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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.,
Petitioner,

v.

MASIMO CORPORATION,
Patent Owner.

Case IPR2024-00294
U.S. Patent 10,736,507

PATENT OWNER RESPONSE

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2002	March 27, 2024 Expert Declaration of R. James Duckworth, Ph.D.
2003	Commission Opinion (Public), <i>Certain Light-Based Physiological Measurement Devices and Components Thereof</i> , Inv. No. 337-TA-1276, EDIS No. 808521 (ITC Oct. 26, 2023)
2004	Decision Denying Institution of <i>Inter Partes</i> Review, <i>Apple Inc. v. Masimo Corp.</i> , IPR2022-01271, Paper 15 (PTAB Jan. 24, 2023)
2005	Decision Denying Institution of <i>Inter Partes</i> Review, <i>Apple Inc. v. Masimo Corp.</i> , IPR2022-01272, Paper 16 (PTAB Jan. 24, 2023)
2006	Decision Denying Institution of <i>Inter Partes</i> Review, <i>Apple Inc. v. Masimo Corp.</i> , IPR2022-01273, Paper 15 (PTAB Jan. 24, 2023)
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2017	Lex Machina Case Statistics for Judge Colm Connolly, Judge Maryellen Noreika, Judge Richard Andrews, Judge Gregory Williams, and Magistrate Judge Jennifer Hall
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2022	Notice of Refund, <i>Apple Inc. v. Masimo Corp.</i> , IPR2022-1273, Paper 19 (PTAB June 20, 2023)
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2024	Notice of Refund, <i>Apple Inc. v. Masimo Corp.</i> , IPR2022-1275, Paper 19 (PTAB June 26, 2023)

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2028	Correspondence from counsel for Apple to counsel for Masimo regarding Apple's prior art grounds in the Delaware Litigation, dated November 16, 2023
2029	Joint Claim Construction Briefing (August 31, 2023) in <i>Apple Inc. v. Masimo Corp et al.</i> , C.A. 22-1378-MN-JLH
2030	Excerpts of the Transcript of the Deposition of Steven Warren in <i>Apple Inc. v. Masimo Corp et al.</i> , C.A. 22-1378-MN-JLH
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2032	Blood Oxygen App On Apple Watch, Apple (retrieved March 12, 2024)
2033	CC1100 Single Chip Low Cost Low Power RF Transceiver, Texas Instruments (June 20, 2006)
2034	Exhibit D-1 to Apple's June 8, 2023 Initial Invalidity Contentions, <i>Apple Inc. v. Masimo Corp.</i> , No. 22-1378-MN-JLH (D. Del.)
2035	Exhibit D-3 to Apple's June 8, 2023 Initial Invalidity Contentions, <i>Apple Inc. v. Masimo Corp.</i> , No. 22-1378-MN-JLH (D. Del.)
2036	Excerpts of Masimo's June 22, 2023 Responses to Apple Inc.'s Initial Invalidity Contentions, <i>Apple Inc. v. Masimo Corp.</i> , No. 22-1378-MN-JLH (D. Del.)

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2038	Declaration of Bilal Muhsin
2039	Prototype Video (last modified August 31, 2011)
2040	User Interface Summary (last modified August 31, 2011)
2041	<i>Masimo iSpO2™ Pulse Oximeter for iOS Platform (iPhone, iPad & iPod touch) for Consumers to Debut at CES, Jan. 3, 2013,</i> https://investor.masimo.com/news/news-details/2013/Masimo-iSpO2supsup-Pulse-Oximeter-for-iOS-Platform-iPhone-iPad--iPod-touch-for-Consumers-to-Debut-at-CES/default.aspx
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2044	Deposition Transcript of Thomas Kenny, Ph.D.

I. INTRODUCTION

Apple’s Petition arises from parallel litigation with Masimo before the Delaware district court (“Delaware Litigation”). Apple was not, historically, a company that had any involvement in physiological monitoring devices. But, around 2013, Apple decided to enter the field and sought out Masimo for its technology. Despite claiming an interest in integrating Masimo’s technology into Apple products, Apple began poaching Masimo’s employees, one after another. The poached employees included Chief Technical Officer Marcelo Lamago—an inventor of three Masimo patents that Apple was recently found to infringe. Lamago took Masimo’s sensor design knowledge with him to Apple. And in the Delaware Litigation, Masimo accuses Apple’s Watches of infringing Masimo’s patented technology, including key features disclosed and claimed in the ’507 Patent.

The ’507 Patent discloses and claims innovative and nonobvious approaches for the mobile computation and display of measurements of physiological parameters. Masimo’s system and method uses an optical sensor to noninvasively measure the user’s blood. The optical sensor transmits measured data to a processing board that performs advanced signal process to compute measurements of physiological parameters, such as oxygen saturation. The processing board transmits measured data to an application running on a mobile device, which displays the computed measurements via a specific graphical user interface. The

claimed techniques allow users to monitor physiological parameters outside of the hospital setting by connecting the optical sensor and processing board to a smartphone or other mobile device and opening an application. The inventors found that using a dedicated processing board to compute measurements improved the performance of the mobile device, including by freeing up its processor for other uses and decreasing its power consumption, leading to longer battery life.

Apple filed its Petition on the one-year deadline. But the Petition fails to show obviousness for numerous reasons.

Every claim in the '507 Patent requires an optical sensor that outputs, and a processing board that receives, “one or more signals responsive to light.” Apple argues that its primary reference, Mendelson, discloses these limitations. But Masimo’s expert—who co-authored Mendelson—confirms it does not. Instead, Mendelson’s Sensor Module outputs only average PPG samples to the Receiver Module, not data actually acquired with the Sensor Module. Thus, Mendelson does not disclose outputting “one or more signals response to light” under that phrase’s plain meaning. Mendelson also does not meet Apple’s Delaware construction that “one or more signals” means “raw detected signal(s)” because the Sensor Module only outputs information after it has been amplified, filtered, and processed.

Independent Claim 1 of the '507 Patent requires that the claimed processing board “is configured to draw power for operation from the mobile computing

device.” In the Mendelson system, injured persons in dangerous scenarios wear a Sensor Module and a Receiver Module, and each Receiver Module transmits measurements to the PDA carried by a medic. The medic uses their PDA to remotely monitor multiple injured people from a safe distance.

Apple concedes that Mendelson’s fully wireless system does not disclose this limitation. Instead, Apple argues that a POSITA would have been motivated based on D’Angelo to modify Mendelson’s Receiver Module to draw power from the medic’s PDA, so that the PDA could “read out measured physiological data” after the Receiver Module’s battery died. However, D’Angelo is not prior art due to the earlier reduction to practice of at least Claim 1 (and Claim 13). Further, even if D’Angelo were prior art, there are many reasons why a POSITA would not have been motivated to use the medic’s PDA to power and “read out” measured data from one injured person’s Receiver Module after its battery died.

Claims 10-11 add that “the mobile computing device comprises a wearable computing device” (Claim 10) and “the mobile computing device comprises a wristwatch” (Claim 11). And these claims depend from Claim 1, which requires that the processing board “is configured to draw power for operation from the mobile computing device.” Attempting to satisfy these claims, Apple argues that a POSITA would have been motivated to make Mendelson’s PDA into a wristwatch and then

use that PDA-turned-wristwatch to power a Receiver Module after its battery died.

But for several reasons, a POSITA would not have been motivated to do so.

Apple has failed to demonstrate that the asserted references render the challenged claims unpatentable. Masimo, therefore, respectfully requests that the Board affirm the patentability of the challenged claims.

II. MASIMO’S PIONEERING TECHNOLOGY

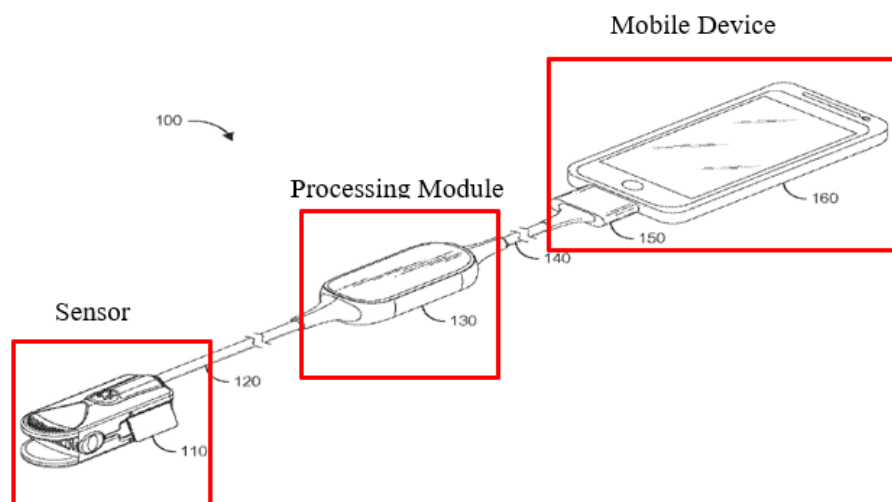
Masimo is the technology leader in the field of noninvasive physiological monitoring. In 1989, Masimo was a small startup operating in an inventor’s condo. Today, Masimo is a publicly traded company employing 6,300 people worldwide with annual revenues exceeding \$1.1 billion. Masimo technology is used in clinical care to monitor over 200 million patients per year. This growth followed Masimo’s development of a range of technologies that revolutionized the field of noninvasive physiological monitoring. Other Masimo patents have withstood extensive attacks, including in litigation through trials, inter-partes reexaminations, an ITC investigation, IPRs, and appeals.¹

¹ See, e.g., *Mallinckrodt, Inc. v. Masimo Corp.*, 147 Fed. Appx. 158, 2005 WL 2139867 at *3 (Fed. Cir. Sept. 7, 2005); *Masimo Corp. v. Philips Elec. N. Am. Corp.*, 2015 WL 2379485 at *1 (D. Del. May 18, 2015); EX2003 (ITC Commission Opinion); EX2004-2009 (PTAB denials of institution for IPR2022-01271-IPR2022-01276); *Masimo Corp. v. Apple Inc.*, 2023 WL 5921622, at *9 (Fed Cir. Sept. 12, 2023); *Apple Inc. v. Masimo Corp.*, 2024 WL 137336, at *1 (Fed. Cir. Jan. 12, 2024); *Apple Inc. v. Masimo Corp.*, 2024 WL 139570, at *1 (Fed. Cir. Jan. 12, 2024).

