

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

U.S. Patent No. 9,048,696

**PATENT OWNER'S RESPONSE TO PETITION FOR *INTER PARTES*
REVIEW OF U.S. PATENT NO. 9,048,696**

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Patent Trial and Appeal Board
U.S. Patent and Trademark Office
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Patent Owner’s Response

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<i>In re Wright</i> , 596 F.2d 1124 (C.C.P.A. 1977)	40
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Statutes

35 U.S.C. § 103	7, 11, 12, 29
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35 U.S.C. § 112	7
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Other Authorities

37 C.F.R. §42.65(a)	1
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PATENT OWNER'S EXHIBIT LIST

Exhibit No.	Description
2001	Expert Declaration of Patrick P. Mercier, Ph.D., Sep. 13, 2024
2002	U.S. Pub. No. 2009/0174263 ("Baarman263")
2003	Defendant's First Amended Invalidity Contentions of U.S. Patent No. 9,048,696 in view of US2008/0079392A1, <i>Powermat Technologies Ltd. v. Anker Innovations Ltd.</i> , Case No. 5-23-cv-00052 (E.D. Tex.), Apr. 18, 2024.
2004	Defendant's First Amended Invalidity Contentions of U.S. Patent No. 9,048,696 in view of US2008/0079392A1, <i>Powermat Technologies Ltd. v. Anker Innovations Ltd.</i> , Case No. 5-23-cv-00052 (E.D. Tex.), Apr. 18, 2024.
2005	U.S. Patent No. 5,455,467 ("Young")
2006	Expert Declaration of Patrick P. Mercier, Ph.D., Mar. 4, 2025
2007	Deposition Transcript of Gary L. Woods, Ph.D., Feb. 20, 2025
2008	The American Heritage Dictionary of the English Language (Houghton Mifflin Co., 4th ed. 2002)
2009	Webster's II Dictionary (Houghton Mifflin Co., 3rd ed. 2005)

LISTING OF CHALLENGED CLAIMS¹

Claim Element	Claim Text
[1.P]	An inductive power outlet operable to transfer power to an inductive power receiver, said inductive power outlet comprising:
[1.1]	a platform for supporting said inductive power receiver;
[1.2]	at least one primary inductive coil embedded in said platform;
[1.3]	an alignment mechanism configured to facilitate alignment between said primary inductive outlet and said inductive power receiver
[1.4]	such that an inductive couple is formed between said primary inductive coil and a secondary inductive coil of said inductive power receiver, said inductive couple having a characteristic resonant frequency; and
[1.5]	a driving circuit wired to said primary inductive coil,
[1.6]	said driving circuit comprising a switching unit configured and operable to provide an oscillating driving voltage across said primary inductive coil such that a secondary voltage is induced in the secondary inductive coil;
[1.7]	wherein said driving circuit is configured and operable to produce said oscillating driving voltage at a transmission frequency substantially different from said characteristic resonant frequency of said inductive couple.
[2.P]	The inductive power outlet of claim 1 said inductive power outlet comprising a signal detector adapted to detect a first signal and a second signal, and said driver is configured to:
[2.1]	increase said transmission frequency when said first signal is detected by the detector, and
[2.2]	decrease said transmission frequency when said second signal is detected by the detector.

¹ For convenience purposes only, Patent Owner adopts for this Response the numbering of claim limitations advanced by Petitioner in the Petition (Paper 2). Patent Owner does not concede the appropriateness of such grouping and numbering of claim limitations.

Claim Element	Claim Text
[3]	The inductive power outlet of claim 1 said driver being configured to adjust said transmission frequency in response to feedback signals.
[4]	The inductive power outlet of claim 3 wherein said feedback signals carry data pertaining to the operational parameters of said electric load.
[5]	The inductive power outlet of claim 4 wherein said operational parameters are selected from the group consisting of: required operating voltage for said electric load; required operating current for said electric load; required operating temperature for said electric load; required operating power for said electric load; measured operating voltage for said electric load; measured operating current for said electric load; measured operating temperature for said electric load; measured operating power for said electric load; power delivered to said primary inductive coil; power received by said secondary inductive coil, and a user identification code.
[6]	The inductive power outlet of claim 2 wherein said detector is selected from the list comprising optical detectors, radio receivers, audio detectors and voltage peak detectors.
[7]	The inductive power outlet of claim 1 wherein said driver further comprises a voltage monitor for monitoring the amplitude of a primary voltage across said primary coil.
[9]	The inductive power outlet of claim 1 comprising a power converter selected from the group comprising: a transformer, a DC-to-DC converter, an AC-to-DC converter, an AC-to-AC converter, a flyback transformer, a flyback converter, a full-bridge converter, a half-bridge converter and a forward converter.
[10]	The inductive power outlet of claim 1 incorporated into at least one application selected from a group consisting of: inductive chargers, inductive power adaptors, power tools, kitchen appliances, bathroom appliances, computers, media players, office equipment, implanted devices, pace makers, trackers and RFID tags.

Claim Element	Claim Text
[11]	The inductive power outlet of claim 1 wherein said alignment mechanism comprises a first magnetic element configured to engage a second magnetic element associated with the power receiver.
[12]	The inductive power outlet of claim 1 wherein said alignment mechanism comprises an audible indication.
[13]	The inductive power outlet of claim 1 wherein said alignment mechanism comprises a visual indication.
[14]	The inductive power outlet of claim 1 wherein said alignment mechanism comprises a tactile indication.

I. INTRODUCTION

Petitioner challenges the patentability of claims 1-7 and 9-14 (the “challenged claims”) of U.S. Patent No. 9,048,696 (“the ’696 Patent”). Petitioner has failed to establish that the challenged claims are rendered obvious by any of the four asserted grounds.

Specifically, none of the cited references alone or in combination disclose or suggest the arrangement of each element of claims 1-7 and 9-14. Moreover, the Petition is filled with conclusory statements that are neither bolstered nor supported by Dr. Gary Woods’ declaration, which simply parrots Petitioner’s conclusions without additional analysis or evidence. *See* 37 C.F.R. §42.65(a) (“Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.”).

For example, Petitioner has failed to demonstrate, among other things: (1) that the cited references alone or in combination disclose or suggest a driving circuit that is configured and operable to produce an oscillating driving voltage at a transmission frequency substantially different from the characteristic resonant frequency of an inductive couple; and (2) that a person of skill would be motivated to combine the teaching of the cited references and a reasonable expectation that the combination would be successful.

Accordingly, Petitioner has failed to meet its burden of showing by a preponderance of the evidence that any of the challenged claims are unpatentable.

II. BACKGROUND

A. Overview of the '696 Patent

The '696 Patent, entitled "Transmission-Guard System and Method for an Inductive Power Supply," is generally directed to an inductive power transmission system. '696 Patent at 2:43-44. As an example, an inductive power outlet may include a primary inductive coil connected to a power supply, and a driver configured to apply an oscillating voltage across the primary coil. *See, e.g., id.* at 1:27-32. When an inductive power receiver is properly aligned with the power outlet, the primary coil may form an inductive couple with a secondary coil contained in the power receiver. *See, e.g., id.* at 1:32-34 and Claim 1 (28:25-37).

The '696 Patent discloses the selection of the transmission frequency f_t within linear or near-linear regions of a frequency-amplitude curve (per Figure 6b below), apart from the resonance frequency f_R (or peak) of the inductive couple. *Id.* at 21:56-57.

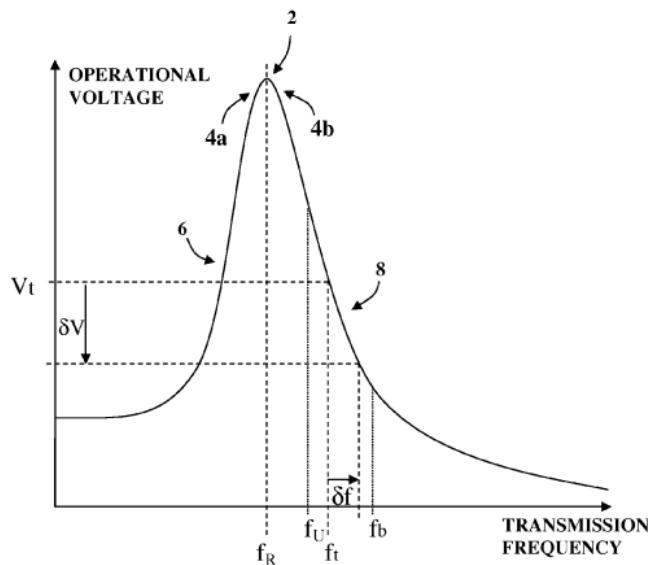


Fig. 6b

Id. at Fig. 6b.

The '696 Patent explains that “voltage is at its highest when the transmission frequency is equal to the resonant frequency f_R .” *Id.* at 21:2-3. But, this also means that “the slope of [a frequency amplitude graph] is steepest in the regions 4a and 4b to either side of the resonance peak . . .” *Id.* at 21:6-8. Accordingly, “a small variation in frequency results in a large change in induced voltage,” and “prior art inductive systems [were] typically very sensitive to small fluctuations in environmental conditions or variations in alignment between the induction coils.” *Id.* at 21:9-15.

Accordingly, the '696 Patent proposes, among other things, an inductive power transmission system that includes a driver “configured and operable to transmit a driving voltage which oscillates at a transmission frequency which is

substantially different from the resonant frequency of the inductive couple.” *Id.* at 21:17-20 (emphasis added). With reference to Figure 6b, 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.” *Id.* at 21:20-23.

The '696 Patent explains that one of the advantages of non-resonant transmission “is that the transmission frequency may be used to regulate power transfer,” as compared with “known systems” in which power is “regulated by altering the duty cycle of transmission voltage provided by the driver.” *Id.* at 21:47-51. The '696 Patent further explains that the driver in the power outlet “may be configured to adjust the transmission frequency in order to regulate power transfer.” *Id.* at 21:52-55.

In this regard, the '696 Patent proposes a power outlet containing a driver configured to adjust the transmission frequency in a linear (or near-linear) manner to predictably regulate power transfer. *See* Ex. 2006 (Mercier Dec.) at ¶ 52. The '696 Patent therefore teaches a linear control technique for regulating power transfer. For example, the “induced voltage can be increased by reducing the transmission frequency and can be reduced by increasing the transmission frequency.” '696 Patent

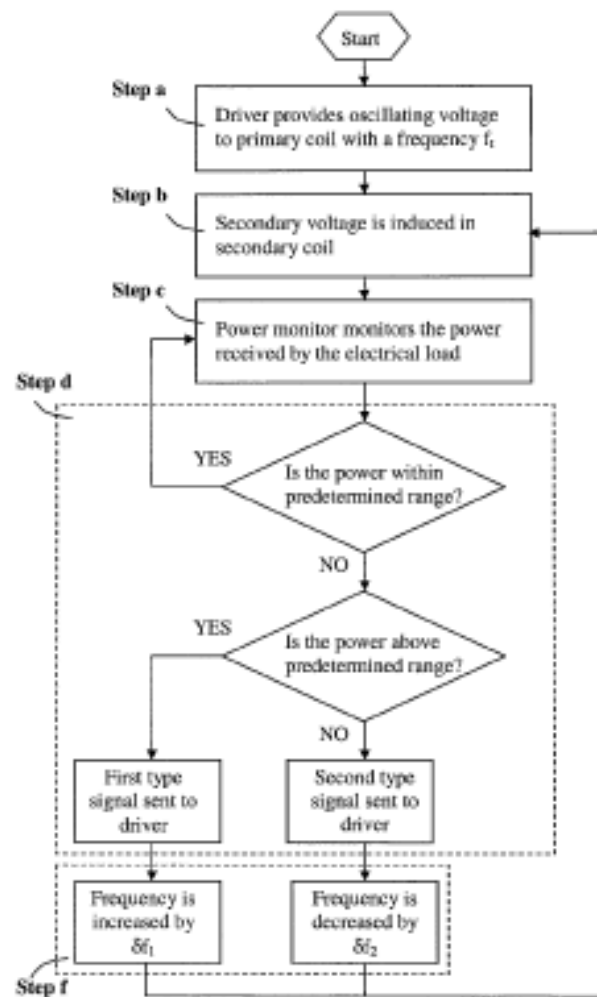
at 21:61-63. In other words, the induced voltage can be altered by a variable of δV by adjusting the transmission frequency by a variable of δf . *See also id.* at 21:63-65.

