

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ANKER INNOVATIONS LTD.,
Petitioner,

v.

POWERMAT TECHNOLOGIES LTD.,
Patent Owner.

Case IPR2024-00995
Patent No. 9,083,204

SECOND DECLARATION OF DR. GARY L. WOODS

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

I. INTRODUCTION AND SCOPE OF WORK

1. On August 13, 2024, I submitted a First Declaration in IPR2024-00995. *See* EX1003. I submit this Second Declaration for purposes of responding to Patent Owner's Response to Petition (POR) submitted on May 21, 2025 and the declaration testimony of Dr. Mercier (EX2009). In this Second Declaration, I provide additional analysis regarding the claims of U.S. Patent No. 9,083,204 (the '204 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 '204 Patent. I am familiar with the technology described in the '204 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 '204 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 '204 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, the Board's Decision Instituting IPR ("Institution Decision"), and the deposition transcripts of Dr. Mercier (EX1102, EX1103).

III. TECHNICAL DISCUSSION

5. The analysis expressed in my First Declaration fully explains why each and every feature of the Challenged Claims of the '204 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 '204 Patent, and the cited prior art. As I previously explained with reference to the applied prior art, each of Grounds 1A, 1B, and 2 renders obvious the Challenged Claims. I need not repeat that analysis here. Rather, this declaration is intended to respond to particular arguments presented in the POR and the testimony of Dr. Mercier, including testimony from the declaration submitted with Patent Owner's briefing (EX2009) and the testimony that he provided during his depositions (EX1102, EX1103).

IV. CLAIM CONSTRUCTION

A. “Substantially Different” (Claims 1, 10)

7. I understand that Patent Owner has proposed a construction for the phrase “a non-resonant transmission frequency *substantially different* from said characteristic resonant frequency of said inductive couple” to further require that the claimed system implement “a linear control technique for predictably regulating power transfer.” POR, 27 (emphasis added). To the extent that a “linear control technique” involves anything more than a non-resonant transmission frequency in the near-linear region of the frequency-amplitude graph, I disagree.

8. Based on my review of the claim language, the specification, and the file history, it would be improper to import an unclaimed requirement for a “linear control technique” based on construction of the term “substantially different.” The

term “substantially different” is never defined in the specification of the ’204 Patent, and the portions of the specification that describe linear control are merely described as “examples” or “embodiments” as opposed to essential features of the alleged invention. *See* EX1001, 4:14-17 (“Preferably”, “Optionally”), 21:16-23 (“of embodiments,” “Preferably”); 21:56-65 (“For example”), 22:45-64 (“One example”). The discussion of “substantially different” in the file history also lacks any mention of linear control (e.g., incremental increases/decreases in transmission frequency) as a requirement for this claim term. *See, e.g.*, EX1002, 102-105, 55-64 (file history including no discussion of incremental change as a requirement for “substantially different” frequency). Given the absence of any clear intent in the specification or file history to further restrict the scope of “substantially different” beyond a frequency that lies in the near-linear region of a frequency-amplitude graph, a POSITA would not have read the term “substantially different” to further require implementation of a linear control technique.

9. A POSITA would have understood that a predictable, near-linear response would be produced when a frequency within the near-linear region is adjusted within that region by virtue of the region being near-linear. To that extent, a frequency in the near-linear region would inherently allow for linear control. However, the term “substantially different” does not in itself mean that the system must further realize the benefits of linear control based on adjustments to the non-

resonant transmission frequency within the near-linear region. A “a non-resonant transmission frequency substantially different from said characteristic resonant frequency of said inductive couple” encompasses any *single* frequency that lies in the near-linear region of the frequency-amplitude graph. It does not refer to *multiple* frequencies within the near-linear region where linear control could be achieved.

10. Patent Owner’s related argument that a “substantially different” transmission frequency must “allow for some incremental change (increase or decrease) in frequency while remaining in one of the near-linear regions of the frequency-amplitude graph” is incorrect. Again, a frequency in the near-linear region would inherently allow for linear control to the extent that a predictable, near-linear response would be produced if a frequency within the near-linear region were adjusted within that region. By arguing that an allowance for incremental change is a distinct requirement for a “substantially different” frequency apart from the frequency being within the near-linear region, however, Patent Owner appears to contend that not all frequencies within the near-linear region are necessarily “substantially different.” I disagree and find no basis to support this position in the claims, specification, or file history. Moreover, Elements [1.7]-[1.8] and [13] already recite language that describe “incremental” changes in the non-resonant transmission frequency. A POSITA would have considered the additional features recited in these claim elements sufficient to set forth what is required in relation to

“incremental” frequency change, and consequently, there is no need to further inject a requirement for an allowance for incremental change in the construction of “substantially different.” To reiterate my opinion from my First Declaration, the specification and file history confirm that “a non-resonant transmission frequency substantially different from said characteristic resonant frequency of said inductive couple” must at least encompass the frequencies within one of the near-linear regions of the frequency-amplitude graph. EX1003, ¶40. For example, the frequencies indicated by reference numerals 6 and 8 in FIG. 6b of the ’204 Patent are non-resonant transmission frequencies “substantially different” from the characteristic reference frequency. Each of Grounds 1A, 1B, and 2 include prior art teachings that expressly disclose and/or align with the ’204 Patent’s preferred embodiment in FIG. 6b of a transmission frequency that is “substantially different” from a characteristic resonant frequency. EX1003, ¶41. Accordingly, PO’s further construction is not needed here.

B. “Incremental Value” (Claims 1, 13)

11. Independent claim 1 recites the following language in Elements [1.7]-[1.8]:

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

[1.8] provide more power by decreasing said non-resonant transmission frequency by an **incremental value** when said second

signal is detected by the detector.

12. Claim 13, which depends from claim 10, recites similar language:

[13] The method of claim 10 wherein the step of said driver adjusting said non-resonant transmission frequency further comprises: said driver reducing said non-resonant transmission frequency by an **incremental value** Δf_1 when the received feedback signal is of the first type S_a , and said driver increasing said non-resonant transmission frequency by an **incremental value** $+\Delta f_2$ when the received feedback signal is of the second type S_b .

13. In the POR, Patent Owner contends that the term “incremental value” should be interpreted according to its plain and ordinary meaning, which it construes to mean that the incremental increase/decrease of the non-resonant transmission frequency must exclude “selecting a discrete transmission frequency value.” POR, 34. Patent Owner argues that these limitations instead require “a series of small adjustments (*e.g.*, $+\Delta f_1$ or $-\Delta f_2$) for reaching a particular value (or frequency range in this instance).” POR, 32, 34. Further, Patent Owner contends that the “incremental value” must represent a “gradual change” by unspecified “small” amounts. POR, 32.

14. Based on my review of the specification and file history, there is no indication that the inventor or applicant intended to apply any special meaning to the term “incremental value.” The specification does not provide a specific

definition for “incremental value” nor does the file history reflect any intent to disclaim or disavow the full scope of the term “incremental value.” I therefore agree that the term “incremental value” should be afforded its plain and ordinary meaning.

15. I do not, however, agree with Patent Owner’s explanation of the plain and ordinary meaning. Patent Owner’s description of the plain and ordinary meaning actually distorts the meaning through injection of additional limitations that are plainly not required by the breadth of a single “incremental” increase or decrease in the non-resonant transmission frequency as recited in claims 1 and 13. Indeed, the claims include no language that necessarily places the incremental increase/decrease in the context of “a *series* of small adjustments ... for reaching a particular value (or frequency range ...).” POR, 32 (emphasis added). Elements [1.7]-[1.8] and [13] each recite just a single incremental increase and a single incremental decrease in the non-resonant transmission frequency. If the applicant had intended for the claims to require a series of incremental changes to gradually reach an acceptable frequency range, the applicant might have considered employing different claim language. The claims as written, however, do not refer to any series of increases, instead reciting a mere increase/decrease in the transmission frequency by “*an* incremental value.”

