

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD., SAMSUNG ELECTRONICS
AMERICA, INC., FOSSIL GROUP, INC., FOSSIL STORES I, INC., FOSSIL
PARTNERS, L.P., OURA HEALTH OY, AND ONEPLUS TECHNOLOGY
(SHENZHEN) CO., LTD.,

Petitioners,

v.

OMNI MEDSCI, INC.,
Patent Owner.

U.S. Patent No. 10,874,304

Case No. IPR2025-01251

PATENT OWNER'S PRELIMINARY RESPONSE

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LISTING OF EXHIBITS

Exhibit No.	Description
2001	Complaint, <i>Omni MedSci, Inc. v. Samsung Electronics Co. Ltd. et al.</i> , 2:24-cv-01070-JRG-RSP (E.D. Tex.) (Dec. 20, 2024)
2002	Samsung, Fossil, and Oura's Invalidation Contentions Cover Document and Charts for the '304 Patent, <i>Omni MedSci, Inc. v. Samsung Electronics Co. Ltd. et al.</i> , 2:24-cv-01070-JRG-RSP (E.D. Tex.) (June 3, 2025)
2003	OnePlus's Invalidation Contentions Cover Document and Charts for the '304 Patent, <i>Omni MedSci, Inc. v. Samsung Electronics Co. Ltd. et al.</i> , 2:24-cv-01070-JRG-RSP (E.D. Tex.) (Sept. 30, 2025)
2004	Omni MedSci's Infringement Contentions Cover Document, <i>Omni MedSci, Inc. v. Samsung Electronics Co. Ltd. et al.</i> , 2:24-cv-01070-JRG-RSP (E.D. Tex.) (Mar. 12, 2025)
2005	Samsung, Fossil, and Oura's Motion to Stay, <i>Omni MedSci, Inc. v. Samsung Electronics Co. Ltd. et al.</i> , 2:24-cv-01070-JRG-RSP (E.D. Tex.) (Aug. 27, 2025)
2006	Order Denying Motion to Stay, <i>Omni MedSci, Inc. v. Samsung Electronics Co. Ltd. et al.</i> , 2:24-cv-01070-JRG-RSP (E.D. Tex.) (Aug. 29, 2025)
2007	Docket Navigator Statistics for District Judge James Rodney Gilstrap
2008	Lex Machina Statistics for District Judge James Rodney Gilstrap
2009	Model Order Focusing Patent Claims and Prior Art to Reduce Costs (E.D. Tex.)
2010	<i>Samsung Elecs. Co., Ltd. v. Headwater Rsch. LLC</i> , IPR2025-00482, Paper 13 (PTAB May 28, 2025)
2011	Patent Assignment Record for U.S. Patent No. 8,108,036
2012	<i>Apple Inc. v. Omni Medsci, Inc.</i> , No. IPR2021-00453, Paper 27 (PTAB Apr. 11, 2025)
2013	R. Marbach, T. Koschinsky, F. Gries, and H. Heise, "Noninvasive Blood Glucose Assay by Near-Infrared Diffuse Reflectance

Exhibit No.	Description
	Spectroscopy of the Human Inner Lip,” Appl. Spectrosc. 47, 875-881 (1993)
2014	Roggo, Y., et al., “A review of near infrared spectroscopy and chemometrics in pharmaceutical technologies,” Journal of Pharmaceutical and Biomedical Analysis, 44, 683–700 (2007)
2015	Buttussi, F., et al., MOPET: A context-aware and user-adaptive wearable system for fitness training, Artificial Intelligence in Medicine (2008) 42, 153-163
2016	<i>Apple Inc. v. Omni MedSci, Inc.</i> , IPR2019-00912, Paper 1 (PTAB Apr. 10, 2019)
2017	<i>Apple Inc. v. Omni MedSci, Inc.</i> , IPR2019-00913, Paper 1 (PTAB Apr. 10, 2019)
2018	<i>Apple Inc. v. Omni MedSci, Inc.</i> , IPR2019-00914, Paper 1 (PTAB Apr. 10, 2019)
2019	<i>Apple Inc. v. Omni MedSci, Inc.</i> , IPR2019-00915, Paper 1 (PTAB Apr. 10, 2019)
2020	<i>Apple Inc. v. Omni MedSci, Inc.</i> , IPR2020-00029, Paper 1 (PTAB Oct. 17, 2019)
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. v. 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)
2025	Defendant’s Invalidity Contentions - Exhibit P, <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	Reserved
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2028	Reserved
2029	Reserved
2030	Reserved
2031	Declaration of Prof. Igor Efimov, Ph.D
2032	<i>Curriculum vitae</i> of Prof. Igor Efimov, Ph.D
2033	Omni MedSci Inc.'s P.R. 4-2 Disclosure of Preliminary Claim Constructions and Extrinsic Evidence
2034	Samsung Electronics, Co. Ltd., Samsung Electronics America, Inc., Fossil Group, Inc., Fossil Stores I, Inc., and Fossil Partners, L.P., and Oura Health Oy's P.R. 4-2 Disclosure of Preliminary Claim Constructions and Extrinsic Evidence
2035	König, V., et al., "Reflectance Pulse Oximetry – Principles and Obstetric Application in the Zurich System," Journal of Clinical Monitoring, Vol. 14, pp. 403-412 (1998)
2036	Reserved
2037	<i>Apple Inc. v. Omni MedSci, Inc.</i> , IPR2019-00914, Paper 13 (PTAB Nov. 6, 2019)
2038	Statutory Disclaimer dated November 11, 2025
2039	<i>Omni MedSci, Inc. v. Apple Inc.</i> , No. 25-1646, Corrected Opening Brief of Appellant Omni MedSci, Inc. (Fed. Cir. Sept. 11, 2025)

Omni MedSci, Inc. ("Patent Owner") submits this Preliminary Response under 37 C.F.R. § 42.107 to the Petition for *Inter Partes* Review ("Petition") of U.S. Patent No. 10,874,304 ("the '304 Patent"), filed by Samsung Electronics Co. Ltd., Samsung Electronics America Inc., Fossil Group, Inc., Fossil Stores I, Inc., Fossil Partners, L.P., Oura Health Oy, and OnePlus Technology (Shenzhen) Co., Ltd. ("Petitioners").

I. INTRODUCTION

Patent Owner respectfully requests that the Director deny institution because Petitioners have not shown that any challenged claim of the '304 Patent is unpatentable in relation to any ground raised in the Petition.

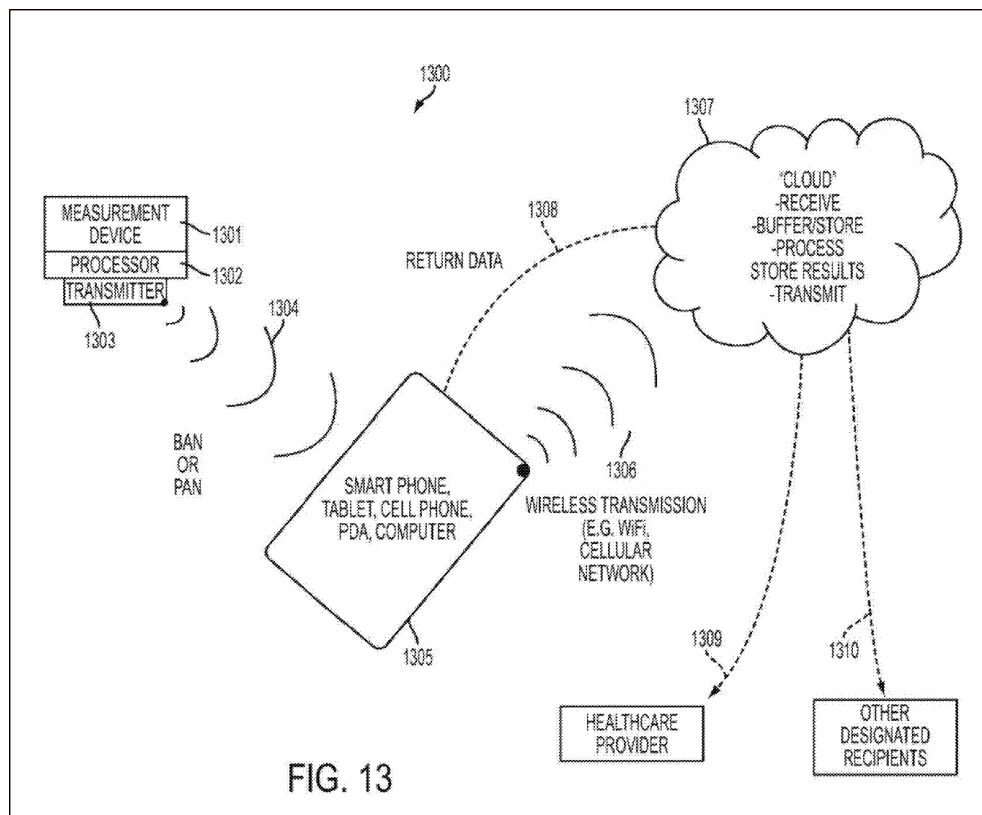
Petitioners fail to show obviousness of the "arc" and "reflective surface" limitations that are recited in multiple challenged claims, as Petitioners fail to establish specifically why or how a person of skill in the art would have implemented the particular relied-upon teachings of LeBoeuf in Lisogurski for these limitations. A person of skill would not have been motivated to make the alleged combinations.

Petitioners also failed to show that Lisogurski discloses the "selection or identification of an object" limitation recited in other challenged claims. A person of skill would recognize that Lisogurski's pulse oximeter is performing parameter measurement, not object identification.

II. OVERVIEW OF THE '304 PATENT

The '304 Patent discloses a comprehensive system for optical measurement and data management that integrates optical signal acquisition, processing, wireless transmission, and cloud-based storage and computation to enable non-invasive physiological monitoring and data analytics. EX1001, Abstract; EX2031, ¶54.

An exemplary physiological measurement or blood constituent monitoring system including a measurement device 1301, a personal device 1305 such as a smartphone or tablet, and a cloud server 1307 is illustrated in FIG. 13:



EX1001, FIG. 13, 33:45-50; 34:58-61; EX2031, ¶55.

