

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.

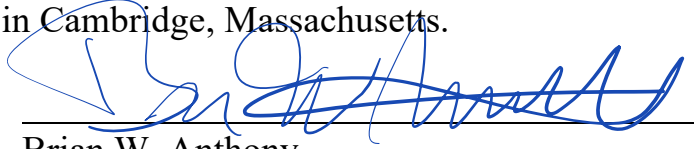
OMNI MEDSCI, INC.,

Patent Owner.

Case IPR2025-01251
Patent No. 10,874,304

**DECLARATION OF BRIAN W. ANTHONY IN SUPPORT
OF PETITIONERS' REPLY TO PATENT OWNER'S RESPONSE**

Executed this 30th day of July 2026, in Cambridge, Massachusetts.



Brian W. Anthony

Declaration of Brian Anthony in Support of Petitioners’ Reply
to Patent Owner’s Response, U.S. Patent No. 10,874,304 (IPR2025-01251)

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Table of Exhibits

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1001	U.S. Patent No. 10,874,304 (“’304”)
1002	File History of U.S. Application No. 16/669,794 (“’304FH”)
1003	Declaration of Brian Anthony in Support of Petition for <i>Inter Partes</i> Review of U.S. Patent No. 10,874,304 (“Anthony”)
1004	Declaration of Brian Anthony in Support of Petition for <i>Inter Partes</i> Review of U.S. Patent No. 9,651,533 submitted in IPR2019-00916, Ex.1003 (“’533-Anthony”)
1005	<i>Apple Inc. v. Omni Medsci, Inc.</i> , No. IPR2019-00916, Paper 1 (P.T.A.B. Apr. 10, 2019) (“’533-Pet.”)
1007	<i>Apple Inc. v. Omni Medsci, Inc.</i> , No. IPR2019-00916, Paper 16 (P.T.A.B. Oct. 18, 2019) (“’533-Inst.”)
1008	<i>Apple Inc. v. Omni Medsci, Inc.</i> , No. IPR2019-00916, Paper 39 (P.T.A.B. Oct. 14, 2020) (“’533-FWD”)
1009	<i>Omni MedSci, Inc. v. Apple Inc.</i> , No. 2021-1229, 2022 WL 2062168 (Fed. Cir. June 8, 2022)
1010	Declaration of Brian Anthony in Support of Petition for <i>Inter Partes</i> Review of U.S. Patent No. 10,517,484 submitted in IPR2021-00453, Ex.1003 (“’484-Anthony”)
1011	<i>Apple Inc. v. Omni Medsci, Inc.</i> , No. IPR2021-00453, Paper 1 (P.T.A.B. Jan. 22, 2021) (“’484-Pet.”)
1013	<i>Apple Inc. v. Omni Medsci, Inc.</i> , No. IPR2021-00453, Paper 7 (P.T.A.B. Aug. 6, 2021) (“’484-Inst.”)

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1014	<i>Apple Inc. v. Omni Medsci, Inc.</i> , No. IPR2021-00453, Paper 11 (P.T.A.B. Feb. 4, 2022) (“484-Pet.-Reply”)
1015	<i>Apple Inc. v. Omni Medsci, Inc.</i> , No. IPR2021-00453, Paper 22 (P.T.A.B. Aug. 3, 2022) (“484-FWD”)
1016	<i>Apple Inc. v. Omni Medsci, Inc.</i> , No. IPR2021-00453, Paper 26 (P.T.A.B. Feb. 14, 2025) (“484-RFWD”)
1017	<i>Apple Inc. v. Omni MedSci, Inc.</i> , No. 2023-1034, 2024 WL 3084509 (Fed. Cir. June 21, 2024), ECF No. 44
1018	<i>Omni MedSci, Inc. v. Apple Inc.</i> , 2:18-cv-00134-RWS, Dkt. No. 211 (E.D. Tex. June 24, 2019) (“CC Order”)
1019	<i>Omni MedSci, Inc. v. Apple Inc.</i> , 2:18-cv-00429-RWS, Dkt. No. 152 (E.D. Tex. Aug. 14, 2019)
1023	Defendants' Supplemental Invalidity and Subject Matter Eligibility Contentions, July 18, 2025. <i>Omni MedSci, Inc. v. Samsung Electronics Co., Ltd. et al.</i> , No. 2:24-cv-01070-JRG-RSP (E.D. Tex.).
1025	U.S. Patent No. 9,241,676 (“Lisogurski”)
1026	U.S. Patent Pub. No. 2010/0217102 (“LeBoeuf”)
1027	U.S. Patent No. 8,108,036 (“Tran”)
1028	U.S. Patent Pub. No. 2005/0049468 (“Carlson”)
1029	U.S. Patent No. 7,139,076 (“Marbach”)
1031	U.S. Patent No. 8,050,730 (“Zhang”)
1032	U.S. Patent No. 8,821,397 (“Al-Ali”)
1033	U.S. Patent Pub. No. 2011/0237911 (“Lamego”)

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Exhibit No.	DESCRIPTION
1034	U.S. Patent No. 5,942,749 ("Takeuchi")
1035	U.S. Patent No. 5,822,473 ("Magel")
1036	US Patent 5,592,124 ("Mullins")
1037	E.F. Schubert, Light-Emitting Diodes (Cambridge Univ. Press, 2nd ed. reprinted 2014)
1038	Joseph D. Bronzino, "The Biomedical Engineering Handbook," (1995)
1039	U.S. Patent No. 8,079,735 ("Vakil")
1041	U.S. Patent Pub. No. 2012/0197093 ("Valencell-093")
1042	U.S. Patent No. 8,862,196 ("Lynn")
1043	U.S. Patent No. 8,412,655 ("Colman")
1044	U.S. Patent No. 5,511,553 ("Segalowitz")
1045	U.S. Patent No. 6,801,799 ("Mendelson")
1046	U.S. Patent No. 6,662,033 ("Casciani")
1048	U.S. Pat. No. 9,239,951 ("Hoffberg")
1049	U.S. Pat. Pub. 2007/0194939("Alvarez")
1051	U.S. Patent No. 6,931,269 ("Terry")
1059	U.S. Patent No. 5,497,769 ("Gratton")
1060	U.S. Patent No. 5,827,182 ("Raley")
1061	U.S. Patent No. 7,764,982 ("Dalke")

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1062	U.S. Patent No. 6,343,223 ("Chin")
1063	W.O. Patent Pub. No. 2000/013003 ("Colvin")
1064	U.S. Patent No. 5,554,273 ("Demmin")
1065	U.S. Patent No. 5,953,713 ("Behbehani")
1066	U.S. Patent No. 6,587,704 ("Fine")
1067	U.S. Patent No. 6,397,092 ("Norris")
1068	U.S. Patent No. 5,360,004 ("Purdy")
1077	U.S. Patent Publication No. 2006/0184040 ("Keller")
1081	US. Patent No. 9,651,533 ("533")
1082	U.S. Patent No. 10,517,484 ("484")
1083	Declaration of Brian Anthony in Support of Petition for Inter Partes Review of U.S. Patent No. 9,861,286 submitted in IPR2019-00914, Ex.1003
1085	<i>Apple Inc. v. Omni Medsci, Inc.</i> , No. IPR2019-00916, Paper 10 (P.T.A.B. July. 22, 2019) ("533-POPR")
1122	Claim Construction Order, <i>Omni MedSci, Inc. v. Samsung Electronics Co., Ltd. et al.</i> , No. 2:24-cv-01070-JRG-RSP, Dkt. No. 154 (E.D. Tex. Mar. 24, 2026)
1127	Transcript of July 16, 2026 Deposition of Dr. Igor Efimov [CONFIDENTIAL]
1128	Transcript of July 23, 2026 Deposition of Dr. Mohammed Islam
1140	Plaintiff's Disclosure of Asserted Claims and Infringement Contentions, Mar. 12, 2025, Ex.04_P.R. 3-1 Chart US10517484 Samsung Watch. <i>Omni MedSci, Inc. v.</i>

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Exhibit No.	DESCRIPTION
	<i>Samsung Electronics Co., Ltd. et al.</i> , No. 2:24-cv-01070-JRG-RSP (E.D. Tex.).

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TABLE OF ABBREVIATIONS

Exhibit No.	DESCRIPTION
'304	U.S. Patent No. 10,874,304 (Ex. 1001)
Claims / Challenged Claims	Claims 1-6, 11-16, 19-22, 26-27 of the '304
IPR	<i>Inter Partes</i> Review
Petitioners	Petitioners 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.
PO	Patent Owner Omni MedSci, Inc.
POSITA	Person of Ordinary Skill in the Art
Board	Patent Trial and Appeal Board
Pet.	<i>Samsung Electronics Co., Ltd. et al. v. Omni MedSci, Inc.</i> , No. IPR2025-01251, Pap. 1 (PTAB Aug. 5, 2025)
POR	<i>Samsung Electronics Co., Ltd. et al. v. Omni MedSci, Inc.</i> , No. IPR2025-01251, Pap. 28 (PTAB May 7, 2026)
'533	U.S. Patent No. 9,651,533 (Ex. 1081)
'484	U.S. Patent No. 10,517,484 (Ex. 1082)
'533-FWD	<i>Apple Inc. v. Omni Medsci, Inc.</i> , No. IPR2019-00916, Paper 39 (PTAB Oct. 14, 2020) (Ex. 1008)
'484-FWD	<i>Apple Inc. v. Omni Medsci, Inc.</i> , No. IPR2021-00453, Paper 22 (PTAB Aug. 3, 2022) (Ex. 1015)
'484-RFWD	<i>Apple Inc. v. Omni Medsci, Inc.</i> , No. IPR2021-00453, Paper 26 (P.T.A.B. Feb. 14, 2025) (Ex. 1016)

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Exhibit No.	DESCRIPTION
Prior FWDs	'533-FWD, '484-FWD, and '484-RFWD (Exs. 1008 & 1015-1016)
Prior IPRs	<i>Apple Inc. v. Omni Medsci, Inc.</i> , No. IPR2019-00916 (PTAB) and <i>Apple Inc. v. Omni Medsci, Inc.</i> , No. IPR2021-00453 (PTAB)
Texas Case	<i>Omni MedSci, Inc. v. Samsung Electronics Co., Ltd. et al.</i> , No. 2:24-cv-01070-JRG-RSP (E.D. Tex.)
Related EDTX Cases	<i>Omni MedSci, Inc. v. Apple Inc.</i> , 2:18-cv-00134-RWS (E.D. Tex.) <i>Omni MedSci, Inc. v. Apple Inc.</i> , 2:18-cv-00429-RWS (E.D. Tex.)
Lisogurski	U.S. Patent No. 9,241,676 (Ex. 1025)
LeBoeuf	U.S. Patent Pub. No. 2010/0217102 (Ex. 1026)
Tran	U.S. Patent No. US 8,108,036 (Ex. 1027)
Carlson	U.S. Patent Pub. No. 2005/0049468 (Ex. 1028)
Marbach	U.S. Patent No. 7,139,076 (Ex. 1029)

I. INTRODUCTION

1. I am the same Brian W. Anthony who provided a declaration for this matter executed on August 5, 2025 ("Declaration") (Ex. 1003, "Anthony").

2. As part of my work in this proceeding, I have been asked by Petitioners to respond to certain assertions offered by Omni MedSci, Inc. ("Omni" or "Patent Owner") in IPR2025-01251 ("IPR") regarding U.S. Patent No. 10,874,304 ("the '304 patent" or "'304").