16. The POR cites to portions of the specification of the ’204 Patent that

describe a “series of feedback signals” that trigger a corresponding series of incremental frequency adjustments supports. POR, 31-34 (citing EX1001, 22:65-23:5, FIG. 6b). But the specification never mandates a series of incremental changes. The cited portions of the specification instead explains that the embodiments that employ a series of feedback signals and a corresponding series of incremental increases/decreases in the transmission frequency merely represent “[o]ne *example* [] power regulation method,” while at the same time acknowledging that “*other* power regulations methods ... may be used.” EX1001, 22:45-23:15 (emphasis added)

17. A POSITA also would not have understood the recited incremental increase/decrease in the non-resonant transmission frequency to exclude “select[ion] [of] a discrete transmission frequency value” as argued in the POR. Patent Owner’s argument appears to rest on the flawed assumption that some meaningful technical distinction exists between (1) increasing/decreasing a transmission frequency by “adding or subtracting” an incremental value to the current frequency and (2) obtaining even the same increased/decreased transmission frequency by selecting that frequency from a finite number of discrete values—even if the same (incremental) frequency adjustment is realized. *See* POR, 29 (citing EX2009, ¶¶127-128), 57. I disagree. A POSITA would have seen no material difference between these two different but equally valid ways of

implementing an increase/decrease to the non-resonant transmission by an incremental value. A POSITA would have recognized that there would be potentially many different ways to program a driver to increase/decrease a transmission frequency by an incremental value, but the specific method of implementation is immaterial to the alleged invention. Elements [1.7]-[1.8] and [13] do not recite details of a specific implementation, but instead claim mere function of increasing/decreasing the non-resonant transmission frequency by an incremental value. This function would be achieved regardless of whether the increase/decrease were made by adding the incremental value to the current non-resonant transmission frequency to obtain a new transmission frequency. It would also be achieved by selecting a new transmission frequency that is separated by an incremental value from the current transmission frequency. The '204 Patent is agnostic between these options. It never discloses specifically whether the increase/decrease in transmission frequency by an incremental value $+\delta f_1/-\delta f_2$ is achieved by calculation of the new transmission frequency through addition/subtraction or by selection of the new transmission frequency from among a set of frequencies separated by a distance $+\delta f_1/-\delta f_2$ from the current transmission frequency. *See, e.g.,* EX1001, 22:45-23:15, FIG. 6b.

18. The dictionaries cited in the POR also do not support Patent Owner's efforts to import requirements for a series of incremental increases/decreases or to

exclude selection of a discrete frequency value to increase/decrease the non-resonant transmission frequency. *See* POR, 32-34 (citing EX2006, EX2007, EX2008, EX2014). None of the cited dictionary definitions delineate between addition/subtraction of a value and realizing an incremental change by selection of a discrete value a distance from the current value. Many definitions in these dictionaries also omit any mention of a series of gradual changes or the like. *See, e.g.,* EX2006 (“2. Something added or gained.”), EX2007 (“3. *maths* a small positive or negative change in a variable or function”), EX2008 (“2. A small variation in a quantity or variable.”).

19. Patent Owner’s and Dr. Mercier’s assertions that my analysis somehow renders the term “incremental value” superfluous are not correct. These arguments plainly mischaracterize my earlier testimony. As I have previously testified, the term “incremental value” is significant insofar as it delimits the magnitude of the claimed increase/decrease in transmission frequency. For example, in the context of claims 1 and 13, a POSITA would have understood that the claimed increase/decrease in the transmission frequency by an “incremental value” must be sufficiently large to produce a corresponding, measurable decrease/increase in transmitted power. This is consistent with the requirement in claim 1 for the driver to provide less/more power by the incremental frequency change. EX1001, 28:40-45. At the same time, an incremental increase/decrease

would not be wider than the frequency span of the near-linear region of the frequency amplitude graph. Otherwise the incremental increase/decrease would be incapable of producing an increased/decreased transmission frequency that remained within the near-linear region. This is consistent both with dictionary definitions of “incremental” that refer to relatively “small” changes and with the specification that illustrates in FIG. 6b an incremental frequency change δf within the near-linear region 8. EX1001, FIG. 6b. The specification confirms that incremental values can have different sizes, but it does not otherwise impose a specific limit on the size of the incremental change within the near-linear region. See EX1001, 23:5-7 (“may be greater than, less than or equal”), FIG. 6b.

V. Ground 1: Onishi Anticipates Claims 1-6, 8, and 10-13

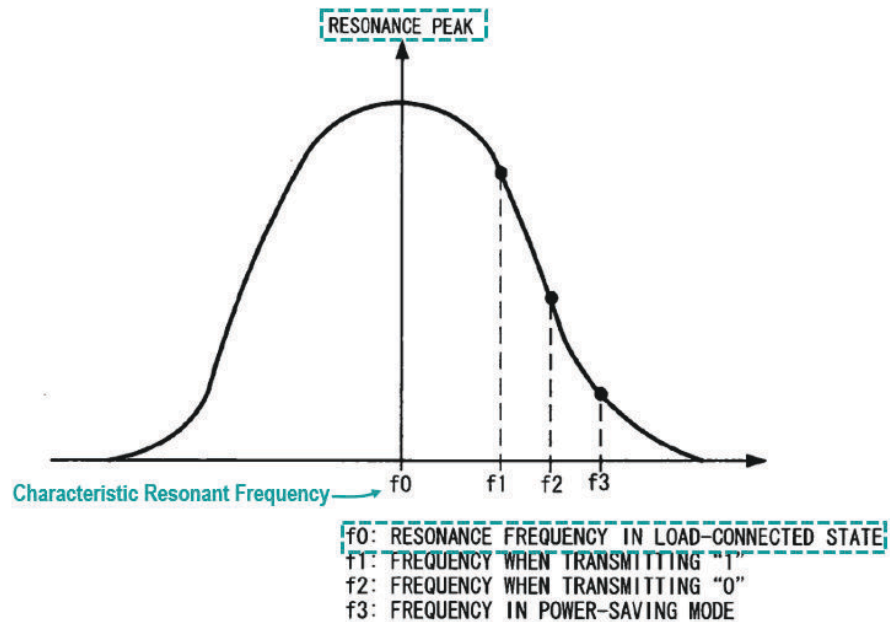
A. Element [1.2]: “said primary inductive coil for forming an inductive couple having a characteristic resonant frequency with at least one secondary inductive coil wired to an electric load”

20. Patent Owner contends that “Onishi does not disclose an inductive couple having a characteristic resonant frequency,” as recited in Element [1.2]. POR, 36; *generally id.*, 36-42. I disagree. Patent Owner’s argument is based almost entirely on a strained reading of a single sentence in paragraph [0180] of Onishi that disregards key context and that is contradicted by the sentence that *immediately follows* the one relied upon by Patent Owner. See EX1004, [0180], FIG. 4. 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. This cannot be reasonably disputed since even Dr. Mercier acknowledged at his deposition that “[i]f you have a parabolic-shaped curve” like Onishi’s, “then yes, I would say there is a characteristic resonant frequency in all cases.” EX1102, 30:20-22; *generally id.*, 29:22-30:22. The ’204 Patent likewise admits that “[k]nown inductive power transfer systems typically transmit power at the resonant frequency of the inductive coupling.”). EX1001, 19:65-66, 20:4-34.

