

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.,
Petitioner,

v.

MASIMO CORPORATION,
Patent Owner.

IPR2024-00243
Patent 10,722,159 B2

Before AMANDA F. WIEKER, RICHARD H. MARSCHALL, and
DAVID COTTA, *Administrative Patent Judges*.

MARSCHALL, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314

Petitioner Apple Inc. filed a Petition (Paper 2, “Pet.”) requesting *inter partes* review of claims 1–25 of U.S. Patent No. 10,722,159 B2 (Ex. 1001, “the ’159 patent”). *See* Pet. 1. Patent Owner Masimo Corporation filed a Preliminary Response (Paper 6, “Prelim. Resp.”). With our authorization, Petitioner filed a Preliminary Reply (Paper 9, “Prelim. Reply”) and Patent Owner filed a Preliminary Sur-reply (Paper 10, “Prelim. Sur-reply”).

We have authority to determine whether to institute an *inter partes* review. *See* 35 U.S.C. § 314; 37 C.F.R. § 42.4(a) (2022). Under 35 U.S.C. § 314(a), we may not authorize an *inter partes* review unless the information in the petition and the preliminary response “shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” Upon consideration of the evidence and arguments in the record, we institute *inter partes* review of the ’159 patent on all challenges set forth in the Petition.

BACKGROUND

A. Real Parties-in-Interest and Related Matters

Petitioner identifies itself as its only real party-in-interest. Pet. 88. Patent Owner identifies itself as its only real party-in-interest. Paper 4, 1.

Petitioner also challenges claims of the ’159 patent in concurrently-filed IPR2024-00244. Pet. 89. The parties identify *Apple Inc. v. Masimo Corp.*, No. 1-22-cv-01378 (D. Del.) (“Delaware Litigation”), involving the ’159 patent, as a related matter. *Id.*; Paper 4, 1.

Petitioner states that it filed a number of *inter partes* review proceedings challenging Patent Owner’s patents and describes three *inter partes* review proceedings as “particularly relevant due to related subject matter and claim scope”: IPR2020-01722 (involving US 10,470,695),

IPR2024-00243
Patent 10,722,159 B2

IPR2022-01291 (involving US 10,687,745 (the “’745 patent”)), and IPR2022-01465 (involving the ’745 patent). Pet. 89. Petitioner also identifies an ITC proceeding between the parties involving the ’745 patent. *Id.* (citing *Masimo Corp. v. Apple Inc.*, ITC Inv. No. 337-TA-1276).

Patent Owner also identifies the following *inter partes* review proceedings related to patents asserted by Patent Owner in the above-referenced Delaware Litigation as related matters:

Petitioner	Case No.	Patent No.
Apple Inc.	IPR2024-00290	8,190,223
Apple Inc.	IPR2024-00296	10,984,911
Apple Inc.	IPR2024-00244	10,722,159
Apple Inc.	IPR2024-00293	10,736,507
Apple Inc.	IPR2024-00294	10,736,507
Apple Inc.	IPR2024-00241	10,687,743
Apple Inc.	IPR2024-00242	10,687,743

Paper 4, 2.

B. The ’159 Patent

The ’159 patent is directed to a non-invasive, optical-based physiological monitoring device. Ex. 1001, code (57). In one embodiment, the device is utilized to measure a patient’s arterial blood oxygen saturation, sometimes shorthand as “SpO2.” *See id.* at 1:22–26, 1:53–2:3, 2:15–17. In other embodiments, the device is utilized to measure other blood constituent characteristics. *See id.* at 2:39–49 (stating the device can measure “oxygen, carboxyhemoglobin, methemoglobin, total hemoglobin, glucose, proteins, lipids, a percentage thereof (e.g., saturation), pulse rate, perfusion index, oxygen content, total

hemoglobin, Oxygen Reserve Index™ (ORI™) or . . . many other physiologically relevant patient characteristics”).

Figure 3 of the '159 patent is reproduced below.

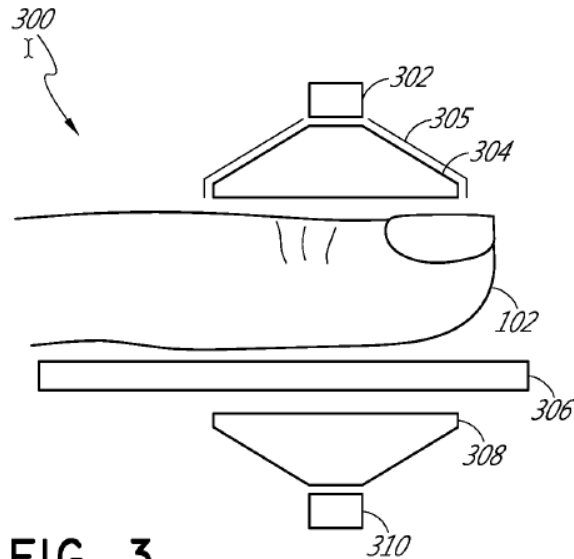


FIG. 3

Figure 3 is a schematic side view of pulse oximetry sensor 300 and tissue measurement site 102 (i.e., a patient's fingertip). Ex. 1001, 5:12–14, 7:4–9. Sensor 300 includes a “reflector 305,” “an emitter 302, a light diffuser 304, a light-absorbing detector filter 306, a light concentrator 308, and a detector 310.” *Id.* at 7:12–14, 7:17–18.

Emitter 302 emits light toward tissue site 102, and diffuser 304 spreads the light over an area. *See* Ex. 1001, 7:12–14, 7:30–49. “In some embodiments, the light diffuser 304 is a beam shaper that can homogenize the input light beam from the emitter 302, shape the output intensity profile of the received light, and define the way (e.g., the shape or pattern) the emitted light is distributed to the tissue measurement site 102.” *Id.* at 7:44–49; *see also id.* at 7:63–66 (“Advantageously, the diffuser 304 can receive emitted light in the form of a point optical source and spread the light to fit a desired surface area on a plane defined by the surface of the tissue

measurement site 102.”). Reflector 305 prevents the emitted light from escaping out of the top portion of diffuser 304, thereby maximizing the light that reaches tissue site 102. *Id.* at 7:14–29.

The light enters tissue site 102, interacts with the patient’s blood flowing through the tissue site, and exits the tissue on the opposite side from which the light entered the tissue. Ex. 1001, Fig. 3, 6:55–64, 7:6–22.

Filter 306 is coated with a “light-absorbing” material “such as, for example, black pigment,” and it has an opening (not shown in Figure 3) through which the transmitted light may pass to reach light concentrator 308 and light detector 310. *Id.* at 7:12–14, 8:32–38, 8:54–59; *see also id.* at 9:31–51 (describing light absorbing filter 306 in Figure 4A as having “rectangular opening 402,” through which light may pass to light concentrator 308 and light detector 310). Detector 310 outputs a signal responsive to the transmitted light, and the signal is communicated to a processor which utilizes the signal to determine a physiological parameter of interest, such as blood oxygen saturation. *Id.* at 9:19–30; *see also id.* at 12:1–14:29 (describing embodiment depicted in Figure 8).

Figures 7A and 7B of the '159 patent are reproduced below.