Dr. Mercier explains:

A POSITA would appreciate that a linear control system is significantly easier to design and operate than one based on non-linear dynamics. Linear control systems operate predictably: if one parameter increases, for example, a corresponding parameter may go down by a linear, predictable amount. In a non-linear control system, if one parameter increases, for example, the corresponding parameter may go down, but not by a linear, easily predictable amount. This significantly complicates control system design and, importantly, makes determination and achievement of control loop performance and stability much more difficult. Control systems employed in systems like wireless charging need to be stable in order to operate reliably and not overheat or breakdown, as may occur in an unstable system. For these reasons, designers often prefer to design linear control systems when possible.

Ex. 2006 (Mercier Dec.) at ¶ 53.

An exemplary power control method is depicted in Figure 6d:



Id. at Fig. 6d; *see also id.* at 22:45-64.

B. Patent Prosecution History

U.S. Patent Application No. 14/152,238—which would ultimately issue as the '696 Patent—was filed on January 10, 2014 as a division of U.S. Patent Application No. 12/883,457. The '696 Patent claims priority to a number of U.S. provisional applications, the earliest of which is U.S. Application No. 61/064,618 (“the '618

Application”), filed on March 17, 2008.²

On September 30, 2014, the Examiner issued a non-final office action that, among other things, rejected the original claims under (1) 35 U.S.C. § 112 as indefinite, and (2) 35 U.S.C. § 103 as obvious based on WO 2006/031133 (Ex. 1017, “Malpas”). Ex. 1002 at 130, 134.

In a response filed December 30, 2014, the Applicant amended claim 1, in relevant part, to recite:

wherein said driving circuit is configured and operable to produce said oscillating driving voltage[] at a transmission frequency significantly substantially different from said characteristic resonant frequency of said inductive couple.

Ex. 1002 at 106 (emphasis in original). The Applicant explained that amended claim 1 requires two distinct frequencies—a transmission frequency and a characteristic

² Petitioner relies on a cursory analysis in alleging that the '696 Patent is not entitled to its March 17, 2008 priority date (Ex. 1012). Pet. at 2. As Petitioner notes, however, each of the prior art references asserted in the Petition appear to predate the filing of the '618 Application. As such, although Patent Owner disagrees with Petitioner's allegations as to priority, the argument is moot because of the dates of the asserted references and the Board need not decide the issue.

resonant frequency:

As a first matter, Applicant notes that as currently amended claim 1 recites **two different frequencies**:

- 1) a “**transmission frequency**” – this being the rate at which the switching unit of the driving circuit produces the oscillating driving voltage, and
- 2) a “**characteristic resonant frequency** of the inductive couple” – this being the natural frequency of oscillation of the inductive couple formed between the primary coil and the secondary coil, which is also the frequency at which the amplitude of voltage induced in the secondary coil peaks.

Id. at 112 (emphases added). The Applicant emphasized that “these two frequencies do not have the same value,” and highlighted claim 1’s express requirement that the “transmission frequency [is] **substantially different** from said characteristic resonant frequency of said inductive couple.” *Id.* at 113 (emphasis added); Ex. 2006, ¶61.

Addressing the obviousness rejection, the Applicant explained that a person of ordinary skill in the art would have interpreted Malpas to require transmission **at or near** resonant frequency:

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

Id. at 114 (emphasis in original). As a result, Applicant argued, “Malpas ***teaches away from*** the invention . . . in which the transmission frequency [in the '696 Patent] is deliberately selected to be substantially different from the characteristic resonant frequency of the inductive couple.” *Id.* at 113 (emphasis in original).

On January 20, 2015, the Examiner issued a final office action, maintaining the Malpas obviousness rejection. On February 26, 2015, the Applicant conducted an Examiner Interview to discuss the “substantially different from said characteristic resonant frequency of said inductive couple” claim term. *Id.* at 77. An “[a]greement was reached that remarks directed to the claim language, Malpas, Figure 6B, and [0160+] would overcome the rejection of record.” *Id.*

In a March 30, 2015 response, the Applicant clarified that “**substantially different** from said characteristic resonant frequency” refers to the “near-linear” regions of a frequency-amplitude graph:

The claims must be interpreted in light of the specification as they would be understood by one of ordinary skill in the art. As such, one having ordinary skill in the art would appreciate that the term “*substantially different from said characteristic resonant frequency*” recited in claims 1 and 17, in view of at least Fig. 6b, should be interpreted **to mean that the frequency of the driving voltage is selected so as to lie within one of the near-linear regions of a frequency-amplitude graph associated with the inductive couple.**

Ex. 1002 at 70 (emphasis added). In doing so, the Applicant highlighted Paragraph [0161] of the pending application (now column 21, lines 15-23) and Figure 6b:

It is a particular feature of embodiments of the current invention that the driver 6230 (FIG. 6 *a*) is configured and operable to transmit a driving voltage which oscillates at a **transmission frequency which is substantially different from the resonant frequency of the inductive couple. Preferably the transmission frequency is selected to lie within one of the near- linear regions 6, 8** where the slope of the frequency-amplitude graph is less steep.

'696 Patent at 21:16-23 (emphasis added).

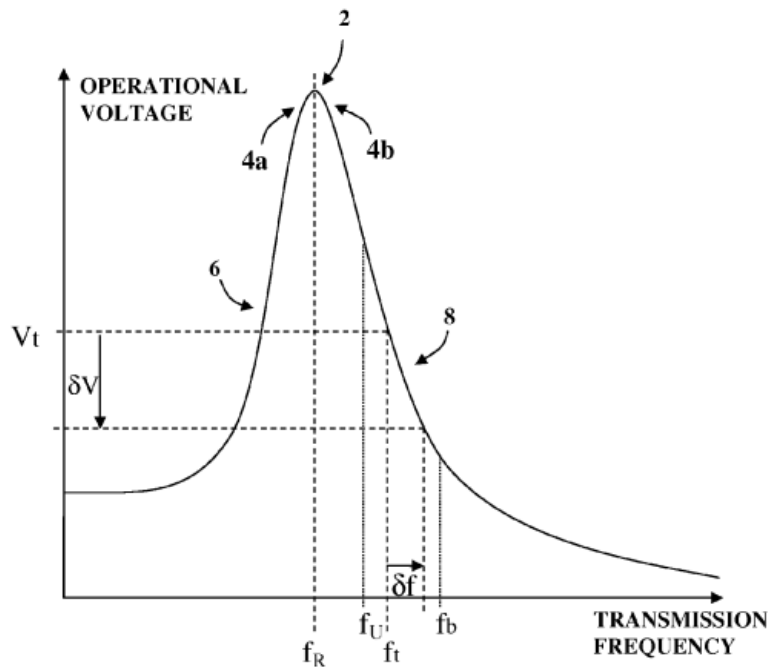


Fig. 6b

Id. at 6b.

On April 8, 2015, the Examiner issued a Notice of Allowance. Ex. 1002 at 44.

C. Summary of Petitioner's Proposed Grounds for Unpatentability

Petitioner alleges that claims 1-7 and 9-14 would have been obvious under pre-AIA 35 U.S.C. § 103 and raises four grounds of alleged unpatentability based on five references:

1. U.S. Patent Pub. 2008/0197804 (“Onishi”);
2. U.S. Patent No. 7,211,986 (“Flowerdew”);
3. U.S. Patent Pub. 2007/0279002 (“Partovi”);
4. U.S. Patent Pub. 2008/0079392 (“Baarman392”); and

5. Excerpts from Ronald J. Tocci et al., *Digital Systems: Principles and Applications*, Pearson Education International, 10th Edition (2007) (“Tocci”).

The alleged invalidity grounds are as follows:

Ground	'696 Patent Claims	Type of Challenge	Primary Reference	Secondary References
1A	1-7, 9-10, and 13-14	§ 103	Onishi	Flowerdew
1B	11-13	§ 103	Onishi	Flowerdew and Partovi
2A	1, 3-5, 7, and 9-14	§ 103	Baarman392	Partovi
2B	2 and 6	§ 103	Baarman392	Partovi and Tocci

D. The Relied-Upon References

The five references relied upon by Petitioner to challenge the patentability of claims 1-7 and 9-14 of the '696 Patent are summarized as follows:

1. Onishi (Ex. 1004)

U.S. Patent Pub. 2008/0197804 (“Onishi”) is entitled “Power Transmission Control Device, Power Reception Control Device, Non-Contact Power Transmission System, Power Transmission Device, Power Reception Device, and Electronic Instrument.” Onishi was filed on February 15, 2008 and was published on August 21, 2008. Onishi claims priority to Japanese Patent Application 2007-036745, filed on February 16, 2007.

Onishi is directed to “[a] power transmission device [that] performs power-saving power transmission [and] that transmits a small amount of power as compared with normal power transmission when the power transmission device has detected that a battery of a load has been fully charged so that the operation of a charge control device (charge control IC) of the load is maintained, thereby enabling recharging due to a charge management function of the charge control device.” Ex. 1004 at Abstract. When recharging starts “the load state of a power reception device increase” and “the power transmission device detects an increase in the load state and changes power transmission from power-saving power transmission to normal power transmission.” *Id.* In contrast, when the power-saving power reception device is “removed during power-saving power transmission, the power transmission device detects that the power reception device has been removed, and stops continuous power transmission so that unnecessary power consumption does not occur.” *Id.*

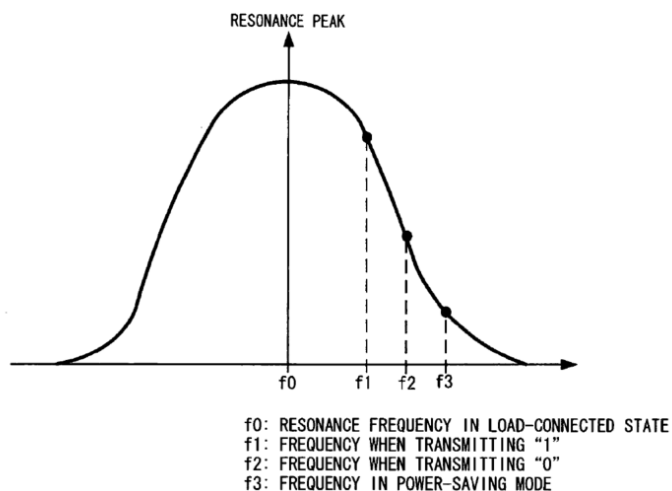
Specifically, Onishi discloses a figure for illustrating the “Frequency Used in Power-Saving Mode” that “show[s] the resonance characteristics of the induction coil and applications of frequencies,” where “the horizontal axis indicates the frequency, and the vertical axis indicates the resonance peak value. *Id.* at [0179]-

[0180]. Onishi explains that:

[T]he frequency f_1 is a frequency used when transmitting “1” during normal power transmission. The frequency f_1 is a basic frequency during power transmission. The frequency f_2 is a frequency used when transmitting “0” (see FIGS. 3A and 3B). A frequency f_3 is a frequency used in the power-saving mode. As is clear from FIG. 4, the relationship “ $f_1 > f_2 > f_3$ ” is satisfied.