Prior devices for noninvasively measuring multiple physiological parameters, such as oxygen saturation and pulse rate, suffered a variety of issues that made them unsuitable for use outside of the clinical environment. Such devices lacked mobility, were not easy to use, could not be integrated with popular mobile devices, and suffered issues with battery life. The inventors of the '507 Patent discovered solutions to these problems and sought to protect their inventions, including those recited in the '507 Patent.

A. '507 Patent Overview

The '507 Patent is directed to a patient monitor that connects to mobile devices. EX1001, 1:20-25. In some embodiments, such as FIG. 1A (below), the patient monitor includes three components: (1) an optical sensor that connects to (2) a processing module that then connects to (3) a mobile device.



Id., FIG. 1A, 3:57-62, 4:65-5:14. The optical sensor outputs signals to the processing module, which processes the signals, computes measurement values, and

outputs the measured values to the mobile device. *Id.*, 4:65-5:14. The mobile device contains “software applications for managing the data and sensor.” *Id.*, 10:43-46. These applications can display the measurement values on the mobile device and provide a user interface for interacting with the application. *Id.*, 10:35-46. The ’507 Patent explains that the processing module can comprise one or more processing boards that perform the functions of the module, such as an analog processing board and a digital processing board. *Id.*, FIG. 1C, 9:1-6, 9:62-65.

The inventions claimed in the ’507 Patent provide distinct advantages over the prior art. EX2037 ¶107. As described in the ’507 Patent, “[m]obility and ease of use are key factors in the health care industry because they correlate to efficient, rapid patient care as well as enable patients to participate in their own care.” EX1001, 2:14-16. The claimed inventions allow for accurate measurements of SpO₂ values outside of a hospital environment using a mobile device, in part by using a separate processing board. As the specification explains, a processing board can provide more accurate SpO₂ measurement values to the mobile computing device, compared to using the mobile computing device itself to compute the values. EX2037 ¶107. For example, the specification explains “the board or card can include one or more signal processors and associated memory, I/O, and the like to provide monitored physiological data to applications executing on traditional smartphone processing environments, such that [the] board or card handles advanced

signal processing and the smartphone displays parameter data.” EX1001, 2:29-38; *see id.*, 9:47-65. Using a dedicated processing board also improves power savings and decreases measurement latency when compared to using a processor on a mobile device. *Id.*, 6:38-7:2. This innovative system allows for more comprehensive patient care than was previously available, for example by allowing a patient’s blood oxygenation values to be continuously monitored to identify a risk of hypoxemia prior to a surgery. *Id.*, 2:58-3:5; EX2037 ¶107.

B. Introduction to the Independent Claims

The ’507 Patent has two independent claims—Claims 1 and 13. Claim 1 exemplifies some of the limitations at issue (bolded), and recites:

1. A mobile pulse oximetry system for informing a user of mobile measurement of oxygen saturation (“SpO2”), the mobile pulse oximetry system comprising:

an SpO2 measurement system including:

an optical sensor configured to output one or more signals responsive to light from a light source attenuated by tissue of the user at a measurement site, said one or more signals responsive to an oxygen saturation of said tissue; and

a processing board in data communication with the optical sensor and a mobile computing device including a display and cellular communication, wherein the processing board is **configured to:**

receive said one or more signals from the optical sensor;

process said one or more signals to generate SpO2 measurement values; and

output the SpO2 measurement values to the mobile computing device; and

one or more hardware processors of the mobile computing device configured to execute an application, the application configured to execute commands to:

generate a graphical user interface having a plurality of display portions;

display, in at least one portion of the plurality of display portions, a representation of a physiological parameter of a plurality of physiological parameters comprising at least the SpO2 measurement values; and

display, in a different portion of the plurality of display portions, a plurality of user inputs configured to allow the user to interact with at least one of the plurality of display portions or the application;

wherein the processing of the one or more signals to generate SpO2 measurement values is performed only on the processing board, thereby freeing up memory available to the mobile computing device; and

wherein the processing board is configured to draw power for operation from the mobile computing device.

EX1001, Claim 1.²

III. APPLE’S REFERENCES

A. Mendelson

The primary reference underlying every ground in Apple’s Petition is a publication (“Mendelson”) entitled “A Wearable Reflectance Pulse Oximeter for Remote Physiological Monitoring.” Pet. 1-2. The Mendelson publication was co-authored Dr. Yitzhak Mendelson and Dr. R. James Duckworth (Masimo’s expert),³

² All emphases and annotations are added unless indicated otherwise.

³ Dr. Duckworth explains his opinions that Apple’s Mendelson-based grounds fail to show the unpatentability of any ’507 Patent claim. EX2037.

who were colleagues for several years, as well as one their then-students. EX1011, 1; EX2037 ¶108. Dr. Duckworth worked extensively with Dr. Mendelson to research, publish papers about, design, and make wearable pulse oximetry devices, including the device described in the Mendelson reference asserted by Apple here. EX2037 ¶108.

Mendelson describes a “pulse oximeter for *remote* physiological monitoring” that is “for use in combat casualty care, such as for remote triage, and by first responders, such as firefighters.” EX1011, 1; EX2037 ¶109. The Mendelson system includes three wirelessly connected components: (1) a “Sensor Module” worn by on each injured person’s forehead; (2) a “Receiver Module” worn on each injured person’s body; and (3) one PDA used by a medic to remotely monitor the injured people from a distance. EX1011, 2; EX2037 ¶109. The Sensor Module wirelessly transmits information in packets to the Receiver Module. EX1011, 2; EX2037 ¶109. The Receiver Module uses the received information to calculate the injured person’s oxygen saturation, heart rate, and PPG waveform, and wirelessly sends that information to the PDA, which displays measurements to the medic. EX1011, 2-3; EX2037 ¶109. As Dr. Duckworth explains, providing remote monitoring was a critical requirement for the Mendelson system. EX2037 ¶109. Therefore, he and Dr. Mendelson deliberately designed the parts of the system worn by the injured person(s) to be separate from, and only ever wirelessly connected to, the PDA used

by the medic for “**remote** monitoring.” *Id.* Because remote monitoring was so important, Drs. Mendelson and Duckworth designed the Receiver Modules to connect together via an ad-hoc network. EX1011, 3; EX2037 ¶109. That ad-hoc network ensured the medic’s PDA could “communicate with a remote unit that is beyond the PDA’s wireless range,” thereby allowing the medic to perform remote monitoring from a safe distance, as far as possible from the dangerous field scenarios (e.g., combat, fires) where injured persons were located. EX1011, 3; EX2037 ¶109.

B. D’Angelo

D’Angelo is an IEEE conference paper allegedly “published” in “September 2011.” Pet. 3. D’Angelo, however, *is not prior art.* *Infra* Sections VIII.A-B; EX2037 ¶110.

Setting aside that it is not prior art, D’Angelo describes a data “management device” that continuously collects and stores sensor data on the management device. EX1007, 1-3; EX2037 ¶111. The management device stores sensor data in its local “module[] for ... storage” (i.e., “a microSD card”), and only sends data to the iPhone when the management device and iPhone are physically connected. EX1007, 1-3; EX2037 ¶111. D’Angelo describes that an “iPhone application enables transferring the data stored on the microSD card inside the management device to the iPhone via [the iPhone’s] serial interface.” EX1007, 3; EX2037 ¶111. D’Angelo also states that the charging pin of its management device can be connected to “the [iPhone’s]

power output pin” so that the iPhone can “read out” previously stored data from the management device’s storage module “even when [the management device’s] battery is empty.” EX1007, 3; EX2037 ¶111.

C. Additional References

Apple includes various additional references in its obviousness grounds for the dependent claims of the ’507 Patent. These references include Moon, Goldsmith, Ording, Kianl, and Tran. Pet. 1-2.

