

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.,
Petitioner,

v.

MASIMO CORPORATION,
Patent Owner.

Case IPR2024-00296
U.S. Patent 10,984,911

DECLARATION OF VIJAY K. MADISETTI, PH.D.

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

I reserve the right to supplement my opinions in the future to respond to any arguments or positions Apple may raise, taking account of new information as it becomes available to me.

Dated: 3/28/24


3/28

Vijay K. Madiseti, Ph.D.

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I, Vijay K. Madisetti, Ph.D., declare as follows:

1. I have been retained by Knobbe, Martens, Olson & Bear, LLP, counsel for Patent Owner Masimo Corporation (“Masimo”). I am making this declaration at the request of Masimo in the matter of *Inter Partes* Review No. IPR2024-00296, which concerns Claims 1-4, 6, 8, 10-13, 15, 17, 19-21, 23-26, and 28 of U.S. Patent No. 10,984,911 (“the ’911 Patent”). I understand that Apple’s Apple Watch Series 6, 7, 8, 9, Ultra, and Ultra 2 are accused by Masimo of infringing Claims 2-4, 8, 20, 21, 24, and 25 of the ’911 Patent in the parties’ parallel litigation in the United States District Court for the District of Delaware (Case No. 22-1378, the “Delaware Litigation” or the “District Court”). I understand that this Declaration is being submitted in this proceeding (IPR2024-00296) as Exhibit 2002.

2. I am being compensated for my work in this matter at my standard hourly rate for expert consulting services. My compensation in no way depends on the outcome of this proceeding. I have no financial interest in any of the parties to these matters.

I. INFORMATION AND MATERIALS CONSIDERED

3. Below is a listing of documents and materials that I considered and reviewed in connection with providing this declaration. In forming my opinions, I have reviewed and considered at least the following materials in preparing this Declaration:

- The '911 Patent, including its claims, specification, and file history;
- Apple's Petition and the declaration of Dr. Kenny (Ex. 1003) in support of Apple's Petition;
- The references Apple relies on in its Petition, including but not limited to Abdul-Hafiz (Ex. 1004), Raley (Ex. 1005), Secker (Ex. 1006), Jarman, (Ex. 1007), Barthelemy (Ex. 1008), Parker (Ex. 1009), Aoyagi (Ex. 1010), Webster (Ex. 1011), Kuenster Ex. 1012);
- Apple's complaints from the Delaware Litigation (Ex. 1062, Ex. 1063) and Masimo's counterclaims in the Delaware Litigation (Ex. 1064);
- Apple's stipulation (Ex. 1066);
- An excerpt of the November 22, 2023 Expert Report of Steven Warren (Apple's District Court invalidity expert) from the Delaware Litigation (Ex. 1068);
- The order granting certain of Masimo's patent infringement counterclaims from the Delaware Litigation (Ex. 1069);
- Any materials referenced directly or indirectly in my Declaration; and
- The information and materials identified in the following table:

Exhibit	Description
2001	<i>Curriculum Vitae</i> of Vijay K. Madisetti
2003	Commission Opinion (Public), <i>Certain Light-Based</i>

Exhibit	Description
	<i>Physiological Measurement Devices and Components Thereof</i> , Inv. No. 337-TA-1276, EDIS No. 808521 (ITC Oct. 26, 2023)
2004	Decision Denying Institution of <i>Inter Partes</i> Review, <i>Apple Inc. v. Masimo Corp.</i> , IPR2022-01271, Paper 15 (PTAB Jan. 24, 2023)
2005	Decision Denying Institution of <i>Inter Partes</i> Review, <i>Apple Inc. v. Masimo Corp.</i> , IPR2022-01272, Paper 16 (PTAB Jan. 24, 2023)
2006	Decision Denying Institution of <i>Inter Partes</i> Review, <i>Apple Inc. v. Masimo Corp.</i> , IPR2022-01273, Paper 15 (PTAB Jan. 24, 2023)
2007	Decision Denying Institution of <i>Inter Partes</i> Review, <i>Apple Inc. v. Masimo Corp.</i> , IPR2022-01274, Paper 15 (PTAB Jan. 24, 2023)
2008	Decision Denying Institution of <i>Inter Partes</i> Review, <i>Apple Inc. v. Masimo Corp.</i> , IPR2022-01275, Paper 15 (PTAB Jan. 30, 2023)
2009	Decision Denying Institution of <i>Inter Partes</i> Review, <i>Apple Inc. v. Masimo Corp.</i> , IPR2022-01276, Paper 15 (PTAB Jan. 30, 2023)
2013	Original Scheduling Order, <i>Apple Inc. v. Masimo Corp.</i> , No. 22-1378-MN-JLH (D. Del. May 25, 2023), D.I. 92
2014	Amended Scheduling Order, <i>Apple Inc. v. Masimo Corp.</i> , No. 22-1378-MN-JLH (D. Del. Sept. 21, 2023), D.I. 359
2018	Transcript of September 14, 2023 Markman Hearing, <i>Apple Inc. v. Masimo Corp.</i> , Nos. 22-cv-1377-MN-JLH, 22-cv-1378-MN-JLH
2019	Aaron Tilley, <i>The Entrepreneur Who Bet His Company on a Fight With Apple</i> , Wall Street J., Dec. 30, 2023, https://www.wsj.com/tech/joe-kiani-entrepreneur-apple-