Id. at [1081].

FIG. 4



Onishi at FIG. 4.

2. Flowerdew (Ex. 1005)

U.S. Patent No. 7,211,986 (“Flowerdew”) is entitled “Inductive Charging System.” Flowerdew was filed on July 1, 2004 and was issued on May 1, 2007.

Flowerdew is directed to “a contactless charging system utilizing induction which does not require a housing with a compartment or recess that must be mechanically matched to the item being charged.” Ex. 1005 at 4:42-45.

Specifically, Flowerdew discloses that “the charger takes the form of a shallow concave (herein also referred to as ‘dished’ or a ‘dish’) or similarly shaped upper charging surface, which whilst substantially flat and thin, develops a magnetic field which is substantially horizontal rather than perpendicular to its surface, which is typically the case if a coil were wound in the same plane as a plate.” *Id.* at 4:49-55. This “angled field that is substantially horizontal” enables the system “to couple energy to a receiver coil comprising a long solenoid, lying horizontally on the upper surface of the charger.” *Id.* at 4:55-59.

Flowerdew discloses multiple figures—like Figure 5—that illustrate a housing for a charger that includes, for example, “a charging surface 357 [that] is a shallow concave surface in the vertical dimension 363.” *Id.* at 7:43-44. The purpose of the concaved surface is “to permit the secure and defined location of a plurality of items placed on the surface” and to optimize “the alignment of some subset of items that are placed on the surface to receive power from charger 302.” *Id.* at 7:53-57.

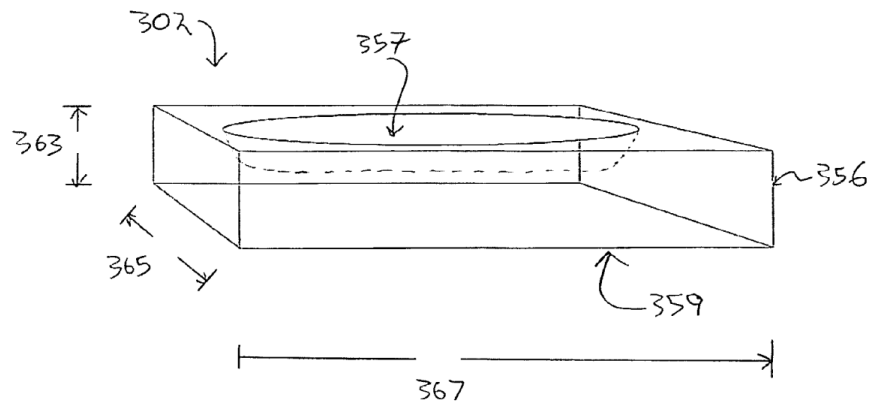


FIGURE 5

Id. at FIG. 5. Flowerdew further explains that the charging surface “may be incorporated into a variety of housing shapes, including a configuration with raised sides,” like the one illustrated in Figure 7. *Id.* at 7:37-39.

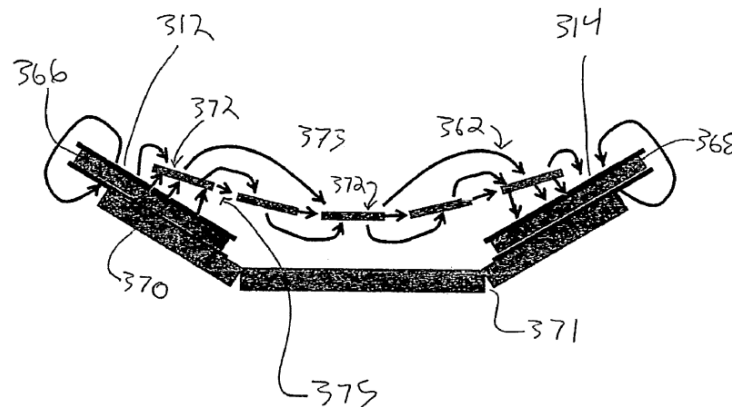


FIGURE 7

Id. at FIG. 7.

In addition to relying on a concaved shape to guide the placement of an item with a receiver coil to couple with the transmitter coil of a charging system, Flowerdew discloses the use of “one or more markers indicating a preferred alignment and/or orientation for items that may be placed on that part of the surface to receive power from charger 302.” *Id.* at 7:57-61; Ex. 2006, ¶ 80.

3. Partovi (Ex. 1007)

U.S. Patent Pub. 2007/0279002 (“Partovi”) is entitled “Power Source, Charging System, and Inductive Receiver for Mobile Devices.” Partovi was filed on

June 1, 2007 and was published on December 6, 2007. Partovi claims priority to U.S. Provisional Application No. 60/810,262, filed on June 1, 2006, U.S. Provisional Application No. 60/810,298, filed on June 1, 2006, and U.S. Provisional Application No. 60/868,674, filed on December 5, 2006.

Partovi is directed to “power supplies, power sources, inductive power sources, charging systems, mobile devices, mobile device chargers, and batteries.” Ex. 1007 at [0004].

Specifically, Partovi focuses on the design and functionality of an inductive charging system that emphasizes efficiency due to alignment between the primary and secondary coils. *Id.* at [0047], [0082]; Ex. 2006, ¶ 83. The system includes a base unit with primary coils that generate a magnetic field to inductively charge mobile devices equipped with secondary coils. Ex. 1007 at [0039]. Partovi highlights the importance of achieving a tightly coupled or aligned system to maximize power transfer efficiency. *Id.* at [0047]. This is achieved through various design features, including the use of multiple coil types, overlapping pad layers, and movable coils that can adjust their position to align with the secondary coils of the mobile devices. *Id.* at [0082].

One of the solutions proffered by Partovi for maintaining a tightly coupled system is the use of movable coils within the charging pad. *Id.* at [0139]. These coils are mounted in such a way that they can move laterally within their segments to optimize alignment with the secondary coils of the mobile devices. *Id.* This movement is facilitated by a suspension mechanism or low-friction materials that allow the coils to float within their designated areas. *Id.* at [0140]; Ex. 2006, ¶ 84. When a mobile device is placed on the pad, the system senses the position of the secondary coil and moves the primary coil to the optimal position for efficient power transfer. Ex. 1007 at [0138]-[0140].

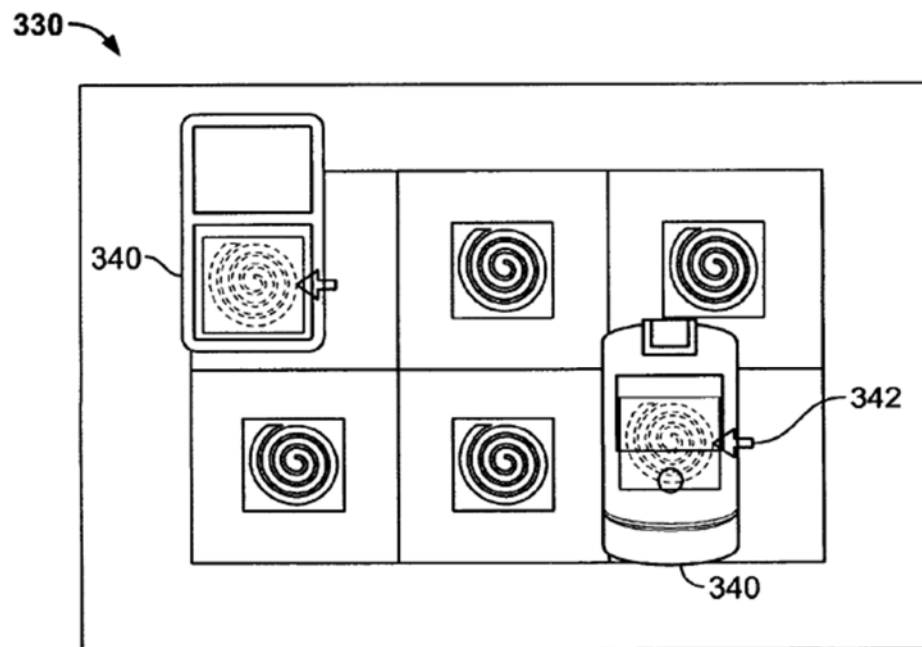


FIG. 16

Id. at Fig. 16.

Partovi also describes the use of magnets to enhance the alignment between the primary and secondary coils. Ex. 2006, ¶ 85. Magnets can be placed at the center of the coils to attract each other, ensuring that the coils are properly aligned when a mobile device is placed on the charging pad. Ex. 1007 at [0082]. This magnetic alignment helps to maintain a tightly coupled system, reducing power loss and improving the overall efficiency of the inductive charging process. Additionally, the system can include visual or audio indicators to guide the user in placing the device correctly on the pad. *Id.*

Partovi further discusses the importance of operating the system at an optimal transmission frequency to ensure efficient power transfer. Ex. 2006, ¶ 86. As an example, the system can be tuned to operate at a specific resonance frequency to maximize the efficiency of the power transfer between primary and secondary coils. Ex. 1007 at [0078]. By carefully selecting and controlling the transmission frequency, the system can maintain high efficiency and minimize power loss during the inductive charging process. *Id.* at [0112]-[0117].

4. Baarman392 (Ex. 1008)

U.S. Patent Pub. 2008/0079392 (“Baarman392”) is entitled “System and Method for Inductively Charging a Battery.” Baarman392 was filed on September

14, 2007 and was published on April 3, 2008. Baarman392 claims priority to U.S. Provisional Application No. 60/827,586, filed on September 29, 2006.

Baarman392 describes an inductive charging system designed to charge batteries, particularly those with nonlinear charging profiles such as Li-Ion batteries, using a primary and secondary coil setup. Ex. 1008 at [0032]. The system includes a charger circuit with a primary coil and a secondary circuit with a secondary coil, which receives power inductively from the primary coil. *Id.* The charger circuit features a frequency controller that adjusts the frequency of the power applied to the primary coil based on feedback from the secondary circuit. *Id.* This feedback mechanism helps optimize the charging process and prevent overcharging in order to maintain the health and longevity of Li-Ion batteries. *Id.* at [0002].

Baarman392 further describes adjusting the operating frequency of the inductive pair in response to the feedback. Ex. 2006, ¶ 89. While power transfer is at its highest when operating at resonance, such as in a tightly coupled system, Baarman392 describes that when the primary coil and the secondary coil are loosely coupled, “significant power transfer can occur when the inverter is operating off-resonance.” Ex. 1008 at [0038]. For example, when a feedback signal is not received, then Baarman392 will decrease the frequency, moving the system towards

resonance. *Id.* at [0055]. So long as no feedback signal is received, then “the frequency is repeatedly reduced [moving closer to resonance] so as to maximize power transfer to the battery” (at resonance). *Id.* at [0058]; *see also id.* at [0038]. Accordingly, the operating frequency can be adjusted based on feedback from the secondary coil. Ex. 2006, ¶ 89.

