -- not just of the coil. It's the resonant frequency of the system when the coils are coupled,” “in the context of the rest of the paragraph and figure 4 it's referring to, it's clear [Onishi is] talking about the resonance frequency of the entire system,” “it's representative of the system when the inductive coils are coupled,” and “[t]hat's clear from the context and from figure 4.”). Contrary to assertions in the POR, my deposition testimony does not support PO’s argument. Nor does it detract from my reliance on Onishi’s paragraph [0180] and FIG. 4 as illustrating a characteristic resonance frequency for the inductive couple.

21. Finally, a POSITA would have understood that an inductive couple between a primary and secondary coil used for transmitting power would have “a characteristic resonant frequency” because this is an inherent physical property of an efficient inductive couple used for transmitting power in an inductively coupled system like Onishi. In fact, Dr. Mercier appears to agree that a POSITA would have understood this in his deposition when he stated that “there is a characteristic

resonant frequency in all cases” and that “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.” EX1102, 29:18-30:23, 33:15-41:15.

B. The Onishi-Flowerdew Combination Renders Obvious Element [1.7]

1. Onishi’s transmission frequencies (f_1 , f_2 , and f_3) are substantially different from the resonant frequency of the inductive couple

22. Both Onishi and the ’696 Patent describe transmission frequencies in essentially the same region of a power transmission graph for an inductive couple. In the ’696 Patent, the transmission frequency is selected between f_U and f_b in FIG. 6b:

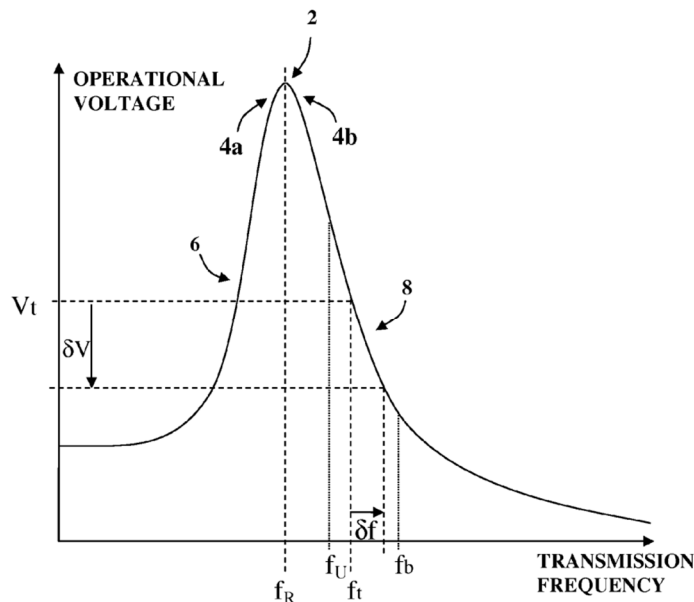
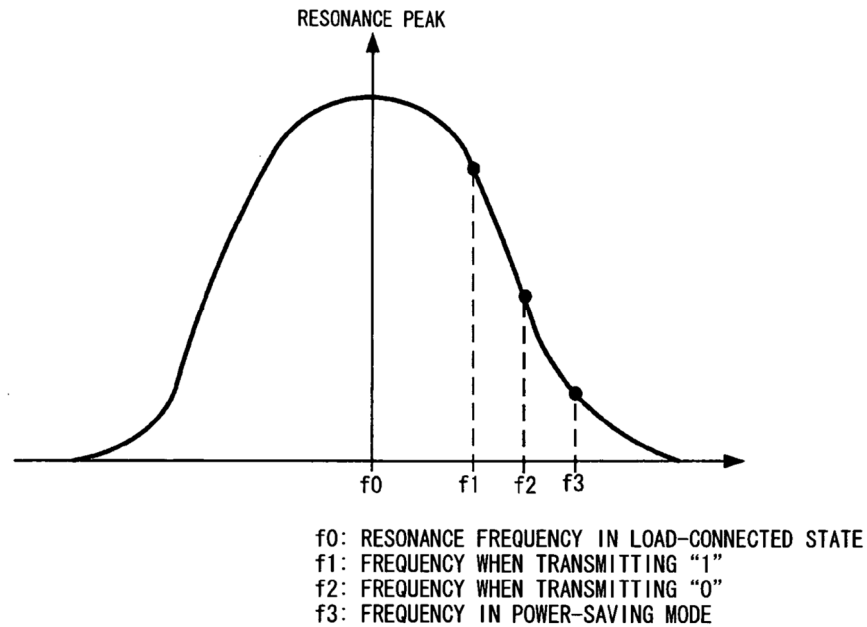


Fig. 6b

EX1001, 6B, 21:16-23, 21:56-65.

23. Similarly, in Onishi, three transmission frequencies (f_1 , f_2 , f_3) are positioned to lie within substantially the same region of the frequency-amplitude graph as the region identified in FIG. 6b of the '696 Patent:



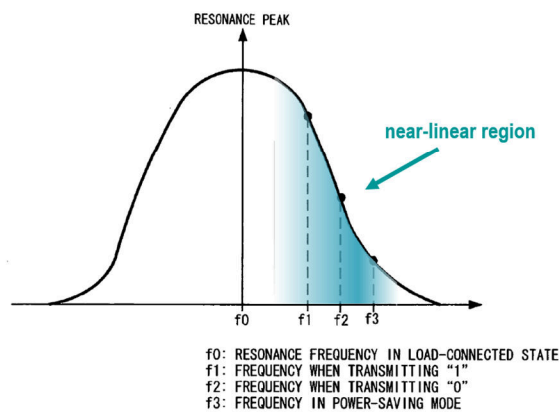
EX1004, FIG. 4, [0180]-[0181]. As I explained in my first declaration, “the strikingly similar positions of Onishi’s frequencies f_1 , f_2 , and f_3 in the frequency-response curve as the transmission frequency (e.g., f_t in FIG. 6B) identified as ‘substantially different’ in the '696 specification confirms that Onishi discloses and renders obvious a transmission frequency that is ‘substantially different’ from the characteristic resonant frequency” EX1003, ¶68.

