

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 B2

**PATENT OWNER'S NOTICE OF APPEAL TO THE
UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT**

Pursuant to 35 U.S.C. §§ 141(c) and 319, and 37 C.F.R. § 90.2(a), notice is hereby given that Patent Owner Apple Inc. hereby appeals to the United States Court of Appeals for the Federal Circuit from the Final Written Decision in Case No. IPR2023-00734 entered October 1, 2024 (Paper 33) (“Final Written Decision”) by the Patent Trial and Appeal Board (“the Board”), and from all underlying orders, decisions, rulings, and opinions related thereto and included therein. This appeal is timely under 35 U.S.C. § 142, 37 C.F.R. § 90.3, Federal Rule of Appellate Procedure 15(a)(1), and Federal Circuit Rule 15(a)(1).

For the limited purpose of providing the Director with the information required by 37 C.F.R. § 90.2(a)(3)(ii) and Federal Rule of Appellate Procedure 15(a)(2)(C), the issues on appeal may include, but are not limited to:

1. The Board’s decision that claims 1-19 of U.S. Patent No. 10,942,491 (“the ’491 patent”) were shown to be unpatentable as obvious under 35 U.S.C. § 103 in view of:
 - a. Kotanagi and Honda for claims 7, 11, 14, and 16;
 - b. Kotanagi, Honda, and Choi for claims 1-3, 5, 13, and 17;
 - c. Kotanagi, Honda, and Fraser for claims 8 and 15;
 - d. Kotanagi, Honda, and Orr for claim 9;
 - e. Kotanagi, Honda, and Park for claims 12 and 18;

- f. Kotanagi, Honda, Choi, and Park for claim 4;
 - g. Kotanagi, Honda, and Jabori for claims 10 and 19; and
 - h. Kotanagi, Honda, Choi, and Jabori for claim 6.
2. All of the Board's subsidiary findings supporting its determination that claims 1-19 of the '491 patent were shown to be unpatentable under 35 U.S.C. § 103; the Board's failure to consider evidence of record properly; the Board's legal errors in undertaking the obviousness analysis; the Board's findings that conflict with the evidence of record and are not supported by substantial evidence; and
3. All other issues decided adversely to Patent Owner in any orders, decisions, rulings, or opinions underlying or supporting the Final Written Decision.

Patent Owner further reserves the right to challenge any finding or determination supporting or relating to the issues above.

Pursuant to 35 U.S.C. § 142 and 37 C.F.R. § 90.2(a)(1), this notice is being filed with the Director of the U.S. Patent and Trademark Office, and a copy is also being filed with the Board. In addition, pursuant to Federal Circuit Rule 15(a)(1) and 37 C.F.R. § 90.2(a)(2), Patent Owner is also electronically filing this notice with

the Clerk of the U.S. Court of Appeals for the Federal Circuit, and paying the fee set forth in Federal Circuit Rule 52.

Respectfully submitted,

Date: December 3, 2024

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CERTIFICATE OF SERVICE

Pursuant to 37 CFR §§ 42.6(e)(4) and 42.205(b), the undersigned certifies that on December 3, 2024, a complete and entire copy of this Patent Owner's Notice of Appeal was provided via email to the Petitioner by serving the correspondence address of record as follows:

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Pursuant to 37 C.F.R. §§ 90.2(a)(1), I hereby certify that in addition to being filed electronically through the Board's P-TACTS System, this Patent Owner's Notice of Appeal is being provided to the Director of the USPTO on December 3, 2024, by electronically filing to the email address as follows:

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I hereby certify that on December 3, 2024, a true and correct copy of the foregoing Notice of Appeal, along with a copy of the Final Written Decision, was filed electronically with the Clerk's Office of the United States Court of Appeals for the Federal Circuit, at the following address:

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MASIMO CORPORATION,
Petitioner,

v.

APPLE INC.,
Patent Owner.

IPR2023-00734
Patent 10,942,491 B2

Before KEN B. BARRETT, JOSIAH C. COCKS, and
ROBERT L. KINDER, *Administrative Patent Judges*.

BARRETT, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

A. *Background and Summary*

Masimo Corporation (“Petitioner”)¹ filed a Petition requesting *inter partes* review of U.S. Patent No. 10,942,491 B2 (“the ’491 patent,” Ex. 1001). Paper 1 (“Pet.”). The Petition challenges the patentability of claims 1–19 of the ’491 patent. We instituted an *inter partes* review of all challenged claims on all proposed grounds of unpatentability. Paper 11. Apple Inc. (“Patent Owner”)² filed a Response to the Petition. Paper 17 (“PO Resp.”). Petitioner filed a Reply (Paper 22, “Pet. Reply”) and Patent Owner filed a Sur-reply (Paper 29, “PO Sur-reply”).

An oral hearing was held on July 9, 2024, and a transcript of the hearing is included in the record. Paper 32 (“Tr.”).

This Final Written Decision is entered pursuant to 35 U.S.C. § 318(a). For the reasons discussed below, we determine that Petitioner has shown by a preponderance of the evidence that claims 1–19 of the ’491 patent are unpatentable.

B. *Related Proceedings*

Both parties identify, as a matter involving or related to the ’491 patent, *Apple Inc. v. Masimo Corporation and Sound United, LLC*, No. 1:22-cv-01378-MN (D. Del.). Pet. 1; Paper 3. Patent Owner also states that “[p]rosecution is ongoing in four patent applications that are continuations of the ’491 Patent,” and identifies those as: 17/188,995, 17/951,973, 18/075,253, and 18/119,175. Paper 8, 19.

¹ Petitioner identifies Masimo Corporation as the real party in interest. Pet. 1.

² Patent Owner identifies Apple Inc. as the real party in interest. Paper 3.

C. The '491 Patent

The '491 patent pertains to “a wearable electronic device having a range of features, including touch input, force input, an interchangeable attachment system, health monitoring functionality, wireless power charging, wireless authentication and transaction functionality, and other features and functionality.” Ex. 1001, 1:23–28. A wristwatch is an example of the wearable electronic device. *See id.* at 6:59–7:4. According to the '491 patent, “some traditional portable electronic devices, particularly wearable electronic devices, may have relatively limited functionality or are only able to perform a specialized set of functions or tasks.” *Id.* at 1:35–39. The Specification states that it addresses this by describing embodiments that “are directed to a wearable electronic device that provides a wide range of functionality, as compared to some traditional wearable electronic devices.” *Id.* at 1:42–45.

Figure 8 of the '491 patent is reproduced below.

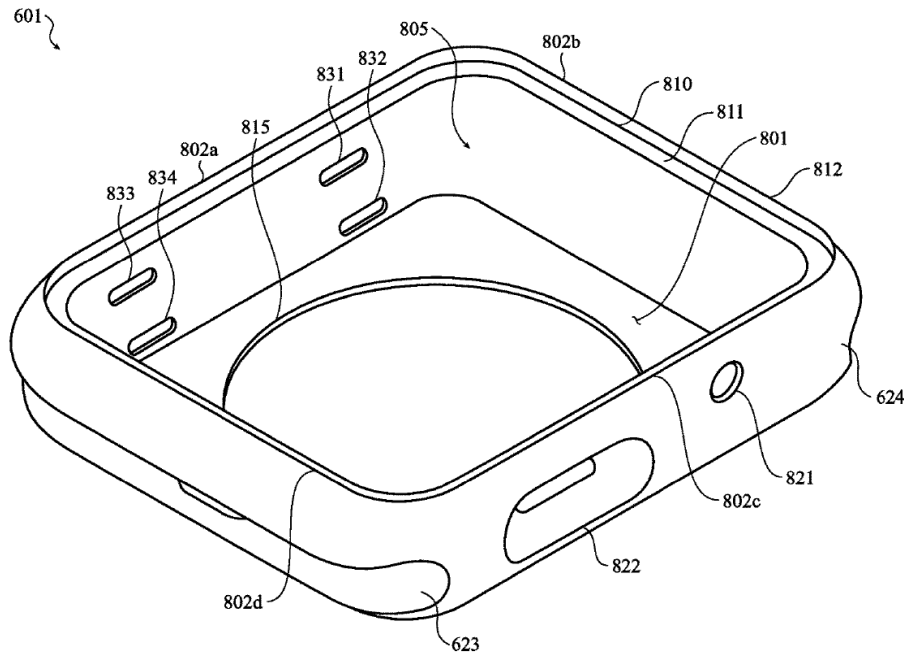


FIG. 8

Figure 8 “depicts an example housing for a wearable electronic device.” *Id.* at 6:15–16. As shown, an opening or aperture 815 is formed in bottom portion 801 of housing 601. *Id.* at 30:65–66.

In some example embodiments, the device includes a biosensor module that is disposed in an opening formed in the flat bottom portion of the housing. The biosensor module may include a chassis positioned in the opening of the housing and defining an array of windows. An array of light sources may be attached to the chassis and configured to emit light into the user through the array of windows. The biosensor module may also include an optically transparent rear cover disposed over the chassis and over the array of windows and operative to pass light emitted from the array of light sources into the user.

Id. at 2:47–57.

Figure 16 of the '491 patent is reproduced below.

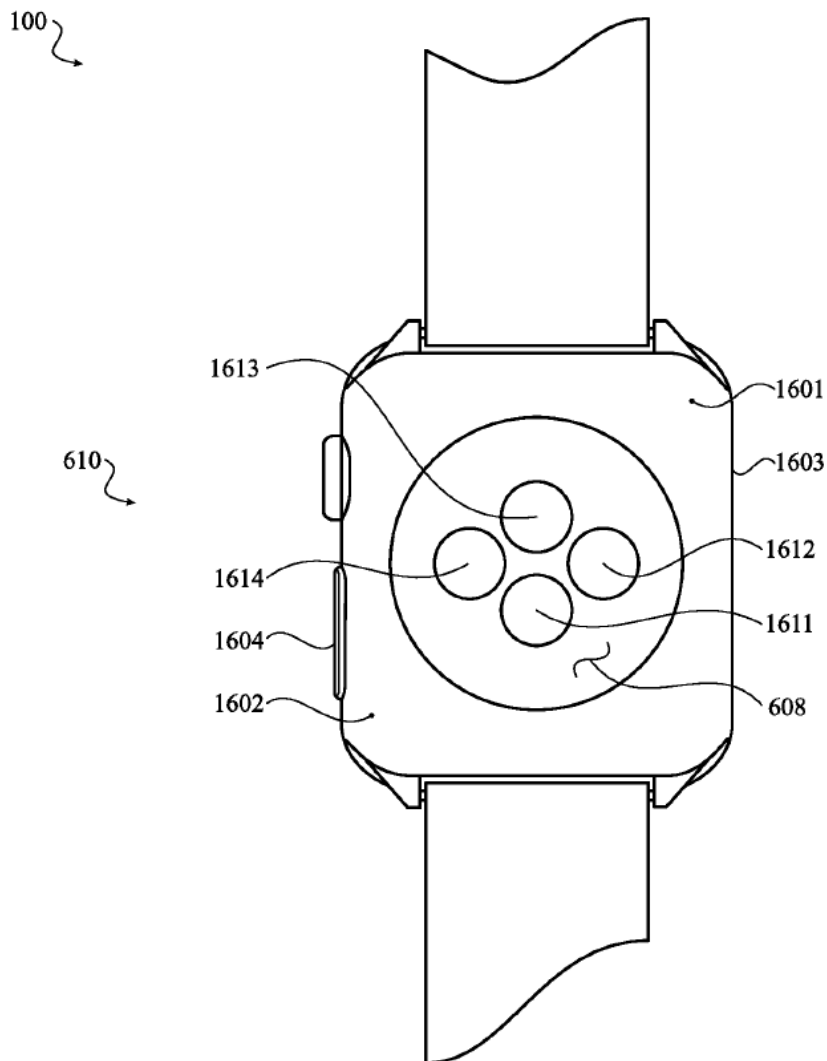


FIG. 16

Figure 16 “depicts an example device having biosensors.” *Id.* at 6:29. Shown is an array of light sources 1611–1613 and detector 1614 that, together, may be configured to function as an optical sensor such as a photoplethysmography (PPG) sensor, which may be used to compute, for example, heart rate. *Id.* at 38:23–26, 38:37–41, 38:65–39:2. Also shown are first electrode 1601 and second electrode 1602 disposed on the rear face of the device 100 and that may be configured to make contact with the skin of

the user's wrist when the device is being worn. *Id.* at 39:40–46. “[T]he electrodes may be configured to detect electrical activity produced by the heart of the user to measure heart function or produce an electrocardiograph (ECG).” *Id.* at 39:66–40:3.