5. Tocci (Ex. 1009)

Ronald J. Tocci, et al., *Digital Systems: Principles and Applications*, Pearson Education International, 10th Edition (2007) (“Tocci”) is a textbook directed to the principles of digital systems.

Part of Tocci’s book is dedicated to explaining Boolean algebra. *See, e.g.*, Ex. 1009 at 18. Tocci describes the use of Boolean variables to represent the voltage levels present on wires or at the input/output terminals of a circuit. This binary representation simplifies the design and analysis of digital circuits because it abstracts away the exact voltage values, focusing instead on the logical state (*e.g.*, HIGH or LOW). *Id.*

Tocci also discloses the use of Boolean algebra to describe and analyze logic gates, such as OR, AND, and NOT. *Id.* The relationship between the inputs and outputs of these gates is often represented using truth tables. *Id.* A truth table lists all possible combinations of input values and the corresponding output values for a

given logic circuit. *Id.*

III. PERSON OF ORDINARY SKILL IN THE ART

Patent Owner disagrees with Petitioner's proposed level of ordinary skill in the art based on the lack of specific experience related to the field of wireless or inductive charging device design. *See* Pet. at 6. As such, Patent Owner proposes that at the time of the '696 Patent, a POSITA would have a working knowledge of wireless charging and inductive charging. Ex. 2006 at ¶ 40. The person would have gained this knowledge through an undergraduate Bachelor of Science degree in electrical engineering, computer engineering, computer science, or a related field, with at least two years of experience working in the field of wireless or inductive charging device design, or testing of such wireless or inductive charging device testing, or an equivalent combination of academic study and work experience. *Id.* More education (e.g., a Master's degree) or work experience any relevant field may compensate for a deficit in one or more relevant qualifications stated above. *Id.*

IV. CLAIM CONSTRUCTION

A. The Board's Preliminary Construction

In its Preliminary Response, Patent Owner offered the following construction for the term "transmission frequency substantially different from said characteristic resonant frequency of said inductive couple":

[A]s explained by Dr. Mercier, 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.

Prelim. Resp. at 25 (citing Ex. 2001 (Mercier Decl.) ¶ 59). In response, the Board—in its Institution Decision—held:

On this record and for purposes of this decision, we determine that—consistent with the Specification’s description of the frequency that is “[p]referably . . . selected” and applicant’s argument regarding the same during prosecution—“a transmission frequency substantially different from said characteristic resonant frequency of said inductive couple” encompasses frequencies that lie within one of the near-linear regions of a frequency-amplitude graph associated with the inductive couple. See Ex. 1001, 21:20-24; Ex. 1002, 70. At this time and for purposes of this Decision, we need not and do not reach the issue of the outer bounds of the scope of “substantially different.”

Paper 7 at 22. The Board further explained—in reference to the ’696 Patent’s discussion of the added benefit of “linear control”—that “Patent Owner has not explained adequately why such a benefit should be read into the claim term

‘substantially different,’ particularly where the quoted Specification support does not explicitly mention linear regulation.” *Id.* at 21 (quoting Prelim. Resp. at 24-25).

B. The term “transmission frequency [that is] substantially different from the characteristic resonant frequency,” as recited in claim 1, should be further construed to allow for some incremental change (increase or decrease) in frequency while remaining in the near-linear regions of the frequency-amplitude graph.

First, claim 1 recites in relevant part:

wherein said driving circuit is configured and operable to produce said oscillating driving voltage at a transmission frequency substantially different from said characteristic resonant frequency of said inductive couple.

’696 Patent at 28:43-46.

While the Board is correct that the ’696 Patent does not use the phrase “linear regulation,” (Paper 7 at 21), a POSITA would understand linear regulation/control as being a central aim of the ’696 Patent. Ex. 2006, ¶111. For example, in the summary section of the ’696 Patent, it explains:

It is another **aim of the invention** to present an inductive power transfer system comprising at least one inductive power outlet comprising at least one primary inductive coil wired to a power supply via a driver; the primary inductive coil for forming an inductive couple with at least one secondary inductive coil wired to

an electric load, the secondary inductive coil associated with an inductive power receiver wherein the driver is configured to provide a driving voltage across the primary inductive coil, **the driving voltage oscillating at a transmission frequency significantly different from the resonant frequency of the inductive couple.** Optionally, the driver comprises a switching unit for intermittently connecting the primary inductive coil to the power supply.

Preferably, **the transmission frequency lies within a range in which induced voltage varies approximately linearly with frequency.** Optionally, **the driver is configured to adjust the transmission frequency in response to the feedback signals.**

Ex. 1001 at 4:1-17 (emphases added); *see also id.* at 22:45-64 (providing one example of a “power regulation method”); Ex. 2006, ¶ 111.

Next, in discussing Figure 6b, the '696 Patent explains:

[T]he 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 . A transmission frequency f_t , higher than the resonant frequency f_R of the system, produces an inducted voltage of V_t . The induced voltage can be increased [incrementally] by [incrementally] reducing the transmission frequency and can be [incrementally] reduced by [incrementally] increasing the transmission frequency. For example,

an increase in transmission frequency of δf produces a decrease in induced voltage of δV .

Ex. 1001 at 21:56-67 (emphases added); *see id.* at 22:61-64 (“If the received feedback signal is of the first type S_a , then the transmission frequency is increased by an incremental value $+\delta f_1$. If the received feedback signal is of the second type S_b , then the transmission frequency is decreased by an incremental value $-\delta f_2$.”).

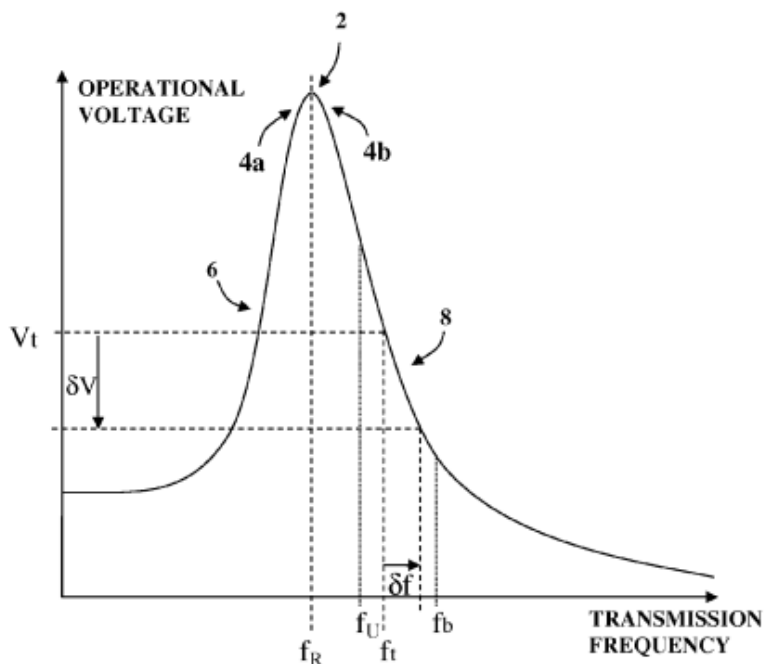


Fig. 6b

Id. at Fig. 6b.

Notably—as explained by Dr. Mercier—a POSITA would understand that frequency f_U , as illustrated in Figure 6b, is the lower bound frequency in the

approximately linear region 8, which also corresponds to the frequency that yields the upper bound of the operational voltage. Ex. 2006, ¶ 100. In contrast, frequency f_b , as illustrated in Figure 6b, is the upper bound frequency in the approximately linear region 8, which also corresponds to the frequency that yields the lower bound of the operational voltage. *Id.* Thus, a POSITA would understand that f_L and f_b may be regarded as referring to the same thing and may be used interchangeably. *Id.*

Finally, claim 2 of the '696 Patent requires:

[2.P] The inductive power outlet of claim 1 said inductive power outlet comprising a signal detector adapted to detect a first signals and a second signal, and said driver is configured to:

[2.1] increase said transmission frequency when said first signal is detected by the detector; and

[2.2] decrease said transmission frequency when said second signals is detected by the detector.

Ex. 1001 at 28:47-54. In other words, the driver is configured to increase/decrease the transmission frequency that is substantially different from said characteristic resonant frequency of said inductive couple (*i.e.*, a frequency that lies within the near-linear region of a frequency-amplitude graph). Ex. 2006, ¶ 101. In reading claim 2 as a whole, a POSITA would understand that the '696 Patent is directed to

a linear control technique for predictably regulating power transfer. Ex. 2006 at ¶ 101.

Accordingly, a POSITA would understand that the selection of a transmission frequency within the near-linear regions of a frequency-amplitude graph (*i.e.*, selection of a transmission frequency that is substantially different from the characteristic resonant frequency) will enable a linear control technique for predictably regulating power transfer. *Id.* at ¶ 112. Thus, a POSITA would define the “transmission frequency [that is] substantially different from the characteristic resonant frequency,” as recited in claim 1, to further allow for some incremental change (increase or decrease) in frequency while remaining in one of the near-linear regions of the frequency-amplitude graph. *Id.*

V. LEGAL STANDARD

Under 35 U.S.C. § 103(a) (pre-AIA), a claim of an issued patent is not patentable if the differences between the claim and the prior art are such that the subject matter as a whole would have been obvious to a person of ordinary skill in the art at the time of the invention. 35 U.S.C. § 103(a) (pre-AIA). Obviousness requires assessing (1) the “level of ordinary skill in the pertinent art,” (2) the “scope and content of the prior art,” (3) the “differences between the prior art and the claims at issue,” and (4) “secondary considerations” of non-obviousness such as

“commercial success, long felt but unsolved needs, failure of others, etc.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007) (quoting *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17-18 (1966)).

It is the petitioner’s burden to prove unpatentability, *E.I DuPont de Nemours & Co. v. Synvina C.V.*, 904 F.3d 996, 1007 (Fed. Cir. 2018), and “to demonstrate both ‘that a skilled artisan would have been motivated to combine the teachings of the prior art references to achieve the claimed invention, and that the skilled artisan would have had a reasonable expectation of success in doing so.’” *Intelligent Bio-Systems, Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1367-68 (Fed. Cir. 2016) (quotations and citations omitted). However, a petitioner must first show that all of the claimed elements are disclosed in the prior art. *See Medichem, S.A. v. Rolabo, S.L.*, 437 F.3d 1157, 1164 (Fed. Cir. 2006) (considering motivation to combine and reasonable expectation of success only “if all the elements of an invention are found in a combination of prior art references”).

VI. THE PETITION FAILS TO DEMONSTRATE BY A PREPONDERANCE OF THE EVIDENCE THAT ANY CHALLENGED CLAIM IS UNPATENTABLE

The Petition is full of manifest gaps that illustrate Petitioner has not met its burden of demonstrating the claims are unpatentable by a preponderance of the evidence. Thus, the Board should confirm the patentability of the challenged claims.

A. Ground 1A: Petitioner Fails to Establish that Claims 1-7 and 9-14 are Rendered Obvious by Onishi in View of Flowerdew

As explained below, Petitioner has not met its burden with respect to Ground 1A. Onishi fails to disclose at least claim elements [1.4], [1.7], [2.1], and [2.2], and Flowerdew fails to remedy those deficiencies. Ex. 2006 at ¶ 114. As claims 2-6 and 9-14 each depend on claim 1, Petitioner cannot show that Onishi in view of Flowerdew renders obvious any of claims 1-7 and 9-14. *Id.*

1. Petitioner Fails to Demonstrate that Onishi in view of Flowerdew Renders Obvious Limitation [1.4]

Limitation [1.4] requires “such that an inductive couple is formed between said primary inductive coil and a secondary inductive coil of said inductive power receiver, said inductive couple having a characteristic resonant frequency.” Onishi does not disclose an inductive couple having a characteristic resonant frequency, and Flowerdew fails to cure this deficiency. Ex. 2006 (Mercier Dec.) at ¶ 115.