IV. LEVEL OF ORDINARY SKILL IN THE ART

A POSITA at the time of the ’507 Patent would have been a person with a working knowledge of physiological monitoring technologies and/or optical sensors used in physiological monitoring technologies. EX2037 ¶36. The person would have had a Bachelor of Science degree in an academic discipline emphasizing the design of electrical, computer, software, or optical technologies, in combination with training or at least one to two years of related work experience with capture and processing of data or information, or designing and using optical sensors or systems, including but not limited to physiological monitoring technologies. *Id.* Alternatively, the person could have had a Master of Science degree in a relevant academic discipline with less than a year of related work experience in the same discipline. *Id.*

Apple proposes a different level of skill that requires no coursework, training, or experience with optics or optical physiological sensors and focuses on general physiological monitoring rather than optical sensors. Pet. 7; EX1003 ¶¶32; EX2037 ¶¶37-38. Indeed, Apple’s definition of the level of skill is flawed because it could be satisfied by a person “who exclusively had experience with invasive physiological monitoring devices.” EX2044, 20:3-9. Masimo’s definition of the level of skill is more accurate. However, Apple does not contend that the level of skill in the art affects the patentability of the challenged claims. Pet. 7; EX1003 ¶¶32-33. Regardless of the level of skill, Masimo agrees that the claims’ patentability is confirmed for at least the reasons set forth below. EX2037 ¶¶38-40.

V. LEGAL STANDARDS

“In an IPR, the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016). The Board is not “free to adopt arguments on behalf of petitioners that could have been, but were not, raised by the petitioner during an IPR.” *In re Magnum Oil Tools, Int’l, Ltd.*, 829 F.3d 1364, 1381 (Fed. Cir. 2016). “The petitioner must instead articulate specific reasoning, based on evidence of record,” as set out in its petition “to support the legal conclusion of obviousness.” *Id.* at 1380. The Board “must base its decision on arguments that

were advanced by a party.” *Id.* at 1381. The Board cannot “decide unpatentability theories never presented by the petitioner.” *Id.*

To prevail on any obviousness ground, a petitioner must show “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-Sys., Inc. v. Illumina Cambridge, Ltd.*, 821 F.3d 1359, 1367-68 (Fed. Cir. 2016) (cleaned up).

A petitioner may not simply identify individual claim components—it must show why a “skilled artisan, with no knowledge of the claimed invention, would have selected these components for combination in the manner claimed.” *In re Kotzab*, 217 F.3d 1365, 1371 (Fed. Cir. 2000). The petitioner must support even simple modifications of a reference with some motivation to make the change. *See In re Gordon*, 733 F.2d 900, 902 (Fed. Cir. 1984).

A petitioner also may not rely on “mere conclusory statements.” *Magnum Oil*, 829 F.3d at 1380. Rather, the petitioner must set forth “some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418-19 (2007) (cleaned up). Similarly, a petitioner cannot simply rely on an expert’s unsubstantiated and conclusory opinions. *See* 37 C.F.R. § 42.65 (“Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little

or no weight.”); *Harmonic*, 815 F.3d at 1363 (affirming petitioner’s failure to establish obviousness where expert testimony “add[ed] nothing beyond the conclusory statements in [the] petition.”).

Moreover, an appropriate obviousness inquiry cannot involve even a “hint of hindsight.” *Star Sci., Inc. v. R.J. Reynolds Tobacco Co.*, 655 F.3d 1364, 1375 (Fed. Cir. 2011). A petitioner may not “simply retrace[] the path of the inventor with hindsight, discount[] the number and complexity of the alternatives, and conclude[] that the invention ... was obvious.” *Ortho-McNeil Pharm., Inc. v. Mylan Labs., Inc.*, 520 F.3d 1358, 1364 (Fed. Cir. 2008). Likewise, “care must be taken to avoid hindsight reconstruction by using the patent in suit as a guide through the maze of prior art references, combining the right references in the right way so as to achieve the result of the claims in suit.” *In re NTP, Inc.*, 654 F.3d 1279, 1299 (Fed. Cir. 2011) (cleaned up).

VI. CLAIM CONSTRUCTION

The Board should give the claims their ordinary and customary meaning, consistent with the specification, as a POSITA would understand them. 37 C.F.R. § 42.100(b); *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005) (*en banc*). Before the district court, Masimo explains that the claims have their plain meaning and thus require no construction. EX2029, 57-84. Masimo takes the same position here. EX2037 ¶¶89-95.

Unlike Masimo, Apple presents inconsistent claim construction positions in the parallel proceedings. Before the district court, Apple argues that the disputed terms require the express, narrow construction that “one or more signals” refers to “raw detected signal(s).” EX2029, 34-40. Apple relies on that narrow construction to argue that the Apple Watch does not infringe. EX2031, 135-137. But here, Apple improperly seeks broader claim scope to support the Petition’s patentability challenges by arguing “no claim terms need be construed.” *Compare id. with* Pet. 3. Specifically, Apple contradicts its district court construction by arguing that Mendelson’s Receiver Module—which does not receive “raw detected signals”—still satisfies the “one or more signals” limitation. *Infra* §VII.B. Apple thus violates the basic tenet of patent law that claims “must be interpreted and given the same meaning for purposes of both validity and infringement analysis.” *Amazon.com, Inc. v. Barnesandnoble.com, Inc.*, 239 F.3d 1343 (Fed. Cir. 2001).

Because Apple takes inconsistent positions on the construction of “one or more signals,” and fails to show unpatentability under any construction, the Petition fails to show the unpatentability of any claim.

First, the Board’s rules “place an affirmative burden on petitioners to ‘set forth: ... how the challenged claim is to be construed.’” *OrthoPediatrics Corp. v. K2M, Inc.*, Case IPR2018-01548, Paper 9, 10 (March 1, 2019) (quoting 37 C.F.R. §

42.104(b)(3)). “This burden continues by requiring petitioners to adequately explain ‘how the construed claim is unpatentable.’” *Id.* (quoting 37 C.F.R. § 42.104(b)(4)).

Apple fails to satisfy these requirements because the Petition never mentions, much less explains, how the prior art allegedly meets *Apple’s* construction that “one or more signals” means “raw detected signal(s).” Pet. §III. And because “one or more signals” is a limitation of every claim, Apple fails to show the unpatentability of any claim. *See, e.g., Hologic, Inc. v. Enzo Life Sciences, Inc.*, IPR2018-00019, Paper 17, 6-9 (PTAB Apr. 18, 2018) (“*Hologic*”) (denying institution for failing to satisfy 37 C.F.R. § 42.104(b)(3)-(4) because while “Petitioner was free to advocate unpatentability under a claim construction it considered to be correct[,] [i]t did not do so.”); *Jiawei Tech. Ltd. v. Simon Nicholas Richmond*, IPR2014-00937, Paper 22, 7-8 (PTAB Dec. 16, 2014).

Second, Apple had “a duty of candor and good faith to the Office.” 37 C.F.R. § 42.11(a). Yet Apple’s Petition never informed the Board about its Delaware claim construction. *See generally* Pet. Apple’s attempt to hide its inconsistent claim construction position from the Board provides an independent reason why the Petition fails to show unpatentability.

Third, in its Petition, Apple could not argue that the claims are unpatentable under its Delaware construction of “one or more signals” because the Petition’s references do not meet Apple’s Delaware construction of that phrase. *Infra* §VII.B.

VII. ALL GROUNDS FAIL TO DEMONSTRATE OBVIOUSNESS

Independent Claim 1 of the '507 Patent recites (a) “an optical sensor” that is “configured to output one or more signals responsive to light” and (b) a “processing board” that is “configured to: receive said one or more signals from the optical sensor.” Similarly, independent Claim 13 recites (a) “outputting, from an optical sensor ... one or more signals responsive to light” and (b) “via a processing board ... receiving said one or more signals from the optical sensor.” Thus, Claims 1 and 13 both require that the “one or more signals” that are (a) “output” from the optical sensor and (b) received by the processing board must be “responsive to light.” EX2037 ¶120.

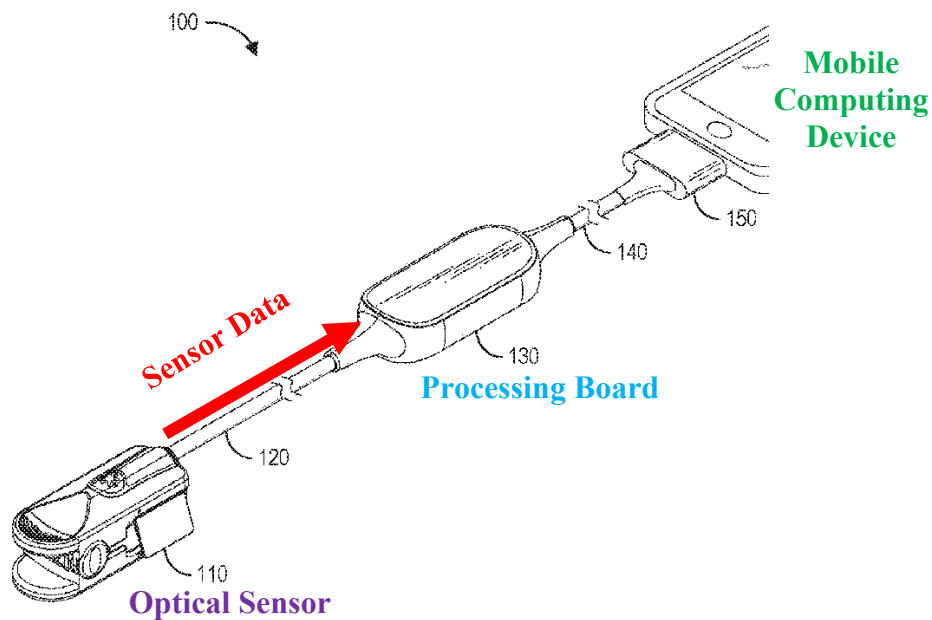
Apple argues that Mendelson teaches these limitations. But Apple’s argument fails because: (1) Mendelson does not disclose an optical sensor outputting, or a processing board receiving, “one or more signals responsive to light” under that phrase’s plain and ordinary meaning; and (2) Mendelson does not meet Apple’s Delaware construction of “one or more signals.”⁴ *Id.* ¶¶120-133.

