

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 IPR2025-01252
Patent No. 11,160,455

PETITIONERS' REPLY TO PATENT OWNER'S RESPONSE

TABLE OF CONTENTS

	<u>Page</u>
I. INTRODUCTION	1
II. CLAIM CONSTRUCTION	2
III. COLLATERAL ESTOPPEL.....	2
IV. LISOGURSKI DISCLOSES AND RENDERS OBVIOUS “A LIGHT SOURCE COMPRISING A DRIVER” ([1.B], [8.B], [15.B])	5
V. LISOGURSKI DISCLOSES AND RENDERS OBVIOUS “THREE OPTICAL WAVELENGTHS” ([1.M], [10], [16]) AND “...ONE OF THE OPTICAL WAVELENGTHS IS USED TO IMPROVE MEASUREMENT...” ([4], [11], [16])	9
VI. LISOGURSKI DISCLOSES AND RENDERS OBVIOUS SIX LEDS ([2], [8.M], [15.M]).....	12
VII. LISOGURSKI AND LEBOEUF RENDER OBVIOUS THE ARC LIMITATIONS ([2], [9], [15]).....	14
VIII. LISOGURSKI IN VIEW OF LEBOEUF RENDERS OBVIOUS THE REFLECTIVE SURFACE LIMITATIONS ([6], [13], [17]).....	20
IX. PO’S ALLEGED SECONDARY CONSIDERATIONS DO NOT NEGATE THE CLAIMS’ OBVIOUSNESS	23
A. No Evidence of Copying or Nexus to the Claims	23
B. No Evidence of Long Felt Need with a Nexus to the Claims	27
X. CONCLUSION.....	28

TABLE OF AUTHORITIES

	Page(s)
<u>Cases</u>	
<i>In re Applied Materials, Inc.</i> , 692 F.3d 1289 (Fed. Cir. 2012)	12
<i>Bos. Sci. Scimed, Inc. v. Cordis Corp.</i> , 554 F.3d 982 (Fed. Cir. 2009)	22
<i>Cisco Sys., Inc. v. Lionra Techs. Ltd.</i> , IPR2024-01281, Paper 26 (PTAB Mar. 4, 2026)	11, 13
<i>DyStar Textilfarben GmbH & Co. Deutschland KG v. C.H. Patrick Co.</i> , 464 F.3d 1356 (2006).....	17
<i>Enova Tech. Corp. v. Seagate Tech. (US) Holdings Inc.</i> , 706 F. App'x 987 (Fed. Cir. 2017)	23
<i>In re Farrenkopf</i> , 713 F.2d 714 (Fed. Cir. 1983)	8
<i>Fleming v. Cirrus Design Corp.</i> , 28 F.4th 1214 (Fed. Cir. 2022)	24
<i>In re Fulton</i> , 391 F.3d 1195 (Fed. Cir. 2004)	18
<i>In re Huai-Hung Kao</i> , 639 F.3d 1057 (Fed. Cir. 2011)	28
<i>Iron Grip Barbell Co. v. USA Sports, Inc.</i> , 392 F.3d 1317 (Fed. Cir. 2004)	25
<i>In re Karpf</i> , 758 F. App'x 960 (Fed. Cir. 2019).....	28
<i>Keynetik, Inc. v. Samsung Elecs. Co.</i> , No. 2022-1127, 2023 WL 2003932 (Fed. Cir. Feb. 15, 2023).....	21
<i>Keysight Techs., Inc. v. Centripetal Networks, LLC</i> , IPR2022-01535, Paper 26 (PTAB Apr. 16 2024)	3

<i>Keysight Techs., Inc. v. Centripetal Networks, LLC</i> , IPR2023-00446, Paper 30 at 21 (PTAB Aug. 5, 2024).....	3
<i>M2M Sols. LLC v. Amazon.com, Inc.</i> , No. 2022-1122, 2023 WL 2154964 (Fed. Cir. Feb. 22, 2023).....	3
<i>In re Mouttet</i> , 686 F.3d 1322 (Fed. Cir. 2012)	19
<i>Nat'l Steel Car, Ltd. v. Canadian Pac. Ry., Ltd.</i> , 357 F.3d 1319 (Fed. Cir. 2004)	16
<i>Oren Techs., LLC v. Proppant Express Invs. LLC</i> , No. 2019-1778, 2021 WL 3120819 (Fed. Cir. July 23, 2021)	3
<i>Pfizer, Inc. v. Apotex, Inc.</i> , 480 F.3d 1348 (Fed. Cir. 2007)	21
<i>Power Integrations, Inc. v. Semiconductor Components Indus., LLC</i> , 926 F.3d 1306 (Fed. Cir. 2019)	4
<i>Rimfrost AS. v. Aker Biomarine Antarctic AS</i> , IPR2018-01730, Paper 35 (PTAB Mar. 6, 2020)	8
<i>Slingshot Printing LLC v. Canon U.S.A., Inc.</i> , No. 2024-1956, 2026 WL 1098251 (Fed. Cir. Apr. 23, 2026).....	18
<i>Spectrum Sols. LLC v. Longhorn Vaccines & Diagnostics, LLC</i> , IPR2021-00847, Paper 114 (PTAB May 3, 2023)	12
<i>Virtek Vision Int'l ULC v. Assembly Guidance Sys., Inc.</i> , 97 F.4th 882 (Fed. Cir. 2024)	18
<i>Vivint, Inc. v. SB IP Holdings LLC</i> , IPR2022-01364, Paper 18 (PTAB Apr. 10, 2024)	3
<i>In re Woodruff</i> , 919 F.2d 1575 (Fed. Cir. 1990)	12
<i>Xerox Corp. v. Bytemark, Inc.</i> , IPR2022-00624, Paper 9 (PTAB Aug. 24, 2022).....	4



XY, LLC v. Trans Ova Genetics, L.C.,
890 F.3d 1282 (Fed. Cir. 2018) 3

TABLE OF EXHIBITS

Exhibit No.	DESCRIPTION
1001	U.S. Patent No. 11,160,455 (“455”)
1002	File History of U.S. Application No. 17/078,771 (“455FH”)
1003	Declaration of Brian Anthony in Support of Petition for Inter Partes Review of U.S. Patent No. 11,160,455 (“Anthony”)
1004	Declaration of Brian Anthony in Support of Petition for Inter Partes 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.”)
1006	<i>Apple Inc. v. Omni Medsci, Inc.</i> , No. IPR2019-00916, Paper 23 (P.T.A.B. Jan. 31, 2020) (“533-POR”)
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. 21-01229, ECF 69 (Fed. Cir. June 8, 2022)
1010	Declaration of Brian Anthony in Support of Petition for Inter Partes 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.”)

Exhibit No.	DESCRIPTION
1012	<i>Apple Inc. v. Omni Medsci, Inc.</i> , No. IPR2021-00453, Paper 10 (P.T.A.B. Nov. 12, 2021) (“484-POR”)
1013	<i>Apple Inc. v. Omni Medsci, Inc.</i> , No. IPR2021-00453, Paper 7 (P.T.A.B. Aug. 6, 2021) (“484-Inst.”)
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. 23-01034, ECF 44 (Fed. Cir. June 21, 2024)
1018	<i>Omni MedSci, Inc. v. Apple Inc.</i> , 2:18-cv-00134-RWS, Dkt. No. 211 (E.D. Tex. June 24, 2019)
1019	<i>Omni MedSci, Inc. v. Apple Inc.</i> , 2:18-cv-00429-RWS, Dkt. No. 152 (E.D. Tex. Aug. 14, 2019)
1020	Second Amended Docket Control Order, June 16, 2025. <i>Omni MedSci, Inc. v. Samsung Electronics Co., Ltd. et al.</i> , No. 2:24-cv-01070-JRG-RSP (E.D. Tex.)
1021	<i>Reserved</i>
1022	<i>Reserved</i>
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.)

