

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MASIMO CORPORATION,
Petitioner,

v.

APPLE INC.,
Patent Owner

Case IPR2023-00734
U.S. Patent No. 10,942,491

PATENT OWNER SUR-REPLY

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PATENT OWNER'S LISTING OF EXHIBITS

Ex. 2001	U.S. Patent Pub. No. 2014/0107493 to Yuen et al. (“Yuen”)
Ex. 2002	RESERVED
Ex. 2003	U.S. Patent Pub. No. 2017/0011210 to Cheong et al. (“Cheong”)
Ex. 2004	U.S. Patent No. 7,946,758 to Mooring (“Mooring”)
Ex. 2005	U.S. Patent Pub. No. 2014/0139486 to Mistry et al. (“Mistry”)
Ex. 2006	U.S. Patent No. 8,229,535 to Mensinger et al. (“Mensingher”)
Ex. 2007	U.S. Patent No. 7,682,070 to Burton (“Burton”)
Ex. 2008-2009	RESERVED
Ex. 2010	U.S. Prov. App. No. 61/943,004 (“Cheong Provisional”)
Ex. 2011	File History of U.S. Patent App. No. 17/188,995
Ex. 2012	File History of U.S. Patent App. No. 17/951,973
Ex. 2013	File History of U.S. Patent App. No. 18/075,253
Ex. 2014	File History of U.S. Patent App. No. 18/119,175
Ex. 2015-2018	RESERVED
Ex. 2019	Prosecution History of US Patent No. 10,627,783
Ex. 2020	U.S. Patent Pub. No. 2014/0275852 to Hong et al. (“Hong”)
Ex. 2021	U.S. Patent No. 4,448,199 to Schmid (“Schmid”)

EX-2022	RESERVED
EX-2023	S. Annam, “Scholar Works at UT Tyler Four-Coil Wireless Power Transfer Using Resonant Inductive Coupling,” Electric Engineering Theses, Paper 19 (2012).
EX-2024	Z. Atrqchi et al., “Efficiency Examination of The Circular Coils with Two Types of Cross-Sections for WPT System,” UMD-SDSP (2020).
EX-2025	Y. Li et al., “Maximizing Transfer Distance for WPT via Coupled Magnetic Resonances by Coupling Coils Design and Optimization,” IEEE Access, vol. 8, pp. 74157–74166 (2020).
EX-2026	Y. Li et al., “Influences of Coil Radius on Effective Transfer Distance in WPT System,” IEEE Access, vol. 7, pp. 125960–125968 (2019).
EX-2027	Y. Li et al., “Directional characteristics of wireless power transfer via coupled magnetic resonance,” Electron., Vol. 9, No. 11, pp. 1–14 (2020).
EX-2028	K. A. Mohamad et al., “Effect of Circular Coil Dimension on Resonant Coupling Wireless Power Transfer System,” J. Telecommun. Electron. Comput. Eng., Vol. 10, No. 2–6, pp. 19–23 (2018).
EX-2029	A. P. Sample et al. “Analysis, experimental results, and range adaptation of magnetically coupled resonators for wireless power transfer,” IEEE Trans. Ind. Electron., Vol. 58, No. 2, pp. 544–554 (2011).
EX-2030	G. Vigneau et al., “Design and modeling of PCB coils for inductive power charging,” Wirel. Power Transf., Vol. 2, No. 2, pp. 143–152 (2015).

EX-2031	R. Vinge, “Wireless Energy Transfer by Resonant Inductive Coupling,” p. 83 (2015).
EX-2032	F. Wen et al., “Research on optimal receiver radius of wireless power transfer system based on BP neural network,” Energy Reports, Vol. 6, pp. 1450–1455 (2020).
EX-2033	U.S. Patent Pub. No. 2007/0228404 to Tran et al. (“Tran”)
EX-2034	U.S. Patent Pub. No. 2005/0274971 to Wang et al. (“Wang”)
EX-2035	U.S. Patent Pub. No. 2010/0193804 to Brown et al. (“Brown”)
EX-2036	U.S. Patent Pub. No. 2005/0030518 to Nishi et al. (“Nishi”)
EX-2037	U.S. Patent No. 7,455,423 to Takenaka (“Takenaka”)
EX-2038	Declaration of Dr. Brian Anthony, Ph.D.
EX-2039	Deposition Transcript of R. James Duckworth, Ph. D.
EX-2040	G. Patancheru, “Wearable Hear Rate Monitoring Unit”
EX-2041	Pulse Sensor Easy to Use Heart Rate Sensor and Kit (World Famous Electronics)
EX-2042	“Bringing Vital Signs Monitoring into the Wearable Domain” (April 2023)
EX-2043	Deposition of Dr. R. Donald Duckworth

I. INTRODUCTION

As the POR explained, Masimo failed to demonstrate obviousness of the Challenged Claims given the Petition's deficient and factually flawed contentions. Masimo's Reply uses the POR-identified issues as a roadmap for presenting new theories and evidence to cure its failure to meet its burden. This revisionist strategy is contrary to Board rules and case law¹, and is highly prejudicial to Apple who—at this late juncture of the proceeding—cannot bring additional evidence/testimony to bear on these issues. Masimo's new theories should therefore be rejected. Even if considered, they fail to demonstrate obviousness of the Challenged Claims.