For example, Onishi discloses a “primary coil L1 (power-transmission-side coil) [that] is electromagnetically couple[d] with [a] secondary coil L2 (power-receiving-side coil) to form a power transmission transformer.” Ex. 1004 at [0137]; Ex. 2006 (Mercier Dec.) at ¶ 116. However, Onishi does not disclose that the primary coil L1 and the secondary coil L2 share a characteristic resonant frequency. Rather, Onishi's discussion of this frequency is only in the context of “the resonance

characteristics of the **induction coil**" (*i.e.*, a single primary coil L1), (Ex. 1004 at [0180]), not in the context of the resonance characteristics of an inductive couple formed by a pair of induction coils (*i.e.*, primary coil L1 **and** secondary coil L2). Ex. 1004 at [0135] (explaining that the resonance characteristic frequency is for "one capacitor which forms a resonant circuit together with the primary coil L1"); *id.* at [0171] ("changing the resonance characteristics of the resonant circuit by changing the inductance or the capacitance to change the resonance frequency (resonance peak)"); *see also* Ex. 2006 (Mercier Dec.) at ¶ 116.

On cross-examination, Dr. Woods admitted that primary coil L1 and the secondary coil L2 would have different characteristic resonance frequencies:

Q.· Now, will an inductive couple of primary coil L1 and capacitor C1 and C2 and secondary coil L2 with capacitor CB1 have a characteristic resonant frequency that is different than the characteristic resonant frequent of the primary coil L1 along with capacitor C1 and C2?

A.· You're asking if the coupled system has a different resonance frequency than the transmission section alone with no receiver?

Q.· Correct.

A.· Yes.

Ex. 2007 at 8:22-10:14. Dr. Woods further testified that the resonance frequency of

the inductive couple is dependent on the resonance frequencies of each individual coil:

Q. Do you agree that the characteristic resonance frequency of the inductive couple system is dependent on both the characteristic resonant frequency of the primary coil L1 resonant frequency and the secondary resonant frequency of coil L2?

A. Yes. Among other things.

Id. at 10:7-14. Moreover, combining the resonant frequencies of the primary coil L1 and the secondary coil L2 is not a simple sum but rather the geometric mean of the two individual resonance frequencies. *Id.* at 14:5-15.

Although Onishi states that “[t]he **resonance characteristics of the primary coil L1 and the secondary coil L2** . . . have a symmetrical and broad mountain shape, as shown in FIG. 4” (Ex. 1004 at [0180]), a POSITA would understand that this discussion relates to two independent inductive coils as opposed to an inductive couple formed therebetween. Ex. 2006 (Mercier Dec.) at ¶ 117. As noted above, the preceding sentence clearly establishes that Figure 4 pertains to the resonance characteristics of the induction coil—not a pair of inductively coupled coils. *Id.* Grounded in this context, a POSITA would recognize this sentence as referring to the resonance characteristics of independent coils (*i.e.*, the primary or secondary

coil). *Id.*

Dr. Woods again acknowledged that primary coil L1 and the secondary coil L2 have different characteristic resonant frequencies, and that the characteristic resonant frequency of an inductive couple comprising these two coils would be different:

Q. Similarly, will the coupled system have a different characteristic resonant frequency than the characteristic resonant frequency of the coil and the capacitor in the reception side?

A. Yes, the two —yes, the two frequencies —right, each has a separate resonant frequency stand-alone and when you put them together there will be a resonance that is —it's neither of those, but it's —right, it's related. I mean it's usually in between them.

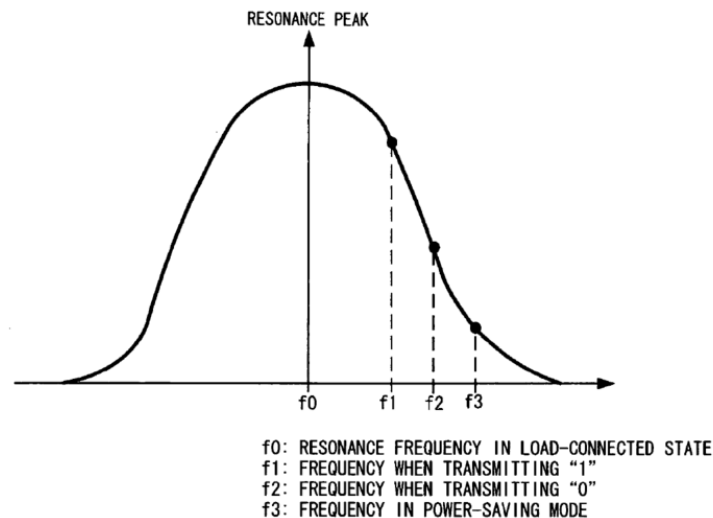
Ex. 2007 at 9:10-21. Addressing this aspect of Dr. Woods' testimony, Dr. Mercier agreed that “each coil-capacitor pair (e.g., L1 and C1, or L2 and C2) has its own characteristic resonant frequency.” Ex. 2006 (Mercier Dec.) at ¶ 118.

In contrast, limitation [1.4] expressly requires that the characteristic resonant frequency pertain to the inductive couple (*i.e.*, based on both primary and secondary inductors), which is consistent with the specification of the '696 Patent. *See, e.g.*, '696 Patent at 21:34-36 (“the **combined** inductance of the **coil pair** changes which in turn changes the resonant frequency of the **system**” (emphasis added)); *id.* at

27:17-20 (“connecting the secondary inductive coil to a transmission circuit for connecting an electric element to the secondary inductive coil thereby increasing the resonant frequency of the inductive power transfer system”); *see also* Ex. 2006 (Mercier Dec.) at ¶ 119.

Thus, Petitioner's argument that Onishi—allegedly by way of Figure 4—“discloses that the inductive couple between primary coil L1 and secondary L2 has a characteristic resonant frequency ‘ f_0 ’, indicated by the ‘RESONANCE PEAK,’” (Pet. at 22), is misplaced because Figure 4 only illustrates “a view showing the resonance characteristics **of the induction coil.**” Onishi at [0180] (emphasis added); *see also* Ex. 2006 (Mercier Dec.) at ¶ 120. Nothing in Onishi indicates that Resonance Frequency f_0 , or any other frequency identified in Onishi, is the characteristic resonant frequency of an inductive couple formed by an induction coil and a coupled secondary coil. Ex. 2006 (Mercier Dec.) at ¶ 120.

FIG. 4



Onishi at FIG. 4.

At most, Onishi is unclear as to whether Figure 4 depicts the resonance characteristics of the inductive couple, but such an ambiguous disclosure is insufficient for establishing unpatentability of a claim. *See Wasica Fin. GmbH v. Cont'l Auto. Sys., Inc.*, 853 F.3d 1272, 1284 (Fed. Cir. 2017) (“[I]t has long been understood that ambiguous references do not, as a matter of law, anticipate a claim.”); *W.L. Gore & Assocs., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1554 (Fed. Cir. 1983) (refusing to find claims anticipated when the prior art references were “unacceptably vague”). Flowerdew fails to cure this deficiency in Onishi, nor does Petitioner make such an allegation. *See* Pet. at 21-22; Ex. 2006 (Mercier Dec.) at

¶ 121.

Accordingly, Petitioner has not demonstrated by a preponderance of the evidence that Onishi in view of Flowerdew renders obvious limitation [1.4]. Ex. 2006 (Mercier Dec.) at ¶ 122.

2. Petitioner Fails to Demonstrate that Onishi in view of Flowerdew Renders Obvious Limitation [1.7]

Limitation [1.7] requires “wherein said driving circuit is configured and operable to produce said oscillating driving voltage at a transmission frequency **substantially different** from said characteristic resonant frequency of said inductive couple.” Onishi discloses a power transmission device that is configured to operate in two principal power transmission modes—a “normal” mode for charging the battery of a power reception device, and a “power-saving” mode for when the battery is fully charged and requires little to no power (*i.e.*, for maintenance purposes). Onishi categorizes exemplary frequencies, f_1 and f_2 , as “normal” power transmission frequencies, and frequency f_3 as a “power-saving” transmission frequency. See Onishi at [0181], [0214], FIG. 4.

Petitioner alleges that each of f_1 , f_2 , and f_3 qualify as a “transmission frequency substantially different from said characteristic resonant frequency of the inductive couple.” Pet. at 27. But none of f_1 , f_2 , and f_3 are described, shown, or

otherwise disclosed as occurring within the near-linear regions of a frequency-amplitude graph associated with the inductive couple, as required by claim 1. Ex. 2006 (Mercier Dec.) at ¶ 124. Nor are they otherwise disclosed as substantially different from the characteristic resonant frequency of the inductive couple. *Id.*

Flowerdew neither cures this deficiency in Onishi nor is proffered for such purpose. See Pet. at 27-28; Ex. 2006 (Mercier Dec.) at ¶ 125.

a. Petitioner's Reliance on Onishi's Figure 4 is Improper

Petitioner asserts that Onishi discloses “a non-resonant transmission frequency (e.g., frequencies f_1 , f_2 , or f_3) that is substantially different from the characteristic resonant frequency (e.g., frequency f_0) of the inductive couple.” Pet. at 27. In support of this assertion, Petitioner argues that “each of frequencies f_1 , f_2 , and f_3 lie in a near-linear region of the frequency-response curve and thus . . . fall within the scope of being ‘substantially different’ from the characteristic resonant frequency f_0 .” Pet. at 27-28.

However, as explained in greater detail below, Onishi expressly discloses that the normal power transmission frequencies (*i.e.*, frequencies f_1 and f_2) are at or near the resonance frequency, see Ex. 1004 at [0053] (“The transmission frequency during power-saving power transmission is set at a frequency apart from the resonance frequency (resonance peak) as compared with the frequency during

normal power transmission, for example.”); *id.* at [0181] (“In FIG. 4, the frequency f_1 is a frequency used when transmitted ‘1’ during normal power transmission. . . . The frequency f_2 is a frequency used when transmitting ‘0’ . . .”), and that the power-saving mode frequency (*i.e.*, frequency f_3) is set apart from the resonance frequency such that only a small amount of power is transmitted. *Id.* at [0053] (“Note that power-saving power transmission only transmits only a small amount of power which merely maintains the battery charge management function of the load. . . . The transmission frequency during power-saving power transmission is set at a frequency apart from the resonance frequency (resonance peak) as compared with the frequency during normal power transmission, for example.”); *id.* at [0181] (“A frequency f_3 is a frequency used in the power-saving mode.”); *see also* Ex. 2006 (Mercier Dec.) at ¶ 126.

To counter this written disclosure in Onishi, Petitioner relies on Onishi’s illustration of frequencies f_1 , f_2 , and f_3 in Figure 4. Ex. 1003 at ¶¶ 67-68. The stated purpose of this illustration, however, is to show that “the relationship ‘ $f_1 > f_2 > f_3$ ’ is satisfied”—*i.e.*, as opposed to showing the actual locations of the frequencies f_1 , f_2 , and f_3 on a frequency-amplitude graph. Ex. 1004 at [0181]. Ex. 2006 (Mercier Dec.) at ¶ 127.