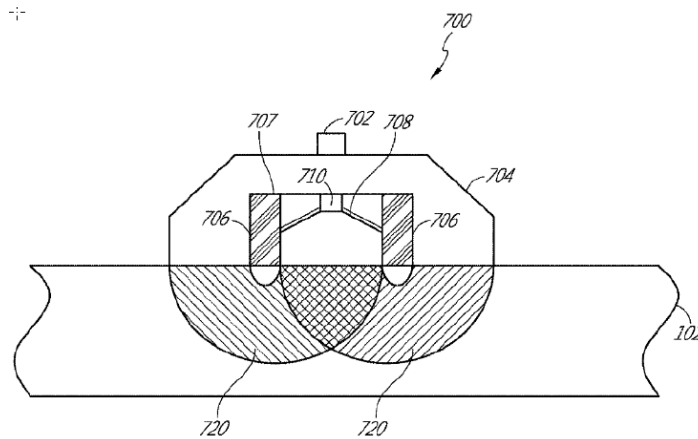


FIG. 7A

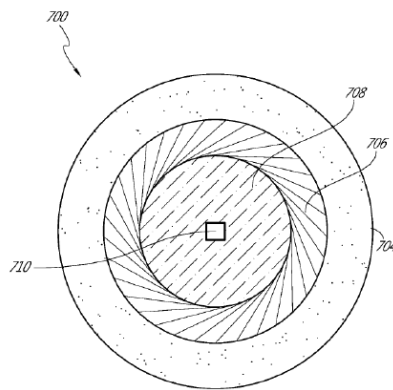


FIG. 7B

Figure 7A is a schematic side view of pulse oximetry sensor 700 and tissue measurement site 102, and Figure 7B is a schematic top view of sensor 700 with some components removed. Ex. 1001, 5:28–33, 10:40–42, 11:54–56. Sensor 700 is useful in connection with a tissue site having a “relatively flat surface, such as, for example a wrist, because the emitter 702 and detector 710” are located on “the same side of the tissue measurement site 102.” *Id.* at 10:43–49. Sensor 700 includes light diffuser 704 and light concentrator 708, and components 702, 704, 708, and 710 function substantially the same as corresponding components 302, 304, 308, and 310 of sensor 300 as described above. *Id.* at 10:49–11:9, 11:21–43. One difference, however, is that diffuser 704 spreads the light “over a wide,

donut-shaped area . . . outlined by the light diffuser 704” (seen best in Figure 7B) to enter tissue site 102. *Id.* at 10:65–11:6.

Sensor 700 additionally includes light blocker 706 and cover 707, which prevent light from emitter 702 from passing directly into light detector 710 without first traversing light path 720 within tissue site 102. Ex. 1001, 11:10–20, 11:44–67.

C. Challenged Claims

The ’159 patent includes 25 claims, all of which Petitioner challenges here, including independent claims 1, 14, and 19. Ex. 1001, claims; Pet. 1. Claims 1 and 14, which are illustrative of the subject matter of the challenged claims, are reproduced below.

1. [1.0] A physiological monitoring device comprising:
 - [1.1] a plurality of emitters configured to emit light in a first shape;
 - [1.2] a material positioned between the plurality of emitters and a tissue measurement site on a wrist of a user when the physiological monitoring device is in use, the material configured to change the first shape into a second shape by which the light emitted from one or more of the plurality of emitters is projected towards a surface of the tissue measurement site;
 - [1.3] a plurality of detectors configured to detect at least a portion of the light after passing through tissue, the plurality of detectors further configured to output at least one signal responsive to the detected light;
 - [1.4] a surface comprising a dark-colored coating, the surface positioned between the plurality of detectors and the tissue when the physiological monitoring device is in use,
 - [1.5] wherein an opening defined in the dark-colored coating is configured to allow at least a portion of light reflected from the tissue to pass through the surface;

[1.6] a light block configured to prevent at least a portion of the light emitted from the plurality of emitters from reaching the plurality of detectors without first reaching the tissue; and

[1.7] a processor configured to receive and process one or more signals responsive to the at least one outputted signal and determine a physiological parameter of the user responsive to the one or more signals.

14. [14.0] A physiological monitoring device comprising:

[14.1] a plurality of optical sources configured to emit light proximate a wrist of a user;

[14.2] a diffuser configured to be positioned between the plurality of optical sources and a tissue measurement site on the wrist of the user when the physiological monitoring device is in use;

[14.3] a light block having a circular shape;

[14.4] a plurality of detectors configured to detect at least a portion of the light after the light passes through a portion of the tissue measurement site bounded by the light block, wherein the plurality of detectors are arranged in an array having a spatial configuration corresponding to a shape of the portion of the tissue measurement site bounded by the circular shaped light block, wherein the plurality of detectors are further configured to output at least one signal responsive to the detected light, and wherein the plurality of optical sources and the plurality of detectors are arranged in a reflectance measurement configuration;

[14.5] wherein the light block is configured to prevent at least a portion of light emitted from the plurality of optical sources from reaching the plurality of detectors without first reaching tissue;

[14.6] a processor configured to receive and process one or more signals responsive to the at least one outputted signal and determine a physiological parameter of the user responsive to the one or more signals; and

[14.7] wherein the physiological monitoring device is configured to transmit physiological parameter data to a separate processor.

Ex. 1001, claims 1, 14 (with bracketed designations added by Petitioner, *see* Pet. viii).

D. Asserted Grounds of Unpatentability

Petitioner asserts that claims 1–25 are unpatentable on the following grounds:

Claim(s) Challenged	35 U.S.C. § ¹	Reference(s)/Basis
1, 2, 4–13	103	Iwamiya, ² Sarantos ³
3	103	Iwamiya, Sarantos, Han ⁴
14–25	103	Iwamiya, Sarantos, Utter ⁵

Petitioner relies on the declaration of Brian W. Anthony, Ph.D. (Ex. 1003), and Patent Owner relies on the declaration of Vijay K. Madisetti, Ph.D. (Ex. 2002).

¹ The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112–29, 125 Stat. 284, 285–88 (2011), revised 35 U.S.C. §§ 102, 103 effective March 16, 2013. The date of the earliest patent document to which the ’159 patent claims priority is July 2, 2015. *See* Ex. 1001, codes (63), (60). Because that date falls after the effective date of the applicable AIA amendments, we apply the AIA versions of §§ 102 and 103 here.

² US 8,670,819 B2, issued Mar. 11, 2014 (Ex. 1004, “Iwamiya”).

³ US 9,392,946 B1, issued July 19, 2016 (Ex. 1005, “Sarantos”).

⁴ US 2016/0058312 A1, published Mar. 3, 2016 (Ex. 1008, “Han”).

⁵ US 8,446,275 B2, issued May 21, 2013 (Ex. 1006, “Utter”).

ANALYSIS

A. Discretionary Denial in View of Parallel District Court Litigation

Patent Owner argues that we should deny institution under *Fintiv* based on the Delaware Litigation. Prelim. Resp. 16–33; *see Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 at 11–12 (PTAB Mar. 20, 2020) (precedential) (holding that PTAB has discretion to deny institution in certain circumstances where there is a parallel district court proceeding). Our analysis under *Fintiv* is guided by the USPTO Director’s Memorandum, issued on June 21, 2022, titled “Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation” (“Director’s Memo”).⁶ Pursuant to the Director’s Memo, we “will not discretionarily deny institution . . . where a petitioner presents a [*Sotera*] stipulation.” Director’s Memo 3 (citing *Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019, Paper 12 (PTAB Dec. 1, 2020) (precedential as to § II.A)). Because Petitioner has offered a stipulation like that in *Sotera*, i.e., a stipulation to “not pursue for the instituted claims, in [the Delaware Litigation], the same grounds as in the IPR2024-00243 petition or any grounds that could have reasonably been raised in that Petition” (Ex. 1078, 1), we do not discretionarily deny institution under *Fintiv*.

Patent Owner argues that Petitioner’s stipulation “does not carry the benefits underlying the Director’s Guidance” because it was filed “only after the parties and the court conducted extensive and costly fact and expert discovery, and fully briefed and argued dispositive motions.” Prelim. Sur-

⁶ Available at https://www.uspto.gov/sites/default/files/documents/interim_proc_discretionary_denials_aia_parallel_district_court_litigation_memo_20220621_.pdf.

reply 2. This argument is not persuasive because the Director’s Guidance does not afford discretion to discount a *Sotera* stipulation based on how far a parallel district court litigation has progressed when the stipulation was made. Director’s Memo 7 (explaining, without qualification, that “the PTAB will not discretionarily deny institution of an IPR or PGR in view of parallel district court litigation where a petitioner stipulates not to pursue in a parallel district court proceeding the same grounds as in the petition or any grounds that could have reasonably been raised in the petition”); *see also* *NXP USA, Inc. v. Impinj, Inc.*, IPR2021-01556, Paper 13 (Vidal Sept. 7, 2022) (precedential) (explaining that the only appropriate time for a petitioner to offer a stipulation related to *Fintiv* factor 4 is prior to the Board’s decision on institution).

Accordingly, we decline to deny institution based on the Delaware Litigation.