For the independent claims, Masimo's obviousness theory presents a wrist-worn device with a wireless charging coil and optical elements provided within a

¹ See *Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1369–70 (Fed. Cir. 2016) (upholding PTAB exclusion of reply brief for presenting new obviousness theories and evidence); *Google LLC v. Nobots LLC*, IPR2022-00940, Paper 38, at 24-26 (PTAB Nov. 29, 2023) (finding improper reply where Petitioner presented a new obviousness theory based on background or common knowledge instead of the originally-cited reference); Consolidated Trial Practice Guide (Nov. 2019), 73-74.

confined opening behind a rear device cover. The references underpinning this theory—Honda and Kotanagi—do not teach/suggest this configuration. And this configuration is also refuted by the only record evidence that teaches a configuration of a wireless charging coil and optical elements in a watch's rear portion. Even if the proposed combination's device could be configured as Masimo proposes, Masimo has not shown that a POSITA would have done so—particularly considering the detrimental impact to wireless charging stemming from its proposed combination. Masimo's Reply does not dispute these issues and instead colors them as tradeoffs. But, these tradeoff arguments are refuted by the evidence on which Masimo relies. Masimo also attempts to sidestep these issues by providing new modifications to its combination. These new theories, if considered, stand refuted by the record and still fail to cure the issues with the proposed combination. Masimo has therefore failed to demonstrate obviousness of the independent claims.

Independent claim 1 additionally recites that the electronic watch is configured to measure an electrocardiogram (ECG) using the first and second electrodes positioned along the watch's rear surface. Claims 13 and 17 recite similar limitations. For these claims, Petitioner leverages Choi's alleged teachings of ECG measurements to argue that Kotanagi's electrodes—alone or in combination with additional electrodes—would be configured to measure ECG.

Petition, 50-54. However, Kotanagi's electrodes are used to detect skin contact via potential difference measurements—and not to measure ECG. And no other reference in the Petition teaches electrodes used for skin contact detection also disclose their usage for ECG measurements. Indeed, Choi—the only reference identified in the Petition that contemplated both functionalities—teaches separate electrodes for wearing detection (which Masimo contends is akin to Kotanagi's skin contact detection), on the one hand, and ECG detection, on the other hand. Thus, even if Kotanagi's and Choi's teachings could be combined, Masimo's Petition failed to make a *prima facie* showing that Kotanagi's skin contact electrodes would be additionally used for ECG measurements.

To remedy this failure, Masimo's Reply advances newly-cited references that purportedly teach electrodes serving dual functions. This new evidence should be rejected because it is untimely, improper, and could have been raised in the Petition. Even if considered, the newly-identified evidence fails to teach that Kotanagi's skin contact electrodes would additionally be used for ECG measurements. At best, the newly-identified references teach common electrodes being used for ECG and GSR measurements, which are distinct from Kotanagi's potential difference-based skin contact detection. None of the newly-identified evidence teach that Kotanagi's electrodes, which detect skin contact via potential difference measurements, also being used for ECG measurements.

Therefore, the totality of the evidence—including the Reply’s improper new theories and evidence—confirms Masimo’s failure to make a *prima facie* showing of obviousness for these “electrode” claims.

II. KOTANAGI-HONDA DOES NOT RENDER OBVIOUS CLAIM 7

Claim 7 recites (1) a “biosensor module” “configured to pass an optical signal through a window defined within the non-conductive material of the cover,” (2) a “wireless charging receive coil” “configured to inductively couple to an external wireless charging device through the non-conductive material of the cover,” and (3) the “biosensor module” and “wireless charging receive coil” positioned/aligned “below the cover.”

Masimo contends that, in Kotanagi-Honda, the housing is metal in view of Kotanagi and includes a glass cover 23 behind which a biosensor module and a wireless charging receive coil would be positioned, such that wireless power and optical signals would pass through this cover. Petition, 18-21. However, neither Honda nor Kotanagi teach Masimo’s proposed configuration. POR, 31-35. Only one identified reference—Fraser—describes a wrist-worn device with both wireless coil and optical elements. However, Fraser teaches that the coil, when positioned around optical elements, expands well beyond the cover—thus confirming that the coil would not be provided in the confined opening behind

Kotanagi's cover glass, as Masimo proposes. POR, 46-61. Thus, the record evidence does not teach/suggest Masimo's concocted combination. *Id.*

Masimo also does not dispute the numerous issues—including the detrimental impact to wireless charging—with its proposed combination. POR, 31-64. Instead, Masimo advances multiple rebuttals, which are legally and factually flawed, as explained below.

