

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

WHOOOP, INC.,

Petitioner,

v.

OMNI MEDSCI, INC.,

Patent Owner

U.S. Patent No. 12,193,790

Case No. PGR2026-00003

PATENT OWNER'S RESPONSE

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2020	Reserved
2021	<i>Apple Inc. v. Omni MedSci, Inc.</i> , IPR2020-00175, Paper 1 (PTAB Dec. 11, 2019)
2022	Defendant's Invalidity Contentions, <i>Omni MedSci, Inc. vs. Apple Inc.</i> , Case No. 2:18-cv-00134 (E.D. Tex.) (Aug. 28, 2018)
2023	Defendant's Invalidity Contentions - Exhibit A, <i>Omni MedSci, Inc. v. Apple Inc.</i> , Case No. 2:18-cv-134-RWS (E.D. Tex.) (Aug. 28, 2018)
2024	Defendant's Invalidity Contentions - Exhibit N, <i>Omni MedSci, Inc. v. Apple Inc.</i> , Case No. 2:18-cv-134-RWS (E.D. Tex.) (Aug. 28, 2018)
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2026-2030	Reserved
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2032	Complaint, <i>Omni MedSci, Inc. v. Whoop, Inc.</i> , No. 1:25-cv-00140 (D. Del.) (Feb. 3, 2025)
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2059	<i>Apple Inc. v. Omni MedSci, Inc.</i> , IPR2021-00453, Exhibit 1068, Transcript of October 9, 2024 Conference Call
2060	<i>Apple Inc. v. Omni MedSci, Inc.</i> , IPR2019-00916, Paper 32, Patent Owner's Sur-Reply (Jun. 11, 2020)

Pursuant to 37 C.F.R. § 42.220 and the Board's Scheduling Order (Paper 12), Omni MedSci, Inc. ("Patent Owner") submits this Response to the Petition for Post Grant Review (Paper 1, "Petition") of U.S. Patent No. 12,193,790 ("the '790 Patent") filed by Whoop, Inc. ("Petitioner").

I. INTRODUCTION

Petitioner has not carried its burden to show that claim 7 of the '790 Patent—the only challenged claim—is unpatentable under any of the five grounds in the Petition.

As an issue common to Grounds 1–3, claim 7 recites a wearable device that is configured to "identify an object." In a prior IPR of a related patent, the Board construed that phrase to mean "to recognize or establish an object as being a particular thing," and the Federal Circuit affirmed that construction and confirmed that identifying an object is distinct from merely detecting or measuring it. Petitioner asks the Board to apply this same construction, yet each of its prior art grounds improperly collapses identification into ordinary measurement.

In Ground 1, Petitioner relies on Lisogurski's pulse oximeter, which merely estimates blood oxygen saturation from the known absorption properties of hemoglobin without recognizing or establishing any object as a particular thing. But even if Lisogurski did disclose this, Petitioner's argument still fails because that determination is performed by Lisogurski's back end processing circuitry in the non-

wearable monitor, not the wearable sensor, and Petitioner never proposed relocating that circuitry. Petitioner separately fails to show that Lisogurski discloses or renders obvious the claimed “one or more lenses” (limitation 7[c]) or a wearable detection system (limitation 7[d]), improperly relying on the general knowledge of a POSITA to supply missing disclosures.

Grounds 2 and 3 fare no better. Lamego (Ground 2) and Soller (Ground 3) likewise measure known parameters—additional blood constituents and hematocrit, respectively—without identifying any object, and neither cures Lisogurski's lack of a wearable device configured to identify an object. Petitioner also fails to establish a sufficient motivation to combine the references, relying instead on generic assertions that the references are analogous and that a POSITA would seek more accurate measurements.

Petitioner's threshold collateral-estoppel argument also fails. Rather than comparing claim 7 of the '790 Patent to a single adjudicated claim in a prior IPR, Petitioner stitches together limitations from different claims of two different patents adjudicated in different proceedings, and its own expert admitted he performed no claim-by-claim analysis. Moreover, estoppel does not apply because the prior decisions rested on alternative, independently sufficient grounds that were not essential to the judgments, and one prior decision is on appeal and not yet final.

Finally, Petitioner's indefiniteness (Ground 4) and non-enablement (Ground

5) theories rest not on the intrinsic record but on mischaracterizations of Patent Owner's appellate arguments for a related patent. The term "identify an object" has already been construed and affirmed, multiple parties and experts have applied it to the prior art, and the specification provides numerous working examples of identification. Petitioner's non-enablement theory ignores the *Wands* factors and is predicated on the false premise that claim 7 requires reliable and accurate non-invasive glucose level monitoring.

For these reasons, and as discussed more fully below, the Board should rejected Petitioner's arguments and confirm the patentability of claim 7.

II. BACKGROUND

A. Overview of the '790 Patent

The '790 Patent discloses wearable optical systems that generate optical light, including near-infrared wavelengths, deliver that light to tissue (such as skin at the wrist), and detect returned light with one or more detectors. EX1001, 20:56-22:34; These systems process the resulting signals to obtain physiological information and, in certain embodiments, identify an object or material based on its optical response. EX1001, 87:32-33; EX2055 ¶62.

An exemplary system is depicted in Figure 31:

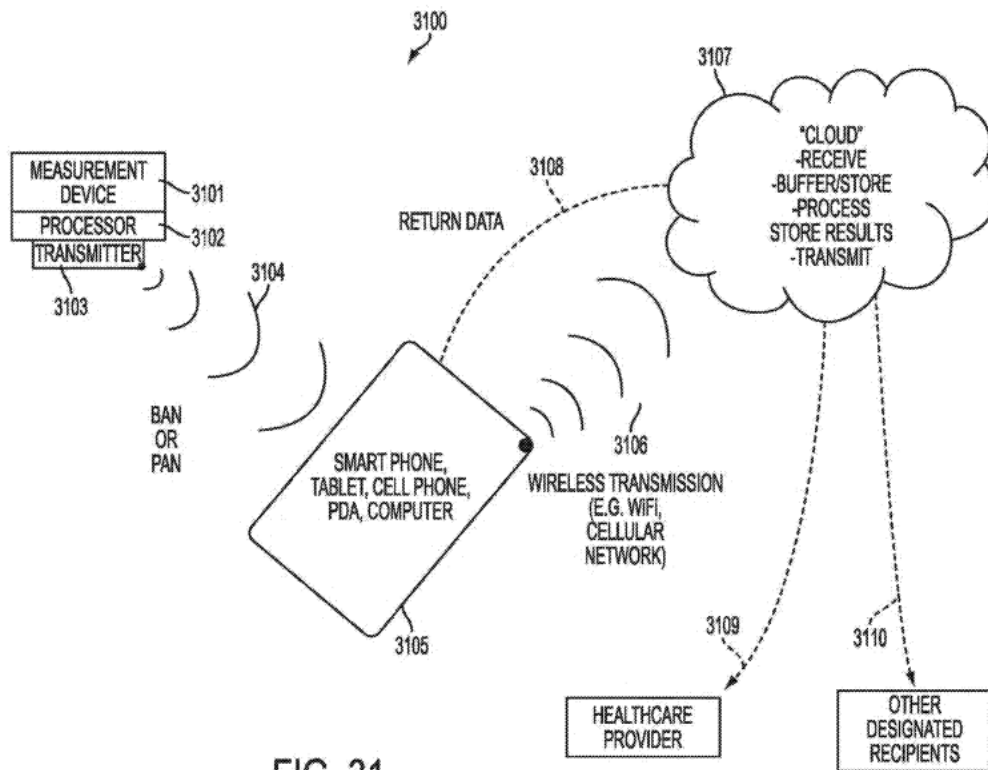
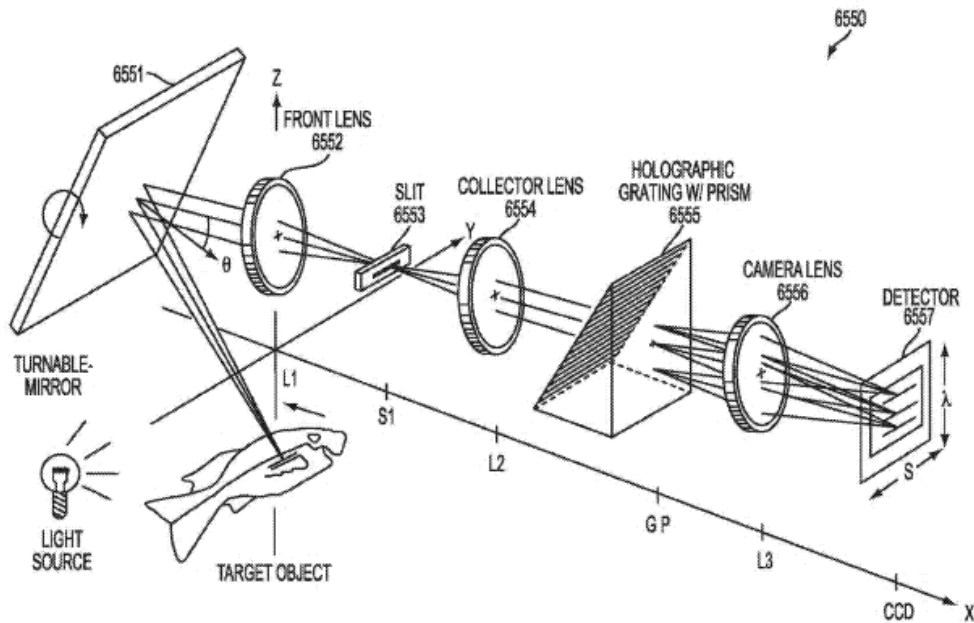


FIG. 31

EX1001, FIG. 31

The specification describes implementations using a plurality of semiconductor diodes (e.g., LEDs or laser diodes) capable of emitting at one or more wavelengths, including near-infrared wavelengths in the 700-2500 nm range. EX1001, 20:56-22:34; FIG. 65B; EX2055 ¶63. Light is directed to tissue via optical lenses, and the reflected or transmitted light is received by a detection system which produces an electrical signal that is then analyzed. *Id.*



EX1001, FIG. 65B

The '790 Patent describes synchronization between the light source and the detection system to improve the signal to noise ratio, along with various modulation techniques to improve the signal to noise ratio. EX1001, 9:19-21, 59:64-67. Greater accuracy is achieved through reducing the relative contribution of ambient light and other background influences. EX2055 ¶64. For example, the specification describes the use of an active illuminator to modulate sunlight and use synchronous or lock-in detection such that sunlight changes are factored out, improving the signal to noise ratio. EX1001, 58:24-45. In another example, the signal to noise ratio is improved by “narrow band filtering around the modulation frequency may be used to reject noise outside the modulation frequency.” EX1001, 58:34-36; EX2055 ¶65. In

another example, “change detection schemes may be used, where the detection system captures the signal with the light source on and with the light source off. Again, for this system the light source may be modulated. Then, the signal with and without the light source is differenced.” EX1001, 58:37-41; EX2055 ¶66.

The '790 Patent performs identification by applying algorithmic analysis to multi-wavelength data. EX2055 ¶¶67-71. The specification describes identification through comparison against reference libraries, the use of mathematical modeling (such as multivariate techniques), and signal processing technologies to determine material identity. EX1001, 18:10-27; 20:28-32; 21:7-28; 54:32-59; EX2055 ¶67. “In addition, change detection may help to *identify objects* that change in the field of view.” EX1001, 58:42-45;¹ EX2055 ¶67.

Identification is also described by the '790 Patent through correlating spectral data with a spectral library to identify the blood constituents of interest, including, for example, glucose, triacetin, ascorbate, lactate, alanine, and others. EX1001, 18:10-27; EX2055 ¶68. “Although glucose has a distinctive signature in the SWIR wavelength range, one problem of non-invasive monitoring is that many other blood constituents also have hydro-carbon bonds” and thus must be identified and distinguished. EX1001, 18:3-6; EX2055 ¶68. “To identify the blood constituents of

¹ All emphasis in evidence and case citations here is added unless otherwise noted.

interest...the spectrum may be correlated with a library of known spectra.” EX1001, 18:19-24; EX2055 ¶68. The identities of other blood constituents such as proteins, albumin, urea, creatine, or nitrates, are recognized through SWIR optical techniques, including pattern matching libraries and algorithms. EX1001, 20:24-32; EX2055 ¶69.

The specification of the ‘790 Patent describes distinguishing between the identities of different materials such as gypsum, painted structures, from other materials, such as plant life, soil, and trees. EX1001, 54:32-59; EX2055 ¶71. This identification is achieved by active remote sensing which references the chemical signature of data from a spectral library to identify materials. EX1001, 54:32-59. In other words, the ‘790 Patent discloses processes for “identification of objects based on their chemical signature.” EX1001, 54:58-59; EX2055 ¶71.

Identification of blood constituents of interest may be improved by techniques described in the ‘790 Patent. EX1001, 21:7-28; EX2055 ¶70. One technique comprises the use of a higher light level or intensity to improve the signal to noise ratio. EX1001, 21:11-13. Another uses mathematical modeling and signal processing methodologies to reduce interference—which accentuates differences between spectra. *Id.*, 21:13-22. “In addition, by using a wider wavelength range and using more sampling wavelengths may improve the ability to discriminate one signal from another.” *Id.*, 21:22-28.

B. Technology Background

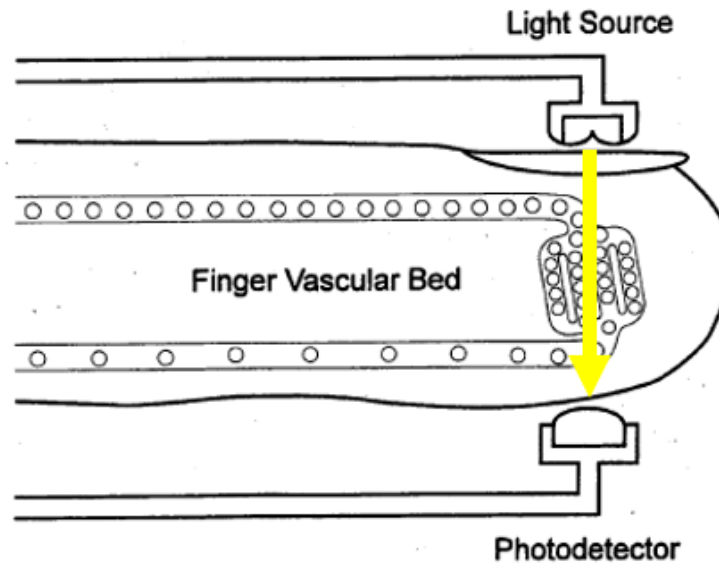
The Petition includes a technology background section that was “adopted from Apple’s ‘484/’533 IPR petitions.” Petition, 19-20. Petitioner suggests that this background has been “accepted by the Board.” *Id.*, 20 (citing EX1021, 8-14; EX1015, 4-12). This is misleading: Petitioner’s citations are to Apple’s IPR petitions, not the Board’s final written decisions. EX1021 (Apple petition for the ‘484 Patent); EX1015 (Apple petition for the ‘533 Patent). Contrary to Petitioner’s suggestion, neither of the Board’s prior decisions expressly adopted or “accepted” Apple’s technology background. *See* EX1008 (FWD for the ‘533 Patent); EX1011 (FWD for the ‘484 Patent).

In contrast to the Petition’s express acknowledgment that it “adopted” Apple’s technology background, Petitioner’s expert, Dr. Mercier, denied that the technology background section in his declaration was adapted from Apple’s IPR petitions and claimed that he created it independently. EX2052, 21:14-22:2. This is not credible. Dr. Mercier’s technology background is substantively identical to Apple’s petitions and cites the same materials. *Compare* EX1003 ¶¶ 59-67 (identifying the same four market trends: (1) wireless wearable monitoring for remote care; (2) a consumer market for pulse-oximetry/heart-rate fitness devices; (3) miniaturization of electronics; and (4) use of apps, smartphones, and cloud-based storage), *with* EX1015, 6-8 (“Prevailing Industry Trends Before 2012”) *and* EX1021, 10-12 (same

section, reciting the identical four trends in the same order and in nearly identical language). Dr. Mercier's only "new" analysis appears to be one paragraph where he provides an image from his 2012 thesis. EX1003 ¶66; EX2052, 21:20-22:2.

Petitioner's technology background discusses photoplethysmography (PPG) as applied to pulse oximetry, where different wavelengths of light can be used to "calculate the composition of the blood and tissue" based on "how much light is absorbed" by tissue. Petition, 20. The term "[o]ximetry refers to the colorimetric measurement of the degree of oxygen saturation, that is, the relative amount of oxygen carried by the hemoglobin in the erythrocytes, by recording the variation in the color of deoxyhemoglobin (Hb) and oxyhemoglobin (HbO₂).” EX1033, 14; *see also id.*, 58 (“Oximetry is the determination of the oxygen content of blood or tissues, normally by optical means”). Oximetry operates based on known absorbance properties for Hb and HbO₂ at different wavelengths of light. *Id.*

As Petitioner acknowledges, there are two modes for pulse oximetry. Petition 20; EX1033, 14. One option is transmission mode oximetry, where light is transmitted through one side of a tissue sample (e.g., a finger) and detected on the other side. EX2052, 29:1-22. An example of transmission oximetry is shown below:



EX1033, 61 (annotated)

Another option is reflectance mode oximetry, where light is directed onto a sample and a detector measures light that is reflected from the sample. EX2052, 29:1-22.