The device may also include a receive coil within the housing configured to inductively couple with an external transmit coil. A power conditioning circuit may be configured to recharge the rechargeable battery using power received by the receive coil. . . . The device may also include a first alignment magnet positioned within the receive coil and configured to align the device with respect to a second alignment magnet positioned within the external transmit coil.

Id. at 5:35–44.

Figure 18 of the '491 patent is reproduced below.

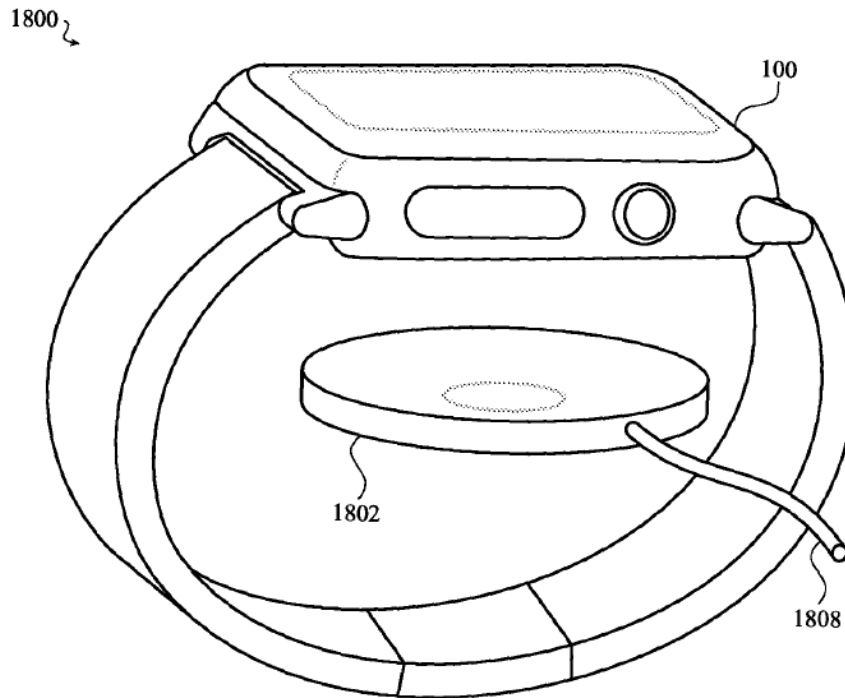


FIG. 18

Figure 18 “depicts a front perspective view of an example wireless power transfer system 1800 in an unmated configuration” and “shows an inductive

power transmitter dock 1802 that is configured to couple to and wirelessly transmit power to an inductive power receiver accessory, in this case device 100.” *Id.* at 43:4–9.

Figure 19 of the ’491 patent is reproduced below.

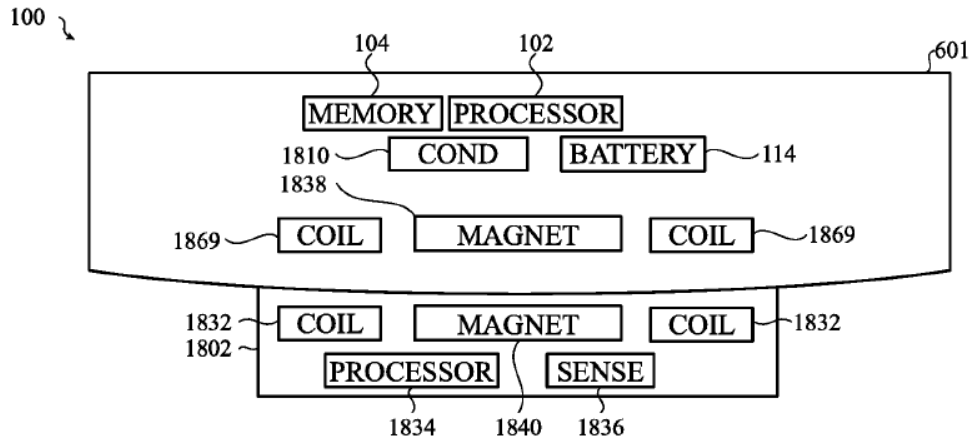


FIG. 19

Figure 19 “depicts a block diagram of an example inductive charging system.” *Id.* at 6:34–35. “[T]he device 100 includes a receive coil 1869 having one or more windings for inductively coupling with a transmit coil 1832 of the dock 1802.” *Id.* at 44:39–41. “The receive coil 1869 may receive power wirelessly from the dock 1802 and may pass the received power to a battery 114 within the device 100 via power conditioning circuit 1810.” *Id.* at 44:41–44.

D. Illustrative Claims

Of the challenged claims of the ’491 patent, claims 1, 7, and 14 are independent claims. Claims 1 and 7, reproduced below with Petitioner’s annotations inserted, are illustrative.

1. [1a] An electronic watch comprising:
[1b] a housing formed from a metal material and defining a rear opening along a rear portion of the housing;

- [1c] a touch-sensitive display positioned at least partially within the housing;
- [1d] a band coupled to the housing and configured to couple the electronic watch to a user;
- [1e] a cover formed from a dielectric material and forming a seal along the rear opening of the housing;
- [1f] an optical sensor positioned within the housing and configured to transmit an optical signal through the dielectric material of the cover;
- [1g] a charging coil positioned within the housing and configured to receive wireless power through the dielectric material of the cover;
- [1h] a first electrode positioned along a rear surface of the electronic watch; and
a second electrode positioned along the rear surface of the electronic watch, wherein:
 - [1i] the electronic watch is configured to measure a heart rate using the optical sensor, and
 - [1j] the electronic watch is configured to measure an electrocardiogram using the first electrode and the second electrode.

7. [7a] A wearable electronic device comprising:
- [7b] a housing formed from a conductive material and defining a first opening opposite to a second opening;
 - [7c] a band attached to the housing and configured to secure the wearable electronic device to a user;
 - [7d] a display positioned in the first opening;
 - [7e] a cover comprising a non-conductive material and positioned over the second opening, the cover forming a portion of an exterior surface of the wearable electronic device;
 - [7f] a biosensor module positioned below the cover configured to pass an optical signal through a window defined within the non-conductive material of the cover; and
 - [7g] a wireless charging receive coil aligned with the second opening and below the cover, the wireless charging receive coil configured to inductively couple to an external wireless

charging device through the non-conductive material of the cover.

Ex. 1001, 57:65–58:21, 58:50–67.

E. Evidence

Petitioner relies on the following references:

Name	Reference	Exhibit(s)
Kotanagi	WO 2005/092182 A1, published Oct. 6, 2005	1005
Honda	US 6,265,789 B1, issued July 24, 2001	1006
Choi	WO 2015/034149 A1, published March 12, 2015	1011
Park	US 2015/0214749 A1, published July 30, 2015	1012
Jabori	WO 2015/116111 A1, published Aug. 6, 2015	1017
Orr	US 4,163,447, issued Aug. 7, 1979	1025
Fraser	US 2015/0355604 A1, published Dec. 10, 2015	1041

Petitioner also relies on the declarations of R. James Duckworth, Ph.D. (Exs. 1003, 1060) in support of its arguments, and Patent Owner relies on the declaration of Brian Anthony, Ph.D. (Ex. 2038) in support of its arguments. The parties also rely on other exhibits as discussed below.

F. Asserted Grounds of Unpatentability

Petitioner asserts that the challenged claims are unpatentable on the following grounds:

Claim(s) Challenged	35 U.S.C. §³	Reference(s)/Basis
7, 11, 14, 16	103	Kotanagi, Honda
1–3, 5, 13, 17	103	Kotanagi, Honda, Choi
8, 15	103	Kotanagi, Honda, Fraser

³ The Leahy-Smith America Invents Act (“AIA”) includes revisions to 35 U.S.C. §§ 102 and 103 that became effective on March 16, 2013. Because the earliest filed application identified in the ’491 patent has a filing date of September 2, 2014 (Ex. 1001, codes (60), (63), 1:3–18), we apply the AIA-version of 35 U.S.C. § 103.

Claim(s) Challenged	35 U.S.C. § ³	Reference(s)/Basis
9	103	Kotanagi, Honda, Orr
12, 18	103	Kotanagi, Honda, Park
4	103	Kotanagi, Honda, Choi, Park
10, 19	103	Kotanagi, Honda, Jabori
6	103	Kotanagi, Honda, Choi, Jabori

II. ANALYSIS

A. Principles of Law

Petitioner bears the burden of persuasion to prove unpatentability of the claims challenged in the Petition, and that burden never shifts to Patent Owner. *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). To prevail, Petitioner must establish by a preponderance of the evidence that the challenged claims are unpatentable. 35 U.S.C. § 316(e) (2018); 37 C.F.R. § 42.1(d).

A patent claim is unpatentable under 35 U.S.C. § 103 “if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains.” 35 U.S.C. § 103; *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) if

present, any objective evidence of obviousness or non-obviousness.⁴

Graham v. John Deere Co., 383 U.S. 1, 17–18 (1966).

B. The Level of Ordinary Skill in the Art

In determining the level of ordinary skill in the art, various factors may be considered, including the “type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field.” *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (quoting *Custom Accessories, Inc. v. Jeffrey–Allan Indus., Inc.*, 807 F.2d 955, 962 (Fed. Cir. 1986)).

Petitioner contends that:

A POSITA [(person of ordinary skill in the art)] of the '491 patent would have had at least a bachelor's degree in a discipline related to biomechanical devices, such as Mechanical Engineering, Biomedical Engineering, Electrical Engineering, Physics, Industrial Design, or an equivalent discipline, and at least three years of experience working with or developing electronic medical or consumer devices.

Pet. 7.

Patent Owner contends that:

a person of ordinary skill in the art on or about the claimed priority date of the '491 Patent would have had at least a bachelor's degree in electrical engineering, mechanical engineering, biomedical engineering, computer engineering, physics, or a related field, and would have had at least two years of relevant work experience with capture and processing of data or information, including but not limited to physiological information, or equivalents thereof. EX-2038,

⁴ The parties have not directed our attention to any objective evidence of obviousness or non-obviousness.

¶¶40–44, 3–19. Less work experience may be compensated by a higher level of education and vice versa. *Id.*

PO Resp. 14.

We discern no material difference between the parties’ definitions. *Cf.* PO Resp. 14 (Patent Owner stating that “[t]he analysis presented [in the Response] remains unchanged even if [Petitioner’s proposed] skill level is applied.”). Petitioner’s definition is consistent with the level of ordinary skill reflected in the prior art references of record. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (recognizing that the prior art itself may reflect an appropriate level of skill in the art). For purposes of this decision, we apply Petitioner’s definition of the person of ordinary skill in the art. We note, however, that were we to adopt Patent Owner’s assessment, the outcome of this Decision would be the same.