B. Discretionary Denial in View of Parallel Petitions

Petitioner filed two petitions for *inter partes* review against claims of the ’159 patent, challenging claims 1–25 in this Petition and claims 1–5, 7–14, and 16–25 in IPR2024-00244. *See Apple Inc. v. Masimo Corp.*, IPR2024-00244, Paper 3 (PTAB Dec. 12, 2023). Patent Owner argues that Petitioner “fails to establish that two petitions on the ’159 Patent are necessary” and that, “if the Board institutes one petition, it should deny the other one.” Paper 8, 1, 5. Petitioner requests that we consider this Petition before we consider the Petition in IPR2024-00244. Paper 3, 1. Accordingly, we reserve consideration of whether multiple petitions are merited for the decision in IPR2024-00244.

C. Legal Standards

In an *inter partes* review, “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) (citing 35 U.S.C. § 312(a)(3) (requiring *inter partes* review petitions to identify “with particularity . . . the evidence that supports the grounds for the challenge to each claim”)). If Petitioner meets its burden as to one challenged claim, we generally institute as to all challenged claims because, “[w]hen instituting *inter partes* review, the Board will authorize the review to proceed on all of the challenged claims and on all grounds of unpatentability asserted for each claim.” *SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348, 1354, 1359–60 (2018); 37 C.F.R. § 42.108(a).

A claim is unpatentable as obvious under 35 U.S.C. § 103 if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, “would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.” *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) where in evidence, so-called secondary considerations.⁷ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

⁷ The current record in this proceeding does not include any argument or evidence directed to objective indicia of nonobviousness.

D. Level of Ordinary Skill in the Art

In determining the level of skill in the art, we consider the problems encountered in the art, the art's solutions to those problems, the rapidity with which innovations are made, the sophistication of the technology, and the educational level of active workers in the field. *Custom Accessories, Inc. v. Jeffrey-Allan Indus., Inc.*, 807 F.2d 955, 962 (Fed. Cir. 1986).

Petitioner describes a person of ordinary skill in the art ("POSITA") as follows:

A person of ordinary skill in the art relating to the subject matter of the '159 Patent ("POSITA") would have had a working knowledge of physiological monitoring technologies. The person would have had a Bachelor of Science degree in an academic discipline emphasizing the design of electrical, computer, or software technologies, in combination with training or at least one to two years of related work experience with capture and processing of data or information, including but not limited to physiological monitoring technologies. APPLE-1003, [¶¶ 20–22]. 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.*

Pet. 4.

Patent Owner contends that Petitioner "presents a relatively low level of ordinary skill in the art," which "supports the patentability of the claims," and further notes that, "in the Delaware Litigation, [Patent Owner's] expert presented a slightly different definition of the level of ordinary skill which includes education and/or experience with optical technologies." Prelim. Resp. 11–12 (citing Ex. 2002 ¶¶ 48–51). Patent Owner considers that the differences between the parties' definitions do not impact the challenges here. *Id.*

On the present record, Petitioner’s definition of a POSITA is consistent with the level of skill reflected in the ’159 patent and the asserted prior art. Accordingly, for purposes of this Decision, we adopt Petitioner’s description. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (explaining “the prior art itself [may] reflect[] an appropriate level” as evidence of the ordinary level of skill in the art) (quoting *Litton Indus. Prods., Inc. v. Solid State Sys. Corp.*, 755 F.2d 158, 163 (Fed. Cir. 1985))).

We note that we would reach the same outcome in this Decision under either definition of a POSITA. If the parties continue to propose differing levels of ordinary skill in the art during trial, they should state whether any issue in the case turns on those differences.

E. Claim Construction

We construe each claim “using the same claim construction standard that would be used to construe the claim in a civil action” under 35 U.S.C. § 282(b). 37 C.F.R. § 42.100(b). Under this standard, claim terms are generally 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 v. AWH Corp.*, 415 F.3d 1303, 1312–14 (Fed. Cir. 2005) (en banc) (“We have frequently stated that the words of a claim ‘are generally given their ordinary and customary meaning.’” (citations omitted)). “The Board is required to construe ‘only those terms . . . that are in controversy, and only to the extent necessary to resolve the controversy.’” *Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019) (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

Here, we address arguments relating to the claim term “opening” and to claim language requiring a “plurality of detectors” that are “arranged in an array having a spatial configuration corresponding to a shape of the portion of the tissue measurement site bounded by the circular shaped light block.”

1. “Opening”

Petitioner submits that “no claim terms need be construed to resolve issues of controversy in the present Petition.” Pet. 5. Patent Owner contends that as applied to the term “opening” in independent claims 1 and 19, Petitioner’s position in this proceeding is inconsistent with Petitioner’s claim construction in the Delaware Litigation. Prelim. Resp. 12–13. In particular, Patent Owner argues that in the Delaware Litigation, Petitioner’s expert explained that “opening” “means ‘empty space.’” *Id.* (quoting Ex. 2037 ¶ 465). According to Patent Owner, Petitioner “relied on that construction for noninfringement in Delaware” but, here, Petitioner “identified Iwamiya’s ‘optical filter 17’—a material that is not empty space—as the claimed ‘opening.’” *Id.* at 13–14 (citing Pet. 5, 23–24). Patent Owner asserts that this inconsistency warrants denial of institution. *Id.* at 12, 14.

Petitioner does not dispute that its invalidity assertions here are inconsistent with the non-infringement position it advanced in the Delaware Litigation, but argues that Patent Owner “cannot reasonably complain” because the position it advances here is “consistent with the positions advanced by [Patent Owner] in the Delaware Litigation.” Prelim. Reply 3. Petitioner further argues that “institution would be consistent with recent IPRs in which the Board found highly similar claims of related patent 10,687,745 that included ‘opening’ features unpatentable over highly similar

grounds.” *Id.* at 5. More specifically, Petitioner argues that the Board in IPR2022-01291 “previously found such [opening] features disclosed by Iwamiya,” and quotes the Final Written Decision in that case as stating: “we find Iwamiya’s device includes optical filter 17 mounted within an opening of light shielding frame 18.” *Id.* (quoting IPR2022-01291, Paper 75 at 26).

At this point in the proceeding, we do not find it necessary, to expressly construe the term “opening” in order to reach a decision on institution and, under the circumstances, we do not find a basis for denying institution in Petitioner’s application of the claim language requiring an “opening.” *But see infra* Section F.3.b (identifying a potential issue that may benefit from record development on claim construction). Neither party offers an express construction of the term “opening” to the prior art. Pet. 5; Prelim. Resp. 12–15 (arguing inconsistency but declining to offer an express claim construction).

On the present record, we are persuaded that the plain and ordinary meaning of “opening” encompasses Iwamiya’s optical filter 17 as mounted within light shielding frame 18. *See* Pet. 23–24; *see infra* at Section F.3.b. This is consistent with Patent Owner’s position, in the Delaware Litigation, that a solid material can provide an opening, and with the finding of the panel in the Final Written Decision in IPR2022-01291. Ex. 2035, 26 (Final Written Decision in IPR2022-01291); Ex. 2037 ¶¶ 463–465 (report by Petitioner’s expert, Dr. Sarrafzadeh in the Delaware Litigation, regarding non-infringement, reproducing an image that Petitioner represents is from Patent Owner’s expert, Dr. Madisetti, in which Dr. Madisetti labeled transparent material an “Opening in Dark-Colored Coating,” and in which Dr. Sarrafzadeh asserts that “every space that Dr. Madisetti . . . identified is

filled with solid material, not empty space”). Indeed, Patent Owner does not here dispute that Iwamiya’s optical filter provides an opening under the plain and ordinary meaning of that term. Prelim. Resp. 12–15, 34–36 (arguing that Petitioner’s position is inconsistent with its position in the Delaware Litigation but not arguing that Iwamiya’s optical filter does not provide an “opening” under the construction Patent Owner uses in the Delaware Litigation or the plain and ordinary meaning).

We recognize that Petitioner’s invalidity assertions here are potentially inconsistent with its non-infringement positions in the Delaware Litigation. *See* Prelim. Reply 3. However, as discussed herein, the current record supports Petitioner’s position that Iwamiya’s optical filter provides an opening within Iwamiya’s light shielding frame, under the plain and ordinary meaning of that term.

Given that the present record supports that Iwamiya’s optical filter creates an “opening,” that Patent Owner does not contest that Iwamiya discloses an “opening” consistent with its construction in the Delaware Litigation, and that neither party offers an express construction of “opening” in this proceeding, we decline to deny institution on the basis that Petitioner’s positions are potentially inconsistent with the positions they have advanced in the Delaware Litigation.