Petitioner's technology background conspicuously fails to explain how a pulse oximeter estimates blood oxygen saturation. Petition 20-21. As discussed more fully below, this is important because Petitioner incorrectly claims that pulse oximeters necessarily recognize or establish an object as a particular thing. *See infra*, §§VII.A.1, VII.B.1, VII.C.1. As an example, according to the Biomedical Engineering Handbook submitted with the Petition, the following equation can be used for computing oxygen saturation of blood:

$$\text{Oxygen saturation} = A - B \left[\frac{\text{OD}(\lambda_1)}{\text{OD}(\lambda_2)} \right]$$

EX1030, 14. In this equation, “A and B are coefficients which are functions of the specific absorptivities of H_b and H_bO₂, and OD is the corresponding absorbance (optical density) of the blood.” *Id.*, 14-15. In other words, the absorbance of two specific wavelengths of light is measured, and oxygen saturation is calculated using the above equation.

III. LEVEL OF SKILL IN THE ART

Petitioner proposes the following definition for a POSITA in relation to the '790 Patent:

“A person of ordinary skill in the art (“POSITA”) at the time of the alleged invention (December 2012) would have had good working knowledge of optical sensing techniques and their applications, and familiarity with optical system design and signal processing techniques. The POSITA would have an undergraduate degree in engineering (electrical, mechanical, biomedical, or optical) or a related field of study, along with relevant experience studying or developing physiological monitoring devices (e.g., non-invasive optical biosensors) in industry or academia. *Id.* Lack of professional experience can be remedied by additional education, and vice versa.

Petition, 13 (internal citations omitted); EX1003 ¶25.

This definition does not specify how much “relevant experience” a POSITA would have. *Id.* Petitioner's expert testified that a POSITA would have approximately 2 years of experience. EX2052, 155:5-156:15. For purposes of this

Response, Patent Owner adopts Petitioner's proposed level of skill. EX2055 ¶¶55-61.

IV. SUMMARY OF REFERENCES IN THE PETITION

Petitioner challenges claim 7 of the '790 Patent based on Lisogurski and Carlson (Ground 1), Lisogurski, Carlson, and Lamego (Ground 2), and Lisogurski, Carlson, and Soller (Ground 3).

A. Lisogurski (EX1027) (Grounds 1-3)

Lisogurski describes a non-invasive system for measuring parameters related to a subject's blood. EX1027, 3:61-4:5; EX2055 ¶¶92-93. Exemplary systems are illustrated in Figures 1 and 3:

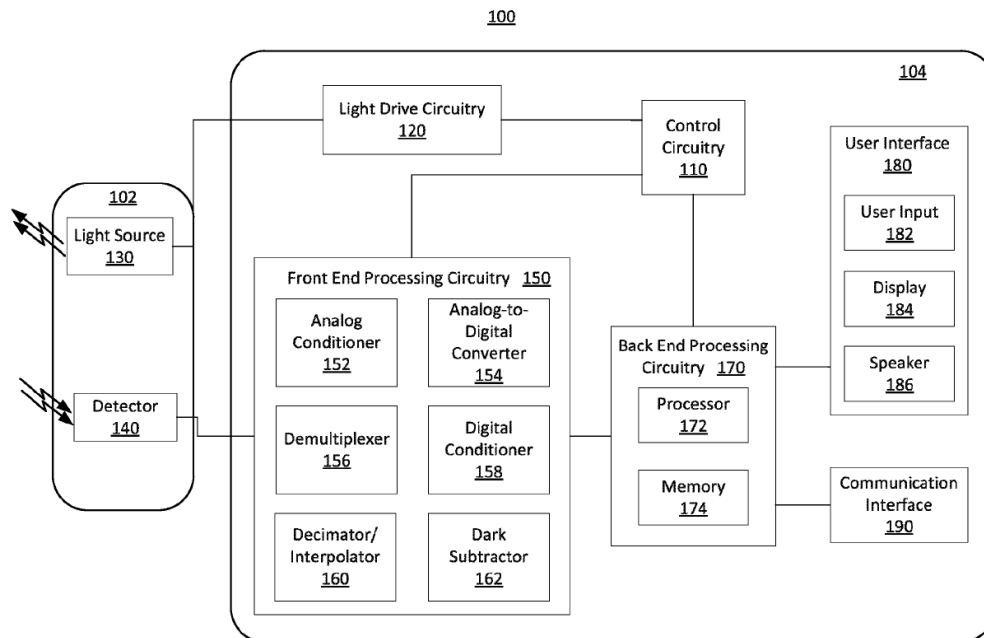


FIG. 1

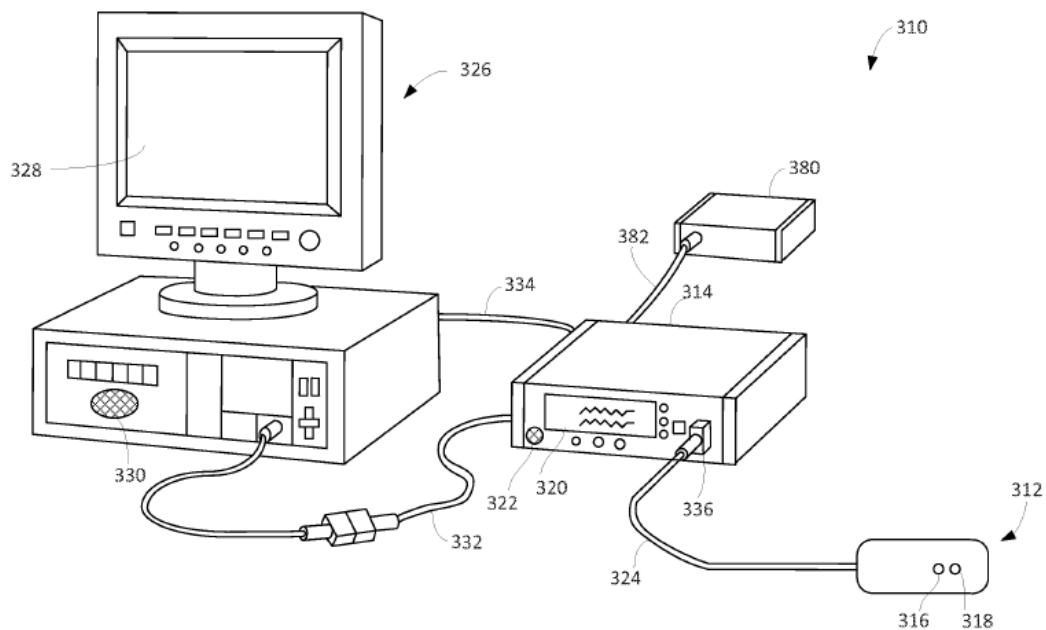


FIG. 3

EX1027, FIGS. 1, 3. A subject wears sensor unit 312, while the other components in the system are included for system calibration, data processing, and displaying information. EX1027, 17:54-18:15, 18:32-67; EX2055 ¶93. The sensor unit 312 includes light emitting diodes for directing light of different wavelengths to the subject's tissue and a detector that detects the light reflected from the tissue and converts it into an electrical signal. EX1027, 4:42-62, 10:48-64; EX2055 ¶93.

In FIG. 1, Lisogurski's front end processing circuitry 150 processes signals from detector 140. EX1027, 12:42-49; EX2055 ¶93. Then, "[p]rocessor 172 may receive and process physiological signals received from front end processing circuitry 150. For example, processor 172 may determine one or more physiological parameters based on the received physiological signals." EX1027, 14:60-64. The

system compares the signals to determine parameters such as blood oxygen saturation. *Id.*, 24:58-25:5.

B. Carlson (EX1028) (Grounds 1-3)

Carlson describes a non-invasive optical pulse oximeter. EX1028, ¶2; EX2055 ¶94. The oximeter is designed to be clipped onto a user's ear. EX1028, ¶¶48-49; EX2055 ¶94. This is illustrated in Figures 1 and 2:

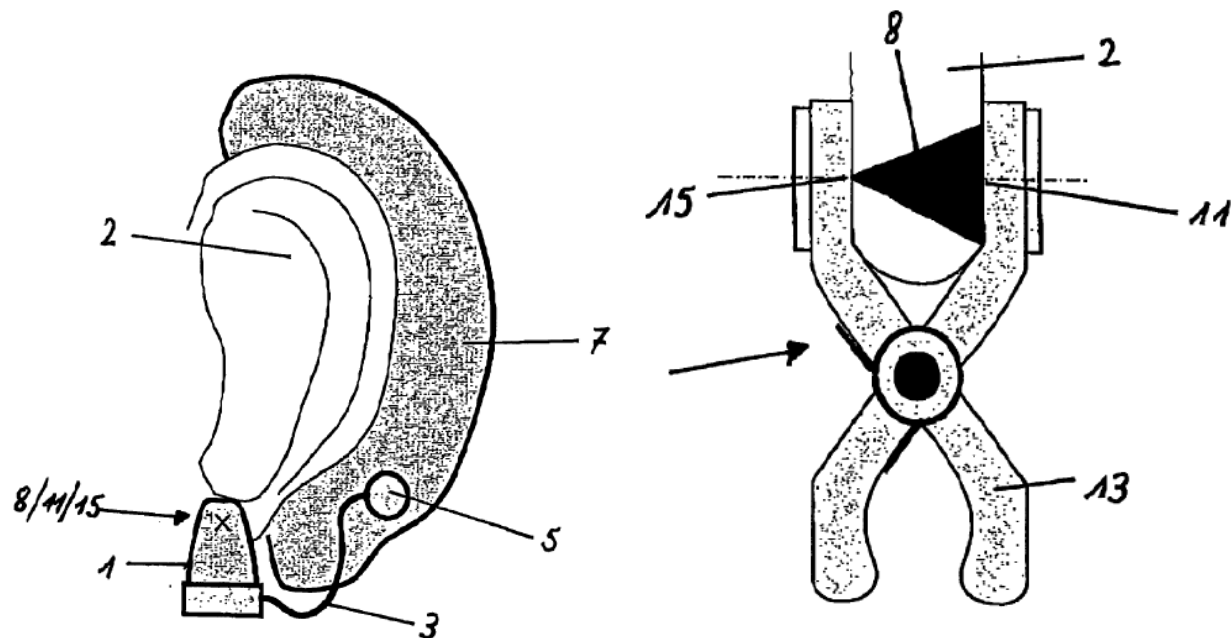


Figure 1

Figure 2

EX1028, FIGS. 1-2. Carlson's oximeter relies on various techniques, including beam shaping optical elements, to direct light through a tissue sample. EX1028, ¶¶10, 13-14, 62; EX2055 ¶95. Carlson also relies on "optical wavelength filters" which filter the light detected by the photo detecting element to a particular range of wavelengths before it is detected. EX1028, ¶¶26, 62; EX2055 ¶95.

C. Lamego (EX1062) (Ground 2)

Lamego describes a multi-wavelength physiological monitoring system that estimates concentrations of blood constituents, such as methemoglobin (MetHb) and carboxyhemoglobin (COHb), to compensate and improve the accuracy of conventional oxygen saturation or related outputs. EX1062, Abstract, ¶¶0003]; EX2055 ¶¶96-97. Multiple light sources using different wavelengths, paired with a detector, measure attenuated light from tissue to determine information related to oxygen saturation and related blood information.

D. Soller (EX1030) (Ground 3)

Soller describes a non-invasive optical technique for estimating hematocrit using multiple wavelengths, photodetector measurements, and statistical modeling, including regression techniques, to correlate measured optical signals with hematocrit values. EX1030, Abstract, 5:33-11:42; EX2055 ¶¶98-99. Soller focuses on improving measurement accuracy for a predefined estimation task.

V. CLAIM CONSTRUCTION

Petitioner argues that apart from limitation 7[l] (discussed below), “all other terms should be construed according to their plain and ordinary meaning” and that no construction is necessary. Petition, 17 (citing EX1003, ¶¶43-44). As discussed below, the Board should construe the phrase “identify an object” consistent with its prior claim construction for this term in a related patent. EX2055 ¶¶80-87.

A. Limitation 7[l]: “Identify an Object”

Limitation 7[l] recites: “wherein the wearable device is at least in part configured to identify an object.” EX1001, 87:32-33. In a prior decision concerning related U.S. Patent No. 10,517,484 (“the ‘484 Patent”), the Board construed the phrase “to identify an object” to mean “to recognize or establish an object as being a particular thing.” Petition, 17; EX1011, 8-10. The Federal Circuit affirmed the Board’s construction. EX1012, 5. Petitioner asks the Board to “adopt[] an identical construction to the extent a construction is necessary in this PGR” (Petition, 18), and its expert confirmed that he applied the prior construction in his analysis (EX1003, ¶196; EX2052, 23:17-12).

In the prior IPR for the ‘484 Patent, Patent Owner demonstrated that there is a difference between (1) identification, which requires recognizing or establishing an object is a particular thing and (2) detection, which merely requires noticing an object’s presence.” EX1011, 8. The Board found:

[W]e decline to adopt Petitioner’s proposal to construe the terms “identify an object” and “detect an object” to have the same meaning. Instead, we construe these terms consistent with the dictionary definitions of “identify” and “detect,” *i.e.*, we construe “to identify an object” to mean “to recognize or establish an object as being a particular thing,” and we construe “to detect an object” to mean “to discover or notice the existence or presence of something.”

EX1015, 10. The Federal Circuit reaffirmed this distinction and rejected Apple's argument that identifying an object "only require[s] that the claimed wearable device discover or determine the existence, presence, or fact of an object—*i.e.*, detecting said object" as this would collapse the distinction between the terms "identify" and "detect." EX1012, *3-4.

The Board's prior construction is supported by the specification, which exemplifies identification through distinguishing unknown constituents and describes identification through discriminating among multiple unknown constituents using spectral analysis, pattern matching algorithms, and spectral signature libraries. EX1001, 18:17-27, 78:51-79:12; FIG. 41; EX2055 ¶¶69, 293, 297, 311. For example, the specification explains that "to identify the blood constituents of interest...the spectrum may be correlated with a library of known spectra." EX1001, 18:19-21. The specification teaches "identification of objects based on their chemical signature." EX1001, 54:58-59.

Accordingly, the Board should adopt the same construction for the phrase "identify an object" as it did in the prior IPR for the '484 Patent *i.e.*, "to recognize or establish an object as being a particular thing." EX1015, 10.

VI. COLLATERAL ESTOPPEL DOES NOT APPLY

Petitioner argues that Patent Owner "is collaterally estopped from challenging the unpatentability of claim 7 (and motivation to combine Lisogurski and Carlson),

at least as to limitations 7[pre]-7[k].” Petition, 29. Specifically, Petitioner argues that claim 7 “is materially identical to the claims found unpatentable by the Board in the prior ‘533 and ‘484 IPRs.” *Id.* 26.

The Petition discusses three prior proceedings. *See* Petition 26-32. The first is a final written decision concerning related U.S. Patent No. 9,651,533 (the “533 Patent,” EX1004) in which the Board found certain claims unpatentable (EX1008) (the “533 IPR”). The second is a final written decision concerning related U.S. Patent No. 10,517,484 (the “484 Patent,” EX1005) in which the Board determined some challenged claims unpatentable (EX1011) (the “484 IPR”). The third is a remand decision for the ‘484 IPR in which the Board found the remaining claims of the ‘484 Patent unpatentable. EX1013. As detailed below, Petitioner’s collateral estoppel arguments based on the ‘533 and ‘484 IPRs should be rejected.

A. Applicable Law

Collateral estoppel, also called issue preclusion, is appropriate only if: (1) the issue is identical to one decided in the first action; (2) the issue was actually litigated in the first action; (3) resolution of the issue was essential to a final judgment in the first action; and (4) plaintiff had a full and fair opportunity to litigate the issue in the first action. *In re Freeman*, 30 F.3d 1459, 1465 (Fed. Cir. 1994).

To establish that collateral estoppel applies, Petitioner “must show that . . . resolution of the particular issue was essential to the final judgment in the first

action.” *Comair Rotron, Inc. v. Nippon Densan Corp.*, 49 F.3d 1535, 1537 (Fed. Cir. 1995). The Second Restatement of Judgments provides: “If a judgment of a court of first instance is based on determinations of two issues, either of which standing independently would be sufficient to support the result, the judgment is not conclusive with respect to either issue standing alone.” Restatement (Second) of Judgments §27 cmt. i (1982).

Although some courts follow an alternative approach, the Federal Circuit has consistently applied the approach of the Second Restatement. *See, e.g., TecSec, Inc. v. Int’l Bus. Machs. Corp.*, 731 F.3d 1336, 1343 (Fed. Cir. 2013) (“Among other elements, the party that seeks to invoke collateral estoppel must show that the litigated issue was ‘actually determined in the prior proceeding’ and was a ‘critical and necessary part of the decision in the prior proceeding.’ A corollary to this requirement is ‘where the court in the prior suit has determined two issues, either of which could independently support the result, then neither determination is considered essential to the judgment.’” (citation omitted)); *Comair*, 49 F.3d at 1538–39 (holding that a finding was not essential to a judgment for collateral estoppel purposes where that judgment was supportable on other grounds); *Masco Corp. v. U.S.*, 303 F.3d 1316, 1331 (Fed. Cir. 2002) (holding that “[a]ny one of these findings would have been sufficient to support the judgment of noninfringement of Claim 1, making them alternative, not cumulative, findings” and therefore “we are

constrained by our precedent to hold that [the patent owner] is not precluded from relitigating the issues”).

B. Petitioner's Estoppel Argument Mixes and Matches Different Claims from Different Patents

The Federal Circuit has explained that a collateral estoppel analysis requires a claim-by-claim evaluation:

Our precedent does not limit collateral estoppel to patent claims that are identical. Rather, it is the identity of the *issues* that were litigated that determines whether collateral estoppel should apply. If the differences *between the unadjudicated patent claims and adjudicated patent claims* do not materially alter the question of invalidity, collateral estoppel applies.