Exhibit No.	DESCRIPTION
1024	<i>Reserved</i>
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. 2005/0049468A1 (“Carlson”)
1029	<i>Reserved</i>
1030	U.S. Patent No. 7,029,628 (“Tam”)
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”)
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”)
1040	<i>Reserved</i>
1041	U.S. Patent Pub. No. 2012/0197093 (“Valencell-093”)

Exhibit No.	DESCRIPTION
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”)
1047	U.S. Patent No. 5,028,787 (“Rosenthal”)
1048	U.S. Pat. No. 9,239,951 (“Hoffberg”)
1049	U.S. Pat. Pub. 2007/0194939 (“Alvarez”)
1050	U.S. Patent No. 8,364,226 (“Diab”)
1051	U.S. Patent No. 6,931,269 (“Terry”)
1052-1058	<i>Reserved</i>
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”)
1062-63	<i>Reserved</i>
1064	U.S. Patent No. 5,554,273 (“Demmin”)
1065	U.S. Patent No. 5,953,713 (“Behbehani”)
1066-76	<i>Reserved</i>
1077	U.S. Patent Publication No. 2006/0184040 (“Keller”)

Exhibit No.	DESCRIPTION
1078-1080	<i>Reserved</i>
1081	US. Patent No. 9,651,533 (“533”)
1082	U.S. Patent No. 10,517,484 (“484”)
1083	<i>Reserved</i>
1084	Declaration of Jonathan Bradford
1085	<i>Apple Inc. v. Omni Medsci, Inc.</i> , No. IPR2019-00916, Paper 10 (P.T.A.B. Jul. 22, 2019) (“533-POPR”)
1086	<i>Samsung Electronics Co., Ltd. et al v. Omni MedSci, Inc.</i> , No. IPR2025-01253, Paper 6 (P.T.A.B. Aug. 5, 2025)
1087	<i>Samsung Electronics Co., Ltd. et al v. Omni MedSci, Inc.</i> , No. IPR2025-01254, Paper 6 (P.T.A.B. Aug. 5, 2025)
1088-1090	<i>Reserved</i>
1091	<i>Apple Inc. v. Omni Medsci, Inc.</i> , No. IPR2021-00453, Paper 27 (P.T.A.B. Apr. 11, 2025)
1092	<i>Samsung Electronics Co., Ltd. et al v. Omni MedSci, Inc.</i> , No. IPR2025-01249, Paper 1 (P.T.A.B. Aug. 5, 2025) (“868 Pet.”)
1093	<i>Samsung Electronics Co., Ltd. et al v. Omni MedSci, Inc.</i> , No. IPR2025-01250, Paper 1 (P.T.A.B. Aug. 5, 2025) (“533 Pet.”)
1094	<i>Samsung Electronics Co., Ltd. et al v. Omni MedSci, Inc.</i> , No. IPR2025-01251, Paper 1 (P.T.A.B. Aug. 5, 2025) (“304 Pet.”)
1095	<i>Reserved</i>
1096	<i>Samsung Electronics Co., Ltd. et al v. Omni MedSci, Inc.</i> , No. IPR2025-01254, Paper 1 (P.T.A.B. Aug. 5, 2025) (“475 Pet.”)

Exhibit No.	DESCRIPTION
1097	<i>Samsung Electronics Co., Ltd. et al v. Omni MedSci, Inc.</i> , No. IPR2025-01253, Paper 1 (P.T.A.B. Aug. 5, 2025) (“790 Pet.”)
1098	Email correspondence between counsel for Fossil to counsel for Omni
1099	U.S. Patent No. 9,055,868 (“868”)
1100	U.S. Patent No. 10,874,304 (“304”)
1101	<i>Reserved</i>
1102	U.S. Patent No. 12,193,790 (“790”)
1103	U.S. Patent No. 12,268,475 (“475”)
1104	<i>Apple Inc. v. Omni MedSci, Inc.</i> , No. IPR2020-00175, Paper 26 (P.T.A.B. June 14, 2021)
1105	<i>Omni MedSci, Inc. v. Apple Inc.</i> , No. 2021-2213, 2022 WL 2062167 (Fed. Cir. June 8, 2022), ECF No. 47
1106	<i>Apple Inc. v. Omni Medsci, Inc.</i> , No. IPR2020-00029, Paper 7 (P.T.A.B. Apr. 22, 2020)
1107	<i>Apple Inc. v. Omni Medsci, Inc.</i> , No. IPR2019-00914, Paper 13 (P.T.A.B. Nov. 6, 2019)
1108	<i>Apple Inc. v. Omni Medsci, Inc.</i> , No. IPR2019-00917, Paper 14 (P.T.A.B. Oct. 17, 2019)
1109	<i>Reserved</i>
1110	United States District Courts – National Judicial Caseload Profile
1111	EDTX Trials 2026-08-17

Exhibit No.	DESCRIPTION
1112	Joint Mot for Preferential Trial Setting, <i>Multimedia Techs. Ltd. v LG Elecs.</i> , 2:22-cv-00494-JRG-RSP, Dkt. No. 273 (E.D. Tex. Mar. 18, 2025)
1113	Omni's First Set of Common Interrogatories to Defendants (2025-05-12)
1114	<i>Reserved</i>
1115	OnePlus Waiver of Service, <i>Omni MedSci, Inc. v. Samsung Electronics Co., Ltd. et al.</i> , No. 2:24-cv-01070-JRG-RSP, Dkt. No. 70 (E.D. Tex. June 27, 2025)
1116	<i>Omni MedSci, Inc. v. Apple Inc.</i> , 4:20-cv-00563, Dkt. No. 52 (N.D. Cal. Dec. 06, 2021)
1117	Declaration of James Nowell in Support of Petitioners' Opposition to Patent Owner's Discretionary Denial Brief
1118	Defendants' Preliminary Constructions and Extrinsic Evidence – Exhibit A, <i>Omni MedSci, Inc. v. Samsung Electronics Co., Ltd. et al.</i> , No. 2:24-cv-01070-JRG-RSP (E.D. Tex. Oct. 31, 2025)
1119	Local Patent Rules for the United States District Court for the Eastern District of Texas
1120	Email correspondence between counsel for Samsung to counsel for Omni
1121	December 9, 2025 email from the Board authorizing Petitioners to file additional brief regarding the impact of the <i>Revvo</i> and <i>Tesla</i> decisions
1122	<i>Reserved</i>

Exhibit No.	DESCRIPTION
1123	Supplemental Declaration of Jonathan Bradford in Support of Petition For Inter Partes Review of U.S. Patent No. 11,160,455 (Mar. 4, 2026)
1124	Declaration of Brian Anthony in Support of Petitioners' Reply to Patent Owner Response ("Anthony-Reply") [CONFIDENTIAL]
1125	<i>Omni MedSci, Inc. v. Apple Inc.</i> , 4:20-cv-00563-YGR, Dkt. No. 54 (N.D. Cal. Jan. 13, 2023)
1126	<i>Omni MedSci, Inc. v. Apple Inc.</i> , 4:20-cv-00563-YGR, Dkt. No. 1 (N.D. Cal. Jan. 24, 2020)
1127	Transcript of Igor Efimov, Ph.D. (July 16, 2026) ("Efimov-Tr.") [CONFIDENTIAL]
1128	Transcript of the Deposition of Mohammed Islam, Sc.D. (July 23, 2026) ("Islam-Tr.")
1129	Abhay Rai LinkedIn Resume
1130	Leo Lautenschlager LinkedIn Resume
1131	Badri Padmanabhan LinkedIn Resume
1132	Sanjith Thayyilthodiyil LinkedIn Resume
1133	Kevin Lee LinkedIn Resume
1134	Samsung Semiconductor, Inc.'s System LSI Webpage
1135	Samsung Electronics Co., Ltd. Consolidated Financial Statements, Dec. 31, 2024 and 2023
1136	Samsung SDS Co., Ltd. Consolidated Financial Statements, Dec. 31, 2024 and 2023