3. My experience, qualifications, and compensation are provided in my August 5, 2025 Declaration and **Appendix A** thereto. Anthony, ¶¶14, 16-24, Appendix A. In this Reply Declaration, I have been asked to respond to certain assertions raised by Omni in its Patent Owner's Response ("POR") (Paper 28) and by Igor Efimov, Ph.D., in his supporting declaration (Ex. 2043 ("Efimov")).

4. I understand that, in this proceeding, the Board has instituted *Inter Partes* Review proceedings of claims 1-6, 11-16, 19-22, 26-27 as anticipated and/or rendered obvious based on all Grounds (Grounds 1-10) set forth in my prior Declaration. Anthony, ¶¶71-407. I also understand that, subsequent to the Board's institution of the IPR, Patent Owner disclaimed claims 1-3, 11, 14, 19-20, 25, and 27, such that claims 4-6, 12-13, 15-16, 21-22, and 26 ("Challenged Claims" or "Claims") remain in this proceeding. Ex. 2038; Ex. 2042.

5. In reaching the conclusions described in this Reply Declaration, I have relied on the documents and materials cited herein as well as those cited within and identified in my prior Declaration (*see* Anthony, ¶¶15, Appendix B). A complete listing of all materials on which I have relied upon or considered in formulating my opinions is included in Appendix A attached hereto. The materials that I have relied upon in this Reply Declaration and in my prior Declaration are the types of materials on which experts in the relevant field of art would reasonably rely in forming an opinion on the subject.

6. In formulating the opinions set forth in this Reply Declaration, I have also relied upon the legal understandings set forth in my prior Declaration. *See* Anthony, ¶¶25-39. My opinions are also based upon my education, training, research, knowledge, and personal and professional experience.

II. LEVEL OF ORDINARY SKILL IN THE ART

7. In my August 5, 2025 Declaration, I opined that on or before December 31, 2012, a person of ordinary skill in the art (“POSITA”) relating to the technology of the '304 patent “would have had a good working knowledge of optical sensing techniques and their applications, and some familiarity with optical system design and signal processing techniques. That knowledge would have been gained via an undergraduate education in engineering (electrical, mechanical, biomedical or optical) or a related field of study, along with relevant experience in studying or

Declaration of Brian Anthony in Support of Petitioners' Reply to Patent Owner's Response, U.S. Patent No. 10,874,304 (IPR2025-01251) developing physiological monitoring devices (e.g., non-invasive optical biosensors) in industry or academia. This description is approximate; varying combinations of education and practical experience also would be sufficient." Anthony, ¶¶49-52. Patent Owner and Dr. Efimov applied the same definition in their analyses (Efimov, ¶¶50-53; POR, 6), and I continue to apply that definition here.

III. CLAIM CONSTRUCTION

8. I was instructed by counsel to apply certain constructions in providing my opinions in the Declaration, including for the "light source" and "identification of an object" limitations that the Board previously construed. Anthony, ¶¶54-55. I understand that the Board has already found those limitations met by Lisogurski under its construction in the prior '533 and '484 IPRs. Anthony, ¶¶112-113, 355-356. Consistent with the Board's decision, and as I explained in my Declaration as detailed below, it is my opinion that the "light source" and "identification of an object" limitations are met by Lisogurski under the Board's construction. Anthony, ¶¶54-55.

9. I understand that, after I submitted my August 5, 2025 Declaration, the Court in *Omni MedSci, Inc. v. Samsung Electronics Co., Ltd. et al.*, No. 2:24-cv-01070-JRG-RSP (E.D. Tex.) ("Texas Case") issued an order construing certain claim terms. Ex. 1122. I have reviewed each of these constructions, and applying those

Declaration of Brian Anthony in Support of Petitioners' Reply to Patent Owner's Response, U.S. Patent No. 10,874,304 (IPR2025-01251) constructions has no impact on my opinions set forth in my Declaration or in this Reply Declaration, except as otherwise set forth in this Reply Declaration.

10. For example, in the parallel Texas Case, the court construed the modulation limitations in Claim 19 (“modulating at least one of the semiconductor sources” and “synchronize to the modulation”) as “[vary/varying/the varying of] the amplitude, frequency, or phase of the light produced.” Ex. 1122, 10-14, 18. I also understand that, in the parallel Texas Case, the Petitioners had proposed the Board’s prior construction: “varying the amplitude, frequency, or phase of the light produced by at least one of the LEDs *to include information*,” which is narrower than the construction adopted by the court because it includes the additional requirement that the light is varied to include information. Anthony, ¶55; Ex. 1122, 10-14. As I had explained in my Declaration, the modulation limitations are met by Lisogurski under the narrower prior Board construction. Anthony, ¶¶224-225, 234. Lisogurski therefore also meets the modulation limitations under the broader construction adopted by the court in the parallel Texas Case, which only requires that the semiconductor sources vary the amplitude, frequency, or phase of the light produced. Accordingly, either construction may be used and the limitation would still be met by Lisogurski.

11. Further, I understand that the parties in the parallel Texas Case agreed to construe “beam” as “photons or light transmitted to a particular location in space,”

Declaration of Brian Anthony in Support of Petitioners' Reply to Patent Owner's Response, U.S. Patent No. 10,874,304 (IPR2025-01251) which is consistent with the construction I applied in my Declaration. Ex. 2047, 7-12; Anthony, ¶¶64. As I explained in my Declaration, Lisogurski meets the "beam" limitations and my opinion remains the same. Anthony, ¶¶112-113, 124-126.

12. Dr. Efimov and Patent Owner applied the Board's previous construction of "identification of an object," and Dr. Efimov applied the court's construction for "modulating" and "beam" terms, but otherwise does not challenge that those limitations are met by the prior art, or that any other construction is needed. Efimov, ¶¶72-73, 75; POR, 12-16.

IV. GROUNDS OF UNPATENTABILITY

13. I note that Patent Owner's and Dr. Efimov's challenges to the asserted prior-art Grounds are limited to the issues addressed in the following sections. With respect to the remaining claims and Grounds, Patent Owner and Dr. Efimov rely on the same, but no additional, arguments. *See* POR, 22-23, 36, 52-55, 58; Efimov, ¶¶91-96, 149-152, 179-198, 210-213. Accordingly, those arguments fail as to the remaining claims and Grounds for the same reasons discussed below.

A. LISOGURSKI DISCLOSES AND RENDERS OBVIOUS CLAIMS 1, 3, 11, 19, 20

14. In my Declaration, I explained that Lisogurski anticipates and renders obvious all limitations of claims 1, 3, 11, 19, and 20 challenged in Ground 1. Anthony, ¶¶108-259. I understand that Patent Owner has statutorily disclaimed all of the claims 1, 3, 11, 19, and 20 challenged in Ground 1. Nonetheless, it still

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15. Additionally, Patent Owner and Dr. Efimov argue that independent claims 1, 11, and 19 challenged in Ground 1 contain limitations not addressed in either of the prior '533 or '484 IPRs. Efimov, ¶¶91; POR, 18-19. However, the limitations to which Dr. Efimov points (“an output signal representing...a non-invasive measurement on blood contained within the sample” and “the captured light including...the input optical beam reflected from the tissue”) were at least partially addressed by the Board in the prior proceedings, and the remaining portions of those limitations are disclosed by, and at least rendered obvious by, Lisogurski, as I discussed in my Declaration. Anthony, ¶¶133-136, 151, 230. Further, in the '484-FWD, the Board already found that the “increasing the signal-to-noise ratio by increasing a light intensity relative to an initial light intensity” limitation was taught by Lisogurski, as I explained in my Declaration. Anthony, ¶¶114-116. I note that Patent Owner and Dr. Efimov do not dispute my opinion regarding those limitations set forth in my Declaration. Efimov, ¶¶91; POR, 19-20. I also note that, for claim limitations that are identical or substantially identical to the limitations addressed in the prior '533 and '484 IPRs, my Declaration explains why my prior opinions remain applicable in this proceeding, why I agree with the Board's analyses, and why any

Declaration of Brian Anthony in Support of Petitioners' Reply to Patent Owner's Response, U.S. Patent No. 10,874,304 (IPR2025-01251) differences in claim language do not alter my conclusions. *See e.g.*, Anthony, ¶¶110, 112-117, 122-123, 125-127, 130, 132.

B. LISOGURSKI IN VIEW OF LEBOEUF RENDERS OBVIOUS REFLECTIVE SURFACE (CLAIMS 2, 14, AND 27)

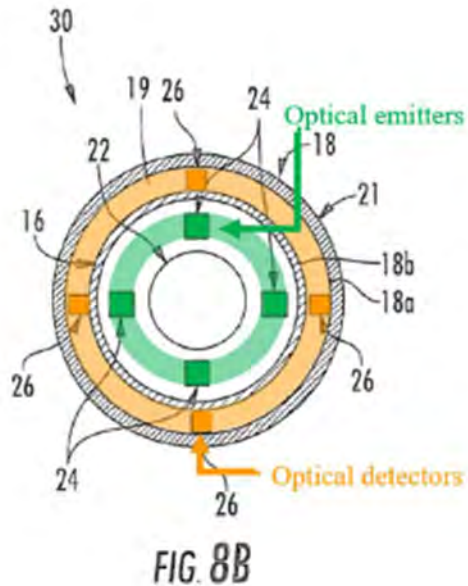
16. I understand that Patent Owner has disclaimed claims 2, 14 and 27 of the '304 patent. While Patent Owner appears to contend that Lisogurski in view of LeBoeuf does not render obvious reflective surface limitations, Patent Owner provides no supporting argument. POR, 22-23. Dr. Efimov likewise does not offer any opinion for those claims in connection with Ground 2. Efimov, ¶93.

17. For the reasons detailed in my Declaration, it is my opinion that claims 2, 14 and 27 of the '304 patent (including the reflective surface limitations) are rendered obvious by Lisogurski in view of LeBoeuf. Anthony, ¶¶269-274, 290-293, 314-317.

C. LISOGURSKI IN VIEW OF LEBOEUF RENDERS OBVIOUS THE ARC LIMITATIONS (CLAIMS 4-6, 15-16, 21-22)

18. As I explained in my Declaration, Lisogurski in view of LeBoeuf renders obvious the arc limitations, satisfying “wherein 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” (Claims 4, 15, 21), “wherein the first arc is offset from the second arc” (Claims 5, 15, 21), and “wherein the first arc and the second arc are concentric” (Claims 6, 16, 22). Anthony, ¶¶260, 278-279,

Declaration of Brian Anthony in Support of Petitioners' Reply to Patent Owner's Response, U.S. Patent No. 10,874,304 (IPR2025-01251) 282-289, 294-313. Indeed, LeBoeuf explicitly discloses concentric arc arrangements for optical emitters (e.g., LEDs) and detectors:



Ex. 1026 (LeBoeuf), Fig. 8B (annotated).

19. Patent Owner and Dr. Efimov's focus on Lisogurski is misplaced—as I had explained in my Declaration, it is Lisogurski in view of LeBoeuf, in which LeBoeuf's teachings of arranging emitters and detectors along arcs is applied to Lisogurski's detector 140 coupled to front end processing circuitry 150, that renders obvious the arc limitations. Anthony, ¶¶260, 278-279; *see* Efimov, ¶¶97-100; POR, 23-24. Additionally, as I explain both in my Declaration and below, and contrary to Dr. Efimov's arguments, a person of ordinary skill in the art would have been motivated to apply LeBoeuf's arc arrangements teaching to Lisogurski to maximize

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the light signals detected and to improve the accuracy of the measurements.
Anthony, ¶¶261-264.