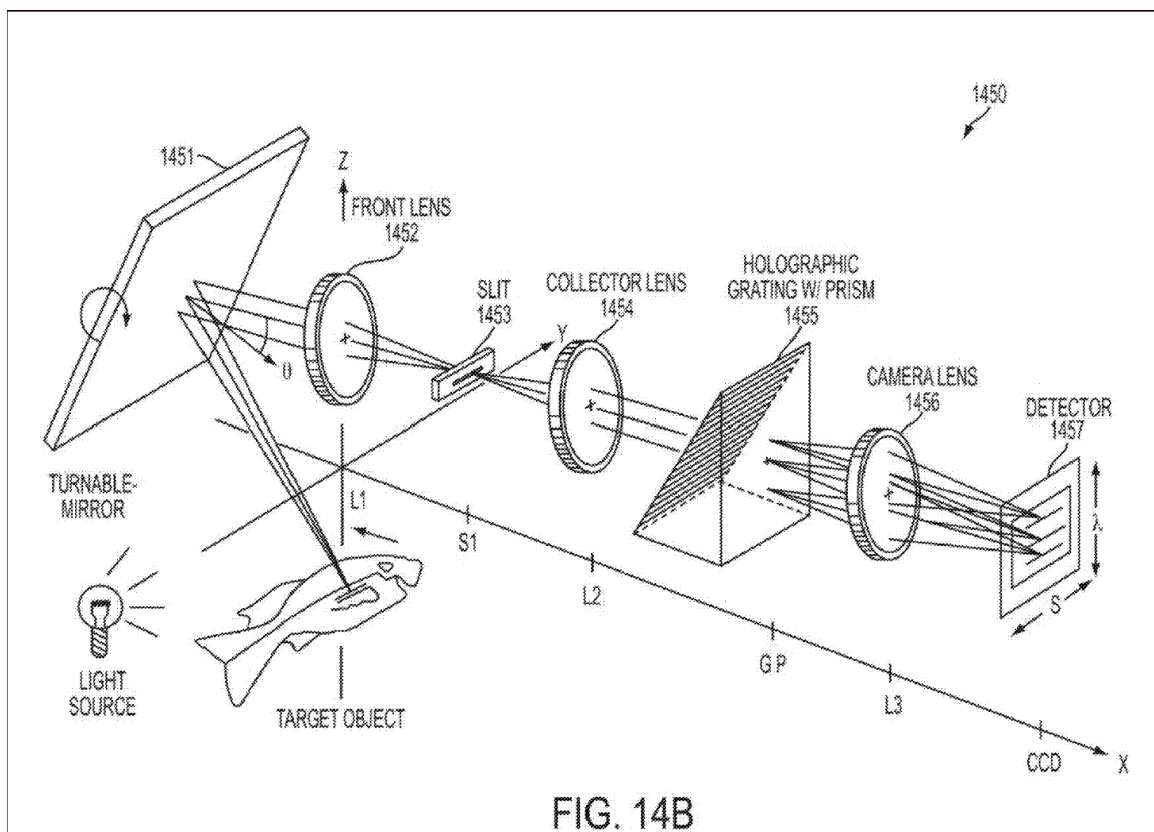
The '304 Patent extends beyond physiological monitoring by incorporating identification capabilities that use algorithmic analysis of spectral data from multiple wavelengths. EX1001, 35:17-23; EX2031, ¶56. The '304 Patent discloses that “pattern matching algorithms and other software and mathematical methods” can identify specific blood constituents. EX1001, 35:17-19; EX2031, ¶56. It further explains that spectral data may be compared with a “library of known spectra” to calculate overlap integrals and apply threshold functions to quantify constituent concentrations. EX1001, 35:19-23; EX2031, ¶56.

The '304 Patent further states that various blood constituents exhibit distinct near-infrared signatures, requiring spectroscopy and spectral fingerprinting to accurately identify glucose. EX1001, 4:58-62; EX2031, ¶57. The '304 Patent explains that constituent selection and analysis can be enhanced using advanced mathematical and signal processing methods, including multiple linear regression, partial least squares, and principal component regression (PCR). EX1001, 20:7-17; EX2031, ¶57.

The '304 Patent additionally describes identifying materials and biological constituents using optical techniques in the short-wave infrared (SWIR) range. EX1001, 20:41-49; EX2031, ¶58. The SWIR region captures characteristic molecular vibrations, allowing substances such as glucose, ketones, and many solids

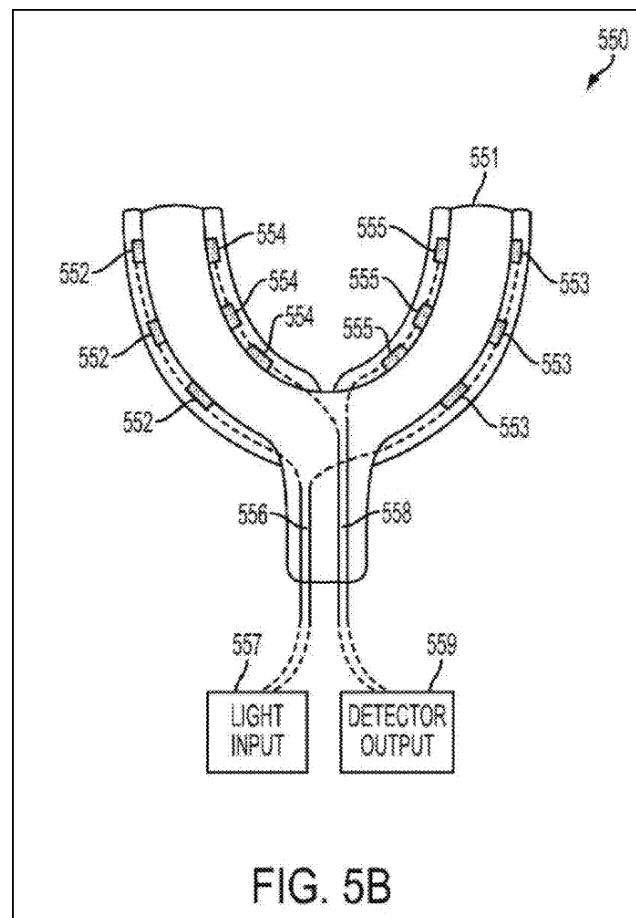
to exhibit unique spectral signatures, which can be used for identification through “stand-off detection or remote sensing.” EX1001, 20:41-49; EX2031, ¶58.

The '304 Patent also describes a reflective surface. EX1001, 31:6-9; 36:60-67; EX2031, ¶59. The claims recite that “the measurement system further comprises a reflective surface to receive and redirect at least some of the at least a portion of the analysis output beam reflected or transmitted from the sample.” EX1001, 36:60-67; EX2031, ¶59. For example, the '304 Patent discloses that, as illustrated in FIG. 14B (reproduced below), “the input light may be directed first by a tunable mirror 1451.” EX1001, 31:6-9; EX2031, ¶59.



EX1001, FIG. 14B.

The '304 Patent further specifies a distinct spatial arrangement of light sources and detectors along arcs. EX1001, 17:56-59; 37:6-13; EX2031, ¶60. Certain claims recite that “the receiver comprises a plurality of detectors arranged along a first arc, and wherein the plurality of semiconductor sources are arranged along a second arc” EX1001, 37:6-13; EX2031, ¶60. As illustrated in FIG. 5B (reproduced below), as an example, “the mouth guard may have one or more light source input ports 552, 553 and one or more detector output ports 554, 555.” Ex. 1001, 17:56-59; EX2031, ¶60.



EX1001, FIG. 5B.

Patent Owner has statutorily disclaimed 1, 3, 11, 19, and 20 of the '304 Patent. EX2038. The Board has held that such disclaimers are not a request for adverse judgment and do not give rise to estoppel as to the remaining challenged claims. *Daikin Industries, Ltd. v. Chemours Co. FC, LLC*, IPR2018-00993, Paper 12 at 2-7 (PTAB Nov. 13, 2018); *see also* 37 C.F.R. § 42.107(e).

III. LEVEL OF SKILL IN THE ART

Petitioners propose the following definition for a person of ordinary skill in the art ("POSITA") in relation to the '304 Patent:

On or before the claimed priority date of 12/31/2012, a person of ordinary skill in the art ("POSITA") "would have [had] a good working knowledge of optical sensing techniques and their applications, and familiarity with optical design and signal processing techniques," and would have obtained such knowledge through "an undergraduate education in engineering (electrical, mechanical, biomedical, or optical) or a related field of study, along with relevant experience studying or developing physiological monitoring devices...in industry or academia."

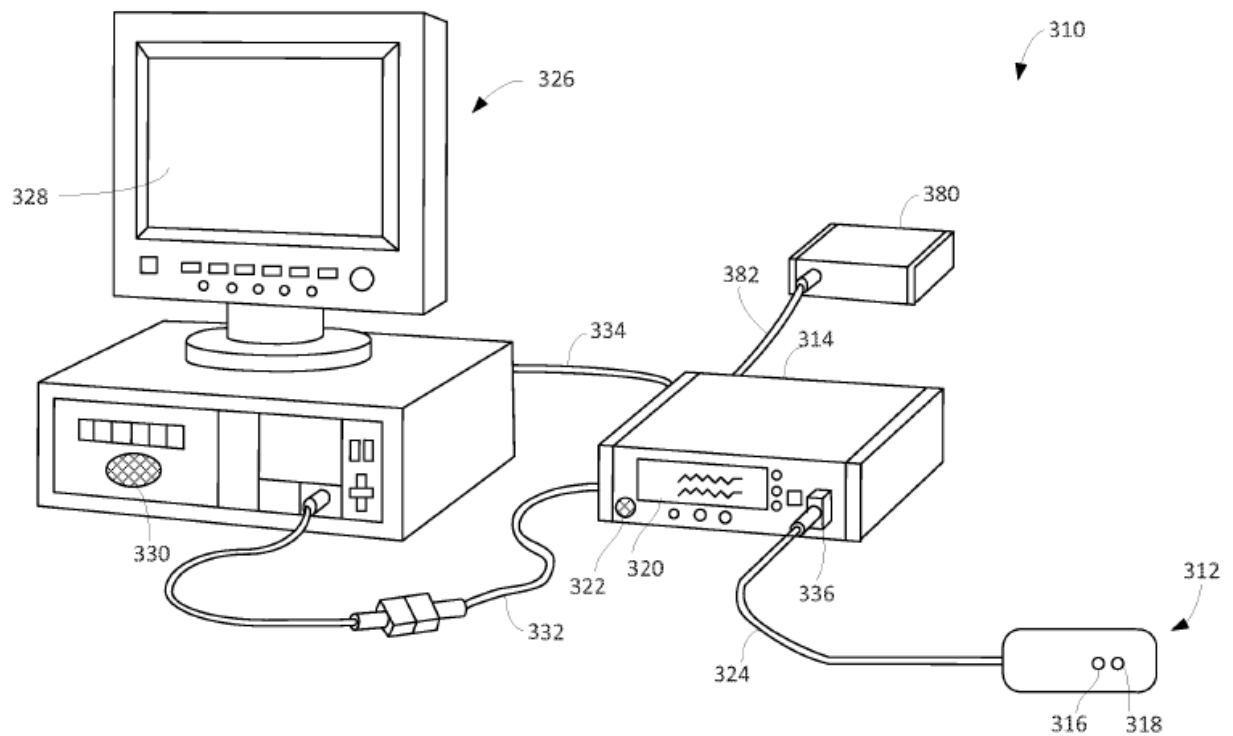
Pet., 13. For purposes of this Preliminary Response, Patent Owner adopts Petitioners' proposed definition. EX2031, ¶¶50-53.

IV. SUMMARY OF REFERENCES IN THE PETITION

Petitioners challenge claims 1-6, 11-16, 19-22, and 26-27 of the '304 Patent as allegedly obvious in Grounds 1-10, which involve various combinations of the following references: Lisogurski, LeBoeuf, Tran, Carlson, and Marbach. Pet., 7-8.