Ohio Willow Wood Co. v. Alps S., LLC, 735 F.3d 1333, 1342 (Fed. Cir. 2013) (citations omitted) (second emphasis added); *see also Apple Inc. v. Smart Mobile Techs LLC*, No. 2024-1352, 2026 WL 160563, at *3 (Fed. Cir. Jan. 21, 2026) (discussing *Ohio Willow* and a “side-by-side, limitation-by-limitation comparison of the claims”); *ParkerVision, Inc. v. Qualcomm Inc.*, 116 F.4th 1345, 1356 (Fed. Cir. 2024) (citing *Ohio Willow*, 735 F.3d at 1342) (“Evaluating this issue requires a comparison of the scope of the claims at issue in the [earlier] Action with the scope of the claims asserted [in the latter Action].”).

Rather than comparing challenged claim 7 to a single claim adjudicated in a prior proceeding, Petitioner presents a table comparing the limitations of claim 7 to

limitations of multiple claims appearing in two different patents (the '533 and the '484 Patents) that were challenged by Apple in two different proceedings (the '533 IPR and the '484 IPR). Petition 27-29; EX2055 ¶101. For limitations 7[pre], 7[a], and 7[b], Petitioner points to claims 1, 5, and 13 of the '533 Patent (EX1004). *Id.* 27. But for limitations 7[c] through 7[k], Petitioner identifies only limitations in claim 1 of the '484 Patent (EX1005), with no reference to the '533 Patent. *Id.* 27-28. And for limitation 7[l], Petitioner identifies only a limitation in claim 3 of the '484 patent. *Id.* 29.

Petitioner's mixed-and-matched approach—stitching together limitations from different claims of different patents adjudicated in different proceedings—cannot satisfy the required claim-by-claim, “side-by-side, limitation-by-limitation” comparison. *Ohio Willow Wood*, 735 F.3d at 1342; *Smart Mobile*, 2026 WL 160563, at *3. Indeed, Petitioner's expert, Dr. Mercier, admitted that he did not perform a claim-by-claim comparison between the '790 Patent and the previously challenged claims of the '533 and '484 Patents:

Q. Now, in forming this opinion in paragraph 77 of your declaration, did you compare each and every limitation of claim 7 to each and every limitation of the challenged claims from the '533 and '484 Patents?

A. I didn't do a claim-by-claim analysis. . . .

EX2052, 110:18-22.

A detailed comparison between claim 7 and the '533 and '484 Patent reveals that there are multiple differences. EX2055 ¶¶100-121. For example, the '533 Patent claims do not recite at least the following limitations of challenged claim 7: lenses configured to deliver a lens output light to tissue comprising skin (limitation 7[c]); a detection system configured to receive lens output light reflected from the tissue and to be synchronized to the light source (limitation 7[d]); detectors that are spatially separated and at least one analog to digital converter is coupled to at least one of the detectors (limitation 7[e]); output signal indicative the physiological parameters (limitation 7[f]); a detection system configured to generate first and second signals responsive to light received while semiconductor diodes are off and on, and to increase the signal-to-noise ratio by comparing those signals (7[h]–7[k]); and identify an object (limitation 7[l]). EX2055 ¶¶105-114; EX2052, 114:18-23. These limitations are absent from the '533 Patent claims that were previously considered, so there is no identity of issues, and no collateral estoppel, with respect to the '533 IPR.

Petitioner's limited citations to the '533 Patent are flawed for two additional reasons. First, Petitioner relies on multiple independent claims from the '533 Patent, i.e., independent claim 5 for limitation 7[pre] and independent claim 13 for limitations 7[a] and 7[b]. Petition 27. Second, claim 13 of the '533 Patent does not recite that the “wearable device [is] adapted to be placed on a wrist of a user” as

required by limitation 7[a]. *See* EX1004, 30:46-31:20; EX2055 ¶107; EX2052, 115:6-19, 121:9-15. These are additional reasons evidencing that there is no collateral estoppel with respect to the '533 IPR.

Similarly, Petitioner fails to identify limitations in the '484 Patent corresponding to limitations 7[pre] and 7[b] of challenged claim 7 of the '790 Patent. Petition 27. Nor does Petitioner identify a limitation within the '484 Patent corresponding to the “a wearable device for measuring one or more physiological parameters” portion of limitation 7[a]. *Id.* Thus, Petitioner has failed to establish identity of issues with respect to the '484 Patent, so there is no collateral estoppel with respect to the '484 IPR.

Because there are material differences between challenged claim 7 and the claims Petitioner identifies in its mixed and matched comparison chart, Petitioner has failed to establish that its challenge to claim 7 of the '790 Patent is identical to Apple's challenges in the '533 and '484 IPRs. Thus, collateral estoppel does not apply.

Patent Owner also raises arguments below that were not raised, and therefore not at issue, in the Apple proceedings. For example, Patent Owner explains the fallacy of Petitioner's contentions that pulse oximeters identify oxygenated and deoxygenated forms of hemoglobin and that it would have been obvious to relocate Lisogurski's front end circuitry to the sensor. *See* §VII.A.1.a.2. These arguments,

which were not advanced in the Apple IPRs, further evidence material differences between the issues addressed in the prior proceedings and this proceeding that render collateral estoppel inappropriate here.

C. Additional Collateral Estoppel Requirements are Missing

Beyond the material differences in claim scope between the claim 7 of the '790 Patent and those of the '533 and '484 Patents, collateral estoppel does not apply because many of the Board's findings were not essential to the final judgment.

1. The '533 IPR

In the '533 IPR, Apple argued that claim 13's requirement that "the light source configured to increase signal-to-noise ratio . . . by increasing a pulse rate of at least one of the plurality of semiconductor sources" was met by two separate mappings: (1) Lisogurski alone (EX1015, 35-36) and (2) the combination of Lisogurski and Carlson (*id.*, 37-39). The Board determined that this limitation was taught by Lisogurski alone (EX1008, 27-30 ("Petitioner has demonstrated how Lisogurski alone teaches the pulse rate limitation.")) *and* by the combination of Lisogurski and Carlson (*id.*, 30-35 ("Petitioner has demonstrated that the combination of Lisogurski and Carlson teaches a light source configured to increase signal-to-noise by increasing LED pulse rate.")). The Federal Circuit summarily affirmed the Board's conclusion without addressing either theory. EX1009. Because the Board determined claim 13 of the '533 patent was obvious under two different

mappings of the references, neither mapping was essential to the final judgement. *TecSec*, 731 F.3d at 1343; *Comair*, 49 F.3d at 1538–39.

As another example, as discussed below, Petitioner failed to show that the claimed “lenses” in limitation 7[c] would have been obvious over Lisogurski alone or the combination of Lisogurski and Carlson. *Infra* §VII.A.2. When addressing a “plurality of lenses” requirement in claim 13 of the ‘533 Patent, the Board found that “Lisogurski’s wireless sensor 102/312, when combined with the knowledge of a person of ordinary skill in the art *or* the teachings of Carlson, meets this limitation.” EX1008, 35. Because either basis (Lisogurski and knowledge of a POSITA or Lisogurski and Carlson) was sufficient, neither was essential to the final judgment and no estoppel applies. *TecSec*, 731 F.3d at 1343; *Comair*, 49 F.3d at 1538–39. Moreover, as discussed more fully below, the Office has indicated after the ‘533 IPR that it impermissible to rely on the knowledge of a POSITA to fill in a missing disclosure. *Infra* §VII.A.2.

Additionally, as discussed below, Petitioner failed to show that a POSITA would have modified Lisogurski to relocate front end processing circuitry 150 from monitor 104 to sensor 102 (a wearable device). *Infra* §VII.A.2. While the Board addressed a similar modification in the context of different claims in the ‘533 IPR, Apple’s petition proposed this modification conditionally and expressly suggested that it was not necessary. EX1015, 47 (proposing modification “[t]o the extent the

claims are found to require the front end processing circuitry and detector to be in the same device and that configuration is not shown in Lisogurski”). Against this backdrop, Petitioner has not shown that any findings regarding this modification were necessary to the judgment in the ‘533 IPR.

While Petitioner submitted several of the papers in the ‘533 IPR as exhibits in this proceeding, it failed to include Patent Owner’s sur-reply, which made clear that Patent Owner’s argument “focus[ed] on the ‘pulse rate’ limitation is not an admission that the references disclose the other limitations of the challenged claims” of the ‘533 Patent. EX2060, 1 n.2. This belies Petitioner’s suggestion that Patent Owner somehow conceded or acquiesced to all the arguments in Apple’s petition other than the ones it addressed. *See* Petition 2.

2. The ‘484 IPR

In the ‘484 IPR, Apple argued that claim 1 of the ‘484 Patent would have been obvious in view of the combination of Lisogurski and Carlson (EX1021, 7, 24+57) and in view of the combination of Lisogurski, Carlson, and Tran (*id.*, 7, 59-61). The Board determined claim 1 to be obvious in view of each of these two grounds in its initial final decision (EX1011, 22-44, 46-48) and maintained these rejections of claim 1 in its remand decision (EX1013, 12). Because the Board determined claim 1 of the ‘484 patent was obvious under two different mappings, neither was essential to the final judgement and collateral estoppel does not apply.

As detailed below, Petitioner failed to show that Lisogurski discloses or renders obvious limitation 7[d], which requires relocating Lisogurski's front end processing circuitry 150 from monitor 104 to sensor 102, or limitation [c], which requires one or more lenses. *Infra* §§VII.A.2, VII.A.3. Similarly to the '533 IPR, Apple conditionally argued that one would relocate front end processing circuitry 150 in the '484 IPR petition. EX1021, 26-27, 36. For the "one or more lenses" in claim 1 of the '484 Patent, Apple argued that Lisogurski discloses this feature (EX1021, 29-30) or, in the alternative, that it was obvious over Lisogurski and Carlson (*id.*, 30-33). In the first final written decision, the Board summarized the arguments in the Petition and found "that Petitioner has demonstrated that Lisogurski teaches each of claim limitations 1(a)-1(k)." EX1011, 24-27. Because the Board could have found for Apple under either theory, there is no indication that either was necessary to the Board's conclusion. *TecSec*, 731 F.3d at 1343; *Comair*, 49 F.3d at 1538–39.

Even when all the requirements for collateral estoppel are present, its application is subject to exceptions. *B & B Hardware, Inc. v. Hargis Indus., Inc.*, 575 U.S. 138, 148 (2015) (citing Restatement (Second) of Judgments §§ 27–28). One exception is the lack of incentive to litigate the first action. *See* Restatement (Second) of Judgments § 28(5)(c) (explaining that an exception may exist when "the party sought to be precluded...did not have an...incentive to obtain a full and fair

adjudication in the initial action”). The Federal Circuit has applied this exception and declined to impose collateral estoppel when some claims remain following an earlier Board decision and the patent owner declined to appeal the Board’s decision. *Oren Techs., LLC v. Proppant Express Invs. LLC*, No. 2019-1778, 2021 WL 3120819, at *3 (Fed. Cir. July 23, 2021) (finding no preclusion “because of Oren’s lack of incentive to litigate the ’929 patent given the timing of this court’s decision affirming the district court’s stipulated judgment of non-infringement and ***because of the survival of a claim*** in the ’929 patent as compared to the invalidation of all challenged ’626 patent claims.”) (emphasis added).

In the ‘484 IPR, Patent Owner initially prevailed on claims 3-6 and 8-14 of the ‘484 Patent (i.e., approximately 50% of the challenged claims), which minimized its incentive to litigate the Board’s unpatentability findings for claims 1, 2, 7, and 15-23² based on Lisogurski, Carlson, and Tran. EX1015, 61. Notably, in *Oren Techs.*, the Federal Circuit concluded that issue preclusion did not apply when *one* claim survived the prior Board proceeding. *Oren Techs.*, 2021 WL 3120819, at *3.

² Petitioner and Dr. Mercier argue that the Federal Circuit affirmed the Board’s findings for claims 1, 2, 7, and 15-23 in the ‘484 IPR. *See, e.g.*, Petition 1; EX1003 ¶¶76. This is nonsensical because, as Petitioner acknowledges, Patent Owner did not appeal those findings, so they were not before the Federal Circuit. Petition 5 n.2.

Accordingly, the Board should conclude that issue preclusion does not apply in this proceeding and Omni is not collaterally estopped from challenging Petitioner's assertions of unpatentability.

D. The '484 Remand Decision Has No Preclusive Effect

Petitioner concedes that the '484 IPR remand decision (EX1013) currently has no collateral estoppel effect because it has been appealed. Petition 29; *United Therapeutics Corp. v. Liquidia Techs., Inc.*, 74 F.4th 1360, 1372 (Fed. Cir. 2023) ("an IPR decision does not have collateral estoppel effect until that decision is affirmed or the parties waive their appeal rights."). Petitioner only relies on the '484 IPR remand decision findings for claim 3 of the '484 Patent for limitation 7[l] in the '790 Patent. Petition 29. For this additional reason, there is no collateral estoppel for claim 7 because neither of the prior IPR decisions that are final addressed whether Lisogurski discloses a wearable device configured to identify an object.

Petitioner suggests that if the Board's findings in the '484 IPR remand decision "are affirmed (or the appeal is dismissed) during the pendency of this petition, collateral estoppel would likewise apply." Petition 32. But even if the remand decision became final (it is not), collateral estoppel would not apply for at least two reasons. First, the issues are not identical: in the '484 IPR, Apple challenged claim 3 by asserting it would have been obvious in view of the

combination of Lisogurski, Carlson, and Tran.³ EX1021, 7, 59-60, 62-63. Here, however, Petitioner does not rely on Tran in Grounds 1-3. *See* Petition 32-90. Thus, there is no identity of issues between the '484 IPR remand decision and this proceeding.

Second, Patent Owner did not have a full and fair opportunity to litigate the issues. In the '484 IPR petition, Apple did not propose a construction for the phrase “to identify an object.” EX1021, 19-21, 62-63. Instead, Apple took an overbroad interpretation that equated detecting and identifying and asserted that Lisogurski's “probe-off signal” satisfied this limitation. *Id.* at 62. Patent Owner responded by explaining that the claims and specification used “to identify” in accordance with its ordinary usage to mean “to recognize or establish an object as being a particular thing” and explaining the differences between “to identify” and “to detect.” EX2056, 11-14, 37-38. Patent Owner noted that Lisogurski's probe-off signal satisfied neither of these limitations. *Id.* at 36–38.

In its reply, Apple proposed an alternate interpretation of “to identify.” EX2057, 20-22. Apple also argued that each of Lisogurski and Tran taught measuring blood oxygen saturation, thereby satisfying the ordinary and customary meaning of “to identify” as set forth by *Omni*. *Id.* at 24. Patent Owner replied by

³ U.S. Patent No. 8,108,036.

arguing that Apple's interpretation was an improper new argument and explaining that "measuring" is not the same as "identifying." EX2058, 25-28. The Board agreed with Patent Owner's interpretation of "to identify" and that Apple's reply introduced improper new arguments. EX1011, 51-52. On appeal, the Federal Circuit confirmed Patent Owner and the Board's interpretation of "to identify," but remanded for the Board to consider Apple's reply arguments. EX1012, 3-6.

After remand, the Board held a conference call with the parties to discuss the need for additional briefing. *See* EX1013, 2. Both parties stated that additional briefing would be useful. *See generally* EX2059. Patent Owner explained that the Federal Circuit's decision created an open question as to whether Apple's reply arguments relied on the same embodiments as the petition. *Id.*, 7:25-8:10. Patent Owner further explained that, although it was able to address Apple's reply arguments in the sur-reply, the length limitation for sur-replies and the need to address several other issues did not allow Patent Owner to fully address Apple's arguments. *Id.*, 16:24-17:10; *see also* EX2058, 30 (indicating that Patent Owner's sur-reply used 5,591 of its allowed 5,600 words); 37 C.F.R. § 42.24(a) (setting a limit of 5,600 words for sur-replies). The Board, however, declined to allow additional briefing. EX1013, 3-4.

"In determining whether a party has had a 'full and fair' opportunity to litigate an issue, a court should look at . . . whether there were significant procedural

limitations in the prior proceeding” *Banner v. United States*, 238 F.3d 1348, 1354 (Fed. Cir. 2001). As explained by Patent Owner in the ’484 IPR and summarized above, the sur-reply did not present Patent Owner a full and fair opportunity to litigate the issues presented by Apple for the first time in its reply. The word limitation for sur-replies, especially given the issues raised in Apple’s reply that could be addressed only in the sur-reply, were a significant procedural limitation that prevented Patent Owner from having a full and fair opportunity to respond. Patent Owner was also procedurally barred from submitting new evidence with its sur-reply, including expert testimony explaining why Apple’s new reply arguments were wrong. The Board should determine that collateral estoppel is not appropriate in this case.

VII. PETITIONER FAILED TO MEET ITS BURDEN

Petitioner has not met its burden of showing that claim 7 of the ’790 Patent is unpatentable under any of the grounds presented in the Petition. EX2055 ¶¶122-311.

A. Ground 1: Lisogurski in View of Carlson

In Ground 1, Petitioner asserts that claim 7 of the ’790 Patent is obvious over Lisogurski in view of Carlson. Petition 32; EX1003 ¶¶90-92. As discussed below, Petitioner failed to meet its burden. EX2055 ¶¶123-218.

1. Limitation 7[l]: Lisogurski Does Not Disclose a Wearable Device Configured to Recognize or Establish an Object as a Particular Thing

Limitation 7[l] recites: “wherein the wearable device is at least in part configured to identify an object.” EX1001, 87:32-33. As discussed above, the phrase “identify an object” should be construed to mean “to recognize or establish an object as being a particular thing.” *Supra* §V.A; EX1015, 10.