Exhibit No.	DESCRIPTION
1137	Declaration of James Nowell in Support of Petitioners' Reply to Patent Owner Response
1138	Declaration of Brian Anthony in Support of Petitioners' Reply to Patent Owner Response ("Anthony-Reply") [REDACTED]
1139	Transcript of Igor Efimov, Ph.D. (July 16, 2026) ("Efimov-Tr.") [REDACTED]

TABLE OF ABBREVIATIONS

Abbreviations	DESCRIPTION
Claims	Claims 1-20 of the '455 patent
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
Pet.	<i>Samsung Electronics Co., Ltd. et al. v. Omni MedSci, Inc.</i> , No. IPR2025-01252, Paper 1 (PTAB Aug. 5, 2025)
POR	<i>Samsung Electronics Co., Ltd. et al. v. Omni MedSci, Inc.</i> , No. IPR2025-01252, Paper 26 (PTAB May 7, 2026)
Anthony	Declaration of Brian Anthony in Support of Petition for Inter Partes Review of U.S. Patent No. 11,160,455 (Ex.1003)
Anthony-Reply	Declaration of Brian Anthony in Support of Petition for Inter Partes Review of U.S. Patent No. 11,160,455 (Ex.1124)
Texas Case	<i>Omni MedSci, Inc. v. Samsung Electronics Co., Ltd. et al.</i> , No. 2:24-cv-01070-JRG-RSP (E.D. Tex.)
'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)
Prior FWDs	'533-FWD, '484-FWD, and '484-RFWD (Exs. 1008 & 1015-1016)

Abbreviations	DESCRIPTION
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)
'533	U.S. Patent No. 9,651,533 (Ex.1081)
'484	U.S. Patent No. 10,517,484 (Ex.1082)
'455	U.S. Patent No. 11,160,455 (Ex.1001)
Lisogurski	U.S. Patent No. 9,241,676 (Ex.1025)
Carlson	U.S. Patent Pub. No. 2005/0049468 (Ex.1028)
Tran	U.S. Patent No. US 8,108,036 (Ex.1027)
LeBoeuf	U.S. Patent Pub. No. 2010/0217102 (Ex.1026)
Lamego	U.S. Patent Pub. No. 2011/0237911 (Ex.1033)
Mendelson	U.S. Patent No. 6,801,799 (Ex.1045)
Valencell-093	U.S. Patent Pub. No. 2012/0197093 (Ex.1041)
Efimov-Tr.	Transcript of Igor Efimov, Ph.D. (July 16, 2026) (Ex.1127)
Islam-Tr.	Transcript of the Deposition of Mohammed Islam, Sc.D. (July 23, 2026) (Ex.1128)
SNR	Signal-to-Noise Ratio
PIC	Patent Owner's Preliminary Infringement Contentions filed in the Texas Case (Ex.2116)

Abbreviations	DESCRIPTION
SEC	Samsung Electronics Co., Ltd.
SEA	Samsung Electronics America, Inc.
SSI	Samsung Semiconductor, Inc.
SDS	Samsung SDS

I. INTRODUCTION

As the Petition details, the Grounds render obvious claims 1-20 (“Claims”). Collateral estoppel applies to the vast majority of the limitations here given previous Board decisions finding identical or substantially identical limitations unpatentable.

The Patent Owner Response (“POR”) challenges a limited number of issues:

(1) whether Lisogurski discloses or renders obvious:

- “a light source comprising a driver” ([1.b], [8.b], [15.b]) (all grounds),
- “three optical wavelengths” ([1.m], [10], [16]) (all grounds);
- “one of the optical wavelengths is used to improve measurement of...the output signal corresponding to the other two optical wavelengths” ([4], [11], [16]) (Grounds 1-2, 5-6);
- six LEDs ([2], [8], [15]) (all grounds); and

(2) whether Lisogurski in view of LeBoeuf renders obvious:

- semiconductor sources and detectors in one or more arcs ([2], [9], [15]) (Grounds 2, 6), and
- “the wearable device further comprises a reflective surface” ([6], [13] (Grounds 4, 8), [17] (Grounds 2, 6)).

Patent Owner (“PO”) relies on mischaracterizations of the Petition, prior art, law, and Claims themselves. The Claims are unpatentable, and PO’s reliance on alleged secondary considerations of non-obviousness is misplaced.

II. CLAIM CONSTRUCTION

The prior art discloses the Claims’ indisputable scope. Claim construction is unnecessary. Pet., 15-18. PO does not disagree, and identifies no prior construction relevant to the Petition other than those already identified in the Petition. POR, 10. Anthony-Reply, ¶8.

III. COLLATERAL ESTOPPEL

“[C]ollateral estoppel should apply to entire limitations [1.pre]-[1.l], [8.pre]-[8.l], [15.pre]-[15.l], and at least partially to [5], [7], [12], [14], [18] and [20],” given prior Board decisions.^{1,2} Pet., 18-20; Anthony, ¶¶9-11. PO does not disagree that the Board already found limitations identical or substantially identical to those limitations unpatentable. POR, 12-15.

¹ Petitioners partially assert collateral estoppel against [1.b], [8.b], and [15.b]. Pet., 28 n.7, 30-31, 47, 58.

² Contrary to PO (POR, 14), the Board previously found “a reflective surface” disclosed by the prior art. ’484-FWD, 58-61; ’484-RFWD, 12. Anthony-Reply, ¶12.

Collateral estoppel attaches to individual limitations. *See M2M Sols. LLC v. Amazon.com, Inc.*, No. 2022-1122, 2023 WL 2154964, at *4 (Fed. Cir. Feb. 22, 2023) (estopping plaintiff from arguing prior art’s teaching of a disputed limitation); *Keysight Techs., Inc. v. Centripetal Networks, LLC*, IPR2023-00446, Paper 30 at 21 (PTAB Aug. 5, 2024) (applying “estoppel from asserting that [certain limitations] are not taught or suggested”); POR, 12-16.

While the ’484-RFWD is on appeal (POR, 16-17), it will become final—collateral estoppel thus applies—upon “affirmance.” *XY, LLC v. Trans Ova Genetics, L.C.*, 890 F.3d 1282, 1294 (Fed. Cir. 2018). Regardless, the Board’s unpatentability findings regarding substantially identical limitations in the ’484-RFWD apply equally here with no reason to “deviate from the [’484-RFWD].” *Vivint, Inc. v. SB IP Holdings LLC*, IPR2022-01364, Paper 18 at 52 n.15 (PTAB Apr. 10, 2024); Pet., 20.

No lack of incentive exception to collateral estoppel applies to the ’484-FWD. POR, 16-17. PO was actively asserting unpatentable ’484 claims against Apple seeking damages. ’484-FWD; Exs.1125-1126; *Keysight Techs., Inc. v. Centripetal Networks, LLC*, IPR2022-01535, Paper 26 at 6, 19-22 (PTAB Apr. 16 2024) (applying collateral estoppel where not all claims were found unpatentable). *Oren Techs., LLC v. Proppant Express Invs. LLC* is inapposite—there, the lack of incentive came from a stipulated judgment of non-infringement. No. 2019-1778,

2021 WL 3120819, at *3 (Fed. Cir. July 23, 2021). *Power Integrations, Inc. v. Semiconductor Components Indus., LLC* is also inapposite—the patentee lacked incentive to appeal IPR unpatentability findings because of a jury finding of non-infringement. 926 F.3d 1306, 1313 n.4, n.6 (Fed. Cir. 2019) (emphasizing the decision has no bearing on “IPR decisions in circumstances different than” that case).

PO mischaracterizes Dr. Anthony’s declaration as simply quoting the Board and improperly incorporating prior testimony. POR, 18. Dr. Anthony’s “prior testimony” has been resubmitted here, not improperly incorporated. Ex.1004; Ex.1010. Even in [1.pre] that PO challenges, Dr. Anthony discusses the Board’s prior analysis, confirms his prior consistent testimony, compares the limitations in the prior decision and in the ’455, and explains why the Board’s analysis equally applies here. Anthony, ¶¶109-114. For new limitations, Dr. Anthony further explains how the prior art teaches them. E.g., Anthony, ¶124. PO’s reliance on *Xerox Corp. v. Bytemark, Inc.* is misplaced as it involved expert testimony without cited support. IPR2022-00624, Paper 9 at 15 (PTAB Aug. 24, 2022). Anthony-Reply, ¶¶9-13.