⁴ Apple’s Petition is based on “[Masimo’s] apparent interpretation of this element [“one or more signals...”] in its exemplary infringement claim charts” from the Delaware Litigation. Pet. 11, 44. Thus, the Board should also consider Apple’s construction from the same case (EX2029, 29-30) that “one or more signals” means “*raw detected signal(s)*.” And under that construction, Apple fails to show unpatentability of any claim. *Infra* §VII.B.

A. **Mendelson Does Not Disclose An Optical Sensor Outputting “One or More Signals Responsive To Light” Or A Processing Board Receiving Those Light “Signals”**

Apple argues that Mendelson’s “Sensor Module” discloses the claimed “optical sensor.” Pet. 10-11, 44. And Apple argues that Mendelson’s “Receiver Module” discloses the claimed “processing board.” *Id.* 12-13, 44-45. Apple also argues that Mendelson discloses outputting and receiving “one or more signals responsive to light” as claimed because Mendelson states that “[t]he information acquired by the Sensor Module is transmitted wirelessly to [the] body-worn Receiver Module” and the Receiver Module ultimately calculates oxygen saturation. *Id.*, 10-11, 44; EX1003 ¶¶53-56. But Apple is wrong. EX2037 ¶122. The information transmitted by Mendelson’s Sensor Module and received by its Receiver Module is not “one or more signals responsive to light” output from the optical sensor, under the plain meaning of that phrase. *Id.* ¶¶122-131.

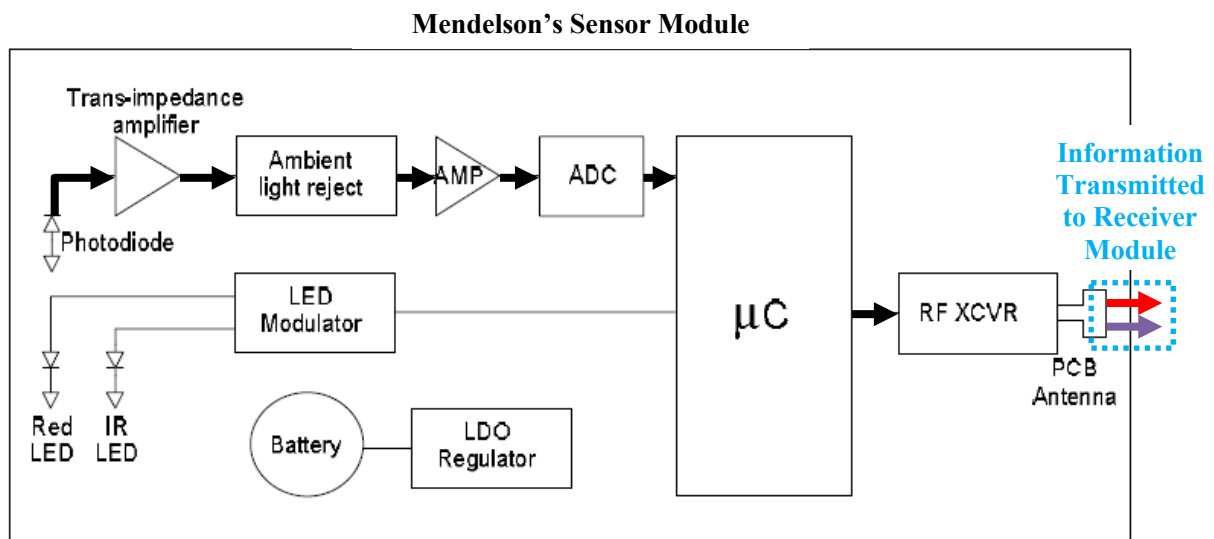
A POSITA would have understood that the plain and ordinary meaning of “one or more signals responsive to light” output by the optical sensor refers to ***data that is actually acquired*** with the optical sensor. EX2037 ¶123. The ’507 Patent’s specification supports this understanding. *Id.* For example, the specification describes the following embodiment of the claimed system that includes an optical sensor 110 connected to a processing board 130 that is connected to a mobile computing device 160.



EX1001, FIG. 1A; EX2037 ¶123. It explains that “the sensor has light emitting diodes (LEDs) that transmit [light] into a tissue site and a detector.” EX1001, 1:28-34; EX2037 ¶124. It also explains that the “sensor 110 provides data in the form of an output signal indicative of ... light” measured from “body tissues....” EX1001, 4:46-51; EX2037 ¶124. That output signal data from the sensor is indicative of measured light because it is light intensity data acquired with the sensor’s detector. EX1001, 1:28-34; 4:46-51; EX2037 ¶124. Specifically, the detector “responds to the intensity” of light by outputting data (an electrical signal) corresponding to the intensity of the light that it measures. EX1001, 1:28-34; 4:46-51; EX2037 ¶124. That “sensor data is transmitted from sensor 110 along the first cable 120 to the processing module 130, which can apply noise filtering and signal processing techniques described below....” EX1001, 4:67-5:4; EX2037 ¶124. Thus, a POSITA

would have understood that the plain meaning of “one or more signals responsive to light” output by the optical sensor and received by the processing board refers to data actually acquired with the optical sensor. EX2037 ¶124. Conversely, the specification never teaches that the optical sensor outputs data that is not measured by the sensor such as averages of acquired data. *Id.*

Mendelson fails to disclose outputting “one or more signals responsive to light,” under the plain meaning of that phrase. EX2037 ¶125. The below diagram of Mendelson’s Sensor Module (the alleged “optical sensor”) illustrates what happens between its photodiode outputting a detected signal (left) and information being transmitted to the Receiver Module (right).



EX1011, 2; EX2037 ¶125. The Sensor Module has a “photodiode” that outputs a signal responsive to the detected light. *Id.* The photodiode signal is amplified

(“Trans-impedance amplifier”), filtered to remove ambient light (“ambient light reject” signal conditioning), amplified again (“AMP”), converted from analog to digital by an “ADC,” and received by a microcontroller (“μC”). *Id.* The microcontroller processes the signal and provides the resulting information to the RF transceiver (“RF XCVR”). *Id.* The RF transceiver then processes that information into packets that are transmitted to, and received by, Mendelson’s Receiver Module. *Id.*

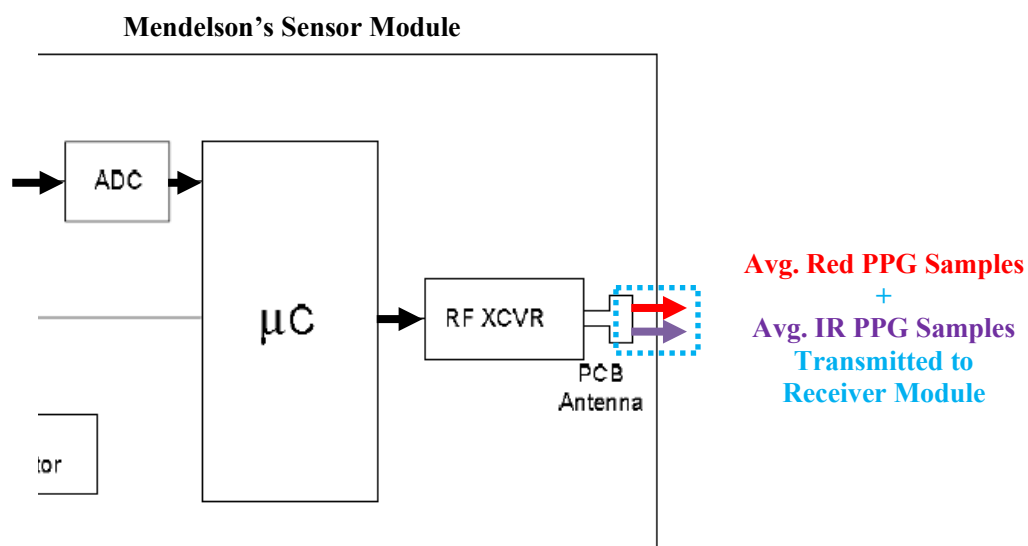
As Dr. Duckworth explains, and a POSITA would have understood, Mendelson’s Sensor Module does not output data actually acquired with the Sensor Module. EX2037 ¶126. Instead, the Sensor Module computes and outputs *average* red and infrared PPG samples to the Receiver Module.⁵ *Id.*

In use, Mendelson’s Sensor Module first turns on the red LED for a short period. *Id.* ¶126; EX1011, 2-3. During that time, the Sensor Module’s microcontroller takes five consecutive samples of red-light intensity using the photodiode. EX2037 ¶126. Those five red light intensity samples are amplified, filtered, amplified, and converted by the Sensor Module’s ADC converter into five red PPG samples. The five red PPG samples are then summed and temporarily stored in the volatile memory of the Sensor Module’s microcontroller. *Id.* Once the

⁵ Dr. Duckworth not only co-authored Mendelson, but was also integrally involved in researching, developing, and building the system it describes. *Supra* §III.A.

red LED turns off, the Sensor Module turns on the infrared LED for the same short period and follows the same process, resulting in five infrared PPG samples that are summed by the microcontroller and temporarily stored in its volatile memory. *Id.*

Next, each set of summed PPG samples is divided by five (the number of samples), resulting in one average red PPG sample and one average infrared PPG sample per cycle. EX2037 ¶127. Only the average red PPG sample and average infrared PPG sample computed by the microcontroller are processed into packets for transmission to the Receiver Module, as shown below.