24. Based on my review, it also would have been obvious to a POSITA to select each of frequencies f_1 , f_2 , and f_3 so as to lie within the near-linear region of

the frequency amplitude graph when considering Onishi's communication and load detection features.

25. For example, a POSITA would have recognized that in the resonant frequency may fluctuate during power transmission and that such fluctuations would result in unwanted changes in the induced voltage at Onishi's secondary coil. *See e.g.*, EX1004, FIG. 4 (showing the transmission frequencies f_1 , f_2 being selected away from the characteristic resonant frequency); EX1008, FIG. 3 (showing the operating frequencies within a region away from the characteristic resonant frequency); EX1008, [0078] ("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."). Accordingly, it would have been obvious to a POSITA to position the power transmission frequencies f_1 and f_2 in the near-linear region to avoid operating in a region where a variation in resonance would cause a large unwanted change in the voltage induced at Onishi's secondary coil. Again, this is further supported by FIG. 4, where Onishi positions f_1 and f_2 within a remarkably similar region as the '696 Patent's "near-linear region":

EX1004 (Onishi), FIG. 4:



EX1001, (the '696 Patent), FIG 6b:

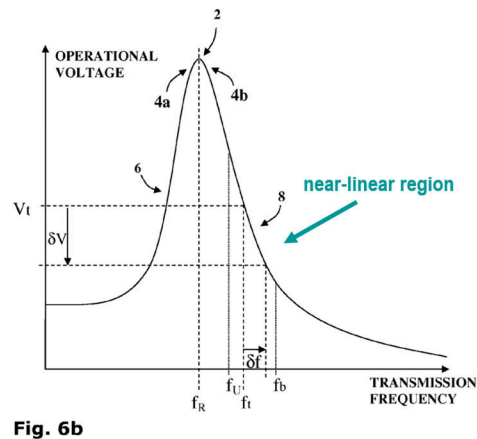


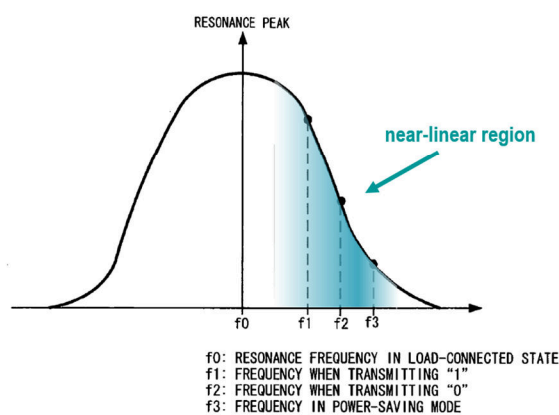
Fig. 6b

EX1004, FIG. 4 (annotated to show the near-linear region with variable shading because the '696 Patent does not provide any criterion to establish quantitative boundaries); EX1001, FIG. 6b (annotated).

26. Likewise, it also would have been obvious to position f_3 in the near-linear region to reliably implement Onishi's load detection feature in the power-saving transmission mode. Onishi discloses that a "change in the load state of the power reception device can be detected by monitoring a change in the amplitude of the induced voltage in the primary coil." EX1004, [0064]. Onishi explains that "when the power reception device has changed from a low-load state (*power-saving state*) [(i.e., a state where the transmission frequency is at f_3)] to a high-load state (recharge state), *the amplitude of the induced voltage in the primary coil increases.*". *Id.* (Emphasis Added). A POSITA would have understood that f_3 would be selected to lie within the near-linear region of the frequency amplitude

graph to allow Onishi's power transmission device to "reliably detect a change in load state by determining a change in amplitude using the threshold value." *Id.*, see also Abstract, [0027], [0062]-[0063], [0067] (explaining that a "change in the load state of the power reception device can be detected in almost real time."), [0101], [0186]-[0187], [0223]-[0225], [0240]. Specifically, a POSITA would have understood that the frequency f_3 would preferably be positioned within the near-linear region to optimize the reduction in power consumption while still operating at a frequency to "reliably detect a change in load state." This is further supported by FIG. 4, where Onishi positions f_3 within a remarkably similar region as the '696 Patent's "near-linear region":

EX1004 (Onishi), FIG. 4:



EX1001, (the '696 Patent), FIG 6b:

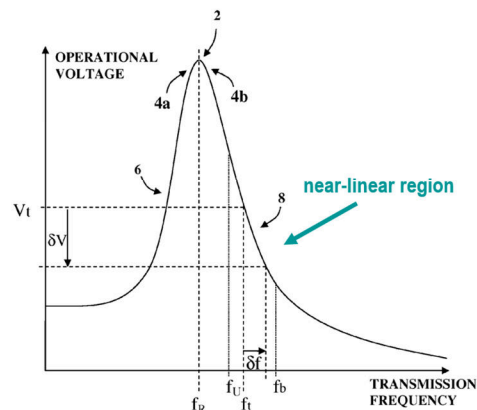


Fig. 6b

EX1004, FIG. 4 (annotated to show the near-linear region with variable shading because the '696 Patent does not provide any criterion to establish quantitative

boundaries); EX1001, FIG. 6b (annotated).