In fact, Onishi does not state, nor does Petitioner contend, that Figure 4 is drawn to scale, and Onishi provides no dimensions or vertical-axis labels with respect to Figure 4. *See* Ex. 2007 at 22:17-23:19 (acknowledging that Onishi fails to provide any quantitative measure of the values f_1 , f_2 , or f_3). This lack of context renders Petitioner's reliance on Onishi's Figure 4 for element [1.7] deficient. Ex. 2006 (Mercier Dec.) at ¶ 127; *see Hockerson-Halberstadt, Inc. v. Avia Group Int'l*, 222 F.3d 951, 956 (Fed. Cir. 2000) (“[I]t is well established that patent drawings do not define the precise proportions of the elements and may not be relied on to show particular sizes if the specification is completely silent on the issue.”).

Despite any similarities that may exist between, as Petitioner characterizes them, the “substantially similar positions of Onishi's frequencies f_1 , f_2 , and f_3 in the frequency-response curve” and the '696 Patent's “transmission frequency (e.g., f_t in FIG. 6B)” (*see* Pet. at 28), absent quantitative values any similarities are merely speculative. *See White v. H.J. Heinz Co.*, 640 F. App'x 930, 934 (Fed. Cir. 2016) (“Absent any written description in the specification of quantitative values, arguments based on measurement of a drawing are of little value.” (quoting *In re Wright*, 596 F.2d 1124, 1127 (C.C.P.A. 1977))). Onishi is devoid of any quantitative values.

While Figure 4 of Onishi and Figure 6b of the '696 Patent both depict parabolic like curves, without dimensions or vertical-axis labels a POSITA would not be able to draw any conclusions regarding any similarities between the two illustrations. Ex. 2006 (Mercier Dec.) at ¶ 128. For example, even assuming for the sake of argument that the vertical axis label in Figure 4 of Onishi is “RESONANCE PEAK,” Petitioner’s application of Figure 4 would still make no sense: this is not a variable that varies with frequency, rather it is a single frequency that is achieved at “peak” impedance, voltage, current or some other electrical characteristic—it is not a variable to be used in this context as a vertical axis of a plot versus frequency. Ex. 1004 at Fig. 4; *see also* Ex. 2006 (Mercier Dec.) at ¶ 128.

If, on the other hand, it is assumed, *arguendo*, that “RESONANCE PEAK” refers to a single point on the curve, then there is no vertical axis label on the plot, and it is unknown what is being represented. Ex. 2006 (Mercier Dec.) at ¶ 128. Thus, without additional information, no conclusions can be drawn regarding the teachings of Figure 4 in Onishi. *Id.*

Accordingly, Petitioner’s arguments that rely on Onishi’s illustration of Frequencies f1, f2, and f3 in Figure 4 are improper and misguided, and do not meet Petitioner’s burden. Ex. 2006 (Mercier Dec.) at ¶ 129.

Regardless, even if some value exists in a visual analysis of patent drawings that lack quantitative values, it appears—contrary to Petitioner's assertions—that frequencies f_1 and f_3 (as illustrated in Onishi Figure 4) fall outside the near-linear region of the frequency-response curve. *See* Pet. 27 (arguing that “each of the frequencies f_1 , f_2 , and f_3 lie in a near-linear region of the frequency-response curve”); Ex. 2006 (Mercier Dec.) at ¶ 129 n. 4.

b. Onishi's Normal Power Transmission Frequencies (f_1 and f_2) are Not Substantially Different from the Resonant Frequency

Neither of Onishi's normal power transmission frequencies, f_1 and f_2 , qualify as a transmission frequency that is “**substantially different** from the characteristic resonant frequency resonant frequency of said inductive couple,” as required by claim 1. Ex. 2006 (Mercier Dec.) at ¶ 130.

Assuming *arguendo* that the vertical axis in Figure 4 is referring to a realistic design variable such as voltage, Onishi describes frequencies f_1 and f_2 as being at or near resonant frequency (f_0 in Onishi)—similar to the Malpas reference distinguished by Applicant during prosecution, and contrary to claim 1: “The transmission frequency during power-saving power transmission is set at a frequency apart from the resonance frequency (resonance peak) **as compared with the frequency during normal power transmission**, for example.” Onishi at [0053]

(emphasis added). *See also* Ex. 2006 (Mercier Dec.) at ¶¶ 62-67, 131.

On cross-examination, Dr. Woods discussed the context of Onishi's description of the normal power transmission and power-saving transmission modes:

Q. What does the word “apart” mean to you in the context of paragraph 53 of Onishi?

A. I guess you would say -- I guess Onishi would say distinguishable from. I think that's a fair word a POSITA might have used at the time.

Q. What's an antonym for “distinguishable from”?

A. Indistinguishable from.

Ex. 2007 at 17:7-14-23. This is in part because of the “**broad mountain shape**” of the resonance curve, which results in the normal power transmission frequencies being outside the linear or near-linear region of the resonance curve. Onishi at [0180] (“The 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, for example.”) (emphasis added); *see also* Ex. 2006 (Mercier Dec.) at ¶ 131.

Thus, Petitioner has not met its burden in establishing that either of normal power transmission frequencies (f_1 and f_2) are substantially different from the

characteristic resonant frequency of the inductive couple, as required by limitation [1.7]. Ex. 2006 (Mercier Dec.) at ¶ 132.

c. Onishi's Power-Saving Mode Frequency (f3) is Not a Transmission Frequency that is Substantially Different from the Resonant Frequency

Onishi's power-saving mode frequency f3—while “set at a frequency apart from the resonance frequency” (Onishi at [0053])—is neither described, shown, nor otherwise disclosed as a transmission frequency that is substantially different from the characteristic resonance of the inductive couple. Ex. 2006 (Mercier Dec.) at ¶ 133.

First, Petitioner has failed to demonstrate that Onishi's power-saving mode frequency f3 falls within the linear or near-linear regions of a “frequency-amplitude graph associated with the inductive couple,” as required by claim 1, per statements made by the Applicant during prosecution to obtain the '696 Patent. Ex. 2006 (Mercier Dec.) at ¶ 134. Onishi merely describes the frequency f3 as being “apart” from the resonance frequency f0. Simply being “apart” is not sufficient to qualify as “substantially different.” *Id.* Dr. Mercier highlights the significance of being far enough from peak resonance to mitigate against large, unintended fluctuations in induced voltage:

[I]t is plain from the claim language itself that the transmission frequency must be meaningfully different from the characteristic resonant frequency of the inductive couple. **A POSITA would also presume this difference to serve a purpose, e.g., over a transmission frequency that is simply “different” from the resonance frequency. The specification states the purpose and goal of this requirement quite clearly, namely, to avoid operating at or near the resonance peak to mitigate against large unintended fluctuations in induced voltage.** Such fluctuation may occur, for example, at transmission frequencies located in regions 4a or 4b of the frequency-amplitude graph depicted in Figure 6b.

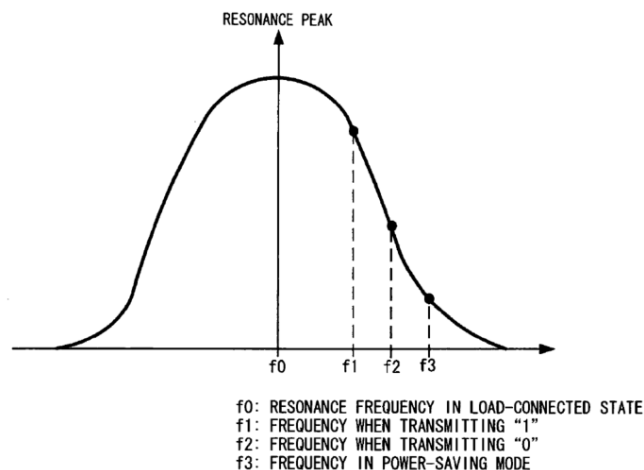
Ex. 2006 (Mercier Dec.) at ¶ 97 (emphasis added) (citations omitted).

Dr. Mercier further explains that operating at a transmission frequency that is substantially different from the resonant frequency—as opposed to simply “different”, “apart from”, or “distinguishable from” resonant frequency—ensures that “there is some room for the incremental fluctuation of the transmission frequency (δf) without incurring large unpredictable fluctuations of induced voltage. *Id.* at ¶ 102.

Second, assuming *arguendo* that Petitioner's reliance on Onishi's Figure 4 is proper—which it is not—the figure is at best unclear as to whether frequency f_3 lies within a near-linear or **non**-linear region of the resonance curve, the latter being in

direct contravention of the stated location of the transmission frequency on a frequency-amplitude graph. Ex. 1002 at 70 (explaining that a POSITA “would appreciate that the term ‘*substantially different from said characteristic resonant frequency*’ . . . 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” (emphasis added)); *see also* Ex. 2006 (Mercier Dec.) at ¶ 136.

FIG. 4



Onishi at Fig. 4. Further, operating in the non-linear region of the frequency-amplitude graph (even if not at or near resonance) would only undermine the predictability of the system, contrary to the stated intent of the '696 Patent. Ex. 2006 (Mercier Dec.) at ¶ 136; *see also id.* at ¶ 53 (discussing benefits, stability, and

predictability of linear control systems).

Third, Onishi describes power-saving mode frequency f_3 as corresponding to the region in which little to no power is transmitted to the receiver. Onishi at [0178] (“a small amount of power is continuously transmitted in the power-saving mode after the battery has been fully charged based on the above consideration”); *id.* at [0186] (“This causes the power transmission control device 20 of the power transmission device 10 to switch the mode from the power-saving mode to the normal charging mode so that full-power power transmission starts, for example. This enables the power reception device 40 to continue to recharge the battery 94.”); *id.* at [0053] (“The transmission frequency during power-saving power transmission is set at a frequency apart from the resonance frequency (resonance peak) as compared with the frequency during normal power transmission, for example.”); *see also* Ex. 2006 (Mercier Dec.) at ¶ 137. Assuming *arguendo* that the vertical axis of Onishi’s Figure 4 is voltage, in essence what this means is that the power-saving mode frequency falls within the range of frequencies that result in an operation voltage that is approaching zero non-linearly, where supplied power is lower, and thus the power-saving mode frequency is outside the linear and near-linear regions of the resonance curve. Ex. 2006 (Mercier Dec.) at ¶ 137.

Accordingly, the power-saving mode transmission frequency f_3 is not a transmission frequency that is substantially different from the resonant frequency, and thereby does not satisfy the requirements of the claim limitation. *Id.* at ¶ 138.

d. Petitioner has Not Established that Onishi Discloses a Transmission Frequency that is Substantially Different from the Characteristic Resonant Frequency of the *Inductive Couple*

Claim limitation [1.7] requires a “driving circuit . . . configured and operable to produce said oscillating driving voltage at a transmission frequency substantially different *from said characteristic resonant frequency of said inductive couple.*” As demonstrated above in Section VI.A.1 regarding limitation [1.4], Onishi’s discussion of resonance characteristics, including its description of Figure 4, is limited to the context of the individual coil(s). Therefore, for at least the reasons stated above in Section VI.A.1, Petitioner has failed to demonstrate that Onishi discloses a transmission frequency substantially different from the characteristic resonant frequency *of the inductive couple*, as required by limitation [1.7]. Ex. 2006 (Mercier Dec.) at ¶ 139. Petitioner has effectively only addressed each of frequencies

f1, f2, and f3 relative to the characteristic resonant frequency of the individual coil(s), not of the inductive couple as required by element [1.7]. *Id.*

3. Petitioner Fails to Demonstrate that Onishi in view of Flowerdew Renders Obvious Limitations [2.1] and [2.2]

Claim 2 requires:

[2.P] The inductive power outlet of claim 1 said inductive power outlet comprising a signal detector adapted to detect a first signals and a second signal, and said driver is configured to:

[2.1] increase said transmission frequency when said first signal is detected by the detector; and

[2.2] decrease said transmission frequency when said second signals is detected by the detector.