21. Patent Owner and Dr. Mercier incorrectly contend that Onishi’s frequency f_0 is the “characteristic resonance frequency” for the primary coil alone as opposed to the characteristic resonant frequency for the inductive couple. This assertion is rooted in 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 FIG. 4 merely depicts “the resonance characteristics of the *induction coil*’ (*i.e.*, primary coil L1), ..., not in the context of the resonance characteristics of an inductive couple formed by an induction coil (*i.e.*, primary coil L1) *and* a secondary coil (*i.e.*, secondary coil L2).” POR, 37 (emphasis in original).

FIG. 4

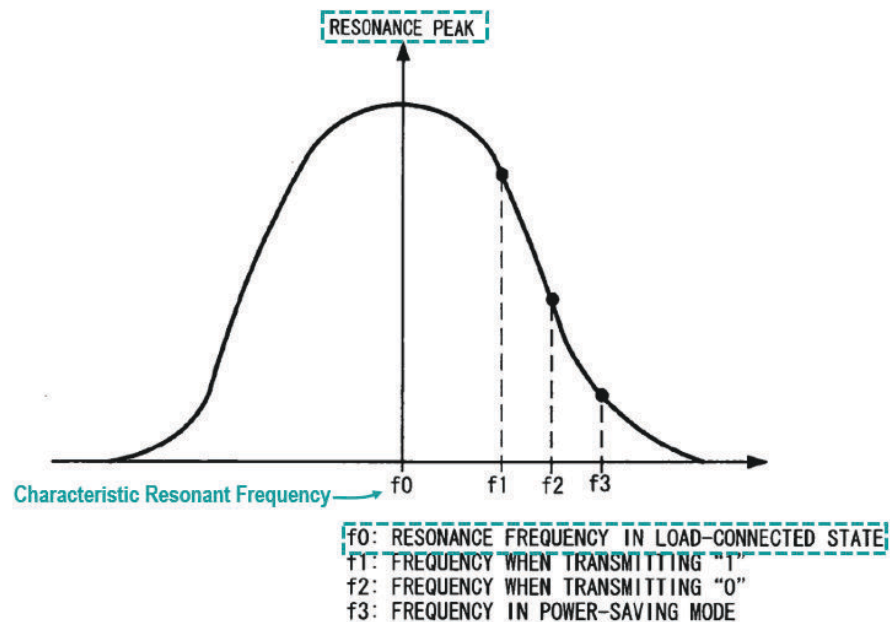


EX1004, FIG. 4 (as annotated in my First Declaration (EX1003) at ¶54)

22. 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).

23. 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 coils 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 '204 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 have understood that the graph in both FIG. 4¹ in Onishi and FIG. 6b in the '204 would be generated using the same values: (1) driving frequency applied to the primary 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

¹ 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].

POSITA there would have been no meaningful difference between the frequency “ f_0 ” in Onishi and frequency “ f_R ” in the ’204 Patent. Whether the y-axis in Onishi represents power, voltage, or current induced in the secondary coil would be immaterial because the frequency-response would be effectively the same with greater power transfer and higher induced currents and voltages at frequencies closer to the characteristic resonance of the inductive couple, and lower power transfer and lower induced currents and voltages at frequencies farther from the characteristic resonance of the inductive couple.

24. 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. 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 formed from these two coils can be different from the resonant frequency of either coil’s circuit when they are not coupled. EX2007, 8:22-10:14, 9:10-21. However, when an inductive couple is

formed, the system as a whole exhibits a single characteristic resonant frequency and the resonant frequency of each coil becomes the resonant frequency of the inductive couple.

25. I articulated these concepts in my deposition, but Patent Owner misrepresented the implications of my testimony. Nonetheless, Patent Owner cannot change what Onishi 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 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.

26. Finally, as mentioned above, 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.” EX1102, 29:18-30:23; *see also* 33:15-41:15.

B. Element [1.5]: “said driving voltage oscillating at a non-resonant transmission frequency substantially different from said characteristic resonant frequency of said inductive couple”

1. Onishi’s transmission frequencies (f₁, f₂, and f₃) are substantially different from the resonant frequency of the inductive couple

27. Both Onishi and the ’204 Patent describe transmission frequencies that lie in the same near-linear region of a power transmission curve for an inductive couple. In the ’204 Patent, the transmission frequency is selected between f_U and f_b in FIG. 6b:

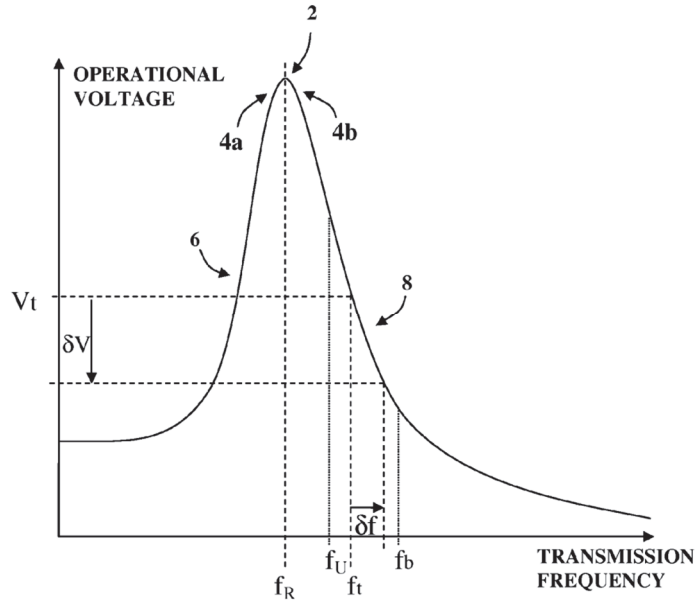
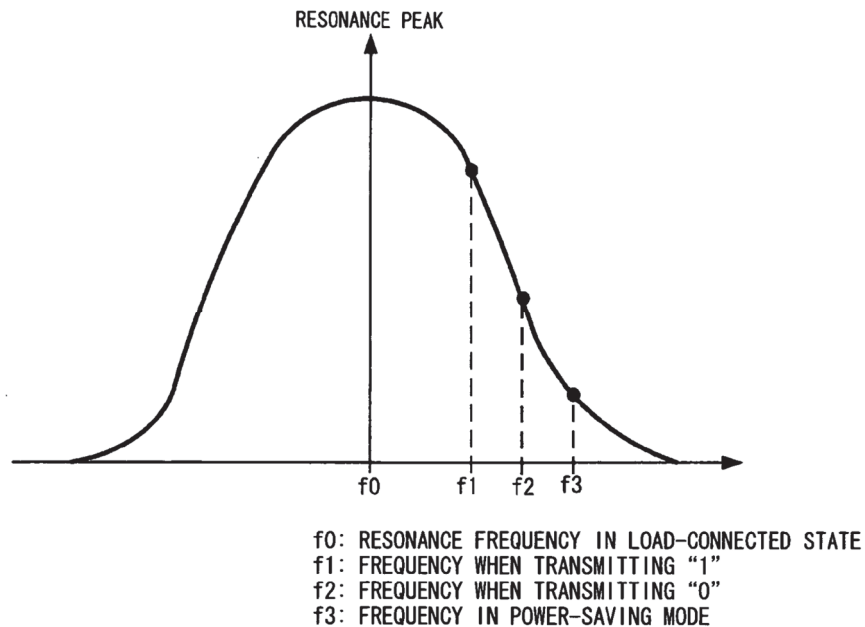


Fig. 6b

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

28. Similarly, in Onishi, three transmission frequencies (f_1 , f_2 , f_3) are lie within substantially the same region of the frequency-amplitude graph as the region identified in FIG. 6b of the '204 Patent:



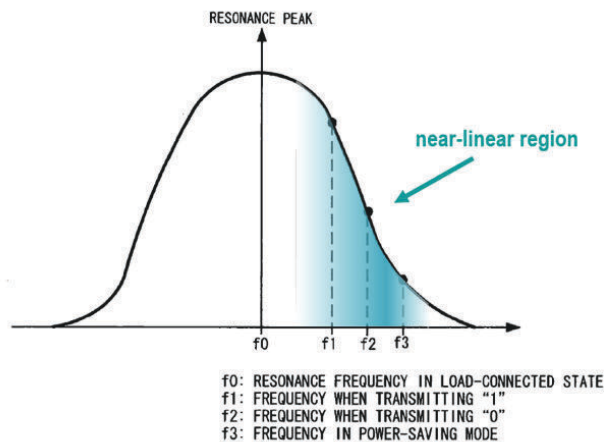
EX1004, FIG. 4, [0180]-[0181]. As I explained in my first declaration, “the substantially similar positions of Onishi’s frequencies f_1 , f_2 , and f_3 in the frequency-response curve as the transmission frequency (e.g., f_t in FIG. 6B) identified as ‘substantially different’ in the [’204] specification confirms that Onishi discloses a transmission frequency that is ‘substantially different’ from the characteristic resonant frequency” EX1003, ¶59.

29. Based on my review, a POSITA also would have understood each of frequencies f_1 , f_2 , and f_3 to lie within the near-linear region of the frequency amplitude graph when considering Onishi’s communication and load detection features.

30. For example, a POSITA would have recognized that 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); EX1006, FIG. 3 (showing the operating frequencies within a region away from the characteristic resonant frequency); EX1006, [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, a POSITA would have understood Onishi’s power transmission frequencies f_1 and f_2 to be positioned 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 '204 Patent's "near-linear region":

EX1004 (Onishi), FIG. 4:



EX1001, FIG 6b:

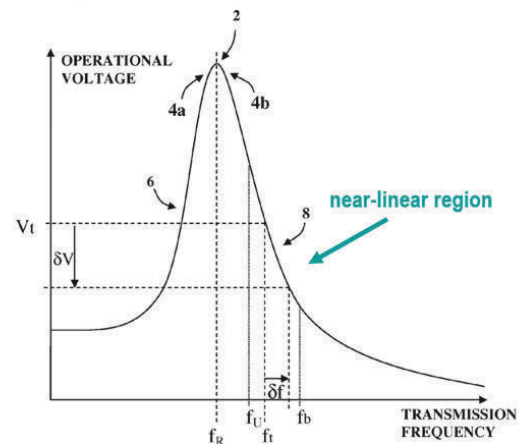


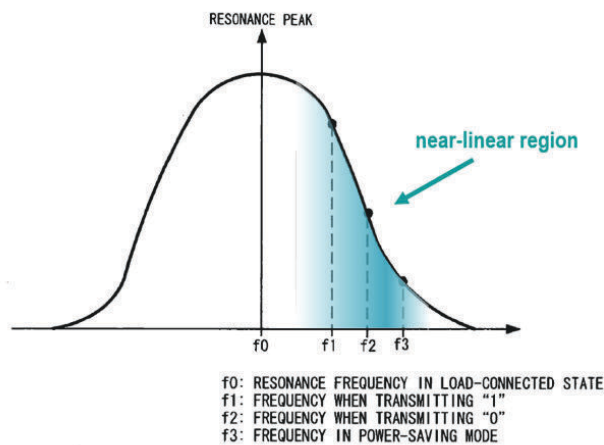
Fig. 6b

EX1004, FIG. 4 (annotated to show the near-linear region with variable shading because the '204 Patent does not provide any criterion to establish quantitative boundaries); EX1001, FIG. 6b (annotated).

31. Likewise, a POSITA would have understood that frequency f_3 would be positioned in the near-linear region to enable 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 f3)] 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 f3 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 f3 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 f3 within a remarkably similar region as the’204 Patent’s “near-linear region”:

EX1004 (Onishi), FIG. 4:



EX1001, FIG 6b:

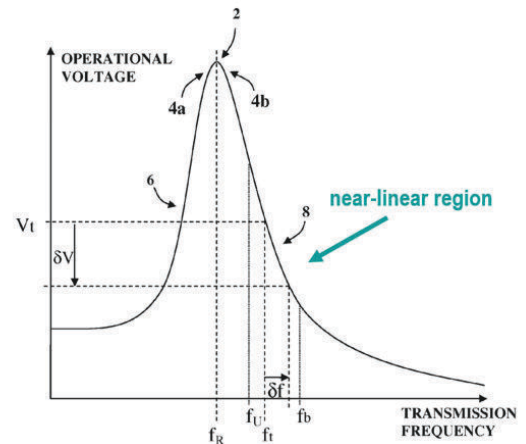
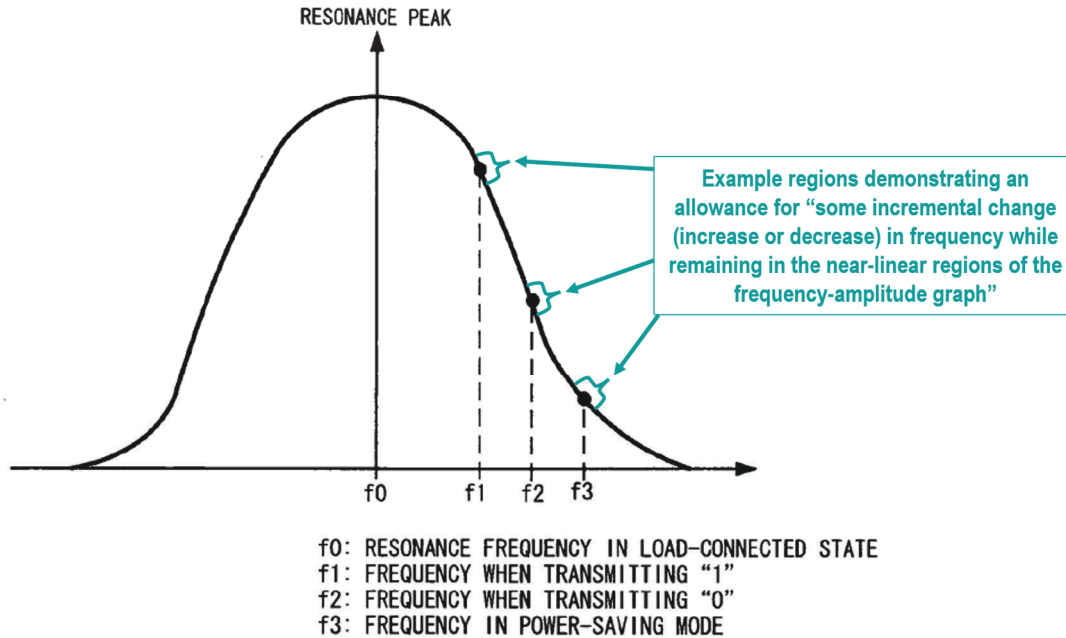


Fig. 6b

EX1004, FIG. 4 (annotated to show the near-linear region with variable shading because the '204 Patent does not provide any criterion to establish quantitative boundaries); EX1001, FIG. 6b (annotated).