20. In this regard, I disagree that I provided non-responsive testimony during my deposition. POR, 23-24, n.2. Instead, in the context of Ground 2 (Lisogurski in view of LeBoeuf), I testified that "LeBoeuf teaches an arc arrangement" and made clear that I relied on "the combination of Lisogurski and LeBoeuf" in forming my opinion. Ex. 2045, 161:11-23.

21. Regarding the motivation to combine Lisogurski and LeBoeuf, my Declaration provided more than just a "generic motivation" (Efimov, ¶¶108-111) for applying LeBoeuf's arc arrangement teachings to Lisogurski. My motivation-to-combine analysis was based on the disclosures of the references themselves and the knowledge of a person of ordinary skill in the art regarding the behavior of light in biological tissue. As I had explained in my Declaration, Lisogurski discloses a physiological-monitoring device that emits light into biological tissue and detects reflected light, while LeBoeuf teaches detector arrangements positioned along arcs. Anthony, ¶¶262-263; Lisogurski, 11:9-27; LeBoeuf, Fig. 8B. As further explained in my Declaration, a person of ordinary skill in the art 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 and locations. Anthony, ¶¶262-263. Arranging optical emitters in an arc increases the amount of

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light on an area of interest, so arranging optical emitters in an arc would increase both the area over which the measurement is performed and the amount of signals which enter and exit the tissue, thus improving the measurement accuracy by increasing the reflected signals captured and reducing the effects of irregularities in the tissue on the resulting measurements. Anthony, ¶¶262-264, 280; Mendelson, 4:14-65 (explaining that such configurations “maximize the detection of backscattered light from the skin and minimize differences from local tissue inhomogeneity”). A person of ordinary skill in the art would also have understood that arranging detectors in an arc would increase the area over which light is detected after it exits the skin, and thus would have been motivated to apply LeBoeuf's teachings of detectors arranged along an arc to improve the detection of scattered light from biological tissue and in turn increase the signal-to-noise ratio of Lisogurski's wearable device. Anthony, ¶¶262-263; Mendelson, 4:14-65.

22. Patent Owner and Dr. Efimov also misunderstand my discussion of reasonable expectation of success in applying LeBoeuf's arc arrangement teachings to Lisogurski as motivation to combine. Efimov, ¶118 (citing Anthony, 262); POR, 26-27. My discussion in those sections was instead intended to demonstrate that there would have been a reasonable expectation of success due to the similarities between Lisogurski's wearable physiological sensors and LeBoeuf's earbuds which also perform physiological measurements. Anthony, ¶¶262, 264. Regardless, the

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similarities between Lisogurski and LeBoeuf—including their intended use—confirm my opinion that a person of ordinary skill in the art would have been motivated to apply LeBoeuf's arc arrangement teachings to Lisogurski for increased accuracy in measurements.

23. Though Patent Owner and Dr. Efimov argue that neither Lisogurski nor LeBoeuf provides the motivation to combine because they do not recite an arc arrangement (Efimov, ¶¶112-113; POR 23-25), my opinions are based on what a person of ordinary skill in the art would have understood or been motivated to do based on Lisogurski's and LeBoeuf's disclosures as a whole, which includes more than just the text of those references. For example, as I explained in my Declaration and as I testified during my deposition, Fig. 8B of LeBoeuf discloses both LEDs and photodetectors arranged in arcs and Mendelson, which reflects the knowledge of a person of ordinary skill in the art, demonstrates that it was known that configurations such as LEDs and photodetectors arranged in arcs would increase the accuracy of a measurement. Anthony, ¶¶260-263, 278-279; Ex. 2045, 189:15-20, 191:16-192:8, 193:7-194:20, 203:20-25; *see also* LeBoeuf, Fig. 8B, [0123].

24. Specifically, Mendelson discusses “backscattered light,” and a person of ordinary skill in the art would have understood that “backscattered” means that the light scatters when exiting the skin at a various angles such that an arc arrangement would increase the area covered by the detectors, maximizing the

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fraction of backscattered light collected. Anthony, ¶¶260-263; *see also* Mendelson, 4:14-65. Although, as Patent Owner and Dr. Efimov note (Efimov, ¶¶123, 125; POR, 27-28), Mendelson does not explicitly recite the term “angle,” a person of ordinary skill in the art would have understood that “backscattered” indicates that the light is exiting the skin at various angles. Backscattering describes light that has undergone multiple scattering events within the tissue and re-emerges through the surface it entered. Because each scattering event randomizes the direction of propagation, the re-emerging light is distributed over a range of exit angles and exit locations rather than returning along the incident path, which is why increasing the area over which light is collected increases the collected fraction. *Id.* Mendelson connects this directly to arc arrangements, explaining that “[a]nother approach is based on the use of a sensor having six photodiodes arranged symmetrically around the LEDs ... in order to maximize the fraction of backscattered light collected by the sensor.” Mendelson, 4:14-29.

25. Dr. Efimov argues that I misquoted certain disclosures in Mendelson (Efimov, ¶128). I did not. Dr. Efimov himself mischaracterizes the discussion by citing a configuration described in a later section of Mendelson to argue that the arc configuration is unrelated to the backscattered-light discussion. Efimov, ¶128. Dr. Efimov is incorrect, and his discussion omits relevant portions of Mendelson. For example, my Declaration cited to 4:14-29 of Mendelson—4:14-16 that Dr. Efimov

Declaration of Brian Anthony in Support of Petitioners' Reply to Patent Owner's Response, U.S. Patent No. 10,874,304 (IPR2025-01251) omitted teaches "a sensor having six photodiodes arranged symmetrically around the LEDs." Anthony, ¶263 (citing Mendelson 4:14-65). In discussing the same approach, Mendelson confirms that such a configuration "essentially creates a large area photodetector" in order "to maximize the fraction of backscattered light collected by the sensor." Mendelson, 4:23-27; Anthony, ¶263 (citing Mendelson 4:14-65). Contrary to Dr. Efimov's objection that these two passages of Mendelson are separate and unrelated, Mendelson explicitly states that these passages are related to the same "approach" and discuss the same design principle—distributing optical emitters and detectors in arc arrangements rather than clustering them. Mendelson, 4:14-65; Ex. 2045, 203:4-8, 203:20-25.

26. Notably, Patent Owner and Dr. Efimov do not disagree that Mendelson provides the motivation to arrange detectors in arc. Patent Owner and Dr. Efimov, however, assert that Mendelson does not show an arc arrangement of LEDs—based on that incorrect assumption, Patent Owner and Dr. Efimov opine that any motivation Mendelson may provide is restricted to detectors and thus not applicable to LeBoeuf disclosing arc arrangements for both LEDs and detectors. Efimov, ¶¶116-117, 124-126; POR, 26. I disagree—Mendelson teaches and provides motivation to arrange both LEDs and detectors along arcs. Mendelson, 4:14-65; Anthony, ¶¶260-263. For example, Patent Owner and Dr. Efimov ignore Mendelson's teaching where "four R and four IR LEDs are spaced at 90-degree

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intervals around the substrate and at an equal radial distance from the photodiode,” which describes LEDs positioned along a circular arc, improving accuracy by increasing the surface area of the subject's tissue exposed to the emitted light and which is similar to in LeBoeuf's Fig. 8B. Mendelson, 4:36-44. Four emitters at an equal radial distance and 90-degree spacing lie on a common circle, and a person of ordinary skill in the art would therefore have understood Mendelson to describe emitters positioned along a circular arc. Ex. 2045, 201:24-202:3. Mendelson therefore describes LEDs positioned along an arc (Mendelson, 4:36-44), in addition to surrounding the LEDs with photodetectors in an arc arrangement (Mendelson, 4:14-65)—the same arc arrangements depicted in LeBoeuf's Fig. 8B. Similar to my discussion above, Mendelson also teaches that this “radially-symmetric photodetector array can help to maximize the detection of backscattered light from the skin and minimize differences from local tissue inhomogeneity,” which thus also teaches that LeBoeuf's Fig. 8B configuration allows improving the accuracy of measurements through the improved detection of backscattered light and increased area of measurement to increase signals detected and decrease errors resulting from irregularities in the tissue. Mendelson, 4:14-65. Thus, as I discussed above, a person of ordinary skill in the art would have been motivated to arrange Lisogurski's LEDs and detectors in arcs as taught by LeBoeuf's Fig. 8B configuration to increase both the amount of light directed to an area of interest and to increase the signals detected

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from the scattered reflected light from the areas of interest, which in turn increases the accuracy of the resulting measurements. Anthony, ¶¶263-264; *see also* Lisogurski, 11:16-20 (“The light intensity may be directly related to the absorbance and/or reflectance of light in the tissue. That is, when more light at a certain wavelength is absorbed or reflected, less light of that wavelength is received from the tissue by detector 140”).

27. Additionally, contrary to Patent Owner's and Dr. Efimov's argument that the cited portions of Mendelson do not support the assertion that a “closely grouped detector arrangement would fail to capture much of the angularly scattered light” (Efimov, ¶127; POR, 26), arranging LEDs and photodetectors in arc configurations not only increases the area covered and the amount of signals reflected from the area of interest, but also improves the detection of scattered light from biological tissue by capturing more of the light exiting the tissue at different angles and locations. Anthony, ¶¶262-263 (explaining that an arc arrangement “enhances the amount of scattered light from biological tissue detected, thereby improving the signal relative to background noise and resulting in an increased signal-to-noise ratio”); *see also* Mendelson 4:14-65 (explaining that an arc configuration “essentially creates a large area photodetector made of six discrete photodiodes” which “maximize[s] the fraction of backscattered light collected by the sensor” and that increasing the area of measurement “minimize(s) differences

Declaration of Brian Anthony in Support of Petitioners' Reply to Patent Owner's Response, U.S. Patent No. 10,874,304 (IPR2025-01251) from local tissue inhomogeneity"); Lisogurski, 9:50-52 (explaining that its system "increase[s] the brightness of the light sources in response to the noise to improve the signal-to-noise ratio"). In view of Lisogurski's teaching that "[t]he light intensity may be directly related to the absorbance and/or reflectance of light in the tissue," a person of ordinary skill in the art would thus have been motivated to arrange the LEDs and detectors in arcs to increase the amount of light on an area of interest and to improve detection of such light scattered from the area of interest, as disclosed in LeBoeuf. Anthony, ¶¶262-263; Lisogurski, 11:16-20.

28. I also disagree with Patent Owner's mischaracterization of my testimony as if I had not reviewed documents cited in Mendelson. Instead, I testified: "I believe I've reviewed that document in the past. I don't recall the last time I reviewed it." Ex. 2045, 199:6-7. Regardless, Mendelson itself discloses and confirms the knowledge of a person of ordinary skill in the art as discussed above, and whether or not I reviewed the documents cited in Mendelson does not impact my opinion.

29. Although Patent Owner and Dr. Efimov rely on other LED and detector arrangements, including those disclosed in LeBoeuf, to attempt to downplay the importance of the arc configurations applied to Lisogurski (Efimov, ¶¶120, 125; POR, 26-27), he does not address Mendelson's teachings or how they reflect the knowledge of a person of ordinary skill in the art. As I discussed above, Mendelson

Declaration of Brian Anthony in Support of Petitioners' Reply to Patent Owner's Response, U.S. Patent No. 10,874,304 (IPR2025-01251) discloses the benefits of arc configurations of emitters and detectors in increasing the signals directed at a tissue sample and subsequently detecting the reflected light signals. Mendelson 4:14-65. A person of ordinary skill in the art would have known of these benefits and thus would have been motivated to look to LeBoeuf's arc arrangement teachings and applied these teachings to Lisogurski's sensor in order to produce more accurate measurements.