A. Lisogurski (EX1025) (Grounds 1-10)

Lisogurski describes a non-invasive system for measuring parameters related to a subject's blood. EX1025, 3:61-4:5; EX2031, ¶82. The system is illustrated in Figures 3 and 1:



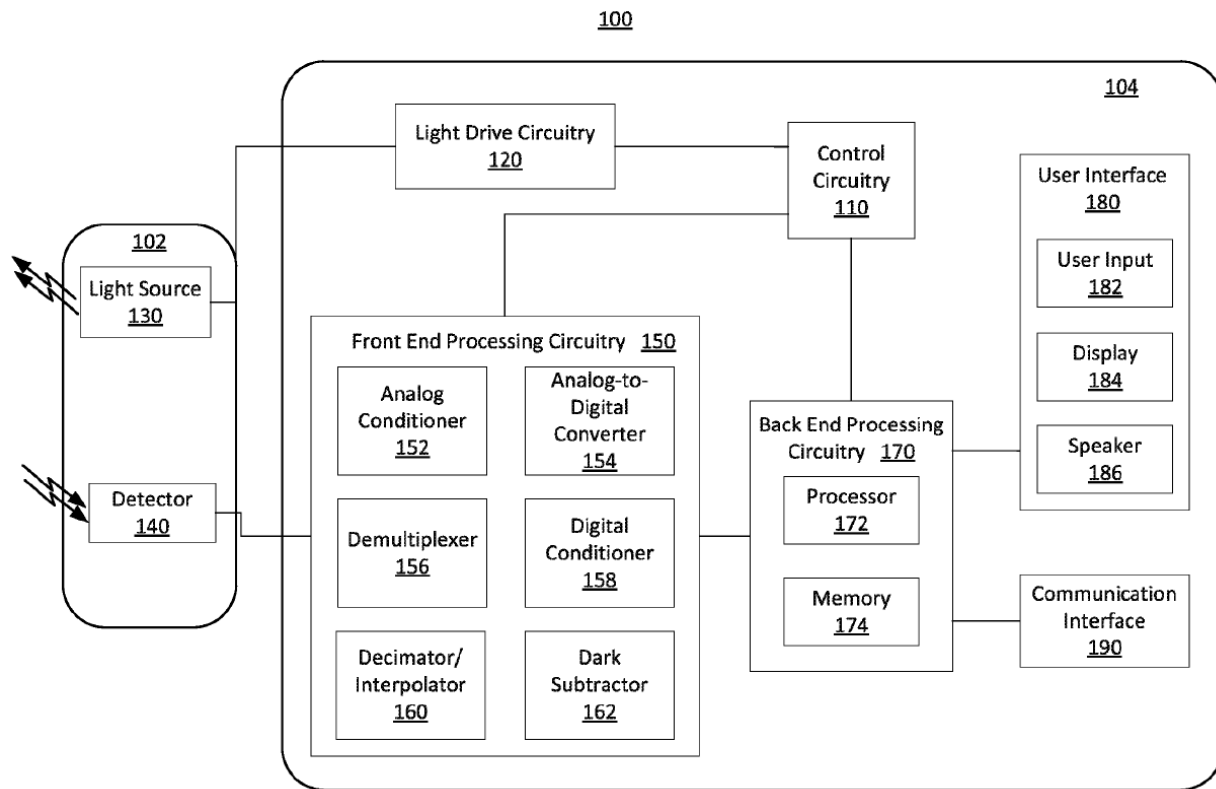


FIG. 1

EX1025, FIGS. 3, 1; EX2031, ¶82.

A subject wears sensor unit 312, while the other components in the system are included for system calibration, data processing, and displaying information. EX1025, 17:54-18:15, 18:32-67; EX2031, ¶82. 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. EX1025, 4:42-62, 10:48-64; EX2031, ¶83. Front end processing circuitry 150 processes that signal. EX1025, 12:42-49; EX2031, ¶83. Then, “[p]rocessor 172 may receive and process physiological signals received from front

B. LeBoeuf (EX1026) (Grounds 2, 4, 6, 8)

FIG. 3

EX1026, FIG. 3, ¶[0042]; EX2031, ¶84. The light-guiding earbuds include a speaker, such as speaker 22 shown in Figure 3, an earbud housing 16 in acoustical communication with the speaker 22, and apertures 34*a*-34*b* through which sound from the speaker 22 can pass. EX1026, ¶¶[0006], [0009], [0102], FIG. 3; EX2031, ¶85.

The light-guiding earbuds also include a light-guiding cover to deliver light from an optical emitter into the ear canal and to collect and deliver light from outside the earbud to an optical detector, such as shown by cover 18, optical emitter 24, and optical detector 26 depicted in Figure 3 above. EX1026, Abstract, ¶¶[0006], [0106], FIG. 3; EX2031, ¶85. The light directed into the ear from a light emitter and the subsequent collection of light at a detector may be used for detecting or measuring, for example, body or skin temperature, blood gas levels, heart rate, blood flow, etc. EX1026, ¶[0010]; EX2031, ¶85.

C. Tran (EX1027) (Grounds 3, 4, 7-10)

Tran describes a patient heart monitoring system with wireless nodes forming a wireless mesh network. EX1027, Abstract, 3:3-13, 8:29-33; EX2031, ¶86. Tran's system also includes a wearable appliance adapted to communicate with the wireless nodes and a statistical analyzer to determine a heart attack or stroke attack. EX1027, Abstract, 3:3-13; EX2031, ¶86. The wearable appliance may include sensors and

may non-invasively measure, for example, blood pressure. EX1027, 4:62-65, 9:23-30; EX2031, ¶86.

D. Carlson (EX1028) (Grounds 5-8)

Carlson describes a non-invasive optical pulse oximeter. EX1028, [0002]; EX2031, ¶87. The oximeter is designed to be clipped onto a user's ear. EX1028, [0048]-[0049]; EX2031, ¶87. This is illustrated in Figures 1 and 2:

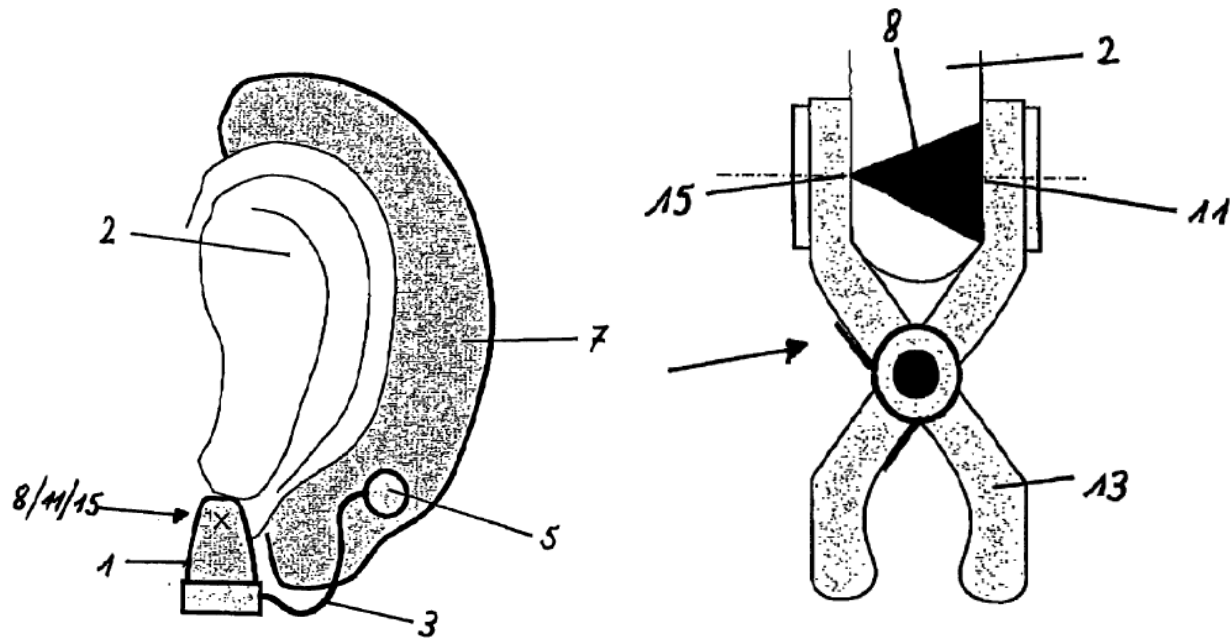


Figure 1

Figure 2

EX1028, FIGS. 1-2; EX2031, ¶87. The oximeter relies on various techniques, including beam shaping optical elements, for improving the signal-to-noise ratio and signal-to-background ratio of the signal generated by its photo detecting element when it detects light that has been reflected from bodily tissue. EX1028, [0010], [0013]-[0014], [0062]; EX2031, ¶88. 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 by the photo detecting element. EX1028, [0026], [0062]; EX2031, ¶88.

E. Marbach (Ex. 1029) (Grounds 9-10)

Marbach concerns the improvement of the “stability and reproducibility of optical diffuse reflection measurements.” EX1029, 5:53-6:19; EX2031, ¶89. Marbach discloses an apparatus which includes light sources that emit light at a sample and that operate in conjunction with detectors which detect light. EX1029, 5:53-6:19; EX2031, ¶89. Marbach discloses the use of multivariate measurements in such applications and states that “[a]ccuracy is optimized when so-called multivariate Wiener filtering is used to process the multivariate input data into the single, user-desired output.” EX1029, 12:19-27; EX2031, ¶89.

V. CLAIM CONSTRUCTION

Petitioners note that certain terms in the '304 Patent have been construed in prior Board or district court proceedings but otherwise contend that the remaining terms or phrases in the challenged claims of the '304 Patent do not require construction and can be afforded their plain and ordinary meanings. Pet., 13-15. Petitioners also state that they do not believe that the terms from the prior Board or district court proceedings need to be construed here. *Id.*

Patent Owner agrees that claim construction is not necessary at this time for

the Board to find that Petitioners did not meet their burden for institution. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017). Patent Owner reserves the right to seek constructions in litigation or if institution is granted, and to further respond to any constructions that Petitioners propose.

A. The Petition Does Not Comply with the Board's Claim Construction Rules

The Board's rules require that the petition sets forth "[h]ow the challenged claim is to be construed." 37 C.F.R. § 42.104(b)(3). "[W]hen a petitioner takes alternative positions before the Board and a district court, that petitioner should, at a minimum, explain why alternative position are warranted." *Revvo Techs., Inc. v. Cerebrum Sensor Techs., Inc.*, IPR2025-00632, Paper 20 at 3-4 (PTAB Nov. 3, 2025) (precedential). This rule "ensure[s] that the Board correctly construes claim terms and to minimize inconsistency in claim construction between forums." *Id.* at 4. In this case, Petitioners' claim construction positions in the Petition and the Texas Case are inconsistent, which warrants denial of the Petition.

Petitioners acknowledge that "[i]n the Texas Case, [Petitioners] identified certain limitations [of the '304 Patent] as indefinite." Pet., 14 n.3 (citing EX1023, 236-38). Specifically, Petitioners assert that the following terms or phrases are indefinite in district court:

- “a receiver configured to: ... synchronize to the light source” (claims 1, 11);
- “the light source configured to increase signal-to-noise ratio by increasing a light intensity relative to an initial light intensity from at least one of the plurality of semiconductor sources” (claims 1, 11);
- “wherein the measurement system is at least in part configured for selection or identification of an object” (claim 12);
- “wherein the measurement system is configured to use artificial intelligence in making decisions” (claim 12);
- “wherein the light source is configured to further increase the signal-to-noise ratio by increasing a pulse rate of at least one of the plurality of semiconductor sources from an initial non-zero pulse rate” (claim 13);
- “the receiver comprises a plurality of detectors arranged along a first arc, and wherein the plurality of semiconductor sources are arranged along a second arc that is offset from the first arc” (claims 4, 5, 15, 21);
- “wherein the first arc and the second arc are concentric” (claims 6, 16, 22);
- “a receiver configured to: ... synchronize to the modulation of the at least one of the semiconductor sources” (claim 19);
- “the measurement device further configured to improve a signal-to-noise ratio of the input optical beam reflected from the tissue by: differencing the first

signal and the second signal, and increasing the light intensity relative to the initial light intensity from at least one of the semiconductor sources” (claim 19); and

- “wherein the light source is configured to further improve the signal-to-noise ratio of the input optical beam reflected from the tissue by increasing a pulse rate of at least one of the plurality of semiconductor sources from an initial non-zero pulse rate” (claim 20).

EX1023, 236-38. Despite this, Petitioners apply the plain and ordinary meaning for each of these terms in the Petition. Pet., 13-14.