Lisogurski does not disclose this limitation for two reasons. EX2055 ¶126. First, the pulse oximetry technique described in Lisogurski does not include recognizing or establishing an object as a particular thing. Second, even if pulse oximetry necessarily involves identifying an object (it does not), Petitioner failed to show that Lisogurski discloses a wearable device configured to perform this functionality.

a) Lisogurski Does Not Disclose Recognizing or Establishing an Object as a Particular Thing

Lisogurski does not disclose identifying an object, i.e., recognizing or establishing an object as a particular thing. EX2055 ¶¶127-154; *supra* §V.A. The Petition argues that Lisogurski meets the claim construction because “measuring blood oxygen saturation requires selecting oxygenated and deoxygenated hemoglobin from among other blood constituents, and then identifying and quantifying both components.” Petition, 70 (citing EX1003 ¶¶197-198; EX1027,

4:42-51). Petitioner also argues that “in order to calculate blood oxygen saturation, a pulse oximeter, like the one taught by Lisogurski, necessarily must distinguish between the different forms of hemoglobin—oxygenated and deoxygenated.” *Id.* (citing EX1003 ¶200). Similarly, Petitioner asserts that “[a] system that can calculate a measurement using ‘two forms’ of hemoglobin obtained with two different wavelengths must necessarily ‘recognize or establish an object as being a particular thing,’ specifically, a particular form of hemoglobin.” Petition 70-71.

Lisogurski does not expressly disclose that its system recognizes or establishes an object (e.g., oxygenated or deoxygenated hemoglobin) as a particular thing. EX2055, ¶¶134-154; *supra* §V.A. Instead, Lisogurski merely describes standard pulse oximetry, which involves using the known absorption properties of hemoglobin at different wavelengths to estimate the blood oxygen saturation using standard calculations. EX1027, 4:36-62, 9:38-42, 24:41-57, 37:2-12; EX2055 ¶¶136-137. Petitioner tacitly acknowledges the lack of express disclosure in arguing that pulse oximetry “necessarily” involves identifying an object, i.e., that this functionality is inherent. Petition 70-71; *PAR Pharm., Inc. v. TWI Pharms., Inc.*, 773 F.3d 1186, 1195–96 (Fed. Cir. 2014) (“A party must, therefore, meet a high standard in order to rely on inherency to establish the existence of a claim limitation in the prior art in an obviousness analysis—the limitation at issue necessarily must be present, or the natural result of the combination of elements explicitly disclosed by

the prior art”); *Roland Corp. v. inMusic Brands, Inc.*, IPR2018-00335, Paper 14 at 18 (PTAB July 2, 2018) (“Petitioner’s argument that these features are inherent is insufficient absent persuasive evidence or argument that such features are necessarily present”).

Contrary to Petitioner’s suggestion, pulse oximetry does not involve identifying an object. Pulse oximetry is used to estimate the oxygen saturation of blood. EX2055 ¶136. There is no need to identify a particular blood constituent as either oxygenated or deoxygenated hemoglobin for this purpose. *Id.* Pulse oximetry uses known absorption properties of hemoglobin at two specific wavelengths of light (e.g., red and IR light) and estimates oxygen saturation. EX2055 ¶¶136-138; EX2052, 30:24-31:7. For example, Lisogurski explains that “it has been observed that highly oxygenated blood will absorb relatively less red light and more IR light than blood with a lower oxygen saturation” and “[b]y comparing the intensities of two wavelengths at different points in the pulse cycle, it is possible to estimate the blood oxygen saturation of hemoglobin in arterial blood.” EX1027, 4:45-51; EX2055 ¶137.

Lisogurski explains that “the system may determine blood oxygen saturation using two wavelengths of light and a ratio-of-ratios calculation.” EX1027, 4:54-56; EX2055 ¶138; EX2052, 27:21-28:3. According to Lisogurski, “[r]atio-of-ratio calculations are common calculations in pulse oximeters” and “use IR and red . . . to

determine oxygen saturation.” EX1027, 45:6-8. An equation for this calculation is shown below, “where terms relate to the maximum, minimum, and mean amplitudes of the associated signals.” *Id.*, 45:9-22.

$$\frac{\left(\frac{Red_{max} - Red_{min}}{Red_{mean}} \right)}{\left(\frac{IR_{max} - IR_{min}}{IR_{mean}} \right)}$$

This calculation does not require establishing or recognizing an object as a particular thing. EX2055 ¶139.

As another example, Biomedical Engineering Handbook (EX1033) explains that “a simple quantitative relationship can be derived for computing the oxygen saturation of blood” using the equation below.

$$\text{Oxygen saturation} = A - B \left[\frac{OD(\lambda_1)}{OD(\lambda_2)} \right]$$

EX1033, 14-15; EX2055 ¶140. In this equation, “A and B are coefficients which are functions of the specific absorptivities of Hb and HbO₂, and OD is the corresponding absorbance (optical density) of the blood.” EX1033, 15. This calculation does not require or involve recognizing or establishing an object as a particular thing. EX2055 ¶140.

These equations refute Petitioner's erroneous claims that "measuring blood oxygen saturation requires selecting oxygenated and deoxygenated hemoglobin from among other blood constituents, and then identifying and quantifying both components" and "a pulse oximetry . . . necessarily must distinguish between the different forms of hemoglobin." Petition 70 (emphases omitted). Petitioner cites no objective evidence to support its (mis)characterizations of pulse oximetry other than Dr. Mercier's declaration, who in turn cites no technical literature to support his assertion that a pulse oximeter necessarily identifies an object. *Id.*; EX1003 ¶¶196-203; 37 C.F.R. § 42.65(a) ("Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight").

Petitioner also argues in the alternative that "Lisogurski teaches that other wavelengths may be used that can identify other blood constituents using the spectral signature of those constituents." Petition, 71 (citing EX1003 ¶202; EX1027, 1:22-25, 4:36-41). However, Lisogurski does not disclose recognizing or establishing a blood constituent as a particular thing; it merely describes determining "physiological parameter such as blood oxygen saturation, hemoglobin, blood pressure, pulse rate, other suitable parameters, or any combination thereof" (EX1027, 1:22-25) and "an amount of a blood constituent (e.g., oxyhemoglobin) being measured" (*Id.*, 4:36-41). EX2055 ¶¶141-144.

One can measure something without recognizing or establishing it as a

particular thing. EX2055 ¶145. For example, a scale measures mass but does not recognize or establish the object on the scale as being a particular thing. Lisogurski is designed to measure a constituent based on known absorption properties of the constituent at certain wavelengths of light. *Id.* This process does not involve recognizing or establishing an object as a particular thing or differentiating a constituent of interest from other constituents. *Id.* Similarly, one can notice the existence of something without recognizing or establishing an object as a particular thing. *Id.* ¶146.

Petitioner and Dr. Mercier conflate (i) measuring or detecting an object with (ii) identifying an object. The Petition acknowledges that the claim construction for “identify an object” is “not synonymous with ‘detecting’ the presence of an object,” yet it ignored that distinction in its analysis. Petition 68; EX1011, 50-51; EX1012, *4-5; *supra* §V.A. Dr. Mercier does not acknowledge or address the distinction between identifying and detecting in his declaration. EX1003 ¶¶44, 196-203. He could not articulate the difference between identifying and detecting an object during his deposition:

Q. What's the difference between the phrase “identify an object” and “detect an object” under the Board's claim construction?

A. I didn't do that analysis.

EX2052, 25:21-26:1 (objection omitted). He also admitted that his declaration did

not address the difference between identifying an object and detecting an object:

Q. And you don't discuss in your declaration the difference between identifying an object and detecting an object, correct?

A. No. I was just simply applying the construction offered by or affirmed by the Federal Circuit, and I applied it as a POSITA would in my analysis.

Id., 26:8-14.

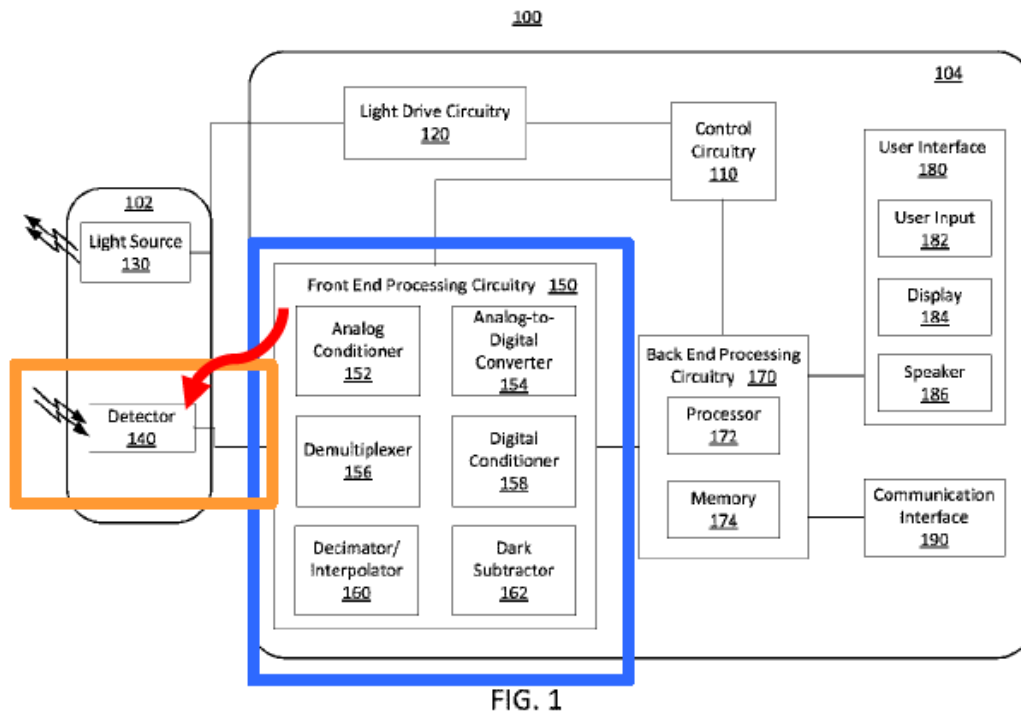
There are multiple instances in Dr. Mercier's declaration where he incorrectly equates identifying an object with detecting an object. For example, Dr. Mercier states that "[t]he specification describes identifying objects *as establishing the presence of the target.*" EX1003 ¶232. Discovering or noticing the presence of something qualifies as *detecting* an object, not identifying an object. EX1011, 10; EX2055 ¶¶149-151. As another example, Dr. Mercier quotes portions of Lisogurski that refer to *detecting* something. EX1003 ¶197 (quoting EX1027, 9:38-45 (referring to "blood oxygen saturation detection algorithm"), 37:2-12 (referring to "detect[ing a] physiological condition" or certain changes)). This testimony underscores that Petitioner did not properly apply the Board's claim construction and failed to show that Lisogurski discloses recognizing or establishing an object as a particular thing.

**b) Lisogurski Does Not Disclose a Wearable Device
Configured to Identify an Object**

Limitation 7[l] requires that “*the wearable device* is at least in part configured to identify an object.” EX1001, 87:32-33; EX2055 ¶153. Even if, *arguendo*, the Board were to find that Lisogurski's pulse oximeter identifies an object (which it does not), Petitioner failed to show that Lisogurski discloses a *wearable device* configured to perform this function. EX2055 ¶¶154-164.

The Petition identifies Lisogurski's sensor 102 as the claimed wearable device (Petition 39) and proposes modifying Lisogurski's sensor 102 to include front end processing circuitry 150 from the monitor 104 (which is not a wearable device) to satisfy limitation 7[d]'s requirement that the wearable device includes a detection

system (*Id.* 47-52). Petitioner shows this proposed modification using the annotated version of FIG. 1 reproduced below:



Petition 50 (annotating EX1027, FIG. 1)

In FIG. 1, “front end processing circuitry 150 may receive a detection signal from detector 140 and provide one or more processed signals to back end processing circuitry 170.” EX1027, 12:42-45; EX2055 ¶156. The “detection signals” are “any of the signals generated within front end processing circuitry 150 as it processes the output signal of detector 140.” EX1027, 12:45-48; EX2055 ¶156. The “[f]ront end processing circuitry 150 may perform various analog and digital processing of the detector signal.” EX1027, 12:48-49; EX2055 ¶156.

Lisogurski's monitor 104 (the non-wearable device) also includes back end processing circuitry 170, which includes processor 172 and memory 174. EX1027, 14:56-57, FIG. 1; EX2055 ¶157. The processor 172 in the back end processing circuitry 170 "may receive and process physiological signals received from front end processing circuitry 150" and "may determine one or more physiological parameters based on the received physiological signals," i.e., the signals from the front end processing circuitry 150. EX1027, 14:60-64; EX2055 ¶157. The physiological parameters determined by the back end processing circuitry 170 include blood oxygen saturation. EX1027, 1:22-25, 4:3-5, 4:36-41, 17:62-67; EX2055 ¶¶157-158; EX2052, 38:3-39:16.

As discussed above, Lisogurski does not disclose recognizing or establishing an object as a particular thing. *Supra* §VII.A.1.a. But even if, *arguendo*, measuring blood oxygen saturation or other blood constituents involves identifying an object under the Board's claim construction (it does not), these are physiological parameters that are determined by Lisogurski's back end processing circuitry 170 in the monitor 104. EX1027, 14:60-64, 1:22-25, 4:3-5, 4:36-41, 17:62-67; EX2055 ¶¶159-161; EX2052, 38:3-39:16. The back end processing circuitry 170 is **not** part of the wearable device, i.e., the sensor 102. EX2055 ¶¶159-161. Petitioner did not propose modifying Lisogurski to relocate the back end processing circuitry 170 to the wearable sensor 102. *See* Petition 47-52 (proposing to relocate front end

processing circuitry 150 from monitor 104 to the sensor 102), 54-56 (proposing to relocate control 110 and light drive circuitry 120 from monitor 104 to the light source 130);⁴ EX2052, 74:12-75:6; EX2055 ¶162.

The Petition fails to address the requirement that the *wearable device* is at least in part configured to identify an object. Petition, 68-72; EX2055 ¶163. The only time the term “wearable device” is mentioned in connection with limitation 7[l] is in a footnote incorrectly accusing Patent Owner of taking an inconsistent position in the parallel district court case. *Id.*, 68 n.10. The prior Board decision regarding the ‘484 Patent also fails to identify how Lisogurski discloses a wearable device configured to identify an object. EX1013, 4-7 (discussing Lisogurski’s calculations to estimate blood oxygen saturation but failing to recognize that such calculations involve only *measuring* reflected wavelengths without *identifying* any object as a particular thing); EX2055 ¶164; *supra* §VII.A.1a.

2. Limitation 7[d]: Lisogurski Does Not Disclose or Render Obvious a Wearable Device Including a Detection System

Limitation 7[d] recites: “the wearable device further comprising a detection system configured to receive at least a portion of the lens output light reflected from the tissue and to generate an output signal having a signal-to-noise ratio, wherein the

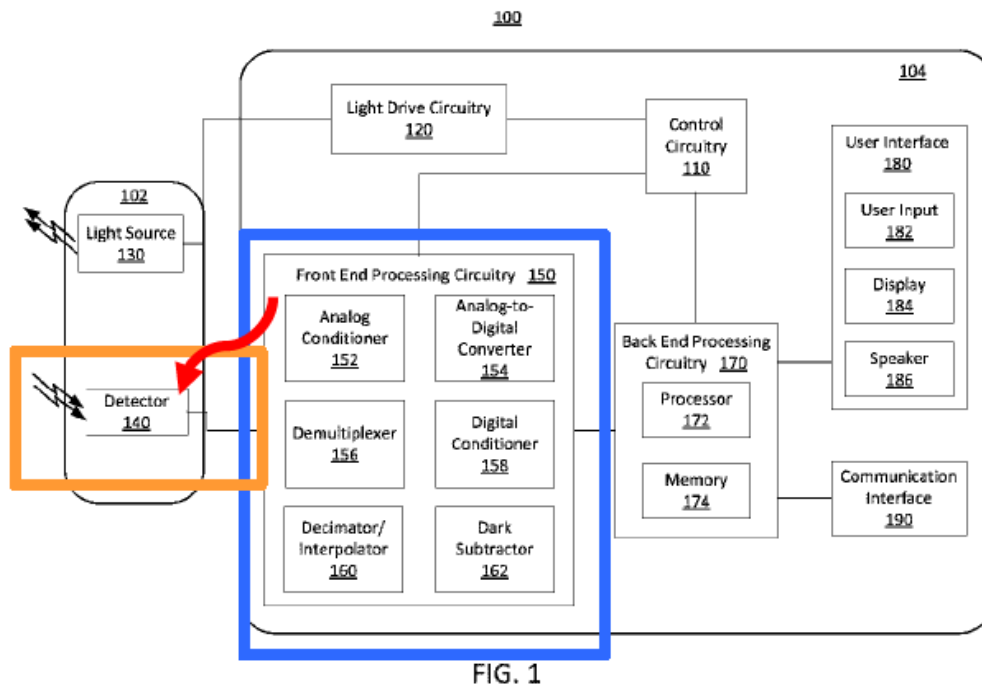
⁴ The term “back end processing circuitry” does not appear in the Petition.

detection system is configured to be synchronized to the light source.” EX1001, 87:8-13; EX2055 ¶165. Limitations 7[h]-7[k] require that the detection system is configured to “generate a first signal responsive to light received while the semiconductor diodes are off,” “generate a second signal responsive to light received while at least one of the semiconductors is on,” and “increase the signal-to-noise ratio by comparing the first signal and the second signal.” EX1001, 87:24-33; EX2055 ¶166.

Petitioner argues that “[t]o the extent the claims require that the detection system is integrated into the sensor (the wearable device), this would have been an obvious modification to Lisogurski.” Petition, 49. The claims expressly require the claimed wearable device includes a detection system that performs each of the claimed functions. EX1001, 87:8-13; EX2055 ¶¶165-166. Thus, Petitioner must show that Lisogurski discloses or renders obvious a detection system that performs the claimed functionality that is part of a wearable device that is adapted to be worn on a wrist.