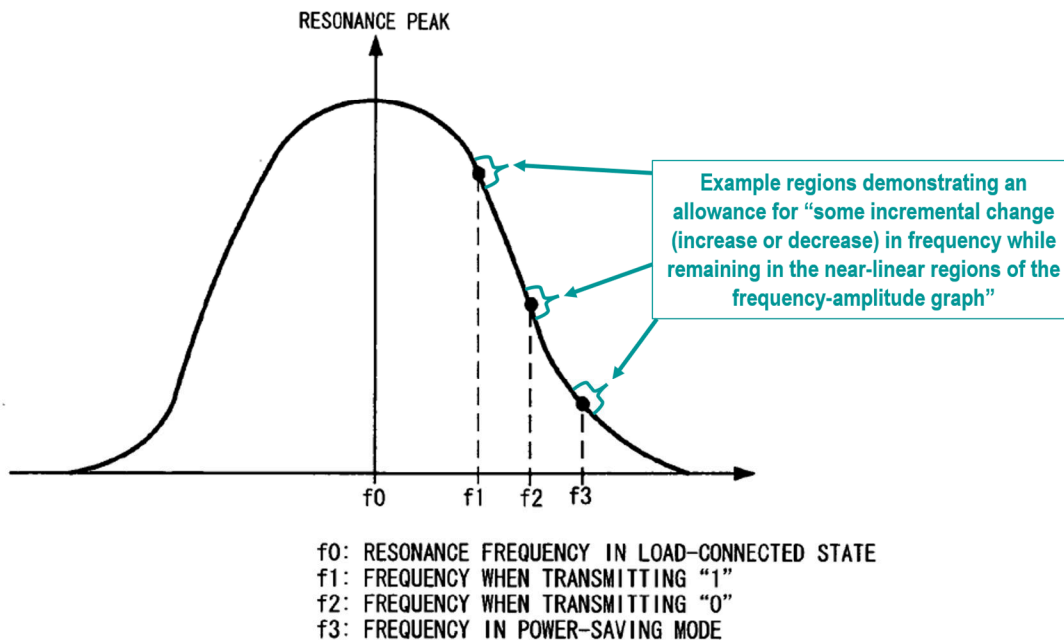
27. Finally, in view of these teachings of Onishi, a POSITA would have understood and found obvious to position f_1 , f_2 , and f_3 within the near-linear region of a frequency amplitude graph for the inductive couple. This arrangement would allow for optimizing the efficiency of the charging system while maintaining reliable data transmission and load-state detection between the power transmission and reception devices. In particular, a POSITA would have understood the design trade-offs that exist when selecting operating frequencies in an inductively coupled system and would have appreciated that while greater power transmission and power savings could be met by placing the transmission frequency near the resonance peak and the power saving transmission frequency outside the near-linear region, such an arrangement would decrease the reliability for data transmission and load detection. Therefore, a POSITA reviewing Onishi would have selected frequencies within the near-linear region to provide the functionality disclosed in Onishi.

28. I also note that Onishi discloses that power is supplied to the charger through an AC adaptor. EX1004, [0126], FIG. 1A. In such a system, a POSITA would be further motivated to place f_3 within the near-linear region to optimize for load detection because when the charger is in operation it is connected to a constant power source (e.g., wall outlet) there is less importance on power savings (e.g., as compared to when the power source is a battery or other power source with a limited

capacity). For example, a POSITA would have known when selecting the frequency of f_3 that there would be design tradeoffs. Moving f_3 far from f_1 and f_2 would minimize power consumption in “save mode,” but at the downside risks of (1) providing insufficient power to maintain the load in a ready state, and (2) the inability of the source to reliably detect a request by the load to return to a high-power state. *See* EX1004, Fig 3B, [0064] (“Specifically, when the power reception device has changed from a low-load state (power saving state) to a high-load state (recharge state), the amplitude of the induced voltage in the primary coil increases. Therefore, the power transmission device can reliably detect a change in load state by determining a change in amplitude using the threshold value, for example.”). Since the system is connected to a constant power source (e.g., a wall outlet) a POSITA would have known that power savings is not mission-critical, as it would be in a charging system powered by batteries. Thus, considering the design tradeoffs, a POSITA would have specifically chosen to locate f_3 in the near-linear region to maximize power saving while maintaining sufficient signal-to-noise ratio for returning to charging.

29. I also note that even under PO’s construction, each of frequencies f_1 , f_2 , or f_3 would still qualify as the transmission frequency because Onishi expressly teaches that each of frequencies f_1 , f_2 , and f_3 , would allow for “some incremental change” within the near-linear region:

FIG. 4



EX1004, FIG. 4 (annotated), [0064], [0134], [0162], [0180]-[0181]; *see also* EX1102, 29:7-15 (Dr. Mercier indicating that he cannot think of an example of a parabolic frequency curve that does not have an approximately linear region).

30. I understand that PO contends that none of f_1 , f_2 , nor f_3 qualify as a frequency that is “substantially different” from the characteristic resonant frequency (e.g., f_0). POR, 37-48. As I discussed above, these arguments are inconsistent with strong evidence that a POSITA would have understood each of f_1 , f_2 , and f_3 to fall in the same linear/near-linear region of the frequency-amplitude graph as the transmission frequencies in FIG.6b of the '696 Patent. I will turn now to addressing PO's and Dr. Mercier's specific arguments against each of these frequencies.