A. Masimo's Arguments are Flawed and Refuted by the Existing Record

1. Masimo Fails to Credibly Refute Kotanagi's Express Size Constraints

The Petition failed to account for Kotanagi's imposed constraints on its protruding part's size. POR, 36-40. None of Masimo's reply arguments justify disregarding these constraints.

Masimo first argues that the protruding part's size is not claimed and therefore irrelevant. Reply, 6-7. However, the size is relevant because it is a constraint stemming from Masimo's proposed combination. Masimo then claims that the protruding part's diameter of 20mm applies to Kotanagi's FIG. 8 embodiment and not to the relied-upon FIG. 5 embodiment. *Id.* Wrong. Kotanagi teaches that the 20mm diameter is a constraint of the "invention"—and not of just one embodiment. EX-1005, ¶¶36-37; EX-1052, 81:21-87:5; POR, 36-40.

Given the protruding part's 20mm diameter, Masimo does not dispute that the available width of Kotanagi's rectangular cover would be roughly half (~10 mm). POR, 36-40; Reply, 6-7. Masimo, however, contends that an Apple-cited reference confirms that coils less than 10mm in diameter would be suitable for wearable devices. Reply, 7-8 (citing EX2028, 2, 5). This argument is flawed in two respects. First, EX-2028, which published in 2018², is not prior art and does not speak to what would have been known as of the patent's effective filing date. Second, the POR was not evaluating whether a smaller coil in a vacuum would be suitable. Rather, the POR addressed the detrimental impact to wireless charging stemming from such a coil's presence in a confined opening and behind/around metallic components (per Masimo's proposed combination)—which this paper doesn't address. POR, 31-61.

Finally, Masimo contends that, if a larger coil is needed, a POSITA would have enlarged Kotanagi's opening and cover glass. Reply, 8. Masimo supports this assertion by citing to Kotanagi's disclosure that the protruding part (within which the cover glass is provided) could be of any shape. *Id.* Notably, the Petition's independent claim analysis did not contemplate a larger coil and accommodating the same by making commensurate adjustments to the opening and cover, nor did it cite Kotanagi's newly-identified portion as corresponding support. Petition, 22-30;

² See <https://jtec.utem.edu.my/jtec/article/view/4363>.

POR, 55-61. This new theory is improper and should be rejected. Nevertheless, if considered, this theory rests on a faulty premise. The cited portion of Kotanagi teaches that the protruding part can have any *shape*—it does not teach/suggest that this component can have any *size* (which Kotanagi expressly constrains to a maximum 20mm diameter). EX-1005, ¶¶36-37, 74-75. Kotanagi also does not teach or suggest that the cover and opening provided therein would be expanded. POR, 55-61. Moreover, components, such as electrodes, disposed on the protruding part suggests that the cover and opening cannot be arbitrarily expanded as Masimo now contends. *Id.* Masimo has thus failed to credibly explain why or how Kotanagi's opening and/or cover would be expanded. *Id.* Therefore, even if coil sizes and shapes could be adjusted, as Masimo asserts in conclusory fashion (Reply, 8), they would still be subject to Kotanagi's size constraints.

2. *Masimo Does Not Dispute the Combination's Detrimental Impact to Quick and Efficient Charging, and Cannot Avoid These Issues with its Flawed Tradeoffs Arguments*

Masimo does not dispute Honda's goal of quick and efficient charging, but asserts that (1) Honda does not set a threshold rate or amount for quick and efficient charging and (2) the claim does not provide such thresholds. Reply, 8-9. These arguments fail. Honda gives multiple examples and configurations that achieve its above-stated goal. EX-1006, 5:9-61, 6:4-16:28. Also, Masimo's assertion that the

claim does not specify any particular charging speed ignores that the detrimental impact to wireless charging is a function of its proposed combination. Similarly, Masimo's assertion that trickle/slow charging is acceptable (Reply, 9) also disregards this express goal.

Masimo next asserts that wireless charging would nevertheless be included in Kotanagi despite Honda's stated goal. Reply, 9. But this overly-broad framing ignores a key issue—whether a POSITA would have implemented the wireless charging coil in the space-constrained portion behind Kotanagi's rear device cover. As the POR explained, a POSITA would not have done so. POR, 31-61.

Moreover, Masimo does not dispute the increased spacing due to its proposed positioning of the coil behind the optical elements, but asserts that a POSITA would have “considered coil spacing and adjustments to accommodate coils as part of ordinary engineering.” Reply, 10. This assertion is conclusory and does not explain how that spacing—mandated by Masimo's combination—would be balanced or how the purported adjustments to the coils would be made.³ Even Masimo's reliance on

³ Masimo's criticisms of Dr. Anthony's testimony regarding component dimensions are misguided. Reply, 10-12. Dr. Anthony's analysis assumed “representative relative dimensions” of Figure 5, which indicated that coil would be 2-to-4mm away

Honda for this proposition (*id.*) fails because Honda seeks to reduce spacing between coils by positioning each coil directly adjacent to the respective device's cover. EX-1006, FIG. 2, 2:36-52, 13:3-31.