2. *“Plurality of detectors . . . arranged in an array . . .”*

Claim 14 requires “a plurality of detectors . . . arranged in an array having a spatial configuration corresponding to a shape of the portion of the tissue measurement site bounded by the circular shaped light block.”

Ex. 1001, claim 14.4. Petitioner does not propose an express construction for this claim language. Pet. 5. Patent Owner contends that, based on the

prosecution history of a parent application, this language should be construed to exclude “arrangements of two or three detectors.” Prelim. Resp. 15 (citing Ex. 2057, 322 (prosecution history of U.S. Patent Application No. 15/195,199 (“the ’199 Application”))). Patent Owner notes that the panel in IPR2022-01291 adopted this construction for “a nearly identical limitation in Claim 15 of the related ’745 Patent.” *Id.* at 15–16 (citing Ex. 2035, 109–112). On this preliminary record, we agree with Patent Owner that, due to statements made during prosecution of a parent application, this claim language should be construed to exclude arrangements of two or three detectors.

During prosecution of the ’199 Application, application claim 1 was amended to recite: a “tissue measurement site . . . having an at least partially circular shape bounded by a light block”; the light block comprising “an annular ring having a circular shape”; and a “plurality of detectors . . . arranged in an array having a spatial configuration corresponding to the shape of the irradiated portion of the tissue measurement site.” Ex. 2057, 311. Patent Owner argued to the Examiner that the “array” limitation had support in the ’199 Application specification because:

The ordinary meaning of the claim term “correspond” means to “have a close similarity; match or agree almost exactly” or “be analogous or equivalent in character, form, or function” or “represent.” New Oxford American Dictionary, 390 (3rd Edition 2010). Consistent with this exemplary definition and the originally-filed application, the phrase “arranged in an array having a spatial configuration corresponding to the shape of the irradiated portion of the tissue measurement site” . . . would be understood by a person having ordinary skill in the art as requiring a sufficient

number of detectors such that, when arranged together in an array, can “match,” “have a close similarity,” or “represent” the “at least partially circular shape” of the irradiated portion of the tissue measurement site. . . .

In order for the claimed “plurality of detectors” to “match” or “represent” an “at least partially circular shape” or an “annular shape,” the “plurality of detectors” must include sufficient detectors to represent such shapes. For example, six or more detectors could be arranged in an annular shape and meet the recited limitation. ***However, two detectors, for example, can only be arranged in a spatial configuration representing a line and three detectors, for example, can only be arranged in a spatial configuration representing a line or a triangle.*** Thus, when read in view of the originally-filed application, the recited “plurality of detectors” would be understood by a person having ordinary skill in the art as including a sufficient number of detectors to represent the desired geometric shape.

Id. at 320–322 (emphasis added).

The plain and ordinary meaning of the “plurality of detectors . . . arranged in an array” language in claim 14 is that the detectors are arranged to have a spatial configuration that corresponds to the circular shape of the light block. Ex. 1001, claim 14. Considered in light of the prosecution history, the current record supports Patent Owner’s argument that this language requires more than three photodiodes because two photodiodes “can only be arranged in a spatial configuration representing a line” (not a circle), and three photodiodes “can only be arranged in a spatial configuration representing a line or a triangle” (not a circle). Ex. 2057, 322. Accordingly, for purposes of this Decision, we construe the “plurality of detectors . . . arranged in an array” claim language to exclude arrangements of two or three detectors.

F. Obviousness Challenges

All of Petitioner’s challenges rely at least in part on a combination involving Iwamiya and Sarantos. *See* Pet. 1. Petitioner’s first challenge argues that the combination of Iwamiya and Sarantos renders claims 1, 2, and 4–13 obvious. *See* Pet. 1, 5–50. The second challenge to claim 3 adds a third reference, Han, to the combination. *Id.* at 1, 50–53. The third challenge to claims 14–25 relies on a different third reference, Utter. *Id.* at 1, 53–74. Patent Owner raises several arguments against these challenges. *See* Prelim. Resp. 34–54.

We first provide a brief overview of Iwamiya and Sarantos, and then address the parties’ arguments. We will focus on the challenge to independent claims 1, 14, and 19, and in particular the combination of Iwamiya and Sarantos and the limitations Patent Owner addresses in its Preliminary Response.

1. Iwamiya

Iwamiya discloses a light-based biological information detecting apparatus. *See* Ex. 1004, code (57), 1:17–22. In one embodiment, the measured biological information is a patient’s “pulse wave.” *Id.* at 1:34–42, 4:13–16, 8:61–9:7.

Figure 4 of Iwamiya is reproduced below.

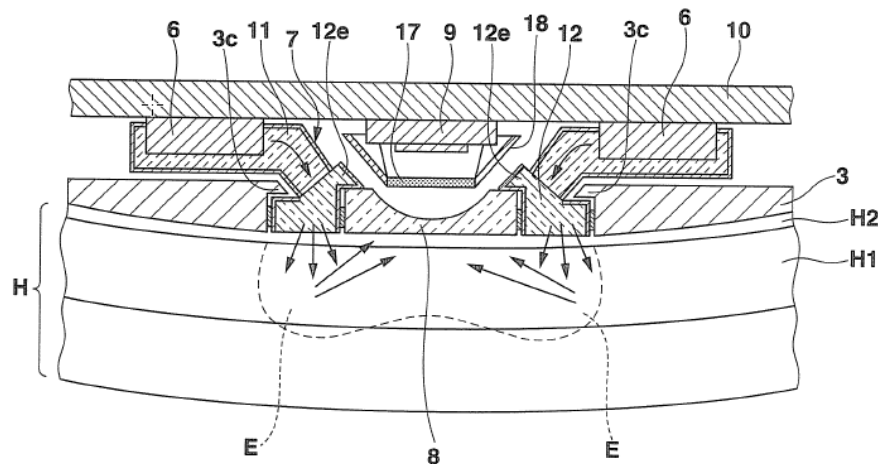


Figure 4 is a cross-sectional view of a wristwatch case including back cover 3, and enclosing a biological information detecting apparatus 5, pressed against a patient's skin H. *See id.* at Figs. 1–4, 4:5–16, 5:54–6:21, 9:61–63.

Detecting apparatus 5 comprises several components mounted on circuit board 10. *See Ex. 1004*, 6:22–31. Two light emitting units 6, located at the 3 o'clock and 9 o'clock positions of the watch face, emit observation light to enter annular light guide unit 7. *See id.* at 6:7–14, 6:34–39, 6:49–52. Unit 7 comprises light guiding ring portion 11 and diffusion ring portion 12, which guide the light to the surface of skin H, as shown by arrows in Figure 4. *See id.* at 6:10–14, 6:41–7:24, 10:18–33. Diffusion ring portion 12 “is formed in almost a ring shape, using a clouded or milky resin with a light diffusing property” in order to “uniformly diffuse and irradiate the observation light over a wide area of a ring shape with respect to the skin H.” *Id.* at Fig. 2, 7:4–24, 10:25–33. Unit 7 includes reflection layers 13 and 15 on its external surfaces, to prevent observation light from leaking out of unit 7 except where the bottom surface of diffusion ring portion 12 contacts skin H. *See id.* at Fig. 3, 6:62–7:3, 7:41–49, 8:14–19.

The light emitted from light emitting units 6 enters skin H, interacts with the patient's blood flowing through the skin in annular irradiation area E, and back-scatters to exit the skin from the same surface it entered the skin, all as shown by arrows in Figure 4. *See* Ex. 1004, 1:28–34, 2:26–31, 6:14–21. The back-scattered light enters scattered light taking unit 8, which is a transparent lens to focus the light on light receiving unit 9. *See* Ex. 1004, 6:14–21, 7:50–8:13, 10:62–11:3, 12:55–67. The focused light encounters optical filter 17 mounted on the lower side of light shielding frame 18. *See id.* at 8:38–42. Light that passes through filter 17 reaches light receiving unit 9, which outputs a signal responsive to the received light, and the signal is communicated (not shown in Figure 4) to a processor that utilizes the signal to determine biological information of interest, such as a pulse wave. *See id.* at 6:17–21, 8:29–37; *see also id.* at 8:58–9:43 (Fig. 10 illustrates a circuit configuration of the biological information detecting apparatus, including unit 9 sending signals to CPU 20).