Petitioner maps Lisogurski's sensor 102 to the claimed wearable device and the combination of detector 140 in the sensor 102 and front end processing circuitry 150 in the monitor 104 to the claimed detection system. Petition 39, 48-50. To satisfy limitation 7[d], Petitioner argues that it would have been obvious to relocate front end processing circuitry 150 from the monitor 104 to the sensor 102 (the wearable

device), and shows this modification using the annotated version of FIG. 1 below:



Petition 50 (annotating EX1027, FIG. 1)

Petitioner alleges that “Lisogurski teaches the front end processing circuitry in the detection system may be integrated directly with the sensor, rather than in a separate monitor.” Petition 49 (citing EX1003 ¶149). Tellingly, Petitioner does not cite Lisogurski for this assertion. *Id.* That is because Lisogurski does **not** teach that front end processing circuitry may be integrated directly with the sensor. EX2055 ¶168. Dr. Mercier admits that “the front end processing circuitry in Lisogurski is depicted in monitor 104 (which . . . is depicted as a separate device from the detector in the wearable sensor)” and argues obviousness. EX1003 ¶149.

Petitioner similarly argues “Lisogurski suggests integrating the front end

processing circuitry with the detection system.” Petition 49 (citing EX1027, 11:20-25, 17:55-59, 18:23-25, 17:32-35). None of Petitioner’s citations to Lisogurski support this contention. EX2055 ¶¶169-174. In the first citation, Lisogurski merely states that “detector 140 may send the detection signal to monitor 104, where the detection signal may be processed and physiological parameters may be determined.” EX1027, 11:20-25; EX2055 ¶170. In the second citation, Lisogurski states that the sensor unit 312 in FIG. 3 may be powered by a battery and wirelessly connected to monitor 314. EX1027, 17:55-59; EX2055 ¶171. The third citation likewise describes using a “wireless transmission device” instead of the cable 324 in FIG. 3. EX1027, 18:23-25; EX2055 ¶¶172-173. In the fourth citation, Lisogurski states that “one or more components of physiological monitoring system 310 may include one or more components of physiological monitoring system 100 of FIG. 1.” EX1027, 17:32-35; EX2055 ¶174. None of these citations say anything about relocating front end processing circuitry 150 from monitor 104 to sensor 102. EX2055 ¶¶169-175. Instead, they merely reflect that in the FIG. 3 embodiment, the sensor 310 can communicate wirelessly with monitor 314. EX1027, 17:55-59, 18:23-25; EX2055 ¶¶169-175.

Based on Lisogurski’s reference to wireless communication between the detector and monitor, Petitioner argues that a POSITA would modify Lisogurski to integrate the front end processing circuitry 150 from monitor 104 in FIG. 1. in the

sensor 102 because “the signal received by the detector would preferably be converted from analog to digital form in order to be wirelessly transmitted to the monitor.” Petition 50-51. Dr. Mercier similarly asserts that “in order to satisfy Lisogurski’s disclosed embodiment of wirelessly connecting the monitor to the detector . . . the analog-to-digital conversion processing circuitry would need to be integrated into the sensor.” EX1003 ¶151. This does not supply a motivation to relocate front end processing circuitry 150. EX2055 ¶¶ 176-179.

During his deposition, Dr. Mercier admitted that an analog to digital converter is “not strictly necessary” to enable wireless communication between the detector and the monitor and that one “can transmit an analog signal either wirelessly or via wired connection over any distance.” EX2052, 76:25-77:10, 78:16-18; EX2055, ¶178. When confronted with his declaration testimony that “analog-to-digital conversion processing circuitry would *need* to be integrated into the sensor” and that this is “*necessary* circuitry” (EX1003 ¶151), i.e., that analog-to-digital conversion was *required*, Dr. Mercier could not explain the inconsistency in his testimony. EX2052, 76:11-78:8. Then, when asked to confirm that adding an analog-to-digital converter to sensor 102 was not needed “in order to satisfy Lisogurski’s disclosed embodiment of wirelessly connecting the monitor to the detector” (EX1003, ¶151), he testified that an analog-to-digital converter “would be necessary” because “I’m putting the front-end processing circuitry 150 into the detector area.” *Id.*, 77:24-78:8.

Dr. Mercier's circular reasoning does not explain the inconsistency in his declaration or, more importantly, why a POSITA would relocate front end processing circuitry 150 to the sensor 102 in the first place. EX2055 ¶179.

Putting aside these inconsistencies, Petitioner relies on Lisogurski's statement that "the functionality of some of the components of monitor 104," including front end processing circuitry 150, "may be divided over multiple components." Petition 51 (quoting EX1027, 16:2-9). If the analog-to-digital conversion were needed for wireless communication (which it is not), that would at most only motivate relocating analog conditioner 152 and analog-to-digital converter 154 from front end processing circuitry 150. EX2055 ¶¶180-182. Petitioner provides no reason why the other components in the front end processing circuitry 150, including demultiplexer 156, decimator/interpolator 160, digital conditioner 158, and dark subtractor 162, would need to be integrated into the sensor 102 to allow for wireless communication as they would be unnecessary for that limited purpose. Petition, 49-50; EX1003 ¶¶149-152; EX2055 ¶182. This omission is critical because Petitioner relies on the dark subtractor 162 for the functionality in limitations 7[i]-7[k] without explaining why one would be motivated to relocate dark subtractor 162 to the sensor 102. Petition 62-68; EX1003 ¶¶184-194; EX2052, 49:3-14.

Petitioner also argues that relocating front end processing circuitry 150 to sensor 102 would be obvious "in view of the market trends" discussed in the

background section of the Petition. Petition 50; EX1003 ¶151 (referring to “market trends toward miniaturized, power-efficient electronics” as a reason to avoid “a wired connection between sensor and monitor”). None of the alleged “trends” Petitioner identifies supplies a motivation to relocate Lisogurski’s front end processing circuitry from the monitor to the sensor. Petition 21-24; EX2055 ¶183.

As to the purported market trend towards “miniaturized devices,” modifying Lisogurski’s sensor 102 to include front end processing circuitry 150 would increase the component count in sensor 102 by a factor of at least 4 and therefore increase the form factor of the wearable device. EX2055 ¶184. If a POSITA sought to “miniaturize[]” the wearable device, they would not modify it to include more components for the same functionality. *Id.* Petitioner and Dr. Mercier do not even attempt to address how the sensor 102 would be modified to include these additional components while maintaining a form factor that would be viable for a wrist-worn device. EX2055 ¶185.

Regarding Dr. Mercier’s reference to “power-efficient electronics,” the proposed modification would not make the system more power-efficient. EX1003 ¶151; EX2055 ¶186. To the contrary, adding components to the sensor 102 would increase its power requirements and reduce its battery life. EX2055 ¶186; EX2052, 83:17-84:1. According to Petitioner’s expert, a wearable device that constantly monitors health conditions and uses active wireless communications would require

substantial amounts of peak and average power draws. EX2052, 90:7-92:6; EX2051 ¶138. Battery life is a key metric for a wearable device, and the pace of battery miniaturization was slow in the 2013 timeframe. EX2052, 84:2-85:3; EX2050, 28. A POSITA would not modify the wearable device as Petitioner suggests because it would lead to reduced battery life and/or require a larger capacity battery that would increase the form factor of the device. EX2055 ¶187.

Petitioner's proposed relocation of front end processing circuitry 150 to a wearable sensor is contrary to its own expert's Ph.D. thesis, which states: "From a system perspective, it makes sense to push complexity away from locations where weight and volume (and as a result, energy) are constrained, and move this complexity to locations where energy is more abundant." EX2050, 29; EX2052, 86:13-23. In Lisogurski, weight, volume, and energy are constrained in the wearable sensor, but less constrained in the monitor 104, which is why Lisogurski places the front end processing circuitry 150 (among other components) in the monitor and not the sensor. EX2055 ¶188.

Petitioner also argues that this modification would be obvious "in view of . . . existing wearable devices (*e.g.*, Nonin finger clip sensors)." Petition 50 (citing EX1003 ¶¶149-151). The Board should reject this bald assertion because Petitioner provides no evidence of what "Nonin finger clip sensors" are or whether they qualify as prior art. *Id.* Dr. Mercier's testimony regarding the "Nonin" device is similarly

conclusory and should be disregarded. EX1003 ¶149; 37 C.F.R. § 42.65(a) (“Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight”).

3. Limitation 7[c]: Lisogurski and Carlson Do Not Render Obvious One or More Lenses as Claimed

Limitation 7[c] recites: “the wearable device comprising one or more lenses configured to receive at least a portion of the output optical light and to deliver a lens output light to tissue comprising skin.” EX1001, 87:4-7. The Petition argues that “Lisogurski [a]lone” discloses or renders obvious limitation 7[c] or, in the alternative, this limitation is obvious over Lisogurski and Carlson. Petition, 43-47. Petitioner failed to meet its burden under either theory. EX2055 ¶¶190-218.

a) Lisogurski Does Not Disclose or Render Obvious Using One or More Lenses

The Petition argues that “Lisogurski teaches a wearable device . . . comprising one or more lenses configured to receive at least a portion of the output optical light and to deliver a lens output light to tissue comprising skin” and that “Lisogurski teaches that its measurement device . . . is configured to receive a portion of the output optical light via, e.g., an encapsulant or a lens system that captures and focuses the emitted light.” Petition 43-44 (citing EX1027, 7:38-8:3, 10:52-56, 19:25-31). But contrary to Petitioner's suggestion, Lisogurski does not expressly disclose one or more lenses or a “lens system.” EX2055 ¶¶192-197. Indeed, Dr. Mercier

admitted that Lisogurski “doesn’t explicitly teach a lens.” EX2052, 60:5-10.

The Petition also suggests that Lisogurski “teaches” using an “encapsulant” and alleges that there are three types of LEDs: (1) LEDs with no encapsulant; (2) LEDs with an optically inert encapsulant; and (3) LEDs with an optically active encapsulant that function as, e.g., a lens. Petition 44; EX1003 ¶139. But Lisogurski⁵ does not expressly disclose that an LED includes an encapsulant, let alone an encapsulant that functions as a lens. EX2055 ¶196; EX2052, 58:14-24. The word “encapsulant” does not appear in Lisogurski. *Id.*

Petitioner does not assert that the first LED type (with no encapsulant) or the second LED type (with an optically inert encapsulant) meet the requirement of “one or more lenses” in limitation 7[c]. Petition 44; EX2052, 57:22-25 (agreeing that an optically inert encapsulant would not function as a lens). As for the third LED type (with an optically active encapsulant), Dr. Mercier could not say whether all optically active encapsulants function as a lens. EX2052, 57:14-20. By Petitioner’s own admissions, an LED in Lisogurski’s system *may* have an encapsulant and in that case the encapsulant *may* function as a lens. EX2055 ¶¶197-198. This is insufficient to establish that Lisogurski discloses one or more lenses as claimed.

⁵ Carlson does not expressly disclose that any of its LEDs include an encapsulant, let alone an encapsulant that functions as a lens. *See* Ex. 1028; EX2055 ¶200.

PersonalWeb Techs., LLC v. Apple, Inc., 917 F.3d 1376, 1382 (Fed. Cir. 2019) (finding “mere possibilities” the claimed feature is present is insufficient to show an inherent disclosure).

The Petition argues in the alternative that “[a] POSITA would have found it obvious . . . to select an LED for Lisogurski’s system that uses an encapsulant for a lens, which would have been a common configuration with known benefits.” Petition 44 (citing EX1003 ¶140). This argument is flawed because the prior art (in this case, Lisogurski alone) does not disclose one or more lenses and Petitioner instead purports to rely on the knowledge of a POSITA to fill in the gap. The Office’s July 31, 2025 memo provides that “general knowledge” such as “expert testimony, common sense, and other evidence that is not ‘prior art consisting of patents or printed publications’” may not be used to “supply a missing claim limitation.” July 31, 2025 Memo on Enforcement and Non-Waiver of 37 C.F.R. 42.104(b)(4) and Permissible Uses of General Knowledge in *Inter Partes* Reviews;⁶ *see also Shenzhen*

⁶ While memo states that it applies to IPR petitions, its reasoning should also apply to PGRs. *Compare* 37 C.F.R. § 42.104(b)(4) (“The petition must specify where each element of the claim is found in the prior art patents or printed publications relied upon . . .”), *with id.* 37 C.F.R. § 42.204(b)(4) (“Where the grounds for

Root Tech. Co. v. Willow Blossom Holdco Ltd., IPR2025-00554, Paper 10 at 17 n.7 (PTAB Oct. 14, 2025) (“As a practical matter, . . . applicant admitted prior art, expert testimony, common sense, and other evidence that is not ‘prior art consisting of patents or printed publications’ may not be used to supply a missing claim limitation.”); *Qualcomm Inc. v. Apple Inc.*, 24 F.4th 1367, 1373–77 (Fed. Cir. 2022); *Qualcomm Inc. v. Apple Inc.*, 134 F.4th 1355, 1364–65 (Fed. Cir. 2025). Accordingly, Petitioner’s obviousness theory based on Lisogurski alone fails.

**b) Lisogurski and Carlson Do Not Render Obvious
Using One or More Lenses**

As an alternative to Lisogurski alone, Petitioner argues that Carlson renders obvious one or more lenses. Petition 35-37, 42-47. Petitioner provides the following annotated version of FIG. 4 of Carlson:

unpatentability are based on prior art, the petition must specify where each element of the claim is found in the prior art.”).

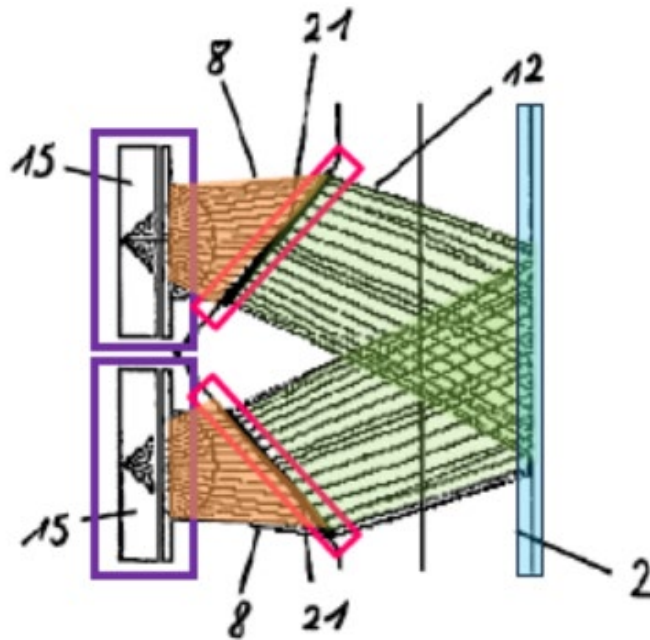


Figure 4

Petition 46 (annotating EX1028, FIG. 4)

Carlson states that “it is proposed, as shown in FIG. 4, to use beam shaping optics 20 to direct the emitted optical radiation 8 emitted from the two LEDs 15 to the middle of the earlobe” so that “the two initial light beams 8 are guided in forms of bundled beams 12 to a relatively small area within the middle ear 2.” EX1028 ¶54; EX2055 ¶204. The purpose of these beam shaping elements is “to direct the emitted optical radiation of, e.g., the LED light source into the human or animal tissue and the photon detecting element in order to increase the optical signal power, detected by the pulsoximeter sensor, and thus increasing the Signal/Noise—and signal/Background ratio.” EX1028 ¶14; EX2055 ¶204.

Carlson describes an undesirable situation where “the beam path could divert

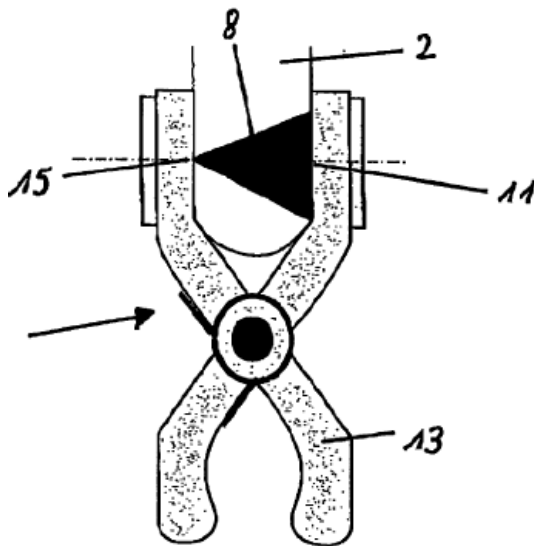
substantially from the optical axis of the LED and the photo detector” and then explains “it is preferred to further provide means for stabilizing the signal guiding and detecting and to provide means for the beam path to be co-linear with the optical axis of the LED and the photo detector.” EX1028 ¶73; EX2055 ¶205. Carlson also describes a clamping mechanism “which guarantees that the beam path has always been co-linear with the optical axis 67 of the LED and the photo detector.” EX1028, ¶73; EX2055 ¶205.