C. Claim Construction

We apply the same claim construction standard used in district court actions under 35 U.S.C. § 282(b), namely that articulated in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). *See* 37 C.F.R. § 42.100(b). In applying that standard, claim terms generally are given their ordinary and customary meaning as would have been understood by a person of ordinary skill in the art at the time of the invention and in the context of the entire patent disclosure. *Phillips*, 415 F.3d at 1312–13. “In determining the meaning of the disputed claim limitation, we look principally to the intrinsic evidence of record, examining the claim language itself, the written description, and the prosecution history, if in evidence.” *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 469 F.3d 1005, 1014 (Fed. Cir. 2006) (citing *Phillips*, 415 F.3d at 1312–17). “[W]hile extrinsic evidence can shed useful light on the relevant art, . . . it is less significant than the intrinsic

record in determining the legally operative meaning of claim language.”
Phillips, 415 F.3d at 1317 (internal quotation marks omitted).

Petitioner proposes constructions for certain terms concerning the cover material—“a cover formed from a dielectric material,” “a transparent substrate,” and “a cover comprising a non-conductive material”—and window terms such as “defines at least one window” and “window defined.” Pet. 7–10. Patent Owner states that it does not take a position regarding Petitioner’s offered constructions. PO Resp. 15.

On this record and for purposes of this decision, we determine that no claim terms require express construction.

*D. The Alleged Obviousness of Claims 7, 11, 14, and 16
Over Kotanagi and Honda (Ground 1)*

Petitioner alleges that claims 7, 11, 14, and 16 of the ’491 patent would have been obvious over Kotanagi and Honda. *See* Pet. 15–30 (addressing independent claim 7). Of those challenged claims, claims 7 and 14 are independent. Petitioner contends, *inter alia*, that Kotanagi discloses much of the subject of independent claim 7, and that Honda discloses wireless charging teachings and structure, including the alignment of the charging coil with an opening in the rear of the housing and having a non-conductive cover. *See id.*

Patent Owner argues, *inter alia*, that a person of ordinary skill in the art would not have implemented the proposed combination because, due to size restrictions of Kotanagi, the size and positioning of charging coil in the proposed combination would result in slow and inefficient charging. *See, e.g.*, PO Resp. 34–35. Patent Owner also argues that an ordinary artisan would not have chosen the proposed combination because there were more desirable known alternatives. *See id.* at 35.

1. Kotanagi (Ex. 1005)

Kotanagi discloses a biological information measuring device in the form of “a wristwatch-type device which detects pulse rate as a type of biological information while mounted to the wrist.” Ex. 1005 ¶ 44.

“[B]iological sensor part 8 . . . includes an LED (Light Emitting Diode) (light-emitting part) 5 for emitting light toward the living body while in contact with the living body surface” and “a PD (Photodetector) (light-receiving part) 6 for receiving reflected light from the living body out of the light emitted by the LED 5 and generating a pulse signal (biological information signal) corresponding to the amount of received light.” *Id.* ¶ 46.

Kotanagi’s Figure 7 is reproduced below.

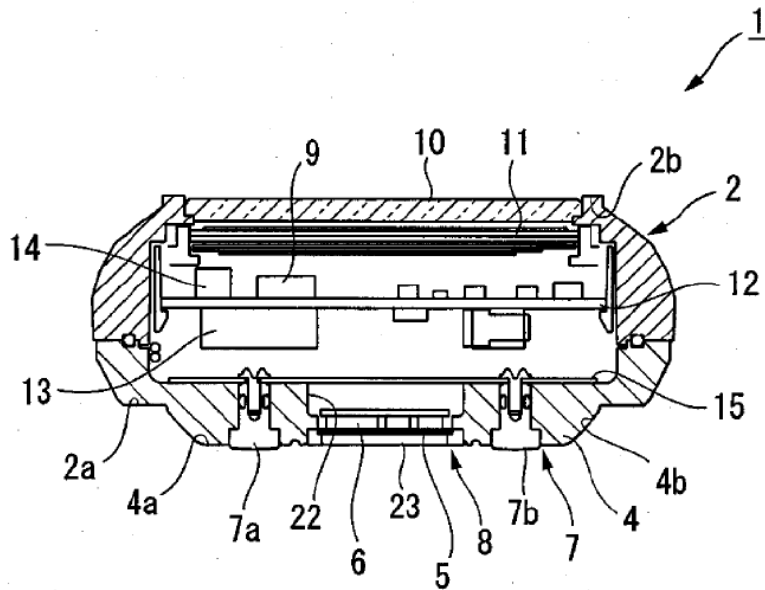


Figure 7 is FIG. 7 is a cross-sectional view of a biological information measuring device.” *Id.* ¶ 41.

[A] through-hole 22 passing through the outside and the inside of the housing 2 is formed in the center of the lower surface 4a of the protruding part 4, and a cover glass 23 is fixed to the housing 2 so as to block the through-hole 22. The LED 5 and the PD [photodetector] 6 are disposed adjacent to one another in a direction orthogonal to the longitudinal direction of the

housing so as to touch the inside of the glass cover 23. That is, the LED 5 and the PD 6 are configured so as to be dropped into the protruding part 4. As a result, the LED 5 and the PD 6 are as close to the living body surface B as possible.

Id. ¶ 55. “The pair of electrodes 7a and 7b have a function of detecting whether there is contact with the living body surface B based on the potential difference between the electrodes.” *Id.* ¶ 59.

Kotanagi discloses that a connection terminal for recharging the battery by an external device is located on the side surface of the housing. *Id.* ¶ 53. “In addition, rather than the external connection terminal 21, a transformer or the like for supplying power to a recharger and to the inside of the housing 2 may be provided so as to recharge the rechargeable battery 13 in a contactless state.” *Id.*

2. Honda (Ex. 1006)

Honda “relates to an electronic apparatus in which one of two devices charges the other in a non-contact fashion.” Ex. 1006, 1:4–6. Honda, in describing Figure 1, discloses that “the electronic watch 200 detects biological information including the pulse rate or the heart rate of the body through an unshown sensor and stores it.” *Id.* at 6:17–20.

Honda’s Figure 2 is reproduced below.

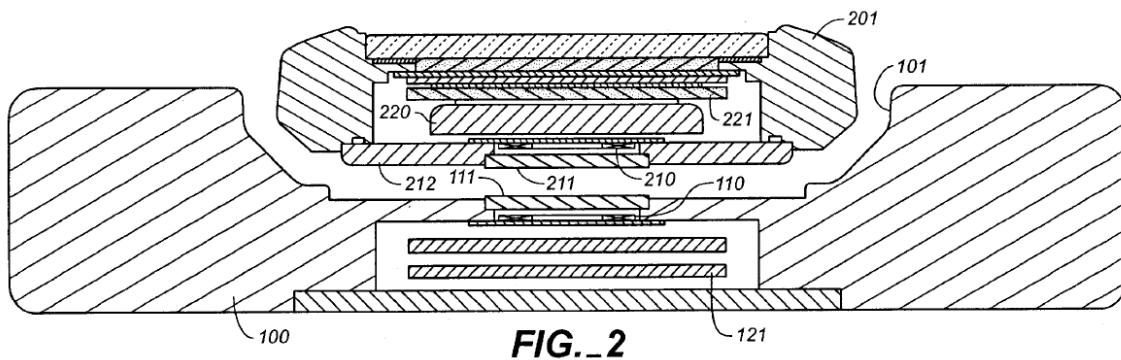


Figure 2 is a sectional view showing the construction of a station and an electronic watch. *Id.* at 5:20–21. “As shown, a watch-side coil 210 for the

data transmission and the battery charging is arranged in a case back 212 of the watch body 201 and is covered with a cover glass 211.” *Id.* at 6:22–25. “The watch body 201 includes a circuit board 221, connected to a secondary battery 220 and a watch-side coil 210.” *Id.* at 6:25–27. “A station-side coil 110 is arranged in the portion of the socket 101 of the station 100, facing the watch-side coil 210, and is covered with a cover glass 111.” *Id.* at 6:28–30.

Honda discloses measured data that compares device housing materials and transmission efficiencies. *Id.* at 13:33–34, Fig. 15. Honda states that “the use of an insulating material [such as glass] for the external housing results in a transmission efficiency ten times as high as the one achieved by a stainless [steel] product.” *Id.* at 13:45–48, Fig. 15 (depicting transmission efficiency for stainless steel and glass materials); *see also id.* at 2:44–50 (explaining that eddy currents that take place in the electrically conductive stainless steel material of a device weakens the electromagnetic coupling).

3. Independent Claim 7

a. [7a] *A wearable electronic device comprising:*

[7b] *a housing formed from a conductive material and defining a first opening opposite to a second opening;*

[7c] *a band attached to the housing and configured to secure the wearable electronic device to a user;*

[7d] *a display positioned in the first opening;*

Petitioner asserts that “Kotanagi describes a ‘wristwatch-type device which detects pulse rate as a type of biological information while mounted to the wrist.’” Pet. 15 (quoting Ex. 1005 ¶ 44). Petitioner contends that Kotanagi teaches a housing made of metal such as aluminum, that aluminum is strongly conductive, and that the housing has the recited “first opening”

on top and a “second opening” at the bottom. *Id.* at 16–17 (citing, *inter alia*, Ex. 1005 ¶ 48, Figs. 6, 7; Ex. 1003 ¶ 134); *see also id.* at 16 (asserting that “Honda explicitly describes its metal housing as ‘conductive.’” (citing Ex. 1006, 13:22–32; Ex. 1003 ¶¶ 133–134)). Petitioner further contends that Kotanagi has a band for fixing the device to an arm and a display in the first (top) opening. *Id.* at 17–18 (citing, *inter alia*, Ex. 1005 ¶¶ 27, 60, Figs. 1, 6, 7; Ex. 1003 ¶¶ 135–136). Patent Owner does not raise any arguments regarding these contentions.

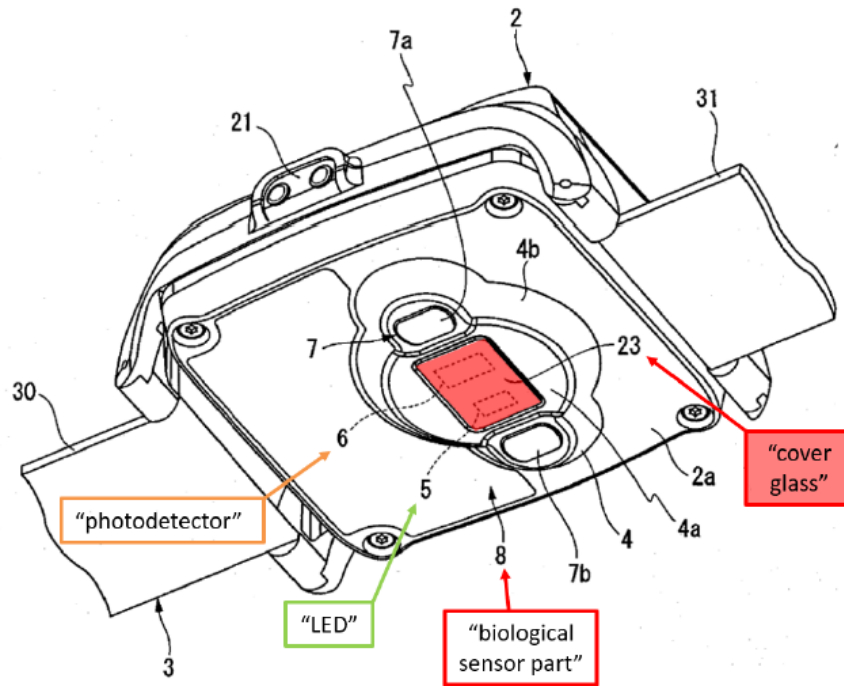
b. [7e] a cover comprising a non-conductive material and positioned over the second opening, the cover forming a portion of an exterior surface of the wearable electronic device;

[7f] a biosensor module positioned below the cover configured to pass an optical signal through a window defined within the non-conductive material of the cover; and

Petitioner contends that Kotanagi’s cover glass 23 is positioned as claimed (over the second opening) and forms a portion of the exterior surface, and that a person of ordinary skill in the art would have known that glass is non-conductive. Pet. 18–19 & n.8 (citing Ex. 1001, 58:27–30 (dependent claim 3); Ex. 1003 ¶ 137; Ex. 1005 ¶ 55; Ex. 1006, 15:61–62 (Honda referring to an “insulating body (glass, for example)”). Petitioner additionally contends that Honda also “discloses a biosensing watch with a metal case back and a non-conductive glass cover.” *Id.* at 19 (citing Ex. 1006, 15:47–49, Fig. 2; Ex. 1003 ¶ 138).