32. I also note that even under Patent Owner'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).

33. Importantly, a POSITA also would have understood each of f_1 , f_2 , and f_3 to lie in the near-linear region of the frequency-amplitude graph because Onishi sought to achieve predictable power transmission levels at each of frequencies f_1 , f_2 , and f_3 , and this would only be achieved with frequencies in the near-linear region. Although the bounds of the near-linear region are not well-defined in the '204 Patent, a POSITA would have recognized that the near-linear region would at least include those frequencies in which frequency adjustments can be made that result in changes

in power transmission levels that are sufficiently predictable in the context of a given application. Onishi achieves such predictable control in transitioning between normal and power-saving power transmission modes based on its selection of frequencies f_1 , f_2 , and f_3 , which strongly implies that these frequencies lie in the near-linear region.

34. 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 near-linear region of the frequency-amplitude graph as the transmission frequencies in FIG.6b of the '204 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 f_1 and f_2 are substantially different from the characteristic resonant frequency of the inductive couple

35. Patent Owner argues that f_1 and f_2 “are at or near the resonance frequency” and therefore not “substantially different.” POR 44, 52. 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[]”² EX1004, [0053]. However, this sentence merely 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 positioned relatively closer to resonance than f_3 , much like f_U is positioned relatively closer to resonance than f_b in FIG. 6b of the ’204 Patent.

36. Patent Owner’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

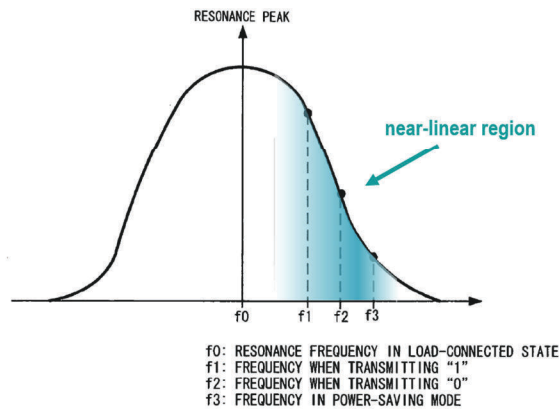
² Here, I note that Onishi discloses that frequencies f_1 and f_2 are used during normal power transmission and frequency f_3 is used during power-saving power transmission. EX1004, [0134], [0162], [0181], [0211], [0214]-[0215].

‘ $f_1 > f_2 > f_3$ ’ is satisfied”); EX1102 42:2-44:1 (acknowledging in the ’204 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).

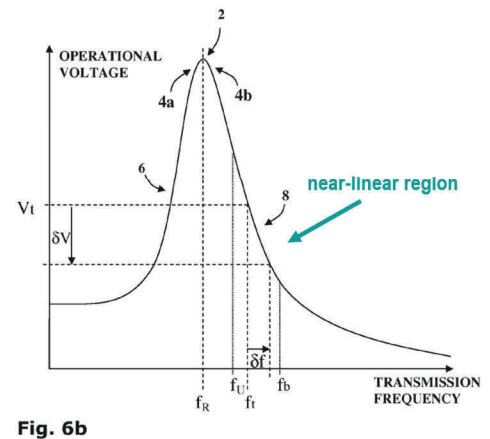
37. PO’s related arguments regarding the “broad mountain shape” of Onishi’s graph are also not supported by the express disclosure. For example, as shown in FIG. 4, frequencies f_1 and f_2 both fall well outside the broad cap of the curve and are instead positioned on the near-linear slope to the side of the broad cap. EX1004, [0180], FIG. 4. Additionally, PO’s analysis does not address the express disclosure in Onishi as I outlined above. Even if 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.

38. 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 ’204 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:



EX1004, FIG. 4 (annotated to show the near-linear region with variable shading because the '204 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

39. Patent Owner also argues that Onishi fails to demonstrate that f_3 falls within the near-linear regions of a “frequency-amplitude graph associated with the inductive couple.” POR, 42, 51-54. I disagree for at least the following reasons.

40. First, Onishi expressly discloses that f_3 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 f_3 is “substantially different” from resonant frequency f_0 under any reasonable understanding of Onishi’s figure and under any reasonable

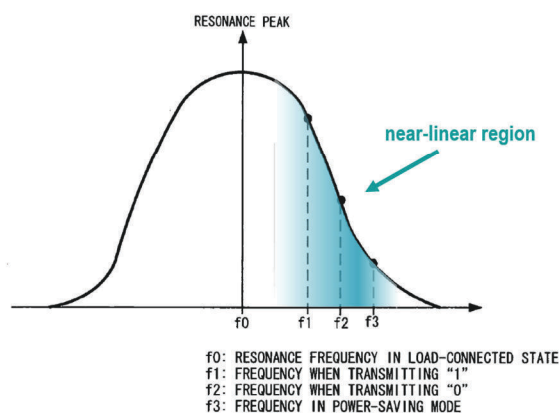
interpretation of the claim term “substantially different.” EX1004, [0181], [0214]-[0215], [0226], FIG. 4. I note that f_3 must be set substantially off-resonance to achieve the lower power transmission levels that are desired and characteristic of Onishi’s power-saving power transmission mode. *See also* EX1004, [0181], [0214]-[0215], [0226], FIG. 4. PO’s arguments also ignore the similarity between the position of “ f_3 ” in Onishi to the near-linear region in the ’204 Patent. EX1004, FIG. 4 (position of f_1 , f_2) *cf.* EX1001, FIG. 6b (position F_u).

41. Second, Onishi explains that f_3 “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.

42. 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 '204 Patent:

EX1004 (Onishi), FIG. 4:



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

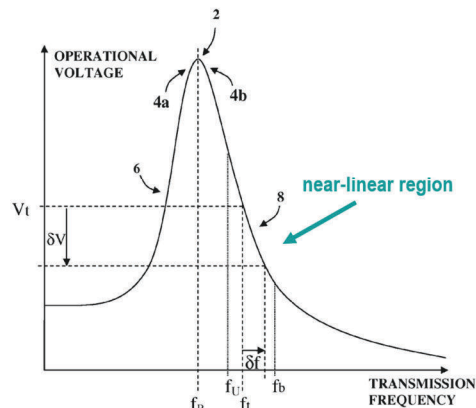


Fig. 6b

EX1004, FIG. 4 (annotated to show the near-linear region with variable shading because the '204 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, the location of f_3 within a near-linear region is at least as clear as the identified near-linear region in the '204 Patent.

4. Onishi's FIG. 4 is Sufficiently Clear to Establish That Frequency f_0 is the Characteristic Resonant Frequency of the Inductive Couple and that Frequencies f_1 , f_2 , and f_3 Lie in the Near-Linear Region

43. Patent Owner and Dr. Mercier advance several arguments aimed at discrediting FIG. 4 of Onishi to contend that FIG. 4 is so ambiguous as not to be useful. FIG. 4 is certainly sufficiently clear to establish that frequency f_0 is the characteristic resonant frequency of the inductive couple and that frequencies f_1 , f_2 , and f_3 lie in the near-linear region. Again, Onishi's FIG. 4 is nearly identical to FIG. 6b of the '204 Patent, and if a POSITA would sufficiently understand the '204 Patent's FIG. 6b, so too would the POSITA be sufficiently equipped to understand Onishi's FIG. 4.

44. For example, Patent Owner argues that FIG. 4 provides an illustration of the relationship between f_1 , f_2 , and f_3 but not "the actual locations" on a frequency-amplitude graph. I note that my First Declaration relies not on FIG. 4 alone but also Onishi's description of FIG. 4 and description of related concepts. Collectively, Onishi clearly discloses the claimed features. 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. Onishi's express

disclosure in fact supports the conclusion that each of frequencies f_1 , f_2 , and f_3 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 “ f_1 is a frequency used... f_2 is a frequency used... f_3 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 nearly identical to what is disclosed in the '204 Patent. *Compare* EX1004, FIG. 4 *with* EX1001, FIG. 6B.

