

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD.;
SAMSUNG ELECTRONICS AMERICA, INC.,
Petitioner

v.

OURARING, INC.
Patent Owner.

Case No. PGR2024-00030
U.S. Patent No. 11,868,178

**REPLY DECLARATION OF DR. BRIAN ANTHONY IN SUPPORT OF
PETITION FOR POST-GRANT REVIEW
OF U.S. PATENT NO. 11,868,178**

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LIST OF EXHIBITS¹

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Ex-1005	U.S. Patent Publication No. 20120016245 to Niwa (“Niwa”)
Ex-1006	U.S. Patent No. 8,954,135 to Yuen (“Yuen”)
Ex-1007	U.S. Patent No. 10,303,867 to Schröder (“Schröder”)
Ex-1008	Certified Translation of DE 102013012339.9 to Schröder
Ex-1009	Original DE 102013012339.9 to Schröder
Ex-1010	U.S. Patent Publication No. 20140244009 to Mestas (“Mestas”)
Ex-1011	U.S. Provisional Patent Application No. 61/768,279 to Mestas
Ex-1012	U.S. Patent No. 8,700,111 to LeBoeuf (“LeBoeuf”)
Ex-1013	U.S. Patent Publication No. 20120218184 to Wissmar (“Wissmar”)
Ex-1014	INTENTIONALLY LEFT BLANK
Ex-1015	INTENTIONALLY LEFT BLANK
Ex-1016	INTENTIONALLY LEFT BLANK
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¹ Four-digit pin citations that begin with 0 are to the branded numbers added by Samsung in the bottom right corner of the exhibits. All other pin citations are to original page, column, paragraph, or line numbers.

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Ex-1018	INTENTIONALLY LEFT BLANK
Ex-1019	INTENTIONALLY LEFT BLANK
Ex-1020	Claim Mapping Table
Ex-1021	INTENTIONALLY LEFT BLANK
Ex-1022	Parallel Citations (Schröder '867 to Certified Translation of DE 102013012339.9)
Ex-1023	<i>Dynamic Drinkware</i> -type analysis for Mestas
Ex-1024	U.S. Patent No. 4,830,014 to Goodman (“Goodman”)
Ex-1025	U.S. Patent No. 6,745,061 to Hicks (“Hicks”)
Ex-1026	U.S. Patent No. 7,190,986 to Hannula (“Hannula”)
Ex-1027	Volker Konig et al., <i>Reflectance Pulse Oximetry – Principles and Obstetric Application in the Zurich System</i> , 14 Journal of Clinical Monitoring (Aug. 1998) (“Konig”)
Ex-1028	U.S. Patent No. 6,608,562 to Kimura (“Kimura”)
Ex-1029	Kevin K. Tremper et al., <i>Pulse Oximetry</i> , 70 Journal of American Society of Anesthesiologists, Inc. (Jan. 1989) (“Tremper”)
Ex-1030	Y. Mendelson et al., <i>A Wearable Reflectance Pulse Oximeter for Remote Physiological Monitoring</i> , Proceedings of 28 th IEEE EMBS Annual International Conference (Aug. 30-Sept. 3, 2006) (“Mendelson 2006”)
Ex-1031	Sokwoo Rhee et al., <i>Artifact-Resistant, Power-Efficient Design of Finger-Ring Plethysmographic Sensors Part I: Design and Analysis</i> , IEEE (2000) (“Rhee 2000 Part I”)

Ex. No.	Description
Ex-1032	Sokwoo Rhee et al., <i>Artifact-Resistant, Power-Efficient Design of Finger-Ring Plethysmographic Sensors Part II: Prototyping and Benchmarking</i> , IEEE Proceedings of 22 nd Annual EMBS Int'l Conference (July 23-28, 2000) ("Rhee 2000 Part II")
Ex-1033	Sokwoo Rhee et al., <i>Artifact-Resistant Power-Efficient Design of Finger-Ring Plethysmographic Sensors</i> , 48 IEEE Transactions of Biomedical Engineering (July 2001) ("Rhee 2001")
Ex-1034	U.S. Patent No. 6,699,199 to Asada ("Asada '199")
Ex-1035	Sokwoo Rhee, <i>Design and Analysis of Artifact-Resistive Finger Photoplethysmographic Sensors for Vital Sign Monitoring</i> , MIT (June 2000) ("Rhee Thesis 2000")
Ex-1036	C.T. Olofson et al., <i>Machining of Titanium Alloys</i> (1965) ("Olofson")
Ex-1037	H. Harry Asada et al., <i>Mobile Monitoring with Wearable Photoplethysmographic Biosensors</i> , IEEE Engineering in Medicine & Biology Magazine 28 (May-June 2003) ("Asada 2003")
Ex-1038	Denisse Castaneda et al., <i>A review on wearable photoplethysmography sensors and their potential future applications in health care</i> , Int J Biosens Bioelectron (2018)
Ex-1039	U.S. Patent No. 7,468,036 to Rulkov et al. ("Rulkov")
Ex-1040	U.S. Patent Publication No. 2006/0211924 to Dalke et al. ("Dalke")
Ex-1041	<i>Guidelines To Enhancing The Heart-Rate Monitoring Performance Of Biosensing Wearables</i> (2014)
Ex-1042	U.S. Patent No. 4,880,304 to Jaeb et al. ("Jaeb")
Ex-1043	Tom Lister et al., <i>Optical Properties of human skin</i> , Journal of Biomedical Optics (2012)
Ex-1044	John G. Webster, <i>Design of Pulse Oximeters</i> , CRC Press (1997)

Ex. No.	Description
Ex-1045	U.S. Patent Publication No. 20130211291 to Tran (“Tran”)
Ex-1046	WO 2001/017421A1 to Lindberg (“Lindberg”)
Ex-1047	WO 2011/132009 to Nyiradi (“Nyiradi”)
Ex-1048	U.S. Patent Application Publication No. 2014/0361945 to Misra et al. (“Misra”)
Ex-1049	U.S. Patent Application Publication No. 2014/0361934 to Ely et al. (“Ely”)
Ex-1050	European Patent No. 2281205 (Chen)
Ex-1051	Lawrence K. Au et al., <i>Episodic Sampling: Towards Energy-Efficient Patient Monitoring with Wearable Sensors</i> , Annual International Conference of the IEEE Engineering in Medicine and Biology Society (2009)
Ex-1052	Anastasios Petropoulos et al., <i>Flexible PCB-MEMS flow sensor</i> , Procedia Engineering 47 236-239 (2012) (“Petropoulos”)
Ex-1053	Tianjia Sun et al., <i>Wireless Power Transfer for Medical Microsystems</i> , Springer (2013) (“Sun”)
Ex-1054	U.S. Patent Pub. No. 2014/0187160 to Prencipe (“Prencipe”)
Ex-1055	H. Ardebili and Michael G. Pecht, <i>Encapsulation Technologies for Electronic Applications</i> , William Andrew (2009) (“Ardebili”)
Ex-1056	Ciprian Ciofu et al., <i>Injection and Micro Injection of Polymeric Plastics Materials: A Review</i> , Int’l J. Modern Mfg. Techs. 49 (2013)
Ex-1057	Richard J. Ross, <i>LCP Injection Molded Packages—Keys to JEDEC 1 Performance</i> , IEEE, 2004 Electronic Components and Technology Conference 1807 (2004)

Ex. No.	Description
Ex-1058	Tadamoto Sakai, <i>Encapsulation Process for Electronic Devices Using Injection Molding Method</i> , 12 Advances in Polymer Technology 61 (1993)
Ex-1059	N.J. Teh et al., <i>Embedding of Electronics within Thermoplastic Polymers using Injection Moulding Technique</i> , IEEE, 2000 Int'l Electronics Manufacturing Technology Symposium 10 (2000)
Ex-1060	U.S. Patent No. 6,201,698
Ex-1061	U.S. Patent No. 4,012,629
Ex-1062	INTENTIONALLY LEFT BLANK
Ex-1063	INTENTIONALLY LEFT BLANK
Ex-1064	INTENTIONALLY LEFT BLANK
Ex-1065	INTENTIONALLY LEFT BLANK
Ex-1066	INTENTIONALLY LEFT BLANK
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Reply Declaration of Brian W. Anthony, Ph.D.

Ex. No.	Description
Ex-1077	INTENTIONALLY LEFT BLANK
Ex-1078	INTENTIONALLY LEFT BLANK
Ex-1079	Dr. Anthony's Supplemental Declaration
Ex-1080	Mr. Michael Davies Declaration
Ex-1081	Dr. Mercier's transcript vol. 1
Ex-1082	Dr. Mercier's transcript vol. 2
Ex-1083	Mr. Andrew Clarke's depo transcript
Ex-1084	Francine Gemperle et al., <i>Design for Wearability</i> , in Digest of Papers Second Int'l Symposium on Wearable Computers 116 (1998)
Ex-1085	U.S. Patent No. 9,582,034 ("the '034 patent")
Ex-1086	U.S. Patent No. 10,842,429
Ex-1087	U.S. Patent No. 11,599,147
Ex-1088	U.S. Patent Publication No. 20070059595
Ex-1089	U.S. Patent No. 9,385,396 ("Goh")
Ex-1090	Xie, Wen. "When Commercial Success Can Prove Non-Obviousness." IP WatchDog. February 10, 2022. https://ipwatchdog.com/2022/02/10/commercial-success-can-prove-non-obviousness/id=145576/

Ex. No.	Description
Ex-1091	<p>Lee, Jihyoung, Kenta Matsumura, Ken-ichi Yamakoshi, & Peter Rolfe. “Comparison between red, green and blue light reflection photoplethysmography for heart rate monitoring during motion.” Conference Proceedings: Annual International Conference of the IEEE Engineering in Medicine and Biology Society 2013. July 1, 2013.</p> <p>https://www.researchgate.net/publication/257601230_Comparison_between_red_green_and_blue_light_reflection_photoplethysmography_for_heart_rate_monitoring_during_motion</p>
Ex-1092	<p>De Ridder, Benjamin, Bart Van Rompaey, Jarl K Kampen, Steven Haïne, & Tinne Dilles. “Smartphone Apps Using Photoplethysmography for Heart Rate Monitoring: Meta-Analysis.” JMIR Cardio. February 27, 2018.</p> <p>https://pmc.ncbi.nlm.nih.gov/articles/PMC6834218/</p>
Ex-1093	<p>Castaneda, Denisse, Aibhlin Esparza, Mohammad Ghamari, Cinna Soltanpur, & Homer Nazeran. “A review on wearable photoplethysmography sensors and their potential future applications in health care.” National Library of Medicine. August 6, 2018. https://pmc.ncbi.nlm.nih.gov/articles/PMC6426305/</p>
Ex-1094	<p>Marston, William. “Photoelectric Plethysmography.” ScienceDirect. July 1, 2025.</p> <p>https://www.sciencedirect.com/topics/medicine-and-dentistry/photoelectric-plethysmography</p>
Ex-1095	<p>Kameyama, Koujiro & Kiyoshi Mita. “Optical semiconductor device and method of manufacturing the same.” Google Patents. June 1, 2010.</p> <p>https://patents.google.com/patent/US7728438B2/en?q=(transparent+epoxy+potting+compound)&oq=transparent+epoxy+potting+compound</p>
Ex-1096	INTENTIONALLY LEFT BLANK

Ex. No.	Description
Ex-1097	Takahashi, Dean. “Precise heart-rate monitor wristwatch Mio Alpha debuts today.” VentureBeat. December 3, 2012. https://venturebeat.com/business/precise-heart-rate-monitor-wristwatch-mio-alpha-debuts-today/
Ex-1098	Dickinson, Liz. “ALPHA - the Holy Grail of Heart Rate (Look Ma, no hands!).” Kickstarter. June 25, 2012. https://www.kickstarter.com/projects/alphaheartrate/alpha-the-holy-grail-of-heart-rate-look-ma-no-hand/description
Ex-1099	Wearables. “Mio Alpha.” Wearables.com. July 1, 2025. https://wearables.com/products/mio-alpha
Ex-1100	Mio. “ALPHA: Complete User Guide.” Physical Enterprises Inc. December 3, 2012. https://www.swimmershop.it/upload/MIO_Alpha_UserGuide_Eng.pdf
Ex-1101	INTENTIONALLY LEFT BLANK
Ex-1102	Bolestsis, Costas, Simon Mccallum, & Brynjar F. Landmark . “The Use of Smartwatches for Health Monitoring in Home-Based Dementia Care.” Lecture Notes in Computer Science. July 1, 2015. https://www.researchgate.net/publication/280946621_The_Use_of_Smartwatches_for_Health_Monitoring_in_Home-Based_Dementia_Care
Ex-1103	Biggs, John. “The Basis B1 Fitness Band Is Amazing But Still Needs Polish.” TechCrunch. March 18, 2013. https://techcrunch.com/2013/03/18/the-basis-b1-fitness-band-is-amazing-but-still-needs-polish/
Ex-1104	Weiss, C. C. “Scosche RHYTHM simplifies fitness monitoring.” New Atlas. October 16, 2012. https://newatlas.com/scosche-rhythm-fitness-monitor/24569/

Ex. No.	Description
Ex-1105	Scosche. “User Guide.” RHYTHM: WIRELESS PULSE MONITOR. October 18, 2012. https://www.scosche.com/media/wysiwyg/PDFs/RTHM_web_ENGLISH.pdf
Ex-1106	INTENTIONALLY LEFT BLANK
Ex-1107	INTENTIONALLY LEFT BLANK
Ex-1108	INTENTIONALLY LEFT BLANK
Ex-1109	INTENTIONALLY LEFT BLANK
Ex-1110	INTENTIONALLY LEFT BLANK
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Ex-1113	INTENTIONALLY LEFT BLANK
Ex-1114	INTENTIONALLY LEFT BLANK
Ex-1115	INTENTIONALLY LEFT BLANK
Ex-1116	INTENTIONALLY LEFT BLANK
Ex-1117	Botha, Roelof. “Jawbone: The Rise and Fall of the First Wearable Technology Company.” Crucible Moments. December 2, 2023. https://www.sequoiacap.com/podcast/crucible-moments-jawbone/
Ex-1118	INTENTIONALLY LEFT BLANK
Ex-1119	INTENTIONALLY LEFT BLANK
Ex-1120	Jauch. “White Paper: Introduction to Lithium Polymer Battery Technology.” Jauch. November 1, 2018. https://www.jauch.com/downloadfile/5c5050fa5b6510e9a8ad76299baae4e53/white_paper_introduction_to_lipo_battery_technology_11-2018_en.pdf

Ex. No.	Description
Ex-1121	LG Electronics. “Battery Cell of Curved Shape and Battery Pack Employed With The Same.” Justia. March 10, 2009. https://patents.justia.com/patent/20110097615
Ex-1122	Cohen, Nancy. “LG Chem turns to stepped, curve and cable batteries.” Phys.Org. October 9, 2013. https://phys.org/news/2013-10-lg-chem-cable-batteries.html
Ex-1123	LG Electronics. “Press Release: LG Unveils World's First "Real" Curved Smartphone.” LG. October 30, 2013. https://www.lg.com/levant_en/about-lg/press-and-media/lg-unveils-worlds-first-real-curved-smartphone
Ex-1124	Pierce, David. “LG G Flex Review.” The Verge via WayBack Machine. December 6, 2013. https://web.archive.org/web/20250114175821/https://www.theverge.com/2013/12/6/5181536/lg-g-flex-review
Ex-1125	Sridhar, Srivatsan. “Samsung SDI introduces curved battery for wearable devices.” fonearena. April 15, 2014. https://www.fonearena.com/blog/101236/samsung-sdi-introduces-curved-battery-for-wearable-devices.html
Ex-1126	Sheetal. “Samsung SDI tends to invest more in batteries for wearable devices.” SammyFans. April 22, 2022. https://www.sammyfans.com/2022/04/22/samsung-sdi-to-invest-more-in-batteries-for-wearable/
Ex-1127	Samsung. “[Battery101] Innovation Creates Batteries for Wearables.” Samsung SDI Newsroom. August 09, 2024. https://news.samsungsdi.com/global/articleView?seq=166
Ex-1128	Kyung-Don, Joo. “Samsung SDI curved battery is tops.” Korea JoongAng Daily. April 15, 2014. https://koreajoongangdaily.joins.com/2014/04/15/industry/Samsung-SDI-curved-battery-is-tops/2987967.html

Ex. No.	Description
Ex-1129	Samsung. “Samsung Gear Fit Awarded “The Best Mobile Device” at the MWC 2014.” Samsung Newsroom. February 28, 2014. https://news.samsung.com/global/samsung-gear-fit-awarded-the-best-mobile-device-at-the-mwc-2014
Ex-1130	Summerson, Cameron. “[MWC 2014] Samsung Announces The Gear Fit, A Fitness Tracker Smartwatch Band Thingy.” Android Police. February 24, 2014. https://www.androidpolice.com/2014/02/24/mwn-2014-samsung-announces-the-gear-fit-a-fitness-tracker-smarwatch-band-thingy/
Ex-1131	Harden, Dan. “The Making of the Nike Fuelband.” Whipsaw. June 6, 2015. https://www.whipsaw.com/latest/the-making-of-the-nike-fuelband
Ex-1132	Nike. “Nike+ Fuelband.” FCC ID Database. January 5, 2012. https://fccid.io/QYUM411/User-Manual/user-manual-1630150.pdf
Ex-1133	mikeselectricstuff. “Nike+ Fuelband teardown.” YouTube. May 31, 2012. https://www.youtube.com/watch?v=7xdajSS_cOU
Ex-1134	“M411 Nike+ FuelBand Teardown Internal Photos Nike.” FCC ID Database. January 24, 2012. https://fccid.io/QYUM411/Internal-Photos/internal-photos-1630135
Ex-1135	アーロン ビー ウィースト, アーロン ビー ウィースト, ジャミアン アール コベット, & ジャミアン アール コベット. “Wearable device assembly with athletic function.” Google Patents. November 1, 2011. https://patents.google.com/patent/JP6071890B2/en?q=(curved+PC+B)&before=priority:20130101&page=1
Ex-1136	OURA. “Previous Oura Ring Generations.” OURA. July 1, 2025. https://support.ouraring.com/hc/en-us/articles/360025570153-Previous-Oura-Ring-Generations#h_01H55VMQGE9BGRY7K7W22RG5B6
Ex-1137	Swappa. “Sell Oura Ring Gen 2.” Swappa. July 1, 2025. https://swappa.com/sell/product/oura-ring-gen-2