Id.

This cycle (taking five red PPG samples, summing them, taking five infrared PPG samples, summing them, computing the average red PPG sample and average infrared PPG sample, and processing those two average samples into packets) repeats many times per second (e.g., 80 Hz) while the system is in use. *Id.* The

Sensor Module transmits the average PPG samples to the Receiver Module twice per second (i.e., 2 Hz) as a continuous data stream. EX2037 ¶128. The Receiver Module uses that stream of average red and infrared PPG samples (i.e., the “information acquired by the Sensor Module”) to construct the red and infrared “PPG signals” that it uses to “compute SpO₂ and HR.” *Id.*; EX1011, 2.

Accordingly, **average** red and infrared PPG samples are the only information that Mendelson’s Sensor Module outputs to its Receiver Module. EX2037 ¶129. And those output average PPG samples are **not** data actually acquired with the optical sensor. *Id.* Instead, they are values computed using acquired data. *Id.* Thus, a POSITA would have understood that Mendelson does not disclose an optical sensor outputting, or processing board receiving, “one or more signals responsive to light” under the plain meaning of that phrase. *Id.* Neither Apple nor its expert suggest modifying Mendelson to send any other data. And neither presents any reason to make such a modification.

Rather, Apple relies on the “information” transmitted from Mendelson’s Sensor Module to its Receiver Module. Pet. 10-11, 44. Apple and its expert never address, much less show, what happens to the Sensor Module’s photodiode signal before any “information” is sent to the Receiver Module. *See generally* Pet.; EX1003. Despite conceding that the Sensor Module has “signal processing circuitry” (Pet. 6), Apple ignores that circuitry and its microcontroller. Pet. 10-11,

44. That microcontroller results in the Sensor Module outputting average PPG samples to the Receiver Module, not any data actually acquired from using the sensor, as explained above. EX2037 ¶130. Thus, Apple fails to show that Mendelson discloses these limitations. Instead, Apple merely assumes the “information” transmitted by the Sensor Module must be the claimed “one or more signals responsive to light.” *Id.* But Apple’s assumption defies the actual operation of Mendelson and reveals the hindsight underlying Apple’s argument. *Id.*

Apple also ignores the inconsistency between the opinions of its expert here and its expert in the Delaware Litigation. Apple’s expert in Delaware opines that the signal from a photodiode is no longer the claimed “one or more signals” once it is “converted, amplified, filtered, or otherwise processed.” EX2031 ¶340; *see id.* ¶344 (arguing the claims require that “the signals output from the optical sensor to the processing board ... must be unprocessed”). But Apple’s expert in this IPR “did not apply” Apple’s Delaware construction of “one or more signals” because he “didn’t ask for or know about” that construction at the time of his report. EX2044, 32:8-18. Instead, Apple’s expert here opines that Mendelson discloses the claimed “one or more signals,” EX1003 ¶¶53-56, despite admitting that the Sensor Module converts, amplifies, filters, and processes the photodiode signal before outputting any information. EX2044, 70:6-19; EX1011, 2-3; EX2037 ¶131. The conflicting testimony of Apple’s experts on this point demonstrates that Mendelson does not

actually disclose an optical sensor that outputs, or a processing board that receives, “one or more signals responsive to light” as Claims 1 and 13 require. EX2037 ¶131.

B. Mendelson Does Not Disclose “One Or More Signals” Under Apple’s Delaware Construction

Apple had the burden to show how the prior art allegedly meets Apple’s own construction of “one or more signals,” but failed to do so. *Supra* §VI. Apple could not argue unpatentability under its Delaware construction because the Petition’s only art for this feature, Mendelson, does not meet that construction. EX2037 ¶¶132-133.

Apple argues in the Delaware Litigation that the claimed “one or more signals” means “raw detected signal(s)” from the optical sensor. EX2029, 34-40 (“the detected signals received by the processing board—which are the same detected signals output from the optical sensor as evidenced by ‘said one or more signals’—are the unprocessed signals (i.e., raw signals).”). Apple further argues that a POSITA would have understood that “one or more signals” does not refer to “signals that had been converted, amplified, filtered, or otherwise processed” before being received by the processing board. EX2031 ¶¶340-341. Based on its construction, Apple argues in Delaware that its Apple Watches do not infringe because the signals received by their processing board are not the “raw” and “unprocessed” signals that are “‘detected’ by the photodetectors.” *Id.* ¶344.

Here, however, Apple argues that Mendelson satisfies the “one or more signals” limitations of Claims 1 and 13. Pet. 10-11, 44. But Mendelson’s Sensor

Module does not output raw detected signals to the Receiver Module. EX2037 ¶131. Rather, the Sensor Module converts, amplifies, filters, and processes its photodiode signal into average PPG samples that are the only information output to the Receiver Module, as explained above. *Id.*; *supra* §VII.A. Apple fails to show the unpatentability of any claim because Mendelson does not disclose “one or more signals” under Apple’s construction of that phrase. EX2037 ¶133. Apple also fails to show that any claim is unpatentable because Apple could not, and did not, challenge the claims under the construction of “one or more signals” that Apple considers correct. *Hologic*, 8-9.

VIII. EVERY GROUND BASED ON D’ANGELO FAILS TO DEMONSTRATE OBVIOUSNESS

Claim 1 recites that the claimed processing board “is configured to draw power for operation from the mobile computing device.” Apple does not argue that Mendelson teaches this limitation of Claim 1. Pet. 37-43. Instead, Apple relies on D’Angelo (in Grounds 1D and 2D) as allegedly teaching this limitation. *Id.* Apple also argues a POSITA would have modified Mendelson based on D’Angelo to satisfy this limitation of Claim 1. *Id.* But D’Angelo is not prior art. EX2037 ¶¶135-140. And Apple fails to show that a POSITA would have been motivated to modify Mendelson based on D’Angelo as proposed. *Id.* ¶141.

Accordingly, for at least these reasons, Apple has not met its burden of demonstrating that Grounds 1D and 2D render obvious Claim 1 or any other claim.

And for at least the same reasons, Apple’s grounds relying on D’Angelo to challenge Claim 1’s dependent claims (Grounds 1E-1I, 2E-2I) fail to demonstrate obviousness.

A. Apple Fails To Show That D’Angelo Is Prior Art

Apple argues that D’Angelo, an IEEE paper, is pre-AIA § 102(b) prior art. Pet. 2-3. Apple thus had the burden to show that D’Angelo is a § 102(b) prior art printed publication. *See, e.g., Hamamatsu Photonics K.K. v. SEMICAPS Pte Ltd.*, No. IPR2017-02110, 2019 WL 1292463, at *14 (PTAB Mar. 18, 2019).

Whether a document is a prior art printed publication is determined on a case-by-case basis. *In re Klopfenstein*, 380 F.3d 1345, 1350 (Fed. Cir. 2004). “The key inquiry is whether the reference was made sufficiently accessible to the public interested in the art before the critical date.” *Hamamatsu*, 2019 WL 1292463, at *14 (cleaned up). “A given reference is ‘publicly accessible’ upon a satisfactory showing that such document has been disseminated or otherwise made available to the extent that persons interested and ordinarily skilled in the subject matter or art exercising reasonable diligence, can locate it.” *SRI Int’l., Inc. v. Internet Sec. Sys., Inc.*, 511 F.3d 1186, 1194 (Fed. Cir. 2008).

Apple concedes that September 20, 2012 is the effective filing date of the ’507 Patent. *See, e.g.,* Pet. 57 (“By the 2012 priority date of the ’507 patent....”); EX1003 ¶27 (applying “September 20, 2012” as “the Critical Date”). Thus, for D’Angelo to be a § 102(b) publication as alleged, it was Apple’s burden to show that D’Angelo

was publicly accessible more than a year earlier (i.e., before September 20, 2011).

But Apple fails to meet its burden to show that D’Angelo is § 102(b) art.

D’Angelo was not publicly accessible until ***December 1, 2011***. As the Board has recognized, based on the testimony of the Senior Director of Publishing Technologies for IEEE, “it is regular practice by IEEE to publish articles and make them available ***on the IEEE Xplore web site.***” *Smart Microwave Sensors GmbH v. Wavetronix LLC*, 2017 WL 3034507, at *12 (PTAB July 17, 2017). And consistent with this regular practice, D’Angelo was not published until it was “added to IEEE Xplore” on ***December 1, 2011***:

Date Added to IEEE Xplore: 01 December 2011
--

EX2043. Apple never informed the Board of the IEEE’s “regular practice” of publishing articles on IEEE Xplore and never provided the Board with the IEEE Xplore webpage for D’Angelo. IEEE Xplore shows that D’Angelo was published on December 1, 2011, less than one year before the ’507 Patent’s effective date. *Id.*; EX2037 ¶138. Thus, Apple fails to show that D’Angelo is § 102(b) prior art. EX2037 ¶138; *see, e.g., Hamamatsu*, 2019 WL 1292463, at *16 (relying on date added to IEEE Xplore webpage in finding reference was not prior art); *Smart*, 2017 WL 3034507, at *12-13 (finding failure to establish references were prior art where petitioner never showed date added to IEEE Xplore).