30. As I had noted in my Declaration, Lisogurski discloses that "[a]ny suitable configuration of light source 316 and detector 318 may be used" and "sensor unit 312 may include multiple light sources and detectors, which may be spaced apart," (Anthony, ¶262; Lisogurski, 17:42-45), and as I explained in both my Declaration and above, a person of ordinary skill in the art would thus have been motivated to arrange the light sources and detectors in arc configurations for increasing measurement accuracy. Anthony, ¶¶262-263. I therefore did not, as Dr. Efimov argues, "fail to explain why a person of ordinary skill in the art would have been motivated to use the alleged arc arrangement in Figure 8B in particular rather than any of the other possible disclosed arrangements in LeBoeuf." Efimov, ¶120. A person of ordinary skill in the art would have specifically recognized the benefits provided by the arc arrangements, which provide sufficient motivation to apply LeBoeuf's arc arrangement teachings to Lisogurski.

31. Patent Owner and Dr. Efimov further argue that a person of ordinary skill in the art would not have been motivated to combine Lisogurski and LeBoeuf due to LeBoeuf's additional earbud components. Efimov, ¶¶130-137, 141; POR, 29-31. However, I did not propose *physically inserting* LeBoeuf's earbud into Lisogurski's sensor—instead, my opinion was that a person of ordinary skill in the art would have been motivated to *implement* LeBoeuf's *teaching* of arc arrangements of the LEDs and detectors to Lisogurski to improve measurement accuracy. Anthony, ¶¶262-264. Similarly, Dr. Efimov argues that light guide 18 (also referred to as cover 18 (LeBoeuf, ¶[0107])) and light-guiding region 19 are what enables detection of scattered light by optical detector 26 (Efimov, ¶115), but he ignores LeBoeuf's disclosure that these components are optional. LeBoeuf, ¶[0103] ("it should be noted that, in other embodiments, the earbud housing 16 may also serve as a light guide *without the need for cover 18*"). Importantly, as discussed above, the arc arrangements of LEDs and detectors, without other components that Patent Owner and Dr. Efimov allege as required (Efimov, ¶¶130-131; POR, 31), improve detection of the light signal, and thus improve measurement accuracy.

32. Further contrary to Patent Owner and Dr. Efimov's arguments (Efimov, ¶¶138-140; POR, 33-36), the geometry of LeBoeuf, or the disclosure of different configurations in LeBoeuf's other embodiments, do not negate a person of ordinary skill in the art's motivation to apply LeBoeuf's teaching of arc arrangements of the

Declaration of Brian Anthony in Support of Petitioners' Reply to Patent Owner's Response, U.S. Patent No. 10,874,304 (IPR2025-01251) LEDs and detectors to Lisogurski. Anthony, ¶¶262-264; Lisogurski, 17:42-45 (“[a]ny suitable configuration” of light sources and detectors may be used). LeBoeuf does not state that the arrangement depicted in Figure 8B is limited to its earbud embodiment, and a person of ordinary skill in the art would have understood the benefits of distributing emitters and detectors over area to apply to other systems that use emitters and detectors to perform optical physiological measurements. Importantly, as discussed above, I do not propose inserting LeBoeuf's earbud embodiment physically into Lisogurski—again, my opinion instead is that a person of ordinary skill in the art would have applied LeBoeuf's arc arrangement teachings to Lisogurski's sensor to achieve their corresponding benefits of improved measurements. Ex. 2045, 182:18-24, 205:6-25, 339:15-17, 340:2-10.-

33. In that regard, and contrary to Patent Owner's characterization of my testimony, I did not agree that the arc arrangements cannot be realized without LeBoeuf's other components—at best, I acknowledged that LeBoeuf discloses those components. Ex. 2045, 168:18-169:18; POR, 33-34.

D. LISOGURSKI IN VIEW OF TRAN OR IN VIEW OF LEBOEUF AND TRAN RENDERS OBVIOUS CLAIMS 1-3, 11, 14, 19, 20, AND 27

34. I understand that Patent Owner has disclaimed claims 1, 3, 11, 19, and 20 of Ground 3 and claims 2, 14, and 27 of Ground 4. Based on the disclaimer, Patent Owner contends that Ground 3 is moot as to claims 1, 3, 11, 19, and 20 and

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Ground 4 is moot as to claims 2, 14, and 27. POR, 36, 52. Otherwise, Patent Owner and Dr. Efimov do not offer any opinion for those claims in connection with Grounds 3 and 4. Efimov, ¶¶150, 180; POR, 36, 52.

35. Regardless, for the reasons detailed in my Declaration, it is my opinion that claims 1-3, 11, 14, 19, 20, and 27 of the '304 patent are rendered obvious by Lisogurski in view of Tran and in view of LeBoeuf and Tran. Anthony, ¶¶269-274, 290-293, 314-317.

E. LISOGURSKI DISCLOSES AND RENDERS OBVIOUS THE “IDENTIFICATION OF AN OBJECT” LIMITATION (CLAIMS 12, 13, 26)

36. As I explained in my Declaration, Lisogurski discloses and renders obvious “wherein the measurement system is at least in part configured for selection or identification of an object” of Claims 12 and 26. Anthony, ¶¶353-356. Claim 13 depends from Claim 12 and is also disclosed or rendered obvious by Lisogurski for the same reasons. Anthony, ¶362. I note that, other than noting claim 13's dependency on claim 12, Patent Owner and Dr. Efimov do not otherwise challenge that Lisogurski discloses the additional limitations of Claim 13 (“the light source is configured to further increase the signal-to-noise ratio by increasing a pulse rate...from an initial non-zero pulse rate”). Efimov, ¶¶151, 168; POR, 36-37; *see* Anthony, ¶363.

37. As I noted in my Declaration and testified, and as Dr. Efimov noted in his declaration, selection and identification are recited in the alternative. Anthony, ¶356; Ex. 2045, 220:3-221:7; Efimov, ¶¶158-159. As Lisogurski meets “identification,” I focused only on “identification” in my Declaration and do so here as well. Anthony, ¶356. Because the limitation is written in the alternative, it is my opinion that satisfying “identification of an object” element is sufficient to satisfy the limitation at issue here, as Lisogurski does. Ex. 2045, 219:20-221:7, 225:16-18.

38. As I discussed in my Declaration, I understand that the Board found in the '484-RFWD that Lisogurski discloses and renders obvious a substantially similar limitation in the prior '484 IPR (“wherein the wearable device is at least in part configured to identify an object”) and it is my opinion that the Board’s reasoning there is equally applicable here. Anthony, ¶355. I understand that the '484-RFWD is currently on appeal (Ex. 1091), but I have independently reviewed Lisogurski against these limitations and agree with the Board’s rationale finding the limitation met by Lisogurski. Anthony, ¶¶355-356. My opinion is not just simply “restat[ing] the Board’s findings,” as Patent Owner and Dr. Efimov incorrectly contend (Efimov, ¶156; POR, 45-47), but rather is based on my independent review of Lisogurski, the Board’s analysis regarding the same, and comparison of the “identification of an object” limitation in the '304 patent and substantially similar claim language in the '484 patent (“identify an object”)—based on that independent analysis, I have

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39. As I explained, Lisogurski's sensor identifies an object. Specifically, Lisogurski teaches a sensor that calculates the amount of oxyhemoglobin in a tissue sample to measure SpO₂—as the Board put it, this involves "us[ing] different wavelengths to "distinguish hemoglobin from oxygen carrying hemoglobin," and thus satisfies "identify an object" because Lisogurski teaches distinguishing and identifying the oxyhemoglobin blood constituent from other constituents in the blood for measurement. Anthony, ¶355; '484-RFWD, 7; Lisogurski, 4:36-62. I also testified to this point during my deposition when I explained that Lisogurski's measurement of SpO₂ involves "distinguishing and identifying the oxyhemoglobin blood constituents," consistent with the Board's construction of the limitation and corresponding decision in the prior '484 IPR. Ex. 2045, 217:14-218:1; Anthony, ¶¶55, 352-360.

40. Specifically, I testified that "Lisogurski teaches identifying an object, the blood constituent oxyhemoglobin" through a "calculation or measurement of the

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41. Patent Owner and Dr. Efimov argue that distinguishing an object for "identification" is different from performing oximetry measurements on the object by Lisogurski because they incorrectly assume that oximetry measurements focus only on a known constituent (hemoglobin) and does not distinguish hemoglobin from other constituents. Efimov, ¶¶161-166; POR, 39-44. However, it is my opinion that this was already considered by the Board in its '484-RFWD based on the Federal Circuit's construction of the "identifying an object" limitation—specifically, the Board determined that "[a]s Lisogurski discloses a method of measuring oxygen saturation that uses different wavelengths to distinguish hemoglobin from oxygen carrying hemoglobin, i.e., oxyhemoglobin, Lisogurski teaches identifying an object, i.e., the blood constituent oxyhemoglobin." '484-RFWD, 5-7; Lisogurski, 4:36-51. Based on that analysis, and while noting that there

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42. In this regard, and contrary to Patent Owner's and Dr. Efimov's arguments (Efimov, ¶156; POR, 47-49), I did not opine in my Declaration that the '484-RFWD is supported by my prior '484 declaration testimony that addressed a different aspect of Lisogurski. *See* Anthony, ¶355. Instead, I simply opined in my Declaration, upon further independent examination of Lisogurski and these limitations, that my reasoning is consistent with the Board's decision and that I agreed with the Board's reasoning in the '484-RFWD. *Id.* My Declaration explained my reasoning for agreeing with the Board's '484-RFWD, including an explanation as to how Lisogurski distinguishes and identifies hemoglobin and oxyhemoglobin in blood, and cited to both the '484-RFWD and my prior '484 declaration, both of which included additional detail which supported my Declaration in this IPR proceeding. *Id.*; '484-RFWD, 4-7; '484-Declaration ¶¶38-39.

43. Patent Owner and Dr. Efimov argue that “[t]o identify an object, the system must determine what the object is, recognizing the object as a particular thing.” Efimov, ¶157; POR, 50. I note that this is exactly what the Board found that Lisogurski discloses when the Board addressed essentially identical claim limitations in the ’484-RFWD—specifically, the Board found that Lisogurski discloses “identify an object” because Lisogurski’s sensor “calculat[es] an amount of a blood constituent, e.g., oxyhemoglobin” in a tissue sample, which involves distinguishing and identifying oxyhemoglobin in blood and thus identifying an object (oxyhemoglobin) from other blood constituents. ’484-RFWD, 6; Lisogurski, 4:36-51. It is my opinion, as I explained in my Declaration, that the same rationale should apply here. Anthony, ¶355.

44. Patent Owner’s and Dr. Efimov’s arguments relating to the distinction between “analyte” and “constituent” are therefore based on a false premise that Lisogurski presupposes what it measures. Efimov, ¶160; POR, 36-45. Further, Lisogurski never uses the term “analyte,” much less provides a disclosure where the distinction between “analyte” and “constituent” is material. Additionally, even under Patent Owner’s and Dr. Efimov’s own definitions of “constituent,” tissue and blood constituents (Efimov, ¶160; POR, 37)—such as adipose, collagen, and elastin—are still measurable and identifiable, and each is an “analyte” for purposes of certain measurements such that Dr. Efimov’s hypothetical “analyte” vs.