Iwamiya discusses how previously known pulse wave measuring devices generally used observation light wavelengths “shorter than 600 nm” (nanometers), because absorbance of light by hemoglobin in the blood is “very high” below 600 nm versus longer wavelengths. Ex. 1004, 1:43–52. However, according to Iwamiya, when the patient's skin contains a large amount of melanin,⁸ then observation light in the ultraviolet to visible band (i.e., below about 700 nm)⁹ may be absorbed by melanin pigment instead of

⁸ Iwamiya indicates this may occur, for example, if the patient has a dark skin color. *See* Ex. 1004, 1:64–66.

⁹ The visible light band spans about 400–700 nm, and the ultraviolet light band falls below the visible band with a maximum wavelength of about 400 nm. Ex. 1004, Fig. 6

hemoglobin, so biological information such as a pulse wave cannot be measured accurately. *See id.* at 1:53–2:6.

Accordingly, Iwamiya’s light emitting units 6 emit infrared light at a wavelength of 940 nm, “where absorbance of melanin[] pigment contained in the skin H is low.” Ex. 1004, Fig. 6, 6:31–34, 10:15–18, 10:34–38, 11:43–49. Similarly, “light receiving unit 9 has a spectral sensitivity characteristic of reacting strongest with light of a specific wavelength band of about $\lambda = 940$ nm,” with a “gradually lowered” sensitivity at lower wavelengths. *Id.* at 8:29–37, Fig. 9. In addition, optical filter 17 “transmit[s]” light wavelengths greater than 900 nm and “shield[s]” light wavelengths less than 900 nm, in order to “alleviate[] an influence from a measurement change due to external light, such as sunlight.” *Id.* at 8:42–57, 11:3–8, 13:1–23.

2. Sarantos

Sarantos discloses a fitness monitor worn on a user’s wrist like a wristwatch, which utilizes photoplethysmography (PPG) sensors (i.e., light-based sensors) to measure the wearer’s heart rate. *See* Ex. 1005, code (54), 1:7–24, 1:36–56 (describing prior art monitor 100 shown in Fig. 1), 6:66–7:23 (describing Sarantos’s monitor 200 shown in Fig. 2). Figure 22 of Sarantos is reproduced below.

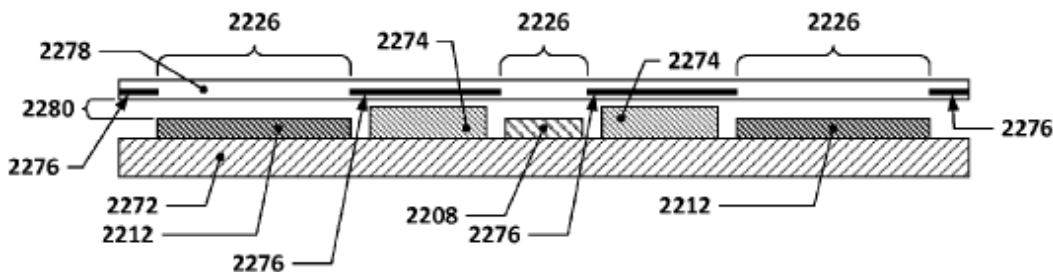


Figure 22 is a cross-sectional view of a PPG sensor. Ex. 1005, 6:52–54, 16:60–62. The PPG sensor has central light source 2208 flanked by two

photodetector elements 2212 disposed on substrate 2272, with walls 2274 disposed in between. *See id.* at 17:1–3, 17:26–32. In this way, the sensor “may be held against a person’s skin, e.g., by being held in place with a strap” so light emitted by light source 2208 shines “into the person’s skin, where the light then diffuses into the surrounding flesh and is then emitted back out of the person’s skin and into the . . . photodetector elements 2212” to measure the person’s heart rate. *Id.* at 17:16–25, 17:39–42.

Sarantos’s PPG sensor includes window 2278 composed of a transparent material such as acrylic, “with an in-mold label 2276 embedded within it.” Ex. 1005, 17:3–6. Label 2276 “may be black or otherwise rendered opaque to light to prevent light from entering or exiting the PPG sensor through the window 2278 except through window regions 2226.” *Id.* at 17:6–10. Also, “other masking techniques, such as a painted or silk-screened mask applied to the window 2278, may be used.” *Id.* at 17:10–12. In this way, “label 2276 or the masking may prevent stray light from other sources, e.g., ambient light, from reaching . . . photodetector elements 2212 and affecting the heart rate signal obtained by the PPG sensor.” *Id.* at 17:12–16.

3. *Independent Claims 1 and 19*

We begin with Petitioner’s argument that independent claim 1 would have been obvious in view of Iwamiya and Sarantos and that independent claim 19 would have been obvious in view of Iwamiya, Sarantos, and Utter. *See* Pet. 7–27 (addressing motivation to combine Iwamiya and Sarantos and claim 1), 56–60 (addressing motivation to combine Iwamiya, Sarantos, and Utter), 64–70 (addressing claim 19).

Patent Owner disputes two aspects of Petitioner’s showing as to claims 1 and 19. First, Patent Owner argues that a POSITA would not have been motivated to combine Iwamiya and Sarantos as set forth in the Petition. Prelim. Resp. 38–48. Second, Patent Owner argues that Petitioner does not identify in the combination of Iwamiya and Sarantos an “opening defined in the dark-colored coating” configured to allow light to “pass through the surface.” Prelim. Resp. 36–38.¹⁰ We focus our discussion of this ground on these disputed issues, as we otherwise find Petitioner’s contentions regarding claims 1 and 19 to be sufficiently supported by the cited evidence, including the references themselves and the cited testimony of Dr. Anthony.

a. Motivation to Combine

Independent claims 1 and 19 require “a surface comprising a dark-colored coating . . . positioned between the plurality of detectors and the tissue.” Ex. 1001, claims 1, 19. The Petition asserts that this limitation is satisfied by the combination of Iwamiya’s light shielding frame and Sarantos’s black or opaque coating such as its in-mold label or its silk-screened mask. Pet. 7–13 (explaining combination), 21–23 (addressing limitation 1.4), 65 (addressing same limitation in claim 19, which incorporates analysis of limitation 1.4). More specifically, Petitioner contends:

[A] POSITA would have been motivated to implement Iwamiya’s light shielding frame 18 to include a black or opaque

¹⁰ As noted above in the claim construction analysis for “opening,” Patent Owner also argues that the combination fails to disclose the “opening” limitation in claims 1 and 19 under Petitioner’s proposed construction in the Delaware Litigation. *See* Prelim. Resp. 34–36. Patent Owner’s arguments are not persuasive, based on the current record, because we do not construe the term “opening” to require an empty space.

dark-colored coating (as taught by Sarantos) such that the resulting coated light shielding frame has improved characteristics for shielding the photodiodes from stray light, thereby minimizing the amount of light that reaches the photodiodes 9 from LEDs 6 without first being reflected off the user's skin, thus increasing accuracy of the sensor.

Pet. 9 (citing Ex. 1003 ¶¶ 31–44). According to Petitioner, a POSITA would have understood that Sarantos's dark coating would not only block light, but also limit reflections, which “would have reduced the amount of arrant light that could reflect back from the empty space through the optical filer 17 to the photodiodes.” *Id.* at 9, 12. Petitioner also asserts that “Iwamiya is silent as to the material or coating used to implement the light shielding frame 18” and, thus, a POSITA, seeking to implement Iwamiya's device, would have “looked to other references, such as Sarantos, . . . to identify materials and/or coatings for implementing Iwamiya's light shielding frame 18 to best block [e]rrant light from reaching the photodiodes 9.” *Id.* at 11–12.