Apple and its declarants ignore D'Angelo's December 2011 publication date on IEEE Xplore and fail to show any particular date when D'Angelo became publicly available. As explained below, Apple submits nothing in its Petition or the various statements of its declarants that meets its burden to show that D'Angelo was publicly accessible before September 20, 2011.

First, in its Petition, Apple never even identifies, much less shows, the specific date that Apple alleges D'Angelo became publicly accessible. Pet. 2-3. Apple merely asserts that D'Angelo is § 102(b) art as of "September 2011," but not any specific date. *Id.* Thus, on its face, the Petition fails to show that D'Angelo is § 102(b) prior art because Apple does not even contend that D'Angelo was published or publicly accessible before September 20, 2011.

Apple also merely speculates that "D'Angelo was made publicly available and interested persons would have been able to locate D'Angelo *on or shortly after* its presentation at the August 30th to September 3rd, 2011 IEEE EMBS Annual International Conference." *Id.*, 2. But Apple never explains what "on or shortly after" means, and never actually shows that D'Angelo was publicly accessible before September 20, 2011. *Id.*

Second, Apple relies on the declaration of a former librarian, Munford (Pet. 2 (citing EX1012 ¶¶22, 7-10, 12-13, 16-20)), but Munford provides no evidence that D'Angelo was publicly available before September 20, 2011. Munford, like Apple,

never identifies a specific date when D’Angelo allegedly became publicly available. *See generally* EX1012. Munford does not even contend that she attended the 2011 IEEE EMBS conference where D’Angelo was allegedly presented—she lacks personal knowledge of what occurred there. *Id.* Thus, Munford merely speculates that D’Angelo “was presented at the 2011 [conference]” and “first made available to the public at the 2011 IEEE EMBS [conference].” *Id.* ¶¶22, 17. But Munford’s speculation also fails to show that D’Angelo was made publicly accessible at the conference she never attended. *See, e.g., Smart Microwave*, 2017 WL 3034507, at *12 (rejecting testimony about whether copies of paper were provided at conference by declarant who did not attend).

Munford further speculates that D’Angelo was made publicly accessible “*shortly after*” the 2011 IEEE EMBS conference through the conference proceedings held by the libraries of (1) Ohio State University, (2) Syracuse University, and (3) the University of Michigan. EX1012 ¶22; *see id.* ¶¶7-10. But Munford never explains what date “shortly after” means, and never shows that D’Angelo was made publicly accessible through any university library before September 20, 2011. *See generally id.* Munford relies on “MARC records” to show that in 2005, these libraries began obtaining the annual edition of Proceedings of the IEEE EMBS Annual International Conference. *Id.* ¶¶18-20 (citing Appxs. OSU01, SU01, UOFM01). But Munford identifies nothing showing *when* each library

obtained the edition of the proceedings (of the 33rd (i.e., 2011) IEEE EMBS conference) that allegedly contained D'Angelo.

Munford also provides no evidence showing *when* D'Angelo or the associated conference proceedings were first made publicly accessible by any of the three libraries she relies upon. Instead, Munford vaguely asserts that after 2005, the libraries “continued to acquire new editions [of IEEE EMBS conference proceedings] *in perpetuity*.” *Id.* ¶¶18-20. But that shows nothing about when these libraries made D'Angelo, or the conference proceedings allegedly containing it, publicly accessible, much less that either event happened before September 20, 2011. Munford's declaration therefore falls far short of establishing that D'Angelo was made publicly accessible before September 20, 2011, either at the 2011 IEEE EMBS conference or via the conference proceedings.

Munford also states that a July 2011 webpage shows the 2011 IEEE EMBS conference “is being advertised to take place from August 30 – September 3, 2011.” *Id.* ¶17 (citing Appx. DANGELO02). But that information is merely duplicative what is stated in D'Angelo, namely that a conference occurred over those dates. EX1007, 1. The webpage fails to show that D'Angelo was publicly accessible before September 20, 2011.

Third, Apple relies on the declaration of its expert Dr. Kenny (Pet. 2 (citing EX1003 ¶114)), but Kenny provides no evidence that D'Angelo could be or was

obtained before September 20, 2011. Kenny, like Apple and Munford, never identifies a specific date when D'Angelo allegedly became publicly available. EX1003 ¶114. And Kenny, like Munford, never attended the 2011 IEEE EMBS conference and thus lacks personal knowledge of what occurred there. *Id.*; EX2044; 38:8-18. Kenny, in his declaration and deposition, merely discussed IEEE conferences generally, speculating that, at some unspecified point, "IEEE members would have had access to the archives of the proceeding papers." EX1003 ¶114; EX2044, 38:19-45:18. But Kenny never identifies a date *when* D'Angelo (or the proceedings containing it) might have become publicly accessible. *Id.* Kenny also stated that IEEE conference proceedings are usually made accessible to the public sometime "*after* the event of the conference itself." EX2044, 45:19-47:10.

In sum, for at least these reasons, Apple fails to show D'Angelo was publicly available before September 20, 2011 and thus fails to show it is § 102(b) prior art.

B. D'Angelo Is Not Prior Art

D'Angelo became publicly available on December 1, 2011, *less than one year* before the '507 Patent's effective filing date. *Supra* §VIII.A. Thus, D'Angelo is not § 102(b) prior art. At most, D'Angelo might qualify as § 102(a) art. But, here, the claimed inventions were reduced to practice before the reference date of D'Angelo. And indeed, the inventions recited in the independent Claims 1 and 13 were reduced

to practice by August 31, 2011. EX2037 ¶¶41-88. Thus, D’Angelo, which published months later in December 2011, is also not § 102(a) prior art.

Accordingly, D’Angelo is not prior art. Because Apple’s Grounds 1D and 2D rely on D’Angelo (Pet. 1-2), both grounds of unpatentability fail.⁶

C. **A POSITA Would Not Have Been Motivated To Modify Mendelson In View Of D’Angelo To Make Mendelson’s Receiver Module Draw Power From The PDA**

As Apple concedes, Mendelson’s Receiver Module does not draw power from its PDA. Pet. 37-43. Because Mendelson lacks this limitation of Claim 1, Apple seeks to “apply D’Angelo to Mendelson ... to configure Mendelson’s Receiver Module to draw power from the PDA/smartphone.” *Id.*, 40-43. Apple alleges a single motivation for its proposed modification. Namely, Apple argues that modifying Mendelson’s Receiver Module to draw power from the PDA “would have allowed the PDA/smartphone *‘to read out the’ measured physiological data ‘even when its battery is empty.’*” Pet. 42 (quoting EX1007, 1530). At his deposition, Apple’s expert stated his opinion is that a POSITA “would consider modifying Mendelson so that the power connection from the PDA to the Receiver Module could allow download of physiological data,” including both (1) “the current flow of data” and (2) “data that’s been stored.” EX2044, 55:12-20. But even if D’Angelo

⁶ Apple’s other grounds relying on D’Angelo fail for at least the same reason. Pet. 1-2.

were prior art, there are numerous reasons why a POSITA would not have been motivated to modify Mendelson as Apple proposes. EX2037 ¶¶141-156.

First, modifying Mendelson’s Receiver Module to draw power from the PDA to read out “the current flow of data” (i.e., ongoing/new measurements) after the Receiver Module’s battery had died, which Apple calls “crucial backup functionality,” would defeat Mendelson’s intended purpose. Mendelson’s system was expressly intended “for use in combat casualty care, such as for *remote triage*, and by first responders, such as firefighters.” EX1011, 1; EX2037 ¶142. Because such scenarios are “harsh and hazardous,” a “primary goal” of Mendelson’s design is “readily allowing the *telemetry of physiological information to medical providers*” located remotely, such as “far-forward medics.” EX1011, 1; EX2037 ¶142. Mendelson’s system was thus intended “to determine a casualty’s condition *remotely without exposing the first responders to increased risks.*” *Id.* Thus, a critical intended purpose of Mendelson’s system is keeping the medic using it out of harm’s way by allowing them to *remotely* monitor injured people. *Id.* This overarching intended purpose is confirmed by Mendelson’s title—“A Wearable Reflectance Pulse Oximeter *for Remote* Physiological Monitoring.” *Id.* Indeed, Dr. Duckworth explains that he and his colleagues specifically designed Mendelson’s system to achieve a primary and fundamental intended purpose—*remote* monitoring. EX2037 ¶142. Apple’s expert likewise admits that remote monitoring

is a “priority” and “important” purpose of Mendelson’s system. EX2044, 64:10-22; EX2037 ¶142.

To accomplish its intended remote monitoring purpose, a critical aspect of Mendelson’s design is that the “body-worn Receiver Module” worn by injured persons transmits physiological measurements “*wirelessly* to a PDA” that is “carried by medics or first responders.” EX1011, 2-4; EX2037 ¶143. Mendelson continues that the system’s “PDA-based wireless system architecture ... allows the PDA to communicate with a [Receiver Module] that is beyond the PDA’s wireless range” because Receiver Modules can be wirelessly connected in an “ad-hoc network.” EX1011, 3; EX2037 ¶143. And because of this wireless connectivity of the Receiver Modules and the PDA, Mendelson’s system kept “far-forward medics” out of harm’s way. EX1011, 1, 3; EX2037 ¶143. Indeed, to achieve the system’s remote monitoring purpose, Dr. Duckworth explains that he and his colleagues specifically designed the Receiver Module to be a battery-powered device that connects *wirelessly* to the medic’s PDA. EX2037 ¶143.