IV. LISOGURSKI DISCLOSES AND RENDERS OBVIOUS “A LIGHT SOURCE COMPRISING A DRIVER” ([1.B], [8.B], [15.B])

Lisogurski’s “light drive circuitry 120” is undisputedly a driver. POR, 19-20. The Board already agreed that a POSITA would have been motivated to incorporate Lisogurski’s light drive circuitry (“Driver”) into sensor 102 given “numerous industry trends” to improve wearable sensors’ capabilities. Pet., 25-27 (quoting ’533-FWD, 22-25). A POSITA would have further understood—and at least found obvious—that Driver is “*within light source 130*” inside sensor 102 for the same reason the Board agreed to the previous modification—e.g., Driver “output[s] the electric current that is applied to the LEDs, [and a POSITA] would have understood that this [Driver] would need to be in the same device as the LEDs.” ’533-Pet., 32; *see also* ’533-FWD, 23 (agreeing with the petitioner’s “sufficient reasoning”); Pet., 31 (citing Pet., §IX.B.2, Anthony, ¶¶124-125), 27 (citing Anthony ¶¶90-107), 47, 58 (explaining [8.b] and [15.b] met for the same reasons as [1.b]). Anthony-Reply, ¶¶15-18.

PO is thus estopped from arguing a POSITA would not have relocated components from Lisogurski’s monitor 104 into sensor 102. ’533-FWD, 22-25. Indeed, the Board’s summary of the modifications combine Driver 120 with light source 130. ’533-FWD, 22-23 (figure combining green elements). Contrary to PO (POR, 28-29), Lisogurski provides no “[signal-to-noise ratio (“SNR”)] goal” or

indication its purported goal is to separate alleged noise-generating components from the sensor. Lisogurski, FIG. 1, 10:42-49, Fig. 3, 17:32-42; '533-FWD, 23. Instead, as the Board recognized, Lisogurski teaches integrating those components (e.g., Driver) into other parts of Lisogurski's system, such as its sensor. '533-FWD, 23 (quoting Lisogurski, 16:2-4, 16:7-9). Dr. Efimov's testimony that relocation would decrease SNR is unsupported. Ex.2043, ¶¶130-131. Rather, as Dr. Anthony recognized, relocation would improve SNR with "precise synchronization and optimal signal integrity," and "reduce[d] noise, signal degradation, and latency" aligned with "standard industry practices." Anthony, ¶¶94, 102. Anthony-Reply, ¶¶17-19, 22, 29-33.

PO fails to address the Petitioners' extension of the Board's rationale for integrating Lisogurski's light drive circuitry into the sensor, and thus the light source. Pet., 31. Instead, PO focuses on Lisogurski's literal disclosure or motivation for further modification—PO's arguments thus fail for this reason alone. POR, 19-29. Anthony-Reply, ¶¶17-20.

As Dr. Anthony undisputedly explained, a POSITA would have understood the benefit of "integrating[] [Driver] directly with the LEDs" to "maintain[] precise synchronization and optimal signal integrity." Anthony, ¶94; Pet., 26-27. Driver is "operationally interdependent" to light source, and combining Driver with "optical sources reduces electrical noise and interference, enhances reliability, simplifies

device architecture, and facilitates more efficient manufacturing”—all well-known “standard design goals.” Anthony, ¶¶124-125; Pet., 31. Anthony-Reply, ¶17.

Indeed, light sources commonly included Driver. Pet., 27 (citing Anthony, ¶¶90-107). Ex.1031 discloses an exemplary “probe unit compris[ing] a red light source, an infrared light source and the light driver circuit” to combine light sources and Driver in the same unit just as the claim requires. Ex.1031, 14:12-26. Anthony-Reply, ¶¶19-20.

The Board already agreed a POSITA would have modified Lisogurski to include both light source and Driver in the sensor—PO’s efforts to draw a box excluding Driver from the light source lack merit. POR, 20-29; Pet., 31. Indeed, Lisogurski’s light source 130, as modified, “include[s]...Red and IR...[LEDs]” and Driver (Lisogurski, 10:52-56; Pet., 30-31)—Driver would thus generate light drive signals driving the LEDs within the “light source,” rather than the “light source” itself as PO misunderstands. Lisogurski, 11:50-57 (“light drive signal...control[s] operation of each wavelength of light”); POR, 25-26. Contrary to PO (POR, 25), this is how Dr. Anthony explained that Driver generates light drive signals to turn “on and off” the light source. Ex.2045, 51:21-53:12. Anthony-Reply, ¶¶21-24.

Likewise, PO provides no support in arguing light source 130’s heat may damage or interfere with Driver. POR, 27-28. Lisogurski does not concern the light source’s heat *on drive circuitry*. Lisogurski, 1:17-19, 3:58-60 (discussing heating

effect in abstract); *id.*, 5:7-9 (discussing heating effects on the user). Likewise, PO’s Ex.2036 discusses heating effects on LEDs themselves—not surrounding circuitry—and using heat sinks to address such concerns, which Ex.1037 confirms to have significantly reduced heat before the priority date (Ex.1037, 30-31). Ex.2036. This is consistent with Dr. Anthony’s testimony, which PO again mischaracterizes. POR, 27; Anthony Tr., 87:2-11, 87:14-88:10 (confirming “not so much heat that a POSITA would be concerned with the [] performance or the motivations to combine here”), 88:11-21, 107:1-13. Dr. Efimov’s conclusory declaration likewise provides no support. Ex.2043, ¶124. Anthony-Reply, ¶¶25-27.

PO’s arguments regarding the modification’s “complications, costs, and design issues” are precluded, contrary to the law, and unfounded. POR, 27. PO is estopped based on the Prior FWDs finding a POSITA would have relocated components in monitor 104 to sensor 102. *Supra* §III; *Rimfrost AS. v. Aker Biomarine Antarctic AS*, IPR2018-01730, Paper 35 at 21-24 (PTAB Mar. 6, 2020) (estopping PO from relitigating that a POSITA would not have had reason to combine art). Further, economic reasons do “not mean that [a POSITA] would not make the combination because of some technological incompatibility.” *In re Farrenkopf*, 713 F.2d 714, 718 (Fed. Cir. 1983). Notably, PO bases its alleged concern on the very embodiment of Lisogurski the Board found “expressly suggests the modification by teaching embodiments in which ‘the functionality of some of

the components may be combined in a single component’ and embodiments in which ‘the functionality of some of the components of monitor 104...may be divided over multiple components.’” ’533-FWD, 23 (quoting Lisogurski, 16:2-4, 16:7-9);’484-FWD, 24-25. With the common use of driver circuitry within a light source, PO’s concerns would not have been an issue. Pet., 27 (citing Ex.1031). Anthony-Reply, ¶¶19-20, 28.