Petitioners’ only explanation for its inconsistent positions is that “the prior art discloses and/or renders obvious the indisputable scope of these limitations.” Pet., 14 n.3 (citing EX1003, ¶¶66-67, 118-120, 141-142, 181, 200, 235, 242, 258-59, 281, 285, 289, 298, 304, 309, 313, 342-43, 359-360, 364, 400-401). Dr. Anthony similarly fails to explain the inconsistency and merely repeats the same conclusory assertions from the Petition. EX1003, ¶¶66-67, 118-120, 141-142, 181, 200, 235, 242, 258-59, 281, 285, 289, 298, 304, 309, 313, 342-43, 359-360, 364, 400-401. The Board should deny institution because Petitioners fail to justify their inconsistent positions. *Tesla, Inc. v. Intellectual Ventures II LLC*, IPR2025-00340, Paper 18 at 3-5 (PTAB Nov. 5, 2025) (informative) (denying institution where petitioner argued that claim term was indefinite in district court but adopted patent owner’s plain and

ordinary meaning construction in its petition).

B. Prior Constructions by the Board

As noted in the Petition, the Board construed the following terms in the prior IPRs concerning patents related to the '304 Patent:

Term/Phrase	Board's Construction
"a light source comprising a plurality of semiconductor sources that are light emitting diodes ... configured to increase signal-to-noise ratio by ... increasing a pulse rate of at least one of the plurality of semiconductor sources"	"a light source containing two or more light emitting diodes (semiconductor sources), wherein at least one of the light emitting diodes is capable of having its pulse rate increased to increase a signal-to-noise ratio" (EX1008, 10-12)
"to identify an object"	"to recognize or establish an object as being a particular thing" (EX1015, 8-10; EX1016, 3)
"modulating at least one of the LEDs"	"varying the amplitude, frequency, or phase of the light produced by at least one of the LEDs to include information" (EX2037, 10)

Patent Owner applies these constructions in its analysis below. EX2031, ¶¶70-73.

VI. PETITIONERS FAILED TO MEET THEIR BURDEN

The Director should deny institution because Petitioners have not met their burden of showing a reasonable likelihood that any claim of the '304 Patent is unpatentable for any of the grounds in the Petition.

A. Ground 1: Obviousness Based on Lisogurski (Claims 1, 3, 11, 19, 20)

In Ground 1, Petitioners argue that claims 1, 3, 11, 19, and 20 of the '304 Patent are obvious over Lisogurski alone. Pet., 18-49. Patent Owner has statutorily disclaimed claims 1, 3, 11, 19, and 20 of the '304 Patent, rendering Ground 1 of the Petition moot. EX2038.

B. Ground 2: Obviousness Based on Lisogurski and LeBoeuf (Claims 2, 4-6, 14-16, 21-22, 27)

In Ground 2, Petitioners argue that claims 2, 4-6, 14-16, 21-22, and 27 of the '304 Patent are obvious over Lisogurski and LeBoeuf. Pet., 49-57. For at least the reasons discussed below, Petitioners fail to meet their burden. *See* EX2031, ¶¶94-182.

1. Claims 2, 14, 27: Lisogurski and LeBoeuf Do Not Render Obvious the Reflective Surface Limitation

Claims 2, 14, and 27 each recite a “reflective surface.” Claim 2 recites, “the measurement system further comprises a reflective surface to receive and redirect at least some of the at least a portion of the analysis output beam reflected or

transmitted from the sample.” EX1001, 36:60-67. Claim 14 recites, “the measurement system further comprising a reflective surface to receive and redirect at least some of the at least a portion of the analysis output beam reflected or transmitted from the sample.” EX1001, 38:39-46. Claim 27 recites, “the measurement device further comprises a reflective surface configured to receive and redirect at least a portion of light reflected from the tissue.” EX1001, 40:39-42.

Lisogurski and LeBoeuf do not render obvious the “reflective surface” limitations recited in claims 2, 14, 27. Pet., 54-57; *see* EX2031, ¶¶95-137. Notably, Petitioners do not argue that collateral estoppel applies to these limitations. Pet., 16, 54-55, 57. Petitioners concede that Lisogurski does not disclose the claimed “reflective surface” and rely on LeBoeuf, arguing that LeBoeuf includes a reflective surface that scatters and focuses light from optical emitters 24 and that “a POSITA would have been motivated to modify Lisogurski’s measurement system with LeBoeuf’s reflective surface teachings to advantageously enhance the quality of signal measurements.” Pet., 52-53, 55. The relevant components in LeBoeuf are illustrated in Petitioners’ annotated Figure 8C:

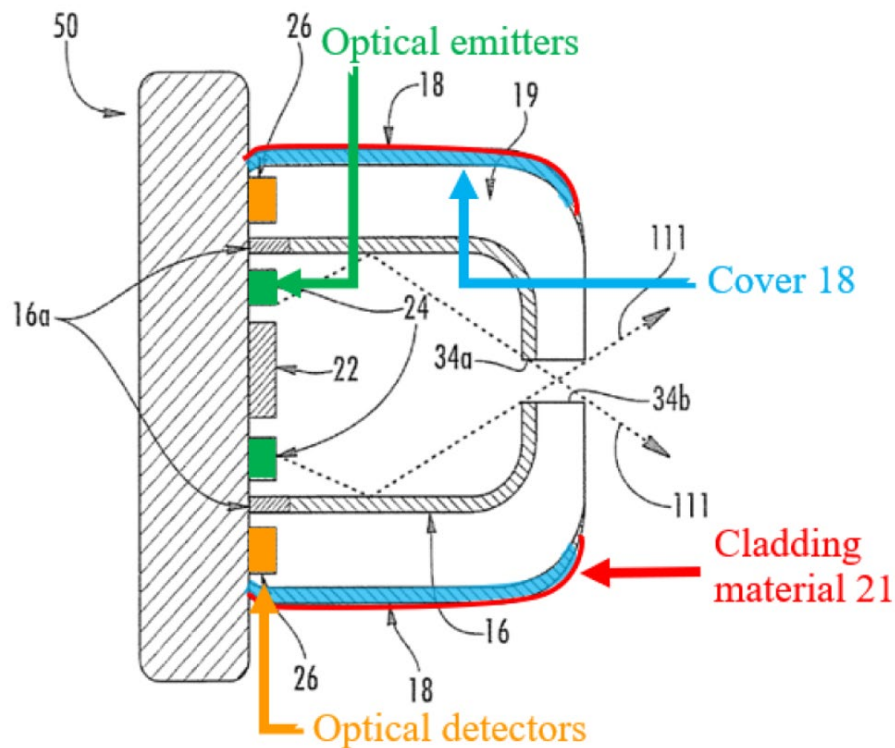


FIG. 8C

Pet., 51 (annotating EX1026, FIG. 8C)

Petitioners failed to establish that a POSITA would have been motivated to implement LeBoeuf's alleged reflective surface in Lisogurski. EX2031, ¶99.

a) Petitioners Do Not Establish Motivation to Implement LeBoeuf's Alleged Reflective Surface in Lisogurski

As explained below, Petitioners' motivation-to-combine argument fails to specifically explain, with supporting evidence, why or how LeBoeuf's alleged reflective surface would have been implemented in Lisogurski's system.

(1) Petitioners Fail to Show *Why* LeBoeuf's Teachings Would Have Been Implemented in Lisogurski's System

As an initial matter, Petitioners appear to only argue that a POSITA would have been motivated to modify Lisogurski to include the “reflective surface (e.g., ‘a cover 18’ with ‘cladding material 21 [which] may be reflective material’)” from LeBoeuf, but not any of the other components that are integrated with the alleged reflective surface, such as earbud housing 16, cover 18, or apertures 34*a*-34*b*. Pet., 54-55; EX1026, ¶[1025], FIG. 8C. Petitioners do not clearly specify which, if any, such related component(s) in LeBoeuf's Figure 8C would allegedly be implemented in Lisogurski. Pet., 52-53 (asserting merely to “employ a reflective material in Lisogurski's LEDs”), 55 (“modify Lisogurski's measurement system with LeBoeuf's reflective surface teachings”). Indeed, Petitioners' motivation-to-combine argument refers only to LeBoeuf's “reflective [surface or material]” and does not mention any related components in LeBoeuf's Figure 8C embodiment, such as earbud housing 16. Pet., 52-53; EX2031, ¶107. Thus, Petitioners only argue to implement LeBoeuf's alleged reflective surface in Lisogurski. Pet., 52-53.

As for the alleged motivation for such a modification, Petitioners cite and rely on a single paragraph in LeBoeuf, a single paragraph in Valencell-093 (EX1041), two paragraphs in Chin, and two paragraphs in Colvin to allege motivation to combine. Pet., 52-53 (citing EX1026, ¶[0125]; EX1041, ¶[0152]; EX1062, 3:28-33,

7:46-57; EX1063, 8:24-25, 51:28-52:8, Fig. 23D). However, none of the cited disclosures supports a motivation to combine LeBoeuf's reflective surface with Lisogurski's system.

First, Petitioners cite LeBoeuf's statements regarding an alleged advantage associated with the Figure 8C embodiment: reducing unwanted signals. Pet., 52-53 (citing EX1026, ¶[0125]). Importantly, however, LeBoeuf states that this is an advantage of "this *configuration*," which refers to not just the alleged reflective surface but instead to the combination of related components in the Figure 8C embodiment, including at least the components annotated in green below:

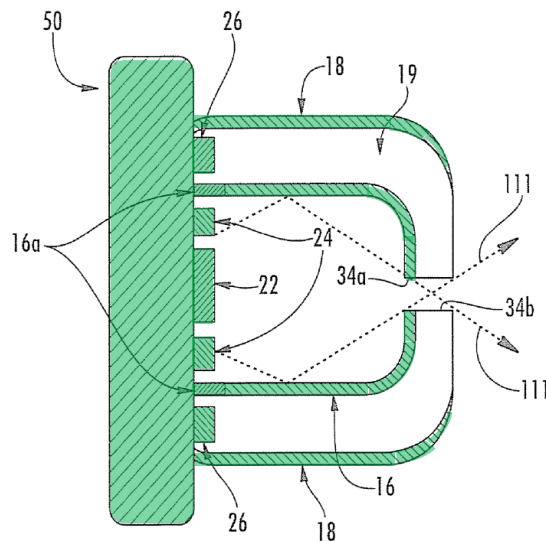


FIG. 8C

EX1026, FIG. 8C (annotated), ¶¶[0123], [0125]; EX2031, ¶110.

For example, regarding the "configuration" in Figure 8C, LeBoeuf discloses

that earbud housing 16 “may be at least partially reflective to scatter light [from emitters 24]” such that “optical energy 111 may exit the earbud 30 through apertures 34a, 34b, in the housing 16 and cover 18,” through which “sound from the speaker 22” also passes. EX1026, ¶¶[0125], [0123], FIG. 8C; EX2031, ¶111. A POSITA would have understood, as LeBoeuf teaches, that Petitioners’ cited advantage is necessarily based on this collective “configuration” of components, and not the result of LeBoeuf’s alleged reflective surface in isolation. EX1026, ¶[0125], FIG. 8C; EX2031, ¶111. Thus, the cited advantage associated with the “configuration” in Figure 8C does not supply a motivation for Petitioners’ proposed combination implementing only LeBoeuf’s alleged reflective surface in Lisogurski, without any related components from Figure 8C. EX2031, ¶112.

Second, Petitioners cite once to Valencell-093. Pet., 53 n.12 (citing EX1041, [0152]). But this cited disclosure relates to the specific configurations shown in “FIGS. 24-27,” in which a “light guiding region 2306” (e.g., “reflector”) “surround[s] or partially surround[s] [a] sensor module 700, 800 and/or isolation region 2304” in such a way that “light guiding region 2305 helps direct light to and/or from the sensor module 700, 800 and a blood flow region,” with “sensor module 700, 800 ... at least partially exposed.” EX1041, ¶[0152], FIGS. 24-27. Petitioners improperly ignore the context of Valencell-093’s teaching regarding a reflective surface. *Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561, 1568 (Fed.