Apple’s proposed modification, using the PDA to provide power to Mendelson’s Receiver Module, would require the medic carrying the PDA to enter the dangerous scenario and be co-located with the casualty. EX2044, 66:1-7; EX2037 ¶144. Thus, Apple’s proposed modification would defeat Mendelson’s intended purpose of providing “remote monitoring” without “exposing the first

responders to increased risks.” EX2037 ¶144. Indeed, as Dr. Duckworth explains, Apple’s proposed modification would defeat the intended remote monitoring purpose of Mendelson’s system during any time the medic had to use their PDA to provide backup power to the Receiver Module at the casualty. *Id.*

Because Apple’s proposed modification would defeat Mendelson’s intended purpose, a POSITA would not have been motivated to modify Mendelson as Apple proposes. EX2037 ¶145. Indeed, defeating the intended purpose of Mendelson confirms the lack of a motivation to modify Mendelson’s Receiver to draw power from the PDA. *See, e.g., Adidas AG v. Nike, Inc.*, 963 F.3d 1355, 1359 (Fed. Cir. 2020) (affirming Board finding no motivation to combine where doing so would render primary reference “inoperable for its intended purpose”); *Polaris Indus. v. Arctic Cat, Inc.*, 882 F.3d 1056, 1069 (Fed. Cir. 2018) (finding error in the Board’s failure to consider evidence that a proposed combination would result in a modification “which would run contrary to one of [the reference’s] stated purposes”); *Pollard Banknote Ltd. v. Nanografix Corp.*, 2020 WL 96682, at *6-8 (PTAB Jan. 8, 2020) (finding failure to show motivation where combination would defeat intended purpose of combination reference). And Apple’s insistence that providing backup power would have motivated its proposed modification, despite that modification defeating Mendelson’s intended purpose, reveals the impermissible hindsight underlying Apple’s grounds. EX2037 ¶145.

Further, Apple’s proposed modification assumes that the medic would use the PDA to power the Receiver Module attached to an injured person, upon reaching that person in the field. Pet. 42; EX2037 ¶146. But Apple is wrong. A POSITA would have understood that if the medic went to the injured person, he or she would not have used Mendelson’s PDA to power the Receiver Module because there would no longer be a need to remotely monitor that person. EX2037 ¶146. Instead, the medic would have directly monitored the person right in front of them using typical medical equipment such as a finger-clip pulse oximeter or stethoscope, and applied the emergency medical care deemed necessary. *Id.* And if the person’s injuries warranted monitoring after their treatment, the medic would not have stayed with the person to power their Receiver Module with the medic’s PDA. *Id.* Instead, the medic would have simply replaced the Receiver Module’s AA batteries, allowing the medic to quickly resume remote monitoring of the field. *Id.*

Second, modifying Mendelson’s Receiver Module to draw power from the PDA as proposed would not have allowed the PDA to read out “data that’s been stored” (i.e., previously measured physiological data) even after the Receiver Module’s battery had died. EX2037 ¶147. Apple relies on D’Angelo for providing the motivation to use Mendelson’s PDA to power the separate device (Receiver Module) so that measured data can be “read out” from the separate device after its battery has died. Pet. 42; EX2037 ¶149. But Apple ignores that D’Angelo’s system

could only perform that functionality because measured data was “*stored on the microSD card*” inside the management device.” EX1007, 2-3; EX2044, 57:3-18; EX2037 ¶149. And unlike D’Angelo, Mendelson’s Receiver Module did not have a microSD card or other non-volatile storage device from which measured data could be “read out” after its battery died, as explained below. EX1011; EX2044, 58:8-11, 59:14-18; EX2037 ¶149. Thus, a POSITA would have understood that D’Angelo’s approach to “reading out” stored data would not work in Mendelson’s system. EX2037 ¶149. And Apple proposes no modification to address this key difference.

Mendelson does not disclose that its Receiver Module stores measurements or even has any storage device from which the PDA could read out measurements after the Receiver Module’s battery died. EX1011, 2-3; EX2037 ¶147. Apple does not even argue otherwise. Pet. 42; EX1003 ¶124. And Dr. Duckworth, the co-author of Mendelson and co-creator of its system, confirms that the Receiver Module does not store measurements that could be “read out” after its battery died, even if the Receiver Module was subsequently powered. EX1011, 2-3; EX2037 ¶147. Thus, a POSITA would have understood there was no “measured physiological data” to “read out” from the Receiver Module after its battery died. EX2037 ¶147.

There was no measured physiological data to read out of Mendelson’s Receiver Module after its battery died because Mendelson’s system relies exclusively on the PDA to store such data. Specifically, rather than store information

from the Sensor Module, the Receiver Module “synchronously” uses it to generate the PPG signals that are then used to “compute SpO2 and HR values.” EX1011, 2; EX2037 ¶148. And rather than store those signals and values, the Receiver Module outputs them as a continuous “stream of data” to the “PDA carried by medics or first responders” to enable real-time remote monitoring. EX1011, 3-4; EX2037 ¶148. Indeed, Mendelson’s system used the PDA to “store vital medical information received from the wearable unit,” i.e., the Receiver Module. EX1011, 3-4; EX2037 ¶148. And that data could be “downloaded or streamed” from the PDA’s storage “to a remote base station.” EX1011, 3-4; EX2037 ¶148. Because Mendelson’s system stored its data solely on the PDA, a POSITA would have understood that there was no “measured physiological data” to “read out” from the Receiver Module after its battery died. EX2037 ¶148.

Accordingly, a POSITA would not have been motivated to modify Mendelson’s Receiver Module to draw power from the PDA as proposed because doing so would not allow the PDA to “read out” the previously “measured physiological data” after the Receiver Module’s battery died. EX2037 ¶150. And for the same reason, a POSITA would not have reasonably expected Apple’s proposed modification to succeed. *Id.* Apple’s insistence that “reading out” measured data from the Receiver Module after its battery died would have motivated the modification, despite that being impossible because the Receiver Module has no

stored data to read out, reveals the impermissible hindsight underlying its grounds.

Id.

Third, using the PDA to read out measured data from one Receiver Module as Apple proposes would have eliminated intended functionality of Mendelson’s design. Mendelson explains that its system’s wireless design ensures “[t]he PDA can monitor multiple wearable pulse oximeters simultaneously and allows medics to [remotely] collect vital physiological information” from each injured person in the field. EX1011, 2; EX2037 ¶151. However, Apple’s proposed modification requires using the PDA to read out data from the single Receiver Module to which it was connected. Pet. 42 (proposing to modify Receiver Module so that PDA could “read out the measured physiological data [from the connected Receiver Module] even when its battery is empty”); EX2044, 55:12-20 (“I think a [POSITA] would consider modifying Mendelson so that the power connection from the PDA to the Receiver Module could allow download of physiological data [to the PDA].”). A POSITA would have understood that the medic was not using the PDA as intended (i.e., monitoring “**multiple**” injured people at the same time) whenever the medic had to use the PDA to read out **one** injured person’s Receiver Module, as Apple proposes. EX2037 ¶151. Accordingly, a POSITA would not have been motivated to modify Mendelson as proposed because doing so would eliminate functionality that Mendelson’s system was intended to provide. *Id.*

Fourth, Apple fails to show that providing battery “backup functionality” would have motivated a POSITA to modify Mendelson’s Receiver Module. EX2037 ¶152. As discussed, Mendelson’s system was designed for remotely monitoring emergency events that are relatively short in duration, including combat casualty care and triage. And Mendelson’s Sensor and Receiver Modules already include batteries that provide ample power for their intended use. For example, Mendelson states that the Sensor Module is powered by a “CR2032 type coin cell battery ... providing at least 5 days of operation.” EX1011, 2; EX2037 ¶152. And Dr. Duckworth confirms that Mendelson’s Receiver Module uses two AA batteries, which provides a similar number of days of operation. EX1011, 2; EX2037 ¶152. Thus, given that Mendelson’s system was already amply powered for its intended use in limited duration emergency events, a POSITA would not have been motivated to modify Mendelson’s Receiver Module so that the PDA could be used to provide backup power. EX2037 ¶152. Rather, a POSITA would have understood that using the PDA to provide backup power would be redundant of the ample power supply already included in the Receiver Module itself. *Id.*

Moreover, a POSITA would have recognized that simply replacing the dead AA batteries with new ones was a much easier, cheaper, and faster solution. EX2037 ¶153. A POSITA would not have modified Mendelson’s PDA and Receiver Module as Apple proposes to have the ability to provide backup power

when the backup power solution was as easy as replacing two AA batteries. *Id.* And a POSITA would have recognized that, unlike Apple’s modification, replacing the AA batteries would have allowed the medic to immediately resume the remote monitoring functionality that Mendelson’s system was specifically intended to provide. *Id.*