2. Onishi's transmission frequencies f1 and f2 are substantially different from the characteristic resonant frequency of the inductive couple

31. PO argues that f1 and f2 “are at or near the resonance frequency” and therefore not “substantially different.” POR 38-39. The primary support PO cites is 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[]”³ EX1004, [0053]; POR, 38-39. However, this sentence addresses the *relative* positions of the transmission frequencies during normal power transmission (f1, f2) and during power-saving power transmission (f3). EX1004, [0053] (“*as compared with*”). I note that nothing in paragraph [0053] or elsewhere in Onishi implies that f1 and f2 “are at or near the resonance frequency” as alleged. Frequencies f1 and f2 are positioned relatively closer to resonance than f3, much like f_U is positioned relatively closer to resonance than f_b in FIG. 6b of the '696 Patent.

³ Here, I note that Onishi discloses that frequencies f1 and f2 are used during normal power transmission and frequency f3 is used during power-saving power transmission. EX1004, [0134], [0162], [0181], [0211], [0214]-[0215].

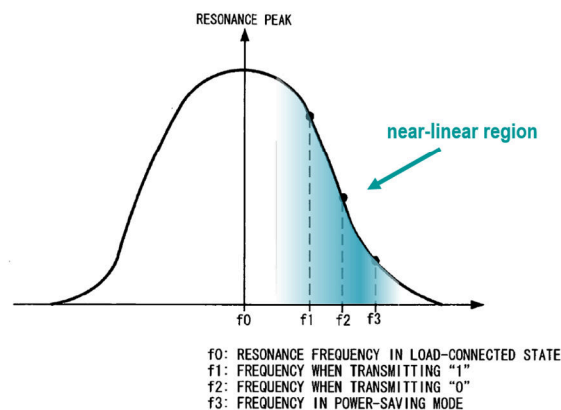
32. PO's contention that f_1 and f_2 are necessarily at or near resonance because f_3 is even further from resonance is contrary to the express disclosure in FIG. 4, which shows f_1 and f_2 set significantly apart from f_0 . EX1004, FIG. 4. If Onishi had intended f_1 and f_2 to be at or near resonance, f_0 , Onishi would have depicted f_1 , and f_2 closer toward resonance than they are in FIG. 4. In other words, 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 . *See also* [0181] ("the relationship ' $f_1 > f_2 > f_3$ ' is satisfied"); 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).

33. PO's related arguments regarding the "broad mountain shape" of Onishi's graph are also not supported by the express disclosure. For example, 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. Additionally, PO's analysis does not address the express disclosure in Onishi as I outlined above. *Above* Section V.B.1. While PO and Dr. Mercier are correct that the "broad mountain shape" would allow for non-resonant frequencies that are outside the near-linear region, Onishi expressly positions f_1 and

f_2 within the near-linear region and not this “broad mountain region.” EX1004, FIG. 4, [0180], *see also above* Section V.B.1.

34. Finally, PO’s argument that f_1 in FIG. 4 is not positioned in the near-linear region (POR, 42) is not persuasive for the reasons outlined above including because of the remarkable similarity to the identified near-linear region in the ’696 patent. *See above* Section V.B.1. For example, f_1 in FIG. 4 of Onishi is in essentially the same near-linear region as f_U in FIG. 6b of Onishi:

EX1004 (Onishi), FIG. 4:



EX1001, (the '696 Patent), FIG 6b:

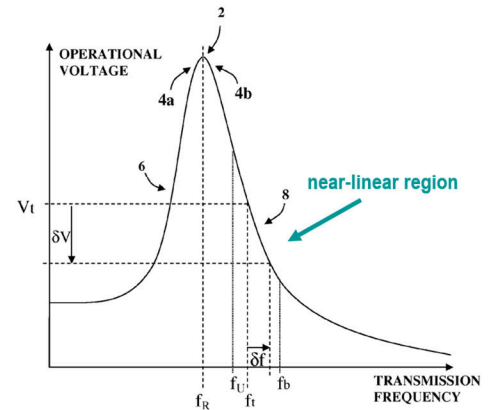


Fig. 6b

EX1004, FIG. 4 (annotated to show the near-linear region with variable shading because the ’696 Patent does not provide any criterion to establish quantitative boundaries); EX1001, FIG. 6b (annotated).

3. Onishi’s transmission frequency f_3 is substantially different from the characteristic resonant frequency of the inductive couple

35. PO and Dr. Mercier also argue that Onishi fails to demonstrate that f3 falls within the near-linear regions of a “frequency-amplitude graph associated with the inductive couple.” POR, 42, 44-48; EX2006, ¶¶133-138. I disagree for at least the following reasons.

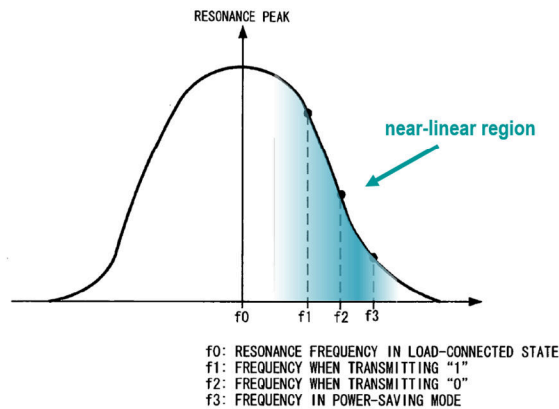
36. First, Onishi expressly discloses that f3 is a “transmission frequency during power-saving power transmission” that “is set at a frequency *apart* from the resonance frequency (resonance peak).” EX1004, [0053] (emphasis added). As shown in FIG. 4, frequency f3 is “substantially different” from resonant frequency f0 under any reasonable understanding of Onishi’s figure and under any reasonable interpretation of the claim term “substantially different” (i.e., the claim term that PO chose to use to claim its alleged invention without any more precise definition). EX1004, [0181], [0214]-[0215], [0226], FIG. 4. I note that f3 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. *See also* EX1004, [0181], [0214]-[0215], [0226], FIG. 4. PO’s arguments also ignore the similarity between the position of “f3” in Onishi to the near-linear region in the ’696 patent. EX1004, FIG. 4 (position of f1, f2) *cf.* EX1001, FIG. 6b (position F_u).