Ex. 1001 at 28:47-54.

Thus, the driver of claim 1 is configured to “[increase/decrease] said transmission frequency when said [first/second] signal is detected by the detector.” Based on claim 2’s reliance on claim 1, the transmission frequency is required to be substantially different from said characteristic resonant frequency of said inductive couple (*i.e.*, a frequency that lies within the near-linear region of a frequency-amplitude graph). Onishi does not disclose the increasing/decreasing of a

transmission frequency within the near-linear region of the resonance curve, and Dr. Woods does not rely on Flowerdew to cure this deficiency. Ex. 2006 (Mercier Dec.) at ¶ 140.

Onishi discloses three preset frequencies— f_1 , f_2 , and f_3 . Ex. 1004 at [0053], [0171], [0181]. Onishi further explains that “frequency f_1 is a frequency used when transmitting ‘1’ during normal transmission,” “frequency 2 is a frequency used when transmitting ‘0,’” and “frequency f_3 is a frequency used in the power-saving mode.” *Id.* at [0181]. Accordingly, each is a discrete frequency having a distinct purpose and—as explained above—each frequency falls outside the near-linear region of the resonance curve. Any positive change in frequency (f_1 to f_2 , f_2 to f_3 , or f_1 to f_3) or any negative change in frequency (f_3 to f_2 , f_2 to f_1 , or f_3 to f_1) will require a non-linear increase/decrease in the transmission frequency. Ex. 2006, ¶ 141. Thus, Onishi fails to disclose a power control technique that maintains a substantially different transmission frequency, as required in claim 1. *See also* Ex. 2007 at 24:24-25:2 (Q. Does figure 4 disclose any other frequencies than F_0 , F_1 , F_2 , and F_3 ? . . . A. Figure 4 just lists those four frequencies.).

Flowerdew neither cures this deficiency nor is it proffered for such purpose. *See* Pet. at 35-38; Ex. 2006 (Mercier Dec.) at ¶ 142.

Accordingly, Petitioner has not demonstrated that Onishi in view of Flowerdew renders obvious limitations [2.1] and [2.2]. Ex. 2006 (Mercier Dec.) at ¶ 143.

4. There is No Motivation to Combine Onishi and Flowerdew

Petitioner fails to show how to modify Onishi in view of Flowerdew. Ex. 2006 (Mercier Dec.) at ¶ 86. A POSITA would not be motivated to place the charging device of Onishi in the housing disclosed in reference to Figure 2 and/or Figure 5 of Flowerdew (*see* Ex. 1005 at 7:52-61) or Figure 10 (*see* Ex. 1005 at 11:25-44) of Flowerdew because there is no expectation of success. Ex. 2006 (Mercier Dec.) at ¶ 144. Each of the embodiments disclosed in Figures 2, 5, and 10 of Flowerdew requires a specific geometry with one or more pairs of primary coils 312 and 314 oriented at an angle relative to each other to generate a nearly horizontal magnetic field with the secondary coil. *Id.*; *see, e.g.*, Ex. 1005 at 5:42-45. (“[C]harging coil 312 and charging coil 314 are disposed at an angle to each other to direct the path of the generated electromagnetic field in a desired manner to enable horizontal coupling.”).

In contrast, Onishi is directed to a configuration having a single charging coil. Ex. 2006 (Mercier Dec.) at ¶ 144. The single charging coil of Onishi would not provide the horizontal coupling required by Flowerdew. *Id.* Furthermore, attempting

to modify Onishi using the teachings of Flowerdew would render the combination inoperable because the principle of operation of Flowerdew is contrary to Onishi's which requires a vertical coupling between the primary coil L1 and the secondary coil L2 as shown in Fig. 1B of Onishi. *Id.*

Moreover, Flowerdew's housing shape for the charging device is specifically designed to facilitate coupling with a secondary coil shaped as a long solenoidal coil. *Id.* at ¶ 145; *see* Ex. 1005 at 4:49-59 ("In an embodiment of the invention, the charger takes the form of a shallow concave (herein also referred to as "dished" or a "dish") or similarly shaped upper charging surface By developing an angled field that is substantially horizontal, it is possible to couple energy to a receiver coil comprising a long solenoid, lying horizontally on the upper surface of the charger."), *id.* at 6:14-16 ("One feature of the invention is a charger 302 which generates an essentially horizontal magnetic field and the use of a long solenoidal coil 326 to receive this field."); *id.* at 6:54-59 ("The inventive system advantageously utilizes a coil wound on a long, thin permeable core (a solenoidal winding) as the inductive element to receive energy from a horizontal field in the secondary unit being charged."). Petitioner has not explained why Onishi's arrangement would be used with a long solenoidal coil as a secondary coil. Ex. 2006 (Mercier Dec.) at ¶ 145.

B. Ground 1B: Petitioner Fails to Establish that Claims 11-13 are Rendered Obvious by Onishi in View of Flowerdew and Partovi

Ground 1B differs from Ground 1A only in that Partovi is used for claim limitations 11, 12, and 13, but not for claim elements [1.4] or [1.7]. Accordingly, for the reasons that Ground 1A fails with respect to claim limitations [1.4] and [1.7] (and therefore all dependent claims), Ground 1B fails as well. Ex. 2006 (Mercier Dec.) at ¶ 146. Partovi fails to cure the above described deficiencies of Onishi, nor has Petitioner made such an allegation. *Id.* In addition, as explained below, a POSITA would not be motivated to combine Onishi and Partovi.

1. There is No Motivation to Combine Onishi and Partovi

Petitioner fails to show how to modify Onishi in view of the Partovi. Ex. 2006 (Mercier Dec.) at ¶ 147. There is no expectation of success in attempting to combine the teachings of Partovi with Onishi to achieve a system that operates “at a transmission frequency substantially different from said characteristic resonant frequency of said inductive couple.” *Id.* For example, Petitioner argues that Onishi discloses operation at a transmission frequency substantially different from said characteristic resonant frequency. *See* Pet. at 27-28. Yet, Partovi is specifically directed to the use of magnetic alignment to facilitate operation at resonance. Ex. 1007 at [0118] (“The coil in the wireless charger system is driven by switching the

FET at the resonance frequency of the circuit when the receiver is present. Without the receiver nearby, the circuit is detuned from resonance and radiates minimal EMI.”); *see also* Ex. 2006 (Mercier Dec.) at ¶ 147. Partovi’s arrangement is therefore intended to maximize power transfer efficiency. Ex. 1007 at [0047] (“The power transfer efficiency between the primary coil and the secondary should be maximized.”); *see also* Ex. 2006 (Mercier Dec.) at ¶ 147. A POSITA would not be motivated to use a magnetic alignment targeted for resonant power transmission in a system intended to provide non-resonant power transmission *e.g.*, power transmission at a frequency substantially different from resonant frequency. Ex. 2006 (Mercier Dec.) at ¶ 147.

Accordingly, the Onishi-Partovi system imagined by Petitioner would be incompatible with both Onishi (non-resonant operation) and Partovi (resonant operation) and Petitioner has failed to demonstrate by a preponderance of the evidence that the resulting system would function, let alone anticipate or render obvious the claim element. Ex. 2006 (Mercier Dec.) at ¶ 148. Indeed, Petitioner relies on Onishi’s alleged disclosure of a non-resonant operation without accounting for the tightly coupled system, resulting from the inclusion of Partovi’s alignment mechanism. *Id.*; *see* Pet. 27-28.

C. Ground 2A: Petitioner Fails to Establish that Claims 1, 3-5, 7, and 9-14 are Rendered Obvious by Baarman392 in View of Partovi

Ground 2A fails because Petitioner has failed to show with particularity how the combination of Baarman392 and Partovi would render obvious claim element [1.7]. Further, a POSITA would not be motivated to combine Baarman392 and Partovi. As such, Ground 2A fails.

1. Baarman392 and Partovi Do Not Render Obvious Claim Element [1.7]

Claim [1.7] requires “wherein said driving circuit is configured and operable to produce said oscillating driving voltage at a transmission frequency substantially different from said characteristic resonant frequency of said inductive couple.” For this limitation, Petitioner relies solely on alleged disclosures in Baarman392. Specifically, Petitioner cites Baarman392’s discussion of an inverter operation at “off-resonance.” Pet. at 63. However, the Petition fails to demonstrate that Baarman392 operating “off-resonance” is the claimed “transmission frequency substantially different from said characteristic resonant frequency.” Ex. 2006 (Mercier Dec.) at ¶ 150.

First, Baarman392 describes the general operation of its inverter as in the range between frequency A and frequency B, where frequency B “is *somewhat less*

than the resonant frequency.” Ex. 1008³ at [0038]. However, frequencies “***somewhat less than*** the resonant frequency” are—by definition—not ***substantially different from*** the resonant frequency, as claimed. Ex. 2006 (Mercier Dec.) at ¶ 151.

During cross-examination, Dr. Woods attempted to equate the concepts, but in doing so effectively read out “substantially” from the claim:

- Q. Is it your opinion that frequencies that are somewhat less than the resonant frequency are substantially different than the resonant frequency.
- A. I don't know about in general, but **I would say frequency B is - we know it's not on resonance. Baarman says so. So I would say that makes it substantially different.**

Ex. 1007 at 33:12-20. Put differently, Dr. Woods stated that because frequency B “is **not on [i.e., different from]** resonance . . . that makes it **substantially different**”—*i.e.*, that “different” and “substantially different” are the same. Ex. 2006 (Mercier Dec.) at ¶ 152. Not only does this conflict with the common usage of

³ Dr. Woods's citations to “EX1006” (Purdy) throughout the discussion of element [1.7] for Ground 2A are understood to reference Baarman392, Ex. 1008.

“substantial,”⁴ it ignores the specification, which expressly excludes off-resonant regions 4a and 4b (described as “to either side of the resonance peak 2”) in Figure 6b from the scope of what is “substantially different from the resonant frequency of the inductive couple.” Ex. 1001 at 21:6-8 and 21:16-20; Ex. 2006 (Mercier Dec.) at ¶ 152. It also ignores one of the fundamental canons of claim construction that all terms are to be afforded weight and meaning.

Per above, and as explained by Dr. Mercier, claim 1 “requires a transmission frequency that is meaningfully different from the characteristic resonant frequency in order to mitigate against large unintended fluctuations in induced voltage .” Ex. 2006 (Mercier Dec.) at ¶ 153. Accordingly, and per the specification and prosecution history of the '696 Patent, a POSITA would interpret the transmission frequency of claim 1 to lie within the near-linear region of a frequency-amplitude graph. Ex. 2006 (Mercier Dec.) at ¶ 153; *see also id.* at ¶¶ 94, 98, 102.

⁴ *See, e.g.*, The American Heritage Dictionary of the English Language 1376 (Houghton Mifflin Co., 4th ed. 2002) (Ex. 2008) (“substantial . . . 5. Considerable in importance, value, degree, amount, or extent: *won the election by a substantial margin.*”); Webster’s II Dictionary 699 (Houghton Mifflin Co., 3rd ed. 2005) (Ex. 2009) (“substantial . . . 5. Considerable <a *substantial* snowfall>”).