Fifth, a POSITA would not have used the PDA to power a Receiver Module because doing so would drain the PDA’s battery more quickly. EX2037 ¶154. A POSITA would not have used the PDA to power a Receiver Module because the PDA is the central node for the system—without it, the system provides no monitoring functionality at all. EX1011, 2-3; EX2037 ¶154. Indeed, a POSITA would have understood that Mendelson is a “PDA-based wireless system” that displays nothing and provides no monitoring functionality if the PDA’s battery is dead. *Id.* Because the system would be unusable if the PDA’s battery died, a POSITA would not have risked depleting the PDA’s battery to power only one Receiver Module, in a system that could include many such Receiver Modules. EX2037 ¶154. Instead, a POSITA would have preserved the battery of the PDA and powered a dead Receiver Module by simply replacing its AA batteries, as explained above. *Id.*

Sixth, implementing Apple’s proposed modification would have required adding components to Mendelson’s Receiver Module, such as a voltage converter

and external power connector, to allow it to be powered by the PDA. EX2047 ¶155. Mendelson’s Receiver Module does not have such components because it already has a power source and was specifically designed to be a “compact, low-power, small-size, light- weight, [] unobtrusive” and “cost-effective” system. EX1011, 1-2; EX2037 ¶155. Thus, Apple’s proposed modification would have run contrary to Mendelson’s design by adding components that make its Receiver Module larger, heavier, and more expensive to produce. EX2037 ¶155. And the impact of these negative changes (increased size, weight, and cost) would have been magnified in the typical use of Mendelson’s system because the system was designed to be used with not just one, but multiple Receiver Modules. *Id.*; EX1011, 1, 4. Accordingly, these considerations would have dissuaded a POSITA from modifying Mendelson’s Receiver Module as proposed. *Id.*

Seventh, Apple’s expert revealed at his deposition that his obviousness opinion for modifying Mendelson’s Receiver Module to draw backup power from the PDA is based on what a POSITA “might” or “would consider” doing, or what “could be useful.” *See, e.g.*, EX2044, 49:4-14 (“a person of ordinary skill in the art would consider” modifying the Receiver Module to draw power from the PDA), 49:15-50:4 (same), 50:5-51:1 (same), 55:12-20 (same), 55:5-11 (“It could be useful to read out previously captured and stored data, as well as whatever the current measurements are [].”), 61:5-17 (a POSITA “might consider some of the choice

Mendelson made in 2006, and perhaps substitute a microcontroller for a slightly more modern microcontroller”); EX2037 ¶156. But the obviousness inquiry asks what a POSITA *would have been motivated* to do, not merely what might or “could” be done. *Adidas AG v. Nike, Inc.*, 963 F.3d 1355, 1359 (Fed. Cir. 2020). Because it’s expert’s tentative and speculative opinion does not address what a POSITA *would* have been motivated to do, Apple fails to show obviousness. EX2037 ¶156.

Accordingly, the sole reason advanced by Apple—providing backup power—would not have motivated a POSITA to modify Mendelson’s Receiver Module to draw power from Mendelson’s PDA. EX2037 ¶157. For at least the above reasons, a POSITA would not have been motivated to modify Mendelson’s Receiver Module to draw backup (or any) power from the PDA. *Id.*

IX. APPLE’S OTHER GROUNDS FAIL TO SHOW UNPATENTABILITY FOR ANY DEPENDENT CLAIM

All of Apple’s Grounds include unpatentability arguments for dependent claims, and Grounds 1B-1C, 1E-1I, 2B-2C, and 2E-2I argue obviousness for dependent claims only. Pet. 1-2. But Apple fails to demonstrate that the cited references, alone or in combination, disclose or render obvious the associated independent claims, Claims 1 and 13. *Supra* §§VII-VIII. Accordingly, for at least the reasons explained above, Apple’s Grounds fail to show to show unpatentability of any dependent claim. EX2037 ¶158.

X. GROUNDS 1I AND 2I FAIL TO DEMONSTRATE OBVIOUSNESS

Claim 1 recites that “the processing board is configured to draw power for operation from the mobile computing device.” Claims 10 and 11 depend from Claim 1 and add that “the mobile computing device comprises a wearable computing device” (Claim 10) and “the mobile computing device comprises a wristwatch.”

Apple argues that a POSITA would have been motivated to modify the Mendelson-D’Angelo combination based on Goldsmith by making the alleged “display device,” Mendelson’s PDA, into a wristwatch. Pet. 62-64; EX2044, 75:7-76:1 (“I think the proposed combination contemplates replacing the PDA with a wristwatch.... [You] might even still call it a PDA, but it would have the form, shape of a wristwatch.”). Apple alleges four motivations for its proposed modification: (1) “increas[ing] the portability of the display device”; (2) “free[ing] up the user’s hands for other tasks”; (3) “increas[ing] the ease of user” by not having “to retrieve the display device from a pocket, backpack, or bag”; and (4) “provid[ing] additional functionality to devices already owned by users.” *Id.* Apple fails to show obviousness of Claims 10-11 for at least the reasons set forth above for Claim 1. Apple also fails to show obviousness of Claims 10-11 because a POSITA would not have been motivated to make Mendelson’s PDA into a wearable “wristwatch.” EX2037 ¶¶160-165.

Apple’s proposed modification ignores the intended purpose of the PDA in Mendelson’s system. As explained above, Mendelson’s system is expressly intended for “remote monitoring” of injured persons in dangerous and hazardous environments. EX1011, 1; EX2037 ¶161. And to accomplish its remote monitoring purpose, Mendelson is a “PDA-based” system that uses its “wireless communication capabilities to transfer SpO₂, HR, body acceleration, and posture information” from the Receiver Module worn by injured persons “to a PDA carried by medics or first responders.” EX1011, 3-4; EX2037 ¶161.

To satisfy Claim 1, on which Claims 10-11 depend, Apple argues a POSITA would have modified Mendelson’s Receiver Module to draw backup power from the PDA. Pet. 40-43. Thus, the overall modification that Apple proposes for Claims 10-11 is making Mendelson’s PDA into a wristwatch and using that PDA-turned-wristwatch to provide backup power to the Receiver Module. *Id.*, EX2044, 75:7-76:21; EX2037 ¶162.

Regardless of whether backup power was provided to Mendelson’s Receiver Module by the PDA or the PDA-turned-wristwatch, both modifications require the medic with the PDA or wristwatch to enter the dangerous scenario and co-locate with the injured person. EX2037 ¶163. Accordingly, Apple’s proposed modification for Claims 10-11 suffers the same fatal deficiencies as Apple’s proposed modification for Claim 1. *Id.* That is, Apple’s proposed modifications for

these claims would defeat Mendelson’s intended purpose of “determin[ing] a casualty’s condition remotely without exposing the first responders to increased risks.” *Id.*; *supra* §VIII.C. Dr. Duckworth explains that Apple’s proposed modification would defeat the intended “remote monitoring” purpose of Mendelson’s system whenever the medic had to use their PDA or PDA-turned-wristwatch to provide backup power to the Receiver Module. EX2037 ¶163. Relatedly, if the medic was using the PDA-turned-wristwatch to power and read out data from one injured person’s Receiver Module as Apple proposes, the medic would not be using the PDA-turned-wristwatch to monitor “multiple” injured people simultaneously, which is functionality that Mendelson’s system was specifically designed to provide. *Id.*

Because Apple’s proposed modification would defeat Mendelson’s intended purpose, a POSITA would not have been motivated to modify Mendelson as proposed. *Id.*; *see, e.g., Adidas*, 963 F.3d at 1359; *Polaris*, 882 F.3d at 1069; *Pollard*, 2020 WL 96682, at *6-8. And again, Apple’s insistence on a modification that would have defeated Mendelson’s expressly intended purpose of remote monitoring reveals the impermissible hindsight underlying Apple’s grounds. EX2037 ¶164.

Further, if the PDA was made into a wristwatch as Apple proposes, a POSITA would not have used the resulting wristwatch to power a Receiver Module. *Id.* ¶165.

A POSITA would have understood that the PDA-turned-wristwatch was a small device with a very small battery capacity that was not suitable for powering the Receiver Module. A POSITA also would have understood that Mendelson's system was unusable if the battery of the PDA (or PDA-turned-wristwatch) died. *Id.*; *supra* §VIII.C. Therefore, a POSITA would not have been motivated to use the PDA-turned-wristwatch to power a Receiver Module because doing so posed a high risk of draining the PDA-turned-wristwatch's small battery, rendering the entire system unusable. EX2037 ¶165.

XI. CONCLUSION

For the reasons explained above, Petitioner has not shown by a preponderance of the evidence that the challenged claims are unpatentable. Masimo thus requests that the Board issue a final written decision that the challenged claims are not unpatentable.

Respectfully submitted,

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Dated: October 10, 2024

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CERTIFICATE OF COMPLIANCE

Pursuant to 37 C.F.R. § 42.24(d), Counsel for Patent Owner Masimo Corporation hereby certifies that this document complies with the type-volume limitation of 37 C.F.R. § 42.24(b). According to Microsoft Office Word 2010's word count, this document contains approximately 10,608 words, including any statement of material facts to be admitted or denied in support, and excluding the table of contents, table of authorities, mandatory notices under § 42.8, exhibit list, certificate of service or word count, or appendix of exhibits or claim listing.

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CERTIFICATE OF SERVICE

I hereby certify that, pursuant to 37 C.F.R. § 42.6(e) and with the agreement of counsel for Petitioner, a true and correct copy of **PATENT OWNER RESPONSE AND EXHIBITS 2037-2044** is being served electronically on October 10, 2024, to the e-mail addresses shown below:

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