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"constituent" distinction is irrelevant. Indeed, Patent Owner's and Dr. Efimov's logical fallacy is illustrated by their own examples of a scale or a pH meter as performing measurements without identifying the object being measured. Efimov, ¶¶157, 167; POR, 36-37. Unlike a scale or a pH meter that cannot recognize what it is measuring (e.g., any object with mass can be weighed on a scale and any pH of any object can be measured by a pH meter without recognizing what the object is), Lisogurski's blood oxygen measurement provides a measurement only upon identification of the blood oxygen in the object being analyzed, and it does not report a measurement of other blood constituents merely because they are present. '484-RFWD, 4-7 ("As Lisogurski discloses a method of measuring oxygen saturation that uses different wavelengths to distinguish hemoglobin from ... oxyhemoglobin, Lisogurski teaches identifying an object"); Anthony, ¶¶355-356; Ex. 2045, 219:20-221:7. This is exactly what Patent Owner and Dr. Efimov argue is required for "identification of an object." Efimov, ¶157; POR, 36-37.

45. In this regard, I also note that Patent Owner's position here is inconsistent with its position in the parallel Texas Case. For example, I reviewed Ex. 1140, which I understand is Patent Owner's infringement claim chart served in the parallel Texas Case. There, Patent Owner contends that the "identify an object" limitation is met simply because the accused product allegedly detects a presence of

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46. Additionally, contrary to Patent Owner's and Dr. Efimov's arguments (Efimov, ¶166; POR, 36-45), the fact that Lisogurski's functionality includes "detection" does not mean that it assumes the presence of hemoglobin or that it does not perform "object identification." Indeed, as I testified during my deposition, "notic[ing] the existence or presence of something" (i.e., detection) is not mutually exclusive of "recognizing or establishing" that something is blood oxygen (i.e. identification), as Lisogurski does. Ex. 2045, 213:12-19, 216:12-21, 234:5-245:25; *see also* '484-RFWD, 4-7; Lisogurski, 4:36-62 ("the photonic signal interacting with the tissue is selected to be of one or more wavelengths that are attenuated by the blood in an amount representative of the blood constituent concentration"); Anthony, ¶¶355-356. And, although "distinguishing" an object is distinct from performing measurements on it, as Dr. Efimov noted (Efimov, ¶161), Lisogurski teaches both distinguishing and measuring an object because Lisogurski's calculation and measurement of the amount of oxyhemoglobin that exists in blood using different wavelengths and intensities of reflected light involves distinguishing and identifying the oxyhemoglobin blood constituent from other components of a blood sample (e.g., hemoglobin). Anthony, ¶355; Lisogurski, 4:36-62.

47. Further, Lisogurski's Fig. 4, which Dr. Efimov points to in his arguments, discloses "determining a physiological parameter" to calculate oxygen saturation, confirming that Lisogurski's measurement system determines what the measured parameter is before performing calculations. Lisogurski, Fig. 4, 20:49-60. This thus confirms that Lisogurski does not "operate[]" on the presupposition that hemoglobin is present" as Dr. Efimov incorrectly argues, but instead determines, recognizes, and establishes that the sample does indeed contain blood oxygen, to make the measurement on that identified parameter. *See* Lisogurski, Fig. 4, 20:49-60 ("the system may determine a physiological parameter using information from the attenuated photonic signals"). As I had testified during my deposition, Lisogurski's blood oxygen measurement requires a confirmation that there is an object "responding to the light that you're using" (Ex. 2045, 43:12-16) and using "certain wavelengths" allows confirmation, or identification, of blood oxygen (Ex. 2045, 43:23-44:4). In other words, rather than assuming the presence of oxyhemoglobin for oximetry measurements, Lisogurski first detects the tissue's responses to the different wavelengths of input light to confirm and identify if oxyhemoglobin is present.

48. Patent Owner and Dr. Efimov also attempt to incorporate elements from the '304 specification into the "identification of an object," despite these elements not being in the claim language. Efimov, ¶¶162-163, 167; POR, 37-38, 50-51. For

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example, Patent Owner and Dr. Efimov appear to opine that specific techniques, including each and all of the following techniques, are required to satisfy “identification of an object” limitation: (1) using pattern matching algorithms and other software and mathematical methods; (2) “using a[n unspecified] wider wavelength range” and “more sampling wavelength”; (3) identification via “signal processing techniques” including “[v]arious mathematical derivatives, including the first and second derivatives”; and (4) spectrum correlation “with a library of known spectra.” Efimov, ¶¶162-163; POR, 50-51. These techniques, however, are only exemplary techniques in the specification, not recited in the claim language, and, as Dr. Efimov himself testified, are not required to satisfy “identification of an object” limitation. Ex. 1127, 233:3-21.

**F. LISOGURSKI DISCLOSES AND RENDERS OBVIOUS
IMPROVING THE SIGNAL-TO-NOISE RATIO OF THE
“SELECTION OR IDENTIFICATION OF AN OBJECT”
(CLAIMS 12, 13, 26)**

49. As I explained in my Declaration, Lisogurski discloses and at least renders obvious “improv[ing] a signal-to-noise ratio of the selection or identification” of an object. Anthony, ¶357. As further explained in my Declaration, a person of ordinary skill in the art would also have found it obvious to use multivariate techniques to implement Lisogurski’s “improve[ment] [of] signal-to-noise ratios.” Anthony, ¶358.

50. Specifically, Lisogurski discloses and at least renders obvious “wherein the measurement system is configured to improve a signal-to-noise ratio of the selection or identification” of Claim 12 and “wherein the wearable device is configured to improve a signal-to-noise ratio of the selection or identification” of Claim 26. Anthony, ¶367. Claim 13 depends from Claim 12 and is also disclosed or rendered obvious by Lisogurski for the same reasons. Anthony, ¶362. I note that, other than noting claim 13’s dependency on claim 12, Patent Owner and Dr. Efimov do not otherwise challenge that Lisogurski discloses the additional limitations of Claim 13 (“the light source is configured to further increase the signal-to-noise ratio by increasing a pulse rate...from an initial non-zero pulse rate”). Efimov, ¶¶151, 168; POR, 36-37.

51. As I also explained in my Declaration, “improv[ing] a signal-to-noise ratio of the selection or identification” is taught and at least rendered obvious by Lisogurski, which teaches various techniques and methods for improving SNR. Anthony, ¶357. For example, Lisogurski teaches that its physiological monitoring system “increase[s] the brightness of the light sources...to improve the signal-to-noise ratio” in response to “background noise.” Anthony, ¶357; Lisogurski, 9:49-52. A person of ordinary skill in the art would have understood, and at minimum found obvious, that these techniques—such as increasing light intensity—for improving SNR and thus the accuracy of measurements, would be applicable to the

Declaration of Brian Anthony in Support of Petitioners' Reply to Patent Owner's Response, U.S. Patent No. 10,874,304 (IPR2025-01251) optical measurements performed by Lisogurski's measurement system, including those used to perform Lisogurski's identification of certain blood constituents (e.g., oxyhemoglobin). Anthony, ¶357; Lisogurski, 9:49-52.

52. Lisogurski also discloses taking measurements using multiple LEDs and wavelengths, which would produce the multivariate input data for such multivariate techniques to improve the identification of objects, such as oxyhemoglobin. Lisogurski, 11:13-27, 19:20-31. As I explained in my Declaration, Lisogurski discloses that its sensor contains multiple LEDs, including an LED that emits red light, and an LED that emits infrared light. Lisogurski, 4:42-45, 7:38-8:3, 10:48-52, 10:56-63, 17:37-45, 19:25-31, Figs. 1, 3; *see also* '533-FWD, 25-26; Anthony, ¶112. These multiple LEDs emitting different wavelengths of light would thus produce multivariate data—that is, each wavelength channel yields a separate measured variable describing the same tissue sample, so the set of per-wavelength intensity measurements constitutes a multivariate observation of that sample rather than a single univariate reading—which serves as the input data for the multivariate techniques to improve the SNR of the object identification (e.g., of oxyhemoglobin for oximetry measurements) for which the LEDs of different wavelengths are being used.

53. As I had further explained in my Declaration, a person of ordinary skill in the art would have found it obvious to use such multivariate techniques including

Declaration of Brian Anthony in Support of Petitioners' Reply to Patent Owner's Response, U.S. Patent No. 10,874,304 (IPR2025-01251) to improve SNR of the object identification, at least because they are used to improve the accuracy of measurements. Anthony, ¶¶357-358. Indeed, as I had previously explained, multivariate techniques are just algorithms applied to "multivariate input data." *Id.* In other words, multivariate techniques are simply algorithms or other methods of cleaning or transforming data which are performed on multivariate input data, which is already being collected in Lisogurski's sensor given its multiple LEDs and wavelengths.

54. Rather than discussing the multivariate techniques in the context of "selection or identification of an object," Patent Owner and Dr. Efimov mix and match different claim elements. For example, while noting that the improvement of the signal-to-noise ratio is specifically for the "selection or identification of an object" (Efimov, ¶¶170-171; POR, 50-52), Patent Owner and Dr. Efimov then turn to the "pattern identification or classification" element of the claims, which is a separate claim requirement from the "selection or identification of an object" and to which the signal-to-noise ratio improvement requirement does not apply. Efimov, ¶¶173-176; POR, 50-52. Below is a recitation of claim 12, with the claim language at issue here colored in blue and the portions that Patent Owner and Dr. Efimov mix and match colored in red:

[12.pre] The measurement system of claim 11, wherein the measurement system is configured to use artificial intelligence in making decisions;

[12.a] *wherein the measurement system is configured to perform pattern identification or classification*, and wherein the measurement system is configured to apply a threshold function to a comparison with a stored data set; and

[12.b] wherein the measurement system is at least in part configured for selection or identification of an object, and wherein the measurement system is *configured to improve a signal-to-noise ratio of the selection or identification by applying* regression signal processing methodologies or *multivariate techniques*.

55. With this improper mix of claim language, Patent Owner and Dr. Efimov then attempt to attack my arguments for this limitation ([12.b]) by attacking Tran, which I do not discuss for this limitation, or for any of the limitations within [12.b]. Efimov, ¶173; POR, 50-52; *see* Anthony, ¶¶352-360. Instead, I had only used Tran for the “pattern identification or classification” limitation in [12.a], which Patent Owner and Dr. Efimov attempt to require for “improv[ing] a signal-to-noise ratio of the selection or identification by applying...multivariate techniques,” despite no such requirement in the claim language. Efimov, ¶173; POR, 50-52. Indeed, as Dr. Efimov himself testified, the construction “identify an object” does not require pattern matching. Ex. 1127, 233:3-10.

56. For example, Patent Owner and Dr. Efimov argue that “[a] POSITA would not have been motivated to apply Tran’s stroke-detection regression method to Lisogurski’s pulse oximetry system for improving SNR of ‘selection or identification of an object’” and attempts to connect Tran to this limitation due to Tran’s disclosure of “regression methods” for analysis. Efimov, ¶175; POR, 51-52.

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However, I did not propose applying Tran's teaching to Lisogurski in this manner or for any related features in my Declaration. Anthony, ¶357. Instead, I only applied Tran's teachings of artificial intelligence and pattern recognition to Lisogurski in [12.a], neither of which relate to improving SNR of object identification in [12.b]. Anthony, ¶¶346-348.