Ex. No.	Description
Ex-1138	OURA . “Product: Oura Gen 3 Heritage Black.” OURA. July 1, 2025. https://ouraring.com/product/rings/oura-gen3/heritage/black
Ex-1139	OURA. “OURA ring. Improve sleep. Perform better.” Kickstarter. August 15, 2015. https://www.kickstarter.com/projects/oura/oura-ring-improve-sleep-perform-better
Ex-1140	McLear, John. “NFC Ring - One Smart Ring, Unlimited Possibilities.” Kickstarter. July 20, 2013. https://www.kickstarter.com/projects/mclear/nfc-ring
Ex-1141	Museum of Failure. “Logbar Ring.” Museum of Failure. March 16, 2024. https://museumoffailure.com/exhibition/logbar-ring
Ex-1142	TheTouch X s.r.o. “HB Ring.” TheTouch via Wayback Machine. Accessed on May 6, 2025. https://web.archive.org/web/20250506183725/https://my.thetouchx.com/
Ex-1143	Urbanowicz Jewelers. “Latest in Wearable Tech: This Ring Lets You See and Feel Your Lover’s Heartbeat in Real Time.” Urbanowicz Jewelers Blog. September 6, 2016. https://www.pittsburghdiamonds.com/urbanowicz-jewelers-blog/2016/Sep/06/latest-wearable-tech-ring-lets-you-see-and-feel-yo/
Ex-1144	IPS Team. “HB Ring Review – Innovative Wedding Band To Feel Heartbeat Of Your Loved One?.” Infinite Power Solutions. October 1, 2020. https://www.infinitepowersolutions.com/hb-ring/
Ex-1145	INTENTIONALLY LEFT BLANK
Ex-1146	INTENTIONALLY LEFT BLANK
Ex-1147	INTENTIONALLY LEFT BLANK

Ex. No.	Description
Ex-1148	Wiggers, Kyle. “The love of your life can hear your heartbeat in real time with smart wedding band.” digitaltrends. August 4, 2016. https://www.digitaltrends.com/wearables/hb-ring-touch-wedding-band-smart-heartbeat/
Ex-1149	Huffington, Arianna. “My Q and A With Petteri Lahtela, Whose OURA Ring Will Track Your Sleep.” Huffpost. August 19, 2015. https://www.huffpost.com/entry/my-q-and-a-with-petteri-l_b_8010488
Ex-1150	Ben Greenfield. “11 Crucial Health Questions & Mighty Self-Quantification Ring To Rule Them All: The Official Oura Ring Q&A.” BenGreenfieldLife. July 18, 2016. https://bengreenfieldlife.com/article/self-quantification-articles/how-does-the-oura-ring-work/
Ex-1151	Ben Greenfield. “The New Oura Ring: Track Naps, Advanced HRV Tracking, Personalized Sleep Typing, Client Dashboard Feature & Much More!.” BenGreenfieldLife. November 30, 2017. https://bengreenfieldlife.com/article/self-quantification-articles/the-new-oura-ring/
Ex-1152	OURA. “Why Oura.” OURA. July 1, 2025. https://ouraring.com/why-oura
Ex-1153	OURA. “Rings.” OURA. July 1, 2025. https://ouraring.com/product/rings
Ex-1154	de Zambotti, Massimiliano, Leonardo Rosas, Ian M. Colrain, & Fiona C. Baker. “The Sleep of the Ring: Comparison of the OURA Sleep Tracker Against Polysomnography.” National Library of Medicine. March 1, 2019. https://pubmed.ncbi.nlm.nih.gov/28323455/

Ex. No.	Description
Ex-1155	Pearson, Anthony. “The Oura Ring For Personal Sleep Analysis: Lots of Hype and Data, Little Science, Utility or Accuracy.” The Skeptical Cardiologist. Accessed on July 6, 2025. https://theskepticalcardiologist.com/2019/02/09/the-oura-ring-for-personal-sleep-analysis-lots-of-hype-and-data-little-science-utility-or-accuracy/
Ex-1156	Robbins, Rebecca, Matthew D. Weaver, Jason P. Sullivan, Stuart F. Quan, Katherine Gilmore, Samantha Shaw, Abigail Benz, Salim Qadri, Laure K. Barger, Charles A. Czeisler, & Jeanne F. Duffy. “Accuracy of Three Commercial Wearable Devices for Sleep Tracking in Healthy Adults.” Sensors. August 7, 2024. https://www.mdpi.com/1424-8220/24/20/6532
Ex-1157	Ferguson, Abby. “As an athlete, I’m not a fan of smart rings. Here’s why.” Pocketlint. September 20, 2024. https://www.pocket-lint.com/smart-rings-arent-for-athletes/
Ex-1158	Seitz, Patrick. “Health Tracking Is Moving To Smart Rings From Watches. Oura Leads Market.” Investor's Business Daily. January 9, 2025. https://www.investors.com/news/technology/smart-rings-proliferate-at-ces-2025
Ex-1159	Shirer, Michael, Jitesh Ubrani, & Lujyne Amro. “IDC Forecasts Continued Growth for Wearables But Growth Will Be Uneven Across Product Categories.” International Data Corporation. September 26, 2024. https://my.idc.com/getdoc.jsp?containerId=prUS52615024
Ex-1160	Nalbach, Tyler. “Apple Watch Sales Over the Years: How Many Have Been Sold Since 2015.” Longvadon. March 28, 2025. https://longvadon.com/blogs/blog/apple-watch-sales
Ex-1161	Oura Team. “Meet Oura: Discover the Brand-New Oura Ring 4.” The Pulse Blog. October 3, 2024. https://ouraring.com/blog/oura-ring-4/
Ex-1162	Apple. “Why Apple Watch.” Apple. July 1, 2025. https://www.apple.com/watch/why-apple-watch/

Ex. No.	Description
Ex-1163	Apple. “Compare Apple Watch models.” Apple. July 1, 2025. https://www.apple.com/watch/compare/
Ex-1164	Oura Team. “Meet Oura: Technology in Oura Ring Gen3.” The Pulse Blog. February 7, 2024. https://ouraring.com/blog/ring-technology/
Ex-1165	Carroll, Rory. “Pebble rocks CES 2013 with launch of its wireless watch.” The Guardian. January 9, 2013. https://www.theguardian.com/technology/2013/jan/09/ces-2013-pebble-wireless-watch
Ex-1166	Samsung. “[Galaxy History ③] Evolution of the Galaxy Watch Series: Reimagining the Watch.” Samsung Newsroom. July 8, 2024. https://news.samsung.com/global/galaxy-history-%E2%91%A2-evolution-of-the-galaxy-watch-series-reimagining-the-watch
Ex-1167	Golder, Peter N. & Gerard J. Tellis. “Pioneer Advantage: Marketing Logic or Marketing Legend?.” Journal of Marketing Research. May 1993. https://www.jstor.org/stable/3172825
Ex-1168	Bennett, Brian. “Jawbone Up24 review: A great fitness tracker with style and comfort.” CNet. November 13, 2013. https://www.cnet.com/reviews/jawbone-up24-review/
Ex-1169	Ricker, Thomas. “Jawbone Up fitness band review.” The Verge via Wayback Machine. November 6, 2011. https://web.archive.org/web/20250527221407/https://www.theverge.com/2011/11/6/2541783/jawbone-up-review
Ex-1170	Seifert, Dan. “Fitbit Force review.” The Verge via Wayback Machine. October 18, 2013. https://web.archive.org/web/20250524010659/https://www.theverge.com/2013/10/18/4848424/fitbit-force-review

Ex. No.	Description
Ex-1171	Lawrence, Erin. “Misfit Shine Fitness and Activity Monitor – Review.” TechGadgets Canada. May 29, 2019. https://www.techgadgetsCanada.com/misfit-shine-fitness-activity-monitor-review/
Ex-1172	“Nike+ FuelBand Manual.” Nike via Wayback Machine. January 18, 2013. https://web.archive.org/web/20130118195034/http://support-en-us.nikeplus.com/ci/fattach/get/276180/0/filename/FuelBand_Manual_Online_ENG_edit12b_rev.pdf
Ex-1173	Stein, Scott. “Samsung Gear Fit review: Curved-screen fitness smartwatch one step short.” CNet. April 7, 2014. https://www.cnet.com/reviews/samsung-gear-fit-review/
Ex-1174	Maker, Ray. “Mio Alpha Optical Heart Rate Monitor In-Depth Review (Bluetooth Smart/ANT+).” DC Rainmaker. February 12, 2013. https://www.dcrainmaker.com/2013/02/monitor-bluetooth-smartant.html
Ex-1175	Maker, Ray. “Basis B1 Watch In-Depth Review.” DC Rainmaker. July 25, 2013. https://www.dcrainmaker.com/2013/07/basis-b1-review.html
Ex-1176	Bonnington, Christina. “Review: Garmin Vivofit.” Wired. March 7, 2014. https://www.wired.com/2014/03/garmin-vivofit/
Ex-1177	“Lifeband Touch ¹ Activity Tracker - Medium.” LG. Accessed on July 11, 2025. https://www.lg.com/us/mobile-accessories/lg-FB84-BM-activity-tracker
Ex-1178	“Polar Loop User Manual: Important Information.” Polar. Accessed on July 11, 2025. https://support.polar.com/e_manuals/Loop/Polar_Loop_user_manual_English/ch07.html
Ex-1179	Healey, Nic. “Sony SmartBand SWR10 review: Sony SmartBand tries to be too smart for its own good.” CNet. June 13, 2014. https://www.cnet.com/reviews/sony-smartband-swr10-review/

Ex. No.	Description
Ex-1180	Porter, Jediah. “Jawbone UP Move Review.” GearLab. April 11, 2018. https://www.outdoorgearlab.com/reviews/fitness/pedometer/jawbone-up-move
Ex-1181	Welch, Chris. “Jawbone UP3.” The Verge via Wayback Machine. April 23, 2015. https://web.archive.org/web/20241117073856/https://www.theverge.com/2015/4/23/8469123/jawbone-up-3-review-fitness-tracker
Ex-1182	clay. “How Much Did Fitbit Raise? Funding & Key Investors.” clay Dossier. March 31, 2025. https://www.clay.com/dossier/fitbit-funding
Ex-1183	Osterloh, Rick. “Google completes Fitbit acquisition.” Google Blog. January 14, 2021. https://blog.google/products/platforms-devices/fitbit-acquisition/
Ex-1184	Tracxn Technologies Limited. “Misfit Wearables - Company Profile.” Tracxn. June 20, 2025. https://tracxn.com/d/companies/misfit-wearables/__gG8yNvcKEPPBr9mV9PD_Gg3pOm462qPzhY9vWkA7NTU#about-the-company
Ex-1185	Singleton, Micah. “Fossil acquires wearable maker Misfit for \$260 million.” The Verge. November 15, 2015. https://www.theverge.com/2015/11/12/9725478/fossil-group-acquires-wearable-maker-misfit-260-million
Ex-1186	Dane, Sonali. “Jawbone: The Biggest Unicorn Death of 2017.” Wharton PEVC. March 2, 2018. https://www.whartonugpevc.com/articles/2018/3/23/jawbone-the-biggest-unicorn-death-of-2017
Ex-1187	CBInsights. “Jawbone’s Valuation History Gave Early Hints As To Its Eventual End.” CBInsights: Research. July 7, 2017. https://www.cbinsights.com/research/jawbone-valuation-history/

Ex. No.	Description
Ex-1188	Somerville, Heather. “Jawbone's demise a case of 'death by overfunding' in Silicon Valley.” Reuters. July 10, 2017. https://www.reuters.com/article/technology/jawbones-demise-a-case-of-death-by-overfunding-in-silicon-valley-idUSKBN19V0BS/
Ex-1189	FinSMEs. “Jawbone Raises \$49M from Andreessen Horowitz.” FinSMEs. March 17, 2011. https://www.finsmes.com/2011/03/jawbone-raises-49m-from-andreessen-horowitz.html
Ex-1190	Jill Duffy. “Fitbit Force Review.” PC Mag. March 24, 2014. https://www.pcmag.com/reviews/fitbit-force
Ex-1191	Curry, David. “Fitbit Revenue and Usage Statistics (2025).” Business of Apps. January 22, 2025. https://www.businessofapps.com/data/fitbit-statistics/
Ex-1192	Dolan, Brian. “Misfit's Shine raised \$846K on Indiegogo; new product expected this fall.” MobiHealth News via Wayback Machine. January 24, 2013. https://web.archive.org/web/20160219184005/http://mobihealthnews.com/20024/misfits-shine-raised-846k-on-indiegogo-new-product-expected-this-fall/
Ex-1193	Duffy, Jill. “Jawbone UP Review.” PC Mag. March 20, 2013. https://www.pcmag.com/reviews/jawbone-up
Ex-1194	Apple. “Apple Watch Series 1 - Technical Specifications.” Apple: Documentation. July 1, 2025. https://support.apple.com/en-us/111985
Ex-1195	Smith, Chris. “Sony SmartWatch 2 official: specs, features, release date and pricing.” Android Authority. June 25, 2013. https://www.androidauthority.com/sony-smartwatch-2-official-specs-features-release-date-pricing-234796
Ex-1196	“Samsung Galaxy Gear.” GSM Arena. Accessed on July 10, 2025. https://www.gsmarena.com/samsung_galaxy_gear-7716.php

Ex. No.	Description
Ex-1197	“What are the key features of Samsung Galaxy Gear(SM-V700)?.” Samsung. October 13, 2020. https://www.samsung.com/in/support/mobile-devices/what-are-the-key-features-of-samsung-galaxy-gear/
Ex-1198	“Sony SmartWatch 2 SW2.” GSM Arena. Accessed on July 10, 2025. https://www.gsmarena.com/sony_smartwatch_2_sw2-7719.php
Ex-1199	“Sony SmartWatch 3 SWR50.” GSM Arena. Accessed on July 10, 2025. https://www.gsmarena.com/sony_smartwatch_3_swr50-7691.php
Ex-1200	Bhartiya, Swapnil. “Review: LG Watch Urbane Has Great Design, Missing Features.” LiNux.com. May 19, 2015. https://www.linux.com/news/review-lg-watch-urbane-has-great-design-missing-features/
Ex-1201	Maker, Ray. “Fitbit Surge In-Depth Review.” DC Rainmaker. January 20, 2015. https://www.dcrainmaker.com/2015/01/fitbit-surge-review.html
Ex-1202	Pebble Technology. “Pebble: E-Paper Watch for iPhone and Android.” Kickstarter. April 11, 2012. https://www.kickstarter.com/projects/getpebble/pebble-e-paper-watch-for-iphone-and-android
Ex-1203	Heater, Brian. “Smartwatch pioneer and Kickstarter darling Pebble is returning in a new form.” TechCrunch. January 27, 2025. https://techcrunch.com/2025/01/27/smartwatch-pioneer-and-kickstarter-darling-pebble-is-returning-in-a-new-form/
Ex-1204	Arthur, Charles. “Review: Pebble's smart watch doesn't try too hard - but does what you need.” The Guardian. May 21, 2013. https://www.theguardian.com/technology/blog/2013/may/21/pebble-smart-watch-kickstarter

Ex. No.	Description
Ex-1205	Ulanoff, Lance. “Pebble was one of the best smartwatches ever and now it's a miracle if you can get one to work.” techradar. July 1, 2024. https://www.techradar.com/health-fitness/smartwatches/pebble-was-one-of-the-best-smartwatches-ever-and-now-its-a-miracle-if-you-can-get-one-to-work
Ex-1206	Mlot, Stephanie. “CES 2013: Pebble Smartwatch to Ship Jan. 23.” PC Mag. January 9, 2013. https://www.pcmag.com/news/ces-2013-pebble-smartwatch-to-ship-jan-23
Ex-1207	Patel, Nilay. “Pebble smartwatch review.” The Verge. January 28, 2013. https://www.theverge.com/2013/1/28/3924904/pebble-smartwatch-review
Ex-1208	France-Presse, Agence. “Time is ripe for smart watches, say analysts.” Gadgets360. April 1, 2013. https://www.gadgets360.com/others/news/time-is-ripe-for-smart-watches-say-analysts-348697
Ex-1209	Buckley, Sean. “Samsung's Galaxy Gear ads play on your nostalgia, invoke Dick Tracy.” Engadget. October 6, 2013. https://www.engadget.com/2013-10-06-samsungs-galaxy-gear-ads-play-on-your-nostalgia.html
Ex-1210	Zeis, Adam. “The best smartwatches from CES 2014.” smartwatchfans via Wayback Machine. January 13, 2014. https://web.archive.org/web/20140330184434/http://www.smartwatchfans.com/best-smartwatches-ces-2014
Ex-1211	Arthur, Charles & Samuel Gibbs. “Apple makes move into wearables with smartwatch and new iPhones.” The Guardian. September 9, 2014. https://www.theguardian.com/technology/2014/sep/09/apple-watch-cupertino-investors
Ex-1212	Musil, Steven. “Apple still dominates growing global smartwatch sector.” CNET. May 6, 2020. https://www.cnet.com/tech/mobile/apple-still-dominates-growing-global-smartwatch-sector/