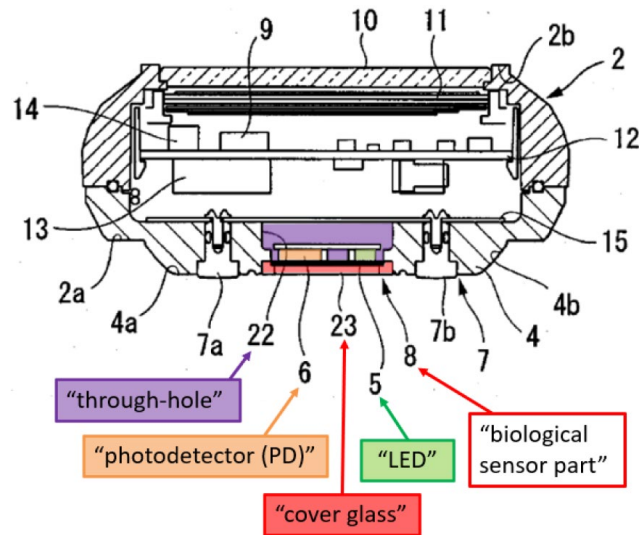
Petitioner further contends that “Kotanagi teaches . . . [a] biosensor module ‘disposed on the lower surface 4a of the protruding part 4,’” and that the biosensor module includes Kotanagi’s LED (Light Emitting Diode) 5 and PD (photodetector) 6 for generating a pulse signal. *Id.* at 20 (citing

Ex. 1003 ¶¶ 140–141; Ex. 1005 ¶ 46). Petitioner provides an annotated version of Kotanagi's Figure 5, which is reproduced below.



Id. Above, is Petitioner's annotated version of Kotanagi's Figure 5, which is a perspective view of a biological information measuring device. Ex. 1005 ¶ 41. Shown are Petitioner's annotations for biological sensor part 8, which includes LED 5 and photodetector 6, and cover glass 23 (shaded red). *See id.* ¶¶ 46, 55.

Petitioner also provides an annotated version of Kotanagi's Figure 7, which is reproduced below.



Pet. 21. Above, is Petitioner's annotated version of Kotanagi's Figure 7, which is a cross-sectional view of a biological information measuring device. Ex. 1005 ¶ 41. Shown are Petitioner's annotations for biological sensor part 8, LED 5 (green), photodetector 6 (orange), cover glass 23 (red), and through-hole 22 (purple). *See id.* ¶¶ 46, 55. Petitioner contends that a person of ordinary skill in the art would understand that Kotanagi's LED and photodetector work by passing optical signals through the cover glass.

Pet. 21 (citing Ex. 1003 ¶¶ 142–143; Ex. 1005 ¶ 55).

Patent Owner does not raise any arguments regarding these contentions.

- c. [7g] a wireless charging receive coil aligned with the second opening and below the cover, the wireless charging receive coil configured to inductively couple to an external wireless charging device through the non-conductive material of the cover.*

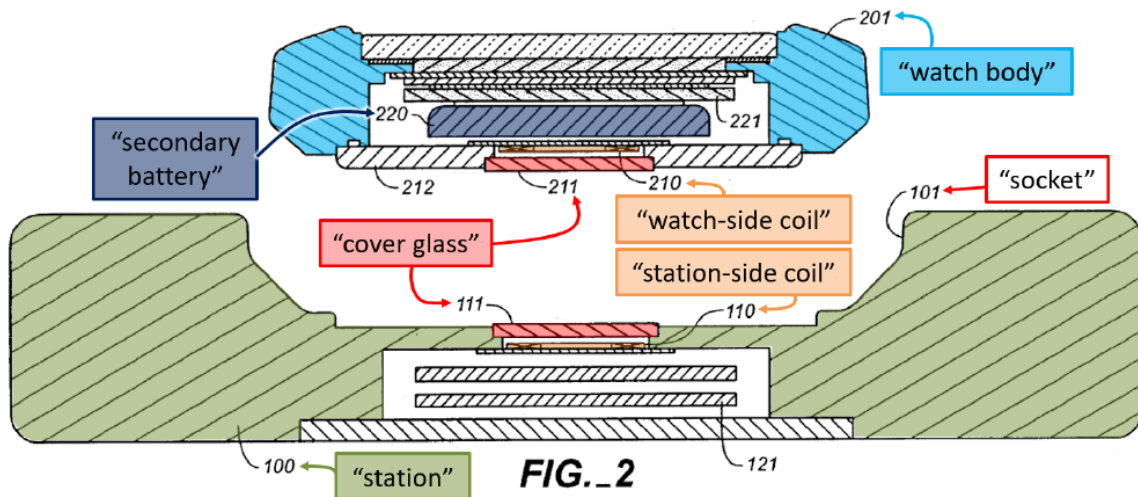
Petitioner contends that the proposed combination of Kotanagi and Honda teaches the recited alignment of a wireless charging receive coil relative to the bottom opening in the device housing and with the coil

configured to charge the device through the non-conductive cover. Pet. 22–30.

Petitioner first contends that Kotanagi discloses the use of a wireless charging receive coil. Specifically, Petitioner notes that “Kotanagi teaches that ‘a transformer or the like for supplying power to a recharger and to the inside of the housing 2 may be provided *so as to recharge the rechargeable battery 13 in a contactless state.*’” *Id.* at 22 (quoting Ex. 1005 ¶ 53). Petitioner contends that a person of ordinary skill in the art would have known “that transformers use coils and that contactless charging uses a wireless charging receive coil.” *Id.* (citing Ex. 1003 ¶ 144).

For the recited coil alignment with the housing opening, Petitioner turns to Honda. Petitioner contends that Honda discloses a contactless charging system for an electronic watch. *Id.* Petitioner further contends that Honda is like Kotanagi in that Honda teaches a biosensor and has a cover glass over an opening in the bottom face of the watch. *Id.* at 22–23 (citing Ex. 1006, 6:17–19, Figs. 1, 2; Ex. 1003 ¶ 145). According to Petitioner, “[t]hese similarities increase a POSITA’s expectation of a successful combination.” *Id.* at 23 (citing Ex. 1003 ¶ 146). Petitioner further asserts that, “[b]ehind Honda’s cover glass is a charging coil” and “Honda thus teaches a ‘wireless charging receive coil’ ‘aligned with’ the opening, and ‘below the cover,’ as claimed.” *Id.* (citing Ex. 1006, 6:22–25, Fig. 2; Ex. 1003 ¶ 147).

Petitioner additionally contends that “Honda further teaches inductive coupling of the charging station coil and the watch coil.” *Id.* at 24 (citing Ex. 1006, 6:36–40, Fig. 2; Ex. 1003 ¶ 148). One of Petitioner’s annotated versions of Honda’s Figure 2 is reproduced below.



Id. at 24. Above, is Petitioner's annotated version of Honda's Figure 2, which is a sectional view showing the construction of a station and an electronic watch. Ex. 1006, 5:20–21. Shown is watch-side coil 210 (orange) arranged in case back 212 of watch body 201 (light blue) and covered with cover glass 211 (red). *Id.* at 6:22–25. Secondary battery 220 (dark blue) is inside watch body 201. *See id.* at 6:25–27. Also shown is station-side coil 110 (orange) arranged in the portion of socket 101 of station 100 (green), facing watch-side coil 210 (orange), and covered with cover glass 111 (red). *Id.* at 6:28–30.

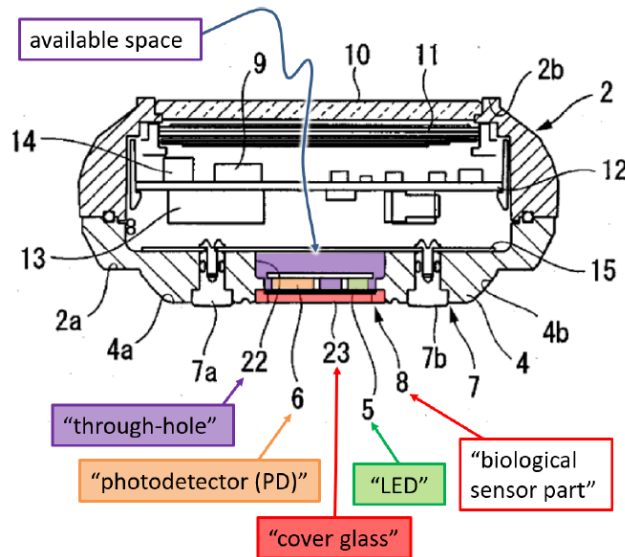
Petitioner's proposed combination modifies Kotanagi to have a charging receive coil in the housing and aligned behind the cover glass. *See* Pet. 24. Petitioner contends that:

Given Honda's teaching of a wireless receive coil near a rear opening similar to that taught in Kotanagi (where both Honda's and Kotanagi's openings have a cover glass), a POSITA would have used Honda's teachings to either:

- 1) modify Kotanagi to position a wireless charging coil behind Kotanagi's cover glass, LED, and PD [photodetector]; or
- 2) enlarge Kotanagi's opening and cover glass to make room for a coil behind the cover glass, surrounding the LED and PD.

In either case, the resulting magnetic flux would pass through the cover glass, as taught by Honda.

Id. at 24–25. Petitioner asserts that there already is space available in Kotanagi and this would make “the modification from Honda simple and feasible, with a high expectation of success.” *Id.* at 25 (citing Ex. 1003 ¶ 142). In that regard, Petitioner provides an annotated version of Kotanagi’s Figure 7, which is reproduced below.



Id. Above, is Petitioner’s annotated version of Kotanagi’s Figure 7 (a cross-sectional view of a biological information measuring device), labeling “available space” (purple) in through-hole 22 and around LED 5 (green) and photodetector 6 (orange), and above cover glass 23 (red). *See* Ex. 1005 ¶¶ 41, 55.

Petitioner also asserts that Honda teaches that metal covers are inferior for power transmission due to eddy currents and, therefore, a person of ordinary skill in the art would have known to wirelessly charge through a non-conductive material. Pet. 26–27 (citing Ex. 1003 ¶ 155; Ex. 1006, 2:48–50, 13:30–32, Fig. 15).

Petitioner asserts that Honda teaches using its wireless receive coil with an external charging device through a non-conductive cover material, and that a person of ordinary skill in the art would have used Honda's charging station or similar with Kotanagi's watch. *Id.* at 25–26 (citing Ex. 1003 ¶ 150; Ex. 1005 ¶ 53; Ex. 1006, 6:7). Petitioner contends that the combination “teach[es] . . . aligning and positioning the coil within Kotanagi's watch” and that this “also configures the coil ‘to inductively couple to an external wireless charging device through the non-conductive material of the cover’ as claimed.” *Id.* at 26 (citing Ex. 1003 ¶ 151).