Exhibit	Description
	warning-52eb09a9
2028	Correspondence from counsel for Apple to counsel for Masimo regarding Apple's prior art grounds in the Delaware Litigation, dated November 16, 2023
2029	Revised and Corrected Transcript of June 6, 2022 Hearing Open Sessions, <i>Certain Light-Based Physiological Measurement Devices and Components Thereof</i> , Inv. No. 337-TA-1276 (ITC).
2030	Excerpts of November 8, 2023 Deposition of Mohamed Diab, <i>Apple Inc. v. Masimo Corp.</i> , No. 22-1378-MN-JLH (D. Del.)
2031	Joint Claim Construction Brief Regarding Masimo Asserted Patents, <i>Apple Inc. v. Masimo Corp.</i> , No. 22-01378-MN-JLH (D. Del. Aug. 31, 2023), D.I. 295
2032	Excerpts of December 15, 2023 Rebuttal Expert Report of Steven Warren (Public), <i>Apple Inc. v. Masimo Corp.</i> , No. 22-1378-MN-JLH (D. Del.)
2033	Exhibit E-5 to Apple's June 8, 2023 Initial Invalidity Contentions based on Abdul-Hafiz (U.S. Patent Appl. Pub. No. 2004/0039272, <i>Apple Inc. v. Masimo Corp.</i> , No. 22-1378-MN-JLH (D. Del.)
2034	Exhibit E-10 to Apple's June 8, 2023 Initial Invalidity Contentions, <i>Apple Inc. v. Masimo Corp.</i> , No. 22-1378-MN-JLH (D. Del.)
2035	Exhibit E-8 to Apple's June 8, 2023 Initial Invalidity Contentions based on Masimo SET System, <i>Apple Inc. v. Masimo Corp.</i> , No. 22-1378-MN-JLH (D. Del.)
2036	Excerpts of Masimo's September 7, 2023 Responses to Apple Inc.'s Final Invalidity Contentions, <i>Apple Inc. v. Masimo Corp.</i> , No. 22-1378-MN-JLH (D. Del.)
2037	Photographs produced by Apple as APL_DEL04011694-695,

Exhibit	Description
	APL_DEL04011703-704, APL_DEL04011718-719, APL_DEL04011721, APL_DEL04011734, APL_DEL04011827, APL_DEL04011833, APL_DEL04011842
2038	Masimo LNOP & NR SpO ₂ adhesive & reusable sensors brochure, dated 2003, produced by Apple as APL_DEL00037755-756
2039	Photograph produced by Apple as APL_DEL04011705
2040	Photograph produced by Apple as APL_DEL04011717
2041	Excerpt of Datex-Ohmeda 3800 Pulse Oximeter TruTrak [®] + User's Manual, Datex-Ohmeda (Oct. 2002)
2042	U.S. Patent No. 7,096,054 (previously published as Abdul-Hafiz – U.S. Patent Publ. No. 2004/0039272)
2043	Masimo Patent Information, https://professional.masimo.com/company/masimo/patents/ (last visited Mar. 22, 2024)
2044	Photograph produced by Apple as APL_DEL04011734
2045	Photograph produced by Apple as APL_DEL04011735
2046	<i>Masimo Corporation Announces Masimo Rainbow SET, the World's First Pulse CO-Oximeter</i> , Masimo (Mar. 1, 2005), https://professional.masimo.com/company/news/news-media/2005#news-90640ab1-c7ae-4b6f-903a-d1faabe003c6
2047	Steven J. Barker et al., <i>Measurement of Carboxyhemoglobin and Methemoglobin by Pulse Oximetry: A Human Volunteer Study</i> , 105 Anesthesiology 892 (2006)
2048	Mike McEvoy, <i>Non-invasive Screening for CO and MET</i> , EMS1 (Jan. 29, 2009), https://www.ems1.com/ems-products/co-screening/articles/non-invasive-screening-for-co-and-met-rW7fnwZeumUrE2P4/