Ex. No.	Description
Ex-1213	McLear Limited. “New wearable device makes payments simple.” McLEAR. December 4, 2018. https://mclear.co/news/new-wearable-device-makes-payments-simple/
Ex-1214	Hakikat, Atal. “The World’s First Smart Ring You’ll Actually Wear.” The Zine. November 26, 2016. https://www.thezine.com.au/the-worlds-first-smart-ring-youll-actually-wear/
Ex-1215	Ringly. “2018 Update: A New Chapter.” The Buzz: By Ringly. January 22, 2018. https://ringly.com/blogs/news/why-is-everything-sold-out-on-ringly-com
Ex-1216	Ayres, Carly. “In the Details: Making a Smart Ring That Women Would Actually Want to Wear.” Core77. July 3, 2014. https://www.core77.com/posts/27250/in-the-details-making-a-smart-ring-that-women-would-actually-want-to-wear-27250
Ex-1217	Mamiit, Aaron. “CES 2015: The 'Ring' to Control Them All? How Logbar Gesture Control Ring Works.” TechTimes. January 7, 2015. https://www.techtimes.com/articles/25084/20150107/ces-2015-the-ring-to-control-them-all-how-logbar-gesture-control-ring-works.htm
Ex-1218	Venho, Niina. “Moodmetric Ring: Smart Jewelry To Manage Stress.” Indiegogo. September 2015. https://www.indiegogo.com/projects/moodmetric-ring-smart-jewelry-to-manage-stress#/
Ex-1219	Mufson, Beckett. “Finally, a Mood Ring for the 21st Century.” VICE. November 24, 2016. https://www.vice.com/en/article/finally-a-wearable-tech-mood-ring-for-the-21st-century/
Ex-1220	Gorton, Thomas. “The humble mood ring gets a wearable tech update.” DAZED. November 26, 2014. https://www.dazeddigital.com/artsandculture/article/22694/1/the-humble-mood-ring-gets-a-wearable-tech-update

Ex. No.	Description
Ex-1221	Nuanic. “What We Do.” Nuanic. December 7, 2024. https://nuanic.com/about-us
Ex-1222	Nuanic. “Product: The 2nd Generation Ring is Here.” Nuanic. July 1, 2025. https://nuanic.com/product
Ex-1223	K Wearables. “K Home.” K Ring. July 1, 2025. https://mykring.com/
Ex-1224	Johns, Steven. “The gesture Ring by Logbar has been reviewed as "the worst product ever made"." Neowin. November 20, 2014. https://www.neowin.net/news/the-gesture-ring-by-logbar-has-been-reviewed-as-the-worst-product-ever-made/
Ex-1225	Logbar Inc. “Ring by logbar - Shortcut Everything.” Kickstarter. February 27, 2014. https://www.kickstarter.com/projects/1761670738/ring-shortcut-everything
Ex-1226	Perez, Sarah. “Ringly Raises \$5.1 Million Led By Andreessen Horowitz To Expand Its Smart Jewelry Collection Beyond Rings.” TechCrunch. January 21, 2015. https://techcrunch.com/2015/01/21/ringly-raises-5-1-million-from-andreessen-horowitz-to-expand-its-smart-jewelry-collection-beyond-rings/
Ex-1227	McLear, John. “One Smart Ring. Unlimited Possibilities.” Kickstarter. October 1, 2015. https://www.kickstarter.com/projects/mclear/nfc-ring-2016-range-one-smart-ring-unlimited-possi
Ex-1228	Campbell, Philip. “Kerv Wearables launches contactless payment ring at Wearable Technology Show 2017.” The Payments Association. March 8, 2017. https://thepaymentsassociation.org/article/kerv-wearables-launches-contactless-payment-ring-at-wearable-technology-show-2017/

Ex. No.	Description
Ex-1229	Chang, Lulu. “Armed with NFC, the Kerv smart ring works like a contactless credit card.” digitaltrends. March 8, 2017. https://www.digitaltrends.com/mobile/kerv-smart-ring-works-like-contactless-credit-card-2/
Ex-1230	Fintech News Hong Kong. “ORII – The World’s First Voice-Powered Smart Ring Launched.” Fintech News. August 23, 2017. https://fintechnews.hk/1862/iot/orii-the-worlds-first-voice-powered-smart-ring-launched-2/
Ex-1231	Stein, Scott. “Token Ring aims to wrap security around your finger.” CNET. June 27, 2017. https://www.cnet.com/reviews/token-ring-preview/
Ex-1232	Draper, Sam. “GO2SLEEP Wearable Smart Ring Detects Sleep Apnea and More.” Wearable Technologies. August 22, 2018. https://wt-obk.wearable-technologies.com/2018/08/go2sleep-wearable-smart-ring-sleep-detects-sleep-apnea-and-more/
Ex-1233	Wolfe, Daniel. “7 setbacks for wearable payments.” American Banker. March 16, 2018. https://www.americanbanker.com/payments/slideshow/7-setbacks-for-wearable-payments
Ex-1234	Origami Labs. “ORII Kickstarter The Voice Powered Ring.” Kickstarter. July 18, 2017. https://www.kickstarter.com/projects/187732114/orii-your-voice-powered-smart-ring/
Ex-1235	Colt, Anna. “ORII - Fastest Way to Send Texts Without a Screen.” Indiegogo. September 13, 2017. https://www.indiegogo.com/projects/orii-fastest-way-to-send-texts-without-a-screen/#/
Ex-1236	Jennings, Ralph. “This Hong Kong 'Smart Ring' Startup Raised \$2.5M To Crack The Wearables Market.” Forbes. June 7, 2018. https://www.forbes.com/sites/ralphjennings/2018/06/07/why-10000-people-are-buying-finger-rings-to-answer-their-smartphones/

Ex. No.	Description
Ex-1237	Token. “Token Begins Production of its Next-Generation Multifactor Authentication Smart Ring.” BusinessWire. August 3, 2023. https://www.businesswire.com/news/home/20230803058819/en/Token-Begins-Production-of-its-Next-Generation-Multifactor-Authentication-Smart-Ring
Ex-1238	Exchange Rates. “British Pound (GBP) To US Dollar (USD) Exchange Rate History for September 11, 2016.” Exchange Rates. July 6, 2025. https://www.exchange-rates.org/exchange-rate-history/gbp-usd-2016-09-11
Ex-1239	sleepon INC. “GO2SLEEP: AI-powered device for restful sleep.” Indiegogo. November 22, 2017. https://www.indiegogo.com/projects/go2sleep-ai-powered-device-for-restful-sleep#/
Ex-1240	Cassidy, Anne. “The wedding tech now at the heart of couples' nuptials.” BBC. April 23, 2023. https://www.bbc.com/news/business-65322101
Ex-1241	SLEEPON. “SLEEPON Go2sleep Review.” SLEEPON Blog. April 12, 2024. https://www.sleepon.us/sleepon-go2sleep-review/
Ex-1242	Hughes, Locke. “Meet Oura: The Origins and Evolution of Oura Ring.” The Pulse Blog. February 10, 2025. https://ouraring.com/blog/history-of-oura/
Ex-1243	OURA. “Product: Oura Gen 3 Heritage Stealth.” OURA. July 1, 2025. https://ouraring.com/product/rings/oura-gen3/heritage/stealth
Ex-1244	iFixIt. “Oura Ring 2 Teardown.” iFixIt. July 9, 2020. https://www.ifixit.com/Teardown/Oura+Ring+2+Teardown/135207
Ex-1245	OURA. “Product: Oura Gen3 Horizon.” OURA. July 1, 2025. https://ouraring.com/product/rings/oura-gen3/horizon

Ex. No.	Description
Ex-1246	OURA. “Product: Oura Ring 4.” OURA. July 1, 2025. https://ouraring.com/product/rings/oura-ring-4/silver
Ex-1247	OURA. “Product: Oura Gen 3 Heritage Silver.” OURA. July 1, 2025. https://ouraring.com/product/rings/oura-gen3/heritage/silver
Ex-1248	Gebhart, Andrew. “Echo Loop puts Amazon's Alexa on your finger.” CNET. September 25, 2019. https://www.cnet.com/home/smart-home/echo-loop-puts-amazons-alexa-on-your-finger/
Ex-1249	Smith, Dale. “Amazon Echo Loop -- everything we know about Amazon's wacky new smart ring.” CNET. October 8, 2019. https://www.cnet.com/tech/mobile/amazon-echo-loop-everything-we-know-about-amazons-wacky-new-smart-ring/
Ex-1250	Koetsier, John. “Amazon’s Echo Loop Smart Ring Gives A Whole New Meaning To ‘Talk To The Hand’.” Forbes. September 26, 2019. https://www.forbes.com/sites/johnkoetsier/2019/09/26/amazons-echo-loop-gives-whole-new-meaning-to-talk-to-the-hand/
Ex-1251	Newbega RFID Technology. “The Best Smart NFC Ring: Oura Ring 3, McLear Ringpay, and More Compared.” Newbega. April 24, 2024. https://www.newbega.com/news/nfc-ring.html
Ex-1252	Team XYZ. “Health-tracking smart ring from Circular.xyz aims to improve your sleep, energy, and activity.” XYZ Blog. August 10, 2022. https://gen.xyz/blog/circularxyz
Ex-1253	Fedow, Lenore. “Ultrahuman Unveils Luxury Smart Ring.” Technology. January 13, 2025. https://nationaljeweler.com/articles/13558-ultrahuman-unveils-luxury-smart-ring
Ex-1254	Hill, Simon. “Review: Ultrahuman Ring Air.” Wired. October 22, 2023. https://www.wired.com/review/ultrahuman-ring-air/

Ex. No.	Description
Ex-1255	Luna. “Unlocking Human Potential.” Luna Zone. July 1, 2025. https://www.lunazone.com/
Ex-1256	Noise. “Global Smart Wearable Leader, Noise, Launches Its First Smart Ring, Luna Ring; Consolidates Its Leadership With a New Form Factor.” Business Wire. July 25, 2023. https://www.businesswire.com/news/home/20230725952026/en/Global-Smart-Wearable-Leader-Noise-Launches-Its-First-Smart-Ring-Luna-Ring-Consolidates-Its-Leadership-With-a-New-Form-Factor
Ex-1257	Movano. “Movano Health to Launch the Evie Ring on November 20.” Movano Health. October 30, 2023. https://ir.movano.com/news-detail/movano-health-to-launch-the-evie-ring-on-november-20/61b61e38-ed7b-4abe-833d-40a2f43ab99b
Ex-1258	Leabman, Michael. “Enhanced Heart Rate in Motion Accuracy with the Evie Ring Using Advanced Deep Learning Algorithms.” Evie Blog. June 1, 2024. https://eviering.com/blogs/news/enhanced-heart-rate-in-motion-accuracy-with-the-evie-ring-using-advanced-deep-learning-algorithms
Ex-1259	Lida. “CES 2024: The Evie Ring is The First Wearable Smart Ring Designed for Women.” The Sypnotix. January 8, 2024. https://www.sypnotix.com/reviews/ces-2024-evie-ring
Ex-1260	Savvides, Lexy. “Samsung Galaxy Ring Review: My Favorite Smart Ring, Hands Down.” CNET. July 17, 2024. https://www.cnet.com/tech/mobile/samsung-galaxy-ring-review-my-favorite-smart-ring-hands-down/
Ex-1261	Cimino, Kaitlyn. “Samsung Galaxy Ring is here: Price, size, release date, and everything else!” Android Authority. July 10, 2024. https://www.androidauthority.com/samsung-galaxy-ring-3340682/

Ex. No.	Description
Ex-1262	RingConn. “RingConn Gen 1.” RingConn. July 1, 2025. https://ringconn.com/products/ringconn-gen-1?srsltid=AfmBOorH6utnNebg1JBj_xU2IqZRu2nK2l8P4AuRGO5-BQQvzwUcSd9t&variant=47273813672244
Ex-1263	RingConn. “About Us: Why RingConn?.” RingConn. July 1, 2025. https://ringconn.com/pages/about-us
Ex-1264	Tang, Angela. “Zepp Health Announces US Launch Date for Amazfit Helio Ring.” Zepp. April 30, 2024. https://www.zepp.com/press-release/zepp-health-announces-us-launch-date-for-amazfit-helio-ring
Ex-1265	Leclair, Dave. “The Amazfit Helio Ring launches May 15 for only \$299 to take on Samsung Galaxy Ring.” Tom's Guide. May 1, 2024. https://www.tomsguide.com/phones/the-amazfit-helio-ring-launches-may-15-for-only-dollar299-to-take-on-samsung-galaxy-ring
Ex-1266	amazfit. “Amazfit Helio Ring.” amazfit. July 1, 2025. https://www.amazfit.com/products/amazfit-helio-ring
Ex-1267	Chu, Marian (YoonJee). “Sky Labs seeks global expansion of world’s first BP monitor ring.” BioWorld. April 22, 2025. https://www.bioworld.com/articles/719393-sky-labs-seeks-global-expansion-of-worlds-first-bp-monitor-ring?v=preview
Ex-1268	Barton, Katerina. “This South Korean startup developed a wearable ring to treat hypertension.” Fast Company. March 3, 2024. https://www.fastcompany.com/91033750/sky-labs-most-innovative-companies-2024
Ex-1269	CircularRing. “Circular Ring 2: World’s Most Advanced Health Tracking Ring.” Kickstarter. March 5, 2025. https://www.kickstarter.com/projects/circular-ring/circular-ring-2-worlds-most-advanced-health-tracking-ring
Ex-1270	Circular. “Shop.” Circular. July 1, 2025. https://www.circular.xyz/shop

Ex. No.	Description
Ex-1271	Torres, JC. “World's First ECG Smart Ring Raises Nearly \$2.5 Million in Funding Just Within A Month.” Yanko Design. April 12, 2025. https://www.yankodesign.com/2025/04/12/worlds-first-ecg-smart-ring-raises-nearly-2-5-million-in-funding-just-within-a-month/
Ex-1272	RingConn. “RingConn Gen 2.” RingConn. July 1, 2025. https://ringconn.com/products/ringconn-gen-2?variant=48162846769460
Ex-1273	Gebhart, Andrew. “RingConn Gen 2 Air Review.” PC Mag. April 4, 2025. https://www.pcmag.com/reviews/ringconn-gen-2-air
Ex-1274	Allison, Conor. “CES 2025: Wearable’s Best in Show awards revealed.” Wareable. January 13, 2025. https://www.wareable.com/ces/the-best-wearables-at-ces-2025
Ex-1275	Sean. “Noise Luna Ring Gen 2.0 & ColorFit Pro 6 Debuted at CES 2025.” GIZMOCHINA. January 9, 2025. https://www.gizmochina.com/2025/01/09/noise-luna-ring-2-colorfit-pro-6-debut-ces-2025/
Ex-1276	Ultrahuman. “World's First Luxury Smart Ring.” Ultrahuman. July 1, 2025. https://www.ultrahuman.com/rare/
Ex-1277	Song, Victoria. “Ultrahuman thinks its 18-karat gold smart ring is worth \$1,900.” The Verge. January 7, 2025. https://www.theverge.com/2025/1/7/24337049/ultrahuman-rare-ces-2025-smart-ring-wearables
Ex-1278	Kollat, Matt. “Circular’s next-gen smart ring lands with wireless charging and digital sizing – pre-orders now open.” yahoo!tech. March 5, 2025. https://tech.yahoo.com/wearables/articles/circular-next-gen-smart-ring-080000928.html?guccounter
Ex-1279	Samsung. “How to charge the Galaxy Ring.” Samsung. July 1, 2025. https://www.samsung.com/us/support/answer/ANS10003281/

Ex. No.	Description
Ex-1280	amazfit. “Helio Ring.” amazfit US. July 1, 2025. https://us.amazfit.com/products/amazfit-helio-ring
Ex-1281	CircularRing. “Circular Smart Ring: Sleep, Energy, Performance.” Indiegogo. August 1, 2025. https://www.indiegogo.com/projects/circular-smart-ring-sleep-energy-performance#/
Ex-1282	Ultrahuman. “Ultrahuman Ring - Decode Your Metabolism.” Indiegogo. July 1, 2022. https://www.indiegogo.com/projects/ultrahuman-ring-decode-your-metabolism--3#/
Ex-1283	Ultrahuman. “Ultrahuman Ring AIR.” Kickstarter. May 15, 2024. https://www.kickstarter.com/projects/ultrahuman/ultrahuman-ring-air
Ex-1284	Exchange Rates UK. “British Pound to US Dollar History: 2023.” Exchange Rates. July 1, 2025. https://www.exchangerates.org.uk/GBP-USD-spot-exchange-rates-history-2023.html
Ex-1285	Movano. “Movano Health Reports 2023 Financial Results and Provides Business Update.” Movano Health. April 4, 2024. https://ir.movano.com/news-detail/movano-health-reports-2023-financial-results-and-provides-business-update/f99b07bf-7165-4ec3-8042-2b4cd67de674
Ex-1286	RingConn. “RingConn Smart Ring: Smartest Wearable for You.” Indiegogo. November 1, 2025. https://www.indiegogo.com/projects/ringconn-smart-ring-smartest-wearable-for-you--2#/
Ex-1287	RingConn. “RingConn Gen 2: Ultimate Lightness, 12 Days Battery.” Kickstarter. December 23, 2024. https://www.kickstarter.com/projects/2059923007/ringconn-gen-2-ultimate-lightness-12-days-battery