Cir. 1987) (a reference “must be considered in its entirety, ... including portions that would lead away” from the claimed invention). Valencell-093’s full teaching concerns a reflective surface in specified configurations, not in isolation, and thus does not support Petitioners’ argument regarding simply implementing LeBoeuf’s alleged reflective surface without addressing its configuration. EX2031, ¶¶114-115.

The Petition relies on Chin and Colvin in the same manner. Pet., 52 (citing EX1062, 3:28-33, 7:46-57; EX1063, 8:24-25, 51:28-52:8, FIG. 23D). Chin and Colvin do not disclose taking a reflective surface in isolation and incorporating it in a sensor. EX1062, 3:28-33, 7:46-57; EX1063, 8:24-25, 51:28-52:8, FIG. 23D. Instead, Chin describes the configuration shown in Figure 5F, which includes reflector 154 between emitter 140 and detector 142, collectively. EX1062, 7:46-57, Fig 5F. Colvin similarly discusses the components shown in Figure 23D, including LED chip 18 mounted within reflector cup 18-RC, collectively. EX1063, 8:24-25, 51:28-52:8, FIG. 23D. Chin and Colvin similarly do not teach that any benefit would be achieved solely by incorporating a reflective surface into a sensor. EX2031, ¶116.

(2) Petitioners Fail to Show *How* LeBoeuf’s Teachings Would Have Been Implemented in Lisogurski’s System

Petitioners also fail to explain specifically *how* LeBoeuf’s alleged reflective surface would have been implemented in Lisogurski. *PersonalWeb Techs., LLC v. Apple, Inc.*, 848 F.3d 987, 993-94 (Fed. Cir. 2017) (finding the Board failed to

explain “*how* the combination of the two references was supposed to work” (emphasis in original)); *Braintree Labs., Inc. v. Novel Labs., Inc.*, 749 F.3d 1349, 1359 (Fed. Cir. 2014) (patent challenger “failed to prove ... why the ... references would have worked together” (cleaned up)); *see also In re NuVasive, Inc.*, 842 F.3d 1376, 1381-82 (Fed. Cir. 2016) (emphasizing the “need for specificity” in “findings on motivation”).

As explained above, LeBoeuf’s alleged reflective surface is based on and involves multiple related components also shown in Figure 8C, including base 50, earbud housing 16, cover 18, arrangement of emitters 24 and detectors 26, and apertures 34*a*-34*b*. EX1026, ¶¶[0123], [0125], FIGS. 8A-8C; EX2031, ¶118. Petitioners’ motivation-to-combine argument only addresses LeBoeuf’s “reflective [surface or material]” and does not even mention any related components in the Figure 8C embodiment, much less argue to implement those related components in Lisogurski. Pet., 52-53. Petitioners do not explain how LeBoeuf’s alleged reflective surface would be implemented in Lisogurski’s sensor that does not have those related components. EX2031, ¶¶118-120.

(3) Petitioners Fail to Show *Why* or *How* A POSITA Would Incorporate the Related Components

To the extent that Petitioners suggest modifying Lisogurski to include all or some of the related components associated with LeBoeuf’s alleged reflective surface

in Figure 8C (which they do not, as explained above), Petitioners nonetheless fail to establish why and how such teachings would be implemented in Lisogurski.

Petitioners do not identify any motivation to modify Lisogurski to include any components from LeBoeuf's Figure 8C because they do not identify which, if any, such components would be implemented in Lisogurski's sensor. Pet., 52-53; EX2031, ¶¶121-122.

The only components potentially addressed in the Petition are cover 18 with cladding material 21 (identified together as a "reflective surface") in combination with earbud housing 16, all of which are discussed at a high level in Petitioners' analysis of claim 2. Pet., 54-55. But Petitioners fail to establish that a POSITA would have had any motivation to implement earbud housing 16 in Lisogurski's sensor because: (1) earbud housing 16 is an earbud-specific component, but Lisogurski does not teach earbud sensors and (2) earbud housing 16 is premised on and involves other related components in Figure 8C, which are not in Lisogurski. EX1026, ¶¶[0050], [0123], [0125], FIG. 8C; EX1025, 4:6-20; Pet., 52-55; EX2031, ¶¶123-126. Petitioners fail to explain why or how earbud housing 16 would be implemented in Lisogurski's non-earbud sensor without any other related components from LeBoeuf's Figure 8C. Pet., 52-55; EX2031, ¶126.

Regardless of which component(s) of LeBoeuf's Figure 8B that Petitioners suggest a POSITA would have implemented in Lisogurski, such as earbud housing

16 or otherwise, the Petition does not identify motivation for modifying Lisogurski to include any such components because their rationale only mentions LeBoeuf's "reflective [surface or material]." Pet., 52-53; EX2031, ¶126-127.

b) A POSITA Would Not Have Been Motivated to Implement LeBoeuf's Alleged Reflective Surface in Lisogurski

A POSITA would not have been motivated to implement LeBoeuf's alleged reflective surface into Lisogurski as Petitioners allege. EX2031, ¶128.

LeBoeuf is directed extensively to "earbud" devices—including the "light-guiding earbud" in Figure 8C and the substantially similar embodiment in Figures 8A-8B—that are specifically configured to be placed within an ear and transmit light and sound into the ear canal. EX1026, Abstract, ¶¶[0002], [0009], [0048]-[0050], [0123]-[0125], FIGS. 1-12B; EX2031, ¶129. As demonstrated by the following annotated Figure 8C, LeBoeuf's alleged reflective surface is premised on and involves other related components (green):

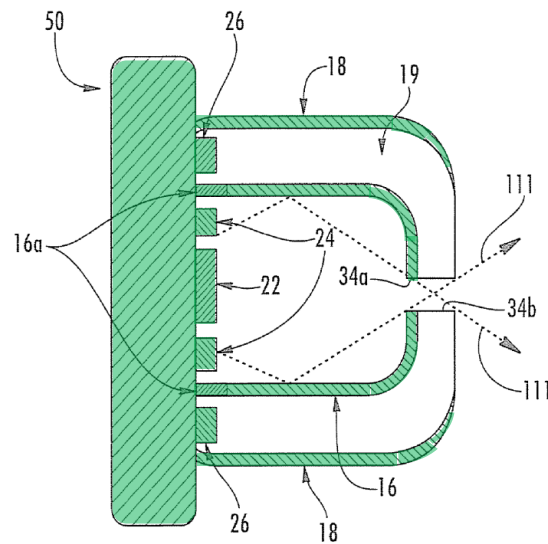


FIG. 8C

EX1026, FIG. 8C (annotated), ¶¶[0123], [0125].

For example, earbud housing 16 “may be at least partially reflective to scatter light [from emitters 24],” such that “optical energy 111 may exit the earbud 30 through apertures 34a, 34b in the housing 16 and cover 18,” and those apertures 34a-34b are also for “sound from the speaker 22” to pass through. EX1026, FIGS. 8A-8C, ¶¶[0123], [0125]. Earbud housing 16 “is in acoustical communication with [that] speaker 22” and “configured to be positioned within an ear.” EX1026, FIGS. 8A-8C, ¶[0123]. Cover 18 “surrounds the earbud housing 16,” such that together they define light guiding region 19, and cover 18 “collects ... and delivers ... collected light to the optical detectors 26.” EX1026, FIGS. 8A-8C, ¶[0123]. The optical emitters 24 and detectors 26 are arranged relative to speaker 22, earbud housing 16,

and cover 18, and all are positioned relative to base 50. EX1026, FIGS. 8A-8C, ¶¶[0123], [0125].

A POSITA would have further understood, as LeBoeuf teaches, that these related components are earbud-specific and that this configuration in Figure 8C—including the alleged reflective surface and the related components upon which it is premised—is specific to an earbud, including the unique physical aspects of guiding sound and light relative to the ear. EX1026, FIG. 8C, ¶¶[0123]-[0125] (“light guiding earbud 30”; “earbud housing 16 ... configured to be positioned within an ear”; “earbud housing 16 is in acoustical communication with a speaker 22 and ... aperture 34a through which sound ... can pass”; “cover 18 includes ... aperture 34b through which sound ... can pass”; “light guiding region 19”; “cover 18 ... delivers light ... into an ear canal” and “delivers ... collected light to the optical detectors”; “earbud housing 16 ... at least partially reflective to scatter light within the cavity defined by the earbud housing 16” such that “optical energy 111 may exit the earbud 30 through apertures 34a, 34b in the housing 16 and cover 18”). For example, the alleged reflective surface is within an earbud housing 16 and reflects light from emitters positioned relative to a speaker 22, and optical energy 11 and sound from speaker 22 exit both exit through apertures 34a-34b. EX1026, ¶¶[0123], [0125], FIGS. 8A-8B.

Lisogurski, in contrast, does not teach or suggest an earbud for placement in an ear, much less teach the related earbud-specific components in LeBoeuf's Figures 8A-8B upon which the alleged arc arrangement is premised. Instead, Lisogurski is limited to sensors for a patient's external sites. EX1025, 4:6-20 (describing, at most, placement on an "earlobe" or "around or in front of the ear," and notably not *within* the ear).

Because Lisogurski does not teach or suggest an earbud sensor for within an ear, a POSITA would not have been motivated to implement LeBoeuf's alleged reflective surface that is premised on earbud-specific components and, together with those components, is specific to an earbud. EX1026, FIG. 8C, ¶¶[0123], [0125]; EX1025, 4:6-20; EX2031, ¶¶133-136. Further, because Lisogurski does not include the related components upon which LeBoeuf's alleged reflective surface is premised, and Petitioners do not argue to implement them into Lisogurski, a POSITA would have had neither the motivation nor capability for implementing LeBoeuf's alleged reflective surface in Lisogurski. EX1026, FIG. 8C, ¶¶[0123], [0125]; Pet., 52-53; EX2031, ¶¶133-136.

Petitioners improperly ignore the full teachings of the references, including by failing to recognize, as explained above, that (i) LeBoeuf's alleged reflective surface is premised on other, earbud-specific components and is part of an earbud-

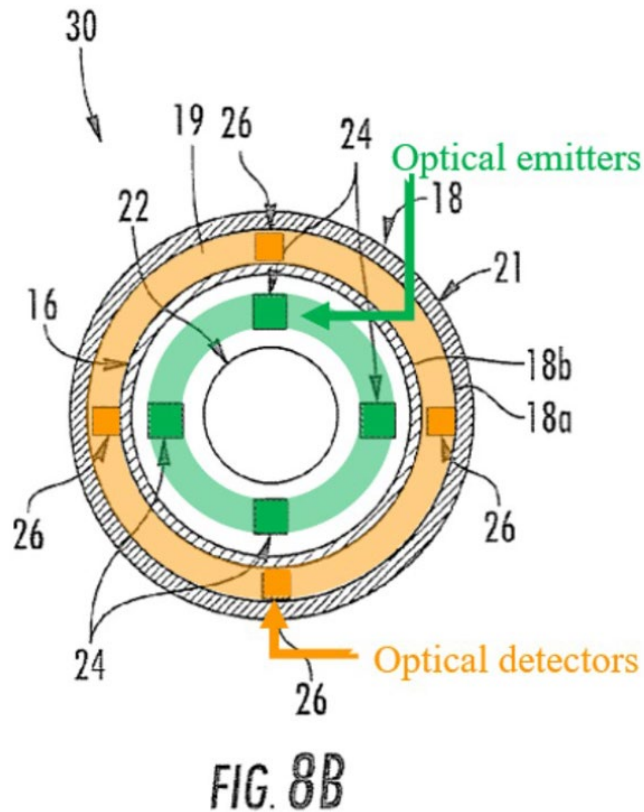
specific configuration in Figure 8C, and (ii) Lisogurski does not teach an earbud. Pet., 52-55; *Panduit*, 810 F.2d at 1568.