Petitioner contends that a person of ordinary skill in the art would have been motivated to make the proposed modifications. *Id.* at 27–28. In that regard, Petitioner further contends:

Kotanagi teaches a pulse rate biosensor watch that may be charged in a “contactless state,” (EX1005 ¶53), motivating a POSITA to look to Honda for “familiar elements” that do “no more than yield predictable results” (*KSR Int’l v. Teleflex Inc.*, 550 U.S. 398, 401 (2007)). Honda teaches wireless watch charging and sensors for measuring pulse/heart rate of the body (EX1006 6:14–20; 8:40–42), motivating a POSITA to look to Kotanagi to “implement a predictable variation” (*KSR* at 401). Thus, there is an express motivation in both references that the subject matter in each should be combined with the other. *See id.* (noting that such a teaching, suggestion, or motivation (TSM) is helpful to show obviousness). *Id.* at 28 (citing Ex. 1003 ¶ 155); *see also id.* at 27 (“Kotanagi and Honda were both assigned to Seiko companies Thus, a POSITA having Kotanagi would have also had access to Honda and readily combined teachings from the two references.”).

According to Petitioner, “[b]oth [the embodiments of Kotanagi and Honda] have a watch shape, both have biosensors, and both have a cover

glass over an opening in the bottom face of the watch.” Pet. 28. Petitioner contends that, because of the similarities, a person of ordinary skill in the art would “expect success when combining features or inserting components from one into the other.” *Id.* (citing Ex. 1003 ¶ 156).

Petitioner also contends that another reference, Fraser (Ex. 1041) supports its position. Specifically, Petitioner contends that:

Although Fraser is not cited in Ground 1, Fraser provides evidence that it would have been feasible to make the second modification option discussed above: to enlarge Kotanagi’s opening and cover glass to make room for a coil behind the cover glass, surrounding the LED and PD. Fraser teaches a biosensing watch with a wireless “charging coil . . . surrounding the light emitters . . . and the light detector” EX1041 [0026]. . . . Fraser teaches that “[t]he light emitters . . . and the light detector . . . can be placed in the middle of the charging coil . . . to reduce the thickness of the apparatus.” EX1041 [0026]. Fraser thus provides evidence of both the feasibility of such a modification, as well as a motivation for this approach (e.g., to reduce apparatus thickness). EX1003 ¶¶157–158.

Id. at 28–29 (reproducing an annotated version of Fraser’s Fig. 3) (fourth alteration in original).

Patent Owner argues that the proposed combination would not have been obvious and that a person of ordinary skill in the art would not have had a reasonable expectation of success in combining the teachings of the references because Kotanagi imposes size restrictions that would result in a coil sized and positioned such that the charging would not be quick and efficient. *See* PO Resp. 34–35. Patent Owner further argues that a person of ordinary skill in the art would not have configured the device as proposed by Petitioner but, rather, would have chosen an existing alternative configuration, namely one that does not meet the claim limitations. *See id.* at 35.

To appropriately evaluate Patent Owner’s argument, we must place it in the proper context. Independent claim 7, in pertinent part, calls for a device having a non-conductive cover positioned over an opening in the device, a biosensor positioned below the cover that is configured to pass biosensor optical signals, and a wireless charging coil aligned with the opening and the cover and configured to inductively couple to a wireless charger. *See* Ex. 1001, 58:56–67.

It is undisputed that Kotanagi discloses an electronic wristwatch-type device having a biosensor aligned with an opening having a cover that can pass optical signals. *See* PO Resp. 15–17, 19. Although Kotanagi depicts an embodiment that utilizes wired charging (via a connection on the side of the device), Kotanagi teaches that wireless (or “contactless”) charging also may be utilized. Ex. 1005 ¶ 53 (“[R]ather than the external connection terminal 21, a transformer or the like for supplying power to a recharger and to the inside of the housing 2 may be provided so as to recharge the rechargeable battery 13 in a contactless state.”). Kotanagi, however, does not describe the details of such wireless charging. It is undisputed that, as of the pertinent timeframe, wireless charging of, for example, wrist-worn devices having biometric sensing, was well-known. *See, e.g.*, PO Resp. 35 (Patent Owner admitting that “the POSITA would have been aware of other well-known and actually functioning configurations of biometric sensing and wireless charging devices.”). We find, and it appears to be undisputed, that the level of skill specifically as to wireless charging was high as of that point in time. *See, e.g.*, Ex. 1006, 6:28–58 (Honda discussing coil testing and comparisons); PO Resp. 59–60 (Patent Owner asserting that a person of ordinary skill in the art would have modeled and compared coil

configurations). Honda discloses an example of an electronic watch that has both biosensors (unshown pulse rate or the heart rate sensors) and wireless charging, and discloses certain wireless charging details that were not included in Kotangi's disclosure. *See, e.g.*, Ex. 1006, 6:12–49. Importantly, Honda teaches aligning the wireless charging coil with an opening and corresponding glass cover, and teaches the benefit of charging through, e.g., a glass cover rather than metal. *See id.* at 6:22–25, 13:33–52, Fig. 2 (depicting watch-side coil 210 behind cover glass 211); Fig. 15 (chart comparing transmission efficiency for certain materials). Dr. Duckworth persuasively opines that “Honda’s Figure 15 and related text . . . teach metal covers are inferior for power transmission,” and “[a] POSITA would have known from Honda’s disclosure to wirelessly charge through a non-conductive material as ‘eddy currents take place in the electrically conductive metal material, weakening the electromagnetic coupling,” and “[t]hus, a POSITA would have aligned Honda’s coil with Kotanagi’s opening such that inductive coupling occurs ‘through the non-conductive material of the cover.’” Ex. 1003 ¶¶ 152–154 (citing Ex. 1006, 2:48–50, Fig. 15 (page 14 of the exhibit)); *see also* Ex. 2038 ¶¶ 152–153 (Dr. Anthony similarly testifying that “Honda discloses that presence of metal materials between the transmitting and receiving coils[] gives rise to eddy currents, which reduce charging efficiency. . . . This is also why Honda provides glass for its rear cover.”).

Patent Owner argues that the proposed combination will result in a configuration “that is contrary to Honda’s teachings and its stated goals and purpose of achieving quick and efficient wireless charging.” PO Resp. 34–35. Patent Owner’s focus on these properties is misplaced. We agree with

Petitioner that characteristics such as charging speed and efficiency are not claimed. *See* Pet. Reply 1 (“[T]he ’491 patent does not disclose, let alone claim, sizing or other details [Patent Owner] Apple asserts are necessary for successful wireless charging.”); *id.* at 6 (“[T]he ’491 patent claims no absolute size or charging speed.”). Rather, the claim drafter utilized broad language to encompass a biosensor device having the capability to wirelessly charge (“inductively couple”) through a cover—both good configurations and those that Patent Owner argues are inferior. And, even if the proposed combination does not yield a commercially viable product, as Patent Owner implies, the broad claim scope would hinder an innovating competitor’s ability to utilize and test that purported less desirable combination on the way to development of a better device.

Patent Owner argues that a person of ordinary skill in the art would not have been motivated to make the proposed combination and would not have had a reasonable expectation of success in making that combination. *See, e.g.*, PO Resp. 34–35. These arguments are not persuasive at least because Patent Owner’s motivation requirement and implied definition of success are not sufficiently tied to the claimed invention. *See, e.g., Elekta Ltd. v. ZAP Surgical Sys., Inc.*, 81 F.4th 1368, 1375 (Fed. Cir. 2023) (“Reasonable expectation of success refers to the likelihood of success in combining references to meet the limitations of the claimed invention.”). Patent Owner would require a successful outcome to be “quick and efficient wireless charging.” *See* PO Resp. 34–35. In making these arguments, Patent Owner is improperly superimposing the purported goals and purpose of Honda, the secondary reference, onto the ordinary artisan. *See, e.g., id.* at 41–45. However, the intended purpose of a prior art reference does not

control the obviousness inquiry. *Intel Corp. v. Qualcomm Inc.*, 21 F.4th 784, 800 (Fed. Cir. 2021). Our reviewing court recently explained:

The [motivation-to-combine] inquiry is not whether a relevant artisan would combine a first reference’s feature with a second reference’s feature to meet requirements of the first reference that are not requirements of the claims at issue. A contrary view would run counter to established principles, including that the claim defines the invention whose obviousness is being assessed and that a skilled artisan may be motivated to combine particular features of different references, *e.g.*, to secure some benefits at the expense of others, even when bodily incorporation would be impossible or inadvisable.

Axonics, Inc. v. Medtronic, Inc., 73 F.4th 950, 957 (Fed. Cir. 2023).

Petitioner’s combination yields the benefit of the addition of wireless charging capability to a biosensor device. A person of ordinary skill in the art would find that benefit to be a motivating reason to make the combination. *See, e.g.*, Ex. 1003 ¶ 176 (Dr. Duckworth’s motivation opinion based, in part, on “Kotanagi’s own statement that its rechargeable battery can be recharged ‘in a contactless state.’”); *id.* ¶ 149 (Dr. Duckworth describing a motivating factor in “Honda’s teaching of a wireless receive coil near a rear opening similar to that taught in Kotanagi (where both Honda’s and Kotanagi’s openings have a cover glass)” and opining that, in the proposed modifications, “the resulting magnetic flux would pass through the cover glass, as taught by Honda”); *see also* Ex. 1052, 45:16–46:2 (Dr. Anthony, on cross-examination and after being asked whether wireless charging is an improvement over wired charging for a consumer watch, responding that “in some instances it could be, and in others it may not be.”). And, as to a reasonable expectation of success, Patent Owner admits that “Petitioner has presented a device configuration in which a wireless charging coil *could* be provided in Kotanagi’s through hole 22.” PO

Resp. 54; *see also id.* at 3 (Patent Owner arguing that “the size of coil that could be provided in this allegedly available space would be small and would significantly limit the amount of wireless power signal transmission,” but not arguing that even Patent Owner’s purported size-limited configuration would be inoperative); *see, e.g.,* Ex. 1003 ¶¶ 155–156 (Dr. Duckworth credibly testifying that a person of ordinary skill in the art would have had a reasonable expectation of success in combining the teachings of Kotanagi and Honda).

Patent Owner argues that Kotanagi’s device has size constraints that would limit the size and positioning of a charging coil, and that the purported combination, as characterized by Patent Owner, would result in a “significantly degrad[ed] wireless charging efficiency” of Honda’s coil. PO Resp. 41–42; *see id.* at 36–45, *id.* at 55 (Patent Owner arguing that, “given the size restrictions imposed by Kotanagi,” the housing and cover glass cannot be expanded to allow for a larger coil). Patent Owner further argues that the combination would have to be configured a certain way and that the resulting configuration would “would frustrate Honda’s goals and intended purpose.” *Id.* at 37–38, 40–41; *see also, e.g., id.* at 43–44 (Patent Owner arguing that the combination, as characterized by Patent Owner, would inject noise and interference that are contrary to Honda’s goals of quick and efficient power transmission). We do not agree with this line of argument. “The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references.” *In re Keller*, 642 F.2d 413, 425 (CCPA 1981). The person of ordinary skill in the art is not compelled to blindly

follow the teaching of one prior art reference over the other without the exercise of independent judgment. *See Lear Siegler, Inc. v. Aeroquip Corp.*, 733 F.2d 881, 889 (Fed. Cir. 1984). As the Supreme Court recognized in *KSR*, “[a] person of ordinary skill is also a person of ordinary creativity, not an automaton.” 550 U.S. at 421.