57. To the extent that Patent Owner and Dr. Efimov intended to address [12.a], the claim simply requires that "the measurement system is configured to perform pattern identification or classification," and does not require or relate to improving the signal-to-noise ratio of the "selection or identification of an object" as Dr. Efimov argues. Efimov, ¶¶173-176; POR, 50-52. And, as I had noted above, Dr. Efimov himself testified that object identification does not require pattern matching. Ex. 1127, 233:3-10. Notably, not only does Dr. Efimov's argument miss the mark, the Board had already found the limitation met by Lisogurski in view of Tran. '484-FWD, 53.

G. LISOGURSKI IN VIEW OF LEBOEUF, TRAN, AND MARBACH RENDERS OBVIOUS "APPLYING ... MULTIVARIATE TECHNIQUES" TO IMPROVE SIGNAL-TO-NOISE RATIO (CLAIMS 12, 13, 26)

58. As discussed above, Lisogurski renders obvious "improv[ing] a signal-to-noise ratio of the...identification by applying...multivariate techniques" and Claims 12 and 26, and for the reasons discussed above, it is my opinion that neither Patent Owner nor Dr. Efimov has substantively challenged my opinion in this regard.

Declaration of Brian Anthony in Support of Petitioners' Reply to Patent Owner's Response, U.S. Patent No. 10,874,304 (IPR2025-01251) See Efimov, ¶¶173-176; POR, 50-52. Claim 13 depends from Claim 12 and is also disclosed and rendered obvious by Lisogurski for the same reasons. Anthony, ¶362. I note that, other than noting claim 13's dependency on claim 12, Patent Owner and Dr. Efimov do not otherwise challenge that Lisogurski discloses the additional limitations of Claim 13 ("the light source is configured to further increase the signal-to-noise ratio by increasing a pulse rate...from an initial non-zero pulse rate"). Efimov, ¶¶151, 168; POR, 36-37. Accordingly, it is also my opinion that Patent Owner's and Dr. Efimov's challenges to Ground 9 do not change the outcome—the limitation is rendered obvious by Lisogurski alone.

59. As I also explained in my Declaration, Lisogurski in view of Tran and Marbach (Ground 9) renders obvious "applying ... multivariate techniques" to the "selection or identification of an object." Anthony, ¶¶403-407.

60. As I had discussed in my Declaration, Marbach discloses performing "measurement algorithms" on "multivariate input data" of measurement signals to "better the measurement accuracy a.k.a. SNR." Marbach, 12:19-27, 11:57-63; Anthony, ¶403. This is done by removing the noise from particular pieces of measurement data, such that "noise correlated between the different pieces of multivariate input data can be subtracted out in the measurement algorithm" to produce the "user-desired output." *Id.* A person of ordinary skill in the art would thus have been motivated to apply Marbach's "multivariate input data" and

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subtraction teachings to Lisogurski to improve the accuracy and SNR of the identification and measurement of objects, an issue that both Lisogurski and Marbach recognize. Anthony, ¶405 (“Marbach specifically emphasizes that combined analysis of multiple signals enables more accurate quantification of analytes”); Marbach, 3:36-67, 5:53-6:19; Lisogurski, 6:7-19 (disclosing techniques for reducing noise, including removing “ambient and background signals” to “improve the signal-to-noise ratio” and “improve the quality of the determined physiological parameter[s]”), 9:46-60, 13:60-14:10.

61. Patent Owner and Dr. Efimov argue that Marbach's multivariate functionality is tied only to Marbach's particular multivariate probes and directed specifically to probe geometry (Efimov, ¶¶202-208; POR, 55-57), but ignore Marbach's disclosure that a variety of probes may be used. Marbach, Figs. 1-5 (illustrating a variety of probes and probe configurations); 16:30-18:19 (describing various probe types and geometries). Marbach itself also performs these multivariate techniques on different multivariate datasets collected using a variety of different probes, thus adapting the multivariate techniques for use across different probes and sensors. Marbach, Figs. 1-5; 16:30-18:19. Indeed, a person of ordinary skill in the art would have understood that multivariate techniques are not limited to a specialized set of hardware—instead multivariate techniques are algorithms to process data that has already been collected.

62. Indeed, Marbach itself recognizes that these techniques just involve algorithms performed on “multivariate input data,” which does not require specific or specialized structures. Marbach, 12:19-27. Consistent with Marbach’s disclosure, and as I explained in my Declaration, my opinion is to implement the algorithmic calculations taught by Marbach for the purposes of improving measurement, rather than inserting any of the probes or their geometry in Lisogurski’s system to replace or modify Lisogurski’s sensor. Anthony, ¶¶403-407; Marbach, 12:19-27; *contra* Efimov, ¶¶207-208; POR, 57-58. Dr Efimov’s arguments that Lisogurski lacks the probe structure in Marbach therefore are also irrelevant, especially because Lisogurski alone, and Lisogurski in view of LeBoeuf, already disclose a sensor that collects multivariate data through its plurality of detectors and LEDs with different wavelengths, as discussed above. Lisogurski, 10:48-64; LeBoeuf, ¶105, FIG. 8B; Efimov, ¶¶206-208; POR, 55-58. Lisogurski’s sensor thus detects and produces the multivariate input data to which a person of ordinary skill in the art would have been motivated to apply Marbach’s multivariate techniques (e.g., measurement algorithms) in order to improve accuracy and SNR would be applied. Lisogurski, 10:48-64; LeBoeuf, ¶105, FIG. 8B; Anthony, ¶¶405-406. Relatedly, while Patent Owner and Dr. Efimov argue that Marbach’s “geometrically-multivariate probes” require “signals of at least a subset of the optical measurement beams [that] are stronger than the hardware noise floor,” such a probe-specific requirement is

Declaration of Brian Anthony in Support of Petitioners' Reply to Patent Owner's Response, U.S. Patent No. 10,874,304 (IPR2025-01251) irrelevant here (Efimov, ¶202; POR, 55-56), and there is no requirement that the data must be collected with a "geometrically-multivariate probe." That condition describes a precondition for useful multivariate processing generally—the measured signals must exceed the hardware noise floor, as the signal otherwise cannot be detected—and as discussed extensively in Lisogurski, Lisogurski's physiological monitoring system and sensor detect the various signals being measured. Lisogurski, 11:9-10, 11:20-27.

V. SECONDARY CONSIDERATIONS

63. As I set forth under My Understanding of Obviousness in the Legal Understanding Section of my Declaration, I understand that certain objective factors called "secondary considerations" or "objective indicia" of nonobviousness, if they are present, may be considered in determining whether the claimed invention would have been obvious to a person of ordinary skill in the art. Anthony, ¶39. I also understand, however, that for such secondary considerations to be relevant to the obviousness of a claim, there must be a causal relationship, or a "nexus," between the claim and the evidence, and that this nexus must be based on a novel element of the claim rather than something in the prior art.

64. Here, I have considered Patent Owner's and Dr. Efimov's assertion of secondary considerations, in addition to Dr. Islam's supporting declarations, and it is my opinion that there is no evidence of secondary considerations or any nexus

Declaration of Brian Anthony in Support of Petitioners' Reply to Patent Owner's Response, U.S. Patent No. 10,874,304 (IPR2025-01251) between any alleged evidence that Patent Owner, Dr. Efimov, and Dr. Islam identify and the '304 Claims. Patent Owner's, Dr. Efimov's, and Dr. Islam's assertion of copying and long-felt need in the industry are without sufficient basis in my opinion, and I disagree with their assertions. POR, 69-74; Efimov, ¶¶313-350; Ex. 2100, ¶¶6-34.

65. First, regarding copying, Patent Owner asserts and Dr. Efimov opines that Samsung was directly exposed to and implemented technology disclosed by Dr. Islam and that this alleged implementation supports the non-obviousness of the challenged claims. Efimov, ¶¶218-234; POR, 59-61; Ex. 2100, ¶¶7-21. In support of that opinion, Dr. Efimov and Dr. Islam together identify several alleged techniques that they contend were disclosed to Samsung, which Dr. Efimov contends were later implemented in Samsung products, [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] Efimov, ¶¶222, 229-232; Ex. 2100, ¶13.

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66. As an initial matter, and further to the fact that not all such features are relevant to the Claims, Dr. Efimov appears to assume that those techniques were proprietary to Omni because Dr. Islam characterized them as such and because they are purportedly “covered by” Omni’s patents. Ex. 1127, 58:6-10; 60:3-11, 117:18-118:3; Efimov, ¶¶224, 229-232, 234; Ex. 2100, ¶¶8-13. I disagree that either basis supports the allegations that Samsung copied the SNR-improvement techniques, or that any such techniques were in fact proprietary. As a preliminary matter, when asked about these techniques, Dr. Islam testified that he did not know if they were used in prior art wearable devices (Ex. 1128, 48:8-49:3, 74:1-14, 85:7-17, 99:9-101:4, 104:22-105:26, 139:8-15), but conceded that they were generally known in the field (Ex. 1128, 30:1-15, 87:6-22, 104:4-20, 132:10-133:16). Indeed, each of Dr. Islam’s alleged “proprietary” “SNR-improvement techniques” was already disclosed in the prior art, as the Board found previously and as shown in the table below. Dr. Efimov’s analysis does not address these prior-art teachings or the Board’s findings.

Feature identified by Dr. Efimov	The Board’s relevant prior finding

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	<div>[REDACTED]</div> <div>[REDACTED]</div>
<div>[REDACTED]</div> <div>[REDACTED]</div>	<div>[REDACTED]</div> <div>[REDACTED]</div> <div>[REDACTED]</div> <div>[REDACTED]</div>
<div>[REDACTED]</div> <div>[REDACTED]</div> <div>[REDACTED]</div>	<div>[REDACTED]</div> <div>[REDACTED]</div> <div>[REDACTED]</div>
<div>[REDACTED]</div>	<div>[REDACTED]</div> <div>[REDACTED]</div>

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67. Furthermore, Dr. Islam provides no allegation as to which of his SNR-Improvement techniques, if any, was implemented in Samsung's products, and Dr. Efimov likewise does not provide his independent analysis as to Samsung's alleged practice of the SNR-improvement techniques—rather, Dr. Efimov appears to rely primarily on Omni's infringement contentions as evidence that Samsung products allegedly implement the functionalities identified above. Efimov, ¶¶229-232; *see generally* Ex. 2100. Dr. Efimov's deposition testimony also confirms the lack of his independent analysis. During his deposition, Dr. Efimov admitted that he did not

Declaration of Brian Anthony in Support of Petitioners' Reply to Patent Owner's Response, U.S. Patent No. 10,874,304 (IPR2025-01251) examine the Samsung Accused Products, did not review Samsung source code, and did not review Samsung internal technical documents concerning the operation of those products. Ex. 1127, 81:11-20, 87:7-20, 97:22-98:3, 98:20-99:7, 114:19-20.

68. Contrary to his cursory opinion on copying based solely on the Patent Owner's infringement contentions, Dr. Efimov, along with Dr. Islam, further agreed that assessing the features and operation of a product ordinarily requires review of the product itself or technical information describing its operation. Ex. 1127, 169:16-170:5, 195:1-4; Ex. 1128, 34:6-50:19, 74:17-76:12, 78:9-79:12, 82:12-83:3, 88:2-89:3, 118:12-119:18. I agree that one cannot confirm what features a product has without at least testing the product or confirming technical descriptions of the product, and cannot confirm how the features are implemented without reviewing the source code or detailed technical descriptions of such features specific to the product at issue.