Ex. No.	Description
Ex-1288	Noise. “LUNA Ring: 70 health metrics. 1 Smart Ring.” Indiegogo. March 1, 2024. https://www.indiegogo.com/projects/luna-ring-70-health-metrics-1-smart-ring#/
Ex-1289	CircularRing. “Shop: Circular Ring Slim.” Circular. July 1, 2025. https://shop.circular.xyz/pages/circular-ring-slim
Ex-1290	Chesnokova, Sofia. “Meet Circular Ring 2: French wearable taking on Oura with cutting-edge features.” TFN. January 7, 2025. https://techfundingnews.com/meet-circular-ring-2-french-wearable-taking-on-oura-with-cutting-edge-features/
Ex-1291	Ultrahuman. “Shop: Ring AIR.” Ultrahuman. July 1, 2025. https://www.ultrahuman.com/ring/buy/us/
Ex-1292	Lomas, Natasha. “Ultrahuman stakes a claim to luxury smart rings with trio of 18K gold and pt950 platinum bands.” Tech Crunch. January 7, 2025. https://techcrunch.com/2025/01/07/ultrahuman-stakes-a-claim-to-luxury-smart-rings-with-trio-of-18k-gold-and-pt950-platinum-bands/
Ex-1293	RingConn. “RingConn Gen 1: Midnight Black.” RingConn. July 1, 2025. https://ringconn.com/products/ringconn-gen-1
Ex-1294	RingConn. “RingConn Gen 2 Air Review.” RingConn. July 1, 2025. https://ringconn.com/products/ringconn-gen-2-air
Ex-1295	RingConn. “RingConn Gen 2: The World's First Ultra-Thin Smart Ring With Sleep Apnea Monitoring.” RingConn. July 1, 2025. https://ringconn.com/pages/ringconn-gen-2?gad_source
Ex-1296	INTENTIONALLY LEFT BLANK
Ex-1297	ID Tech Editorial Team. “Pentagon Cancels \$96M Biometric Ring Contract Amid Privacy Concerns.” IDTechWire. March 7, 2025. https://idtechwire.com/pentagon-cancels-96m-biometric-ring-contract-amid-privacy-concerns/

Ex. No.	Description
Ex-1298	Welch, Carley. “Pentagon’s \$96M wearable contract sparks protest, accusations of vendor preference.” Breaking Defense. February 19, 2025. https://breakingdefense.com/2025/02/pentagons-96m-wearable-contract-sparks-protest-accusations-of-vendor-preference/
Ex-1299	Latto, Joel. “Oura Ring Gen3 Upgrade Offer FAQ (and Launch PR Fail).” Joel Latto. October 27, 2021. https://joellatto.com/2021/10/27/oura-gen3-ring-upgrade-offer-faq-and-launch-pr-fail/
Ex-1300	Gelbart, Bryn. “The Oura Ring Is Even More on Sale Now.” Esquire. December 2, 2024. https://www.esquire.com/lifestyle/tech/a63033170/black-friday-oura-ring-deals-2024/
Ex-1301	buyFSA Experts. “Is an Oura Ring FSA/HSA Eligible?.” buyFSA. December 5, 2024. https://buyfsa.com/blogs/fsa-hsa-eligibility-list/is-an-oura-ring-fsa-hsa-eligible
Ex-1302	Welch, Carley. ““This acquisition is no longer required:’ Defense Health Agency cancels \$96M wearable solicitation.” Breaking Defense. March 5, 2025. https://breakingdefense.com/2025/03/this-acquisition-is-no-longer-required-defense-health-agency-cancels-96m-wearable-solicitation/
Ex-1303	Allison, Conor. “Oura Ring 4 vs. Ring 3: What we recommend after six months.” Wareable. April 13, 2025. https://www.wareable.com/wearable-tech/oura-ring-4-vs-ring-3-key-differences-compared
Ex-1304	Lee, Derrek. “Oura Ring 4 vs. Oura Ring Gen 3: Should you upgrade?.” AndroidCentral. February 18, 2025. https://www.androidcentral.com/wearables/oura-ring-4-vs-oura-ring-gen-3
Ex-1305	Pangarkar, Tajammul. “Fitness Tracker Statistics 2025 By Health, Activities.” Market.Us News. January 13, 2025. https://www.news.market.us/fitness-tracker-statistics/

Ex. No.	Description
Ex-1306	Google Scholar. “Search: “diffusion of innovations”.” Google Scholar. July 7, 2025. https://scholar.google.com.au/scholar?rlz=1C1GGLS_enAU291AU303&q=diffusion%20of%20innovations&um=1&ie=UTF-8&hl=en&sa=N&tab=ps
Ex-1307	Matthews, Tim. “Chap 1 Fig 2 Everett Rogers Diffusion Innovation Model.” Matthews on Marketing. November 15, 2012. https://matthewsonmarketing.com/chap-1-fig-2-everett-rogers-diffusion-innovation-model-2/
Ex-1308	Halton, Clay. “Diffusion of Innovations Theory: Definition and Examples.” Investopedia. May 23, 2025. https://www.investopedia.com/terms/d/diffusion-of-innovations-theory.asp
Ex-1309	Hale, Tom. “The Value of Oura Membership.” The Pulse Blog. May 20, 2022. https://ouraring.com/blog/the-value-of-oura-membership/
Ex-1310	OURA. “Oura Membership.” OURA. July 1, 2025. https://support.ouraring.com/hc/en-us/articles/4409086524819-Oura-Membership
Ex-1311	Neely, Amber. “Oura Ring review: love the feature changes, hate the new subscription.” Apple Insider. March 19, 2023. https://appleinsider.com/articles/23/03/19/oura-ring-review-love-the-features-changes-hate-the-new-subscription
Ex-1312	Oh, Hannah. “I Tested the Oura Ring Gen3 for 10 Months—Here’s My Honest, Unfiltered Review.” Cosmopolitan. July 17, 2024. https://www.cosmopolitan.com/health-fitness/a45931388/oura-ring-3-review/
Ex-1313	Shares, Shervin. “6 Months with the Oura Ring 4. The Truth No One Tells You.” YouTube. March 15, 2025. https://www.youtube.com/watch?v=v6YkMjlltuo

Ex. No.	Description
Ex-1314	PYMNTS Team. “Samsung Enters Smart Ring Market, Expanding Wearable Tech Portfolio.” PYMNTS. July 10, 2024. https://www.pymnts.com/news/wearables/2024/samsung-enters-smart-ring-market-expanding-wearable-tech-portfolio/
Ex-1315	Comstock, Jonah. “Ouraring gets \$5.3M for sleep-tracking ring.” MobiHealth News via Wayback Machine. November 30, 2016. https://web.archive.org/web/20241226062503/http://www.mobihealthnews.com/content/ouraring-gets-53m-sleep-tracking-ring
Ex-1316	Rabinowitz, Harry. “I tested the latest Oura Ring 4 for months — is it worth the upgrade?.” NBC News. April 2, 2025. https://www.nbcnews.com/select/shopping/oura-ring-4-review-rcna196889
Ex-1317	Oura Team. “Meet Oura: Your Oura Readiness Score.” The Pulse Blog. February 7, 2024. https://ouraring.com/blog/readiness-score/
Ex-1318	OURA. “Oura Ring 4.” OURA. July 1, 2025. https://support.ouraring.com/hc/en-us/articles/33045011508115-Oura-Ring-4
Ex-1319	OURA. “Oura Advisor.” OURA. July 1, 2025. https://support.ouraring.com/hc/en-us/articles/39512345699219-Oura-Advisor
Ex-1320	“Oura Ring 4, powered by smart sensing, is here.” Yole Group. October 3, 2024. https://www.yolegroup.com/industry-news/oura-ring-4-powered-by-smart-sensing-is-here/
Ex-1321	Kharpal, Arjun. “Smart ring leader Oura plans international push as CEO touts new features and thinking on hardware.” CNBC. November 14, 2024. https://www.cnbc.com/2024/11/14/oura-plans-international-expansion-tests-nutrition-and-ai-features.html
Ex-1322	McLEAR. “About Us.” McLEAR. July 1, 2025. https://mclear.co/about/

Ex. No.	Description
Ex-1323	NFC RING. “Gallery.” NFC RING. July 1, 2025. https://nfcring.com/gallery/
Ex-1324	McClear, John. “After a year of hard work my Kickstarter is live!.” John McClear. July 20, 2013. https://mcclear.co.uk/tag/clothing/
Ex-1325	Bennett, Brian. “Basis Science Basis B1 Band review: 24-7 fitness watch isn't small but motivates well.” CNet. June 11, 2013. https://www.cnet.com/reviews/basis-band-review/
Ex-1326	Bhavsar, Sagar Naresh. “Samsung's next wave of wearables could include smart earrings and AI necklaces.” Neowin. July 11, 2025. https://www.neowin.net/news/samsungs-next-wave-of-wearables-could-include-smart-earrings-and-ai-necklaces/
Ex-1327	U.S. Patent Publication No. 20120253485
Ex-1328	INTENTIONALLY LEFT BLANK
Ex-1329	David C. Bock et al., Batteries Used to Power Implantable Biomedical Devices, 84 Electrochimica Acta 155 (2012)
Ex-1330	B. Scrosati, Lithium Batteries: From Early Stages to the Future, in Lithium Batteries 13 (B. Scrosati, K.M. Abraham, W. Van Schalkwijk & J. Hassoun eds., 2013)
Ex-1331	U.S. Patent No. 7,968,226
Ex-1332	U.S. Patent No. 6,881,516
Ex-1333	Screenshot from the Internet Archive of Ouraring.com, “The Smart Ring That Helps You Get More Restorative Sleep,” available at https://web.archive.org/web/20171205082910/https://ouraring.com/
Ex-1334	Screenshot from the Internet Archive of Ouraring.com, “What has Changed? The New Oura Ring,” available at, available at https://web.archive.org/web/20191206191935/https://ouraring.com/difference-between-first-and-new-oura-ring/

Ex. No.	Description
Ex-1335	iFixit, Oura Ring 2 Teardown, iFixit (July 9, 2020), https://www.ifixit.com/Teardown/Oura+Ring+2+Teardown/135207
Ex-1336	Screenshots of “What's inside the Oura Ring? (Gen 3 and 2),” available at https://www.youtube.com/watch?v=z7zuWbFNTL8&t=529s

I, Dr. Brian Anthony, declare:

I. INTRODUCTION

1. I am the same Dr. Brian Anthony that submitted a Declaration in this proceeding (Ex-1002). I submit this Reply Declaration on behalf of Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc. (collectively, “Samsung” or “Petitioner”), in response to portions of the Declaration of Dr. Patrick Mercier (Ex-2018) (“Mercier Decl.”) on behalf of Patent Owner Ouraring, Inc. (“Oura,” “Patent Owner,” or “PO”).

2. In preparation for this Reply Declaration, I have considered the materials discussed in my Declaration (Ex-1002) and this Reply Declaration, including, for example, U.S. Patent No. 11,868,178 (“the ’178 Patent”) (Ex-1001), the references cited by the ’178 Patent, the prosecution history of the ’178 Patent, various background articles and materials referenced in my Declaration (Ex-1002) and in this Reply Declaration, the prior art references identified in my Declaration (Ex-1002) and in this Reply Declaration, the Patent Owner’s Response (“POR”), the Declaration of Dr. Patrick Mercier (Ex-2018) including certain references cited therein, the transcript of my deposition in this proceeding (Ex-2020, Ex-2021), and the transcript of the Deposition of Dr. Patrick Mercier (Ex-1081, Ex-1082). In addition, my opinions are further based on my education, training, experience, and

knowledge in the relevant field. PO's arguments fail and the challenged claims should be cancelled.

3. I am being compensated at my usual and customary rate of \$500 per hour. No part of my compensation depends on the outcome of this proceeding, and I have no other interest in this proceeding. My compensation is in no way contingent on the nature of my findings, the presentation of my findings in testimony, or the outcome of this or any other proceeding. I have no other financial interest in this proceeding.

4. I reiterate the Background and Qualifications, Relevant Legal Standards, Level of Ordinary Skill in the Art, and Technology Background sections of my Declaration (Ex-1002), as if fully set forth herein. Ex-1002 ¶¶4-22, 42-131.

5. For the following reasons, it remains my opinion that: (1) Claims 1-3 and 17-18 of the '178 Patent are obvious over Schröder (Ex-1007); (2) Claims 1-3 and 13-16 are obvious over Schröder in view of Niwa (Ex-1005); (3) Claim 12 is obvious over Schröder in view of Mestas (Ex-1010); (4) Claims 1, 4-11, and 13-16 are obvious over Schröder in view of Yuen (Ex-1006); (5) Claims 1-3 and 13-18 are obvious over Niwa; (6) Claims 1-3 and 13-18 are obvious over Niwa in view of Schröder; (7) Claim 12 is obvious over Niwa in view of Mestas; (8) Claim 12 is obvious over Niwa-Schröder in view of Mestas; (9) Claims 4-11 are obvious over

Niwa in view of Yuen; and (10) Claims 4-11 are obvious over Niwa-Schröder in view of Yuen.

II. DR. MERCIER'S ARGUMENTS AGAINST GROUNDS 1-4 FAIL

A. Independent claim 1 is rendered obvious by Schröder (Ground 1), Schröder-Niwa (Ground 2), or Schröder-Yuen (Ground 3)

6. Dr. Mercier does not dispute that Schröder, alone or in combination with Niwa or Yuen, teaches elements 1[pre]-[b]. *See* Ex-1081 (Mercier Tr. 75:15-21). Instead, PO disputes Schröder's teachings of a battery, PCB, and sensors housed inside the finger-ring's cavity as recited in elements 1[c]-1[e].

- 1. Element 1[c]: a battery positioned within a cavity formed between the internal housing component and the external housing component, wherein the battery comprises a shape and size configured to fit within the cavity between the outer circumferential surface of the external housing component and the inner circumferential surface of the internal housing component, and wherein the battery extends through at least a first portion of the cavity of the finger-worn wearable ring device**

7. Dr. Mercier does not dispute that Schröder teaches a battery. *See* Ex-1081 (Mercier Tr. 97:3-4). Rather, Dr. Mercier argues that Schröder does not disclose any position of a battery, or what such a battery would look like, and thus cannot meet any of the structural limitations set forth in limitation 1[c]. Dr. Mercier believes that because Schröder does not provide "details of the battery shape, size, or location" within Schröder's housing, a POSITA could not design a battery within the cavity of the ring device. Ex-2013 ¶¶107-108. But nothing in the claims,

specification, or prosecution history requires a battery of a certain “shape, size, or location.”

8. Element 1[c] recites: a battery positioned within a cavity formed between the internal housing component and the external housing component, wherein the battery comprises a shape and size configured to fit within the cavity between the outer circumferential surface of the external housing component and the inner circumferential surface of the internal housing component, and wherein the battery extends through at least a first portion of the cavity of the finger-worn wearable ring device.

9. Therefore, claim 1 merely requires a battery that fits within a cavity between internal and external housing components, and that cavity being between the external housing component’s outer circumferential surface and the internal housing component’s inner circumferential surface. Dr. Mercier is correct claim 1 does not specify the exact measurements or position of the battery, but that does not mean

10. Dr. Mercier improperly imposes a higher standard on the prior art, by requiring it to disclose specific structural and positional details that are absent from the claimed battery limitation. But Claim 1 does not impose structural limitations, such as “what such a battery would look like.” Nor does the ’178 Patent specification disclose exact measurements. Indeed, Dr. Mercier acknowledged that the ’178

Patent does “not describe manufacturing of batteries” or “provide specific details on how to do size reduction” of curved batteries. See Ex-1081 (Mercier Tr. 17:3-7, 18:17-19:9); *see also id.*, (Mercier Tr. 15:25-16:2, 135:4-17). While Dr. Mercier argues that it is conclusory to suggest that an “optional and unknown sized battery” would be inside the cavity of Schröder’s finger ring “that is outfitted to carry no more than a wire,” he agrees that “inlay 12, with chip module 10 and various other components on it, is inserted into a recess between ring halves 16 and 18 in Schröder.” Ex-1081 (Mercier Tr. 82:10-13).

11. As I explained in my declaration, Schröder’s battery must be of a “size and shape to fit within the cavity” of the finger ring, and thus must be arranged between internal and external housing components. Ex-1002 ¶¶166-168. Even if Schröder is silent about its battery’s exact position, a POSITA is not an automaton and would have known to place a battery within the confines of the ring. Ex-1002 ¶¶166-168; Ex-2020 (Anthony Tr. 162:14-163:11, 168:22-172:5). Dr. Mercier agreed “that a POSITA would be able to look at the components that need to be powered and do a routine engineering exercise to determine the proper power supply and other features of the battery.” See Ex-1081 (Mercier Tr. 130:18-22). Dr. Mercier acknowledged that determining the specifications of a battery was within the skill of a POSITA using “basic engineering principles.” See *id.*, (Tr. 131:1-14) (testifying a POSITA “would understand the peak and average power needs of the device and

would use that information to ... select an appropriate battery”). So even if Schröder did not disclose a battery within its housing, a POSITA would have known how to determine the specifications for such a battery to power the components within the ring and to fit within the ring. This is consistent with my declaration, where I discussed that “the battery must be configured in size and shape to fit within the cavity.” Ex-1002 ¶¶166-167.

12. Next, Dr. Mercier argues that Schröder’s battery would need to be in its chip module 10, which protrudes from the ring housing and is not disclosed to be “in inlay 12” because chip module 10 would have been too large to fit within the inlay. Ex-2018 ¶¶98-99. I disagree with Dr. Mercier’s opinion that Schröder’s battery would protrude out of the ring. He appears to rely solely on Figure 3 of Schröder. See Ex-2018 ¶¶97-99. But I am not relying on Schröder’s chip module 10 nor Schröder’s figure 3 depiction of chip module 10 protruding out of the housing. In addition, Schröder discloses other configurations, without cap 14, as shown in Figure 4, in which the chip module 10 and Schröder’s other electronic components are inside of the ring. See Ex-1081 (Mercier Tr. 77:12-18, 82:4-13, 124:3-7, 145:24-146:2). Dr. Mercier agrees that Figure 4’s embodiment is different than Figure 3’s embodiment. See Ex-1081 (Mercier Tr. 77:15-18).