45. Patent Owner also argues that Onishi's FIG. 4 is deficient because of its lack of dimensions, vertical-axis labels, and quantitative values. However, many of these details are also not explicit in the '204 Patent. The '204 Patent provides no dimensions or quantitative values to define its transmission frequency. *Id.* A POSITA would have been able to understand Onishi's FIG. 4 at least to the same extent that a POSITA would have been able to understand FIG. 6b of the '204 Patent.

46. 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 '204 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

47. 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 [1.2]). 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 '204 Patent.

48. Patent Owner 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 $f_1 < f_2 <$

f3. A POSITA would have understood that Onishi is showing that the power transfer efficiencies at frequencies f1, f2, and f3 do satisfy the inequalities.

C. Elements [1.7]-[1.8]: “said driver is configured to: provide less power by increasing said non-resonant transmission frequency by an incremental value when said first signal is detected by the detector” (1.7) and “provide more power by decreasing said non-resonant transmission frequency by an incremental value when said second signal is detected by the detector” (1.8)

49. Patent Owner argues that Onishi does not disclose a driver configured to provide less/more power by increasing/decreasing the non-resonant transmission frequency by an “incremental value.” POR, 55-62. Specifically, Patent Owner reasons that Onishi is deficient because:

- “Onishi does not disclose transitioning from one of the frequencies f1, f2, or f3 *by adding or subtracting* such a difference to or from any one of f1, f2, or f3.”

- “Onishi does not disclose any intervening frequencies, much less incrementally adjusting the transmission frequency to reach any of frequencies f1, f2, or f3. ... In fact, Onishi appears to preclude any other operating frequencies, *suggesting that these discrete frequencies are selected, rather than reached through incremental adjustments.*”

- “Petitioner’s interpretation of claim 1 effectively reads out ‘incremental’ from the claims. ... If any increase or decrease (e.g., from frequency f1 to frequency f2, or from frequency f2 to frequency f3, as Petitioner proposes) would qualify as an ‘incremental’ increase/decrease, then the term is rendered superfluous.”

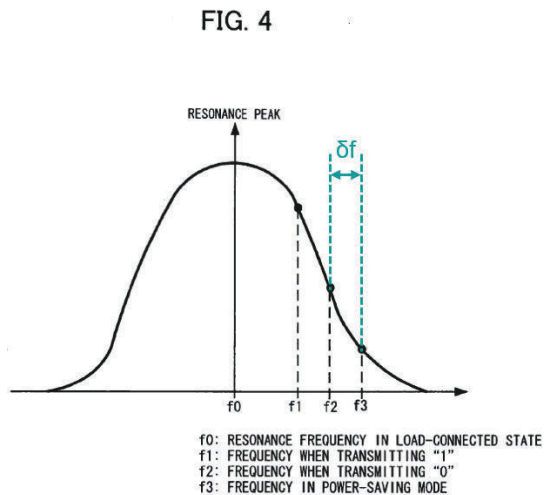
POR, 55-62 (emphases added).

50. A POSITA would have found these arguments to be misguided because they are based on Patent Owner's erroneous interpretation of "incremental value" as allegedly requiring a series of frequency adjustments (e.g., gradual adjustments to an acceptable frequency range) as opposed to selection of a discrete frequency value an incremental distance from the current frequency. *Supra*, §IV.B. The term "incremental value" cannot be used to re-write the claim to require a series of increases or decreases to the transmission frequency when the claim only recites a single increase by an incremental value and a single decrease by an incremental value. *Id.* The term "incremental value" does not exclude selection of a discrete frequency and does not require that the new frequency be obtained only by adding or subtracting the incremental frequency value to the current non-resonant transmission frequency. *Id.*

51. As my First Declaration explained, when initiating power-saving power transmission, Onishi's power transmission section 12 (a component of the *driver*) provides less power by increasing the non-resonant transmission frequency by an incremental value from "f1" or "f2" to "f3." EX1003, ¶¶68-69; EX1005, [0053], [0171], [0181], [0215], [0133]-[0136], FIG. 4. Likewise, when initiating normal power transmission, transmission section 12 provides more power by decreasing the non-resonant transmission frequency by an incremental value from

“f3” to “f1” or “f2.” *Id.*

52. These concepts are represented in FIG. 4 below, which illustrates an incremental increase from f2 to f3 and an incremental decrease from f3 to f2, for example. Notably, a POSITA would have understood the magnitude or scale of Onishi’s frequency change to fall squarely within the scope of the term “incremental value.” For example, Onishi’s incremental frequency change is sufficiently large to impart a change in power delivery while also sufficiently small to maintain transmission in the near-linear region. Indeed, the delta between Onishi’s frequencies f2 and f3 (and between f1 and f2) is shown to be of a similar scale to the incremental increase δf depicted in FIG. 6b of the ’204 Patent (e.g., as a portion of the near-linear region of the frequency-amplitude graph):



Onishi, FIG. 4 (annotated)

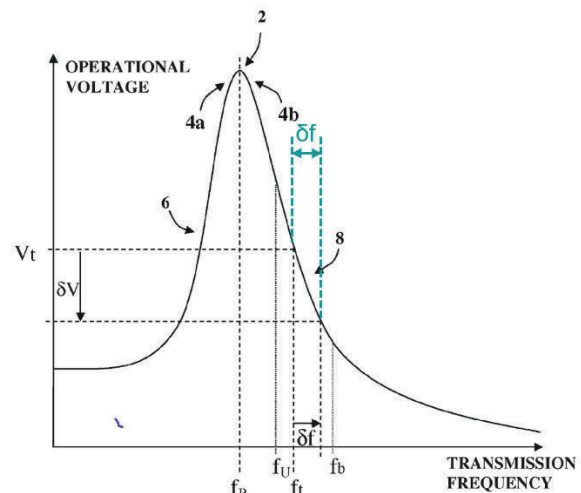


Fig. 6b

'204 Patent, FIG. 6b (annotated)

53. Further, even if the incremental increase/decrease in transmission frequency were required to take place in the context of a series of incremental

changes, this option is expressly disclosed by Onishi. For example, a series of incremental increases to decrease power would occur when transitioning from f_1 to f_2 (e.g., to signal different bit values) and then transitioning to f_3 for power-saving mode. A series of incremental decreases to increase power would occur when transitioning from f_3 to f_2 to revert to normal power transmission mode while signaling the second bit value before transitioning from f_2 to f_1 to signal the first bit value.

D. Element [10.1]: “providing an oscillating voltage to said primary inductive coil at an initial transmission frequency f_t substantially different from a characteristic resonant frequency f_R of the system;”

54. Patent Owner contends that Element [10.1] has not been shown to be anticipated by Onishi for substantially the same reasons as it provided for Element [1.5]. Patent Owner’s arguments are therefore deficient for the same reasons that I addressed above in connection with Element [1.5].

E. Element [13]: “The method of claim 10 wherein the step of said driver adjusting said non-resonant transmission frequency further comprises: said driver reducing said non-resonant transmission frequency by an incremental value df_1 when the received feedback signal is of the first type S_a , and said driver increasing said non-resonant transmission frequency by an incremental value $+df_2$ when the received feedback signal is of the second type S_b .”

55. Patent Owner contends that Element [13] has not been shown to be anticipated by Onishi for substantially the same reasons as it provided for Elements

[1.7]-[1.8]. Patent Owner's arguments are therefore deficient for the same reasons that I addressed above in connection with Elements [1.7]-[1.8].