2. Claims 4-6, 15-16, and 21-22: Lisogurski and LeBoeuf Do Not Render Obvious the Arc Limitation

Claims 4-6, 15-16, and 21-22 each recite an “arc” limitation. Claim 4 recites, “the receiver comprises a plurality of detectors arranged along a first arc, and wherein the plurality of semiconductor sources are arranged along a second arc.” EX1001, 37:6-9. Claims 15 and 21 similarly recite “the receiver comprises a plurality of detectors arranged along a first arc, and wherein the plurality of semiconductor sources are arranged along a second arc that is offset from the first arc.” EX1001, 38:47-51 (claim 15), 40:3-6 (claim 21).

Lisogurski and LeBoeuf do not render obvious the arc limitations in these claims. Pet., 55-57; *see* EX2031, ¶¶138-182. Notably, Petitioners do not argue that collateral estoppel applies to these limitations. Pet., 16, 55-57. Because Lisogurski does not disclose any arrangement of its LEDs or detectors, much less “one or more arcs,” Petitioners rely on LeBoeuf’s arrangement of optical emitters 24 and optical detectors 26 in Figure 8B (referenced herein as LeBoeuf’s “alleged arc arrangement”) and argue that “a POSITA would have been motivated to implement Lisogurski’s detector 140/318 ... with LeBoeuf’s [sic] arc arrangement.” Pet., 51-52, 55-57.

Petitioners rely on the following annotated Figure 8B of LeBoeuf:



Pet., 56. Petitioners, however, fail to establish that a POSITA would have been motivated to implement LeBoeuf's alleged arc arrangement in Lisogurski. EX2031, ¶¶144, 146.

a) Petitioners Do Not Establish Motivation to Implement LeBoeuf's Alleged Arc Arrangement in Lisogurski

As explained below, Petitioners' motivation-to-combine argument fails to specifically explain, with supporting evidence, either why or how LeBoeuf's alleged arc arrangement in Figure 8B would have been implemented in Lisogurski's system.

(1) Petitioners Fail to Show *Why* LeBoeuf's Teachings Would Have Been Implemented in Lisogurski's System

Petitioners first assert a generic motivation for implementing LeBoeuf's alleged arc arrangement of emitters and detectors in Lisogurski's system: "to increase detection of scattered light, thus improving accuracy of physiological measurements." Pet., 51-52. Petitioners do not cite any support from the asserted references for this motivation because the alleged arc arrangement is not disclosed in Lisogurski. Pet., 55-57. With respect to LeBoeuf, the alleged arc arrangement is only disclosed via depiction in Figure 8B, with no discussion of the alleged arc arrangement of emitters and detectors in Figure 8B, much less any related accuracy. *See* EX1026, FIG. 8B, ¶¶[0123]-[0124]. Indeed, Petitioners' motivation-to-combine argument only cites LeBoeuf at paragraph [0105], which does not address the alleged arc arrangement. Pet., 51-52. Petitioners cite LeBoeuf at [0105] to assert that the alleged arc arrangement would "improve the detection of scattered light ... and increase the signal-to-noise ratio," but LeBoeuf's cited paragraph contains no such teachings or even discussion of the alleged arc arrangement. Pet., 52 (citing EX1026, ¶[0105]).

Petitioners' only other cited evidence is Mendelson (EX1045), which does not relate to the alleged arc arrangement in LeBoeuf or the alleged accuracy thereof, and regardless, Petitioners only cite Mendelson regarding alleged arrangement of

detectors, not *emitters*, which fails because the arc limitation involves both detectors and emitters. Pet., 52 (citing EX1045). Also, as discussed below, Mendelson does not support Petitioners' assertion regarding angularly scattered light because Mendelson does not discuss angles.

Petitioners also argue that a POSITA would modify Lisogurski to use LeBoeuf's alleged arc arrangement because: (1) a POSITA would have understood that "light emitted into biological tissue undergoes significant scattering and absorption, and the reflected light exits the tissue at a wide range of angles" (citing EX1025, 11:16-20); and (2) "[a] POSITA would have recognized that a linear or closely grouped detector arrangement would fail to capture much of the angularly scattered light" (citing EX1045, 4:14-65). Pet., 51-52. Critically, however, these issues only relate to *detectors*—not *emitters*. Thus, even if a POSITA had these understandings, as Petitioners allege, this does not address the arc requirement for the semiconductor sources in claims 4-6, 15-16, and 21-22. EX1001, 37:6-9 ("semiconductor sources are arranged along a second arc"). Further, to the extent that Petitioners' references to angularly scattered light are intended to support their suggestion that the modification would increase accuracy, it would at most only do so with respect to detectors, not emitters.

In any event, Petitioners' arguments regarding angularly scattered light are unsupported and flawed. With respect to "reflected light" at "angles," the cited

portion of Lisogurski does not address angles, and indeed, Lisogurski never mentions an “angle.” Pet., 51-52 (citing EX1025, 11:16-20). Similarly, Mendelson does not discuss “angles.” Pet., 52 (citing EX1045, 4:14-65). Also, Petitioners’ assertion that “linear” arrangements are deficient wrongly assumes the existence of only two arrangements—i.e., linear and arc—and fails to consider the existence of other potential arrangements (e.g., triangle, square, or grid) for capturing angularly scattered light, including the non-linear and non-arc arrangement of detectors in LeBoeuf’s Figure 12A. EX1026, FIG. 12A, ¶[0138]. Petitioners fail to explain why a POSITA would have chosen an arc arrangement from amongst the wide array of non-arc arrangement options, let alone the alleged arc arrangement in LeBoeuf’s Figure 8B. Pet., 51-52; *Virtek Vision Int’l ULC v. Assembly Guidance Sys., Inc.*, 97 F.4th 882, 886-87 (Fed. Cir. 2024) (the “mere ... exist[ence]” of “possible arrangements” does not mean that a POSITA would have been motivated to use them). For example, Petitioners’ own cited portion of Mendelson discusses a non-linear, non-arc arrangement that uses only “a single photodiode [i.e., detector].” EX1045, 4:14-65.

Petitioners’ reliance on Mendelson is flawed for several additional reasons. For example, the arrangements cited in Mendelson are different from LeBoeuf’s alleged arc arrangement. EX1026, FIG. 8B; EX1045, 4:14-65 (referencing, e.g., “Konig” (EX2035, 5-6), which has centralized LEDs, and another sensor with a

“single photodiode”).

Petitioners fail to establish a specific connection between their alleged motivation regarding detection of angularly scattered light and LeBoeuf's particular arrangement of emitters and detectors in Figure 8B. *Innogenetics, N.V. v. Abbott Labs.*, 512 F.3d 1363, 1373 (Fed. Cir. 2008) (“knowledge of a problem and motivation to solve it are entirely different from motivation to combine particular references to reach the particular claimed method”).

(2) Petitioners Fail to Show *How* LeBoeuf's Teachings Would Have Been Implemented in Lisogurski's System

Petitioners also fail to explain specifically *how* LeBoeuf's alleged arc arrangement would have been implemented in Lisogurski. *PersonalWeb*, 848 F.3d at 993-94 (finding the Board failed to explain “*how* the combination of the two references was supposed to work” (emphasis in original)); *Braintree*, 749 F.3d at 1359 (patent challenger “failed to prove ... why the ... references would have worked together” (cleaned up)); *see also NuVasive*, 842 F.3d at 1381-82 (emphasizing “need for specificity” in “findings on motivation” to combine).

LeBoeuf's alleged arc arrangement of emitters 24 and detectors 26 in Figure 8B is based on and involves multiple related components also shown in Figure 8B, including base 50, earbud housing 16, cover 18, and speaker 22. EX1026, FIGS. 8A-8B, ¶[0123]; EX2031, ¶¶168-169. Petitioners do not even address those related

components in LeBoeuf's Figure 8B, much less argue to implement those related components into Lisogurski. Pet., 51-52. Petitioners thus do not explain how LeBoeuf's alleged arc arrangement, which is based on those related components, would purportedly be implemented in Lisogurski's sensor that does not have those related components. EX2031, ¶169.

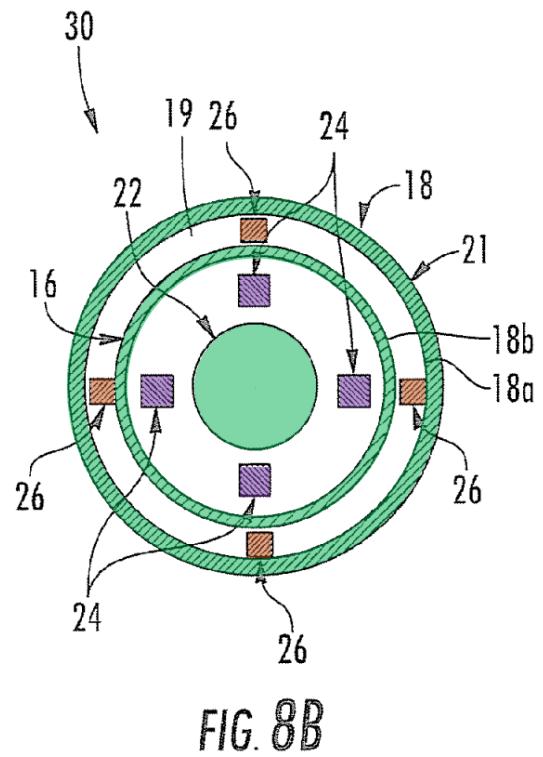
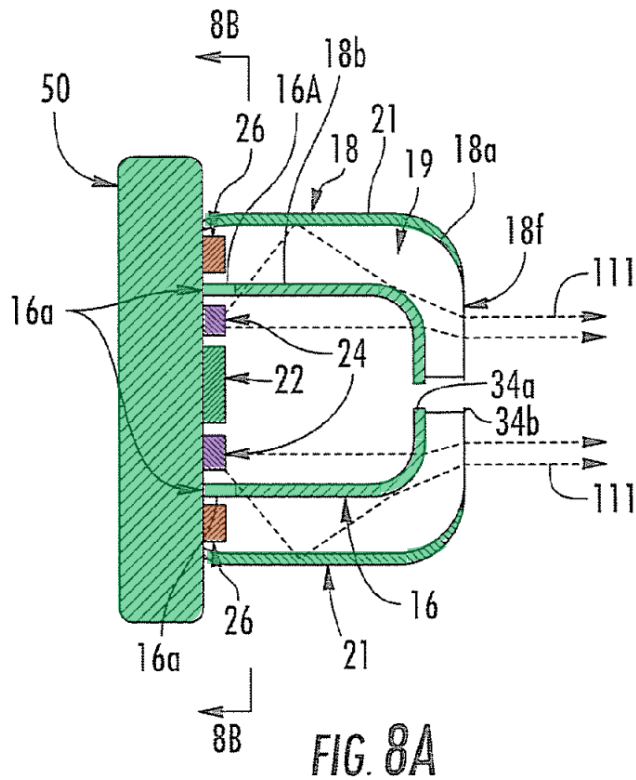
Further, Petitioners do not explain how LeBoeuf's alleged arc arrangement of emitters and detectors would work to achieve Petitioners' alleged motivation of accuracy in Lisogurski without those other related components, and a POSITA would have understood that it would not, as explained below. Pet., 51-52; EX1026, FIGS. 8A-8B, ¶[0123]; EX2031, ¶170.

b) A POSITA Would Not Have Been Motivated to Implement LeBoeuf's Alleged Arc Arrangement in Lisogurski

Regardless of the deficiencies in the Petition, a POSITA would not have been motivated to implement LeBoeuf's alleged arc arrangement into Lisogurski. EX2031, ¶171.