13. I also disagree with Dr. Mercier’s opinion that Schröder needed to disclose its battery’s precise position within a cavity. I note that Dr. Mercier agreed

that “inlay 12, with chip module 10 and various other components on it, is inserted into a recess between ring halves 16 and 18 in Schröder.” Ex-1081 (Mercier Tr. 82:10-13). Dr. Mercier further agreed that there must be a recess anytime there is an inlay because “how else is it going to get in there? It needs space to exist, right?” *Id.* (Mercier Tr. 101:12-16). While Dr. Mercier states Schröder does not provide the exact details, he confirmed that a POSITA would have understood how the electrical components would fit inside of Schröder’s ring, based on Schröder’s teachings and the level of a POSITA. As I explained in my declaration, “components housed inside a device are necessarily in a cavity within the device.” Ex-1002 ¶¶162-164.

14. Schröder teaches that its energy storage unit, i.e., battery, provides power to chip module 10, which is taught to be within Schröder’s housing on inlay 12. *See* Ex-1007, 9:13-15, 11:46-50. A POSITA would have understood Schröder as teaching the chip module in the recess. Ex. 1007, 9:58–60, 12:8–9, 12:48–52, 12:62–65, Fig. 8.

15. Schröder’s components—e.g., its battery—would be understood to be inside the ring. I explained how placing components inside of a ring-form factor was well known. *See, e.g.*, Ex-1002 ¶¶68-82, ¶276 (citing Ex-1013 ¶¶28, 73; Ex-1062 ¶¶17, 30). Dr. Mercier agreed “inlay 12, with chip module 10 and various other components on it, is inserted into a recess between ring halves 16 and 18 in Schröder.” Ex-1081 (Mercier Tr. 82:10-13, 101:12-16) (agreeing that there has to be

a recess anytime there is an inlay because “how else is it going to get in there? It needs space to exist, right?”). A POSITA would have understood that Schröder’s battery would be included between Schröder’s ring housings 16 and 18.

16. Furthermore, Dr. Mercier quotes Schröder out of context. The immediately preceding sentence in Schröder states that “[i]deally, a ring blank has a **uniform thickness** over its total length, in order to **avoid later steps or shoulders**.” Ex-1007, 14:9-10. Schröder clearly sets forth the goal of “uniform thickness,” but still provides guidance in case the ideal condition cannot be met. See Ex-1007, 14:9-13. Schröder repeatedly indicates that the ideal situation is that any components that are attached to the inlay inside a recess of its ring halves and do not protrude beyond the device. See Ex-1007, 13:27-25, 14:9-20.

17. Moreover, the desire to keep components contained within a wearable was well known by 2013. Prior art shows that there are only so many configurations for electrical components inside a wearable electronic. I previously discussed Rhee in my declaration, which teaches a finger-ring sensor with inner and outer surfaces. Ex-1002 ¶¶165-164. Back in 1998, Francine Gemperle authored a study entitled “Design for Wearability,” discussing wearable computer technology. The Gemperle study offers “design guidelines” that outline “the considerations and principles necessary for the design of wearable electronics.” Ex-1084, 2. One of these guidelines is “containment,” which Gemperle describes as considering what goes

inside the form factor: “Designing wearable objects generally requires the object to contain materials such as digital technology, water, food, etc. While some of these things are malleable in form, there are many constraints that these ‘insides’ bring to the outer form.” *Id.*, 4. These references illustrate the general requirement that electronic components be housed within the form factor.

18. That said, given the small volume of a finger-ring form factor, there are a finite number of configurations possible for electronical components. There is a limited amount of space for a cavity so the number of configurations for these internal components is also limited. For example, and as I explained in my declaration about background information for assembling electronic parts and for dependent claims 2 and 3, components are either going to overlap or not overlap. *See* Ex-1002 ¶¶72-86, 182-183. I also discussed prior art that showed internal electronic components could be assembled at various positions on a ring device, such as the inner band, the top of the device, or the bottom of the device. *See* Ex-1002 ¶¶78-86. Thus, a POSITA would not need every component’s precise location in order to enable an invention.

19. Moreover, Schröder suggests a desire to minimize the amount of space taken up by electrical components. For example, Schröder describes a chip module, antenna coil and “further electronics” on a carrier foil. *See* Ex-1005, 13:22-25. Schröder then states “a depression is manufactured in the carrier foil, e.g. by milling,

lasering etching, before” the other components “are inserted into the depression. *Id.*, 13:27-31. Schröder expressly states that the purpose of the depression is to prevent components from protruding beyond the carrier foil to allow for “an even surface.” *Id.*, 13:31-35. This passage in Schröder demonstrates the general desire to best utilize the limited space of a wearable electronic device. *See also* Ex-1081 (Mercier Tr. 112:4-9).

20. A POSITA would have known that there are only so many ways to arrange components inside an enclosed ring. Having reviewed Dr. Mercier’s declaration and transcript, he does not articulate a reason for his disagreement.

21. Dr. Mercier agreed that there are several motivations that attribute to how a POSITA would configure Schröder’s components. *See, e.g.*, Ex-1081, (Mercier Tr. 112:4-9). As I explained in my deposition, when designing a ring, a POSITA understands that there are “design trade-offs, including use of space relative to other design factors.” Ex-2020, 61 (Anthony Tr. 243:4-12). Indeed, a POSITA considers “the manufacturability, the comfort, the size, the space, the cost. And having it be a ring and constraints, it has a range of size, but doesn’t make it have to be the tiniest thing possible.” *Id.* (Anthony Tr. 243:13-21).

22. Even if Schröder discloses a battery that is not encapsulated within the ring’s housing components, that does not foreclose the idea from being obvious to a POSITA. Dr. Mercier acknowledged that a POSITA would have known how to

determine the specification for a ring's components to allow them to fit within the ring. See Ex-1081 (Mercier Tr. 130:18-131:8) (testifying a POSITA “would understand the peak and average power needs of the device and would use that information to ... select an appropriate battery”); see also *id.*, (Mercier Tr. 112:4-9).

23. Likewise, even if the battery is in the chip module 10 as Dr. Mercier proposes, then the battery may still be located between the internal and external housing components by being on the bottom of chip module 10 or the recess it sits in, closest to inlay 12. Annotated Figure 3 below illustrates this configuration.

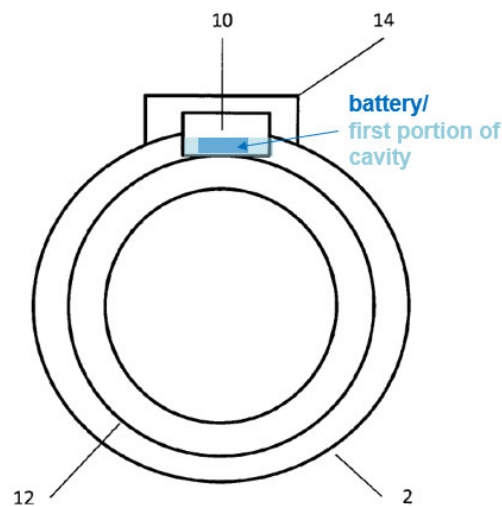


Fig. 3

Ex-1005, Fig. 3 (annotated).

24. While Dr. Mercier argues a POSITA would not have the skill to modify Schröder to configure and fit a battery into a finger ring, Dr. Mercier misunderstood my testimony when I explained why I did not initially opine on finding a battery in

2013 to fit in Schröder's ring—simply because Schröder undisputedly teaches a battery that is presumed enabled. Ex-2020, 206:14-18, 214:7-17, 321:5-10. But a POSITA of a wearable electronic at the time of the '178 Patent would have designed components to be placed within the wearable electronic. Indeed, wanting to keep components contained within a wearable device is a commonsense design consideration, that was formally published as early as the 1990s. *See* Ex-1062, 2, 4. At my deposition, I explained that a POSITA would have known how to determine specifications for a battery to fit inside Schröder's cavity and how to source such a battery from vendors. Ex-2021 (Anthony Tr. 315:9-316:19-21, 454:2-455:11). And I previously explained in my declaration that a POSITA would have found it obvious to place the battery within the inlay to allow for wireless charging of the battery. *See* Ex-1002 ¶164. Nothing in Schröder teaches away from placing a battery within Schröder's inlay.

2. **Element 1[d]: a printed circuit board disposed between the internal housing component and the external housing component, wherein the printed circuit board extends through at least a second portion of the cavity of the finger-worn wearable ring device different from the first portion; and**

Element 1[e]: one or more sensors electrically coupled with the printed circuit board and the battery and configured to acquire data from the user through the internal housing component;

25. It is my opinion that Schröder, alone or in combination with Niwa (Ground 2) or Yuen (Ground 4), teaches the PCB and sensor limitations.

- a. **Dr. Mercier requires a level of specificity that is inconsistent with what is actually required by the claims.**

26. Dr. Mercier appears to require very detailed instructions in order to understand all that a prior art reference like Schröder teaches. For example, he requires Schröder to provide details on how its components are arranged. Yet, when asked, he admitted that it would not be outside the level of a POSITA and that he did not feel the need to do the analysis required to miniaturize all of the power components to fit inside the housing. *See, e.g.*, Ex-1081, 21:25-23:17; *see also* Ex-1002 ¶215; Ex-2021 (Anthony Tr. 454:2-456:22) (my testimony regarding “at the time of 2013, a POSITA would have been familiar with the miniaturized electronic components that were available and found it trivial”). But Dr. Mercier’s testimony actually supports my point: the configuration is a matter of choice that a POSITA would have found obvious. Dr. Mercier seems to categorize that the components

being inside the ring as significant and faults Schröder's disclosure, but Schröder does not need to disclose what is well-known in the art, such as having electronic components inside of the ring housing because that is within the knowledge of a POSITA and there are certainly motivations on how to configure Schröder's components. For example, as I previously explained, a "POSITA, in looking at the design trade-offs in terms of battery size and providing power for the functionality on the PCB, Schröder, in view of the knowledge of a POSITA, would know how to arrange such components inside of the cavity of Figure 7." Ex-2020, 212:6-214:13. Moreover, Dr. Mercier discussed that the '178 Patent did not invent the ring form factor, batteries, and using biometric sensors on wearables devices. Ex-1081 (Mercier Tr. 15:11-18:22); *see also* Ex-1082 (Mercier Tr. 202:3-206:13).

27. As I explained above, a POSITA would have known that there are only so many ways to arrange components inside an enclosed ring. The design consideration of "containment," i.e., keeping components contained within a wearable electronic has been known for decades before the '178 Patent. *See* Ex-1062.

28. At my deposition, I testified that a POSITA would have been "cognizant of not having significant radial changes" to Schröder's ring because the ring needed to be both "aesthetically" pleasing and thick enough "from a manufacturing perspective" to conform within the housing. Ex-2021 (Anthony Tr.

278:11-279:9). Thus, Schröder need not describe specific arrangement details that are absent from the claim elements because a POSITA would have known how to conform the ring's components to its housing.

b. Schröder teaches a PCB in the ring's cavity (Ground 1) .

29. Dr. Mercier argues Schröder's inlay cannot be the claimed PCB because the inlay is a cavity. *See* Ex-2018 ¶96. Dr. Mercier asserts that I adopted Wikipedia's definition of PCB, and that definition excludes Schröder does not teach an inlay consistent with that definition. *See id.*, ¶122. I disagree with Dr. Mercier's assessment. As an initial matter, I merely referenced the Wikipedia article for "PCB" to confirm what this well-known acronym stood for. This reference was not a formal adoption of what I believe is a "printed circuit board." *See* Ex-2020, 19 (Anthony Tr. 73:12-16). Second, the '178 Patent itself does not "specifically show the wiring between components" for its PCB. *See* Ex-1082 (Mercier Tr. 464:4-19).

30. Nonetheless, even under the Wikipedia definition, it is my opinion that Schröder's inlay is a PCB. For example, a POSITA would have understood that Schröder's inlay 12 that "consists of a preferably flexible carrier material, e.g. PET, **Kapton**, etc." (Ex-1007, 12:28-29) would be understood as a PCB because, as described in the Wikipedia PCB page, Kapton is "a **polyimide** foil. Used for flexible printed circuits, in this form common in small form-factor consumer electronics or for flexible interconnects." Ex-2023, 9; *see also* Ex-2020 (Anthony Tr. 73:12-16);

Ex-1081, (Mercier Tr. 80:17-81:10). The '178 Patent describes how its own PCB can also be made of a “flexible material clear to those of skill, such as polyimide.”

Ex-1001, 18:38-40.²

31. Beyond the material of inlay 12 being understood as a PCB, I explained at my deposition how components like the battery “need to be assembled on the inlay”, which is consistent with the Wikipedia definition of PCB. *See* Ex-2020 (Anthony Tr. 172:1-5); *see also id.* (Anthony Tr. 167:21-168:10) (explaining “the chip module and other electronics are embedded on an inlay”); *id.* (Anthony Tr. 173:5-16 (“[T]he Schröder finger ring has a battery positioned within the cavity between the internal and external housing components. Schröder describes the inlay with the components embedded on it certainly in column 12, so a POSITA reading Schröder would understand that the battery is on that inlay that sits inside the cavity.”). Dr. Mercier even agreed that Schröder’s carrier foil may have depressions manufactured into the carrier foil so that electronic devices can be inserted into those depressions. Ex-1081, 105:9-108:9. A POSITA would have understood that when there is a carrier with components assembled on a substrate and these components are connected to other circuitry and components with traces and other features, the carrier is a PCB. A POSITA would understand the described carrier as a PCB is

² To the extent that Dr. Mercier alleges that PCB requires multiple layers and wiring, Dr. Mercier agrees that Schroder teaches having multiple layers (Ex-1081, 107:23-108:9) and a wiring pattern (*id.*, 106:17-25).

because the key features (substrate, component mounting, conductive pathways, and mechanical and electrical connectivity) align directly with the fundamental characteristics of a PCB or “carrier with components assembled on a substrate and connected to each other using circuitry” as described. In my original declaration (Ex-1002), this understanding was discussed in the context of explaining that Schröder’s device and similar prior art references disclose or suggest such arrangements. Specifically, the specification describes (and my declaration notes) Schröder’s flexible carrier material (such as PET or Kapton foil), onto which components like chips, antenna coils, and other electronic devices can be applied and interconnected, directly aligning with typical PCB construction principles. For instance, my declaration explains that Schröder’s teachings would be understood as using a “flexible carrier” or “carrier foil” with components mounted on it, analogous to a flexible PCB or a rigid-flex PCB, depending on the implementation details.

32. As I explained in my declaration and further explained in my deposition, when viewing Schröder’s ring halves 16 and 18 configuration of Figure 7 arrangement in the cross-section arrangement of a modified but consistent Figure 5, which I have annotated as Figure 5’ below, Schröder’s PCB (inlay 12, purple) is between the inner housing component (16, red) and external housing component (18, green). See Ex-1002 ¶¶156-160; Ex-1007, 12:62-65; Ex-2020, 44:3-45:2 (“Figure 4 in the patent and Figure 5 in the patent, describe these two rings that go together,

and 18 and 16 are two halves of these rings. But in Figure 7, the internal housing component is the inner ring and the external housing component is the outer ring.”). Schröder’s inlay 12 is in a recess between Schröder’s ring housing components 16 and 18. In the Figure 7 configuration, inlay 12 conforms to the arc of the cavity between internal housing component 16 and external housing component 18 because the components (16, 18) wrap around the circumference of the user’s finger.

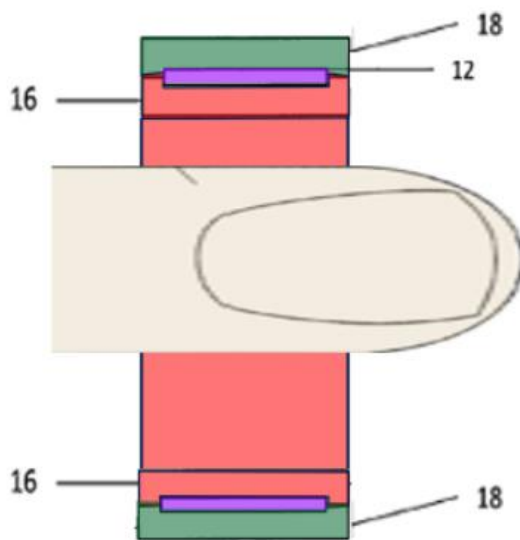


Fig. 5'

Ex-1005, Fig. 5' (modified).

33. Dr. Mercier argues that Schröder used the term “circuit board” in one embodiment to support the notion that a POSITA would not consider Schröder’s inlay to be a PCB. See Ex-2018 ¶122. Dr. Mercier appears to have overlooked Schröder’s explanation that “inlay 12 serves as a carrier,” Ex-1007, 8:57-58, which is consistent with what a POSITA would have understood a PCB is, or its other

references to “circuit,” in explaining how its various components are electronically connected, *see, e.g., id.*, 6:6:20-27, 6:43-45, 9:60-62, 11:63-67; Figs. 4-10. Instead, Dr. Mercier relies on Schröder’s embodiment where its external secure unit 2 is “in the form of an M2M module for vehicles,” and thus unrelated to Schröder’s finger-ring teachings. Ex-1007, 22:39-42.

c. Schröder-Niwa teaches a PCB in the ring’s cavity (Ground 2).

34. Dr. Mercier argues Schröder-Niwa does not teach the PCB limitation because Schröder’s ring halves do not correspond to recited internal and external housing structures, Niwa’s stacking arrangement runs counter to Schröder’s curved inlay, and that there are no details about the location of the circuits to supply power to the battery. I disagree.

35. First, Schröder’s ring halves 16 and 18 correspond to the internal and external housings in Schröder’s Figures 7 and 8 configuration for the reasons explained above for Schröder alone and further supported by my deposition testimony. Ex-2020, 205:8-210:13; *see* Ex-1002 ¶¶155-160; Ex-1007, 12:62-65; Ex-2020, 44:3-45:2.