Dr. Duckworth persuasively testifies that, “if, under the relevant engineering trade-offs, a POSITA wanted to increase charging speed, consistent with Honda’s teachings, Honda would have provided the motivation and information to either re-size or reshape Kotanagi’s protrusion and/or cover glass to provide for a larger coil.” Ex. 1060 ¶ 346; *see also* Ex. 1003 ¶¶ 157–159 (“[I]t would have been feasible to make the second modification option discussed above: to enlarge Kotanagi’s opening and cover glass to make room for a coil behind the cover glass, surrounding the LED and PD.”); Ex. 2039, 47:5–10 (“[A] POSITA would view Honda’s teachings to either modify Kotanagi to position wireless charging coil behind Kotanagi’s cover glass or enlarge the Kotanagi’s opening and cover glass to make room for a coil behind the cover glass.”); PO Resp. 44 (Patent Owner admitting that Honda teaches that metal is inferior for power transmission and “[t]his is precisely why Honda seeks to provide glass for its rear cover.”). And, although the references express certain goals, Patent Owner does not adequately identify any disclosure in either reference that disparages Petitioner’s articulated combination. *See DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 567 F.3d 1314, 1327 (Fed. Cir. 2009) (“A reference does not teach away, however, if it merely expresses a general preference for an alternative invention but does not ‘criticize, discredit, or otherwise discourage’ investigation into the invention claimed.”).

Even if, as Patent Owner argues, the proposed combination would not quickly charge the device, this is not dispositive. Dr. Anthony agrees that “[d]evices, depending on their use and their function, can benefit from either fast charge or trickle charge or a little bit of charge.” Ex. 1052, 19:3–6. “It’s not necessary to show that a combination is ‘the *best* option, only that it be a *suitable* option.’” *Intel Corp.*, 21 F.4th at 800 (quoting *PAR Pharm., Inc. v. TWI Pharms., Inc.*, 773 F.3d 1186, 1197–98 (Fed. Cir. 2014)); *see also In re Mouttet*, 686 F.3d 1322, 1334 (Fed. Cir. 2012) (“[J]ust because better alternatives exist in the prior art does not mean that an inferior combination is inapt for obviousness purposes.”); *Medichem, S.A. v. Rolabo, S.L.*, 437 F.3d 1157, 1165 (Fed. Cir. 2006) (“[A] given course of action often has simultaneous advantages and disadvantages, and this does not necessarily obviate motivation to combine.”). Based upon the final record before us, we find that a person of ordinary skill in the art would consider even a slow charging configuration to be a suitable option.

Relatedly, Patent Owner argues that another prior art reference, Fraser, discloses a biosensor watch “that implements a larger wireless charging receive coil covering a substantial portion of the rear watch surface and in doing so, counteracts the signal degradations that come from interposing materials and/or spacing between the wireless charging receive and transmit coils (as Petitioner’s proposed configuration demands).” PO Resp. 46 (citing Ex. 2038 ¶ 158). Patent Owner then proposes and analyzes its own combination where Kotanagi is modified by Fraser. *See id.* at 46–54, 56–61. Patent Owner argues that a person of ordinary skill in the art would have compared Petitioner’s proposed combination (as characterized by Patent Owner as being severely space-constrained) against Patent

Owner’s proposed Kotanagi-Fraser combination. *See, e.g., id.* at 59 (“[W]hen modeling such a coil relative to a Fraser-like larger coil, a POSITA would have observed . . .”). Based on this comparison, Patent Owner argues that a person of ordinary skill in the art, being aware of such alternatives, “would not contemplate or concoct Petitioner’s proposed configuration.” *Id.* at 46 (citing Ex. 2038 ¶ 157).

This argument is not persuasive because the existence of alternatives, even if better than Petitioner’s proposed combination, does not obviate the motivation to make the combination. *See, e.g., In re Mouttet*, 686 F.3d at 1334 (“[T]he mere disclosure of alternative designs does not teach away,” and “just because better alternatives exist in the prior art does not mean that an inferior combination is inapt for obviousness purposes.” (internal quotations omitted)); *KSR*, 550 U.S. at 421 (“A person of ordinary skill is also a person of ordinary creativity, not an automaton.”).

Additionally, Patent Owner, in detailing this comparison analysis that allegedly would have been conducted by a person of ordinary skill in the art, implicitly concedes that such a person had a very high level of skill, which further supports a conclusion of obviousness. *See, e.g., PO Resp.* 53 (arguing that “[a] POSITA would have . . . recognized that positioning the coil in the allegedly available space behind the optical elements would limit the size of the coil, and by extension, reduce the device’s wireless power transmission rate and efficiency,” but not going so far as to argue that it would have been inoperable) (citing Ex. 2038 ¶ 177)); *id.* at 59–60 (arguing that an ordinary artisan would model the two combinations and observe that Petitioner’s purportedly constrained combination would charge a device in 10 hours versus 1 hour for Patent Owner’s alternative combination). And,

Patent Owner's arguments as to how a person of ordinary skill in the art purportedly would compare and contrast the placement behind the cover glass (the claimed alternative) versus another configuration requires the person of ordinary skill to be thinking of the claimed configuration in order to make such a comparison. In other words, for a person of ordinary skill in the art to consider the configuration, weigh the pros and cons of that configuration, and then decline to actually build a device having that particular configuration, the artisan would have to recognize that configuration. *See, e.g.*, PO Resp. 53 (Patent Owner arguing that "[a] POSITA would have recognized that positioning the coil in the allegedly available space behind the optical elements would limit the size of the coil, and by extension, reduce the device's wireless power transmission rate and efficiency."). Patent Owner's argument, if correct, is that a particular alternative combination would have been preferred by a person of ordinary skill in the art, but does not undermine Petitioner's showing that the claimed and purportedly less desirable combination would have been obvious. After performing the comparison that purportedly indicates the undesirability of the proposed combination, that combination would not vanish from the artisan's mind and suddenly become non-obvious.

We determine that Petitioner has demonstrated by a preponderance of the evidence that Kotanagi in combination with Honda discloses or suggests a wireless charging receive coil aligned with the opening and a cover over the biosensor module that is configured to pass optical signals and to inductively couple coils for wireless charging. We also determine that Petitioner has shown that a person of ordinary skill in the art would have

been motivated to make the combination proposed by Petitioner and would have had a reasonable expectation of success in doing so.

d. Conclusion as to Independent Claim 7

Having considered the parties' arguments and evidence, we determine that Petitioner has shown by a preponderance of the evidence that the subject matter of independent claim 7 would have been obvious over Kotanagi and Honda.

4. Independent Claim 14 and Dependent Claims 11 and 16

Petitioner contends that independent claim 14 would have been obvious over Kotanagi and Honda. Pet. 31–40. Independent claim 14 recites an electronic device that is similar to the electronic device of independent claim 7. *See* Ex. 1001, 59:46–60:13. One difference is that claim 14 recites, rather than a cover of non-conductive material, “a cover formed from an optically transparent material” with the device configured to receive wireless power and to measure a user's heart rate through the cover. *Id.* at 60:5–13. Petitioner's contentions for claim 14 are similar to those of claim 7. *See, e.g.,* Pet. 35–40 (addressing the “cover” limitations in the context of the glass cover of the proposed combination). Patent Owner does not raise any arguments regarding Petitioner's contentions for independent claim 14 beyond those addressed above for independent claim 7. *See* PO Resp. 61–63; PO Sur-reply 16.

The remaining claims challenged in Ground 1, claims 11 and 16, are dependent claims. Petitioner identifies teachings in the prior art references that teach or suggest the limitations of those dependent claims and provides persuasive reasoning as to why the claimed subject matter would have been obvious to one of ordinary skill in the art. Pet. 30–31, 40–42. For these

claims, Patent Owner does not present arguments beyond those regarding the independent claims and discussed above. *See* PO Resp. 76.

Having considered the parties' arguments and evidence, we determine that Petitioner has shown by a preponderance of the evidence that the subject matter of independent claim 14 and dependent claims 11 and 16 would have been obvious over Kotanagi and Honda.

*E. The Alleged Obviousness of Claims 1–3, 5, 13, and 17
Over Kotanagi, Honda, and Choi (Ground 2)*

Petitioner alleges that claims 1–3, 5, 13, and 17 of the '491 patent would have been obvious over Kotanagi, Honda, and Choi. *See* Pet. 42–54 (addressing independent claim 1). Of those challenged claims, claim 1 is independent. Patent Owner argues that the proposed combination does not render obvious the limitations directed to the wireless charging coil and the ECG electrodes. *See* PO Resp. 63–74.

*1. Choi (Ex. 1011)*⁵

Choi “relates to a wearable device performing user authentication using biosignals.” Ex. 1011 ¶ 1. Choi's Figure 1 is reproduced below.

⁵ According to Petitioner, Exhibit 1011 is a Patent Cooperation Treaty (PCT) publication that claims priority to Exhibit 1023, a translated Korean patent application publication. Pet. 14; *see* Ex. 1023. The parties do not point to any pertinent distinctions between the two, and we, like Patent Owner, refer only to Exhibit 1011 in addressing the parties' arguments. *See, e.g.*, PO Resp. 25.

[Fig. 1]

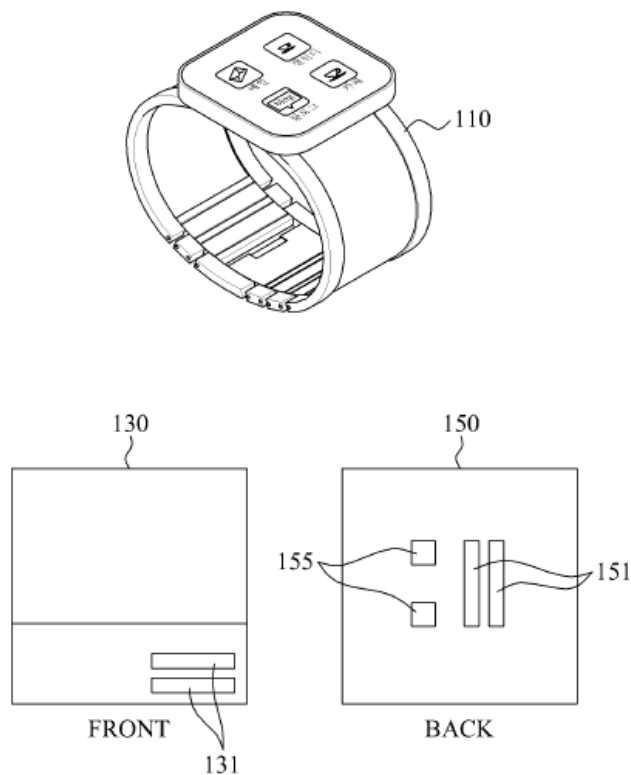


Figure 1 “is a diagram illustrating an example of a wearable device.” *Id.*

¶ 31. “The wearable device includes a plurality of sensors 131, 151, and 155 provided on the front 130 and the back 150, respectively.” *Id.* ¶ 44. “The wearable device detects, using at least one of the sensors 131, 151, and 155, a trigger signal triggering a process of user authentication, and initiates the user authentication based on the detected trigger signal.” *Id.*

Choi explains:

When the process of user authentication with respect to the user is initiated by the first biosignal detected by the sensor 155 provided on the back 150 of the wearable device, the wearable device may authenticate the user, using a second biosignal detected by the sensor 131 provided on the front 130 and/or the sensor 151 provided on the back 150. The second biosignal may be unique to each user, and be distinguished from the first biosignal. The second biosignal may include, for example, an electrocardiogram (ECG) signal, a photoplethysmogram (PPG) signal, a voice of the user, and/or

an impedance signal generated by a body of the user. Based on implementation, the second biosignal may be unique to each user, and thus, recognizing an iris or a fingerprint may be used to obtain the second biosignal.

Id. ¶ 47; *see also id.* ¶ 56 (“The second sensor 220 detects a second biosignal of the user. The second biosignal may include, for example, an ECG signal, a PPG signal, a voice of the user, and/or an impedance signal generated by the body of the user.”).