Petitioner argues that “Lisogurski and Carlson describe analogous systems with overlapping applications and objectives” and thus a POSITA “would have considered these two references together when implementing a system based on Lisogurski’s teachings.” Petition 37. But the mere fact that these references are analogous and discuss related technology, standing alone, does not supply a motivation to combine them. *Johns Manville Corp. v. Knauf Insulation, Inc.*, IPR2018-00827, Paper 9 at 10 (PTAB Oct. 16, 2018) (showing “that a reference is analogous art or relevant to the field of endeavor of the challenged patent is not sufficient to establish that one of ordinary skill would have had reason to combine its teachings with other prior art in the manner set forth in the claim.”); *Securus Techs., Inc. v. Glob. Tel*Link Corp.*, 701 F. App’x 971, 977 (Fed. Cir. 2017) (“[A] broad characterization of [prior art] as both falling within the same alleged field... without more, is not enough for Securus to meet its burden of presenting a sufficient

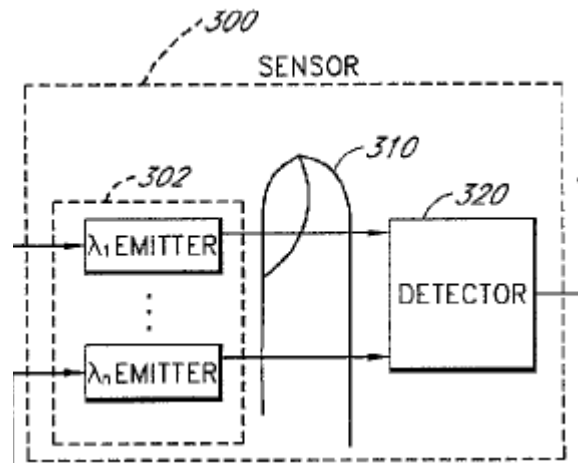
rationale to support an obviousness conclusion...such short-cut logic would lead to the conclusion that any and all combinations of elements known in this broad field would automatically be obvious, without the need for any further analysis”).

Petitioner also asserts that a POSITA would combine Lisogurski and Carlson because they both “concern miniaturized, wireless pulse oximetry devices directed to the same applications . . . such that a POSITA would have considered the two systems together.” Petition 35; EX1003 ¶107. This is an oversimplification. Petitioner fails to acknowledge, much less address, the fact that Carlson and its beam shaping element features are designed for a transmissive oximetry application. EX2055 ¶¶206-208.

Claim 7 recites that the detection system is “configured to receive at least a portion of the lens output light reflected from the tissue.” EX1001, 87:8-10; EX2055 ¶206. In other words, light is directed towards the tissue, and the detection system receives light that is *reflected* from the tissue. This is reflectance mode oximetry. EX2052, 29:14-19. This is different than transmissive mode oximetry where light is directed towards a sample (e.g., an earlobe) and measured by a photodetector on the other side. EX2052, 29:9-13, 29:20-21. Examples of transmission mode oximetry are shown below:



EX1028, FIG. 2



EX1062, FIG. 3

Carlson's beam-shaping elements (alleged lenses) are intended to focus light emitted from LEDs to direct a beam of light through the tissue and directly onto the detector on the opposite side. EX2055 ¶206. This serves two functions: to increase the intensity of the light so that it can pass through the tissue and to ensure that the beam of light is co-linear with the detector (i.e., pointed directly at it). EX2055 ¶206; EX1028 ¶¶14, 54, 73.

Petitioner does not address why or how Carlson's teachings pertaining to beam shaping elements for transmission mode oximetry apply to reflectance mode oximetry. Petition 45-47. For reflectance mode oximetry, there is no need to ensure that a beam of light is sufficiently intense to pass through a sample and to directly align that beam with a detector. EX2055 ¶207. In fact, in reflectance mode, it is not geometrically possible to align the LED(s) directly across from the detector(s) since

they are positioned on the same side of the sample being measured. *Id.*

The oximeters in Lisogurski and Carlson also differ in terms of their form factor. EX2055 ¶208. According to Petitioner, Lisogurski discloses a wearable device adapted to be worn on a wrist. Petition 38-39. Carlson does not disclose a wearable device adapted to be worn on a wrist; it only suggests using its sensor on the following locations of the user's body: ear, finger, or toe. EX2055 ¶208; EX1028, ¶¶48, 52, 75. A POSITA would know that the transmission mode used in Carlson would not be viable for a wrist-worn device because one could not realistically place LED(s) on one side of the wrist and have a detector on the opposite side to measure the light that passes through. EX2055 ¶208. Dr. Mercier agreed that transmission mode would not be viable for a wrist-worn embodiment. EX2052, 121:16-19, 116:13-16, 115:20-116:6. Petitioner fails to account for this material difference between the modes used in Lisogurski and Carlson.

Petitioner also argues in support of its alleged motivation to combine that Lisogurski and Carlson both describe techniques for increasing the signal-to-noise ratio and improving the accuracy of blood oxygen saturation calculations, and that this would be a reason why a POSITA would consider the references together. Petition 36-37. Petitioner's logic is flawed because it does not identify any shortcoming with the techniques in Lisogurski that would motivate a POSITA to look elsewhere (let alone to Carlson). EX2055 ¶209. Petitioner does not explain with

specificity how modifying Lisogurski with Carlson would lead to improvements in this regard. Petition 36-37. There is no teaching or suggestion in Carlson that using a beam shaping element would improve the performance of a reflectance mode oximeter, especially where Lisogurski teaches a subtractive method not present in Carlson that increases the signal-to-noise ratio. EX2055 ¶¶215-218.

Carlson's stated objective is to provide "for robust application of pulseoximetry in telemedicine- and near patient testing applications in rough (optical) environmental conditions, e.g. at changing light influences, such as sunlight, shadow, artificial light, etc." EX1028, ¶10; EX2055 ¶215. Carlson describes a problem where conventional lighting and/or sunlight can influence measurements. EX1028, ¶53; EX2055 ¶215. Carlson's beam shaping optics are disclosed a solution for this problem: "[b]y using the beam shaping optics 21, of course the influence of environmental light or noise, respectively, can be reduced substantially by increasing the S/B ratio." *Id.* ¶54; EX2055 ¶215.

Lisogurski, on the other hand, employs a different technique to address the effects of ambient light. EX2055 ¶216. Lisogurski describes a subtractive technique where the detector current when the LEDs are off is subtracted from the detector current when the LEDs are on, thereby eliminating the effects of ambient light on the signal. EX1027, 11:62-12:41, 16:44-17:10, 12:52-13:6, 13:60-14:10, FIGS. 2A-2B; EX2055 ¶¶216-218. A POSITA starting with Lisogurski would have no reason

to add Carlson's beam shaping optics, which are designed to reduce the influence of ambient light, when Lisogurski already uses a technique that obviates that concern. EX2055 ¶218; *Kinetic Concepts, Inc. v. Smith & Nephew, Inc.*, 688 F.3d. 1342, 1369 (Fed. Cir. 2012) (finding there would be no reason to combine references where both references accomplished the same function).

Petitioner's arguments about improving signal-to-noise ratio also overlook that Carlson describes multiple avenues to potentially increase the signal to noise. EX2055 ¶210. For example, Carlson discloses that "[a]s an alternative" to using beam shaping optics, "it is also possible to influence the sensor architecture of the pulsoximetric sensor." EX1028 ¶55; EX2055 ¶211. As another example, according to Carlson, "it is possible to use a light receiving or light sensitive element 11 with reduced light sensitivity outside the spectral range of the band limited light source as LEDs." EX1028 ¶55. In other words, Carlson discloses that the signal to noise ratio can be increased without using beam shaping elements by using a detector that is more sensitive to the wavelengths of light emitted from the LEDs and less sensitive to other wavelengths of light. EX2055 ¶211. Carlson also describes using filters as alternative to a beam shaping element to increase accuracy; for example, a double pass filter 33 can be used to ensure that light with a wavelength between 660 nm and 580-910 nm passes through the filter to the detector. EX1028 ¶¶56, 62; EX2055 ¶212.

Carlson claims that when using a beam-shaping element, “[t]he increase of the S/B ratio is estimated e.g. to a factor 5.” EX1028 ¶14; EX2055 ¶213. Carlson states that when using other techniques, like “geometric baffles or light traps, respectively, and/or optical wavelength filters,” “[t]he increase of the S/B ratio is e.g. estimated to a factor 10-100.” EX1028 ¶17; EX2055 ¶213. Alternatively, Carlson states that “[b]y using sensor architecture as shown in FIG. 6c, the Signal-to-Background ratio may be increased in a range of a factor 50 to 1000.” EX1028 ¶63; EX2055 ¶213. While there is no evidence that these increases would apply to Lisogurski, if a POSITA were motivated to increase signal-to-noise ratio, according to Carlson, using a beam-shaping element is the least effective way to do so. EX2055 ¶214. This demonstrates Petitioner’s improper use of hindsight. *Purdue Pharma L.P. v. Depomed, Inc.*, 643 F. App’x 960, 966 (Fed. Cir. 2016) (finding the use of improper hindsight is apparent where the petitioner fails “to demonstrate . . . that the problem was known in the art or that [the petitioner’s] formulation of the problem was derived directly from the prior art, rather than from the challenged claims.”); *Grain Processing Corp. v. Am. Maize-Prods. Co.*, 840 F.2d 902, 907 (Fed. Cir. 1988) (“Care must be taken to avoid hindsight reconstruction by using the patent in suit as a guide through the maze of prior art references, combining the right references in the right way so as to achieve the result of the claims in suit”) (internal quotation marks omitted).

B. Ground 2: Lisogurski in View of Carlson and Lamego

In Ground 2, Petitioner asserts that claim 7 is obvious over Lisogurski, Carlson, and Lamego. Petition 72. Specifically, Petitioner argues that if “Lisogurski and Carlson alone do not teach or render obvious claim 7[l],” then identifying an object “would have been obvious in further view of Lamego.” *Id.* 77. Petitioner does not rely on Lamego for limitations 7[c] or 7[d] in Ground 2. *See* Petition 77 (“Limitations 7[pre]-7[k] would have been obvious over Lisogurski and Carlson for the reasons discussed above” in Ground 1). Thus, Petitioner failed to meet its burden for Ground 2 for at least the same reasons discussed above for Ground 1 and limitations 7[c] and 7[d]. *Supra* §§VII.A.2, VII.A.3; EX2055 ¶220.

With respect to limitation 7[l], as discussed below, Petitioner failed to show that Lamego discloses a wearable device configured to recognize or establish an object as a particular thing, or that a POSITA would combine Lamego with Lisogurski and Carlson. EX2055 ¶¶219-254.

1. Lamego Does Not Disclose a Wearable Device Configured to “Identify an Object”

Lamego discloses a multi-wavelength pulse oximeter whose sensor 300 includes at least three LEDs (emitters 302) and a photodetector 320, with the photodetector connected to front end analog signal conditioning circuitry 330, an analog-to-digital conversion circuit 332, and a digital signal processing system 334

that determines parameters such as oxygen saturation, heart rate, and a PPG waveform. EX1062, ¶¶41-43, FIG. 3; EX2055, ¶¶223-224. According to Petitioner, “Lamego discloses a physiological monitor comprising a multi-wavelength sensor with at least three LEDs, each LED emitting light at a different wavelength.” Petition 78. Petitioner offers two theories as to how Lamego allegedly identifies an object.

First, Petitioner argues that “Lamego’s system can identify (recognize or establish) MetHb as an object” based on its alleged teachings that “while a conventional two-wavelength monitor could not ‘**identify** the cause of the decreased reading,’ a multi-wavelength monitor that can also measure MetHb ‘could not only **identify** the cause of decreased S_pO_2 readings, but also (or alternatively compensate for such cause when calculating the patient’s S_pO_2 level and/or signal.” Petition 79 (citing EX1062, ¶37) (emphasis in original).

But Lamego’s discussion regarding “identify[ing] the cause” of decreased readings refers to diagnosing why measurements area measurement is inaccurate—not recognizing or establishing an object as a particular thing. EX2055 ¶¶225-229. Identifying the cause of an aberrant reading is not the same as recognizing or establishing an object as a particular thing, and Petitioner and Dr. Mercier improperly conflate the two. EX2055, ¶¶228-229. Moreover, MetHb is a pre-defined, known blood constituent—not an unknown object to be identified. EX2055, ¶230. Lamego’s system knows from the outset what it is looking for and uses

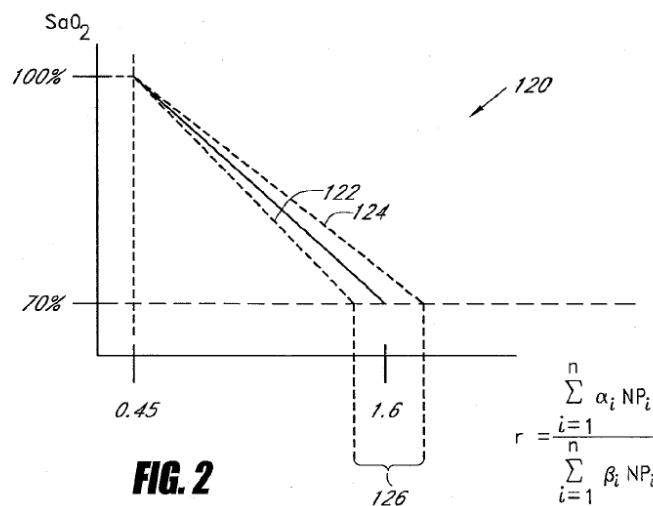
additional wavelengths to measure those known constituents more accurately. *Id.*; EX2052, 95:15-19. Petitioner's own phrasing reveals the flaw: the Petition argues that Lamego teaches recognition of "other blood constituents" using "wavelengths sensitive to the other blood constituents *of interest*." Petition, 79-80. The phrase "of interest" shows that such constituents were identified in advance, and that Lamego's selection of additional wavelengths sensitive to those constituents is pre-defined.

Second, Petitioner argues that Lamego "can also recognize 'other blood constituents' using 'wavelengths sensitive to other blood constituents of interest,' including but not limited to distinguishing carboxyhemoglobin from oxyhemoglobin." Petition, 79-80 (citing EX1062, ¶[0038]). Specifically, Petitioner argues that Lamego meets limitation 7[1] because it can "recognize or establish these two constituents (oxy and carboxyhemoglobin) as separate from one another." Petition, 80.

Lamego's own description of how it calculates blood oxygen saturation confirms that it does not identify an object. EX2055 ¶231. Like traditional two-wavelength oximetry, Lamego estimates oxygen saturation using a calculation in which the inputs are measured signals at known wavelengths; Lamego provides an equation expressing each ratio r in terms of the number of wavelengths n and coefficients α and β . EX1062, ¶33, FIG. 2; EX2055 ¶¶232-233. Calculating blood oxygen saturation in this manner does not require recognizing or establishing any

constituent as a particular thing. EX2055 ¶¶232-233. Nor is Lamego “determining which wavelength corresponds to which constituent”; that is a known property, and the wavelengths Lamego emits are selected based on those known properties. *Id.*

The Petition ignores Lamego's discussion of how blood oxygen saturation is calculated. FIG. 2 illustrates an arterial blood oxygen curve where the y-axis represents blood oxygen saturation, and the x-axis represents ratios of signals based on light transmission at different wavelengths. EX1062, ¶33; EX2055 ¶232.



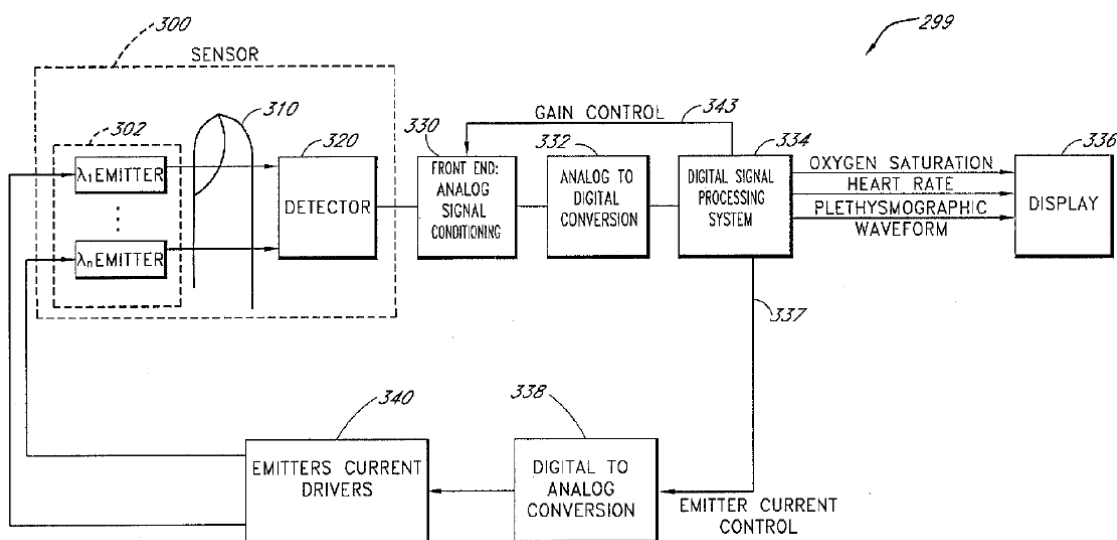
EX1062, FIG. 2

Lamego provides the following equation for expressing each ratio r , where n is the number of wavelengths used by the monitor, and α and β are coefficients. EX1062 ¶33; EX2055 ¶233.

$$r = \frac{\sum_{i=1}^n \alpha_i NP_{RMS,i}}{\sum_{i=1}^n \beta_i NP_{RMS,i}}$$

This reinforces that, like the discussion above for Lisogurski, measuring blood oxygen saturation does not involve recognizing or establishing an object as a particular thing. EX2055 ¶233.

Additionally, Petitioner's reliance on Lamego in Ground 2 does not address Lisogurski's lack of a *wearable device* that is at least in part configured to identify an object. *Supra* §VII.A.1.b; EX2055 ¶236. Indeed, in Lamego, sensor 300 only includes at least three emitters 302 and detector 320 and uses transmission mode oximetry through a finger 310. EX1062 ¶41; EX2055 ¶237; EX2052, 96:1-97:6.