LeBoeuf is directed extensively to "earbud" devices—including the "light-guiding earbud" in Figure 8B—that are specifically configured to be placed within an ear and transmit light and sound into the ear canal. EX1026, Abstract, ¶¶[0002], [0009], [0048]-[0049], [0123], FIGS. 1-12B; EX2031, ¶172. Further, as demonstrated by the following annotated Figures 8A-8B, LeBoeuf's alleged arc

arrangement of emitters 24 (purple) and detectors 26 (orange) is premised on and involves other related components (green):



EX1026, FIGS. 8A-8B (annotated), ¶¶[0123]-[0124]. For example, optical emitters 24 are positioned on base 50 around a centrally located speaker 22 and within earbud housing 16, and optical detectors 26 are positioned on base 50 outside of earbud housing 16 but inside cover 18, with emitters 24 and detectors 26 separated by light blocking region 16a. EX1026, FIGS. 8A-8B, ¶¶[0123]-[0124]. Further, emitters 24 and detectors 26 are generally directed toward cover end portion 18f, with detectors 26 positioned in light guiding region 19 defined between cover 18 and earbud housing 16. EX1026, FIGS. 8A-8B, ¶¶[0123]-[0124].

A POSITA would have understood, and LeBoeuf teaches, that these related components are earbud-specific and that the configuration shown in Figures 8A-8B—including the alleged arc arrangement and the related components upon which it is premised—is specific to an earbud and dictated by the unique physical aspects of guiding sound and light relative to the ear canal. EX1026, FIGS. 8A-8B, ¶[0123] (“light guiding earbud 30”; “earbud housing 16 ... configured to be positioned within an ear”; “earbud housing 16 is in acoustical communication with a speaker 22 and ... aperture 34a through which sound ... can pass”; “cover 18 includes ... aperture 34b through which sound ... can pass”; “light guiding region 19”; “cover 18 ... delivers light ... into an ear canal” and “delivers ... collected light to the optical detectors”).

For example, this earbud-specific nature is evident because the alleged arc arrangement involves emitters and detectors positioned relative to “speaker 22,” “earbud housing 16,” and cover 18 that “delivers light from the optical emitters 24 into an ear canal.” EX1026, ¶[0123], FIGS. 8A-8B. Notably, LeBoeuf’s non-earbud embodiments in Figures 22A-23 do not include the alleged arc arrangement of Figure 8B, further demonstrating that this alleged arc arrangement is earbud-specific. *See* EX1026, ¶¶[0070]-[0072], [0157], [0164], FIGS. 22A-23. *Panduit*, 810 F.2d at 1568 (reference “must be considered in its entirety, ... including portions that would lead away” from the claimed invention).

A POSITA would have understood that Lisogurski, in contrast, does not teach or suggest an earbud for positioning in an ear and taking measurements from the ear canal, much less teach the related earbud-specific components in LeBoeuf's Figures 8A-8B. Lisogurski is limited to sensors for external placement. EX1025, 4:6-20 (describing, at most, placement on an "earlobe" or "around or in front of the ear," and notably not *within* the ear). A POSITA would have understood that Lisogurski's non-earbud sensor is comparable, at most, to LeBoeuf's non-earbud embodiments in Figures 22A-23, not the earbud in Figures 8A-8B. *Compare* EX1025, 4:6-20 (fingertip, toe, earlobe, and body) *with* EX1026, ¶¶[0070]-[0071], [0157] (fingers, toes, and earlobes), [0072], [0164] (body), FIGS. 22A-23. Thus, Petitioners fail to recognize, that (i) the configuration in LeBoeuf's Figures 8A-8B is specific to an earbud, (ii) the arrangement of emitters and detectors is premised on related, earbud-specific components, and (iii) Lisogurski does not teach an earbud. *Panduit*, 810 F.2d at 1568.

Because Lisogurski does not teach or suggest an earbud sensor for within an ear, a POSITA would not have been motivated to implement LeBoeuf's alleged arc arrangement that, as explained above, is premised on earbud-specific components and, together with those components, is specific to an earbud. EX1026, FIGS. 8A-8B, ¶¶[0123]-[0124]; EX1025, 4:6-20. Further, because Lisogurski does not include the related components upon which LeBoeuf's alleged arc arrangement is premised,

a POSITA would have had neither the motivation nor capability to implement LeBoeuf's alleged arc arrangement in Lisogurski. EX1026, FIGS. 8A-8B, ¶¶[0123]-[0124]; Pet., 51-52.

In an attempt to address these differences, Petitioners quote Lisogurski's statement that "[a]ny suitable configuration ... may be used" (Pet., 53 (quoting EX1025, 17:42-45)), but a POSITA would not have understood LeBoeuf's alleged arc arrangement in Figure 8B to be suitable for the reasons discussed above, including that the alleged arc arrangement is based on related components not present in Lisogurski and is earbud-specific, whereas Lisogurski does not include an earbud.

C. Ground 3: Obviousness Based on Lisogurski and Tran (Claims 1, 3, 11-13, 19, 20, 26)

In Ground 3, Petitioners argue that claims 1, 3, 11-13, 19, 20, and 26 of the '304 Patent are obvious over Lisogurski and Tran. Pet., 57-67. Ground 3 is moot as to claims 1, 3, 11, 19, and 20 because these claims have been statutorily disclaimed. EX2038. For the reasons discussed below, Petitioners failed to meet their burden for claims 12, 13, and 26. *See* EX2031, ¶¶183-199.

Claim 12 recites "wherein the measurement system is at least in part configured for selection or identification of an object." EX1001, 38:20-32. Claim 26 recites, "wherein the wearable device is at least in part configured for selection or

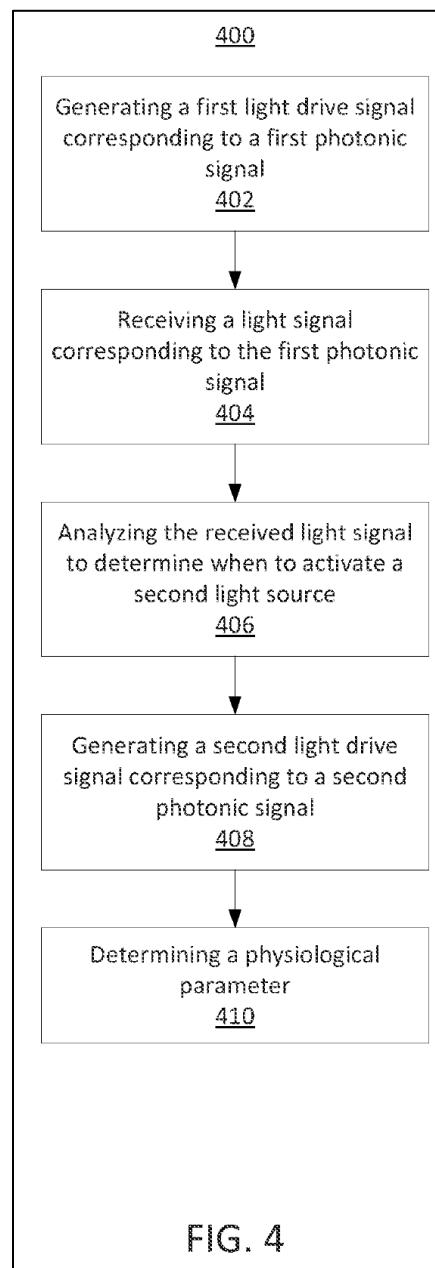
identification of an object.” EX1001, 40:26-38. As discussed above, the phrase “to identify an object” means “to recognize or establish an object as being a particular thing.” *Supra*, §V.B; EX1015, 8-10. Under the claim construction, there is a difference between identifying an object and detecting an object, the latter of which means “to discover or notice the existence or presence of something.” *Id.* To illustrate by way of example, a scale measures weight without identifying the object on the scale. As another example, a pH meter measures acidity without identifying which acids or bases are present.

The '304 Patent exemplifies identification through discrimination among multiple unknown constituents. To distinguish between blood constituents such as glucose, which has spectral features that may overlap with other blood constituents, the '304 Patent describes using “pattern matching algorithms and other software and mathematical methods to identify the blood constituents of interest.” EX1001, 4:58-62, 18:50-54, 35:17-44; EX2031, ¶193. It also describes “using a wider wavelength range and using more sampling wavelengths [to] improve the ability to discriminate one signal from another.” EX1001, 35:41-44; EX2031, ¶193. The identification is achieved via various signal processing techniques. EX1001, 35:23-26; EX2031, ¶194. “Various mathematical derivatives, including the first and second derivatives, may help to accentuate differences between spectra.” EX1001, 20:17-19; EX2031,

¶194. In addition, “the spectrum may be correlated with a library of known spectra to determine the overlap integrals.” EX1001, 35:20-21; EX2031, ¶194.

Based on the foregoing, a POSITA would understand that identification requires determining what the object is, not measuring an assumed object's parameters. EX2031, ¶¶191-92. This is what distinguishes identifying an object from merely detecting something or measuring a parameter of a presumed object. EX1015, 10; EX2031, ¶¶191-92. To identify an object, the system must determine what the object is, recognizing it as a particular thing. EX2031, ¶¶191-92. This is distinct from assuming an object and simply quantifying one of its attributes.

Lisogurski does not disclose identifying an object as claimed because measuring a known parameter does not meet the claim construction. EX2031, ¶¶195-97. Lisogurski's pulse oximeter measures oxygen saturation of hemoglobin—a known, presumed constituent—without identifying what blood constituents are present. *Id.* Lisogurski describes a pulse oximetry system that measures blood oxygen saturation. EX1025, 3:61-4:41; EX2031, ¶¶195-96. The system emits light at two wavelengths, detects the transmitted or reflected light, and calculates oxygen saturation based on the ratio of absorbed light with a detector. EX1025, 4:42-62, FIG. 4; EX2031, ¶195.



EX1025, FIG. 4

Lisogurski operates on the presupposition that hemoglobin is present. EX1025, 4:35-41; EX2031, ¶¶195-97. It uses known characteristics of that single constituent to estimate oxygen saturation. EX1025, 4:35-41; EX2031, ¶197.

Lisogurski does not disclose or suggest any step where the system attempts to determine the identity of a substance or object—it, at most, assumes the identity of the object from the outset. EX1025, 4:35-41; EX2031, ¶¶195-97.

The oximetry technique described in Lisogurski is not a blood identification technique. EX2031, ¶197. Oximetry exclusively focuses on one blood constituent, hemoglobin, and measuring the ratio of oxygenated and deoxygenated hemoglobin, without discriminating hemoglobin from other blood constituents. EX1025, 3:61-4:3; EX2031, ¶¶196-97. This technique applies pre-established assumptions that oxygenated and deoxygenated hemoglobin are inherently present in blood and that the absorbance of specific wavelengths has a mathematical correlation to blood oxygen saturation. EX2031, ¶¶196-98. An oximeter is configured to know what blood constituent it is measuring; it does not recognize or establish the identity of what it is measuring. *Id.*

Rather than addressing Lisogurski's disclosures, the Petition relies almost exclusively on the Board's remand decision concerning the related '484 Patent ("the '484-RFWD"). Pet., 65. Petitioners' reliance on the '484-RFWD is flawed for two reasons. First, the '484-RFWD is not final and does not have any preclusive effect because it is currently on appeal at the Federal Circuit. EX2012; *United Therapeutics Corp. v. Liquidia Techs., Inc.*, 74 F.4th 1360, 1372 (Fed. Cir. 2023) ("[A]n IPR decision does not have collateral estoppel effect until that decision is affirmed or the

parties waive their appeal rights"). The '484-RFWD does not obviate Petitioners' burden to prove that Lisogurski discloses this limitation under the claim construction in this proceeding.