Exhibit	Description
2049	Selim Suner and John McMurdy, <i>Masimo Rad-57 Pulse CO-OximeterTM for noninvasive carboxyhemoglobin measurement</i> , 6 Expert Rev. Med. Devices 125 (2009)
2050	Recordation of Merger Conveying Patents (including Ex. 1007) from Ohmeda, Inc. to Datex-Ohmeda, Inc.
2051	U.S. Patent No. 7,277,741
2052	U.S. Patent No. 9,341,565
2053	Datex-Ohmeda Cardiocap TM /5 Technical Reference Manual, Datex-Ohmeda (2d ed. May 9, 2007)
2054	Excerpts of Apple Watch photographs produced by Masimo as MASITC_01398584-621
2055	Excerpts of Apple Watch photographs produced by Masimo as MASITC_01402291-294
2056	Rimantas P. Buinevicius, <i>A Three-Wavelength Pulse Oximeter for Carboxyhemoglobin Determination</i> , University of Wisconsin-Madison Master of Science Thesis (1987)
2057	Jim Welch, 39 <i>The Fundamentals of Pulse Oximeters</i> , Biomedical Instrumentation & Tech. 125 (2005)
2058	Disposable Pulse Oximeter Sensors, Curbell Medical (2022)
2059	Rad-57 Operator's Manual, Masimo (2006)
2060	John Feiner et al., <i>Accuracy of Carboxyhemoglobin Detection by Pulse CO-Oximeter During Hypoxemia</i> , 117 <i>Anesthesia & Analgesia</i> 847 (2013)
2061	Masimo Signal Extraction Technology brochure, dated 2001, produced by Apple as APL_DEL00037764-771
2062	Masimo Signal Extraction Technology Technical Bulletin, dated 2001, produced by Apple as APL_DEL00037757-763

Exhibit	Description
2063	Excerpt of Datex-Ohmeda S/5™ M-Modules Technical Reference Manual, Datex-Ohmeda (June 2005)
2064	Excerpt of Defendant Masimo Corp.'s Letter Brief (Public) Regarding Cross-Use, <i>Apple Inc. v. Masimo Corp.</i> , No. 22-1378-MN-JLH (D. Del. Mar. 13, 2024), D.I. 621
2065	Excerpt of Transcript of March 20, 2024 Hearing, <i>Apple Inc. v. Masimo Corp.</i> , Nos. 22-cv-1377-MN-JLH, 22-cv-1378-MN-JLH
2066	Excerpt of correspondence between counsel for Apple in Delaware Litigation and counsel for Masimo regarding cross-use of Apple information in IPRs, dated March 27, 2024
2067	U.S. Patent No. 7,272,425
2068	<i>Unimed Medical Disposable SpO2 Sensor, Your Priority Choice!</i> , Unimed (Sept. 18, 2021), https://www.unimed.cn/blogs/news/unimed-medical-disposable-spo2-sensor-your-priority-choice
2069	Patent Owner Preliminary Response, <i>Apple Inc. v. Masimo Corp.</i> , IPR2022-01271, Paper 10 (PTAB Oct. 26, 2022)
2070	Patent Owner Preliminary Response, <i>Apple Inc. v. Masimo Corp.</i> , IPR2022-01272, Paper 11 (PTAB Oct. 26, 2022)
2071	Patent Owner Preliminary Response, <i>Apple Inc. v. Masimo Corp.</i> , IPR2022-01273, Paper 10 (PTAB Nov. 4, 2022)
2072	Patent Owner Preliminary Response, <i>Apple Inc. v. Masimo Corp.</i> , IPR2022-01274, Paper 10 (PTAB Nov. 4, 2022)
2073	Patent Owner Preliminary Response, <i>Apple Inc. v. Masimo Corp.</i> , IPR2022-01275, Paper 10 (PTAB Nov. 4, 2022)
2074	Patent Owner Preliminary Response, <i>Apple Inc. v. Masimo Corp.</i> , IPR2022-01276, Paper 10 (PTAB Nov. 4, 2022)

Exhibit	Description
2075	<i>Apple Watch Series 6</i> , Apple (last visited Dec. 28, 2020), produced by Masimo at MASITC_00918307-327
2076	<i>Apple Watch Series 6 delivers breakthrough wellness and fitness capabilities</i> , Apple (Sept. 15, 2020), https://www.apple.com/newsroom/2020/09/apple-watch-series-6-delivers-breakthrough-wellness-and-fitness-capabilities/ , produced by Apple at APL_MAS_ITC_00310976-989
2077	Apple Watch Series 6 Video
2078	Apple Watch Series 6 “It Already Does That” Commercial

4. In preparing this Declaration, I have considered my own knowledge and experience, including my work in the fields of electrical and computer engineering; my experience teaching within those subjects; my experience working with others involved in those fields; and the materials identified herein. I understand my analyses and opinions, including my review of any materials cited herein, should be made from the perspective of one of ordinary skill in the art related to the '911 Patent at the relevant time (i.e., a “POSITA”). I understand the relevant time is March 1, 2005, as explained more below in Section V. Accordingly, my analyses and opinions are made from that relevant perspective. My testimony herein refers to the knowledge of a person of ordinary skill in the art as of March 1, 2005, unless indicated otherwise.

5. Any figures appearing in this Declaration were prepared with the assistance of counsel and reflect my understanding of the '911 Patent and the materials discussed herein. All annotations, coloring, and emphases have been added unless indicated otherwise.

II. EXPERIENCE AND QUALIFICATIONS

6. My qualifications are set forth in my curriculum vitae, a copy of which is included as Exhibit 2001. A summary of my qualifications follows.