There is also no dispute that the proposed coil positioning behind Kotanagi's optical elements would cause detrimental noise and interference to its proposed wireless charging scheme. Reply, 11-12. Masimo, however, suggests that these issues are acceptable because Honda's device provides wireless charging and heart rate sensing without undue noise or interference. *Id.* But, Honda does not describe where its pulse/heart rate sensor is, nor does it describe this sensor being provided in front of (or around) its wireless charging coil, as Masimo proposes. EX-1006, 6:17-20, FIG. 2. Masimo has therefore failed to demonstrate that its combination's issues/deficiencies would be acceptable.

from the cover (EX-2038, ¶¶148-151; EX-1005, ¶¶27-29). Masimo's arguments also ignore the optical elements' circuitry that adds to their dimensions—as confirmed by multiple corroborating references that Masimo does not address. *See id.* Indeed, recognizing the failure to address these dimension issues, Masimo's expert attempts to cure that failure by presenting a new obviousness theory and evidence (EX-1060, ¶356)—which should be rejected.

3. *A POSITA Would Not Have Provided the Charging Coil Around the Optical Elements in Kotanagi's Opening, As Underscored by Fraser*

Masimo argues that its alternative proposed coil positioning (around optical elements) would not encounter the above-discussed issues. Reply, 12-15. But this configuration is space-constrained and demands placing metallic materials in the coil's core, which would therefore encounter significant wireless charging degradation and would further counsel against the proposed combination. POR, 46-61.

To rebut this assertion, Masimo contends that placing metallic materials in the coil's core is an acceptable trade-off because Honda allegedly teaches core-less coils for “nonelectronic watches” and coils with cores for electronic apparatuses/watches. Reply, 14-15; EX-1060, ¶369. This mischaracterizes Honda. The cited description relates to Honda's FIG. 2, which is directed to “electronic watches,” as Dr. Duckworth conceded during deposition. EX-2043, 32:19-36:17 EX-1006, 6:4-49. Honda thus confirms using coils without cores for electronic watches, whereas coils with cores can be used for other electronic devices (e.g., toothbrushes). *Id.*

Even Masimo's reliance on Fraser to argue acceptability of its proposed configuration fails. Reply, 14-18. While Fraser contemplates positioning metallic materials in its coil's core, it does so in a manner that counteracts their detrimental

effects—i.e., substantially expanding the coil to cover a large portion of the rear device surface. POR, 46-61. Thus, Fraser confirms that a POSITA would not have implemented wireless charging and optical sensing in a wrist-worn device in the manner Masimo proposes. *Id.*

Masimo’s attempts to minimize differences between Fraser and its proposed combination are also unavailing. First, Masimo argues that a large Fraser-like coil is not necessary when smaller coils can provide sufficient current. Reply, 15-16. However, as explained in §II.A.1, this assertion is based on an inapplicable, non-prior art reference and fails to account for detrimental issues of the Kotanagi-Honda configuration (which are not addressed by this paper).

Second, Masimo does not and cannot dispute that using a Fraser-like coil in Kotanagi would reduce charging efficiency. That’s because the device housing in the proposed combination is made of metal, thereby causing detrimental effects to wireless charging due to presence of metallic materials in the wireless power transmission path. POR, 50-56.

Third, Masimo’s characterization of Fraser as a “better alternative” and its own proposed combination as a “suitable option” is legally and factually flawed. Reply, 7-8, 15-17. Fraser is the only evidence of record of a wrist-worn device with an arrangement of a wireless charging receive coil encircling optical elements used for heart rate sensing. However, Fraser confirms that the coil in such a

configuration would expand well beyond the rear device cover of the type shown in Kotanagi. POR, 46-61. Such a configuration would therefore counteract the detrimental wireless power transmission issues, which otherwise would be present in Masimo's proposed configuration—given that the confined opening behind the cover glass would significantly limit the coil's size. *Id.* Masimo cites no evidence teaching/suggesting otherwise.

In this regard, the present case is distinguished from cases where selecting from among two working alternatives involves accepting the tradeoffs between the two (as contemplated by the *Moultet* and *Intel* cases that Masimo cites. Reply, 4, 15. That's because the record here only presents a single working configuration (Fraser) that is different from the concocted Kotanagi-Honda combination, and Masimo has failed to demonstrate that its proposed combination is a "suitable" option/alternative.

4. Masimo's New Theory Regarding Fitting a Larger Coil By Enlarging the Cover and Opening is Improper and Flawed

To resuscitate its flawed combination, Masimo asserts that the cover and opening in Kotanagi's device could be expanded, such that a larger coil could be provided behind the enlarged cover/opening. Reply, 15-17. Although the Petition noted that "a POSITA would have...enlarge[d] Kotanagi's opening and cover glass to make room for a coil behind the cover glass, surrounding the LED and PD"

(Petition, 24-25), it failed to explain why or how the opening and the cover glass could or would in fact be expanded—especially given the size restrictions imposed by Kotanagi on the rear protruding part 4 and the presence of other components like the electrodes 7a and 7b on this surface that further limits any contemplated expansion of the cover glass and the opening. POR, 55-57.