EX1062, FIG. 3

Like the system shown in FIG. 1 of Lisogurski, the sensor 300 communicates with a separate “front end” 330, which in turn communicates with a digital signal processing system 334 that determines oxygen saturation, heart rate, and a PPG waveform. EX1062 ¶¶41-42; EX2055 ¶¶237-238; EX2052, 96:1-97:6, 97:25-98:24. Just like the back end processing circuitry 170 in FIG. 1 of Lisogurski, the digital signal processing system 334 in Lamego is not part of a wearable device. EX2055 ¶238.

Accordingly, even if Lamego discloses identifying an object (it does not) and a POSITA were motivated to combine Lamego with Lisogurski and Carlson (they would not), the resulting combination still would not satisfy all requirements of limitation 7[1]. EX2055 ¶239; *supra* §VII.A.1.b.

2. A POSITA Would Not Have Combined Lisogurski, Carlson, and Lamego

Even if, *arguendo*, Lamego discloses “identify[ing] an object” (which it does not), Petitioner failed to show that a POSITA would have been motivated to combine Lisogurski, Carlson, and Lamego to arrive at the claimed invention. EX2055 ¶¶240-252.

In the “Motivation to Combine” section, Petitioner begins by arguing that “Lisogurski, Carlson, and Lamego are also analogous references” and that a

“POSITA would have considered the references together when implementing a system based on Lisogurski’s teachings.” Petition 74. But the mere fact that these references are analogous and discuss related technology, standing alone, does not supply a motivation to combine them to arrive at the claimed invention. *Johns Manville*, Paper 9 at 10 (showing “that a reference is analogous art or relevant to the field of endeavor of the challenged patent is not sufficient to establish that one of ordinary skill would have had reason to combine its teachings with other prior art in the manner set forth in the claim.”); *Securus Techs.*, 701 F. App’x at 977 (“[A] broad characterization of [prior art] as both falling within the same alleged field . . . without more, is not . . . a sufficient rationale to support an obviousness conclusion”).

Petitioner’s “Motivation to Combine” section summarizes each reference and asserts that “a POSITA would have looked to Lamego to implement and obtain more accurate readings and increase signal-to-noise ratio from Lisogurski’s physiological monitor because a POSITA would have looked for ways to improve the operation of a device by looking to complementary designs and techniques.” Petition 76. But Petitioner does not explain *how* modifying Lisogurski with Lamego would allegedly lead to “more accurate readings and increase[d] signal-to-noise ratio” relative to Lisogurski and Carlson unmodified. *Id.*; EX2055 ¶242.

Indeed, according to Petitioner, Lisogurski and Carlson already teach techniques for obtaining more accurate readings and increasing the signal-to-noise

ratio: “both Lisogurski and Carlson teach techniques for improving the signal-to-noise ratio of blood oxygen saturation measurements.” Petition 74. “Lisogurski and Carlson also both seek to mitigate the effects of patient motion on signal-to-noise ratio and measurement accuracy.” *Id.* 75. Specifically, Petitioner acknowledges that “Lisogurski teaches altering drive parameters of the LEDs” to “thereby increase SNR.” *Id.* 60 (citing EX1027, 1:19-21, 9:46-52, 5:57-61, 9:57-60, 14:40-55, 35:4-9). Petitioner also acknowledges that Carlson “aims to improve these sensors by ‘defin[ing] optical and/or electrical means for increasing the Signal-to-Noise ratio (S/N) ... of a pulsoximeter sensor.’” Petition, 35 (citing EX1028, ¶10). The Petition is flawed because, according to Petitioner, Lisogurski and Carlson already provide improvements to signal-to-noise ratio, and yet the Petition fails to explain why a POSITA would look beyond these existing techniques to add Lamego. EX2055, ¶242.

Dr. Mercier's framing underscores the problem. He asserts that “a POSITA would have been motivated to combine the teachings of Lamego into the optical measurement system of Lisogurski (as modified by Carlson) with the goal of improving the accuracy and signal-to-noise ratio of the system's blood oxygen saturation measurements.” EX1003 ¶215. Dr. Mercier does not assert that adding Lamego would actually improve accuracy and signal-to-noise ratio—he merely asserts that the latter would be a “goal.” *Id.*; EX2055 ¶244.

Second, this conclusory assertion does not address why a POSITA allegedly would have combined Lisogurski, Carlson, and Lamego to arrive at the claimed invention. For example, Petitioner does not address limitation 7[I] in the “Motivation to Combine” section of the Petition. Petition 75-76; EX2055 ¶243. This failure is fatal. As the Federal Circuit has held, “obviousness concerns whether a skilled artisan not only could have made but would have been motivated to make the combinations or modifications of prior art *to arrive at the claimed invention*. *Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1073 (Fed. Cir. 2015). The relevant inquiry is “why a person of ordinary skill in the art would have combined elements from specific references *in the way the claimed invention does*.” *ActiveVideo Networks, Inc. v. Verizon Commc'ns, Inc.*, 694 F.3d 1312, 1328 (Fed. Cir. 2012) (emphasis in original).

Here, Petitioner's motivation, that “a POSITA would have looked for ways to improve the operation of a device by looking to complementary designs and techniques,” is precisely the type of generic rationale that the Federal Circuit has rejected. Petition, 76; *Virtek Vision Int'l ULC v. Assembly Guidance Sys., Inc.*, 97 F.4th 882, 888 (Fed. Cir. 2024) (reversing the Board's obviousness finding where petition contained “nothing other than an assertion that because [claim elements] were disclosed in a prior art reference and were therefore “known,” that satisfies the

motivation to combine analysis. That is an error as a matter of law. It does not suffice to simply be known. A reason for combining must exist.”).

A POSITA would have been dissuaded from incorporating Lamego's multi-wavelength framework into Lisogurski. EX2055 ¶¶246-250. Standard oximetry requires only two wavelengths to measure the ratio of oxygenated to deoxygenated hemoglobin, and there is no technical or physiological benefit to adding wavelengths for that measurement. EX2055 ¶¶247. Adding the additional light sources required by Lamego's approach (e.g., up to eight wavelengths) would substantially increase the component count, size, weight, cost, complexity, power consumption, and computational requirements of the device, and would require developing and validating a multi-dimensional calibration curve—burdens that are especially problematic for a power-constrained wearable device and that provide no benefit for standard oximetry. EX2055 ¶¶248-249. A POSITA accordingly would not have made the combination Petitioner proposes. *Id.* ¶¶246-250.

Petitioner's analysis for limitation 7[1] in Ground 2 does not cure any of these deficiencies with respect to motivation to combine. *See* Petition 77-84. Regarding motivation to combine, Petitioner merely asserts, that “a POSITA would have been motivated to combine the teachings of Lisogurski (in view of Carlson) with Lamego to improve the optical measurement of, e.g., blood oxygen concentration, consistent with Lisogurski's stated goals of reducing noise and improving accuracy.” *Id.* 82.

Again, Petitioner does not explain how modifying Lisogurski with Lamego would lead to improved optical measurements or what aspect(s) of Lamego would be combined with Lisogurski, let alone how they would operate with Lisogurski. *Id.*

C. Ground 3: Lisogurski in View of Carlson and Soller

In Ground 3, Petitioner asserts that claim 7 is obvious over Lisogurski in view of Carlson and Soller. Petition 83; EX1003 ¶¶217-230. Petitioner failed to meet its burden at least because Soller does not disclose “identify[ing] an object” and because a POSITA would not have been motivated to combine Lisogurski and Soller. EX2055 ¶¶253-282.

1. Soller Does Not Disclose “Identify[ing] an Object”

Soller is directed to measuring a known physiological parameter—hematocrit—not to identifying an unknown object. EX1030, Title (“Non-Invasive Optical Measurement of Blood Hematocrit”); EX2055 ¶¶255-259. Hematocrit is the fractional percentage of blood volume composed of red blood cells; like blood oxygen saturation, it is a biological parameter—a ratio—not an object. EX2055 ¶259.

Petitioner describes how Soller measures hematocrit “using a larger set of wavelengths” and “by using a multivariate calibration technique.” Petition 87-88. Soller uses a pre-trained calibration model based on Partial Least Squares (PLS) regression, taking optical spectra as input and outputting a single numerical value:

hematocrit, expressed as a percentage of red blood cells in blood volume. EX2055 ¶260; EX1030, 1:17-44, 5:42-67, 6:27-59, 22:26-42. Outputting a numerical estimate of a known parameter is not the same as recognizing or establishing an unknown object as being a particular thing. EX2055 ¶¶259-260; *supra* §VI.A.2. A device that outputs a hematocrit percentage has identified nothing; it has merely estimated a ratio. EX2055 ¶¶259. Regression is not identification: regression estimates a quantity, whereas identification determines what something is. EX2055 ¶¶261. Soller is directed to the former, not the latter. *Id.*

Petitioner and Dr. Mercier do not point to any teaching in Soller that requires recognition of an object as a particular thing; instead, they incorrectly equate multivariate calibration/regression (mapping optical features to a numeric output) with object identification. EX1003 ¶¶217-30; EX2055 ¶261. A regression-based output of hematocrit does not identify discrete constituents as objects; it estimates a parameter correlated with optical features within a predefined calibration framework. EX2055 ¶261.

Dr. Mercier's own discussion of Soller confirms this analysis: "[i]n sum, Soller teaches the quantification of 'all of the components of red blood cells.'" EX1003 ¶227. But quantification is not identification, and Dr. Mercier does not explain why a POSITA would have looked to Soller to supply the missing capability

of identifying an object—because Soller does not teach that capability. EX2055 ¶¶258-261.

Petitioner's reliance on Soller also does not cure Lisogurski's lack of a wearable device that is at least in part configured to identify an object. EX2055 ¶262. Petitioner and Dr. Mercier do not contend that it would have been obvious, in view of Soller, to modify Lisogurski (as modified by Carlson) so that the wearable device identifies an object. Petition 83-90; EX1003 ¶¶116-118, 217-230; EX2055 ¶262. In the resulting combination, it would still be Lisogurski's back end processing circuitry 170—which is not part of the wearable device—that performs the alleged identification. EX2055, ¶253.

2. A POSITA Would Not Have Been Motivated to Combine Lisogurski, Carlson, and Soller

Even if, *arguendo*, Soller discloses “identify[ing] an object” (which it does not), Petitioner failed to show that a POSITA would have been motivated to combine Lisogurski, Carlson, and Soller to arrive at the claimed invention. EX2055 ¶¶267-283.

Similar to Ground 2, Petitioner generically alleges that “POSITA would have considered Lisogurski, Carlson, and Soller together; they are analogous optical measurement systems with common applications and utility.” Petition 84. But the mere fact that these references are analogous does not mean a POSITA would

combine them. *Johns Manville*, IPR2018-00827, Paper 9 at 10 (showing “that a reference is analogous art or relevant to the field of endeavor of the challenged patent is not sufficient to establish that one of ordinary skill would have had reason to combine its teachings with other prior art in the manner set forth in the claim.”); *Securus Techs.*, 701 F.App’x at 977 (“[A] broad characterization of [prior art] as both falling within the same alleged field ... without more, is not ... a sufficient rationale to support an obviousness conclusion”).

In discussing limitation 7[l], Petitioner asserts that “a POSITA therefore would have been motivated to use Soller’s technique involving three or more wavelengths to yield a more accurate measurement.” Petition 89. Petitioner, however, fails to explain why using Soller’s technique would allegedly “yield a more accurate measurement” compared to Lisogurski unmodified. *Id.*; *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) (“obviousness grounds cannot be sustained by mere conclusory statements”).

The Petition is also flawed because it is unclear what aspects of Soller Petitioner proposes to implement in Lisogurski. The closest Petitioner comes to explaining this is when it asserts that “[i]mplementing Soller’s light source modifications, including the arrangement and number of LEDs and detectors and the number of wavelengths emitted by the LEDs, into Lisogurski would have been routine.” Petition 85; *see also id.* (referring to “these features” from Soller without

identifying them with specificity). The Petition does not explain what “Soller’s light source modifications” entail or how they would be implemented in Lisogurski. *Pers. Web Techs., LLC v. Apple, Inc.*, 848 F.3d 987, 994 (Fed. Cir. 2017) (finding claims non-obvious where petition “nowhere clearly explained, or cited evidence showing, how the combination of the two references was supposed to work”) (emphasis in original); *ActiveVideo*, 694 F.3d at 1327 (finding claims non-obvious because “expert failed to explain...which combination(s) of elements in specific references would yield a predictable result, or how any specific combination would operate”); *Hyundai Motor Co. v. Blitzsafe Texas, LLC*, IPR2016-01476, Paper 12 at 32 (PTAB Jan. 24, 2017) (finding petitioner failed to explain “how or why the references would be combined to produce the claimed invention”).

Regardless of these deficiencies in the Petition, a POSITA would not have been motivated to combine Lisogurski (as modified by Carlson) and Soller. EX2055 ¶277. As discussed herein, Lisogurski is directed to oximetry, i.e., measuring blood oxygen saturation. Petition 32-33 (“a pulse oximetry system”); EX1027, 3:61-4:5; EX2055 ¶270. By contrast, Soller is directed to measuring hematocrit, which is the percentage of red blood cells in a patient’s blood. *See, e.g.*, EX1030, Abstract, 5:42-67, 6:27-59, 22:26-42; EX2055 ¶¶225, 277; EX2052, 16:5-7. A POSITA would not have been motivated to look to or employ Soller’s techniques for measuring

hematocrit in Lisogurski because Lisogurski does not measure hematocrit. EX2055 ¶¶272, 277.

Petitioner appears to recognize this critical difference between Lisogurski and Soller and argues that Lisogurski “could have been modified to measure, e.g., the hematocrit components disclosed by Soller.” Petition 85. This argument fails for several reasons. First, Petitioner provides no reason or evidence as to why a POSITA would allegedly modify Lisogurski to measure hematocrit. *Id.* The fact that Lisogurski allegedly “could have been modified” to do so does not mean that a POSITA would have been motivated to do so. *See, e.g., Polaris Indus., Inc. v. Arctic Cat, Inc.*, 882 F.3d 1056, 1068–69 (Fed. Cir. 2018) (holding that it is error to focus “on what a skilled artisan would have been able to do, rather than what a skilled artisan would have been motivated to do”); *InTouch Techs., Inc. v. VGO Commc’ns, Inc.*, 751 F.3d 1327, 1352 (Fed. Cir. 2014) (a showing that “one of ordinary skill in the could combine” but “not that they would have been motivated to do so” does not establish obviousness).

Second, Lisogurski’s system is simply unable to measure hematocrit without substantial modifications. EX2055 ¶¶278. Oximetry only requires two wavelengths of light to measure blood oxygen saturation, and Lisogurski’s ratio-based, two-wavelength technique cannot measure hematocrit. EX1027, 4:42-62; EX2055 ¶¶279. By contrast, as taught by Soller, measuring hematocrit non-invasively

requires at least seven wavelengths of light. EX1030, 5:50-58, 13:13-28; EX2055 ¶¶279; EX2052, 105:11-16. Lisogurski does not disclose or suggest this. Moreover, Soller teaches that using multivariate calibration/regression is necessary to measure hematocrit, which would further increase the cost and complexity of the device. EX1030, Abstract, 5:42-67, 6:27-59, 22:26-42; EX2055 ¶280.

As much as Petitioner is suggesting that a POSITA would modify Lisogurski with Soller's components and techniques to measure hematocrit, a POSITA would not have been motivated to do this. EX2055 ¶¶272, 278. Modifying Lisogurski to measure hematocrit would increase the component count (e.g., the number of light sources), complexity, size, cost, power consumption, and computational requirements of the device, and would require a calibration sample set with known hematocrit values—potentially including patient-specific calibration—that is suited to clinical settings, not a wearable. EX1030, 6:42-59, 9:28-31, 10:3-5; EX2055 ¶¶278-280. These changes are antithetical to Lisogurski's stated goal to provide a portable or wearable device, and the resulting device still would not identify an object as required by limitation 7[1]. Petition, 35-36 (citing EX1027, 1:4-6, 1:16-18, 3:50-53); EX2055 ¶281.

Nor is there any practical reason to measure hematocrit in a wearable device like Lisogurski's. EX2055 ¶¶273-275. Oximetry monitors a rapid physiological process for which continuous, real-time monitoring in a wearable form factor

provides clinical value, whereas hematocrit reflects a slow, gradual process that does not call for continuous wearable monitoring. *Id.* ¶¶277-275. For this additional reason, a POSITA would not have been motivated to incorporate Soller's hematocrit-measurement approach into Lisogurski's wearable oximeter.

D. Ground 4: Alleged Indefiniteness

In Ground 4, Petitioner argues that Patent Owner's "position as to the scope of 'identify an object' in its appeal of the '484 IPR, if accepted, would render the Challenged Claim unpatentable as indefinite" because Patent Owner's "application of 'identify an object' in the '484 IPR would not inform a POSITA of the scope of the term with reasonable certainty." Petition 90. Petitioner's indefiniteness argument should be rejected for at least four reasons. EX2055 ¶¶283-297.

First, as Dr. Mercier confirmed, Petitioner is not contending that the phrase "to identify an object" is indefinite based on the intrinsic record:

Q. And you don't opine here that claim 7 of the '790 Patent is indefinite, having reviewed the specification and the prosecution history alone, correct?

A. That's right. Because when I reviewed that in the first three grounds in – in my declaration here, I was applying the agreed-upon construction for that specific claim element.

EX2052, 124:4-11. Instead, Petitioner claims that "identify an object" is indefinite

based on alleged arguments in Patent Owner's opening appeal brief for the related '484 IPR. Petition 90-93; EX1003 ¶¶231, 235-236, 238; EX2052, 123:19-24. Petitioner proffers no authority that a claim term can be held indefinite based on appellate arguments that are not part of the intrinsic record.