36. Second, Dr. Mercier’s opinion fails to acknowledge that flat components can be in a curved inlay. As I explained at my deposition, “a battery could exist in part of the cavity going partially circumferentially around and following the cavity, following the structure. It could exist as a narrow band all the

way around.” See Ex-2020, 43 (Anthony Tr. 171:19-1). I further elaborated that the battery did not necessarily have to be curved: it “could be curved for a small enough battery. It potentially could be a flat structure or a small battery, but presumptively a design trade-off would point to whether you needed a curved battery and/or a flat [e.g. piece-wise stepped] battery.” Ex-2020, 43 (Anthony Tr. 172:6-11); *see also id.*, 44 (Anthony Tr. 175:10-19) (chip modules could be of different sizes and also placed on the inlay).

37. Third, the claim does not specify the location of the battery’s circuitry. Although this is a detail a POSITA would have known to address and implement without the additional disclosures from Schröder or Niwa, Schröder explicitly teaches that its energy storage device, i.e. battery, supplies power to its chip module 10 (Ex-1007, 11:46-50). Niwa further teaches how its battery supplies power to its components and the importance at keeping its battery separate from the ring’s components for thermal management. Ex-1005, ¶217.

38. Dr. Mercier then argues Schröder-Niwa does not teach non-overlapping or partially overlapping cavity portions because there was **no** explanation for how Niwa’s flat components would be adapted to Schröder’s curved inlay. Ex-2018 ¶142. But Niwa itself discloses flat components housed within a curved ring. Ex-1005 ¶¶193, 200, 207, 217, Figs. 27, 28; Ex-1002 ¶¶202-203, 210.

39. Finally, Dr. Mercier argues there is no motivation to combine Schröder and Niwa because, according to Dr. Mercier, Schröder’s “sole goal” is to use infrared to detect vein patterns for security verification. *See* Ex-2018 ¶131. But then Dr. Mercier acknowledged that the ***’178 Patent itself*** describes using its capillary mapping for security applications. Ex-1001, 38:37-64, 40:34-41; Ex-1081 (Mercier Tr. 143:14-16). A POSITA viewing Schröder would have looked to other biometric sensors, like Niwa’s photoplethysmography sensor, to improve Schröder’s security goals. *See* Ex-2020 (Anthony Tr. 150:8-153:6).

d. Schröder-Yuen teaches a PCB in the ring’s cavity (Ground 3).

40. Dr. Mercier argues Schröder-Yuen does not disclose a PCB between internal and external housing components because Yuen’s PCB would have too big for Schröder’s inlay and that because Yuen teaches a wristband, Schröder would have to be completely redesigned. I disagree. First, Yuen’s explicitly states that its device could be worn as an “earring” or “toe band,” which is substantially similar in size to a finger ring. *See* Ex-1006, 24:35-40; Ex-1002 ¶261; *see also* Ex-1081 (Mercier Tr. 161:12-19) (Dr. Mercier acknowledging “ring” and “band” can be synonymous). As I explained at my deposition, a POSITA reading Yuen “would understand the various design trade-offs in order to ... accomplish that and how to accomplish a toe band,” because the mere change in proportional size of PCB would have been an obvious change for a POSITA. Ex-2021 (Anthony Tr. 390:2-392:2).

41. Second, Yuen explicitly teaches “a flexible printed circuit board” along with a variety of electronic components attached to the flexible PCB, which are unaddressed by PO. Ex-1006, 2:38-39; *see also* Ex-2021, 354:22-256:4 (“the photodetectors on a flexible or pliable substrate such as flexible PCB allow the inner surface to adapt to the shape of the user’s appendage”).

42. Third, my testimony is not based on bodily incorporation. It is my opinion that, to the extent Schröder does not teach a PCB, Yuen discloses a flexible PCB and a POSITA would have been motivated to use a flexible PCB within its housing components. *See* Ex-1006, 2:38-39, 12:35-38); Ex-2021, 24 (Anthony Tr. 351:3-356:11) (“I’m not proposing wholesale copying of that PCB.”). In view of Yuen and a POSITA’s knowledge, a POSITA would have known how to configure a flexible PCB to fit within Schröder’s ring for the reasons I explained above for Schröder alone. *See supra* Section II.A.2. This is consistent with my declaration. *See* Ex-1002 ¶¶265-266. As I explained at my deposition, flexible PCBs were well known before 2013. *See* Ex-2020 (Anthony Tr. 146:7-11).

B. Dependent claims 17 and 18 are rendered obvious by Schröder.

43. For claims 17 and 18, Dr. Mercier again argues that Schröder does not disclose the battery’s position or disclose a PCB. Ex-2018 ¶¶125-126. I disagree for the reasons I explained above for these limitations. Dr. Mercier also faults my annotation of Figure 7, arguing I failed to annotate the claimed battery and PCB

surrounded by the cavity enclosed the sidewalls. Ex-2018 ¶¶125-126. But such annotations are unnecessary because Schröder undoubtedly teaches the claimed battery and PCB for the reasons I explained above and in my declaration.

44. Moreover, a POSITA would have understood that the “cavity between the internal and external housing components ... houses and thus surrounds” Schröder’s PCB and battery for the reasons stated in my declaration. Ex-1002 ¶¶162-165, 171, 190. Dr. Mercier even agreed that there must be a recess anytime there is an inlay because “how else is it going to get in there? It needs space to exist, right?” Ex-1081 (Mercier Tr. 101:12-16). Similarly, in view of Schröder’s teachings that inlay 12, with chip module 10 and various other components on it, ***are inserted into a recess between ring halves 16 and 18 in Schröder*** (Ex-1081, (Mercier Tr. 82:10-13)), a POSITA would have understood that they exist within the cavity of the housing components because they “need[] space to exist” within the housing.

C. Dependent claims 2 and 3 are rendered obvious by Schröder (Ground 1) or Schröder-Niwa (Ground 2).

45. As I explained in my declaration, Schröder teaches non-overlapping and partially overlapping cavity portions because those are the only two options for cavity portions inside an enclosed ring. See Ex-1002 ¶¶ 182-184, 209.

46. It is my opinion that Niwa teaches components mounted on PCBs. As I explained in my declaration, depending on the design choice, the battery can be not directly mounted to the PCB so that the cavity portion that the battery is located does

not overlap with the PCB. Ex-1002 ¶210. Alternatively, the battery can be directly mounted to the PCB so that portion of the cavity where the battery is located partially overlaps with the cavity portion where the PCB is located. Ex-1002 ¶¶200, 207, 213. Niwa provides the benefit for both non-overlapping and overlapping portions. At my deposition, I explained that a POSITA would have understood the benefits of overlapping portions—e.g., reducing the risk of electrical components and PCB losing connection. *See* Ex-2020 (Anthony Tr. 220:19-221:5). Niwa’s “stacking construction” decreases the volume a PCB uses. I explained at my deposition that a POSITA would be motivated to partially overlap the portions:

Niwa is trying to decrease the size of unit 20, and in doing so, in view of those teachings, a POSITA would similarly have been **motivated to partially overlap** the first portion of the cavity that has the battery and the second portion of the cavity that has the PCB as is discussed -- as disclosed by Niwa, **[t]o fit components inside the limited volume**.

Ex-2021 (Anthony Tr. 272:10-17) (emphases added); *see also id.* (Anthony Tr. 272:21-273:3) (Niwa was “concerned with fitting components inside of a small volume, and so is motivated to have things overlapping”); *id.* (Anthony Tr. 269:5-281:20, 405:21-408:17).

D. Dependent claims 13-16 are rendered obvious by Schröder-Niwa (Ground 2).

47. Dr. Mercier argues Schröder-Niwa does not teach claims 13-16, which specify various configurations for light-emitting sensors, because Schröder is not directed to photoplethysmography (PPG) for Niwa’s teachings to be implemented

into Schröder. Ex-2018 ¶145. But a POSITA would have been motivated to modify Schröder with Niwa for the reasons explained above—that a POSITA would want to improve its security application with biometric sensors. It is my understanding that Schröder need not be directed to PPG for a POSITA to have considered Niwa. For example, incorporating additional light-emitting diodes (LEDs) like Niwa’s implementation provides for beneficial redundancy in the device. *See* Ex. 2020 (Anthony Tr. 228:22-229:18, 231:14-235:1, 239:15-240:1); Ex. 2021 (Anthony Tr. 282:20-284:13).

E. Dependent claims 3 and 12 are rendered obvious by Schröder-Mestas (Ground 3).

1. PO’s “motivation” argument against Schröder and Mestas fails.

48. Dr. Mercier argues that because the power requirements of Schröder and Mestas are different, there would be no motivation to combine these references or a reasonable expectation of success. *See* Ex-2018 ¶159. I disagree for the reasons explained in my declaration. *See* Ex-1002 ¶¶239-242. For example, a motivation exists because Mestas’s teachings offer better use of Schröder’s housing, Ex-2021 (Anthony Tr. 307:3-17, 310:9-19), and teaches increased battery strength, *id.* (Anthony Tr. 327:6-15).

49. As I explained in my declaration, a POSITA would have known how to implement a curved battery like that taught by Mestas in Schröder's ring. See Ex-1002 ¶¶243-249. A battery having a curved shape like the "curved battery" of Mestas would have been obvious to try to avoid increasing the ring's thickness or straining the battery or housing. To clarify, my opinion was not based on bodily incorporation of Mestas's battery into Schröder's ring. Rather, implementing a curved battery would have come up in design considerations for the ring. See Ex-2020 (Anthony Tr. 172:1-5) ("*There's design flexibility in how you would locate any component to accomplish the design trade-offs* with the amount of battery capacity needed relative to the other components that also need to be assembled on the inlay."). As I explained at my deposition, "a battery could exist in part of the cavity going partially circumferentially around and following the cavity, following the structure. It could exist as a narrow band all the way around." See Ex-2020 (Anthony Tr. 171:19-1). I further elaborated that the battery did not necessarily have to be curved: it "could be curved for a small enough battery. It potentially could be a flat structure or a small battery, but presumptively a design trade-off would point to whether you needed a curved battery and/or a flat battery." Ex-2020 (Anthony Tr. 172:6-11); *see also id.* (Anthony Tr. 175:10-19) (chip modules could be of different sizes and also placed on the inlay).

50. Relatedly, a POSITA would have known how to contact vendors for the appropriately sized battery. At my deposition, I explained that a POSITA need not design a battery from scratch. Dr. Mercier also agreed that the '178 Patent itself lacks any details on how to manufacture its battery from scratch. *See* Ex-1082 (Mercier Tr. 411:18-413:19, 490:14-22, 523:15-17, 526:9-10).

51. Moreover, Dr. Mercier acknowledged that electronic components naturally trend smaller:

Q. And would you agree that around 2013 there was a general drive towards making electronic components smaller?

A. Yes.

Q. And would you agree that there was a general drive around 2013 towards making batteries smaller?

A. Yes.· And to add a little bit to that, the semiconductor industry has benefited tremendously from Moore's law, which is a scaling law that suggests that the -- you know, the number of transistors you can fit on a chip doubles every roughly 18 months. It's a beautiful exponential law that increases computing and electronic capabilities massively every year, which, you know, is used to improve computing capabilities but can be also potentially used to miniaturize electronics. But, unfortunately, there's no kind of equivalent Moore's law for battery design that I'm aware of.· And my understanding of batteries is that they scale extremely slowly over time.

Q. Okay.· But you would agree that there was kind of a general pressure in the industry around 2013 to attempt to miniaturize batteries, correct?

...

A. I do.

Ex-1081 (Mercier Tr. 147:20-148:16).

52. It is therefore my opinion that a POSITA would have been motivated to make curved batteries smaller in view of this trend. A POSITA would have known to design a ring with a battery that fits within the ring's housing.

53. Additionally, Dr. Mercier takes my testimony about batteries out of context to argue that a POSITA would have used "coin type batteries" for Schröder's ring. *See, e.g.*, Ex-2021 (Anthony Tr. 315:9-22, 455:1-11). To be clear, I explained that there was no need for a POSITA to design the battery to fit into a ring because there were vendors that sell batteries:

A. They're not going to design an LED or a battery from scratch. They're going to secure those components from providers that sell those items when they're designing their device. So they're not going to design an LED from scratch...

A. He's capable of figuring out what size it needs to be and specifying it appropriately. It's not necessary to design the battery from scratch... It's not necessary -- I'll paraphrase. It's not necessary for the person to design the battery. That person would know the size of the battery they needed and be able to identify a source for it...

A. They would identify the battery they needed, a curved battery with the appropriate energy density, and secure it appropriately.

Q. So in 2013 the POSITA would -- if you wanted to put a curved battery in Schröder, he would figure out the specs of that battery, and he would look for that battery where?

A. From suppliers that make batteries.

Ex-2021 (Anthony Tr. 315:9-318:9); *see id.* (Anthony Tr. 454:2-455:11).

54. While PO takes my quotes in isolation in alleging that "coin type batteries" would be what a POSITA would have used, Dr. Mercier even testified that curved batteries were available. *See, e.g.*, Ex-1081 (Mercier Tr. 148:24-149:1).

Dr. Mercier also mischaracterizes the inventor's testimony about the types of batteries he considered. Indeed, the inventor merely believed a curved battery a less readily-available option:

Q. Why didn't you consider curved batteries at this stage?

A. I don't think we really knew of that as an option at that point in time. Secondly, I think we wanted to make something very simple... when we first started the company, we said it would take six months max. And it ended up being three years. So we were a little bit off there...

Q. Why didn't you consider a curved battery ... at this point?

A. Yeah. So, mostly, we just didn't know about it, and I think the other -- the other directions we were looking seemed more compelling. Being able to find something off-the-shelf was, you know, definitely the simplest path to getting something out the door.

Ex-2024 (Tr. 182:13-183:7).

55. It is my opinion that although the inventor initially considered flat batteries due to time constraints and simplicity, that fact does not mean that curved batteries were unavailable. Indeed, Dr. Mercier agreed that curved batteries were available at the time of the '178 Patent. See Ex-2020 (Anthony Tr. 172:6-173:2); Ex-1081 (Mercier Tr. 148:24-149:16). For example, U.S. Patent Publication No. 20070059595 to Endo et al. ("Endo," Ex-1088) was published in March 2007, with international priority from November 2001. Endo, assigned to Sony Corporation, disclosed how there was a high demand for batteries which supply electric power to portable electronic devices while decreasing, the size, thickness of the battery. Ex-1088 ¶2. Endo discussed that, in order to make various electronic devices more

compact, “it has been necessary to efficiently employ the inner spaces of the electronic devices, and it has been especially demanded to use the inner spaces having curved surfaces as spaces for accommodating the batteries serving as the power sources.” *Id.*, ¶6. Endo thus discloses a “battery in which a possibility of short-circuit is low in the end part ... and battery characteristics are good even when the electrode has, for instance, a curved form or a semicircular curved surface so as to be adapted to the form of each of the inner spaces of various kinds of electronic devices.” *Id.*, ¶11. Endo provides an example curved battery 1, in Figure 5 (annotated in blue below).

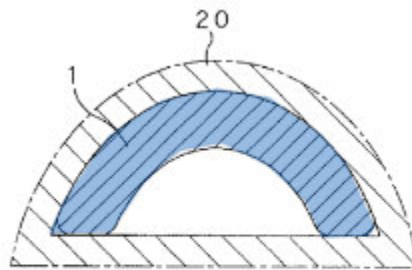


FIG.5

56. Another example is U.S. Patent No. 9,385,396 to Goh et al. (“Goh,” Ex-1089), which was filed December 5, 2014, and claims priority to another U.S. Patent filed March 10, 2009. Goh discloses a curved battery allowing for a “tight contact between the battery cell and the electronic device..., thereby maximizing space utilization and thus providing high efficiency.” Ex-1089, 9:53-60. As shown in Figures 1 and 2 below, Goh describes using an upper and lower jig with a heater

to curve the battery with a radius of curvature R . *Id.*, 7:49-8:30. “Consequently, the battery cell 102 has an average radius of curvature R . The radius of curvature R_2 of the middle part of the battery cell 102 is less than the average radius of curvature R , and the radius of curvature R_1 of each end of the battery cell 102 is greater than the average radius of curvature R .” *Id.*, 8:38-42.

FIG. 1

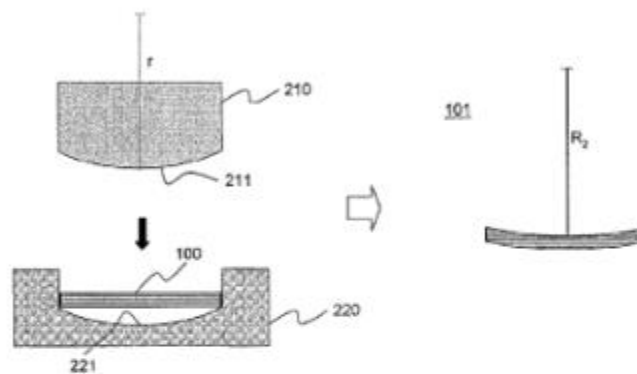
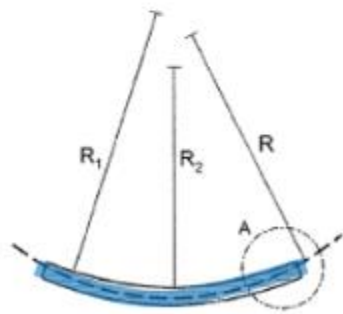


FIG. 2



57. If it is Dr. Mercier’s contention that small, curved batteries did not exist prior or at the time of the ’178 Patent, Dr. Mercier is wrong. Major manufacturers, such as Medtronic, patented contoured lithium battery designs to optimize internal space utilization within curved pacemaker and defibrillator housings, demonstrating the practical feasibility of unconventional battery shapes. Specifically, Medtronic

patented a rechargeable lithium-ion battery featuring a shallow, curved titanium casing tailored explicitly for defibrillators and neurostimulators, allowing the battery to efficiently conform to the internal contours of implantable medical devices. This contoured battery technology successfully achieved commercial implementation. See Ex-1331 (U.S. Patent No. 7,968,226) (contoured battery for implantable medical devices of manufacture); Ex-1329; Ex-1330.