Here, Baarman392 does not describe or conclusively show by a preponderance of evidence either of frequencies A or B as lying within such a region. If anything, Baarman392 suggests a system lacking in the stability and predictability that the claims of the '696 Patent attempt to achieve due to the express inclusion of a near (or "somewhat less than") resonant frequency within the operable transmission frequency range. Ex. 2006 (Mercier Dec.) at ¶ 154. Accordingly, Baarman392 suggests operation at or near resonant frequency, similar to prior art systems, such as Malpas, distinguished by the Applicant (per Examiner agreement) during prosecution. *Id.*; *see also id.* at ¶¶ 62-67.

Next, where Petitioner would describe the range between frequency A and frequency B as "near-linear," Baarman392 describes its power transfer curve for this range as "piece-wise linearized by a software lookup table." Ex. 1008 at [0037]. Dr. Mercier explained:

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). Thus, Baarman392 acknowledges that the curve between frequency A and frequency B is non-linear by the fact that a piece-wise linearization is required.

Ex. 2006 (Mercier Dec.) at ¶ 155. Accordingly, the requirement for approximation by a piece-wise linear function demonstrates that the graph in Figure 3 of Baarman392 does not disclose “the near-linear regions of a frequency-amplitude graph associated with the inductive couple.” Pet. at 8 (citing Ex. 1002 at 70), as a piece-wise linear function is specifically used here to approximate a non-linear curve. Ex. 2006 (Mercier Dec.) at ¶ 155.

Finally, assuming *arguendo* that the range between frequency A and frequency B—as disclosed in Baarman392—includes the near-linear region of a frequency-amplitude graph, operation of the inverter between frequency B and the beginning of the near-linear region of the frequency-amplitude curve is performed non-linearly. Ex. 2006 (Mercier Dec.) at ¶ 156. As explained above, a central aim of the '696 Patent relates to the linear regulation/control for predictably regulating power transfer. *Id.* However, Baarman392's disclosure of non-linear control would result in unpredictability and fluctuations in power expressly solved by the '696 Patent. *Id.* Thus, any power regulation that occurs in the non-near-linear portions of a frequency-amplitude curve (*i.e.*, portions that are not substantially different) fall outside the scope of claim element [1.7]. *Id.* Accordingly, Baarman392 does not render obvious claim element [1.7]. *Id.*

Petitioner has not relied on Partovi to cure these deficiencies in Baarman392. *Id.* at ¶ 156. Thus, Petitioner has not shown that claim element [1.7] is rendered obvious. *Id.*

2. There is No Motivation to Combine Baarman392 and Partovi

A POSITA would not have been motivated to combine Baarman392 and Partovi. Ex. 2006 (Mercier Dec.) at ¶ 158. Partovi's magnetic alignment system is intended to be used for power transfer at resonant frequency. Ex. 1007 at [0118] ("The coil in the wireless charger system is driven by switching the FET at the resonance frequency of the circuit when the receiver is present. Without the receiver nearby, the circuit is detuned from resonance and radiates minimal EMI."); *see also* Ex. 2006 (Mercier Dec.) at ¶ 158. Indeed, Partovi's objective is to maximize power transfer efficiency. Ex. 1007 at [0044] ("The power transfer efficiency between the primary coil and the secondary should be maximized."); *see also* Ex. 2006 (Mercier Dec.) at ¶ 158. Partovi achieves this maximum power transfer efficiency by combining magnetic alignment with operation at resonance. Ex. 2006 (Mercier Dec.) at ¶ 158. There is no expectation that such maximum power transfer efficiency can be achieved when operating in accordance with the teachings of Baarman392. *Id.*

For example, the only reference to operation at "off-resonance" in Baarman392 is an embodiment where "the primary coil 15 and the secondary coil

30 are **loosely coupled**.” *Id.* at ¶ 158. Because the two are loosely coupled, the slope of the power transfer curve about the resonant frequency is not as steep as if the coils 15, 30 were tightly coupled.” Ex. 1008 at [0038]; *see also* Ex. 2006 (Mercier Dec.) at ¶ 159. In other words, Baarman392 requires a loosely coupled system to ensure a less steep power transfer curve. Ex. 2006 (Mercier Dec.) at ¶ 159. In contrast, Partovi discloses a wireless charging system that uses moveable primary coils that move to align with a mobile device, thereby maintaining a tight coupling between the primary coil and the secondary coil in the mobile device. *Id.*; *see, e.g.*, Ex. 1007 at [0042] (“When a secondary coil is placed on the pad, the pad senses the position of the secondary coil and moves the coils to the right position to optimize power transfer”); *id.* at [0083] (“In another embodiment, the coil or wires and the magnet in the charger are mechanically attached to the body of the charger such that the coil can move to align itself appropriately with the mobile device when it is brought into close proximity to the charger. In this way, an automatic alignment of coils or wire patterns can be achieved.”).

As expressly stated by Baarman392, 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 by Baarmn392, which is to ensure that “even if the

inverter 10 is not operating at resonance, significant power transfer can occur when the inverter is operating off-resonance.” Ex. 1008 at [0038]; *see also* Ex. 2006 (Mercier Dec.) at ¶ 159.

There is no expectation that the tightly coupled charging system of Partovi will provide the less steep slope for the power transfer curve required by Baarmn392. Ex. 2006 (Mercier Dec.) at ¶ 160. Accordingly, the Baarman392-Partovi system imagined by the Petition would be incompatible with both Baarman392 (loosely coupled) and Partovi (tightly coupled) and Petitioner has failed to demonstrate by a preponderance of the evidence that the resulting system would function, let alone render obvious the claim element. *Id.* Indeed, Petitioner relies on Baarman392's disclosure of a “loosely coupled” primary and secondary coil as the reason for operating at off-resonance without accounting for the tightly coupled system, resulting from the inclusion of Partovi's alignment mechanism. Pet. at 59; *see also* Ex. 2006 (Mercier Dec.) at ¶ 160.

Therefore, a POSITA would not be motivated to combine the teaching of Partovi (*e.g.*, alignment mechanism) with Baarman392. Ex. 2006 (Mercier Dec.) at ¶ 161.

Furthermore, regarding element [1.7], Petitioner appears to mix embodiments of Baarman in its citation to [0015]-[0019] and [0055]-[0057] without explanation as to why POSITA would do so. *See* Pet. at 64. “Pointing to disparate embodiments without providing a sufficient motivation to combine them is not enough to establish the obviousness of [the claim] as a whole.” *Markforged Inc. v. Continuous Composites, Inc.*, IPR2022-00679, Paper 24 at 14-15 (Sept. 26, 2023). In *Markforged*, the Petitioner argued one-reference obviousness and argued the reference’s statement that “various features of the invention which are, for clarity, described in the contexts of separate embodiments may also be provided in combination in a single embodiment” was sufficient, yet the Board found this insufficient to establish obviousness because Petitioner never provided sufficient motivation combine the embodiments. *Id.*; *see also Markforged Inc. v. Continuous Composites, Inc.*, IPR2022-01431, Paper 7 at 12-13 (Jan. 18, 2023) (denying institution for similar reasons).

Both Federal Circuit and Board case law require a motivation to combine two (or more) embodiments of a reference. *Abiomed, Inc., v. Maquet Cardiovascular, LLC*, IPR2017-01026, Paper 8, 7-8, 10-11 (PTAB Sept. 20, 2017) (an obviousness argument based on “combining multiple embodiments from a single reference” must

include a motivation and a reasonable expectation of success); *In re Stepan*, 868 F.3d 1342, 1346 n.1 (Fed. Cir. 2017) (“Whether a rejection is based on . . . combining multiple embodiments from a single reference . . . there must be a motivation to make the combination and a reasonable expectation that such a combination would be successful, otherwise a skilled artisan would not arrive at the claimed combination.”). Here, Petitioner has failed to provide the required motivation.

D. Ground 2B: Petitioner Fails to Establish that Claims 2 and 6 are Rendered Obvious by Baarman392 in View of Partovi and Tocci

Ground 2B differs from Ground 2A only in that Tocci is used for claims 2 and 6, but not for claim element [1.7]. Accordingly, for the reasons that Ground 2A fails with respect to claim limitation [1.7] (and therefore all dependent claims), Ground 2B fails as well. Ex. 2006 (Mercier Dec.) at ¶ 162.

Moreover, as explained below, Petitioner has not established that claim elements [2.1] and [2.2] are rendered obvious by Baarman392 in view of Partovi and Tocci.

1. Baarman392, Partovi, and Tocci Do Not Render Obvious Claim Elements [2.1] and [2.2]

Claim 2 requires:

[2.P] The inductive power outlet of claim 1 said inductive power outlet comprising a signal detector adapted to detect a first signals

and a second signal, and said driver is configured to:

[2.1] increase said transmission frequency when said first signal is detected by the detector; and

[2.2] decrease said transmission frequency when said second signals is detected by the detector.

Ex. 1001 at 28:47-54.

Thus, the driver of claim 1 is configured to “[increase/decrease] said transmission frequency when said [first/second] signal is detected by the detector.” Based on claim 2’s reliance on claim 1, the transmission frequency is required to be substantially different from said characteristic resonant frequency of said inductive couple (*i.e.*, a frequency that lies within the near-linear region of a frequency-amplitude graph). Baarman392 does not disclose the increasing/decreasing of a transmission frequency within the near-linear region of the resonance curve, and Petitioner does not rely on Partovi or Tocci to cure this deficiency. Ex. 2006 at ¶ 164.

As explained above, Baarman392 describes the general operation of its inverter as in the range between frequency A and frequency B, where frequency B “is somewhat less than the resonant frequency.” Ex. 1008 at [0038]. However, frequencies “*somewhat less than* the resonant frequency” are—by definition—not

substantially different from the resonant frequency, as claimed. Moreover, any change in frequency between frequency A and frequency B will require a non-linear increase/decrease in the transmission frequency. Ex. 2006 (Mercier Dec.) at ¶ 165. Thus, Baarman392 fails to disclose a power control technique that maintains a substantially different transmission frequency, as required in claim 1. *Id.*

Partovi and Tocci neither cure this deficiency nor are they proffered for such purpose. See Pet. at 78-80; Ex. 2006 (Mercier Dec.) at ¶ 166.

Accordingly, Petitioner has not demonstrated that Baarman392 in view of Partovi and Tocci renders obvious limitations [2.1] and [2.2].

VII. CONCLUSION

For at least the foregoing reasons, Petitioner has not met its burden of demonstrating the unpatentability of any challenged claim. Accordingly, Patent Owner requests the Board confirm the patentability the challenged claims.

Case IPR2024-00994
Patent No. 9,048,696
Patent Owner's Response

Dated: March 4, 2025

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Case IPR2024-00994
Patent No. 9,048,696
Patent Owner's Response

CERTIFICATE OF SERVICE

I hereby certify that on this 4th day of March, 2025, a copy of the attached **PATENT OWNER'S RESPONSE** was served by electronic mail to the attorneys of record, at the following addresses:

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Case IPR2024-00994
Patent No. 9,048,696
Patent Owner's Response

CERTIFICATION PURSUANT TO 37 C.F.R. § 42.24(d)

Pursuant 37 CFR 42.24(d), the undersigned certifies that this Response complies with the type-volume limitation of 37 CFR §42.24(a). The word count application of the word processing program used to prepare this Response indicates that the Response contains 12,660 words, excluding the parts of the brief exempted by 37 C.F.R. § 42.24(a).

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