7. I am a tenured full professor in the Colleges of Computing and Engineering at the Georgia Institute of Technology ("Georgia Tech"). I have worked in the area of digital signal processing, wireless communications, computer engineering, integrated circuit design, and software engineering for over 25 years, and have authored, co-authored, or edited several books and numerous peer-reviewed technical papers in these areas.

8. I obtained my Ph.D. in Electrical Engineering and Computer Science at the University of California, Berkeley, in 1989. While there, I received the Demetri Angelakos Outstanding Graduate Student Award and the IEEE/ACM Ira M. Kay Memorial Paper Prize.

9. I joined Georgia Tech in the Fall of 1989 and am now a tenured full professor in the Colleges of Computing and Engineering at Georgia Tech. Among other things, I have been active in the areas of digital signal processing, wireless

communications, integrated circuit design (analog & digital), system-level design methodologies and tools, and software engineering. I have been the principal investigator (“PI”) or co-PI in several active research programs in these areas, including DARPA’s Rapid Prototyping of Application Specific Signal Processors, the State of Georgia’s Yamacraw Initiative, the United States Army’s Federated Sensors Laboratory Program, and the United States Air Force Electronics Parts Obsolescence Initiative. I have received an IBM Faculty Award and NSF’s Research Initiation Award. I have been awarded the 2006 Frederick Emmons Terman Medal by the American Society of Engineering Education for contributions to Electrical Engineering, including authoring a widely used textbook in the design of VLSI digital signal processors.

10. During the past 20 years at Georgia Tech, I have created and taught undergraduate and graduate courses in hardware and software design for signal processing, computer engineering (software and hardware systems), computer engineering and wireless communication circuits.

11. I have been involved in research and technology in the area of digital signal processing since the late 1980s. I am also the Editor-in-Chief of the CRC Press’s 3-volume Digital Signal Processing Handbook (1998, 2010).

12. I have founded three companies in the areas of signal processing, embedded software, military chipsets involving imaging technology, and software

for computing and communications systems. I have supervised the Ph.D. dissertations of over twenty engineers in the areas of computer engineering, signal processing, communications, rapid prototyping, and system-level design methodology.

13. I have designed several specialized computer and communication systems over the past two decades at Georgia Tech for tasks such as wireless audio and video processing and protocol processing for portable platforms, such as cell phones and PDAs. I have designed systems that are efficient in view of performance, size, weight, area, and thermal considerations. I have developed courses and classes for industry on these topics, and many of my lectures in advanced computer system design, developed under the sponsorship of the United States Department of Defense in the late 1990s, are available for educational use at <http://www.eda.org/rassp> and have been used by several U.S. and international universities as part of their course work. Some of my recent publications in the area of design of computer engineering and wireless communications systems and associated protocols are listed in Exhibit 2001.

14. In the mid 2006-2007 timeframe, I collaborated with Professor John Scharf and his colleagues at Emory Healthcare system in developing FFT-based pulse oximetry system prototypes on FPGAs, which extended technologies developed by Prof. Scharf and his colleagues from the 1996 time frame. *See* T. Rusch, R. Sankar,

J. Scharf, “Signal Processing Methods for Pulse Oximetry”, *Comput. Bio. Med.*, Vol. 26, No. 2, 1996. Some of my more recent publications in the area of biological signal processing and bioinformatics are listed in my CV and include, A. Bahga, V. Madiseti, “Healthcare Data Integration and Informatics in the Cloud”, *IEEE Computer*, Vol. 48, Issue 2, 2015, and “Cloud-Based Information Integration Informatics Framework for Healthcare Applications”, *IEEE Computer*, Issue 99, 2013. In addition to my signal processing experience specific to pulse oximetry, I also have experience in developing systems for other physiological signals. Beginning in the early 1990s, I worked, in particular, with ECG/EKG signals, and, in general, with biomedical signals and systems.

15. In addition to my signal processing experience specific to pulse oximetry, I also have experience in developing algorithms and systems for other physiological signals. I worked with ECG/EKG signals in particular, and biomedical signals and systems in general, beginning in the early 1990s. In particular, I worked with graduate student Dr. Shahram Famorzadeh, in 1990 and 1991, to analyze and apply pattern recognition (a category of signal processing algorithms that is based on correlation with a set of templates) to ECG/EKG waveforms to identify physiological conditions.

16. I have experience with biomedical signals and devices in the field of speech and image processing since the late 1980s. I worked on deconvolution

algorithms to recover the state of the system based on observed measurements of the physiological signals in the 1993-1998 time-frame. These signal processing techniques can be applied to pulse oximetry signals. I have been working with these techniques since the mid-1980s.

17. I have studied, researched, and published in the area of adaptive filter signal processing for noise reduction and signal prediction, using correlation-based approaches since the mid-1980s, both in the time-domain and frequency domain, and also to ray-tracing applications, such as Seismic Migration for oil and shale gas exploration. *See, e.g.*, V. Madisetti & D. Messerschmitt, Dynamically Reduced Complexity Implementation of Echo Cancellers, IEEE International Conference on Speech, Acoustics and Signal Processing, ICASSP 1986, Tokyo, Japan, and M. Romdhane and V. Madisetti, “All-Digital Oversampled Front-End Sensors” IEEE Signal Processing Letters, Vol. 3, Issue 2, 1996, and “LMSGEN: A Prototyping Environment for Programmable Adaptive Digital Filters in VLSI”, VLSI Signal processing, pp. 33-42, 1994.