Choi states:

To detect the ECG signal as an example of the second biosignal, a signal detected in at least two different portions of the body of the user may be needed, and thus, the sensors 131 and 151 are provided on the front 130 and on the back 150, respectively. In an example of detecting a biosignal unique to the user from a body part, for example, a voice of the user and/or an impedance signal generated by the body of the user, aside from the ECG signal, a sensor used to receive the second biosignal may be provided on either the front 130 or the back 150. A number of the sensors used to detect the first biosignal and the second biosignal may vary based on need.

Id. ¶ 52.

1. Independent Claim 1

a. The Preamble (1a) and Limitations 1b–1f and 1i

Independent claim 1 is similar to independent claims 7 and 14, reciting an electronic watch that has an optical sensor and a wireless charging coil. Ex. 1001, 57:65–58:21. Claim 1 additionally recites a touch-sensitive display, a rear cover formed from a dielectric material, and two electrodes on the device’s rear surface with the device configured to measure an electrocardiogram (ECG) using the electrodes. *Id.* The watch is configured to measure heart rate using the optical sensor. *Id.* at 58:17–18.

Petitioner contends, *inter alia*, that the glass of Kotanagi's cover is a dielectric material. Pet. 46–47 (citing, *inter alia*, Ex. 1003 ¶¶ 222–223); *see also id.* at 42–48, 50 (addressing the preamble (1a) and limitations 1b–1f and 1i). Petitioner also contends that Choi discloses a biosensing watch with a touch display and that it would have been obvious to incorporate a touchscreen in Kotanagi's device. *Id.* at 44–45. Much of the claimed subject matter is not in dispute as Patent Owner's arguments, discussed further below, pertain to the wireless charging coil and the ECG electrodes. *See* PO Resp. 63–74 (discussing limitation 1g, 1h, and 1j).

b. [1g] a charging coil positioned within the housing and configured to receive wireless power through the dielectric material of the cover

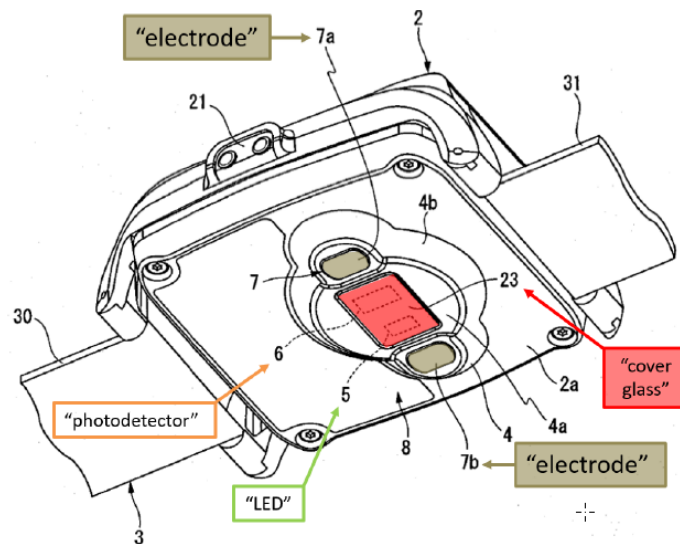
Petitioner contends, for the reasons given for independent claim 7, that the base combination of Kotanagi and Honda teaches the recited “charging coil positioned within the housing and configured to receive wireless power through the dielectric material of the cover” of independent claim 1. *See* Pet. 48–49. Patent Owner does not raise any arguments regarding Petitioner's contentions for the charging coil aspect of independent claim 1 beyond those addressed above for independent claim 7. *See* PO Resp. 63–65; PO Sur-reply 17.

c. [1h] a first electrode positioned along a rear surface of the electronic watch; and a second electrode positioned along the rear surface of the electronic watch, wherein: . . . [1j] the electronic watch is configured to measure an electrocardiogram using the first electrode and the second electrode

Limitations 1h and 1j call for the watch to have two electrodes along its rear surface and the watch to be configured to measure an

electrocardiogram (ECG) using those two electrodes. Ex. 1001, 58:13–16, 58:19–21.

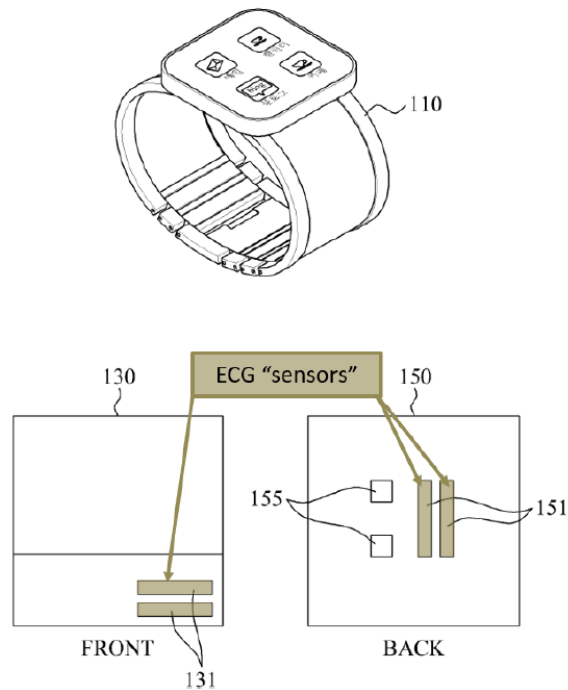
Petitioner contends that “Kotanagi teaches a pair, or plurality, of electrodes that measures a ‘potential difference’ between them.” Pet. 50 (citing Ex. 1005 ¶¶ 59, 86). Petitioner’s annotated version of Kotanagi’s Figure 5 is reproduced below.



Pet. 50 (citing Ex. 1003 ¶ 230; Ex. 1005, Fig. 5). Above is Kotanagi’s Figure 5, perspective view of the biological information measuring device, annotated by Petitioner with colors indicating the optical components (orange and green boxes), the cover glass (red), and electrodes 7a and 7b (brown). *Id.*; Ex. 1005 ¶¶ 41, 59.

Petitioner further contends that “Choi uses electrodes to directly obtain an electrocardiogram,” and notes that Choi states: “To detect the ECG signal . . . , a signal detected in at least two different portions of the body of the user may be needed, and thus, the sensors 131 and 151 are provided on the front 130 and on the back 150, respectively.” Pet. 51 (citing Ex. 1011 ¶ 52) (alteration in original). Reproduced below is Choi’s Figure 1 as annotated by Petitioner.

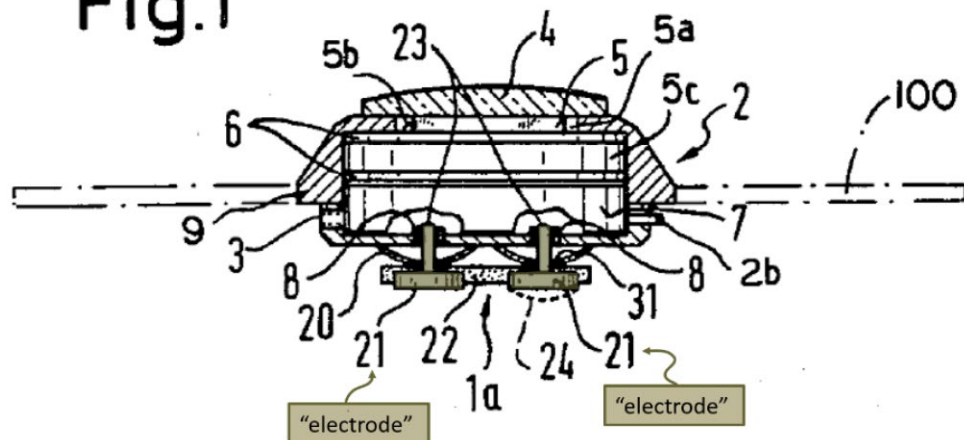
[Fig. 1]



Id. (citing Ex. 1023, Fig. 1; Ex. 1011, Fig. 1; Ex. 1003 ¶ 232). Above is Choi’s Figure 1, which is “a diagram illustrating an example of a wearable device,” with front ECG sensor 131 and back ECG sensor 151 in brown. *Id.*; Ex. 1011 ¶ 42.

Petitioner asserts that “a POSITA would have considered alternative electrode arrangements for ECG measurement” and, relying on Schmid, contends that “[a] POSITA would have known by September 2, 2014 (given its availability in at least 1980), that a pair of ECG electrodes can be spaced as close as 4–5 mm on the back of a watch . . . and remain accurate.” Pet. 52 (citing Ex. 1029, 3:7–15, 4:34–45; Ex. 1003 ¶ 233). Reproduced below is Schmid’s Figure 1 as annotated by Petitioner.

Fig.1



Pet. Reply 27 (citing Ex. 1029, Fig. 1; Ex. 1003 ¶ 233); *see also* Pet. 52 (the unannotated version of Figure 1). Above is Schmid’s Figure 1—which is “an elevational view partly broken away and partly in section, of an electrode assembly or set—with Petitioner’s annotations in the form of brown labels on the two electrodes 21. Pet. Reply 27; Ex. 1029, 4:58–59.

Petitioner explains its proposed modification, contending that, “[i]n view of this knowledge, a POSITA would have used Kotanagi’s existing electrodes and Choi’s teachings to either: (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.” Pet. 52–53 (citing Ex. 1003 ¶ 233).

Petitioner also contends that:

A POSITA would have . . . been motivated before the effective filing date to expect success in combining the teachings of Kotanagi and Choi, because they both teach a watch with both optical and electrode biosensors. Kotanagi teaches “a plurality of electrodes” to detect electrical potential of skin contact. EX1005 ¶¶14,86. Choi teaches similar electrodes, but obtains an ECG or obtains an “impedance signal,” which is analogous to the electrical potential taught in Kotanagi. EX1023 [56]; EX1011 [50]. Because Kotanagi already has multiple electrodes, any further modification from

Choi (e.g., to process electrode signals differently or to add an electrode) would have involved mere combinations of familiar elements according to known methods to yield predictable results.

Id. at 53–54 (citing *KSR*, 550 U.S. at 416; Ex. 1003 ¶¶ 235–241). Petitioner continues:

Moreover, because Kotanagi’s rear electrodes are similarly spaced and positioned (accounting for scale differences) to those of Choi and known 2-electrode devices (*see* EX1029 [Schmid] at 2), configuring them to measure an ECG would thus have been an application of 1980-era technology, with an expectation of success, resulting in a watch with improved biosensing.

Id. at 54 (citing Ex. 1003 ¶ 235).

We note that Patent Owner agrees that: “Kotanagi’s wrist-worn device includes two electrodes on its rear surface,” “Choi teaches a watch that measures ECG using electrodes on the watch’s front and rear surfaces,” and “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.” PO Sur-reply 17–18 (citations omitted).

Patent Owner argues that “Petitioner has failed to demonstrate why or how a POSITA would have combined the teachings of these references in the proposed manner.” PO Resp. 68 (citing Ex. 2038 ¶ 223). Patent Owner notes that Petitioner contends that adding ECG measurement to Kotanagi’s watch will have “improved biosensing,” and argues that “the Petition fails to demonstrate how such functionality would be implemented in Kotanagi’s device.” *Id.* at 70 (citing Ex. 2038 ¶ 234). According to Patent Owner, Kotanagi teaches only that the electrodes have a skin contact detection function, and does not teach using them for ECG measurements. *See id.*

at 67 (citing Ex. 1005; Ex. 2038 ¶¶ 219–220). Patent Owner also argues that “teachings in Choi contemplate ECG sensor positioning on two different surfaces—instead of only a single surface, as characterized by Petitioner.” *Id.* at 67–68 (citing Ex. 2038 ¶¶ 221–222). Also as to Choi, Patent Owner argues that it teaches a skin detection sensor separate from the ECG sensor, and does not teach a single electrode performing both functions. *Id.* at 70–71. Patent Owner concedes that “Schmid’s electrodes are used to measure ECG,” but argues that Schmid’s wrist-worn device itself is not configured to measure ECG because the signals from the ECG electrodes are sent by cable to a conventional EKG machine. *Id.* at 73–74. Patent Owner, in summarizing its position, argues that “Petitioner has not presented sufficient evidence to demonstrate that the same electrodes in Kotanagi—which have a skin contact detection function—would be leveraged alone or in combination with additional electrode(s)—to generate signals that would be ‘process[ed]’ ‘differently’ to additionally obtain ECG measurements.” *Id.* at 72 (citing Ex. 2038 ¶ 239; Pet. 53) (alteration in original).