Even Fraser does not support this modification. Specifically, Masimo relies upon Fraser’s teachings of its coil surrounding light emitters (*see* Petition, 29), but offers no evidence or analysis indicating any feasible expansion of a cover glass or opening in the housing—particularly in view of Kotanagi’s device, as Petitioner’s proposed modification demands. *Id.*; POR, 55-57. The Petition’s claim 7 analysis also never contemplated enlarging a coil to cover a larger part of Kotanagi’s protruding part. Reply, 14, 16-17; Petition, 15-30. Nor did it present the contorted line-drawings to illustrate and suggest—without any evidentiary support other than naked expert testimony—that a hypothetically enlarged coil could be provided therein. Reply, 14, 16-17; Petition, 15-30. Thus, Masimo’s hindsight-motivated presentation of new drawings and theories should be rejected.

Nevertheless, if the cover and/or opening were bigger and a larger coil could be positioned around the optical elements and behind this cover, the coil would still be constrained by the protruding part’s size. Thus, unlike in Fraser, Kotanagi-Honda’s coil would still not cover a substantial portion of the rear device surface

and Masimo cites no evidence suggesting that such a configuration would be to counteract the detrimental impact to wireless charging. POR, 46-61.

5. Masimo's Explanation of the Physics of Wireless Power Transmission is Flawed

As explained below, Masimo fails to credibly rebut the POR's arguments that, if Kotanagi's device included the Fraser-like coil, wireless power would not pass through the device's cover. Reply, 18-23.

While magnetic field may be present in the central portions of two opposing coils and wireless power transfer occurs at least because of magnetic field between the coils, it is incorrect to equate magnetic field with wireless power transfer, as Masimo argues. *See* Reply, 21-23. Indeed, wireless power transfer is not just a function of magnetic field, but also other things, e.g., distance between the coils and the relative alignment of the coils. Masimo and its expert ignore that wireless power transfer happens **between** the coils (i.e., from the transmit coil to the receive coil) and thus, it is the presence of magnetic field **between** proximally-positioned and generally aligned coils (including in the central portion of the coils) that results in wireless power transfer. EX-1052, 152:9-160:4. Unsurprisingly, other than naked expert testimony, Masimo has not identified any evidence indicating that magnetic field existing beyond the coils results in wireless power transfer to the receive coil. Therefore, wireless power transmission—in the context of Fraser and

Kotanagi—happens between the coils, and any magnetic field present beyond the coils, e.g., where the cover would be provided—would not result in wireless power transmission. *Id.*; POR, 48-55.

6. *Dr. Anthony's Modeling is Consistent with Industry-Wide Modeling Approaches*

Dr. Anthony modeled and simulated wireless power transfer between charging coils using techniques described in numerous peer-reviewed papers. EX-2038, ¶¶165-170, 194-197; EX-1052, 33:16-39:15. Dr. Duckworth's criticisms of the modeling (Reply, 23-24; EX-1060, ¶¶380-388) lack merit for the below reasons, which only highlight his own lacking experience with modeling of wireless power transfer (as he confirmed in deposition). EX-2043, 56:15-57:17.

First, Masimo's criticism of the modeling illustrating relative performance—instead of absolute performance—ignores that measuring relative performance enables analyzing how varying certain parameters (while maintaining other parameters the same) impacts wireless charging. EX-1052, 123:18-137:17.

Second, Masimo incorrectly contends that the modeling did not include any inputs, coil configurations, or equations. EX-1052, 123:18-137:17; EX-2038, ¶¶165-170, 194-197. Moreover, as Dr. Anthony explained, there was no need to list equations and functions built into commercial software used for such modeling. *Id.*

Third, Masimo's assertion that improper coil assumptions were used fails again to appreciate that the assumptions were applied equally to all simulated coils to enable the *relative* performance comparison.

Fourth, Masimo's suggestion that Dr. Anthony's cited references do not support his modeling methodology lack merit. Dr. Anthony cited ten references supporting his modeling approach. That some references also discussed wireless charging in other fields (EX-1060, ¶386) corroborates the common methodology for modeling wireless power transfer. Notably, Masimo affirmatively references many of these references (Reply, 7-8, 19, 24)—further undercutting the references' suggested inapplicability. Finally, Masimo does not dispute the conclusions drawn from the modeling, nor does it proffer its own modeling to suggest different conclusions. EX-2043, 56:15-57:17.

On this record, Masimo has not demonstrated that its proposed combination renders obvious claim 7.

III. KOTANAGI-HONDA DOES NOT RENDER OBVIOUS CLAIM 14

Masimo repeats its claim 7 analysis and therefore, fails to render obvious claim as described above for claim 7.