37. Second, Onishi explains that f3 “is a frequency used in the power-saving mode” at a position such that “the power transmission device can reliably detect a change in load state by determining a change in amplitude using the

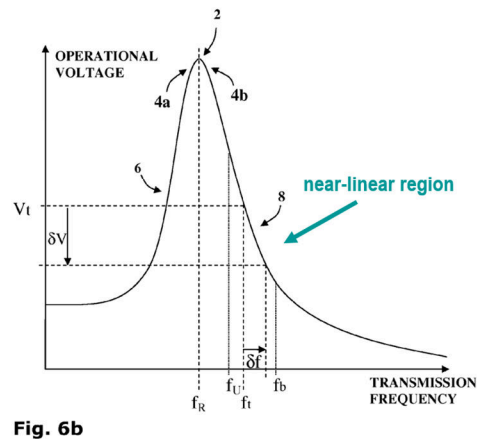
threshold value.” EX1004, [0181], [0064]. These teachings, in view of FIG. 4 of Onishi, indicate that the position of f_3 is not only set sufficiently apart from resonance to achieve lower power transfer, but also would not be so far from resonance that the power transmission device could not reliably detect the change in load state. As I discussed above, 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. Again, 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]. I also note that f_3 being positioned in a region where a small amount of power transmitted is consistent with positioning f_3 within the near-linear region at a position closer to the lower boundary of the near-linear region as compared to F_1 and F_2 (e.g., as shown in FIG. 4 of Onishi). EX1004, [0180]-[0181]; FIG. 4. As discussed above, this position would allow for power saving, in particular as compared to at positions f_1 and f_2 while maintaining reliable load-state detection. EX1004, [0064], [0180]-[0181], FIG. 4.

38. Third, the position of f_3 in FIG. 4 in Onishi is in a region that is remarkably similar to the near-linear region of the preferred embodiment of the '696 patent:

EX1004 (Onishi), FIG. 4:



EX1001, (the '696 Patent), FIG 6b:



EX1004, FIG. 4 (annotated to show the near-linear region with variable shading because the '696 Patent does not provide any criterion to establish quantitative boundaries); EX1001, FIG. 6b (annotated). *See also above* Section V.B.1. Accordingly, and in contrast to the Dr. Mercier's and PO's position (EX2006, ¶136; POR, 45-47), the location of f3 within a near-linear region is at least as clear as the identified near-linear region in the '696 Patent.

4. A POSITA would have understood Onishi's FIG. 4

39. I understand that PO and Dr. Mercier advance several arguments in an attempt to disqualify FIG. 4 of Onishi. POR, 37-49; EX2006, ¶¶123-139. I disagree at least because a POSITA would have understood Onishi's FIG. 4 to teach element [1.7] given the remarkable overlap with the preferred embodiment of the '696 Patent.

40. First, PO and Dr. Mercier argue that FIG. 4 provides an illustration of the relationship between f1, f2, and f3 and not "the actual locations" on a frequency-

amplitude graph. POR, 39; EX2006, ¶127. I note that my expert declaration relies on FIG. 4 alongside Onishi's teaching (that I discussed above) to teach the relationship between the positions of f1, f2, and f3 relative to the frequency amplitude graph of the inductive couple. *See Above* Section V.B.1. Onishi's description including FIG. 4 does not support PO's position that the frequencies shown are not "the actual locations" on the frequency amplitude graph shown. POR, 39; EX2006, ¶127. Onishi provides express statements that support my position that each of these frequencies corresponds to an actual frequency relative to the frequency amplitude graph of FIG. 4 that would be used when the system is 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], [0211]-[0212], [214]-[0215], [0226], [0230], [0232], [0234], FIG. 3A. Additionally, as discussed above, this disclosure in Onishi is almost identical to what is disclosed in the '696 Patent. *Compare* EX1004, FIG. 4 *with* EX1001, FIG. 6B.

41. Next, PO and Dr. Mercier argue that Onishi's FIG. 4 is deficient because of its lack of dimensions, vertical-axis labels, and quantitative values. POR, 40-41; EX2006, ¶128. I note that nothing in the '696 Patent provides these details. The '696 Patent provides no dimensions or quantitative values to define its transmission frequency. *Id.* In fact, I understand that the Examiner identified the lack

of “numerical guidance” in the ’696 Patent during prosecution. EX1002, 129-130. A POSITA would have been able to understand Onishi’s FIG. 4 to the same extent that a POSITA would have been able to understand FIG. 6b of the ’696 Patent.