69. Despite such requirements, and based on my review of the infringement contentions available at Exhibit 2116, the infringement contentions claim charts upon which Dr. Efimov exclusively bases his copying opinion primarily cite datasheets describing capabilities of third-party components rather than evidence demonstrating which Samsung products use those components or how those components actually operate within Samsung products. *See, e.g.*, Ex. 2116, 42-51, 86-108. These allegations simply do not show that any of the SNR-improvement

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limitations are met. For example, to support the allegation that Samsung's products

[REDACTED] the infringement contentions cite documents for multiple processing circuitries, some of which indicates that LED current is programmable. Ex. 2116, 86-90. In my opinion, that disclosure establishes only that certain processing circuitry is capable of driving LEDs at different current levels; it does not establish whether or how those circuitries are implemented in Samsung's products, or that Samsung's products actually [REDACTED], as alleged. Indeed, the infringement contentions in Exhibit 2116 do not identify whether those processing circuitries, each identified as having different features purportedly satisfying limited parts of the claim limitations, are all implemented in an accused product, let alone how the circuitry or which available feature of the circuitry is implemented. The remaining citations identified in connection with that functionality are either not specific to the Samsung products or consist of marketing materials that do not provide technical details regarding product operation. *See, e.g.*, Ex. 2116, 42-51, 86-108.

70. Patent Owner and Dr. Efimov further assert that "Samsung took the information it learned from Dr. Islam regarding the technologies disclosed and claimed in the '304 Patent and implemented those teachings into its own Accused Products." Efimov, ¶231; POR, 60. However, neither Dr. Efimov nor Dr. Islam

Declaration of Brian Anthony in Support of Petitioners' Reply to Patent Owner's Response, U.S. Patent No. 10,874,304 (IPR2025-01251) identifies technical evidence demonstrating that Samsung implemented specific features from the materials provided by Omni or that Samsung was not already using any accused functionalities. Based on my review of [REDACTED] and presentation materials identified by Dr. Islam (Ex. 2100, ¶8 (citing Exs. 2101-2107)) and cited by Dr. Efimov (Efimov, ¶¶218-230), those materials describe the identified functionalities at a high level only and do not provide detailed technical guidance regarding their implementation beyond what the Board already found was known in the art.

71. I also note that the presentation materials themselves acknowledge that several of the identified signal-to-noise ratio improvement techniques were already known and being used in commercial wearable devices before the alleged disclosures to Samsung. *See, e.g.*, Ex. 2106, OMS_SAM0031852 [REDACTED] [REDACTED]). I agree that the SNR-improvement techniques identify well-known generic concepts only, as the Board already found.

72. Notably, despite asserting Samsung's copying, Patent Owner, Dr. Islam, and Dr. Efimov do not explain how the alleged presence of known techniques in Samsung products constitutes evidence that Samsung copied those techniques from Omni rather than independently implemented concepts already known in the art. *See generally* Efimov, ¶¶217-234; POR, 59-61; Ex.2100, ¶¶7-21. Likewise, and as

Declaration of Brian Anthony in Support of Petitioners' Reply to Patent Owner's Response, U.S. Patent No. 10,874,304 (IPR2025-01251) discussed above, other than high-level communications concerning the generic, well-known techniques that the Board already found to be met by the prior art, Dr. Islam fails to identify any proprietary technique that he shared with Samsung or that Samsung could have copied. *See* Ex. 2100. In fact, I note that Dr. Efimov and Dr. Islam fail to identify evidence showing what proprietary information was actually received by Petitioners Samsung Electronics Co., Ltd. or Samsung Electronics America, Inc., how any such entities or individuals were involved in Samsung's wearable-device development efforts, or whether any information presented by Omni was ever incorporated into Samsung products. Ex. 1127, 107:15-111:4, 126:2-137:14; *see generally* Ex. 2100. I have not seen any evidence tying the development or operation of Samsung's products to Dr. Islam's alleged disclosure of Omni's patents or known SNR improvement techniques.

73. Patent Owner, Dr. Islam, and Dr. Efimov further assert that the '304 patent addressed a long-felt but unresolved need relating to motion artifacts, ambient-light interference, and signal-to-noise ratio in wearable physiological monitoring systems. Efimov, ¶¶334-350; POR, 61-63; Ex. 2100, ¶¶22-34. In particular, Patent Owner, Dr. Islam, and Dr. Efimov identify "(1) increasing LED light intensity to improve SNR; (2) increasing LED pulse rate to improve SNR; (3) ambient light cancellation through change detection (differencing signals with LEDs on and off); (4) spatially separated detectors; and (5) synchronization of the detection

Declaration of Brian Anthony in Support of Petitioners' Reply to Patent Owner's Response, U.S. Patent No. 10,874,304 (IPR2025-01251) system with the light source" as purportedly solving the unresolved needs he describes. Efimov, ¶¶237, 249; Ex. 2100, ¶¶24-31; POR, 61-63. I disagree that any such generic, well-known techniques would have resolved any alleged industry need relating to motion artifacts, ambient-light interference, or signal-to-noise ratio in wearable physiological monitoring systems that were not resolved before—indeed, as noted above and consistent with my opinion, the Board already found (as shown in the table above) that each of these functionalities was known in the prior art. '533-FWD, 26, 37-39; '484-FWD, 5-6, 23-27, 43-44, 47-48; Anthony, ¶¶114, 138, 140, 154-155, 253-256; *see* Section IV above.

74. Notably, none of Dr. Efimov's, Dr. Islam's, or Dr. Islam's analyses do explains why these known techniques, either individually or in the combinations recited by the Challenged Claims, would have solved a long-felt need in a manner not already known by a person of ordinary skill in the art. Efimov, ¶¶237, 249-251; Ex. 2100, ¶¶22-33; POR, 61-63. Notably, Dr. Islam admitted that, while some of these techniques were generally known in the field of optical sensing (Ex. 1128, 30:1-15, 87:6-22, 104:4-20, 132:10-133:16), he did not know whether or to what degree these techniques were already being used in wearable devices as of the priority date (Ex. 1128, 48:8-49:3, 74:1-14, 85:7-17, 99:9-101:4, 104:22-105:26, 139:8-15)—thereby failing to show that his alleged inventions provided any solution, let alone a novel one, to the industry's alleged long felt needs. Further, Dr. Islam's

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own evidence states that some of these techniques were being used in commercial wearable devices by 2017 (Ex. 2103, OMS_SAM0031785 (“Some of these techniques are already being used in premium wearable devices.”)) and yet the “SNR ... problem” was still not “solved” in those devices (Ex. 2100, ¶¶31-33). Such techniques, therefore, in fact did not result in any resolution of the purported industry needs per Dr. Islam's own allegation, and could not have newly resolved any such needs because they were all known techniques in the industry. POR, 61-62; Efimov, 236, 248; Ex. 2100, ¶¶31-33.

75. Patent Owner, Dr. Efimov, and Dr. Islam further characterize some of these functionalities as “coordinated” and as “a suite of integrated hardware and signal processing techniques.” POR, 61-63; Efimov, ¶¶233, 237 (“a suite of integrated hardware and signal processing techniques, including ambient light cancellation through change detection schemes, synchronization of LED transmitters and receivers, and dynamic adjustment of LED light intensity”), 249 (“an integrated suite of hardware and SNR-improvement techniques . . . including (1) increasing LED light intensity to improve SNR; (2) increasing LED pulse rate to improve SNR; (3) ambient light cancellation through change detection (differencing signals with LEDs on and off); (4) spatially separated detectors; and (5) synchronization of the detection system with the light source”), 250; Ex.2100, ¶30. Again, I disagree that any such generic, well-known concepts would have resolved

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any industry needs. Further, I note that none of Patent Owner, Dr. Efimov, or Dr. Islam provides any technical evidence demonstrating that the alleged benefits he identifies are attributable to the claimed combinations themselves, rather than to the known benefits associated with the individual techniques that comprise those combinations.

76. Even to the extent any alleged industry needs were resolved, I see no technical evidence in Patent Owner's, Dr. Efimov's, or Dr. Islam's analysis and allegations showing that any alleged resolution of the need is attributable to features unique to the Challenged Claims. For example, Patent Owner, Dr. Efimov, and Dr. Islam assert that the Challenged Claims enabled sufficiently accurate physiological measurements during daytime use and exercise. POR, 61-63; Efimov, ¶¶237, 246, 250; Ex. 2100, ¶30. However, I see no technical analysis comparing the performance of the Challenged Claims against prior systems, quantifying any alleged improvement, or demonstrating that the claimed combinations uniquely achieved the results described in the declarations. Rather, Patent Owner, Dr. Efimov, and Dr. Islam appear to infer that the claimed combinations produced the alleged benefits because they include techniques directed to improving signal-to-noise ratio. Again, these techniques were well-known in the art as of the priority date, yet none of Patent Owner, Dr. Efimov, or Dr. Islam explains why the alleged industry need persisted, especially in light of Dr. Islam's own evidence allegedly indicating that

Declaration of Brian Anthony in Support of Petitioners' Reply to Patent Owner's Response, U.S. Patent No. 10,874,304 (IPR2025-01251) such industry need still existed in 2017. POR, 61-63; Efimov, ¶¶ 235-249; Ex. 2100, ¶¶ 31-33; Ex. 2103, OMS_SAM0031785.

77. Accordingly, while Patent Owner, Dr. Efimov, and Dr. Islam cite references discussing motion artifacts, ambient-light interference, and signal-to-noise ratio (POR, 61-63; Efimov, ¶¶ 238-251; Ex. 2100, ¶¶ 22-30), their analyses do not establish that the Challenged Claims uniquely solved those issues, that any alleged benefits are attributable to features unique to the Challenged Claims, or that the claimed combinations achieved results not already expected from their constituent techniques. To the contrary, the techniques identified by Patent Owner, Dr. Efimov, and Dr. Islam were not only individually known in the art, as discussed above, but were also known, or at least obvious, to be used in combinations, as the Board previously found.

78. For example, the Board previously found that the prior art disclosed combinations including increasing signal-to-noise ratio by increasing light intensity, increasing signal-to-noise ratio by increasing pulse rate, and the detection system configured to be synchronized to the light source. *See* '533-FWD, 26-39. Similarly, the Board separately found that the prior art disclosed combinations including increasing signal-to-noise ratio by increasing light intensity, increasing signal-to-noise ratio by increasing pulse rate, the detection system configured to be synchronized to the light source, change detection based on light-on/light-off

Declaration of Brian Anthony in Support of Petitioners' Reply to Patent Owner's Response, U.S. Patent No. 10,874,304 (IPR2025-01251) measurements, and spatially separated detectors. *See* '484-FWD, 23-48. *See* Paragraph 66 above; Anthony, ¶¶114, 138, 140, 154-155, 253-256.

79. As such, the techniques identified by Patent Owner, Dr. Efimov, and Dr. Islam, whether used individually or in the combinations identified above, were already known in the art and were understood to provide their corresponding benefits, including improvements in signal quality and the accuracy and reliability of physiological measurements, as of the priority date. To the extent any such benefits were achieved, they would have been attributable to the known operation of those techniques and combinations, rather than to any feature unique to the Challenged Claims. Further, the fact that some of these techniques were reportedly being used in commercial wearable devices years later while the alleged signal-to-noise-ratio problems purportedly persisted confirms that the use of such known techniques, whether individually or in combination, did not uniquely solve the alleged industry problems. Accordingly, in my opinion, the evidence does not establish that the Challenged Claims uniquely solved the alleged industry problems, that any alleged benefits are attributable to features unique to the Challenged Claims, or that the claimed combinations achieved results beyond the known and expected benefits of their constituent techniques.