58. Dr. Mercier also argues as if a POSITA would be literally shrinking Mestas's components to fit into Schröder's ring. Ex-2018 ¶¶138-140. But I am not bodily incorporating Mestas's battery into Schröder's ring. See Ex-2021 (Anthony Tr. 307:7-17) (Q: "Whether we're talking about using one or both of Mestas's batteries, the battery disclosed in Mestas's bracelet is too big to put in a ring like Schröder, correct?" A: "... what's taught is the benefit of a curved battery. And ***I'm not proposing a wholesale, just copying and paste that battery into a device of the size of a ring***, but a POSITA would curve the battery to beneficially use the space and size the -- use an appropriate energy density as well as for the power requirements for."). Mestas teaches having curved batteries in a wearable device. It is that teaching that a POSITA would have considered implementing into Schröder. As I explained in my declaration, a battery having a curved shape like the "curved battery" of Mestas would have been obvious to avoid increasing the ring's thickness or straining the battery or housing. Ex-1002 ¶¶214-220. While Dr. Mercier argues

that a POSITA would not be motivated to implement Mestas's battery due to allegedly different power requirements, (Ex-2018 ¶¶141-142), a motivation exists because Mestas's teachings offer better use of Schröder's housing, (Ex-2021 (Anthony Tr. 307:3-17, 310:9-19)), and teaches increased battery strength (*id.*, 327:6-15). To the extent that Dr. Mercier is arguing that the curved battery needed to fit into a finger ring is smaller than Mestas's curved batteries in a larger wearable device does not distinguish Mestas's teaching of using a curved battery, regardless of the size. As I explained above, a POSITA would have known how to adapt a curved battery into Schröder's ring form factor.

2. Schröder-Mestas teaches a curved battery and overlapping cavity portions

59. When addressing the actual combination of Schröder-Mestas, Dr. Mercier repeats his argument that the Schröder and Mestas combination is inoperable because the batteries would be too big. Ex-2018 ¶¶145-147. But as I explained in the previous section, a POSITA would have designed a ring with a curved battery that fits inside the ring. Again, I am not arguing or relying on bodily incorporating Mestas's batteries into Schröder's ring. Instead, a POSITA would have been motivated to implement Mestas's curved battery teachings into Schröder's ring that already includes a battery to avoid increasing the ring's thickness or straining the battery or housing. Ex-1002 ¶¶239-242; *see also* Ex-2021 (Anthony Tr. 307:7-312:15). Dr. Mercier does not address this motivation.

F. Dependent claims 4-11 and 13-16 are rendered obvious by Schröder-Yuen (Ground 4).

60. Dr. Mercier contends Schröder-Yuen does not teach Claims 4-11 for the same reasons it does not teach Claim 1. His arguments fail for the reasons explained above.

61. Dr. Mercier also argues Schröder-Yuen does not teach claims 13-16 “for the same reasons stated ... with respect to the Schröder and Niwa combination,” i.e., a POSITA would not add additional LEDs to Schröder which already discloses an infrared LED to detect vein patterns. But there are multiple reasons for doing so. For example, incorporating additional LEDs like Yuen’s implementation provides for beneficial redundancy in the device. *See* Ex. 2020 (Anthony Tr. 228:22-229:18, 231:14-235:1, 239:15-240:1); Ex. 2021 (Anthony Tr. 282:20-284:13). Redundancy is standard good engineering product-design practice; here it mitigates potential issues such as individual LED failure, inconsistent sensor-skin contact, or signal interruption due to tissue variability, thereby significantly improving the robustness of the device.

62. Even if Schröder already has an LED, Yuen offers “additional design and manufacturing benefits to Schröder’s” ring, such as a flexible PCB, magnetic alignment to improve wireless charging, and teaching specific sensor parameters. Ex-1002 ¶¶255-257.

G. PO's "undue experimentation" argument fails.

63. I understand by counsel that a combination would not have been obvious if a POSITA would have had to undergone "undue experimentation" to reach the claimed subject matter. That is not the case here. A POSITA would not have had to perform undue experimentation to make simple modifications to Schröder's ring. Dr. Mercier attempts to overcomplicate the proposed combination or requiring the references to do more than what a POSITA would have been capable of doing. At the time of the '178 Patent, wearable electronics already were designed and available for purchase. A POSITA would have known how to design a wearable electronic device with components small enough to fit within the device.

III. DR. MERCIER'S ARGUMENTS AGAINST GROUNDS 5-10 FAIL

A. Independent claim 1 is rendered obvious by Niwa (Ground 5) and Niwa-Schröder (Ground 6)

64. Dr. Mercier does not appear to dispute that Niwa, alone or in combination with Schröder and/or Mestas, teaches elements 1[pre] and 1[e].

1. **Element 1[a]: an external housing component defining an outer circumferential surface of the finger-worn wearable ring device;**

Element 1[b]: an internal housing component defining an inner circumferential surface of the finger-worn wearable ring device, the internal housing component coupled with the external housing component

- a. **Niwa teaches internal and external housing components (Ground 5)**

65. Dr. Mercier argues Niwa does not teach an external or internal housing component because it fails to explain how its housing is constructed. Ex-2018 ¶¶182-183. I disagree. The claims merely require that there are internal and external housing components—how housing is constructed is absent from the claims.

- b. **Niwa-Schröder Teaches External/Internal Housing Components (Ground 6)**

66. Dr. Mercier argues that Niwa-Schröder does not teach external or internal housing components. Ex-2018 ¶¶195-197. I disagree. In my declaration, I explained that a “[h]ousing is not limited to two separate components that are bonded together and then later could be separated again,” and a POSITA would “recogniz[e] various assembly techniques that might be used,” such as direct physical contact or using an intermediary structure. Ex-1002 ¶¶315, 320. Thus, a POSITA would have understood that the internal housing component with the external housing component together form the housing for a unified device.

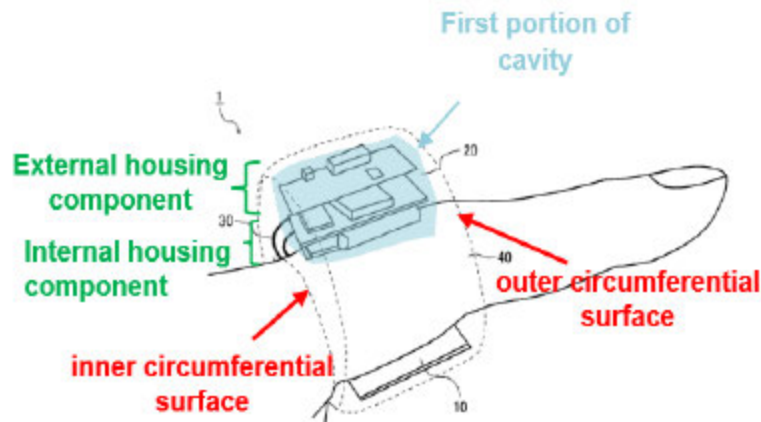
67. Dr. Mercier contends that a POSITA would not have combined Niwa and Schröder because their respective rings have different applications and housing—specifically there is no motivation to modify Niwa’s unitary housing to include ring halves like Schröder. Ex-2018 ¶¶193-194. But here, I provided several motivations driven by design incentives and market forces, such as implementing Schröder’s two-halves design into Niwa’s ring to allow for easier replacement of parts. See Ex-1002 ¶¶306-310.

2. Element 1[c]: a battery positioned within a cavity...;

Element 1[d]: a printed circuit board disposed between the internal housing component and the external housing component...;

68. For Grounds 5 and 6, Dr. Mercier argues that Niwa does not teach a battery or PCB between the internal and external housing components because Niwa does not disclose internal and external housing components. Ex-2018 ¶¶189-190. I disagree. Dr. Mercier’s argument relies on Niwa’s unit 20 being a protrusion with “flat” and “planar” portions. But that part of the outer circumferential surface is planar does not preclude the existence of an external housing component. A POSITA would have understood that Niwa’s external housing component is a structure that encloses space. See Ex-2020, 62-63 (Anthony Tr. 248:19-252:16); Ex-1005, Fig. 26.

FIG.26



69. Moreover, Dr. Mercier's argument fails to account for Niwa's first unit 10, Schröder's disclosure, and my testimony that supports Niwa-Schröder teaching internal and external housing components. Ex-1002 ¶¶329-333.

B. Dependent claim 12 is rendered obvious by Niwa-Mestas (Ground 7) or Niwa-Schröder-Mestas (Ground 8)

70. Dr. Mercier only argues that a POSITA would not be motivated to use Mestas's curved battery in Niwa/Niwa-Schröder's ring; and that Niwa teaches away from a curved battery. Ex-2018 ¶¶201, 203. Niwa's ring has a curved shape, so it would have been obvious to want to utilize components to fit that shape. Ex-1002 ¶¶375-376.

C. Dependent claims 4-10 are rendered obvious by Niwa-Yuen (Ground 9) or Niwa-Schröder-Yuen (Ground 10)

71. Dr. Mercier argues that claims “4-11” are patentable for the reasons he argued for claim 1. POR, 87.³ But for the same reasons as explained in Ground 4, I am of the opinion that Niwa-Yuen and Niwa-Schröder-Yuen teach claims 4-10.

IV. DR. MERCIER’S OBJECTIVE INDICIA ARGUMENTS FAIL

A. PO is not entitled to a presumption of nexus

69. Dr. Mercier argues “Our[a] Ring Gen. 3 and Gen. 4 are coextensive commercial embodiments of the ’178 Patent,” by providing a claim mapping of Oura Gens. 3 and 4 to only independent claim 1 and dependent claims 16 and 17 of the ’178 Patent. Ex-2018 ¶¶159-188. I understand by counsel, that PO must “show[] that the asserted objective evidence is tied to a specific product and that product ‘embodies the claimed features, and is coextensive with them.’” While the inquiries of whether Gens. 3 and 4 practice the challenged claims and are coextensive with the challenged claims may overlap, but showing that the products practice the claims does not show that there is nexus because notable unclaimed features are not considered. Dr. Mercier’s mapping does not show that the product is in fact coextensive with the ’178 Patent claims because he does not consider the unclaimed features. Therefore Gens. 3 and 4 are not entitled to a presumption of nexus.

³ PO disclaimed claim 11. See Ex-2015 (Aug. 28, 2024).

70. Oura Ring Gens. 3 and 4 include significant unclaimed features that are critical or amount to the “heart” of another patent. First, PO’s evidence emphasizes the importance of the Oura Ring Application, with Mr. Andrew Clarke stating that the “Oura Ring and Oura application form a complete solution” (Ex-2019 ¶21) and PO’s employee stating that the application is “absolutely essential” (*id.* (citing Ex-2024, at 88, 93-95)). The Oura Ring Application provides users “access to three daily scores—Sleep, Readiness, and Activity.” *Id.* ¶20 (citing Ex-2051). While the Oura Ring Application, which is essential to PO’s product, is not claimed anywhere in the ’178 Patent, PO’s U.S. Patent No. 10,842,429 recites:

A method for assessing readiness of a user, the method comprising:

...

determining a rest summary for the rest period, based on the measured at least one biosignal and at least one biosignal of a previous rest period;

determining an activity summary for the activity period, based on the obtained movements of an activity period and obtained movements of at least one previous activity period;

determining a body response summary based on the rest summary and the activity summary;

calculating a readiness score based on the body response summary and a previous body response summary, whereby the readiness score indicates a level of readiness of the user; and

using a user interface of the mobile communication device to show elements contributing to the readiness score and instructions related to physical activity and mental activity for improving the readiness score.

Ex-1086, 24:65-25:16. The fact that PO obtained the ’429 Patent covering the calculation of the sleep, readiness, and activity scores and displaying the scores on

a user interface shows how these features amount to more than an insignificant feature not claimed by the '178 Patent.

71. Second, the Oura Ring Membership works “hand-in-hand” with the Oura Ring, “such that a user’s experience improves over time as the Oura Ring gathers mores data, enabling Oura to generate more nuanced insights into the user.” Ex-2019 ¶21. The Oura Ring Membership was released with the Gen. 3 launch but the claims of the '178 Patent do not recite a membership for users nor the “nuanced insights into the user” via the mobile application. Dr. Mercier confirmed that the claims of the '178 Patent do not even recite what to do with the measured/detected data from its light emitting component nor the mobile application. Ex-1082, 222:16-224:22.

72. Third, PO’s evidence emphasizes the sleek and comfortable design and materials used in the ring. *See, e.g.*, Ex-2100, 11 (sleekness); Ex-2102 (comfort); Ex-2059, 2 (materials); Ex-2098 (same). Dr. Mercier agrees that the '178 Patent does not explicitly recite a “sleek and comfortable” requirement. *See e.g.*, Ex-1081, 34:1-15 (“while there’s no explicitly stated upper bound, a POSITA would understand that there is an upper bound, you know, to abide by the desires and recommendations of the specification to make the ring comfortable”), 215:3-11 (“Q. The claims don't recite an aesthetically pleasing ring, correct? A. That’s right. That language isn’t in the claims, but, again, the claims are read in light of the specification, and the

specification, you know, makes small and comfortable use very important”); *see also* Ex-1082 (Mercier Tr. 216:4-17). The ’178 Patent also does not recite the specific material used as the internal and external housing components. Yet PO’s U.S. Patent No. 11,599,147, recited using various materials, such as “titanium, titanium alloy, steel, platinum, gold, silver, aluminum, polymer, plastic, tungsten carbide, and a metal alloy.” Ex-1087, 33:56-62, 34:33-36. The fact that PO obtained the ’147 Patent covering the materials to be used shows how these features amount to more significant features not claimed by the ’178 Patent.

73. Finally, PO attempts to point to the same products for the same alleged objective indication across four patents, which rebuts its contention that the products are coextensive with the ’178 Patent claims. The claims across U.S. Patent Nos. 11,874,702 (“the ’702”), 10,139,859, 10,281,953, and the ’178 Patent do not cover the same invention. For example, the ’178 claims recite internal and external housing components, an inner circumferential cavity with a battery positioned and shaped to fit inside the cavity and a PCB extending through a portion of the cavity within the interior and exterior components. This is a significant feature, as shown by PO’s arguments about the prior art’s teaching a computing device with similar structure. But there is not any analysis regarding which evidence of the same secondary considerations asserted across the four patents is attributable to the claims requiring this feature and those that do not. Thus, nexus cannot be presumed.

B. PO is not entitled to actual nexus

74. Due to the significant unclaimed features, PO, Dr. Mercier, and Mr. Clarke cannot demonstrate that actual exists between the evidence presented and the claims of the '178 Patent because the evidence is directed to significant unclaimed features. I understand that Dr. Mercier only opines on nexus, copying, and long-felt need, while Mr. Clarke provides arguments about the alleged commercial success.

1. Commercial success

75. Mr. Clarke argues that Gens. 3 and 4 have been a “marketplace success,” as based on the “absolute sales and sales growth, the Oura Ring’s contribution to Oura as a company, and its marketplace performance relative to competing products.” Ex-2019 ¶32. Yet Dr. Mercier does not opine on the Gen. 3 and 4’s “commercial success” and Mr. Clarke refused to provide any technical analysis of the ring’s nexus to the claims of the '178 Patent. *See, e.g.*, Ex-1083, 192:19-193:2. Therefore, Gens. 3 and 4’s have not been shown as an “success” or how the sales figures are a direct result to the claimed invention of the '178 Patent.

a. Sales are based on unclaimed features

76. Mr. Clarke argues that Oura’s success is evidenced by substantial sales and sales growth since the introduction Gen. 3 and continued increase with the Gen. 4. Ex- 2019 ¶33. But sales are not due to the claimed invention of the '178 Patent as discussed below.

(1) **Generations 1 and 2's commercial sales show that the characteristics of the '178 Patent were not commercially successful**

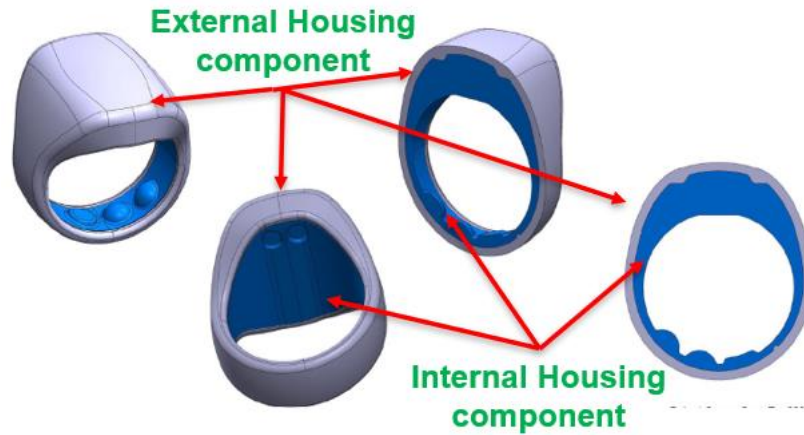
77. While PO does not assert that Oura Ring Generations 1 and 2 are coextensive with the claims of the '178 Patent (Ex-1081, 47:6-13, 49:2-50:9), there is no difference between Gens. 1 and 2 to Gens. 3 and 4 other than the improved sensors, sleekness and comfort of the ring which are not recited in the '178 Patent. For example, Mr. Clarke explained that the Gen. 3 included “new green LED sensors, red LED sensors, and upgraded temperature sensors for “improved monitoring of a user’s heart rate, blood oxygen sensing, period prediction, among other metrics and features.” Ex-2019 ¶17. Mr. Clarke relies on Ex-2098, which discusses the materials the ring is made of, the weight and dimensions, compatibility, connectivity, but there is no mention of the circular form factor of the ring. Similarly, Ex-2100 discusses how the Gen. 3 is “sleek and compact.” *Id.*, 11. These features are again all unclaimed in the '178 Patent.