42. A POSITA also would not require FIG. 4 to show “particular sizes” or even a particular frequency to understand whether they are “substantially different” and lie within the near-linear region, but would instead look to the position of the frequencies relative to a frequency-amplitude curve. This is exactly what is shown in FIG. 6b of the ’696 Patent. Additionally, as I discussed above in Section V.B.1, Onishi is not silent on the position of the frequencies f_1 , f_2 , f_3 relative to the frequency amplitude graph. *See above* Section V.B.1

43. Additionally, it would have been clear to a POSITA that FIG. 4 is a frequency-amplitude graph for an inductive couple. *See above* Section V.A. A POSITA would have readily known that the y-axis relates to a measurement (e.g., voltage, current, or power) in the system indicative of power transferred via the inductive couple in view of Onishi’s disclosure. *See* EX1004, [0171] (the “power value of the resonant circuit becomes a maximum at the resonance peak, and decreases as the resonance frequency moves away from the resonance peak”), [0053]; *see also above* Section V.A (Element [1.4]). This is sufficient for a POSITA to determine that the frequencies f_1 , f_2 , f_3 are in the near-linear region of a frequency-amplitude graph for an inductive couple. In particular, regardless of

whether the Y-axis in FIG. 4 is power (i.e., watts), voltage (volts), or current (amps) the illustrated amplitude curve and positioning of frequencies f_1 , f_2 , f_3 , would demonstrate that the frequencies were selected to be substantially different from the characteristic resonant frequency when compared to the region from f_U to f_b shown in FIG. 6B of the '696 patent.

44. Finally, PO's argument that Onishi fails to disclose the frequencies f_1 , f_2 , and f_3 relative to the inductive couple is not convincing because, as discussed above in Section V.A (Element [1.4]), a POSITA would understand the teachings in Onishi and FIG. 4 to show the frequency amplitude graph for an inductive couple including the resonant frequency of the inductive couple. *Above* Section V.A; *see* POR, 48-49; EX2006 ¶139.

45. PO also contends that Fig 4 of Onishi cannot be taken literally because the text says " $f_1 > f_2 > f_3$ " whereas Fig 4 clearly shows $f_1 < f_2 < f_3$. A POSITA would have understood that Onishi is showing that the power transfer efficiencies at frequencies f_1 , f_2 , and f_3 do satisfy the inequalities.

C. The Onishi-Flowerdew Combination Renders Obvious Claim 2

46. Dr. Mercier and the POR contend that the Onishi-Flowerdew Combination fails to renders Obvious Claim 2 based on their incorrect analysis that frequencies f_1 , f_2 , and f_3 are not substantially different from the characteristic resonant frequency. EX2006, ¶¶140-143; POR, 49-51. However, as I discussed

above for Section V.B (Element [1.7]), the frequencies disclosed in Onishi (e.g., f_1 , f_2 , f_3) are substantially different from the characteristic resonant frequency. *See above* Section V.B. Accordingly, all changes in frequencies (i.e., increasing or decreasing) and importantly those discussed in the Petition and my first declaration will result in a movement along the near-linear portions of the resonant curve. *See above* Section V.B; Pet., 28-38; *See also* EX1003, ¶¶69-78.

47. I also note that 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. Regardless, Onishi would still meet these constraints 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 I discussed above. *See above* Section V.B. For each of these reasons, and those discussed in further detail in the Petition, claim 2 would have been obvious based on Onishi-Flowerdew

D. Predictable Combination of Onishi and Flowerdew

48. Dr. Mercier and POR argue there is no motivation to combine Onishi and Flowerdew. EX2006, ¶¶144-145; POR, 51-52. I disagree. The Petition and my first declaration properly note the suggestion that a POSITA would have recognized from Flowerdew's conventional practice and the predictable benefits that would

have motivated a POSITA to implement such an improvement in Onishi. Pet., 14-17; EX1003, ¶¶49-55.

49. Specifically, I note that the Petition does not propose to combine Flowerdew's horizontal coupling and long solenoidal coil with Onishi's charging system. Instead, the Petition and my first declaration 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; EX1003, ¶¶49-55. The Petition and my first declaration 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. A POSITA would have been more than capable of implementing such conventional features in Onishi's system.

50. Similarly, as presented in the Petition and my first declaration, a POSITA would have had a reasonable expectation of success for implementing Flowerdew's alignment mechanism with Onishi's power transmission device to achieve the Onishi-Flowerdew combination. Pet., 14-17; EX1003, ¶¶49-55.

VI. Ground 1B: The Onishi-Flowerdew-Partovi Combination Renders Obvious Claims 11-13

51. PO's argument against the motivation to combine the Onishi-Flowerdew-Partovi combination and the operability of the resulting system ignores the evidence cited in the Petition and my first declaration. POR, 53-54; EX2006, ¶¶146-148; EX1003, ¶¶91-95. The Petition and my first declaration provides multiple reasons each supported by evidence that would have motivated a POSITA to implement the alignment mechanisms as suggested by Partovi in the power transmission device of the Onishi-Flowerdew combination which the POR fails to address. PET. 46-48; EX1003, ¶¶91-95. Instead, PO and Dr. Mercier argue that a POSITA would not be motivated to use a magnetic alignment targeted for resonant power transmission (e.g., as taught by Partovi) in a system intended to provide non-resonant power transmission e.g., power transmission at a frequency substantially different from resonant frequency (e.g., the Onishi-Flowerdew combination). POR, 53-54; EX2006, ¶¶147-148. I note that here, the POR appears to acknowledge that the Onishi-Flowerdew combination is "intended to provide non-resonant power transmission e.g., power transmission at a frequency substantially different from resonant frequency." POR, 54.

52. PO and Dr. Mercier's position is contradicted by the express teachings in Partovi. For example Partovi states 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 driving a frequency that is “out-of” resonance to create the appropriate voltage in the receiver, such as to operate at any of the frequencies f_1 , f_2 , f_3 , to induce the appropriate voltage in the secondary coil.