80. In sum, Patent Owner's, Dr. Efimov's, and Dr. Islam's contentions regarding copying and long-felt need do not alter my conclusion that the Challenged Claims would have been obvious to a person of ordinary skill in the art.

VI. CONCLUSION

81. In summary, and as outlined in my Declaration and set forth above, I have concluded that claims 1-6, 11-16, 19-22, 26-27 of the '304 patent, including claims 4-6, 12-13, 15-16, 21-22, and 26 remaining after Patent Owner's disclaimer of the other claims, are anticipated and/or rendered obvious over the prior art references discussed in my Declaration and herein. As discussed above, I disagree with Omni's and Dr. Efimov's arguments, and none of their arguments alters my opinions expressed in my previous Declaration.

82. I reserve the right to supplement my opinions in the future to respond to any arguments that Patent Owner or its expert(s) may raise and to consider new information as it becomes available to me.

83. In signing this declaration, I recognize that the declaration will be filed as evidence in a contested case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office.

84. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful

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false statements and the like so made are punishable by fine or imprisonment, or
both, under Section 1001 of Title 18 of the United States Code.

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APPENDIX A (LIST OF MATERIALS CONSIDERED)

Exhibit No.	DESCRIPTION
1001	U.S. Patent No. 10,874,304 ("304")
1002	File History of U.S. Application No. 16/669,794 ("304FH")
1003	Declaration of Brian Anthony in Support of Petition for <i>Inter Partes</i> Review of U.S. Patent No. 10,874,304 ("Anthony")
1004	Declaration of Brian Anthony in Support of Petition for <i>Inter Partes</i> Review of U.S. Patent No. 9,651,533 submitted in IPR2019-00916, Ex.1003 ("533-Anthony")
1005	<i>Apple Inc. v. Omni Medsci, Inc.</i> , No. IPR2019-00916, Paper 1 (P.T.A.B. Apr. 10, 2019) ("533-Pet.")
1007	<i>Apple Inc. v. Omni Medsci, Inc.</i> , No. IPR2019-00916, Paper 16 (P.T.A.B. Oct. 18, 2019) ("533-Inst.")
1008	<i>Apple Inc. v. Omni Medsci, Inc.</i> , No. IPR2019-00916, Paper 39 (P.T.A.B. Oct. 14, 2020) ("533-FWD")
1009	<i>Omni MedSci, Inc. v. Apple Inc.</i> , No. 2021-1229, 2022 WL 2062168 (Fed. Cir. June 8, 2022)
1010	Declaration of Brian Anthony in Support of Petition for <i>Inter Partes</i> Review of U.S. Patent No. 10,517,484 submitted in IPR2021-00453, Ex.1003 ("484-Anthony")
1011	<i>Apple Inc. v. Omni Medsci, Inc.</i> , No. IPR2021-00453, Paper 1 (P.T.A.B. Jan. 22, 2021) ("484-Pet.")
1013	<i>Apple Inc. v. Omni Medsci, Inc.</i> , No. IPR2021-00453, Paper 7 (P.T.A.B. Aug. 6, 2021) ("484-Inst.")

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Exhibit No.	DESCRIPTION
1014	<i>Apple Inc. v. Omni Medsci, Inc.</i> , No. IPR2021-00453, Paper 11 (P.T.A.B. Feb. 4, 2022) (“484-Pet.-Reply”)
1015	<i>Apple Inc. v. Omni Medsci, Inc.</i> , No. IPR2021-00453, Paper 22 (P.T.A.B. Aug. 3, 2022) (“484-FWD”)
1016	<i>Apple Inc. v. Omni Medsci, Inc.</i> , No. IPR2021-00453, Paper 26 (P.T.A.B. Feb. 14, 2025) (“484-RFWD”)
1017	<i>Apple Inc. v. Omni MedSci, Inc.</i> , No. 2023-1034, 2024 WL 3084509 (Fed. Cir. June 21, 2024), ECF No. 44
1018	<i>Omni MedSci, Inc. v. Apple Inc.</i> , 2:18-cv-00134-RWS, Dkt. No. 211 (E.D. Tex. June 24, 2019) (“CC Order”)
1019	<i>Omni MedSci, Inc. v. Apple Inc.</i> , 2:18-cv-00429-RWS, Dkt. No. 152 (E.D. Tex. Aug. 14, 2019)
1023	Defendants' Supplemental Invalidity and Subject Matter Eligibility Contentions, July 18, 2025. <i>Omni MedSci, Inc. v. Samsung Electronics Co., Ltd. et al.</i> , No. 2:24-cv-01070-JRG-RSP (E.D. Tex.).
1025	U.S. Patent No. 9,241,676 (“Lisogurski”)
1026	U.S. Patent Pub. No. 2010/0217102 (“LeBoeuf”)
1027	U.S. Patent No. 8,108,036 (“Tran”)
1028	U.S. Patent Pub. No. 2005/0049468 (“Carlson”)
1029	U.S. Patent No. 7,139,076 (“Marbach”)
1031	U.S. Patent No. 8,050,730 (“Zhang”)
1032	U.S. Patent No. 8,821,397 (“Al-Ali”)
1033	U.S. Patent Pub. No. 2011/0237911 (“Lamego”)

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Exhibit No.	DESCRIPTION
1034	U.S. Patent No. 5,942,749 ("Takeuchi")
1035	U.S. Patent No. 5,822,473 ("Magel")
1036	US Patent 5,592,124 ("Mullins")
1037	E.F. Schubert, Light-Emitting Diodes (Cambridge Univ. Press, 2nd ed. reprinted 2014)
1038	Joseph D. Bronzino, "The Biomedical Engineering Handbook," (1995)
1039	U.S. Patent No. 8,079,735 ("Vakil")
1041	U.S. Patent Pub. No. 2012/0197093 ("Valencell-093")
1042	U.S. Patent No. 8,862,196 ("Lynn")
1043	U.S. Patent No. 8,412,655 ("Colman")
1044	U.S. Patent No. 5,511,553 ("Segalowitz")
1045	U.S. Patent No. 6,801,799 ("Mendelson")
1046	U.S. Patent No. 6,662,033 ("Casciani")
1048	U.S. Pat. No. 9,239,951 ("Hoffberg")
1049	U.S. Pat. Pub. 2007/0194939 ("Alvarez")
1051	U.S. Patent No. 6,931,269 ("Terry")
1059	U.S. Patent No. 5,497,769 ("Gratton")
1060	U.S. Patent No. 5,827,182 ("Raley")
1061	U.S. Patent No. 7,764,982 ("Dalke")

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Exhibit No.	DESCRIPTION
1062	U.S. Patent No. 6,343,223 ("Chin")
1063	W.O. Patent Pub. No. 2000/013003 ("Colvin")
1064	U.S. Patent No. 5,554,273 ("Demmin")
1065	U.S. Patent No. 5,953,713 ("Behbehani")
1066	U.S. Patent No. 6,587,704 ("Fine")
1067	U.S. Patent No. 6,397,092 ("Norris")
1068	U.S. Patent No. 5,360,004 ("Purdy")
1077	U.S. Patent Publication No. 2006/0184040 ("Keller")
1081	US. Patent No. 9,651,533 ("533")
1082	U.S. Patent No. 10,517,484 ("484")
1083	Declaration of Brian Anthony in Support of Petition for Inter Partes Review of U.S. Patent No. 9,861,286 submitted in IPR2019-00914, Ex.1003
1085	<i>Apple Inc. v. Omni Medsci, Inc.</i> , No. IPR2019-00916, Paper 10 (P.T.A.B. July. 22, 2019) ("533-POPR")
1122	Claim Construction Order, <i>Omni MedSci, Inc. v. Samsung Electronics Co., Ltd. et al.</i> , No. 2:24-cv-01070-JRG-RSP, Dkt. No. 154 (E.D. Tex. Mar. 24, 2026)
1127	Transcript of July 16, 2026 Deposition of Dr. Igor Efimov [CONFIDENTIAL]
1128	Transcript of July 23, 2026 Deposition of Dr. Mohammed Islam
1140	Plaintiff's Disclosure of Asserted Claims and Infringement Contentions, Mar. 12, 2025, Ex.04_P.R. 3-1 Chart US10517484 Samsung Watch. <i>Omni MedSci, Inc. v.</i>

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Exhibit No.	DESCRIPTION
	<i>Samsung Electronics Co., Ltd. et al., No. 2:24-cv-01070-JRG-RSP (E.D. Tex.).</i>
2043	Corrected Declaration of Prof. Igor Efimov, Ph.D. dated May 7, 2026 (CONFIDENTIAL)
2044	Updated curriculum vitae of Prof. Igor Efimov, Ph.D.
2045	Transcript of Apr. 17, 2026 Deposition of Dr. Brian W. Anthony
2046	Transcript of Apr. 18, 2026 Deposition of Dr. Brian W. Anthony
2047	2026-01-30 - Exhibit A to the P.R. 4-5 Joint Claim Construction Chart, Omni MedSci, Inc. v. Samsung Electronics Co., Ltd. et al., No. 2:24-cv-01070-JRG-RSP (E.D. Tex.)
2100	Declaration of Dr. Mohammed Islam (CONFIDENTIAL)
2101	OMS_SAM0031768 (CONFIDENTIAL)
2102	OMS_SAM0031776 (CONFIDENTIAL)
2103	OMS_SAM0031782 (CONFIDENTIAL)
2104	OMS_SAM0031797 (CONFIDENTIAL)
2105	OMS_SAM0031867 (CONFIDENTIAL)
2106	OMS_SAM0031851 (CONFIDENTIAL)
2107	OMS_SAM0031961
2108	U.S. Patent No. 5,632,272 to Diab et al. ("Masimo '272 Patent")
2109	U.S. Patent No. 7,738,935 to Turcott ("Pacesetter '935 Patent")
2110	U.S. Patent No. 6,126,595 to Amano et al.
2111	U.S. Patent Publication No. 2014/0275854 ("Fitbit '854 Publication")

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Exhibit No.	DESCRIPTION
2112	GE Dash 2000 Patient Monitor Operating Manual
2113	Accuracy in wrist-worn, sensor-based measurements of heart rate and energy expenditure in a diverse cohort, Scherbina et. al, (Stanford 2016)
2114	Are Currently Available Wearable Devices for Activity Tracking and Heart Rate Monitoring Accurate, Precise, and Medically Beneficial" El-Amrawy et al., Healthcare Informatics Research (2015)
2115	A review of wearable sensors and systems with application in rehabilitation, Patel et. al, Journal of Neuroengineering and Rehabilitation, 2012
2116	Samsung Watch Infringement Claim Chart
	<i>Samsung Electronics Co., Ltd. et al. v. Omni MedSci, Inc.</i> , No. IPR2025-01251, Pap. 1 (P.T.A.B. Aug. 5, 2025) [Petition]
	<i>Samsung Electronics Co., Ltd. et al. v. Omni MedSci, Inc.</i> , No. IPR2025-01251, Pap. 12 (P.T.A.B. Nov. 12, 2025) [Patent Owner's Preliminary Response]
	<i>Samsung Electronics Co., Ltd. et al. v. Omni MedSci, Inc.</i> , No. IPR2025-01251, Pap. 22 (P.T.A.B. Apr. 10, 2026) [Patent Owner's Notice of Deposition of Brian W. Anthony]
	<i>Samsung Electronics Co., Ltd. et al. v. Omni MedSci, Inc.</i> , No. IPR2025-01251, Pap. 28 (P.T.A.B. May 7, 2026) [Patent Owner's Response]