Second, the Board has already construed the phrase "to identify an object" and the Federal Circuit affirmed that construction. *Supra* §V.A; EX1011, 8-10; EX1012, *5. Petitioner does not argue that the phrase "to recognize or establish an object as being a particular thing" is indefinite. Petition 90-93. Moreover, Petitioner and Dr. Mercier contend that Lisogurski (Ground 1), Lamego (Ground 2), and Soller (Ground 3) disclose identifying an object under the operative claim construction. Petition 68-72, 77-83, 86-90; EX1003 ¶¶196-203, 206-216, 219-229. Apple was able to apply the claim construction in the related '484 IPR. EX1012, 3-4. Similarly, another group of petitioners and their expert understood this term and applied it to prior art. EX1053, 40-41 (IPR petition); EX1054, 40-41 (PGR petition).⁷

The fact that multiple parties and experts applied the prior art to this term is strong evidence that it is not indefinite. *ClearOne, Inc. v. Shure Acquisition Holdings, Inc.*, 35 F.4th 1345, 1350–51 (Fed. Cir. 2022) (finding that an expert's

⁷ The petitioners in PGR2025-00064 did not argue that claim 7 of the '790 Patent is indefinite. *See* EX1054.

“ability to determine that prior art disclosed a self-similar microphone configuration” supported a finding that the term was not indefinite); *Guangdong Alison Hi-Tech Co. v. Int’ Trade Comm’n*, 936 F.3d 1353, 1361–62 (Fed. Cir. 2019) (“While not dispositive, the application of these terms by the parties’ experts, along with the examiner and Board at the Patent Office, further supports our conclusion that the challenged claim term is not indefinite.”); *Sonix Tech. Co. v. Pubs. Int’l, Ltd.*, 844 F.3d 1370, 1380 (Fed. Cir. 2017) (finding expert’s application of an allegedly indefinite term to prior art “provide[s] evidence that a skilled artisan did understand the scope of this invention with reasonable certainty”). Petitioner’s disagreement with Patent Owner’s argument that Lisogurski does not disclose identifying an object does not mean that the term is indefinite.

Third, Petitioner is mischaracterizing the arguments in Patent Owner’s opening appellate brief. Petitioner and Dr. Mercier claim that Patent Owner argued that oxygenated and deoxygenated hemoglobin do not qualify as separate objects. Petition 91-92 (citing EX1061, 25-30); EX1003 ¶¶235-236. Tellingly, Petitioner and Dr. Mercier do not provide a quotation where Patent Owner argued this. *Id.* Dr. Mercier could not identify where Patent Owner allegedly argued that oxygenated and deoxygenated hemoglobin are not separate objects and conceded “I don’t know that Omni specifically used that precise language.” EX2052, 133:3-135:22.

Contrary to Petitioner’s suggestion, Patent Owner argued that the Board erred

in finding that Lisogurski discloses identifying an object “[a]n oximeter does not identify one unknown substance as being oxygenated hemoglobin and identify another unknown substance as being deoxygenated hemoglobin because such identification is unnecessary to its functionality.” EX1061, 27. Patent Owner also argued that an oximeter is “configured to know from the outset precisely what it [is] measuring” and therefore does not recognize an unknown constituent as a particular thing. *Id.* Patent Owner explained in its reply appellate brief that “computing the oxygenated hemoglobin percentage neither requires nor involves determining that a given blood constituent is oxygenated hemoglobin, deoxygenated hemoglobin, or some other component.” EX2053, 5. Rather, oximetry involves “analyzing only the oxygen saturation of blood” by using a formula with “known coefficients . . . that correlate to the specific absorptivities of those known components.” *Id.*, 4-5 (emphasis omitted). In short, Patent Owner did not argue that Lisogurski does not disclose identifying an object because oxygenated and deoxygenated hemoglobin are not objects. EX2055 ¶¶287-291.

Fourth, to the extent there is any ambiguity, the specification provides clear examples. Petitioner admits that a POSITA would understand “in light of the specification” that this phrase “refers to identification of any material or constituent by the wearable device as a particular thing.” Petition 91. The specification distinguishes systems designed to measure known parameters from systems

designed to identify objects, describing, for example, active remote sensing to “distinguish different concrete structures” and to distinguish “building materials” from “plant life, soil, and trees,” and explaining that this adds “a fourth dimension—namely, identification of objects based on their chemical signature.” EX1001, 54:32-59; EX2055 ¶¶292-296. A POSITA would readily understand the distinction between identification (determining what something is) and measurement (determining how much of something is present). EX2055 ¶296.

The specification provides multiple examples of how an object can be identified. EX1001, FIG. 65B, 54:32-59; EX2055 ¶297. Exemplary objects can be identified, including building materials such as gypsum, painted structures, plywood, and concrete (EX1001, 54:54-56); plant life, soil, and trees (EX1001, 54:56-57); blood constituents such as glucose, triacetin, ascorbate, lactate, alanine, and urea (EX1001, 18:3-27); and tissue constituents with specific spectral signatures (EX1001, 76:37-49). The specification also explains that identification involves using spectral techniques and pattern matching to recognize materials based on their chemical signatures. EX1001, 54:57-59, 18:20-27; EX2055 ¶297.

For at least the foregoing reasons, Petitioner failed to prove claim 7 to be indefinite.

E. Ground 5: Alleged Non-Enablement

In Ground 5, Petitioner asserts that claim 7 is unpatentable for non-

enablement based on its interpretation of Patent Owner's arguments in the appeal concerning the related '484 Patent. Petition 93; EX1003 ¶¶239-242. Petitioner failed to meet its burden for at least four reasons. EX2055 ¶¶298-311.

First, Petitioner and Dr. Mercier's non-enablement theory is based on mischaracterizing Patent Owner's appellate arguments rather than the specification and prosecution history. Petition 93-95; EX1003 ¶¶239-245; EX2052, 139:17-140:25. When asked whether he considered enablement based on the specification and prosecution history alone, Dr. Mercier testified "I did not do that analysis." EX2052, 140:19-25. There are two problems with this. One, as discussed above, Petitioner and Dr. Mercier misunderstand or mischaracterize Patent Owner's positions in the appeal. *Supra* §VII.D. Two, Petitioner proffers no authority that a claim term can be found non-enabled solely based on arguments in an appellate brief.

Second, Petitioner and Dr. Mercier fail to address the *Wands* factors. *See* Petition 93-95; EX1003 ¶¶239-245; *In re Wands*, 858 F.2d 731 (Fed. Cir. 1988). The Board has found that a petitioner's "failure to adequately address the *Wands* factors supports denial" of a PGR raising an enablement ground. *Merck Sharp & Dohme Corp., v. Wyeth LLC*, PGR2017-00016, Paper 9 at 8-9 (PTAB Oct. 20, 2017) (finding Petitioner's expert did not provide an analysis "grounded in the *Wands* factors" and "Petitioner's arguments relating to undue experimentation rest on unsupported [expert] opinions"); *see also* MPEP 2164.01(a) ("It is improper to

conclude that a disclosure is not enabling based on an analysis of only one of the above factors while ignoring one or more of the others.”). Petitioner failed to meet its burden for this reason alone.

Third, Petitioner's non-enablement arguments are heavily qualified in ways that do not accurately reflect the scope of claim 7. EX2055 ¶¶301-304. Dr. Mercier asserts that “non-invasive optical monitoring of glucose, to a degree of certainty that would be useful in health or disease monitoring and that would distinguish glucose reliably in practical applications . . . has not been accomplished in the art to the present day.” EX1003 ¶242. Claim 7 does not recite monitoring of glucose levels, let alone accurately and reliably monitoring glucose levels for health or disease monitoring. EX1001, 86:60-87:33; EX2055 ¶305. The law does not require that the specification enable a perfect commercial embodiment. *CFMT, Inc. v. Yieldup Int'l Corp.*, 349 F.3d 1333, 1338 (Fed. Cir. 2003) (“Enablement does not require an inventor to meet lofty standards for success in the commercial marketplace. Title 35 does not require that a patent disclosure enable one of ordinary skill in the art to make and use a perfected, commercially viable embodiment absent a claim limitation to that effect.”); *Transocean Offshore Deepwater Drilling, Inc. v. Maersk Contractors USA, Inc.*, 617 F.3d 1296, 1307 (Fed. Cir. 2010) (“It is not required to enable the most optimized configuration, unless this is an explicit part of the claims.”).

Contrary to Petitioner's suggestions, claim 7 merely requires that the detection system is configured "to identify an object," such as glucose. EX2055 ¶305. Petitioner and Dr. Mercier do not contend that a POSITA would be unable to practice the invention and identify an object like glucose without undue experimentation. Petition 93-95; EX1003 ¶¶239-245; EX2055 ¶¶301-304. The '790 Patent specification provides substantial guidance and working embodiments within the scope of claim 7. EX2055 ¶306. These embodiments include non-invasive glucose and blood-constituent monitoring using near-infrared spectroscopy (EX1001, 2:60-3:30); identification of the glucose spectrum (EX1001, 16:48-18:27; FIG. 2), monitoring ketone bodies (EX1001, 18:28-19:47); and hemoglobin A1c monitoring (EX1001, 19:48-21:28). The same framework applies to identifying, for example, building materials, vegetation, and concrete structures based on spectral signatures. EX1001, 54:32-59; EX2055 ¶306.

The specification teaches that "[t]he glucose molecule has the chemical formula $C_6H_{12}O_6$ " and illustrates "the infrared transmittance of glucose 100" in FIG. 1. EX1001, 16:49-17:4, FIG. 1; EX2055 ¶307.

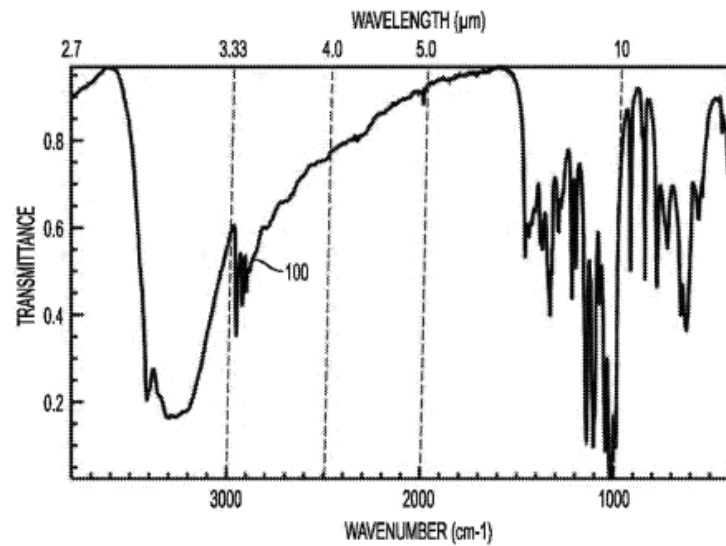
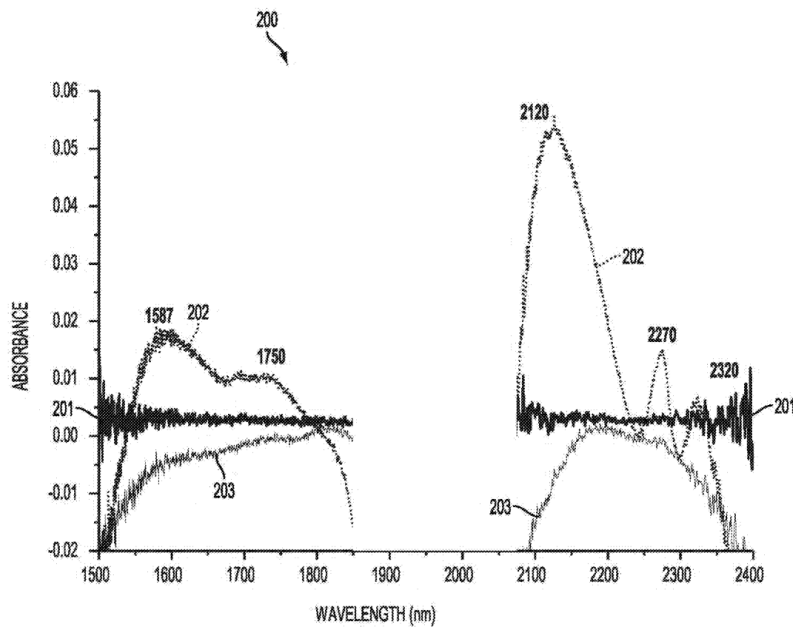


FIG. 1

EX1001, FIG. 1

FIG. 2 illustrates “measurements of the optical absorbance 200 of hemoglobin, glucose and HbA1c.” EX1001, 17:5-13; EX2055 ¶308.



EX1001, FIG. 2

The specification explains that “in the SWIF wavelength range[,] hemoglobin is nearly flat in spectrum 201” and “the glucose absorbance 202 has at least five distinct peaks near 1587 nm, 1750 nm, 2120 nm, 2270 nm and 2320 nm.” EX1001, 17:8-13; EX2055 ¶309; *see also* EX1001, 17:14-30, FIG. 3A.

FIG. 5 “illustrates the spectrum 500 for different blood constituents” and that “[t]he glucose absorption spectrum 501 can be unique with its three peaks in this wavelength range.” EX1001, 18:8-11; EX2055 ¶310.

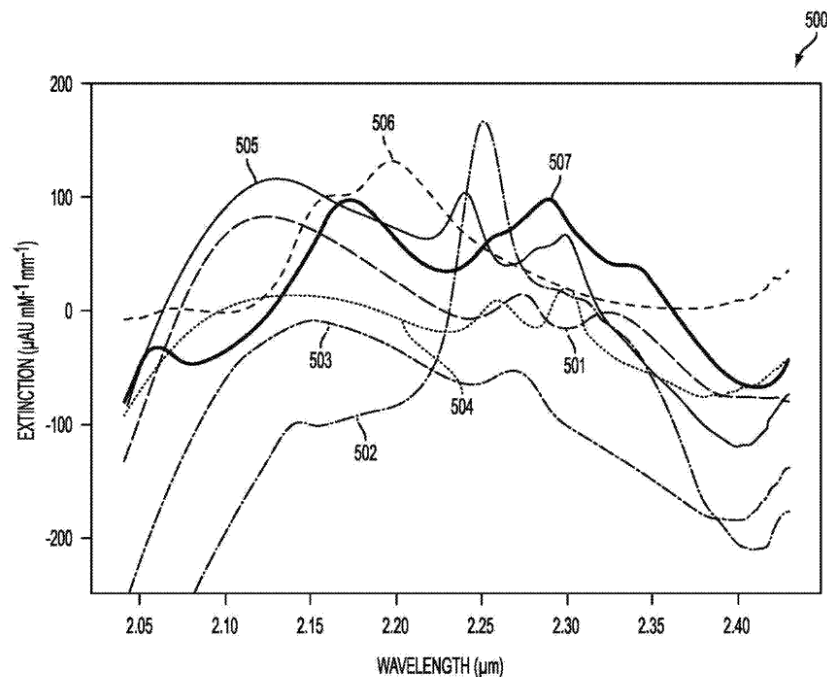


FIG. 5

EX1001, FIG. 5

The specification explains that “[t]o distinguish the glucose 501 from . . . overlapping spectra, it may be advantageous to have information at multiple wavelengths” and “to use pattern matching algorithms and other software and

mathematical methods *to identify the blood constituents of interest.*” EX1001, 18:14-19; EX2055, ¶311; *see also* EX1001, 21:3-6 (“Various signal processing methods may be used to identify and quantify the concentration of cholesterol 876 and/or glucose 877, or some of the other blood constituents”), 46:55-58 (“The SWIR wavelength range may be particularly valuable for identifying materials based on their chemical composition”).

Aside from heavily qualifying his opinions, Dr. Mercier asserts that “reliably and accurately measuring glucose using non-invasive optical techniques is not possible in practice *to this day.*” EX1003 ¶243 (emphasis in original). This is factually incorrect. The *only* support Dr. Mercier cites for this assertion is a 2023 article that states that “accurate detection of blood glucose concentration is not feasible without stable measurement conditions.” EX1003 ¶243 (quoting EX1065). The clear implication of this statement is that accurate detection of blood glucose concentration is feasible under stable conditions, not that it has not been done or requires undue experimentation. EX2055 ¶¶302-303. Consistent with Petitioner’s own evidence, technical literature confirms that “NIR/MIR spectroscopy non-invasive glucose sensors have been successfully used commercially.” EX2054, 7; EX2055 ¶304.

For at least the foregoing reasons, Petitioner failed to prove claim 7 to be non-enabled.

VIII. CONCLUSION

For each of the foregoing reasons, the Petition does not establish claim 7 of the '790 Patent is unpatentable. Patent Owner respectfully requests entry of a Final Written Decision confirming the patentability of claim 7. *See Aqua Prods., Inc. v. Matal*, 872 F.3d 1290, 1307 (Fed. Cir. 2017) (“[I]f the petitioner does not prove a claim (whether original or amended) to be ‘unpatentable,’ the Board should find the claim to be ‘patentable.’”).

Respectfully submitted,

Dated: June 30, 2026

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CERTIFICATION OF WORD COUNT

Pursuant to 37 C.F.R. § 42.24(d), the undersigned hereby certifies that the foregoing Patent Owner's Response is produced using a 14-point Times New Roman font and contains approximately 18,163 words, which is less than the 18,700 total words permitted by the U.S. Patent Trial and Appeal Board rules. Counsel relies on the word count of the computer program used to prepare the response on June 30, 2026.

By: /s/ Jennifer Hayes

Lead Counsel for Patent Owner

CERTIFICATE OF SERVICE

The undersigned hereby certifies that a copy of the foregoing **Patent Owner's**

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