The Board in IPR2022-01291 found Petitioner's proposed reasons why a POSITA would have used Sarantos's dark coating on Iwamiya's light shielding frame persuasive. Petitioner advances much the same rationale here, and we find Petitioner's reasoning persuasive on this record for the same reasons as the Board in IPR2022-01291. As the Board explained:

[W]e agree with [Petitioner's] position that Iwamiya provides no detail concerning the *structural* configuration of frame 18, apart from the illustrations of frame 18 in Figures 1–4. Iwamiya simply identifies the frame as “a light shielding frame,” which is a functional description apart from the word “frame.” Ex. 1004, 8:38–47. We do not discern, and [Patent Owner] does not cite, any disclosure in Iwamiya concerning a specific material or structure of frame 18 that achieves the light shielding function. Thus, Iwamiya leaves it to a person of ordinary skill in the art to choose a material or structure to

incorporate within frame 18 to shield light away from reaching light receiving unit 9 without passing through optical filter 17. *See id.* at 8:38–57, Fig. 4. We find [Petitioner’s] reliance on Sarantos as disclosing a suitable light-shielding material or structure for use with Iwamiya’s frame 18 is invited by Iwamiya’s disclosure. . . .

Sarantos in turn provides a light-based sensor incorporating photodetector elements 2212 shielded from stray light by in-mold label 2276, or alternatively by a painted or silk-screened mask. *See* Ex. 1005, Fig. 22, 17:1–25. In particular, these structures “may be black or otherwise rendered opaque to light to prevent light from” reaching photodetector elements 2212 except through window regions 2226, such as “stray light” from sources other than light source 2208. *Id.* at Fig. 22, 17:6–16. That function is similar to the function of Iwamiya’s light shielding frame 18 shielding light away from reaching light receiving unit 9 without passing through optical filter 17, discussed above. . . .

We conclude that Iwamiya’s leaving the selection of a light-shielding material or structure to incorporate within frame 18 open to the designer’s choice, coupled with Sarantos’s disclosure of a dark-colored coating as performing a light-shielding function, provides ample motivation for Apple’s combination. Thus, we are persuaded by Dr. Anthony’s testimony to this effect. *See* Ex. 1003 ¶¶ 40–42;^[11] Ex. 1042 ¶¶ 7–8; *KSR*, 550 U.S. at 417 (“[A] court must ask *whether the improvement is more than the predictable use of prior art elements according to their established functions.*” (emphasis added)). “A person of

¹¹ Petitioner also relies on the testimony of Dr. Anthony in this proceeding. *See generally* Ex. 1003. It appears that the material cited in this proceeding includes substantially all of the material relied upon by the panel in IPR2022-01291, as well as additional testimony elaborating on why the POSITA would have employed a dark coating on Iwamiya’s light shielding frame 18. During trial, the parties may wish to highlight any differences in the respective records that are relevant to the issues in this case.

ordinary skill is also a person of ordinary creativity, not an automaton,” and “in many cases a person of ordinary skill will be able to fit the teachings of multiple patents together like pieces of a puzzle.” *KSR*, 550 U.S. at 420–21.

Ex. 2035, 38–39.

Patent Owner argues that the Board in IPR2022-01291 erred “because it focused on the wrong question for motivation to combine.” Prelim.

Resp. 40. According to Patent Owner, Iwamiya’s light shielding frame is already described as opaque, and thus “[t]he relevant question for obviousness . . . is whether a POSITA, who already understands that the light shielding frame is opaque, would have been motivated to further **add** a layer of dark-colored coating to it.” *Id.* at 39. Patent Owner asserts that a POSITA “would have no reason to . . . **further add** a dark-colored coating to frame 18” because “[d]oing so would have been needlessly redundant.” *Id.* at 41.

We do not agree with this argument because, although Iwamiya describes its light shielding frame as opaque, it does not speak to how its opacity is achieved, i.e., as to what materials and/or coatings are employed in order to render its frame as opaque. Sarantos teaches that one way to achieve opacity is to use a black “in-mold label” or “other masking techniques, such as a painted or silk-screened mask.” Ex. 1005, 17:6–12. We view Petitioner’s proposal to use Sarantos’s specific materials, i.e., in-mold label or other masking techniques, as implementing the opacity of Iwamiya’s light shielding frame rather than adding to it. *See, e.g.*, Pet. 11 (“Because Iwamiya is silent as to the material or coating used to implement the light shielding frame 18, a POSITA implementing Iwamiya’s device would have looked to other references, such as Sarantos . . . to identify

materials and/or coatings for implementing Iwamiya's light shielding frame 18 to best block ambient light."); Ex. 1003 ¶¶ 40–42.

Patent Owner argues that because Iwamiya's light shielding frame is already opaque, a POSITA "would have needed some reason to add a layer of dark-colored coating to Iwamiya's light shielding." Prelim. Resp. 42. According to Patent Owner, a POSITA would not have found motivation to use a dark coating on the basis that, as Petitioner alleges, a "coated light shielding frame has improved characteristics for shielding the photodiodes from stray light, thereby minimizing the amount of light that reaches the photodiodes 9 from LEDs 6 *without first being reflected off the user's skin*" because "that is *not* the purpose of the light shielding frame." *Id.* (citing Pet. 9; Ex. 2002 ¶ 73). Patent Owner asserts that Petitioner identified a different structure—reflection layers 13 and 15—as preventing light from reaching the photodiodes without first reflecting off the user's skin. *Id.* at 42–43. Patent Owner also argues that Petitioner provides no evidence that "pathlength variations caused by reflections within a sensor housing contribute[] to noise or would reduce measurement accuracy." *Id.* at 44. Indeed, according to Patent Owner "if pathlength variations from reflections inside of a sensor (not within tissue) were actually an issue, a POSITA would have *disregarded Iwamiya entirely* because Iwamiya's sensor design causes untold amounts of reflections within the light guide." *Id.* at 45. Finally, Patent Owner argues that Iwamiya teaches the use of a reflective material to provide light shielding functionality. *Id.* at 46–47.

We do not agree with Patent Owner's arguments, on the current record, because these arguments do not sufficiently address the proffered rationale, i.e., that a POSITA would have looked to Sarantos's in-mold label

or other masking techniques as a way to implement opacity in Iwamiya's light shielding frame. Petitioner's arguments regarding the benefits that a dark coating provides, such as minimizing ambient light, provide additional rationale for using a dark coating. To the extent Petitioner continues to rely on such additional rationale at trial, we will review the parties' competing evidence on these issues, as further developed during the trial. *Compare* Ex. 1003 ¶¶ 34–35 (Dr. Anthony's testimony that a POSITA would have been motivated to implement a dark coating because of its "improved characteristics for shielding the photodiodes from stray light"), *with* Ex. 2002 ¶¶ 73–78 (Dr. Madiseti's testimony that Petitioner fails to demonstrate that adding a dark coating would provide any additional benefit and pointing out that Petitioner identified a different structure for preventing light from reaching the photodetector).

For the reasons discussed above, having considered the evidence and arguments of record, we find that Petitioner has established a reasonable likelihood that it will prevail in showing that a POSITA would have been motivated to combine Iwamiya and Sarantos in the manner set forth in the Petition.

Patent Owner does not make arguments regarding the proposed combination of Iwamiya, Sarantos, and Utter, which applies to claims 19–25. *See generally* Prelim. Resp. 33 – 54. At this stage of the proceeding, Petitioner's contentions and reasoning in support of this combination of prior art is sufficiently persuasive. Pet. 56–60.

b. Opening in the Coating Configured to Allow Light to Pass Through the Surface

Independent claims 1 and 19 both require "an opening defined in the dark-colored coating" that is "configured to allow at least a portion of light

reflected from the tissue to pass through the surface.” Ex. 1001, claims 1, 19. The annotated and excerpted version of Iwamiya’s Figure 4 provided in the Petition (Pet. 24) and reproduced below helps to illustrate Petitioner’s contentions.