We do not agree with Patent Owner’s argument. Patent Owner is arguing each reference individually, asserting that none discloses the overall claimed subject matter, rather than properly evaluating the references’ combined teachings. *See Game & Tech. Co. v. Wargaming Grp. Ltd.*, 942 F.3d 1343, 1352 (Fed. Cir. 2019) (“The question in an obviousness inquiry is whether it would have been obvious to a person of ordinary skill in the art to combine the relevant disclosures of the . . . references, not whether each individual reference discloses all of the necessary elements.”).

Kotanagi teaches a wrist-worn device having an optical biosensor and two electrodes that contact the user’s skin. Choi teaches the use of

electrodes on a wrist-worn device for ECG measurement, although Figure 1 does not depict both sensors as located on the back of the watch as claim 1 recites. However, as Patent Owner agrees, “Schmid discloses that its wrist-worn device includes electrodes on the device’s rear surface . . . to measure ECG.” PO Sur-reply 17–18. We agree with Petitioner that Schmid indicates that a person of ordinary skill in the art would have known that two ECG electrodes may be placed close together on the back of a watch and remain accurate. Pet. 52 (citing Ex. 1029, 3:7–15, 4:34–45; Ex. 1003 ¶ 233); *see* Ex. 1003 ¶ 237. We also agree with Petitioner that the proposed modification of “us[ing] signals from Kotanagi’s existing electrodes to obtain an ECG,” Pet. 52, would have “result[ed] in a watch with improved biosensing,” *id.* at 54.⁶ We determine that Petitioner has demonstrated that a person of ordinary skill in the art would have been motivated to modify Kotanagi’s wrist-worn device to have, in addition to its existing optical biosensor for generating a pulse signal (Ex. 1005 ¶ 46), the ability to measure ECG via Kotanagi’s existing rear electrodes. *See* Pet. 53–54 (“Because Kotanagi already has multiple electrodes, any further modification from Choi (e.g., to process electrode signals differently . . .) would have involved mere combinations of familiar elements according to known methods to yield predictable results.” (citing *KSR*, 550 U.S. at 416)).

Patent Owner argues that, “if Petitioner’s combination seeks to reconfigure Kotanagi’s electrodes to generate ECG measurements (instead

⁶ Because we determine that Petitioner has demonstrated obviousness of its first proposed combination (using Kotanagi’s existing electrodes), we do not reach the second proposed combination (adding additional electrodes to Kotanagi). *See* Pet. 52.

of detecting skin contact), that would frustrate Kotanagi's specific goal and purpose of using the electrodes to ensure skin contact and enhance adherence of its wrist-worn device to the wearer's body." Prelim. Resp. 72 (citing Ex. 2038 ¶ 240; Ex. 1005 ¶ 5). Petitioner replies that it "does not propose to measure ECG *rather than* detect skin contact." Pet. Reply 33. Petitioner asserts that its "proposal to use Kotanagi's electrodes to measure ECG does not prevent using the electrodes to also detect skin contact." *Id.* (citing Pet. 52; Ex. 1060 ¶ 408).

We do not agree with Patent Owner's argument regarding the purported frustrating of Kotanagi's purpose. The intended purpose of a prior art reference does not control the obviousness inquiry. *Intel Corp.*, 21 F.4th at 800; *Axonics, Inc.*, 73 F.4th at 957 ("The [motivation-to-combine] inquiry is not whether a relevant artisan would combine a first reference's feature with a second reference's feature to meet requirements of the first reference that are not requirements of the claims at issue. . . . [A] skilled artisan may be motivated to combine particular features of different references, e.g., to secure some benefits at the expense of others, even when bodily incorporation would be impossible or inadvisable.").

Additionally, even if a person of ordinary skill in the art would want to retain Kotanagi's skin detection in addition to ECG sensing, we are persuaded that an ordinary artisan could accomplish that using the two existing electrodes on Kotanagi's back. We do not agree with Patent Owner's implied argument that the references' electrodes are application-specific and unique. *See* PO Sur-reply 21 ("Masimo's assertion that electrodes 'are generic components used to detect electrical signals by contacting a wearer' . . . is incorrect and does not support the suggestion that

the same electrode would be used for ECG and skin contact detection.” (citing Pet. Reply 30; Ex. 2038 ¶¶ 227–230)). Patent Owner’s assertion that Schmid’s wrist-worn device, having ECG electrodes, does not measure ECG but rather sends the signals to an external ECG apparatus supports the understanding that it is a given device’s circuitry, not the electrode, that determines how the signal from the electrodes is to be used and what biological parameter is detected. *See* PO Resp. 73–74; *see also, e.g.*, Ex. 2038 ¶ 229 (Dr. Anthony testifying that it is the electrodes in conjunction with “the electronics to which they are attached” that determines skin contact by sensing a closed circuit).

Petitioner’s references collectively indicate that the person of ordinary skill in the art was very knowledgeable about electrodes and how to use them for a particular desired purpose. We find to be persuasive (and a proper reply to Patent Owner’s frustration of purpose argument) Petitioner’s contention that a person of ordinary skill in the art would have understood that Kotanagi’s electrodes could be used for both for skin detection and for ECG readings. *See* Pet. Reply 30–31; *see, e.g.*, PO Sur-reply 21–27 (Patent Owner addressing the purported new theories and evidence); *id.* at 27 (Patent Owner asserting that its Response to the Petition refuted the theory that “Kotanagi’s electrodes are used for ECG detection and skin contact detection.”). We find Dr. Duckworth’s testimony in this regard to be credible. Dr. Duckworth testifies that Kotanagi and Choi teach similar electrodes, although used for sensing different parameters. Ex. 1003 ¶ 235. Dr. Duckworth also testifies that “Kotanagi discloses conventional electrodes—i.e., solid metal leads that protrude for body contact—useable for standard electrode functions,” and that “a POSITA would have known

that the same electrical contacts (i.e., electrodes) [of Kotanagi] can be used to detect various physiological signals, such as GSR, ECG, GSP, EMG, etc.” Ex. 1060 ¶ 403. The testimony of Dr. Anthony cited by Patent Owner does not contradict this. *See* Ex. 2038 ¶¶ 227–230. Dr. Anthony lumps together electrodes and the circuitry in opining that those pairs are specialized. *See id.*; *see, e.g., id.* ¶ 227 (“ECG electrodes, along with the accompanying instrumentation system (which generally includes signal amplification and signal filtering), as well as the computation system (which generally involves digital mixing and further filtering), are highly specialized components tailored for the precise measurement of the intricate electrical signals generated by the heart’s activity.”); *id.* ¶ 233 (Dr. Anthony testifying that the *use* of electrodes for determining ECG and skin contact have “notable differences,” rather than opining that the electrodes themselves are different); *see also* PO Sur-reply 21 (Patent Owner arguing: “As Dr. Anthony explained, electrodes *and the associated circuitry* vary based on the function performed.” (emphasis added)). We fail to find, in the paragraphs cited by Patent Owner, an unequivocal opinion from Dr. Anthony that electrodes alone would have been unique for each application.

Having considered the parties’ arguments and evidence, we determine that Petitioner has demonstrated that the combination of Kotanagi, Honda, and Choi renders obvious independent claim 1.

2. Dependent Claims 2, 3, 5, 13, and 17

The remaining claims challenged in Ground 2 are all dependent claims. Petitioner identifies teachings in the prior art references that teach or suggest the limitations of dependent claims 2, 3, 5, 13, and 17, and provides persuasive reasoning as to why the claimed subject matter would have been

obvious to one of ordinary skill in the art. Pet. 54–61. Patent Owner’s Response contains a section directed to dependent claims 13 and 17, which add limitations concerning electrodes for ECG use to, respectively, independent claim 7 and independent claim 14 (the claims that were the subject of Ground 1). *See* PO Resp. 75; Ex. 1001, 59:37–45, 60:32–39. However, for these claims, Patent Owner does not present arguments beyond those regarding the independent claims and discussed above. *See* PO Resp. 75. Patent Owner also does not present separate arguments for dependent claims 2, 3, and 5. *See id.* at 76 (“Claims 2–6, 8–12, 15–16, and 18–19 are not rendered obvious by the presented combination for at least the reasons described above with reference to independent claims from which these claims depend.”).

Having considered Petitioner’s arguments and evidence, we determine that Petitioner has demonstrated that the combination of Kotanagi, Honda, and Choi renders obvious claims 2, 3, 5, 13, and 17.

*F. The Alleged Obviousness of Claims 8 and 15
Over Kotanagi, Honda, and Fraser (Ground 3)*

*The Alleged Obviousness of Claim 9
Over Kotanagi, Honda, and Orr (Ground 4)*

*The Alleged Obviousness of Claims 12 and 18
Over Kotanagi, Honda, and Park (Ground 5)*

*The Alleged Obviousness of Claim 4
Over Kotanagi, Honda, Choi, and Park (Ground 6)*

*The Alleged Obviousness of Claims 10 and 19
Over Kotanagi, Honda, and Jabori (Ground 7)*

*The Alleged Obviousness of Claim 6
Over Kotanagi, Honda, Choi, and Jabori (Ground 8)*

The remaining grounds challenge dependent claims. Petitioner identifies teachings in the prior art references that teach or suggest the

limitations of those dependent claims and provides persuasive reasoning as to why the claimed subject matter would have been obvious to one of ordinary skill in the art. Pet. 61–91. Patent Owner does not present arguments beyond those regarding the independent claims and discussed above. *See* PO Resp. 76 (“Claims 2–6, 8–12, 15–16, and 18–19 are not rendered obvious by the presented combination for at least the reasons described above with reference to independent claims from which these claims depend.”).

Having considered Petitioner’s arguments and evidence, we determine that Petitioner has demonstrated that each of the combinations of relied-on references renders obvious claims 4, 6, 8–10, 12, 15, 18, and 19.

III. CONCLUSION⁷

Petitioner has shown by a preponderance of the evidence that claims 1–19 of the ’491 patent are unpatentable over the relied-upon references.

In summary:

Claim(s)	35 U.S.C. §	Reference(s)/Basis	Claim(s) Shown Unpatentable	Claim(s) Not Shown Unpatentable
7, 11, 14,	103	Kotanagi, Honda	7, 11, 14, 16	

⁷ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner’s attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. *See* 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. § 42.8(a)(3), (b)(2).

Claim(s)	35 U.S.C. §	Reference(s)/Basis	Claim(s) Shown Unpatentable	Claim(s) Not Shown Unpatentable
16				
1–3, 5, 13, 17	103	Kotanagi, Honda, Choi	1–3, 5, 13, 17	
8, 15	103	Kotanagi, Honda, Fraser	8, 15	
9	103	Kotanagi, Honda, Orr	9	
12, 18	103	Kotanagi, Honda, Park	12, 18	
4	103	Kotanagi, Honda, Choi, Park	4	
10, 19	103	Kotanagi, Honda, Jabori	10, 19	
6	103	Kotanagi, Honda, Choi, Jabori	6	
Overall Outcome			1–19	

IV. ORDER

For the foregoing reasons, it is

ORDERED that claims 1–19 of the '491 patent have been proven to be unpatentable; and

FURTHER ORDERED that, because this is a Final Written Decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

IPR2023-00734
Patent 10,942,491 B2

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