IV. KOTANAGI-HONDA-CHOI DOES NOT RENDER OBVIOUS CLAIM 1

A. Kotanagi-Honda-Choi Does Not Render Obvious Limitation [1g]

Masimo repeats its claim 7 analysis and therefore, fails to render obvious this limitation as described above for claim 7.

B. Kotanagi-Honda-Choi Does Not Render Obvious Limitations [1h], [1j]

These limitations recite (1) first and second electrodes “positioned along” an electronic watch’s “rear surface” and (2) that “the electronic watch is configured to measure an electrocardiogram using” these electrodes. The Petition stated that “a POSITA would have used Kotanagi’s existing electrodes and Choi’s teachings to: (1) use signals from Kotanagi’s existing electrodes to obtain an ECG; or (2) add one or more additional electrodes to Kotanagi (as taught by Choi) and use both it and the existing electrodes to obtain an ECG.” Petition, 51-54; Reply, 25-26, 33 (contending that Kotanagi’s existing electrodes would be used for contact detection and ECG measurements).

The POR demonstrated Masimo’s failure to render the above claim features obvious based on at least the following undisputed record evidence (POR, 63-76):

- Kotanagi’s wrist-worn device includes two electrodes on its rear surface. Petition, 50; EX-1005, ¶¶59, 86.

- Kotanagi detects skin contact by determining potential difference between these rear surface electrodes when they contact the skin of a wearer. EX-1005, ¶¶59, 13, 64; Petition, 50.
- Kotanagi does not disclose that these electrodes can be used to measure ECG.
- Schmid discloses that its wrist-worn device includes electrodes on the device's rear surface, and that signals from these electrodes are used by another device—different from its wrist-worn device—to measure ECG. EX-1029, 1:6-11, 5:3-10; Reply, 28.
- Choi teaches a watch that measures ECG using electrodes on the watch's front and rear surfaces. EX-1011, ¶52; EX-1060, ¶411; Petition, 51.
- Choi teaches a wearing detection sensor/electrode that performs wearing detection using impedance measurements. EX-1011, FIG. 3, [68]-[70], [98]-[102]; Reply, 32, 34.
- Choi's wearing detection sensor/electrode is/are separate and different from its electrodes used for measuring ECG. *Id.*; POR, 70-72; EX-1060, ¶411.

In view of this evidence, Masimo has failed to demonstrate that Kotanagi's rear-surface electrodes would be used for ECG and skin contact detection. First,

none of the Petition's identified references disclose or suggest a watch that uses two rear electrodes to measure ECG: Kotanagi's electrodes do not detect ECG, Schmid's wrist-worn device has electrodes but ECG is measured on a different device, and Choi teaches ECG measurement using electrodes on two device surfaces. POR, 67-68, 73. Second, the Petition did not identify any evidence demonstrating that Kotanagi's skin contact electrodes would additionally be used for ECG measurements. *Id.*, 68-74. Indeed, Choi indicates otherwise, given its disclosure of electrodes for measuring ECG and separate electrodes for wearing detection.⁴ *Id.* On this record, even if Choi's and Kotanagi's teachings could be combined, the resulting combination would not teach repurposing Kotanagi's electrodes, which detect skin contact based on potential difference measurements, to additionally perform a different ECG measurement (*see* Reply, 30; POR, 30)—as Masimo's combination demands.

⁴ Although Masimo alleges that Kotanagi's skin contact detection is "similar to" Choi's wearing detection (Reply, 29), Masimo ignores that Choi's wearing detection is done using impedance measurements, which are different from potential difference/voltage drop measurements performing using Kotanagi's electrodes. EX-1052, 161:9-167:19; EX-1005, ¶¶64-65, 14, 59.

This failure to make a *prima facie* showing of obviousness also permeates Masimo's proposed alternative of adding electrodes to Kotanagi's device and using them along with Kotanagi's existing electrodes to measure ECG. Again, Masimo failed to demonstrate that Kotanagi's electrodes, which detect skin contact based on potential difference measurements, would additionally be used to measure ECG. POR, 65-74.

Masimo's Reply now attempts to remedy the Petition's failure to demonstrate obviousness, by advancing new theories and evidence. Specifically, Masimo relies upon newly-cited, non-ground references (EX1055-EX1057, EX1061) to argue that (1) wrist-worn devices that measure ECG using only rear surface electrodes were known, (2) electrodes are generic component and the same electrodes "can be used to detect various physiological signals," and (3) ECG can be measured using skin contact detection electrodes. Reply, 26-33.

As a threshold issue, Masimo's newly-presented theories and evidence should be rejected because they are improper, untimely, and could have been raised in the Petition. *See* §I n1. For example, Masimo's reliance on a newly-identified portion of Choi and EX1055 to suggest that watches with only rear surface electrodes would measure ECG (Reply, 26, 28-29 (citing EX-1011, ¶¶2, 47; Petition, 91; EX-1055, 5:52-62) is an improper attempt to cure Schmid's failure to teach a watch that measures ECG with only rear surface electrodes.