18. Deconvolution of symmetric (seismic) and asymmetric (pulse oximetry) signals has gained much importance in the past two decades. Some of my early work on “Homomorphic Deconvolution of Bandpass Signals” in IEEE Transactions on Signal Processing, October 1997, established several new methods

for deconvolution of such signals that had several advantages of robustness, increased accuracy, and simplicity.

19. In the past decade I have authored several peer-reviewed papers in the area of computer systems, instruments, and software design, and these include:

- V. Madiseti, et al., “The Georgia Tech Digital Signal Multiprocessor”, IEEE Transactions on Signal Processing, Vol. 41, No. 7, July 1993.
- V. Madiseti et al., “Rapid Prototyping on the Georgia Tech Digital Signal Multiprocessor”, IEEE Transactions on Signal Processing, Vol. 42, March 1994.
- V. Madiseti, “Reengineering legacy embedded systems”, IEEE Design & Test of Computers, Vol. 16, Issue 2, 1999.
- V. Madiseti et al., “Virtual Prototyping of Embedded Microcontroller-based DSP Systems”, IEEE Micro, Vol. 15, Issue 5, 1995.
- V. Madiseti, et al., “Incorporating Cost Modeling in Embedded-System Design”, IEEE Design & Test of Computers, Vol. 14, Issue 3, 1997.
- V. Madiseti, et al., “Conceptual Prototyping of Scalable Embedded DSP Systems”, IEEE Design & Test of Computers, Vol. 13, Issue 3, 1996.
- V. Madiseti, Electronic System, Platform & Package Codesign,” IEEE Design & Test of Computers, Vol. 23, Issue 3, June 2006.

- V. Madiseti, et al., “A Dynamic Resource Management and Scheduling Environment for Embedded Multimedia and Communications Platforms”, IEEE Embedded Systems Letters, Vol. 3, Issue 1, 2011.

20. I have been active in the areas of signal processing systems and mobile device communication systems for several years. Some of my publications in this area include “Frequency Dependent Space-Interleaving of MIMO OFDM Systems” Proc. of IEEE Radio and Wireless Conference (RAWCON '03), 2003, “Embedded Alamouti Space Time Codes for High Rate and Low Decoding Complexity”, Proc. IEEE Asilomar Conf. on Signals, Systems, and Computers, 2008; and “Asymmetric Golden Codes for Fast Decoding in Time Varying Channels”, Wireless Personal Communications (2011).

21. Above, I have provided a short summary of my education and experience that I believe is most relevant to the analyses and opinions I have expressed in this Declaration. A copy of my curriculum vitae, which describes in further detail my qualifications, responsibilities, employment history, honors, awards, professional associations, presentations, publications, and patents is included as Exhibit 2001.

III. APPLICABLE LEGAL STANDARDS

22. I am an electrical and computer engineer by training and profession. The opinions I express in this Declaration involve the application of my knowledge

and experience to the evaluation of the '911 Patent and certain prior art to the '911 Patent.

23. Although I have been involved as a technical expert in patent matters before, I am not an expert in patent law and offer no legal conclusions. I have been advised of certain principles of patent law applicable in this matter, which I have used in arriving at my determinations and opinions. The paragraphs below express my understanding of the legal requirements I have used in forming my opinions.

A. Level Of Ordinary Skill In The Relevant Art

24. I understand that certain issues in an IPR, such as claim construction and whether a claim is invalid as obvious, are assessed from the view of a hypothetical person of ordinary skill in the relevant art at the time of the invention. I understand there are multiple factors relevant to determining the level of ordinary skill in the art, including (1) the level of education and experience of persons working in the field at the time of the invention; (2) the sophistication of the technology; (3) the types of problems encountered in the field; and (4) the prior art solutions to those problems. I understand that this hypothetical person of ordinary skill is presumed to have had knowledge from the teachings of the prior art.

25. I discuss the asserted level of skill further below, in Section V of this declaration.

B. Claim Construction

26. I understand that claim construction in an IPR is a legal question for the Board to decide. I also understand, however, that in construing claim terms, the Board asks what the terms would mean to a person of ordinary skill in the relevant art in view of the disclosures in the patent and the prosecution history of the patent. I understand that the Board may also consider external evidence, such as dictionaries. In general, however, I understand that claim terms are given the plain and ordinary meaning one of ordinary skill in the relevant art would apply to them in the context of the patent at the time the patent was filed.