V. LISOGURSKI DISCLOSES AND RENDERS OBVIOUS “THREE OPTICAL WAVELENGTHS” ([1.M], [10], [16]) AND “...ONE OF THE OPTICAL WAVELENGTHS IS USED TO IMPROVE MEASUREMENT...” ([4], [11], [16])

Lisogurski’s light source 130/316 “emit[s] photonic signals having *one or more* wavelengths of light” and “include[s] *any number* of light sources with *any suitable characteristics*.” Lisogurski, 10:48-60, 10:65-11:6, 12:42-48, 17:17-39, 17:43-54; Pet., 45-46, 49-51, 58. A POSITA would thus have understood—and at least found obvious—that Lisogurski’s system would use multiple, *e.g.*, three, wavelengths of light. Pet., 45-46, 57-58 (explaining [10]&[16] met for the same reasons as [1.m]). Indeed, a POSITA would have understood that Lisogurski uses three or more wavelengths of light “to monitor activity with the more sensitive available wavelength” to complement measurements from other less sensitive wavelengths, resulting in more accurate physiological measurements. Lisogurski, 11:6-8, 24:58-25:5; Pet., 45-47, 49-51. Lisogurski’s exemplary “red”/“IR” lights

does not limit Lisogurski's disclosure to two wavelengths or negate its "one or more wavelengths" (e.g., three) teaching to address different constituents' varying sensitivities to different wavelengths of light. Lisogurski, 24:58-25:5; Pet., 50-51, 57-58 (explaining [4], [16] met for the same reasons as [11]); *contra* POR 33, 50-51. Anthony-Reply, ¶¶34, 45-47.

Indeed, different wavelengths were known to penetrate tissue to varying depths with different sensitivities to specific constituents, making each wavelength better suited to detecting particular physiological signals. Anthony, ¶201; LeBoeuf, [0153]. For example, when tissue has more than two light absorbers interacting with two wavelengths of light, preventing accurate measurement of each absorber, additional wavelengths (e.g., three) were known to resolve such issues. Lamego, [0033]-[0037]; Anthony, ¶¶202, 256-257. Anthony-Reply, ¶34.

Likewise, Lisogurski's multiple LEDs of the same wavelength disclosure does not negate its teaching that its light source emits "one or more wavelengths of light." Lisogurski, 10:48-11:6, 17:17-39; POR, 29.³ Lisogurski's additional LEDs

³ Rather than confirming that "three or more wavelengths is a recent advancement" as PO mischaracterizes (POR, 29-30), Dr. Anthony testified only that he is working on a system using those wavelengths. Ex.2045, at 390:10-391:13. Anthony-Reply, ¶36.

in the light source are not limited to the same wavelength, and it was well-known and obvious to use multiple (e.g., three) wavelengths of light as discussed above. PO's unsubstantiated POSITA knowledge also fails—nowhere do the claims require the “third wavelength [be] at or near an isosbestic point.” POR, 30. Anthony-Reply, ¶¶34-35, 37, 43-44, 48-49.

PO likewise fails to discredit POSITA knowledge. LeBouef discloses a pulse oximeter like Lisogurski, using “ultraviolet, visible [e.g., red], and infrared wavelengths.” LeBeouf, [0140]. Regardless of where LeBoeuf's system is worn (e.g., ear), a POSITA would have recognized the benefits of these multiple (e.g., three) wavelengths of light, and PO does not argue otherwise. Pet., 45-46; POR, 29-31. Likewise, Lamego uses an additional wavelength to improve a pulse oximetry system (like Lisogurski)—e.g., the additional wavelength, further to red and IR, accounting for MetHb absorbing the same wavelengths of light used in pulse oximetry, causing inaccurate S_pO_2 readings. Lamego, [0037]; Pet., 46-47; POR, 30-31. Lamego is not part of the Grounds, but confirms POSITA knowledge, motivation, and expectation of success in using three wavelengths. *Cisco Sys., Inc. v. Lionra Techs. Ltd.*, IPR2024-01281, Paper 26 at 76 (PTAB Mar. 4, 2026). Anthony-Reply, ¶¶38-42, 50-51.

VI. LISOGURSKI DISCLOSES AND RENDERS OBVIOUS SIX LEDS ([2], [8.M], [15.M])

While admitting that Lisogurski teaches “one or more,” “multiple,” and “any number” of LEDs, all encompassing six LEDs, PO seeks more. POR, 31; Pet., 48-49, 55-58 (explaining [2], [15.m] met for the same reasons as [8.m]). But, where the prior art discloses overlapping ranges, “applicant must show the particular range is *critical*,” e.g., by showing the claimed range’s “unexpected results relative to the prior art range”—PO does not. *In re Woodruff*, 919 F.2d 1575, 1578 (Fed. Cir. 1990); *Spectrum Sols. LLC v. Longhorn Vaccines & Diagnostics, LLC*, IPR2021-00847, Paper 114 at 57-58 (PTAB May 3, 2023) (applying the same standard in IPR). The ’455 likewise provides no technical significance to six LEDs—PO’s specification cites (POR, 32 (citing ’455, 28:28-50)) only confirm that “[a]lthough six input and output ports are illustrated, *any number of ports may be used*” (’455, 28:26-27). Dr. Efimov provides no significance to “six” either—he merely points out that mathematically with “three distinct wavelengths...six LEDs provide exactly two LEDs per wavelength.” Ex.2043, ¶152. This limitation is thus not entitled to patentable weight, and regardless is taught—and at least rendered obvious—by Lisogurski. Pet., 48; *In re Applied Materials, Inc.*, 692 F.3d 1289, 1297 (Fed. Cir. 2012). Anthony-Reply, ¶¶52-56.

Rather than randomly choosing six LEDs (POR, 32), the Petition explains additional lights were known to improve accuracy, and a POSITA would have understood—and at least found obvious—that Lisogurski’s system comprises multiple (e.g., six or more) LEDs. Pet., 48-49; Anthony, ¶¶250 (noting “improved signal to noise,” “redundancy to component failures,” and “ample illumination of tissue” by using multiple LEDs), 251 (“additional lights...enhance[s] physiological signal detection, such as enhancing the ability to distinguish among multiple absorbers within tissue...”), 252. Anthony-Reply, ¶¶52, 56, 66.

POSITA knowledge further supports the motivation to use six LEDs. Pet., 48-49. Lamego explicitly discloses six LEDs, and teaches using multiple LED wavelengths to improve measurement, which PO fails to address. *Id.*; Lamego, [0035], [0041]; POR, 31-32. Again, while not part of the Grounds (POR, 32), Lamego provides motivation and expectation of success in using six LEDs. *Cisco*, IPR2024-01281, Paper 26 at 76. Anthony-Reply, ¶¶62-65.

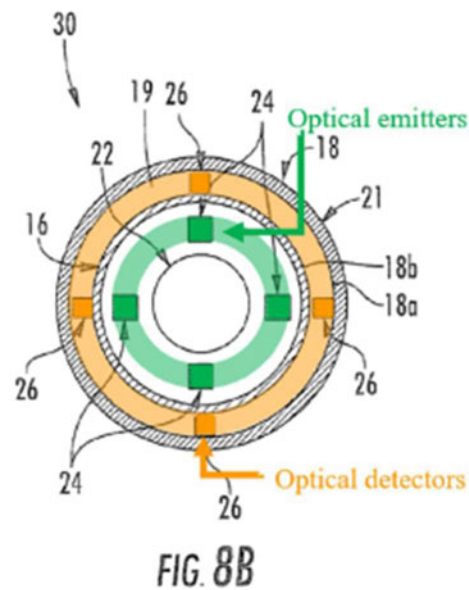
Lastly, Lisogurski does not teach away from increasing LED count (POR, 31)—it explicitly discloses using any number (Lisogurski, 10:52-60). Lisogurski further teaches higher power operation to improve measurement accuracy, despite PO’s alleged power and heat concerns. Lisogurski, 9:4-7 (“[T]he system may operate in a high power mode...for a certain time period following, for example, high noise levels, a loss of signal, or an irregular cardiac rhythm.”); *contra* POR, 31.

At best, as Dr. Anthony recognized (Ex.2045, 104:18-114:19), those concerns must be balanced against Lisogurski's objective to improve accuracy, e.g., by increasing LED count (Pet., 49). Dr. Efimov neither weighs the alleged complexities of a six LED system against the benefits, nor reconciles Lisogurski's explicit teaching of an open-ended LED count in its system. *See* Pet., 48-49 (Lisogurski, 10:52-60, 10:65-11:6, 17:37-39, 17:43-45, 19:22-31, 27:36-43); Ex.2043, ¶¶154-155. Anthony-Reply, ¶¶57-61.