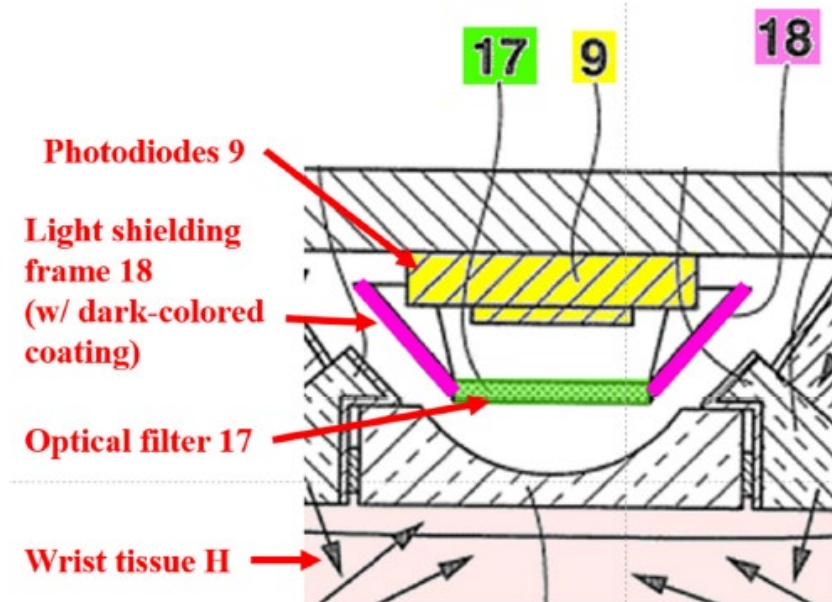


Figure 4 shows a cross-sectional view in which the back cover of Iwamiya’s wristwatch contacts the skin of an arm. Ex. 1004, 4:13–16. In the annotated version of Figure 4, Petitioner has colored light shielding frame 18 magenta, optical filter 17 green, photodiode 9 yellow, and wrist tissue H pink. Pet. 24. As shown in Figure 4, optical filter 17 is mounted on light shielding frame 18. Ex. 1004, 8:38–42.

Petitioner contends that Iwamiya discloses a surface through which a portion of light reflected from the tissue passes. Pet. 21–24. More specifically, Petitioner contends that “light shielding frame 18 . . . surrounding the photodiodes 9” defines a “surface” and that “[l]ight reflected from the tissue passes through optical filter 17 surrounded by the light shielding frame 18 to reach the detectors 9.” *Id.* at 21; *see also id.* at 23 (“light travels through window regions” defined in the coating of Sarantos),

24 (“Iwamiya describes that the ‘optical filter 17 is configured to transmit light of a specific wavelength band of 900 nm or more,’ and thus is configured to allow at least a portion of light reflected from the tissue to pass through this surface to the photodiodes 9.” (citing Ex. 1003 ¶ 65; Ex. 1004, 8:42–44)).

Patent Owner argues that optical filter 17 is “a separate structure different from the light shielding frame.” Prelim. Resp. 37. According to Patent Owner, “the plain language of the claim requires that light ‘pass through the surface’—*i.e.*, ***through*** the light shielding frame.” *Id.* at 37 (citing Ex. 2002 ¶ 64). Patent Owner argues that Petitioner’s allegation that “the light shielding frame ‘surrounds’ the photodetector fails to show that any light passes through that surface.” *Id.* at 38.

On this record, we determine that Petitioner satisfies its burden. Pet. 23–24. Iwamiya discloses that certain wavelengths of light are transmitted through optical filter 17 in Iwamiya’s light shielding frame 18. Ex. 1004, 8:42–44 (“As illustrated in FIG. 8, the optical filter 17 is configured to transmit light of a specific wavelength band of 900 nm or more.”); Ex. 1003 ¶ 65 (explaining that Iwamiya “is configured to allow at least a portion of light reflected from the tissue to pass through to the photodiodes 9”); *see also supra* Section E.2 (discussing Patent Owner’s position, in the Delaware Litigation, that a solid material can provide an opening) (citing Ex. 2035, 26; Ex. 2037 ¶¶ 463–465). Indeed, Patent Owner does not dispute here that Iwamiya’s optical filter provides an opening under the plain and ordinary meaning of that term. Prelim. Resp. 12–15, 34–36 (arguing that Petitioner’s position is inconsistent with its position in the Delaware Litigation but not arguing that Iwamiya’s optical filter does not

provide an “opening” under the construction Petitioner advances here, or under the plain and ordinary meaning). At this stage of the proceeding, we are persuaded that this cited evidence satisfies Petitioner’s institution burden.

However, Patent Owner’s argument that Petitioner fails to show that light would pass *through* Iwamiya’s light shielding frame may have merit after arguments and evidence pertaining to the issue are fully developed. Our ultimate resolution of this issue will likely turn on whether the claim limitation requires that light actually penetrate the “surface” it passes through (as Patent Owner implicitly contends) or whether it is instead sufficient that light is allowed to pass through an opening in the surface (as Petitioner implicitly contends). On the present record, neither party has provided an express construction for the claim language at issue, and, on the present record, we are persuaded that the plain and ordinary meaning of the claim language encompasses light passing through Iwamiya’s optical filter 17 mounted within light shielding frame 18.

4. Independent Claim 14

Petitioner challenges claim 14, and claims 15–18 that depend from claim 14, as part of its obviousness challenge based on Iwamiya, Sarantos, and Utter. Pet. 1, 53–64. Petitioner’s challenge builds on the Iwamiya/Sarantos combination by providing reasons why a POSITA would have been motivated to combine Iwamiya, Sarantos, and Utter with a reasonable expectation of success. *Id.* at 56–60. Aside from its arguments against Petitioner’s motivation to combine Iwamiya and Sarantos addressed above, Patent Owner does not address Petitioner’s reasons for combining Iwamiya, Sarantos, and Utter. *See* Prelim. Resp. 38–54. Based on our

review of the current record, Petitioner adequately establishes that a POSITA would have been motivated to combine Iwamiya, Sarantos, and Utter for the reasons provided by Petitioner. *See* Pet. 56–60.

Petitioner also sets forth an element-by-element comparison of the challenged claims to the asserted art and incorporates its analysis addressing previous claims for limitations in claim 14 that are the same as limitations found in those claims. Pet. 60–63. Patent Owner disputes Petitioner’s showing for the claim limitation requiring a “plurality of detectors . . . arranged in an array having a spatial configuration corresponding to a shape of the portion of the tissue measurement site bounded by the circular shaped light block.” Prelim. Resp. 48–54. We focus our discussion of claim 14 on this disputed issue, as we otherwise find Petitioner’s contentions regarding claim 14 to be sufficiently supported by the cited evidence, including the references themselves and the cited testimony of Dr. Anthony.

Petitioner contends that Iwamiya discloses a “plurality of detectors . . . arranged in an array” as required by claim 14. Pet. 61–63. Petitioner incorporates its analysis for dependent claim 5, which contains the same limitation.¹² *See id.*; Ex. 1001, claim 5; Pet. 29–35 (addressing claim 5). More specifically, although Iwamiya only exemplifies devices with one light receiving unit 9 (i.e., detector) in its figures, Petitioner contends that “Iwamiya describes that the physiological monitoring device includes a plurality of photodiodes configured to detect light reflected by the encircled tissue.” Pet. 31 (citing Ex. 1003 ¶¶ 76–77; Ex. 1004, 6:7–14, 8:20–23, 12:3–

¹² For this reason, like Patent Owner, we consider Petitioner’s arguments as to claim 5 as part of its arguments to claim 14. *See* Prelim. Resp. 48–49 (focusing on Petitioner’s arguments as to claim 5).

17, 14:36–41, Figs. 3–4). As to the specifically claimed spatial configuration, Petitioner relies on Iwamiya’s disclosure that the photodiodes are arranged on the circumference of an optical axis. Petitioner explains:

That Iwamiya’s plural photodiodes 9 are arranged in “a spatial configuration corresponding to a [circular] shape” is evident from the fact that the photodiodes 9 are arranged “on the same *circumference* centered on an optical axis” of the circular light taking unit 8. [Ex. 1004], 14:36-41. From this disclosure, a POSITA would have understood and it would have been obvious that the photodiodes 9 are thus arranged in an array having a spatial configuration corresponding to the circular shape of the tissue measurement site encircled by the circular light block (reflection layers 13 and 15), as illustrated below.

Pet. 37 (citing Ex. 1003 ¶ 77); *see also id.* at 62 (addressing claim 14).

Patent Owner argues that Petitioner “relies on Iwamiya’s vague description of an alternate embodiment.” Prelim. Resp. 49. According to Patent Owner, this is insufficient because “Iwamiya does not illustrate how those photodetectors would be arranged, and critically, whether they would be ‘in an array having a spatial configuration corresponding to a shape of the portion of the tissue measurement site bounded by the circular shaped light block’ as claimed.” *Id.* at 50.