Moreover, as explained in the POR, Choi teaches ECG measurements using electrodes on two device surface. EX-1011, ¶¶47, 52; POR, 67-72. Similarly, when confronted with the Petition’s failure to demonstrate contact detection and ECG measurements using the same electrodes, Masimo’s Reply presents new non-ground references (EX1055-to-1057, EX1061⁵) that purportedly teach such dual-purpose electrodes. Reply, 30-32. The Petition could have addressed these deficiencies—it failed to do so. Masimo should not get a second bite at the apple on issues where it had the burden of proof in the first instance.

Nevertheless, even if considered, the new theories/evidence and Masimo’s additional arguments are flawed, as explained below.

First, Masimo’s assertion that electrodes “are generic components used to detect electrical signals by contacting a wearer” (Reply, 30) is incorrect and does not support the suggestion that the same electrode would be used for ECG and skin contact detection. As Dr. Anthony explained, electrodes and the associated circuitry vary based on the function performed, such that electrodes used for skin contact detection would be different from those used for more refined/sensitive measurements, like ECG. EX-2038, ¶¶227-230.

⁵ Masimo also improperly contends that these theories support its motivations to combine arguments. Reply, 29.

Unsurprisingly, Masimo does not dispute this evidence. And, Masimo's reliance on Kotanagi for its assertion that electrodes are "generic" components (Reply, 31 (citing EX-1005, 27); EX-1060, ¶403)) is misguided. Kotanagi only describes electrodes that are used for skin contact detection—and does not contemplate that these electrodes are generic or could (or would) be used for other, more refined measurements, like ECG.

Second, Masimo references non-ground references (EX1055-to-1057 and EX-1061) to now assert that electrodes used to measure Galvanic Skin Response (GSR) can also be used to measure signals like "ECG, GSP, EMG, etc." Reply, 31. But, GSR is not a skin contact detection measurement. That GSR and ECG can be measured using the same electrode(s) thus does not teach/suggest that Kotanagi's skin contact detection electrodes would be used to additionally measure ECG.

Third, Masimo also presents a flawed transitive property-style argument to draw parallels between ECG and skin contact detection. Specifically, Masimo appears to assert that these measurements can be performed using the same electrodes because (1) ECG and GSR can be detected using common electrodes and (2) GSR and skin contact detection are potential difference measurements. Reply, 31. Both these assertions are flawed. Even if ECG and GSR can be measured using the same electrode(s), that does not address whether skin contact

as in Kotanagi (i.e., using potential difference measurements) can also be detected using the same electrodes. Also, Masimo's own evidence (EX1061) refutes its assertion that GSR and Kotanagi's skin contact sensing are both potential difference measurements. Reply, 31. EX-1061 confirms that GSR is measured by "*applying a known DC or AC potential* across two electrodes and *measuring resistance* across the terminals." EX1061, ¶3.2. In contrast, skin contact in Kotanagi is detected when the potential between two electrodes decreases upon the electrodes coming into contact with a person's skin. EX1005, ¶¶13-14, 59, 64. In other words, Kotanagi's skin contact detection is performed by measuring potential difference, whereas GSR measures resistance.

Fourth, in newly suggesting that a POSITA would have known of circuits to measure ECG using Kotanagi's electrodes, Masimo identifies a "baseline correction circuit" in EX-1061, which purportedly integrates GSR sensing using ECG electrodes "through applying a fixed, known potential difference between the electrodes." Reply, 31. Notably, however, the Petition and the support declaration did not reference any such circuit. Petition, 51-54; EX-1003, ¶¶235-241. This new theory/evidence should therefore be rejected. Even if considered, the cited disclosure describes adapting an electrode used to measure ECG to additionally measure GSR. *See id.* It does not, however, speak to adapting Kotanagi's electrodes, which detect skin contact by determining potential difference between

electrodes, to additionally measure ECG—as Masimo’s combination demands. POR, 68-74. Masimo has also failed to demonstrate how/why any such circuit would be implemented in Kotanagi’s device—which does not have any circuitry for ECG or GSR measurements and instead only performs potential difference-based skin contact detection using its electrodes. *Id.*

Fifth, Masimo additionally relies upon EX-1056 and EX-1057 to suggest that ECG and GSR sensors have common electrodes that can also be used to detect device removal. Reply, 31 (citing EX-1056, ¶19; EX-1057, ¶¶21, 39-41). These disclosures refer to electrodes (which are used to measure ECG/GSR) detecting an open circuit and/or an associated characteristic signal when removed. *See* EX1056, ¶30. In other words, these disclosure do not inform how, if at all, Kotanagi’s electrodes, which detect a potential difference when the device is worn, would be configured for ECG measurements (as Masimo’s combination demands). Thus, even Masimo’s new evidence fails to demonstrate why or how a POSITA would have used Kotanagi’s electrodes for both ECG and potential difference-based contact sensing. Reply, 31.