VI. Ground 1B: The Onishi-Purdy Combination Renders Obvious Claims 1-6, 8, and 10-13

56. Patent Owner raises no new arguments in relation to Ground 1B, instead relying on its same arguments from Ground 1A to contend that the claims are not rendered obvious by the Onishi-Purdy combination. These arguments are deficient for the same reasons that I addressed above in connection with Ground 1A based on Onishi alone. *Supra*, §V.

VII. Ground 2: The Baarman392-Tocci Combination Renders Obvious Claims 1-6, 8, and 10-13

A. Element [1.5]: “said driving voltage oscillating at a non-resonant transmission frequency substantially different from said characteristic resonant frequency of said inductive couple”

57. Based on my review, the POR has not credibly refuted my analysis in my First Declaration showing that Baarman392 teaches “said driving voltage oscillating at a non-resonant transmission frequency substantially different from said characteristic resonant frequency of said inductive couple,” as recited in Element [1.5]. *See* POR, 63-68; EX1003, ¶¶119-120.

58. Patent Owner argues that Baarman392 discloses using a frequency that is “somewhat less than the resonant frequency” and not “substantially different.” EX1006, [0038]; POR, 64. This argument ignores the 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.” EX1006, [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/transmission frequency that results in a generally predictable change in power transfer would be an operating/transmission frequency that lies in the near-linear region identified in FIG. 6b of the ’204 Patent.

59. Additionally, in relation to FIG. 3, Baarman392 confirms that its charger operates across *a range of frequencies* from frequency B closest to resonance to frequency A farthest from resonance. EX1006, FIG. 3, [0038]. Specifically, Baarman392 teaches that “the inverter 10 is operated *between* frequency A and frequency B.” EX1006, [0038] (emphasis added). The plain language of Element [1.5] is satisfied if even one of Baarman392’s operating frequencies is positioned in near-linear portion of the frequency amplitude graph since a “substantially different” non-resonant frequency encompasses frequencies that lie in the near-linear region. *Supra*, §IV.A. In other words, Baarman392 is only distinguishable if *none* of the frequencies between A and B qualify as “substantially different.” *Id.*; EX1002, 70.

60. Here, it is clear that the operating frequencies bounded by A and B in Baarman392 encompass the near-linear region of the curve, and therefore includes

frequencies that are “substantially different” from the characteristic resonant frequency as claimed. EX1006, [0056] (disclosing operating frequencies that extend “near the resonant frequency” to “far from resonance”). This follows because the near-linear region is an inherent feature of all parabolic resonance curves that characterize an inductive couple. In such a parabolic curve like FIG. 3 in Baarman392, the rate of change of the slope of the curve decreases significantly over a region on the side slopes of the curve. This is a straightforward physical phenomenon that was well known before the '204 Patent.³ Accordingly, even if Patent Owner’s assertions were accepted *arguendo* that frequency B is too near resonance and frequency A is too far from resonance, that would imply that the near-linear region necessarily lies ***between*** frequencies B and A., which is precisely in the frequency range in which Baarman392’s system operates. EX1006, [0038]. Baarman392 would select a frequency in the near-linear region in the course of its ordinary operation between frequencies B and A.

³ Dr. Mercier could not dispute in his deposition that a parabolic resonance curve like that depicted in Baarman392 would always have a near-linear region.

EX1102, 29:7-15 (Q. “Do all parabolic frequency curves for an inductive power transmission system have an approximately linear region?” A. “I was trying to think of a counter example. I can’t think of a counter example at the moment.”).

61. Patent Owner also criticizes Baarman392 for applying piece-wise linearization to its power transfer curve. EX1006, [0038] (“piece-wise linearized by a software lookup table”). Patent Owner refers to Dr. Mercier’s opinion that “a POSITA would understand that piece-wise linearization is only used if the curve being approximated is non-linear (if the curve were linear, a piece-wise approximation would be unnecessary).” POR, 66-67 (citing EX2009, ¶182). Accordingly, Patent Owner concludes that Baarman392 must not operate in a linear or near-linear region of the frequency-amplitude curve because piecewise linearization is applied.

62. I disagree. Baarman392’s disclosure for the range between frequencies B and A being “piece-wise linearized by a software lookup table” is entirely 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 a “near-linear” region (e.g., the region shown in FIG. 6b of the ’204 Patent) implies that the region is not perfectly linear. Accordingly, the region between A and B in Baarman392’s FIG 3 being piece-wise linearized can be consistent with a “*near*-linear” curve because the curve could be made even more linear. A “near-linear” curve can still be piecewise linearized to achieve even tighter control and greater linearity, if desired. No parabolic curve is completely linear and the opportunity would always

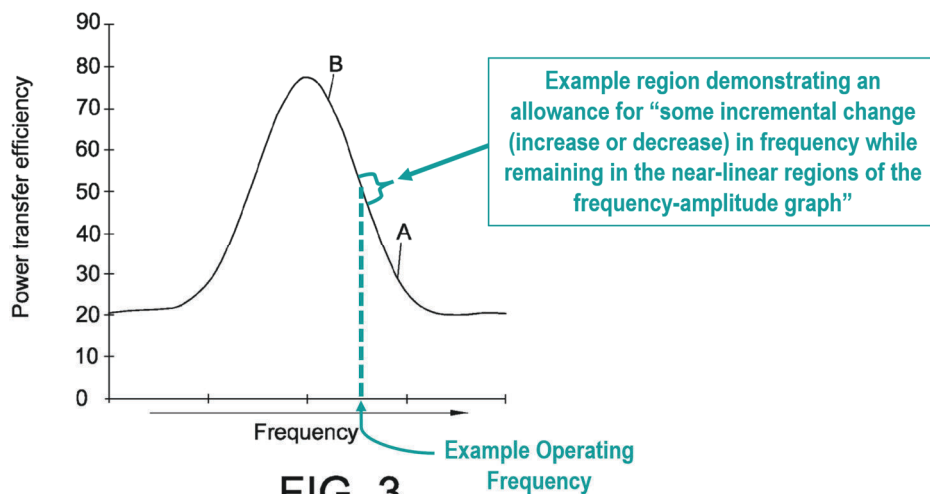
be present to apply piecewise linearization to any portion of a parabolic curve—including within the near-linear region of the parabolic curve depicted in FIG. 6b of the '204 Patent itself.

63. Patent Owner's and Dr. Mercier's reasoning that piecewise linearization is incompatible with operating in the near-linear region is also illogical because, as I described above, it is inherent that the near-linear region must lie between frequencies B and A in Baarman 392's frequency-amplitude graph. A POSITA would have understood and found it obvious that piecewise linearization could nonetheless be applied to better linearize operation across the full range of operating frequencies between A and B—especially if the range of operating frequencies between A and B extended beyond the near-linear region of the curve. EX1006, [0038], [0056], FIG. 3. For example, while power increases/decreases would be reasonably linear and predictable in the near-linear region, they would be less so outside of the region. To the extent Baarman392 chose to select frequencies A and B to encompass not only the near-linear region but also portions of the curve beyond the near-linear regions, piecewise linearization would be especially beneficial to make the operation more predictable in these overly non-linear regions.

64. I note that Baarman392 teaches a solution to the same problem allegedly solved by the '204 Patent for predictable power transfer control. EX1006, [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.”). These teachings would have further reinforced a POSITA’s understanding that Baarman392 discloses a wireless power transmission solution with power regulation that occurs in the near-linear portions of the frequency amplitude graph of an inductive couple.

65. Finally, I note that even under PO’s construction, Baarman392 would still expressly teach Element [1.5], 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:



EX1006, FIG. 3 (annotated), [0038].