C. Obviousness

27. I understand that a claim is unpatentable as “obvious” under 35 U.S.C. § 103 if the claimed subject matter as a whole would have been obvious to a person of ordinary skill in the art at the time of the invention. I also understand that an obviousness analysis takes into account the following factors, which are sometimes referred to as the Graham factors: (1) the scope and content of the prior art, (2) the differences between the claimed subject matter and the prior art, (3) the level of ordinary skill in the art at the time of the invention, and (4) “objective indicia of nonobviousness,” also referred to as secondary considerations of nonobviousness. I understand that these objective indicia include considerations such as whether there was: (i) any unexpected result(s); (ii) skepticism of the invention; (iii) a teaching

away from the invention; (iv) failure of others to find the solution(s) provided by the claimed invention; (v) copying by other companies; (vi) commercial success due to the merits of the claimed invention; (vii) praise by others for the invention; and (viii) a long-felt need in the industry for the claimed invention. I understand that objective indicia of nonobviousness, if available, must be considered as part of the obviousness analysis.

28. In determining the scope and content of the prior art, it is my understanding that a reference is considered appropriate prior art if it falls within the field of the inventor's endeavor. In addition, a reference is appropriate prior art if it is reasonably pertinent to the particular problem with which the inventor was involved. A reference is reasonably pertinent if it logically would have commended itself to an inventor's attention in considering his or her problem. If a reference relates to the same problem as the claimed invention, that supports use of the reference as prior art in an obviousness analysis.

29. To assess the differences between prior art and the claimed subject matter, it is my understanding that 35 U.S.C. § 103 requires the claimed invention to be considered as a whole. This "as a whole" assessment requires showing that a person of ordinary skill in the art at the time of invention, confronted by the same problems as the inventor and with no knowledge of the claimed invention, would

have selected the elements from the prior art and combined them in the claimed manner.

30. It is my further understanding that the Supreme Court has recognized several rationales for combining references or modifying a reference to show obviousness of claimed subject matter. Some of these rationales include: combining prior art elements according to known methods to yield predictable results; simple substitution of one known element for another to obtain predictable results; a predictable use of prior art elements according to their established functions; applying a known technique to a known device (method or product) ready for improvement to yield predictable results; choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success; and some teaching, suggestion, or motivation that would have led a person of ordinary skill in the art to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention.

31. I understand that the obviousness analysis must be performed from the perspective of a person of ordinary skill in the art at the time of the alleged invention. I understand this requirement is to help avoid using impermissible hindsight in the analysis. I further understand that the claims of the patent-at-issue must not be used to provide a road map for obviousness; instead, the claims would have been obvious only if a person of ordinary skill in the art, without knowledge of the patent-at-issue,

would have been motivated to combine the teachings of the prior art to arrive at the claimed invention and had a reasonable expectation of success in doing so.

32. I understand that an assessment of what a reference discloses or teaches—for purposes of an anticipation analysis or an obviousness analysis—must be conducted from the perspective of a person of ordinary skill in the art at the time of the invention. In other words, a reference discloses or teaches a claim limitation if a person of ordinary skill in the art would, at the relevant time, interpret the reference as expressly, implicitly, or inherently disclosing the claim limitation. I further understand that a reference does not need to use the exact language of the claim to disclose a claim limitation. I also understand that something is only “inherent in,” and therefore taught by, the prior art if it necessarily flows from the explicit disclosure of the prior art. I understand the fact that a certain result or characteristic may be present in the prior art is not sufficient to establish inherency.

33. I also understand that the prior art used in an anticipation or obviousness analysis must enable a skilled artisan to make and use the claimed invention without undue experimentation.

34. Applying these legal standards to the challenged claims of the '911 Patent, I believe the challenged claims would not have been obvious to a person of ordinary skill in the art based on the ground asserted by Apple in its Petition, as discussed below.

IV. SUMMARY OF OPINIONS

35. I have conducted analyses leading to the opinions expressed in this Declaration. It is my conclusion, from a technical point of view, that the challenged claims of the '911 Patent (Claims 1-4, 6, 8, 10-13, 15, 17, 19-21, 23-26, and 28) would not have been obvious to a person of ordinary skill in the art based on the grounds asserted by Apple in its Petition. To summarize my opinions, it is my opinion that:

- (Ground 1A) Claims 1, 6, 8, 10, 15, 17, 19-21, 26, and 28 of the '911 Patent would not have been obvious to a person of ordinary skill in the art based on Abdul-Hafiz and Raley; and
- (Ground 1B) Claims 2-4, 11-13, and 23-25 of the '911 Patent would not have been obvious to a person of ordinary skill in the art based on Abdul-Hafiz, Raley, and Secker.

36. Below, I provide the complete analyses supporting my opinions.

V. LEVEL OF ORDINARY SKILL IN THE ART

37. It is my opinion that a person of ordinary skill in the art at the time of the '911 Patent would be a person with a working knowledge of physiological monitoring technologies and/or optical sensors used in physiological monitoring technologies. The person would have had a Bachelor of Science degree in an academic discipline emphasizing the design of electrical, computer, software, or

optical technologies, in combination with training or at least one to two years of related work experience with capture and processing of data or information, or designing and using optical sensors or systems, including but not limited to physiological monitoring technologies. Alternatively, the person could have had a Master of Science degree in a relevant academic discipline with less than a year of related work experience in the same discipline.