Sixth, Masimo’s Reply also attempts to suggest that the same electrodes in Choi can be used for ECG and skin contact detection. Reply, 32-34. Again, Choi teaches a wearing detection sensor (which Masimo asserts is akin to skin contact detection) that is separate from Choi’s electrodes/sensor used for ECG

measurement. Masimo does not dispute this. Reply, 32, 34. Moreover, Choi does not explain how the second signal could or would include **both** ECG and impedance. Choi's provided example of using two signals as a second signal includes a sensor for detecting "voice of the user and/or impedance signal." EX1011, ¶52. Choi is otherwise silent on how two different types of electrical signals—e.g., ECG and impedance—could be measured using the same electrodes.

Even assuming *arguendo* Choi's second sensor can detect both ECG and impedance, Choi confirms that the different electrodes/sensor are needed for wearing detection (given its disclosure of a separate wearing detection sensor). POR, 70-72. Even still, Masimo ignores that impedance and potential difference are different measurements, and thus, Choi's wearing detection based on impedance is different from Kotanagi's potential difference-based skin contact detection. EX-1052, 161:9-167:19. So, again, Masimo's reliance on Choi's teachings does not demonstrate why or how a POSITA would have used Kotanagi's electrodes, which measure skin contact based on potential difference measurements, to additionally perform ECG measurements. Reply, 32.

Seventh, Masimo asserts that its analysis is supported by a final office action in a continuation of the '491 Patent, where the Examiner noted that "ECG collection may be implemented via electrodes 7a and 7b of Kotanagi." EX1062, p. 18. This reliance on the office action of a related application is flawed because (1)

it compares the current claims with those of a pending application with different claim scope and (2) omits that the cited portion of the rejection is being evaluated with respect to a different proposed combination of references. Masimo also omits the examiner's express recognition that Kotanagi's electrodes are not used for "obtain[ing] ECG signals" and the examiner's above-cited assertion relies on a different reference's teachings. *Id.*, pp. 17-18. Even still, no final determination has been reached in that application—prosecution is ongoing there, with the applicant having submitted a response on May 17, 2024.

Eight and finally, Masimo also argues that a "POSITA would have known how to: use Kotanagi's existing electrodes to detect skin contact and trigger the ECG; and ***use added electrodes to perform the ECG.***" Reply, 34. As Dr. Duckworth confirmed, Masimo now asserts that Kotanagi's electrodes simply trigger ECG measurements and that other added electrodes—presumably added in view of Choi—would be used to measure ECG. *Id.*; EX-2043, 50:2-52:20. The Petition did not disclose this theory and instead, exclusively focused on using Kotanagi's electrodes (alone or with additional electrodes) for ECG measurements. Petition, 52. Therefore, this new theory should be rejected.

Even if considered, this new theory fails. Masimo mapped the claimed first and second electrodes to only Kotanagi's rear surface electrodes. Petition, 50. Masimo's new theory—that the alleged rear surface electrodes in Kotanagi only

trigger an ECG, which is then measured using different electrodes—does not teach or suggest the claim limitation reciting “*measure[ment]* of an electrocardiogram *using the first and second electrode.*” That’s because, under Masimo’s new theory, the alleged first and second electrodes only trigger ECG measurements but do not measure ECG—which is measured using electrodes other than Kotanagi’s existing electrodes. If, however, Masimo contends that Kotanagi’s electrodes are used for ECG detection and skin contact detection, that theory stands refuted for the reasons described in the POR and as explained above.

At bottom, the record—even when accounting for the Reply’s new evidence and theories—does not teach or suggest that Kotanagi’s electrodes, which are used to detect skin contact based on potential difference measurements, would be configured in view of Choi to additionally perform a different, ECG measurement. Therefore, Masimo has failed to demonstrate that Kotanagi-Honda-Choi would render obvious “an electronic watch configured to measure ECG using the first and second electrodes” “positioned along a rear surface” of the watch, as per the claim.

V. KOTANAGI-HONDA-CHOI DOES NOT RENDER OBVIOUS CLAIMS 13 AND 17

Masimo repeats its analysis for limitations [1h], [1j], and therefore fails to render obvious these claims as described above for those limitations.

VI. CONCLUSION

Apple requests a FWD confirming the Challenged Claims' patentability.

Respectfully submitted,

Date: June 11, 2024

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CERTIFICATION UNDER 37 CFR § 42.24(d)

Under the provisions of 37 CFR § 42.24(d), the undersigned hereby certifies that the word count for the foregoing Patent Owner Sur-Reply totals 5,597, which is less than the 5,600 words allowed under 37 CFR § 42.24(b)(1).

Respectfully submitted,

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CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 42.6(e)(4), the undersigned certifies that on June 11, 2024, a complete and entire copy of this Patent Owner Sur-Reply and Exhibit 2043 were provided via email, to the Petitioner by serving the email correspondence addresses of record as follows:

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