78. Mr. Clarke then discusses how the Gen 4 brought “battery life improvements, greater measurement accuracy, and an all-new circular titanium-based design” Ex-2018 ¶18. Mr. Clarke relies on Ex-2059, which discusses how the Gen. 4 ring was made of titanium, details its “smart sensing platform” to give the user the most complete picture of health by using research-grade sensors, battery life

and the Oura Ring Membership. Yet these features are all unclaimed in the '178 Patent.

79. But it is clear that Gens. 1 and 2 are a finger-worn wearable ring device, which include an external and internal housing components, where the internal housing components contacts the user's tissue. *See also* Ex-1081, 49:20-68:3 (analyzing the aspects of the Gens. 1 and 2 products contained aspects of the claims, such as an inner and outer circumferential surfaces, battery, and PCB); Ex-1082, 229:7-230:2 ("Q. And is the ring depicted in Exhibit 2121 similar to any figures you described in your declarations" A. "Yes. This is a real-life depiction of the Oura generation 1 design that is depicted in paragraph 71 of the '702 patent, and the same figure is used in the '178 patent.").

Gen. 1



Ex-2034, 7 (not redacted in the exhibit)

Gen. 2

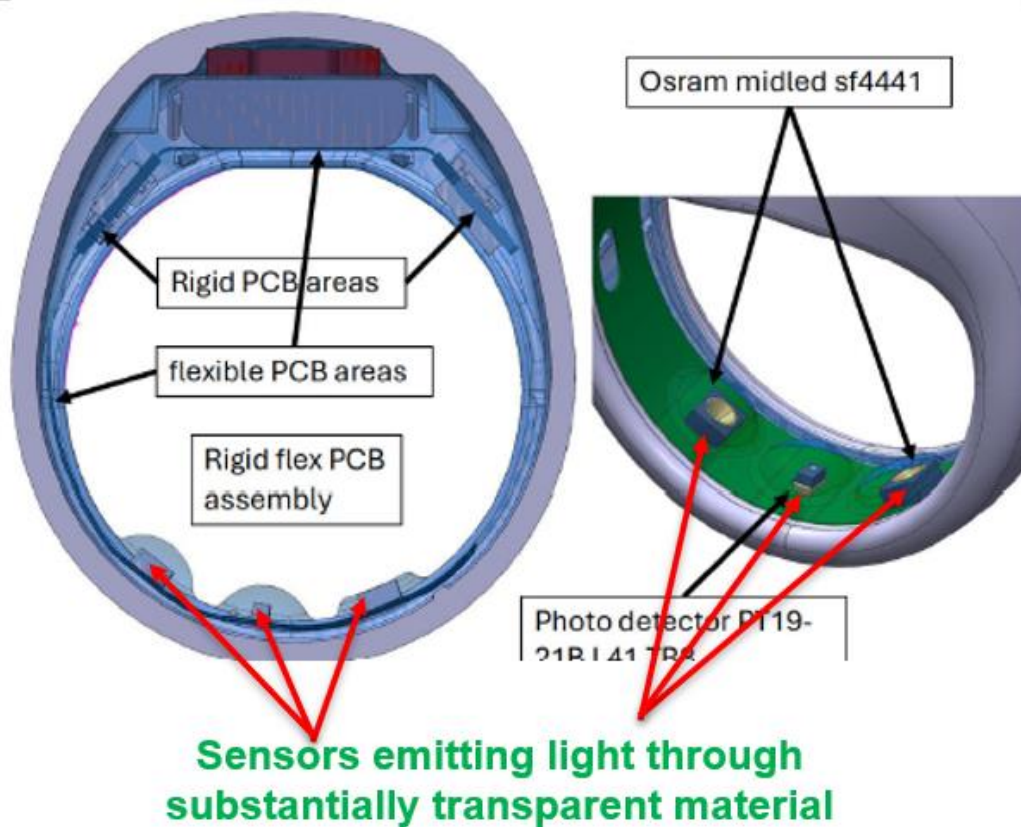


Ex-1333

80. Gens. 1 and 2 also include a battery, PCB, and one or more light emitting sensors positioned between the housing components, as recited in the '178

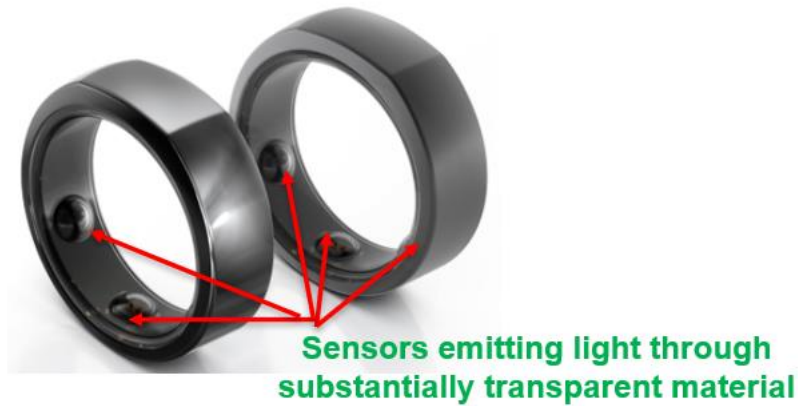
Patent. Gens. 1 and 2's sensors emit light through a substantially transparent material to contact the user's tissue.

Gen. 1



Ex-2034, 7 (not redacted in the exhibit)

Gen. 2



Ex. 1333

SENSORS

- Oura proprietary pulse waveform and pulse amplitude variation detection with infrared PPG sensor
- Body temperature sensor
- 3D accelerometer and gyroscope

Ex-1334, 3.

Battery Life

- Up to one week with a single charge
- Wireless charging: charging time 20–80 minutes depending on how often you charge

Ex-1334, 4.

PRODUCT SPECS

- Dual-core arm-processor: ARM Cortex based ultra low power MCU
- In-ring memory to store data up to 6 weeks
- Water resistant: 100m / 328ft
- Bluetooth Smart, Airplane mode

Ex-1334, 3.



Ex-1244.

Teardowns of the Gen. 2 ring are available online. For example, below shows the wiring of the flexible PCB. *See* Ex-1336.

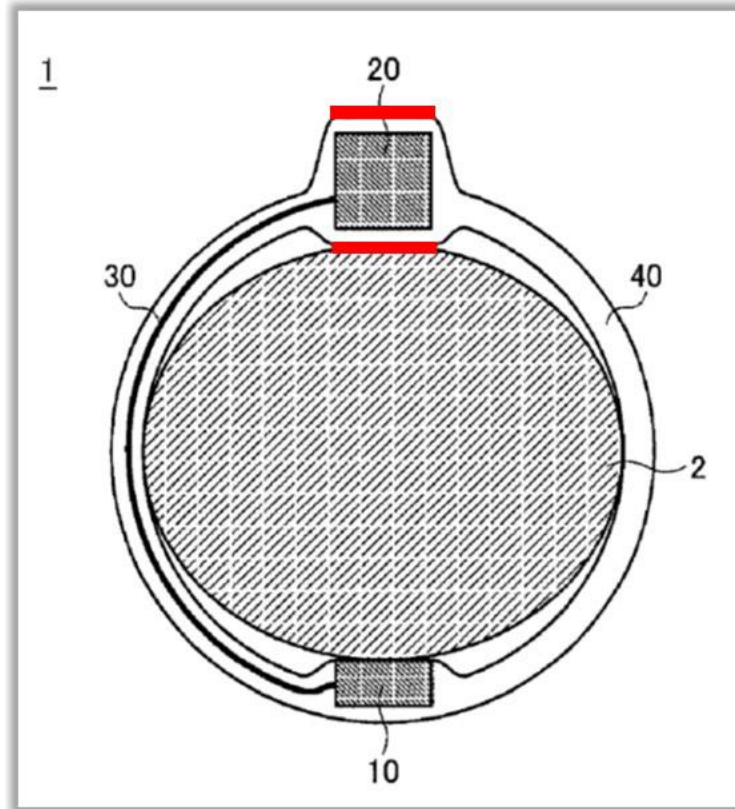


If the commercial success was a direct result of the unique characteristics of the claimed invention of the '702 Patent, then Gens. 1 and 2 would have also been successful.

(1) Mr. Clarke fails to distinguish the sales of the Gen. 3 Oura Ring

81. Mr. Clarke asserts that that the company's monthly unit sales since the launch of the Gen. 3 [REDACTED] its earlier average monthly unit sales. Ex- 2019 ¶33. While Dr. Mercier and Mr. Clarke do not assert that Gens. 1 and 2 are coextensive with the claims (Ex-1081, 47:6-13, 49:2-50:9), Mr. Clarke did not attempt distinguish the sales of when the Gen. 2 was available for purchase after the launch of Gen. 3. Ex-1083, 104:3-106:7. The alleged sales of Gen. 3 thus also include sales of Gen. 2.

82. Mr. Clarke also failed to distinguish the sales between the two Gen. 3 models: Heritage and Horizon. The Heritage Gen. 3 has been described to include a "classic plateau design." Ex-2098; Ex-2056; Ex-2099. While Dr. Mercier assert that the Gen. 3 is coextensive with the claims of the '178 Patent, Dr. Mercier does not explain how the Heritage Gen. 3, with its flat-top, is coextensive with the claims. In a related proceeding, however, Dr. Mercier argues that Niwa does not disclose an external housing component with an external circumferential surface because Niwa teaches that the top of its ring is "planar" as shown in Dr. Mercier's annotation of Niwa Figure 1 below. *See* PGR2024-00030, Ex-2018 ¶¶187-188.



83. To the extent that Dr. Mercier asserts that Heritage Gen. 3 is not coextensive with the claims due to its similar planar surface, Mr. Clarke did not distinguish the sales of the Heritage Gen. 3 models as compared to the Horizon Gen. 3 models to support any commercial success of a coextensive product. In fact, his declaration does not even mention how the Gen. 3 has two models, even when noting that the Gen. 2 did come in two models (Balance and Heritage). *Compare* Ex-2019 ¶16 *with id.*, ¶17.

84. Mr. Clarke contends that the sales of Gen. 3 [REDACTED] over time (Ex-2019, Appendix 7) but Gen. 3's only enhanced capabilities included how its sensors "expand[ed] from infrared to include red and green LEDs that enable daytime heart

rate, workout heart rate, and SpO2 sensing with the same long-lasting battery life of up to 8 days.” Ex-2043. The red and green LEDs, enabled heart rate detection, SpO2 sensing, and a 8 day-long battery are not specifically recited in the ’178 Patent or make it any structurally difference from Gens. 1 and 2.

85. PO further argues argues that the “consistent with the growth in Oura Ring unit sales is the growth in subscribers to the Oura membership.” POR, 80. The Oura Ring Membership was launched with the Gen. 3’s launch to provide “additional personalized data and insights in the Oura application, such as an in-depth sleep analysis, live and accurate heart rate monitoring, body temperature readings for early illness detection and period prediction[.]” Ex-2019 ¶21. The ’178 Patent does not recite a membership or any way processing the detected measurements from the ring’s sensors in any way to provide any of health insights to the user. Ex-1082, 222:16-224:13. The Membership is a separate product offering that is not direct result of the unique characteristics of the ’178 Patent.

86. Mr. Clarke continues that, since the launch of the Oura Ring Gen. 4, sales of the Oura Ring in just the first quarter of FY2025 represented [REDACTED] of Oura’s full year FY2024 sales Ex-2019 ¶33. The Gen. 4 ring similarly includes the same unclaimed features of the Gen. 3 ring. Additionally, PO argues that its success is due to the ring, but as I testified “having good marketing” leads to sales. Ex-2020, 68:16-60:22. Mr. Clarke attempts to downplay PO’s marketing efforts (Ex-

1083, 179:13-186:2), but it is undisputable that PO's marketing [REDACTED] in FY2021, [REDACTED] in FY2022 to [REDACTED] in FY2023. *See* Ex-2107, 5; Ex-2108, 5; Ex-2109, 6; *see also* Ex-2110, 6 (marketing expenses totaling [REDACTED] From October 2024 to Q1 2025). In my experience commercializing a product, I understand that the [REDACTED] and the "addition of experience professionals in marketing, sales, and product development" of course would lead to an increase in sales. Ex-2047, 5.

(2) Contribution from Oura ring to the Oura company doesn't show success

87. PO and Mr. Clarke argue that the Oura ring is critical to PO's existence as a company because "[REDACTED] of Oura's overall revenue is attributable to the Oura Ring" and that "Oura's only product offering is the Oura Ring." Ex-2019 ¶38. But Mr. Clarke does not specify whether this is the Generation 3 and 4 Oura Ring or Oura Rings in general (thus including Gens. 1 and 2). Moreover, Mr. Clarke's testimony that the "[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]." Ex-2019 ¶36 n. 8. The Oura ring is *not* the only product offering when users have to pay for at least [REDACTED], [REDACTED] separate from their purchase of the Oura ring.

Ex-1083, 194:17-195:23. Therefore [REDACTED]

[REDACTED].

88. The company's brand partnerships to the Oura Ring products, but the partnerships spanning "a range of areas such as women's health, metabolic health, behavioral health, and fitness and lifestyle" and "glucose biosensing" are unclaimed. Ex-2019 ¶40. Nowhere in the '178 Patent is a mobile application or using the sensors to provide health and wellness insights for "women's health, metabolic health, behavioral health, and fitness and lifestyle" or glucose sensing claimed. Mr. Clarke is also unclear on the timing associated with the Oura ring. He states that "[a]s of November 2023, Oura had entered into over 600 partnerships." It is unclear whether the "over 600 partnerships" are tied to the Gen. 3 or over the history of the company, from the Gen. 1 launch to present.

b. PO did not create a new market segment within the wearables market

89. PO argues that Oura's development and commercialization enabled the company to be labeled as one of the market pioneers in the smart ring marketplace. POR, 82-83. PO's evidence to support this discuss the health tracking (Ex-2089), battery life, and application support (Ex-2060), which are unclaimed in the '178 Patent. As Mr. Clarke discussed, there were others in the market earlier or even around the same time as Oura. Ex-1083, 205:13-23 ("I don't dispute that there may have been other rings"), 205:24-209:3 (discussing other smart ring companies).

c. PO has not established copying by others

90. Dr. Mercier argues that Ultrahuman and RingConn copied the use of “external housing and internal housing component of [the] Oura Ring where the internal housing is made of internal potting to develop a directly competing product.” POR, 86-89. PO additionally argues that RingConn also copied the “optical protrusion in the potting material” of Oura Ring Gen. 3. Ex-2018 ¶¶189-197. But as explained in above in Section IV.A, PO has failed to show that Gen. 3 is coextensive with the challenged claims and PO cannot show the asserted copying is directed to the challenged claims or the claims of other Oura patents, or some combination thereof. Specifically, the “optical protrusions in the potting material” are not explicitly claimed in the ’178 Patent.

91. PO asserts that Ultrahuman and RingConn smart rings “appear[] to have copied Oura Ring Gen. 3” but the features that are “copied” were well known in the art as evidenced by the prior art, as I described in Ex-1002 over the prior art and the technology background section.

d. Dr. Mercier has not shown a long-felt need

92. Dr. Mercier argues that there was a long felt need to have a finger worn ring with an arrangement with “comfort and compactness” and a “curved battery in conjunction with a printed circuit board mounted within a ring housing.” Ex-2018 ¶¶198, 200-201. But a ring that is comfortable to wear like a wedding band with a

curved battery with a PCB within the housing were well known in the art (Ex-1002 ¶¶72-96) and therefore cannot provide nexus.

93. Dr. Mercier asserts that Asada was the world's leading wearable ring researcher and realized that comfort and compactness were key, but that Asada's prototype failed to achieve these goals. Ex-2018 ¶199. However, as I described in my deposition (Ex. 2020 (Anthony Tr. 125:5-127:1), Dr. Mercier mischaracterizes the scope of Asada's research by omitting the fact that Asada's primary research focus was addressing pressure-induced variations in ring sensors and mitigating associated noise. Notably, Asada did not identify nor emphasize any technical issues related to battery challenges.

94. Dr. Mercier also claims he was "surprised" of PO's use of a curved battery as evidence of long felt unresolved need. Ex. 1082 (Mercier Tr. 221:7-23). Asada's and Dr. Mercier's inability to successfully commercialize a wearable ring with a curved battery do not show that a POSITA recognized a need that was long felt or that others had tried and failed to solve the problems. Critically, Dr. Mercier fails to provide any evidence indicating that either his or Asada's attempts or inability to commercialize a wearable ring was specifically due to issues with curved battery technology. Dr. Mercier does not rule out other plausible factors for lack of commercialization success, such as insufficient marketing strategies, limited expertise regarding manufacturing scale-up, or prohibitive production costs.

Consequently, failure to bring a wearable ring with a curved battery to market does not demonstrate that a POSITA would have recognized a long-felt need nor that commercialization attempts had been made and failed to resolve technical issues specifically related to curved battery technology.

V. CONCLUSION

95. All of the challenged claims are obvious over the prior art.

96. In signing this declaration, I understand 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. I acknowledge that I may be subject to cross-examination in this case and that cross-examination will take place within the United States. If cross-examination is required of me, I will appear for cross-examination within the United States during the time allotted for cross-examination.

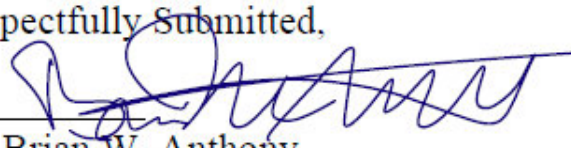
97. I declare that all statements made herein of my knowledge are true, that all statements made on information and belief are believed to be true, and that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

98. I declare under penalty of perjury that the foregoing is true and correct.

Respectfully Submitted,

/s/

Dr. Brian W. Anthony

A handwritten signature in blue ink, appearing to read "Brian W. Anthony", is written over a horizontal line. The signature is stylized with a large initial "B" and a long horizontal stroke extending to the right.