38. Apple asserts that:

A person of ordinary skill in the art at the time of the '911 patent ("POSITA") would have had at least a Bachelor of Science in electrical engineering, mechanical engineering, biomedical engineering, computer engineering, physics, or a related field, with at least one to two years of relevant work experience with capture and processing of data or information including but not limited to physiological information, or equivalents thereof.

Petition at 7. Alternatively, Apple asserts "[s]uperior education could compensate for a deficiency in work experience, and vice-versa." *Id.*

39. Dr. Kenny states that he applies the same level of skill in his analysis:

a person of ordinary skill in the art relating to the subject matter of the '911 Patent as of March 1, 2005 ("POSITA" or "one of ordinary skill") would have had a Bachelor of Science degree in electrical engineering, mechanical engineering, biomedical engineering, computer engineering, physics, or a related field, with at least one to two years of relevant work experience with capture and processing of data or information including but not limited to physiological information, or equivalents thereof. A greater amount of education, *i.e.*, a doctorate in electrical engineering, mechanical engineering, biomedical engineering, computer engineering, physics, or a related field would also qualify for the hypothetical person of ordinary skill in the art in lieu of fewer years of work experience. Additional education or

industry experience may compensate for a deficit in one of the other aspects of the requirements stated above.

Ex. 1003 ¶22.

40. I note that Apple’s asserted level of skill (1) requires no coursework, training or experience with optics or optical physiological monitors; (2) requires no coursework, training or experience in physiology; and (3) focuses on data capture and processing and not sensor design. In responding to Dr. Kenny’s opinions in this proceeding, I apply Apple’s asserted level of skill. Regardless of whether my definition of the level of skill in the art is applied or Apple’s/Dr. Kenny’s definition is applied, my opinions herein remain the same.

41. I understand that the level of ordinary skill in the art for the ’911 Patent is measured as of its March 1, 2005 priority date. My analysis herein is therefore made from the perspective of one of ordinary skill in the art as of that relevant time. Dr. Kenny acknowledges, and never disputes, the March 1, 2005 priority date of the ’911 Patent and used that date in his analysis. Ex. 1003 ¶17. I do not offer any opinions regarding priority in this declaration.

VI. THE ’911 PATENT

A. Overview of the ’911 Patent

42. The ’911 Patent is entitled “Multiple Wavelength Sensor Emitters.” The claimed devices and methods noninvasively determine measurements of

physiological parameters of the user, such as oxygen saturation and pulse rate. *See, e.g.,* '911 Patent at 3:23-58, 5:34-51. The '911 Patent explains:

There is a need to noninvasively measure multiple physiological parameters, other than, or in addition to, oxygen saturation and pulse rate. For example, hemoglobin species that are also significant under certain circumstances are carboxyhemoglobin and methemoglobin. Other blood parameters that may be measured to provide important clinical information are fractional oxygen saturation, total hemoglobin (Hbt), bilirubin and blood glucose, to name a few.

One aspect of a physiological sensor is light emitting sources, each activated by addressing at least one row and at least one column of an electrical grid. The light emitting sources transmit light having multiple wavelengths and a detector is responsive to the transmitted light after attenuation by body tissue.

Id. at 3:23-37. The '911 Patent also explains:

FIG. 1 illustrates a physiological measurement system 10 having a monitor 100 and a multiple wavelength sensor assembly 200 with enhanced measurement capabilities as compared with conventional pulse oximetry. The physiological measurement system 10 allows the monitoring of a person, including a patient. In particular, the multiple wavelength sensor assembly 200 allows the measurement of blood constituent and related parameters in addition to oxygen saturation and pulse rate. Alternatively, the multiple wavelength sensor assembly 200 allows the measurement of oxygen saturation and pulse rate with increased accuracy or robustness as compared with conventional pulse oximetry.

In one embodiment, the sensor assembly 200 is configured to plug into a monitor sensor port 110. Monitor keys 160 provide control over operating modes and alarms, to name a few. A display 170 provides readouts of measured parameters, such as oxygen saturation, pulse rate, HbCO and HbMet to name a few.

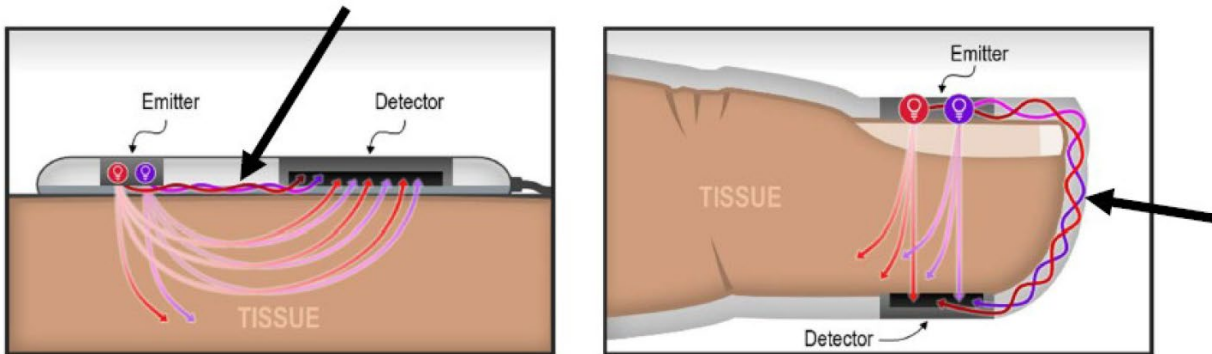
Id. at 5:34-51.