VII. LISOGURSKI AND LEBOEUF RENDER OBVIOUS THE ARC LIMITATIONS ([2], [9], [15])⁴

Lisogurski in view of LeBoeuf renders obvious the arc limitations. LeBeouf discloses optical emitters and detectors spatially separated in arcs.

⁴ The arc limitations of claims 9 and 15 are met for the same reasons as claim 2. Pet., 57-58. In Section IV.B.2 of the Petition, claim 15 was meant for Ground 4 (Lisogurski in view of LeBoeuf and Tran) as is apparent from the Petition. Pet., 8. In Grounds 3-4 (adding Tran's teachings), the Petition cites Ground 2 (Lisogurski in view of LeBoeuf) discussing claim 15. Pet., 60 ("Grounds 3-4: Grounds 1-2 in further view of Tran (Claims 1, 5-8, 12-15, 18-20)"), 64 (citing Pet., § IX.C.3.c); *contra* POR, 62.



LeBoeuf, Fig. 8B; Anthony, ¶¶277-279; Pet., 56-58 (explaining [9] and [15.n] met for the same reasons as [2]). A POSITA would have understood that light emitted into biological tissue undergoes significant scattering and absorption, and the reflected light exits the tissue at a wide range of angles, and therefore would have been motivated to apply LeBoeuf’s teaching of spatially separated detectors and emitters located on one or more arcs (“Arc Teachings”) to improve the detection of scattered light from biological tissue, and increase the signal-to-noise ratio of Lisogurski’s wearable device. Pet., 53 (citing Lisogurski, 11:9-27; LeBoeuf, [0105], FIG. 8B; Anthony, ¶¶262-264; Mendelson); Ex.2045, 195:19-196:6, 198:5-17. Anthony-Reply, ¶¶67-68, 71.

PO does not dispute such benefits of LeBoeuf’s Arc Teachings—instead, PO’s arguments focus on the motivation to apply LeBoeuf’s Arc Teachings to

[REDACTED]

Lisogurski. POR, 49. Each such argument fails. **First**, PO argues no motivation because neither LeBoeuf nor Lisogurski “disclose[s] or suggest[s] that such an arrangement would lead to increased accuracy or reliability.” POR, 36. Motivation can come from figures, as LeBoeuf’s does. *See Nat’l Steel Car, Ltd. v. Canadian Pac. Ry., Ltd.*, 357 F.3d 1319, 1337–38 (Fed. Cir. 2004) (finding motivation to combine teachings from a drawing). PO does not dispute that LeBoeuf’s Fig. 8B shows both LEDs and photodetectors arranged in arcs. Dr. Anthony’s testimony—which PO ignores (POR, 36-40)—confirms Fig. 8B provides the motivation PO argues as missing.⁵ Ex.2045, 195:19-196:6; Pet., 52-55 (citing Anthony, ¶¶258-264). Indeed, arc arrangements were known to “maximize the fraction of backscattered light collected.”⁶ Pet., 52-53 (citing Mendelson, 4:14-65; Anthony, ¶¶262-264). “[M]otivation need not be found in the references sought to be

⁵ LeBoeuf’s and Lisogurski’s devices being capable of being worn on various body parts confirms motivation to combine and reasonable expectation of success. Pet., 53; *contra* POR, 37. Anthony-Reply, ¶¶70, 72.

⁶ Dr. Anthony did not testify that he did not review documents cited in Mendelson—regardless, Mendelson itself provides sufficient description of a POSITA’s knowledge. *Contra* POR, 36-37 (citing Ex.2045, 198:19-201:12). Anthony-Reply, ¶¶77.

combined,” and may be found in the “common knowledge.” *DyStar Textilfarben GmbH & Co. Deutschland KG v. C.H. Patrick Co.*, 464 F.3d 1356, 1361 (2006). That Lisogurski, LeBoeuf, and Mendelson do not explicitly recite “angle” from the Petition’s motivation to combine (i.e., capturing reflected lights “at a wide range of angles”) is immaterial. *Contra* POR, 37. Mendelson discusses “backscattered light” which a POSITA would have understood to be reflected at a wide range of angles. Mendelson, 4:14-65; Pet., 53; Anthony, ¶263. Anthony-Reply, ¶¶72-75.

Second, PO fails to discredit Mendelson. PO does not disagree that Mendelson provides the motivation to apply LeBoeuf’s Arc Teachings for detectors, but argues that Mendelson lacks an LED arc arrangement. POR, 37-38. But, Mendelson teaches “four R and four IR LEDs are spaced at 90-degree intervals around the substrate and at an equal radial distance from the photodiode,” which expressly discloses LEDs in arc. Mendelson, 4:36-44; Pet., 53. Thus, Mendelson teaches LEDs in an arc, further to photodetectors placed around LEDs also in an arc (Pet., 53; Mendelson, 4:14-65), with which PO does not disagree—this is the same configuration in LeBoeuf’s Fig. 8B, confirming the POSITA knowledge in Mendelson that LeBeouf’s Arc Teachings improve backscattered light detection. *Cf.* POR, 28-29. A POSITA would have recognized that this arrangement “enhance[s] measurement accuracy by increasing the surface area of the subject’s tissue exposed to the emitted light.” Anthony, ¶276 (citing Anthony, §IX.B.2). With Lisogurski’s

teaching that light intensity directly relates to the absorbance and/or reflectance of light, a POSITA 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 improve detection of such light scattered from that area, as disclosed in LeBoeuf. Pet., 51-52; Anthony, ¶¶262-264 (citing Lisogurski, 11:9-27). Anthony-Reply, ¶¶69, 73-79.

The Petition’s detailed analysis thus is neither conclusory nor unsupported. *Contra* POR, 49. Contrary to PO, the test is not whether a POSITA in the abstract would have thought of using arcs (POR, 49), but whether a POSITA would have been motivated to apply LeBoeuf’s Arc Teachings to Lisogurski as Petitioners explained. Likewise, rather than presupposing only linear and arc arrangements (POR, 39-40 (citing *Virtek Vision Int’l ULC v. Assembly Guidance Sys., Inc.*, 97 F.4th 882, 886-87 (Fed. Cir. 2024))), Petitioners detailed why a POSITA would have been motivated to apply LeBoeuf’s Arc Teachings to Lisogurski, as discussed above. Pet., 52-53; *Slingshot Printing LLC v. Canon U.S.A., Inc.*, No. 2024-1956, 2026 WL 1098251 at *3 (Fed. Cir. Apr. 23, 2026) (distinguishing *Virtek* based on known design needs and market pressures); *In re Fulton*, 391 F.3d 1195, 1200 (Fed. Cir. 2004) (dismissing argument that “the Board failed to demonstrate that the characteristics disclosed...are preferred over other alternatives disclosed in the prior art”). Anthony-Reply, ¶¶69, 79.

Third, LeBoeuf’s geometry and other components do not negate the motivation to apply LeBoeuf’s Arc Teachings to Lisogurski. Contrary to PO (POR, 40-47), Petitioners do not argue directly *inserting* LeBoeuf’s earbud into Lisogurski’s sensor. Pet., 52-57; *In re Mouttet*, 686 F.3d 1322, 1332 (Fed. Cir. 2012) (“[A] determination of obviousness based on teachings from multiple references does not require an actual, physical substitution of elements.”). Instead, a POSITA would have been motivated to apply LeBoeuf’s LED and detector arc arrangement *teachings*. Pet., 52-57. This is further supported by Lisogurski’s disclosure that “[a]ny suitable configuration of light source 316 and detector 318 may be used” (Lisogurski, 17:42-45; Pet., 53), and Dr. Anthony’s opinion that a POSITA would have been motivated to implement LeBoeuf’s teachings in multiple ways such that the configuration was not dictated purely by the structure of the earbuds. Ex.2045, 205:6-25, 336:1-338:4 (explaining he is not proposing wholesale copying of embodiment); Pet., 53 (citing Anthony, ¶¶262-264). PO’s cites to Dr. Anthony’s testimony confirm, at best, that LeBoeuf’s embodiments include additional components, not that its Arc Teachings cannot be realized without those components. POR, 44-45. Indeed, PO does not argue that LeBoeuf’s Arc Teachings are limited to earbuds only (POR, 44-45), nor does it provide any basis for such an argument (POR, 42-45). Indeed, LeBoeuf discloses the light-guiding structure is

“not limited to earbuds” and “may be molded around another part of the body.”
LeBoeuf, [0090]. Anthony-Reply, ¶¶80-81.