53. I also note that the citations to Partovi in the POR are taken out of context and do not support PO’s conclusion that “Partovi is specifically directed to the use of magnetic alignment to facilitate operation at resonance.” POR, 53-54, *see also* EX2006, ¶147. Specifically, PO relies on paragraph [0118] and [0047] to support its position. Partovi is clear that solution in cited paragraph [0118] is an “embodiment” of Partovi and paragraph [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.” To be clear, nothing in Partovi requires the wireless charger to operate at resonance and, 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]. The argument that a non-resonant transmission system would be incompatible with a magnetic alignment mechanism is also contradicted by the ’696 Patent’s disclosure. *See* EX1001, 10:3-12.

54. For at least these reasons and those presented in my previous declaration and the Petition, a POSITA would be motivated to combine Onishi, Flowerdew, and Partovi. Pet. 46-48; EX1003 ¶¶91-95. Additionally, a POSITA

would have had a reasonable expectation of success in achieving the Onishi-Flowerdew-Partovi combination. Pet. 46-48; EX1003 ¶¶91-95.

VII. Ground 2A: The Baarman392-Partovi Combination Renders Obvious Claims 1, 3-5, 7, and 9-14

A. Baarman392-Partovi Combination Renders Obvious Element [1.7]

55. In contrast to PO's and Dr. Mercier's position, Baarman392 teaches the claimed "transmission frequency substantially different from said characteristic resonant frequency." POR, 55-60; EX2006, ¶¶149-157 *See* EX1003, ¶¶119-120.

56. PO and Dr. Mercier argue that Baarman392 discloses using a frequency that is "somewhat less than the resonant frequency" and not "substantially different." EX1008, [0038]; POR, 55-58; EX2006, ¶¶150-154. This argument ignores that rest of Baarman392's paragraph [0038] which clarifies that 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." EX1008, [0038] (emphasis added), *see also* [0056] (explaining that the charger circuit can "operat[e] relatively far from resonance"). A POSITA would have understood that a change in operating frequency which results in a generally predictable change in power transfer would be an operating frequency that is analogous to a frequency chosen to lie in the near-linear region identified in FIG. 6b of the '696 patent.

57. Additionally, Baarman392 in FIG. 3 shows a range of frequencies from A to B in which the operating frequency can be applied. EX1008, FIG. 3, [0038]. Baarman392 states “[g]enerally, the inverter 10 is operated between frequency A and frequency B.” EX1008, [0038]. I understand that element [1.7] is satisfied if even just one of Baarman392’s operating frequencies is positioned in the linear or near-linear portion of the frequency amplitude graph. In other words, I understand that Baarman392 is only distinguishable if *none* of the frequencies between A and B qualify as “substantially different.” *Id.*; EX1002, 70. Here, it is clear 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. EX1008, [0056] (disclosing operating frequencies that extend from “near the resonant frequency” to “far from resonance”). Dr. Mercier appears to agree that the linear/near-linear region is an inherent feature of all resonance curves for an inductive couple. EX1102, 29:7-15. In this context, it is clear that Baarman392’s operating frequencies include frequencies in the linear/near-linear region.

58. In contrast to PO’s and Dr. Mercier’s position, Baarman392’s disclosure for the range between A and B being “piece-wise linearized by a software lookup table” is consistent with the operating frequency being selected to lie within “the near-linear regions of a frequency-amplitude graph associated with the

inductive couple.” POR, 58-59; EX2006, ¶155. First, a POSITA would have understood that “near-linear” (e.g., the region shown in FIG. 6b of the ’696 Patent) is different from linear in that it allows some variation from a perfect linear response. Accordingly, the region between A and B in Baarman392’s FIG 3 being piece-wise linearized can be consistent with a “*near*-linear” curve. A “near-linear” curve can still be piecewise linearized to achieve even tighter control and greater linearity, if desired.

59. Again I note that Element [1.7] only requires the transmission frequency in “the *near*-linear region.” Accordingly, a curve being piece wise linearized could include regions that are linear and/or near-linear and this would have been clear to a POSITA when reviewing FIG. 3 of Baarman392. In other words, the portion on the graph between A and B being “piece-wise linearized” does not preclude every position of the region between A and B from being linear or near-linear. In fact, a POSITA would have understood and found obvious using a piece-wise linearized look-up table to linearize control across the full range of operating frequencies between A and B—especially if the range of operating frequencies between A and B were to extend beyond the linear/near-linear region of the curve. EX1008, [0038], [0056], FIG. 3. In short, piecewise linearization is consistent with operating in the linear/near-linear region of the resonance curve.

60. I note that Baarman392 teaches a solution to the same problem allegedly solved by the '696 Patent for predictable power transfer control. EX1008, [0038] (“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.”). Based on these teachings, a POSITA would have understood that Baarman392’s disclosure teaches a wireless power transmission solution with power regulation that occurs in the near-linear portions of the frequency amplitude graph of an inductive couple.

61. Finally, I note that even under PO’s construction, Baarman392 would still expressly teach Element [1.7], because at least one of the possible operating frequencies (between A and B in Baarman392’s FIG. 3) would allow for “some incremental change” within the near-linear region:

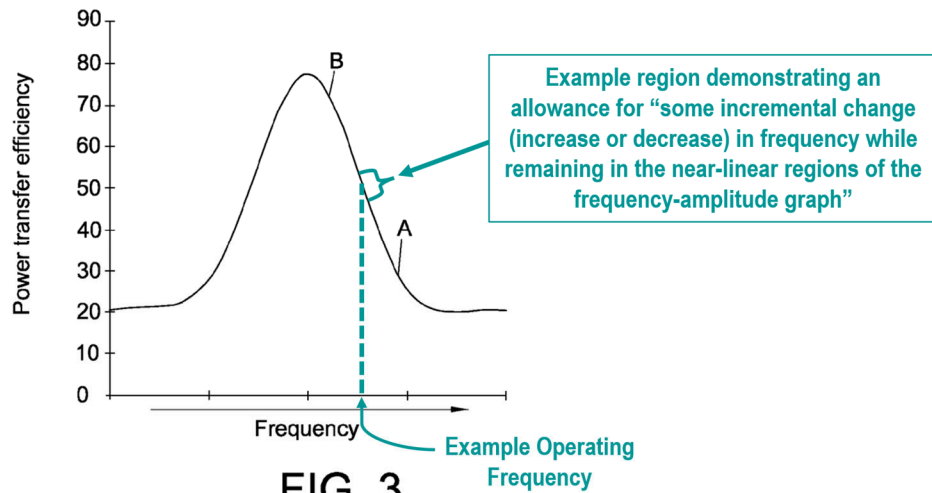


FIG. 3

EX1008, FIG. 3 (annotated), [0038].

B. Predictable Combination of Baarman392 and Partovi

62. In contrast to PO’s and Dr. Mercier’s position, a POSITA would have been motivated to combine Baarman392 and Partovi as outlined in my first expert declaration for several reasons. POR, 60-64. EX2006, ¶¶158-161; *See* EX1003, ¶¶104-109.

63. First, as discussed above, Partovi is clear that in the wireless charger, “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]. *See Above* Section VI. For these same reasons, nothing regarding 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 (*i.e.*, as taught by Baarman392).

64. Second, a POSITA would readily recognize that the solution in Baarman392 would function even in a tightly coupled scenario. In other words, Baarman392's solution would operate even with a steep power transfer curve to achieve the desired behavior. *See* EX1008, [0038]. 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].

65. Third, a POSITA would understand that even with Partovi's alignment mechanism a loose coupling between the primary and second coils could occur for many different reasons. In other words, while improved, the resulting coupling from Partovi's alignment mechanism could still result in a loose coupling between a primary and secondary analogous to the example demonstrated in Baarman392. For example, a POSITA would have understood that the coupling 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. In fact Dr. Mercier recognized that several factors would impact the coupling in his deposition testimony. *See* EX1102, 31:7-33:13 (explaining that other factors that affect the steepness of the curve in addition to the alignment of the coils).

66. Finally, PO's argument that the Petition appears to mix embodiments of Baarman392 for teaching [1.7] is incorrect. 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. Further, the "current embodiment" of Baarman392, as modified by the additional references outlined in my first declaration and the Petition, satisfies all elements of the challenged claims.

VIII. Ground 2B: The Baarman392-Partovi-Tocci Combination Renders Obvious Claims 2, 6

67. In contrast to PO's and Dr. Mercier's position, the Baarman392-Partovi-Tocci Combination Renders Obvious Claim 2, for at least the following independent reasons. POR, 64-66; EX2006, ¶¶162-167; *See also* EX1003, ¶¶139-146.

68. First, Baarman392 explains 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 discloses 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]. Baarman392 also teaches increasing and decreasing the operating frequency along the resonant curve between A and B. This, along with the implementation of Partovi and Tocci as outlined in the Petition and my first declaration, is enough to render claim 2 obvious. Pet., 75-80; EX1003, ¶¶147-155.

69. Second, even if it was not clear whether portions of frequencies near B or A in FIG. 3 were in the near-linear region, Baarman392 would still teach the mapped features in claim 2. Baarman392 explains that the transmission frequency is repeatedly decreased by “ Δ FREQ” to increase the power unit a feedback signal is received or the frequency is less than a minimum operating frequency.⁴ EX1008,

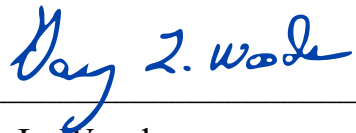
⁴ I note that Baarman392 explains that Min_FREQ is “the predetermined minimum operating frequency” and Max_FREQ is “the maximum frequency for operating the inverter.” EX1008, [0057], [0059]. Baarman392 also explains that “the inverter 10 is operated between frequency A and frequency B.” EX1008, [0038]. A POSITA would have understood that the Min_FREQ corresponds to “B” and the Max_FREQ corresponds to “A” in FIG. 3. *See* EX1008, [0038] (“Frequency B is somewhat less than the resonant frequency”), [0057] (explaining that Min_FREQ is “somewhat greater than the resonant frequency”); FIGs. 3, 7.

FIG. 7, [0055]-[0056]. In other words, in at least some instances the frequency is decreased by “ Δ FREQ” from B until it would reach an operating frequency less than A as shown in FIG. 3. *Id.*, *see also* [0038], FIG. 3. A POSITA would recognize that this would include at least one decrease in frequency, but more commonly multiple decreases in frequency, that is within a portion of the curve between B and A that is linear or near-linear to meet Element [2.2]. Similarly, Baarman392 discloses repeatedly increasing the transmission frequency (twice the value of Δ FREQ) 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 Δ FREQ” from A until the operating frequency would be greater than B as shown in FIG. 3. *Id.*, *see also* [0038], FIG. 3. 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 linear or near-linear portion of the resonant curve. These teachings along with the implementation of Partovi and Tocci as outlined in the Petition and my first declaration are enough to render claim 2 obvious. *See* Pet., 75-80; EX1003, ¶¶147-155.

IX. CONCLUSION

70. I hereby declare that all statements made of my own knowledge are true and that all statements made on information and belief are believed to be true. I further declare that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of the Title 18 of the United States Code.

Dated: 27 May 2025

By: 
Dr. Gary L. Woods