Second, Petitioners fail to proffer adequate testimony from Dr. Anthony. Initially, Dr. Anthony includes the same quote from the '484-RFWD as the Petition. EX1003, ¶355 (quoting EX1016, 4-7); Pet., 65 (quoting same). Dr. Anthony then states that this finding "is consistent with my opinions regarding this '484 limitation, which I incorporate by reference as if fully set forth herein." EX1003, ¶355 (citing EX1010, ¶¶210-23). The Petition does not cite the relevant paragraphs of EX1010. *See, e.g.*, Pet., 65. The Petition and Dr. Anthony's attempted incorporation by reference of testimony from another proceeding is improper under the Board's rules. 37 C.F.R. § 42.6(a)(3); *Cisco Sys., Inc. v. C-Cation Techs., LLC*, IPR2014-00454, Paper 12 at 9-10 (PTAB Aug. 29, 2014) (informative) (finding that "citing the [expert] Declaration to support conclusory statements that are not otherwise supported in the Petition also amounts to incorporation by reference"); *3M Co. v. Evergreen Adhesives, Inc.*, 860 F. App'x 724, 728 (Fed. Cir. 2021) (finding that the Board did not abuse its discretion in disregarded incorporated by reference arguments).

In any event, Dr. Anthony's prior testimony concerning the '484 Patent does *not* support the Board's findings in the '484-RFWD that Petitioners rely on. In the

IPR for the '484 Patent, the Petitioner, Apple, initially argued that Lisogurski meets the “identify an object” requirement because it “can identify an object, such as an ear or a wrist, because it can distinguish when it has fallen off (probe off error).” EX1015, 50. Patent Owner proposed its claim construction for “identify an object” in its Patent Owner Response. *Id.* In its Reply, Apple abandoned its original theory and advanced a new theory attempting to address Patent Owner's construction. *Id.*, 51. After initially finding that Apple did not meet its burden (*id.*, 51-52), following remand from the Federal Circuit, the Board found in the '484-RFWD that “Lisogurski teaches identifying an object, i.e., the blood constituent oxyhemoglobin” (EX1016, 7).

Dr. Anthony's declaration for the '484 Patent only addresses Apple's original theory that Lisogurski identifies an object based on the “probe off error” feature and does *not* opine that Lisogurski identifies an object because it identifies the blood constituent oxyhemoglobin. EX1010, ¶¶220-222.¹ Petitioners do not rely on Apple's original “probe off error” theory in this IPR. Pet., 65. Petitioners failed to meet their burden because Dr. Anthony's testimony that merely quotes the '484-RFWD is insufficient to demonstrate unpatentability. *Alexsam, Inc. v. IDT Corp.*, 715 F.3d

¹ One of the issues in the appeal of the '484-RFWD is that Dr. Anthony's testimony did not support the Board's findings. EX2039, 20, 22-23.

1336, 1348 (Fed. Cir. 2013) (explaining that expert testimony is normally required “not only to explain what the prior-art references disclosed, but also to show that a person skilled in the art would have been motivated to combine them”); *see also Xerox Corp. v. Bytemark, Inc.*, IPR2022-00624, Paper 9 at 15-17 (PTAB Aug. 24, 2022) (precedential) (testimony restating “the petitioner’s arguments without any additional supporting evidence or reasoning” is accorded “little weight”).

For at least these reasons, Petitioners failed to meet their burden for Ground 3. One can measure the acidity of a solution without knowing the specific acids or basis present. One can measure the weight of an object without knowing what that object is. Similarly, one can measure the oxygen saturation of blood without identifying which components are present. Lisogurski performs parameter measurement, not object identification. EX2031, ¶¶195-198.

D. Ground 4: Obviousness Based on Lisogurski, LeBoeuf, and Tran (Claims 2, 4-6, 12-16, 21-22, 26-27)

In Ground 4, Petitioners argue that claims 2, 4-6, 12-16, 21-22, and 26-27 of the '304 Patent are obvious over Lisogurski, LeBoeuf, and Tran. Pet., 57-67. For at least the reasons discussed below, Petitioners fail to meet their burden. *See* EX2031, ¶¶200-202.

Ground 4 is similar to Grounds 2 and 3. Ground 4 is similar to Ground 2 except that Ground 4 further addresses claims 2, 4-6, 14-16, 21-22, and 27 in view

of Tran. Pet., 8. But, Ground 4 does not address the “reflective surface” limitations of claims 2, 14, 27 or the “arc” limitations claims 4-6, 15-16, and 21-22. Pet., 60-67; EX2031, ¶201. Thus, Ground 4 does not address the deficiencies discussed above regarding Lisogurski and LeBoeuf for Ground 2, much less rely upon Tran to cure those deficiencies. *Supra*, §VI.B.

Ground 4 is also similar to Ground 3 except that Ground 4 further addresses claims 12, 13, and 26 in view of LeBoeuf. Pet., 8. But, Ground 4 does not rely upon LeBoeuf for the “selection or identification of an object” limitation of claims 12, 13, and 26. Pet., 65-67; EX2031, ¶201. Thus, Ground 4 does not address the deficiencies discussed above regarding Lisogurski and Tran for Ground 3, much less rely upon LeBoeuf to cure those deficiencies. *Supra*, §VI.C.

E. Ground 5: Obviousness Based on Lisogurski and Carlson (Claims 1, 3, 11, 19, 20)

In Ground 5, Petitioners argue that claims 1, 3, 11, 19, and 20 of the '304 Patent are obvious over Lisogurski and Carlson. Pet., 68-74. Ground 5 is moot because claims 1, 3, 11, 19, and 20 have been statutorily disclaimed. Ex. 2038.

F. Ground 6: Obviousness Based on Lisogurski, LeBoeuf, and Carlson (Claims 2, 4-6, 14-16, 21-22, 27)

In Ground 6, Petitioners argue that claims 2, 4-6, 14-16, 21-22, and 27 of the '304 Patent are obvious over Lisogurski, LeBoeuf, and Carlson. Pet., 68-74.

Ground 6 is similar to Ground 2 except that Ground 6 relies on Carlson in

connection with limitations [1.c], [11.c], and [19.c] and “the ‘pulse rate’ limitations” of claims 13 and 20. Pet., 72-74; EX2031, ¶206. Because Ground 6 does not address the deficiencies in Lisogurski and LeBoeuf discussed above for Ground 2, Petitioners failed to meet their burden for Ground 6 for at least the same reasons as Ground 2. *Supra*, §VI.B.; *see* EX2031, ¶¶205-207.

G. Ground 7: Obviousness Based on Lisogurski, Tran, and Carlson (Claims 1, 3, 11-13, 19, 20, 26)

In Ground 7, Petitioners argue that claims 1, 3, 11-13, 19, 20, and 26 of the '304 Patent are obvious over Lisogurski, Tran, and Carlson. Pet., 68-74. Ground 7 is moot as to claims 1, 3, 11, 19, and 20 because these claims have been statutorily disclaimed. Ex. 2038.

As to claims 12, 13, and 26, Ground 7 is similar to Ground 3 except that Ground 7 relies on Carlson in connection with limitations [1.c], [11.c], and [19.c] and “the ‘pulse rate’ limitations” of claims 13 and 20. Pet., 72-74; EX2031, ¶210. Because Ground 7 does not address the deficiencies in Lisogurski and Tran discussed above for Ground 3, Petitioners failed to meet their burden for Ground 7 for at least the same reasons as Ground 3. *Supra*, §VI.C.; *see* EX2031, ¶¶208-211.

H. Ground 8: Obviousness Based on Lisogurski, LeBoeuf, Tran, and Carlson (Claims 2, 4-6, 12-16, 21-22, 26-27)

In Ground 8, Petitioners argue that claims 2, 4-6, 12-16, 21-22, and 26-27 of the '304 Patent are obvious over Lisogurski, LeBoeuf, Tran, and Carlson. Pet., 68-

74. Ground 8 is similar to Ground 4 except that Ground 8 further addresses claims 2, 4-6, 12-16, 21-22, and 26-27 in view of Carlson. Pet., 8. Specifically, Ground 8 addresses limitations [1.c], [11.c], and [19.c] and “the ‘pulse rate’ limitations” of claims 13 and 20. Pet., 72-74; EX2031, ¶213. Because Ground 8 does not address the deficiencies in Lisogurski, LeBoeuf, and Tran discussed above for Ground 4, Petitioners failed to meet their burden for Ground 8 for at least the same reasons as Ground 4. *Supra*, §§VI.B., VI.C., VI.D.; *see* EX2031, ¶¶212-214.

I. Ground 9: Obviousness Based on Lisogurski, Tran, and Marbach (Claims 1, 3, 11-13, 19, 20, 26)

In Ground 9, Petitioners argue that claims 1, 3, 11-13, 19, 20, and 26 of the '304 Patent are obvious over Lisogurski, Tran, and Marbach. Pet., 74-77. Ground 9 is moot as to claims 1, 3, 11, 19, and 20 because these claims have been statutorily disclaimed. Ex. 2038.

As to claims 12, 13, and 26, Ground 9 is similar to Ground 3 except that Ground 9 attempts to address the “regression signal processing methodologies or multivariate techniques” limitations of claims 12, 13, and 26 using Marbach. Pet., 74-77; EX2031, ¶217. Because Ground 9 does not address the deficiencies in Lisogurski and Tran discussed above for Ground 3, Petitioners failed to meet their burden for Ground 9 for at least the same reasons as Ground 3. *Supra*, §VI.C.; *see* EX2031, ¶¶215-218.

J. Ground 10: Obviousness Based on Lisogurski, Tran, Carlson, and Marbach (Claims 1, 3, 11-13, 19, 20, 26)

In Ground 10, Petitioners argue that claims 1, 3, 11-13, 19, 20, and 26 of the '304 Patent are obvious over Lisogurski, Tran, Carlson, and Marbach. Pet., 74-77. Ground 10 is moot as to claims 1, 3, 11, 19, and 20 because these claims have been statutorily disclaimed. Ex. 2038. As to the remaining claims 12, 13, and 26, Ground 10 is similar to Ground 7 except that Ground 10 further addresses claims 12, 13, and 26 using Marbach. Pet., 8. Specifically, Ground 10 addresses the “regression signal processing methodologies or multivariate techniques” limitations of claims 12, 13, and 26. Pet., 74-77; EX2031, ¶221. Because Ground 10 does not address the deficiencies in Lisogurski, Tran, and Carlson discussed above for Ground 7, Petitioners failed to meet their burden for Ground 10 for at least the same reasons as Ground 7. *Supra*, §§VI.C., VI.G.; *see* EX2031, ¶¶219-222.

VII. CONCLUSION

For at least the foregoing reasons, the Petition should be denied as to each of the requested grounds. For brevity, Patent Owner may not have addressed all characterizations of the applied references and the challenged claims and reserves the right to do so should institution be granted. The absence of a response by Patent Owner to any of the positions presented in the Petition or the associated expert declaration is not a concession to those positions. The fact that Patent Owner's

Preliminary Response has focused on particular arguments is not a concession that there are no other arguments for patentability of the challenged claims.

Respectfully submitted,

Dated: November 12, 2025

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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 Preliminary Response is produced using a 14-point Times New Roman font and contains approximately 9,377 words, which is less than the 14,000 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 November 12, 2025.

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 Preliminary Response** was served on November 12, 2025, by email:

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