**VIII. LISOGURSKI IN VIEW OF LEBOEUF RENDERS OBVIOUS THE
REFLECTIVE SURFACE LIMITATIONS ([6], [13], [17])**

LeBoeuf’s “light guiding earbud 30” includes “at least partially reflective”
“earbud housing 16” so that light “can be focused on a particular region” of interest.
LeBoeuf, [0123], [0125], [0017], [0033]; FIG. 8C; Pet., 59-60, 68, 71 (explaining
[6], [13] met for the same reasons as [17]). As the Petition and Dr. Anthony explain,
a POSITA would have been motivated to apply LeBoeuf’s reflective surface
teaching to Lisogurski’s system to improve efficiency and signal measurement
quality, by focusing the optical output light on particular regions of interest and
reducing signals from regions not of interest. Pet., 53-54; Anthony, ¶¶255-256.
Anthony-Reply, ¶82.

PO argues, without basis, that the advantages of LeBoeuf’s reflective material
teachings “necessarily” depend on Fig. 8C’s “configuration” of components, and
cannot be applied in another context. POR, 53-55. But, Fig. 8C’s only meaningful
difference from other similar embodiments is the reflective surface—the benefits of
Fig. 8C’s “configuration” thus apply to the reflective surface. LeBoeuf, [0125]; Pet.,
54. Indeed, while PO also attempts to distinguish Valencell-093 based on its
configuration, the Board already rejected PO: “a [POSITA] would have had reason

to combine the [reflective surfaces] teachings of Lisogurski and Valencell-093” regarding a substantially similar limitation, “a reflective surface positioned to reflect at least a portion of [the lens output] light reflected from the tissue.” ’484-FWD, 59, 55-60. The same rationale applies here, and PO does not dispute the POSITA knowledge—reflective surfaces help direct light towards the user—confirmed by Valencell-093. Anthony-Reply, ¶¶83-87.

PO further manufactures inconsistency by arguing LeBoeuf’s arc arrangement spreads light while its reflective surface focuses light—this misrepresents Petitioners’ arguments. POR, 47-49. While the LED arc arrangement beneficially increases the skin area exposed to light, the reflective surfaces complementarily ensure that sufficient light is delivered to skin (as opposed to being dispersed elsewhere). Anthony, ¶¶262-263, 265-266, 276, 355. Thus, and consistent with the Board’s prior findings, a POSITA would have understood *how* to apply LeBoeuf’s arc and reflective surface teachings to Lisogurski—PO’s efforts to limit LeBoeuf’s reflective surface teaching to its components also fail for this reason and those discussed in §VII. *Pfizer, Inc. v. Apotex, Inc.*, 480 F.3d 1348, 1364 (Fed. Cir. 2007) (“[O]nly a reasonable expectation of success, not a guarantee, is needed.”); *Keynetik, Inc. v. Samsung Elecs. Co.*, No. 2022-1127, 2023 WL 2003932, at *2 (Fed. Cir. Feb. 15, 2023) (rejecting the requirement for “specific software modifications a skilled artisan would need to make, how he would make them, and why he would have

expected them to be successful”); *contra* POR, 42, 56-61. Anthony-Reply, ¶¶88-89, 92.

The Petition also does not improperly combine LeBoeuf’s embodiments. *Contra* POR 61-62. LeBoeuf Figs. 8A-8D disclose the same embodiment with minimal, complimentary variations in, for example, the earbud housing 16 and cover 18. *See* LeBoeuf, [0073] (“Like numbers refer to like elements throughout....Features described with respect to one figure...can be associated with another...figure”), Figs. 8A-8D (using same numbered elements). For example, Fig. 8B provides “a cross-sectional view of the earbud of FIG. 8A,” nearly identical to Figs. 8C-8D. LeBoeuf, [0048]-[0049]. Thus, Fig. 8B’s arc configurations are also present, but not shown, in Figs. 8C-8D. LeBoeuf, [0050]-[0051]. Further, LeBoeuf teaches that “[v]arious configurations and arrangements of optical emitters and detectors may be utilized in accordance with embodiments of the present invention.” LeBoeuf, [0123], [0073]. Thus, Fig. 8B’s LEDs and detectors in arcs are present in Fig. 8C—those are the same embodiment. Even if not, “[c]ombining two embodiments disclosed adjacent to each other in a prior art patent does not require a leap of inventiveness.” *Bos. Sci. Scimed, Inc. v. Cordis Corp.*, 554 F.3d 982, 991 (Fed. Cir. 2009). Anthony-Reply, ¶¶90-91.

**IX. PO'S ALLEGED SECONDARY CONSIDERATIONS DO NOT
NEGATE THE CLAIMS' OBVIOUSNESS**

A. No Evidence of Copying or Nexus to the Claims

PO wrongly accuses Samsung of copying [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED].⁸ POR, 67-68. That

cannot show nexus or copying. *Enova Tech. Corp. v. Seagate Tech. (US) Holdings Inc.*, 706 F. App'x 987, 995 (Fed. Cir. 2017) (knowledge of the patent and products embodying patent are not “sufficient to establish copying”).

⁷ The Claims do not require [REDACTED]

⁸ PO's [REDACTED]

[REDACTED]

[REDACTED] are separate,

independent entities not involved in this IPR or the Texas Case. POR, 67-68; Ex.2116, 1 (asserting infringement by Samsung Petitioners, but not SDS or SSI). Exs.1134-1136.

[REDACTED]

The Board already found each relevant “SNR-improvement technique” known in the art. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] Anthony-Reply, ¶¶95-96.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

No evidence shows Samsung’s copying “SNR-improvement techniques” [REDACTED]—PO’s and Dr. Efimov’s reliance (POR, 68; Ex.2043, ¶385) on the preliminary infringement contentions (“PIC”) cannot establish copying. *Fleming v. Cirrus Design Corp.*, 28 F.4th 1214, 1224 (Fed. Cir. 2022) (“Not every...product that arguably falls within the scope of a patent

is evidence of copying. Otherwise[,] every infringement suit would automatically confirm the nonobviousness of [a] patent.”); *Iron Grip Barbell Co. v. USA Sports, Inc.*, 392 F.3d 1317, 1325 (Fed. Cir. 2004) (“copying requires the replication of a specific product”).

PO’s only remaining support for its copying assertion is Dr. Efimov’s declaration—it likewise fails. POR, 68 (citing EX2043, ¶¶370, 382-86). **First**, Dr. Efimov’s copying opinion is based on his misunderstanding that Dr. Islam’s “SNR-improving techniques” are proprietary for being “essentially covered by patents”—those “proprietary techniques” were public knowledge, as the Board confirmed. Efimov-Tr., 57:21-58:10. Anthony-Reply, ¶96.

Second, Dr. Efimov concludes copying based solely on PO’s PIC in the Texas Case without analysis. EX2043, ¶382, 385 (citing Exs.2106, 2116). The PIC shows neither Samsung’s copying nor infringement. *E.g.*, Ex.2116, 86-92. For example, for [REDACTED] the PIC relies on documentation concerning multiple different third-party processing circuitries and their available features (including programmable LED current), which do not show that the limitation is met—nor does the PIC show whether or how such processors are implemented in a Samsung product. Ex.2116, 86-90. Dr. Efimov likewise admitted not having examined any Samsung product—or Samsung’s internal documents—while acknowledging the need to assess the products or their technical

descriptions to confirm their features. Efimov-Tr., 71:11-98:7; Islam-Tr., 34:6-50:19, 74:17-76:12, 78:9-79:12, 82:12-83:3, 88:2-89:3, 118:12-119:18 (acknowledging the same). PO's remaining, purported support likewise provides insufficient technical detail. Ex.2116, 91-92; Efimov-Tr. 169:4-15 (confirming no Samsung document with technical details cited in PIC). This is in stark contrast with Lisogurski—which the Board previously found meets this limitation twice. Lisogurski, 6:3-6; '484-FWD, 27; '533-FWD, 26. Anthony-Reply, ¶¶97-99.