The Board in IPR2022-01291 addressed much the same issue and we agree with their analysis. In that case, the claim language at issue required a “plurality of photodiodes . . . arranged in an array having a spatial configuration corresponding to a shape of the portion of the tissue measurement site encircled by the light block.” Ex. 2035, 109. The Board found that Iwamiya met that limitation, explaining:

Iwamiya expressly discloses that its wrist-worn sensor device shown in Figures 1–4 includes “light receiving unit 9” which “is composed of a silicon photo diode”—that is, unit 9

is composed of a single photodiode. Ex. 1004, 4:5–16, 8:20–28; *see also id.* at 14:32–36 (“In the first embodiment . . . *one* light receiving unit is provided.” (emphasis added)).

Iwamiya also expressly discloses, albeit not in any of its figures, that Iwamiya’s “invention is not limited thereto” and “plural light receiving units 9 [i.e., plural photodiodes] may be two-dimensionally disposed . . . in the scattered light taking unit 8.” *Id.* at 14:32–39. In addition, “the plural light receiving units 9 are preferably disposed on the same circumference centered on an optical axis of the scattered light taking unit 8.” *Id.* at 14:39–41.

We find the foregoing descriptions plainly disclose using more than one (“plural”) photodiodes 9, which are disposed in a circular array having its center located at the optical axis of the scattered light taking unit 8 (“disposed on the same circumference centered on”). In particular, Iwamiya states its photodetectors 9 are disposed on “the *same* circumference” (emphasis added), which must be a circle rather than an oval or some other more generic circumference, because the “same” term reflects a constant radius from the center. This also is consistent with the generally circular configuration of Iwamiya’s biological information detecting apparatus, as best seen in Figure 2, and with Iwamiya’s disclosure that its light receiving unit(s) 9 are placed “in the vicinity of the focal position on an optical axis of the scattered light taking unit 8.” *Id.* at Figs. 1–4, 5:57–66, 8:20–28.

Id. at 123–124.

Here, Petitioner directs us to the same disclosure in Iwamiya that the panel in IPR2022-01291 found to disclose an almost identical claim limitation. Pet. 29–35, 61–63. We find that Petitioner has demonstrated a reasonable likelihood that it will prevail in showing that Iwamiya discloses a plurality of photodetectors arranged as claimed for the same reasons the

Board found Iwamiya to disclose the corresponding limitation in the patent challenged in that proceeding in IPR2022-01291.

Patent Owner recognizes that Petitioner’s arguments are similar to those presented in IPR2022-01291, but argues that the Board’s finding in that case was in error. Prelim. Resp. 49–54. For example, Patent Owner argues that “[t]he Board . . . erroneously concluded that ‘Iwamiya itself contemplates using *plural* photodiodes 9 disposed in a circular array having its center located at the optical axis of the scattered light taking unit 8.’” *Id.* at 53 (citing Ex. 2035, 126). Patent Owner then asserts that “[t]here is no such disclosure or suggestion in Iwamiya of a ‘circular array.’” *Id.* We recognize that Iwamiya does not use the term “circular array.” However, Iwamiya does disclose that “the plural light receiving units 9 are preferably disposed on the same circumference centered on an optical axis of the scattered light taking unit 8.” Ex. 1004, 14:39–41. We agree, based on the current record, with the panel in IPR2022-01291 that this “plainly disclose[s] using more than one (‘plural’) photodiodes 9, which are disposed in a circular array having its center located at the optical axis of the scattered light taking unit 8.” Ex. 2035, 123.

Patent Owner presents testimonial evidence that a POSITA would have understood Iwamiya’s disclosure differently than the Board in IPR2022-01291. *See, e.g.*, Ex. 2002 ¶ 87 (Dr. Madisetti’s testimony that “a POSITA would have interpreted Iwamiya’s reference to light receiving units ‘disposed on the same circumference centered on an optical axis of the scattered light taking unit 8’ to refer to the photodetectors’ relative location, not a circular array of detectors”); *see also, id.* at ¶¶ 85–86 (Dr. Madisetti’s testimony on the drawbacks of using an array having a circular spatial

configuration).¹³ At trial, Patent Owner will have the opportunity to further develop this line of evidence. On the present record, the disclosure in Iwamiya is sufficiently clear to support institution.

Patent Owner also argues that the Board in IPR2022-01291 “erred by treating the claim limitation as reciting a numerical range,” when “no such range is recited in the limitation.” Prelim. Resp. 53. According to Patent Owner, it “disclaimed arrangements of two or three photodetectors during prosecution because those arrangements *cannot* form the requisite circular shape,” but, Patent Owner asserts, this disclaimer “did not convert a structural limitation into a numerical range.” *Id.* We do not agree with this argument because we do not see a material difference between construing the claims to exclude arrangements two or three photodetectors—a construction Patent Owner itself requests—and construing the claims to require a range of four or more photodetectors. *See also*, Ex. 2035, 126 (panel decision in IPR2022-01291 rejecting similar argument that claim 14 imposes a structural requirement and thus cannot be directed to a range). To the extent Patent Owner disagrees, Patent Owner may further explain its position at trial.

Other than as discussed above, Patent Owner does not challenge Petitioner’s assertions that claim 14 would have been obvious over Iwamiya,

¹³ Petitioner also presents testimonial evidence on how the POSITA would have understood Iwamiya’s disclosure. *See, e.g.*, Ex. 1003 ¶ 77 (Dr. Anthony’s testimony that “[f]rom [Iwamiya’s] disclosure, a POSITA would have understood, and it would have been obvious, that the photodiodes 9 are . . . arranged in an array having a spatial configuration corresponding to the circular shape of the tissue measurement site encircled by the circular light block”).

Sarantos, and Utter. We have reviewed Petitioner’s arguments and the underlying evidence cited in support as to the remaining limitations in claim 14 and are persuaded that, at this stage, Petitioner sufficiently demonstrates a reasonable likelihood of succeeding in establishing that the combination of Iwamiya, Sarantos, and Utter discloses all of the limitations of claim 14 and that claim 14 would have been obvious over Iwamiya, Sarantos, and Utter.

5. *Remaining Claims*

Petitioner challenges dependent claims 2 and 4–13 as obvious over Iwamiya and Sarantos; dependent claim 3 as obvious over Iwamiya, Sarantos, and Han; and dependent claims 15–18 and 20–25 as obvious over Iwamiya, Sarantos, and Utter. *See* Pet. 1. Patent Owner does not address Petitioner’s arguments and evidence as to the dependent claims with the exception of the arguments we address above in the context of the independent claims. *See* Prelim. Resp. 36–54.

Because Petitioner has shown a reasonable likelihood that it will prevail on its assertion that at least one of the challenged claims is unpatentable based on the grounds advanced here, we institute *inter partes* review as to the remaining obviousness grounds. *See SAS Inst., Inc. v. Iancu*, 138 S. Ct. at 1356 (“Section 314(a) does not require the Director to evaluate every claim individually. Instead, it simply requires him to decide whether the petitioner is likely to succeed on “at least 1” claim. Once that single claim threshold is satisfied, it doesn’t matter whether the petitioner is likely to prevail on any additional claims; the Director need not even consider any other claim before instituting review.”).

CONCLUSION

After considering the evidence and arguments presented in the current record, we determine that Petitioner has demonstrated a reasonable likelihood that it would prevail with respect to at least one claim of the '159 patent challenged in the Petition. Therefore, we grant institution of *inter partes* review as to all challenged claims based on all grounds set forth in the Petition.

NOTICES

The Board shall deem waived any issue not raised by Patent Owner in a timely Response to the Petition under 35 U.S.C. § 313 or as otherwise permitted in another manner during trial, even if the issue was raised in the Preliminary Response or discussed in this Decision.

Nothing in this Decision authorizes Petitioner, in a manner not otherwise permitted by the Board's rules or controlling precedent, to supplement the information supporting any ground advanced in the Petition.

ORDER

In consideration of the foregoing, it is hereby:

ORDERED that, pursuant to 35 U.S.C. § 314(a), *inter partes* review of all challenged claims of the '159 patent is instituted on all grounds of unpatentability set forth in the Petition; and

FURTHER ORDERED that pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is given of the institution of trial, which will commence on the entry date of this Decision.

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