B. Element [1.7]: “said driver is configured to: provide less power by increasing said non-resonant transmission frequency by an incremental value when said first signal is detected by the detector”

66. In my First Declaration, I explained how “Baarman392-Tocci’s driver would have predictably provided less power by increasing the non-resonant transmission frequency by twice the value of $\Delta FREQ$ when the first Boolean logic signal is detected by the peak detector 22 and controller 20 (collectively, the claimed signal detector.” EX1003, ¶126. The POR contests the relevance of the Baarman392-Tocci combination on two bases. As described below, neither argument has technical merit, and as such, the POR does not persuasively rebut the showing in my First Declaration that Element [1.7] is predictably provided by the Baarman392-Tocci combination.

67. First, Patent Owner asserts that “[t]his alleged increase of the transmission frequency—from frequency B to frequency A in Figure 3 [of Baarman392]—would occur at or near the resonant frequency” and is thus “not an incremental increase to a ***non-resonant*** transmission frequency in the near-linear region.” POR, 69. This is plainly not correct. Patent Owner’s argument erroneously assumes that Baarman392’s transmission frequency is necessarily increased from frequency B, but this is not the case. Baarman392 instead explains that its transmission frequency is incrementally adjusted between a “Min_FREQ” and a “Max_FREQ,” and that a feedback signal indicating an abnormal charging

condition, which triggers an incremental frequency increase, can be received at *any* operating frequency between Min_FREQ and Max_FREQ—not merely at Min_FREQ (frequency B).⁴ EX1006, [0054]-[0061], FIG. 7. It is also important to realize that the transmission frequencies between Min_FREQ and Max_FREQ (corresponding respectively to frequency B and frequency A) necessarily encompass the near-linear region of the frequency-amplitude graph associated with the inductive couple because the near-linear region is an inherent feature of all parabolic resonance curves for an inductive couple. In such a parabolic curve like FIG. 3 in Baarman392, the rate of change of the slope of the curve decreases significantly over a region on the side slopes of the curve. This is a straightforward physical phenomenon that was well known before the '204 Patent.

⁵ Accordingly, even if Patent Owner's assertions were accepted *arguendo* that

⁴ Frequencies B and A in FIG. 3 of Baarman392 represent the minimum and maximum of the operating frequency range, respectively. A POSITA therefore would have understood frequency B to correspond to Min_FREQ and would have understood frequency A to correspond to Max_FREQ.

⁵ Dr. Mercier could not dispute in his deposition that a parabolic resonance curve like that depicted in Baarman392 would always have a near-linear region.

EX1102, 29:7-15 (Q. "Do all parabolic frequency curves for an inductive power

frequency B is too near resonance and frequency A is too far from resonance, that would imply that the near-linear region necessarily lies *between* frequencies B and A., which is exactly in the frequency range in which Baarman392's system operates. EX1006, [0038]. By applying incremental frequency increases over the entire frequency range from frequency B to frequency A, Baarman392 would necessarily achieve an incremental increase to a "substantially different" non-resonant transmission frequency in the near-linear region when the current transmission frequency between frequencies B and A is in the near-linear region.

68. Patent Owner's assumption that frequency B (MIN_Freq) is necessarily not in the near-linear region is also incorrect. Even if Baarman392 does not expressly describe where frequency B lies in relation to the near-linear region of the curve, it would have been obvious to a POSITA and consistent with Baarman392's disclosure to select frequency B to be in the near-linear region. EX1006, [0038] ("[f]requency B is somewhat less than the resonant frequency"); EX2010, 33:12-20. FIG. 3 of Baarman392 clearly indicates that frequency B is intended to be meaningfully different from the resonance frequency, which is evident from the fact that frequency B is not shown to overlap the characteristic

transmission system have an approximately linear region?" A. "I was trying to think of a counter example. I can't think of a counter example at the moment.").

resonance frequency of the inductive couple. Moreover, a POSITA seeking to limit the power transmitted to the secondary device and/or seeking to ensure more linear control across the entire range of operating frequencies (e.g., with less need for piecewise linearization), would have sought to select a MIN_Freq within the near-linear region of the curve since doing so would reduce the maximum power transmitted to the secondary device and would provide better control in that region.

69. Second, Patent Owner asserts that “operation of [Baarman392’s] inverter between frequency B and frequency A is performed non-linearly” and therefore fails to provide Element [1.7]. POR, 70. I disagree. Baarman392’s operating frequencies between frequency B and frequency A encompass the near-linear region of the frequency-amplitude graph and Baarman392’s system therefore *does* naturally provide linear control in the near-linear region by incrementally increasing the transmission frequency by $2 \cdot \Delta \text{FREQ}$ when an abnormal charging condition is detected. EX1006, [0059], FIG. 6. Moreover, I do not agree that Element [1.7] necessarily requires linear control. The plain language of Element [1.7] merely recites that the driver is configured to provide less power by incrementally increasing the non-resonant transmission frequency. There is no separate requirement for linear control recited in this claim element, to the extent “linear control” is meant to imply more than operating in the near-linear region.

C. Element [1.8]: “provide more power by decreasing said non-resonant transmission frequency by an incremental value when said second signal is detected by the detector”

70. In addressing Element [1.8] in my First Declaration, I explained that “the predictable Baarman392-Tocci combination can be implemented so that a normal charging condition would be represented by a second Boolean logic signal (*second signal*), as HIGH” and “[i]n this context, Baarman392-Tocci’s driver would have predictably provided more power by decreasing the non-resonant transmission frequency $\Delta FREQ$ when the second Boolean logic signal is detected by the peak detector 22 and controller 20” EX1003, ¶128. The teaching of a second Boolean logic signal to represent Baarman392’s normal charging condition originates from Tocci, and thus, my conclusion that a POSITA would have found Element [1.8] was based on the *combination* of Baarman392 and Tocci—not based on Baarman392 alone.⁶

71. While Patent Owner argues that Element [1.8] has not been shown to be obvious (*see* POR, 70-71), Patent Owner’s argument only address the teachings of Baarman392 *alone* and altogether ignores the cited teachings of Tocci or the application of Tocci in the Baarman392-Tocci *combination*. Patent Owner has

⁶ I have not formed an opinion whether Baarman392 alone discloses or would have rendered obvious Element [1.8].

therefore failed to refute the detailed analysis in my First Declaration regarding the obviousness of combining Baarman392 and Tocci, and my explanation of how the predictable Baarman392-Tocci *combination* provides Element [1.8].

D. Element [10.1]: “providing an oscillating voltage to said primary inductive coil at an initial transmission frequency f_t substantially different from a characteristic resonant frequency f_R of the system;”

72. Patent Owner contends that Element [10.1] has not been shown to be obvious by the predictable Baarman392-Tocci combination for substantially the same reasons as it provided for Element [1.5]. Patent Owner’s arguments are therefore deficient for the same reasons that I addressed above in connection with Element [1.5].

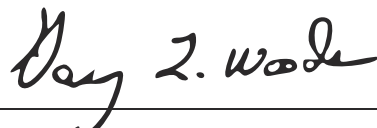
E. Element [13]: “The method of claim 10 wherein the step of said driver adjusting said non-resonant transmission frequency further comprises: said driver reducing said non-resonant transmission frequency by an incremental value df_1 when the received feedback signal is of the first type S_a , and said driver increasing said non-resonant transmission frequency by an incremental value $+df_2$ when the received feedback signal is of the second type S_b .”

73. Patent Owner contends that Element [13] has not been shown to be obvious by the predictable Baarman392-Tocci combination for substantially the same reasons as it provided for Elements [1.7]-[1.8]. Patent Owner’s arguments are therefore deficient for the same reasons that I addressed above in connection with Elements [1.7]-[1.8].

VIII. CONCLUSION

74. 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: 08/20/2025

By: 
Dr. Gary L. Woods