Third, Dr. Efimov notes that the presentation to Samsung lists patents and publications, but they do not include the '455 issued in 2021. Ex.2106, OMS_SAM0031857. Moreover, Dr. Efimov admitted no knowledge regarding most entities or individuals [REDACTED] Samsung's corporate structure, or how any such entities or individuals relate to Samsung's wearable-device development—he could not have opined on what information Samsung Electronics Co., Ltd. (“SEC”) or Samsung Electronics America, Inc. received or how the information was used, if at all, in the accused products. Efimov-Tr., 107:7-111:4, 126:2-139:7; Ex. 2100, ¶¶7-21. Indeed, the materials cited by Dr. Efimov and Dr. Islam generally [REDACTED]

[REDACTED]

[REDACTED]. Ex.2100, ¶8; Ex.2105, OMS_SAM0031867. And, whether Dr. Islam allegedly offered to help

Samsung is irrelevant to whether the alleged techniques were actually incorporated in Samsung's devices or whether Samsung had already developed any of the accused features prior to the alleged meeting. Ex.2043, ¶383. There is no evidence tying the development or operation of Samsung's products to Dr. Islam's alleged disclosure of the '533 patent or known SNR improvement techniques. Anthony-Reply, ¶¶100-102.

B. No Evidence of Long Felt Need or Nexus to the Claims

Each of the '455 limitations PO identifies as resolving alleged long-felt needs *was already known in the art*, as the Board agreed in the prior FWDs. POR, 69-71 (“...increase [SNR] ratio by increasing light intensity...,” “...increase [SNR] by comparing the first signal and the second signal,” “detection system...synchronized to the light source,” “...detectors [] spatially separated from each other”); *see also* Pet., §IX.A. Indeed, Dr. Islam testified these needs were long-felt, but did not know whether they were being used in wearables before his patents. Islam-Tr., 30:1-15, 48:8-49:3, 74:1-14, 132:10-133:16, 139:8-15 (named inventor admitting these concepts were known in the field and admitting he did not know whether they were used in wearable devices before his patents). Anthony-Reply, ¶¶103-105.

PO fails to establish that the '455 indeed resolved any alleged needs to avoid “the patient [to] remain still” or “controlled clinical environments,” let alone that the '455 improved the prior art. POR, 69-70. Dr. Islam alleges that although “premium

wearable devices” used his “techniques” by 2017 (Ex.2103, OMS_SAM0031785), the “SNR...problem” was not “solved” in those devices (Ex.2100, ¶33)—his “techniques” thus did not resolve any alleged long-felt need. No nexus between PO’s hand-picked—already known—limitations (individually or collectively) and the alleged issues being resolved exists. POR. 69-71; *In re Huai-Hung Kao*, 639 F.3d 1057, 1068 (Fed. Cir. 2011) (requiring nexus); *In re Karpf*, 758 F. App’x 960, 965 (Fed. Cir. 2019) (finding no “evidence, other than attorney argument, that the claimed invention meets that [unresolved] need”). Anthony-Reply, ¶¶106-109.

X. CONCLUSION

PO’s arguments do not distinguish any Claim from the prior art. The Claims should be found unpatentable.

Respectfully submitted,

Dated: July 30, 2026

By: /James L. Davis, Jr./
Name: James L. Davis, Jr.
Registration No. 57,325
*Counsel for Petitioners Samsung
Electronics Co. Ltd. and Samsung
Electronics America Inc.*

CERTIFICATE OF COMPLIANCE

Pursuant to 37 C.F.R. §42.24(c) and (d), the undersigned hereby certifies that this Petitioner's Reply to Patent Owner's Response complies with the type-volume limitation of 37 CFR §42.24(c) because, exclusive of the exempted portions, it contains 5599 words, including figures, as counted by the word processing program used to prepare the paper.

Dated: July 30, 2026

By: /James L. Davis, Jr./
Name: James L. Davis, Jr.
Registration No. 57,325
*Counsel for Petitioners Samsung
Electronics Co. Ltd. and Samsung
Electronics America Inc.*

CERTIFICATE OF SERVICE

The undersigned certifies that the foregoing PETITIONERS' REPLY TO PATENT OWNER'S RESPONSE was served by filing this document through the Patent Trial and Appeal Case Tracking System (P-TACTS) as well as providing a courtesy copy via electronic mail to the following attorneys of record for each party as listed below:

OMNI MEDSCI, INC.	
Lead Counsel	Back-Up Counsel
Jennifer Hayes Registration No. 50,845 Nixon Peabody LLP 300 South Grand Avenue, Suite 4100 Los Angeles, CA 90071-3151 Phone: 213-629-6179 Facsimile: 213-629-6001 jenhayes@nixonpeabody.com	Daniel Stringfield Registration No. 68,677 Phone: 312-977-4130 Facsimile: 833-923-0056 dstringfield@nixonpeabody.com Timothy Maloney Registration No. 38,233 Phone: 312-977-4451 Facsimile: 833-818-8070 tmaloney@nixonpeabody.com Angelo J. Christopher Registration No. 81,594 Phone: 312-977-4391 Facsimile: 312-977-4405 achristopher@nixonpeabody.com Benjamin R. Holt Registration No. 78,605 Phone: 202-585-8048 Facsimile: 833-824-1380 bholt@nixonpeabody.com Daniel Georgiev Registration No. 80,647

	Phone: 312-977-4412 Facsimile: 833-824-7710 dgeorgiev@nixonpeabody.com Corey Leggett Registration No. 70,017 (415) 984-8340 Facsimile: 415-984-8300 cleggett@nixonpeabody.com
FOSSIL GROUP, INC., FOSSIL STORES I, INC., AND FOSSIL PARTNERS, L.P.	
	Back-Up Counsel
	Jared A. Smith Reg. No. 73,749 FISH & RICHARDSON P.C. 12860 El Camino Real, Suite 400 San Diego, CA 92130 Phone: +1 858-678-4702 Fax: +1 858-678-5099 jasmith@fr.com Ricardo J. Bonilla Reg. No. 65,190 FISH & RICHARDSON P.C. 1717 Main Street, Suite 5000 Dallas, TX 75201 Phone: +1 214-760-6150 Fax: +1 214-747-2091 rbonilla@fr.com
OURA HEALTH OY	
	Back-Up Counsel
	Jasjit S. Vidwan Reg. No. 72,080 MAYER BROWN LLP 1999 K Street, NW Washington, DC 20006-1101

	Tel.: 202.263.3065 <u>JVidwan@mayerbrown.com</u> Robert G. Pluta Reg. No. 50,970 MAYER BROWN LLP 71 S. Wacker Drive Chicago, IL 60606 Tel.: 312.701.8641 <u>RPluta@mayerbrown.com</u>
ONEPLUS TECHNOLOGY (SHENZHEN) CO., LTD.	
	Back-Up Counsel Jack Shaw Reg. No. 72,262 CHERRY JOHNSON SIEGMUND JAMES PC 8140 Walnut Hill Lane, Suite 105 Dallas, Texas 75231 Tel: 254-732-2242 Fax: 866-627-3509 <u>jshaw@cjsjlaw.com</u>

Dated: July 30, 2026

By: /James L. Davis, Jr./
Name: James L. Davis, Jr.
Registration No. 57,325
*Counsel for Petitioners Samsung
Electronics Co. Ltd. and Samsung
Electronics America Inc.*