43. The claimed devices and systems are the result of research conducted by Ammar Al-Ali and his coinventors into more accurately measuring multiple physiological parameters. *See, e.g.*, Ex. 2030, 122:1-129:3, 138:9-141:14. The sensor designs claimed in the '911 Patent include various features to measure physiological parameters more accurately in difficult conditions, such as for determining additional parameters and at various measurement locations, including “a finger,” “a foot,” “an ear,” or “a forehead or other tissue surface.” *See, e.g.*, '911 Patent at 5:66-6:3 (“various tissue sites other than a finger, such as a foot or an ear”), 6:42-55, 15:14-23, FIGS. 1, 32, 46, Claims 2-4, 8, 20, 21, 24, 25.

44. The claimed devices and methods determine multiple physiological parameters by utilizing at least three LEDs configured to emit light of at least three different wavelengths, and at least one detector configured to detect emitted light after attenuation by the user’s tissue. *See, e.g., id.* at Claims 1, 10, 19. The claimed devices and methods also include a light block that reduces a significant problem encountered by the inventors—light piping. *Id.*; Ex. 2030, 122:1-123:17, 126:7-128:21, 130:23-131:19, 227:18-230:1. As co-inventor Mohamed Diab explained, “[t]he ability to minimize light piping turned out to be extremely important.” Ex. 2030 at 130:23-131:9; *see also id.* at 229:1-7 (“The light piping [mitigation] and the light block that we have used was quite critical because even the designs that we have right there did not work before for the ADT and the LNOP sensor. We had to go

beyond that. That was another piece ... [that] directly impacted the accuracy.’’).

Light piping occurs when light goes directly from a light source to a detector without first being attenuated by the user’s tissue. *See, e.g.,* ’911 Patent at 6:45-47. The below figures depict (with black arrows) examples of light piping.



Light piping is a problem because light that reaches the detector without first being attenuated by the user’s tissue provides no information about the parameters of the tissue being measured and thus leads to inaccuracy in noninvasive physiological measurements. The devices and methods recited in the claims of the ’911 Patent reduce light piping and improve measurement accuracy by including a light block formed at least partly of black material and having a top with only one opening or window through which light can reach the detector, with the area of the opening or window being smaller than the area of the detector. *See, e.g.,* ’911 Patent at Claims 1, 10, 20. This combination of features improves accuracy of physiological parameter measurements and provides the ability to measure difficult physiological parameters at numerous different measurement sites.

45. The '911 Patent has three independent claims. They are Claims 1, 10, and 19. Many of the limitations at issue (bolded below) are included in Claim 1 of the '911 Patent, which recites:

1. A physiological monitoring device comprising:
 - at least three LEDs recessed into a cavity*, the at least three LEDs configured to emit light of *at least three different wavelengths*;
 - at least one detector configured to detect at least a portion of the light emitted from the at least three LEDs after at least a portion of the light has been attenuated by tissue, the at least one detector configured to output at least one signal responsive to the detected light;
 - a light block* surrounding the at least one detector, the light block comprising a shoebox structure configured to recess the at least one detector into the shoebox structure, wherein the shoebox structure is at least partially formed of a black material, *wherein a top* of the shoebox structure *includes only one opening through which light is configured to pass, the opening comprising an area smaller than a detection surface area of the at least one detector*; and
 - a processor configured to receive and process one or more signals responsive to the outputted at least one signal and determine a physiological parameter* of a user responsive to the one or more signals.

'911 Patent at Claim 1.

46. Dr. Kenny applies the same combination of references against Claim 1 (Ex. 1003 ¶¶72-116), Claim 10 (*id.* ¶¶120-139), and Claim 19 (*id.* ¶¶140-148), as well as their relevant dependent claims. For Claims 10 and 19, Dr. Kenny primarily relies on and incorporates his analysis for Claim 1. *Id.* ¶¶120-123, 129-131, 135-136, 141-148. Accordingly, in analyzing the Petition and Dr. Kenny's opinions, my analysis applies to each of Claims 1, 10, and 19 unless indicated otherwise.

VII. APPLE'S CITED REFERENCES

47. Apple's Petition presents two grounds, Grounds 1A and 1B. Apple's Ground 1A combines Abdul-Hafiz's pulse oximeter (Ex. 1004) with Raley (Ex. 1005). Petition at 1. Ground 1A challenges Claims 1, 6, 8, 10, 15, 17, 19-21, 26, and 28. *Id.* Apple's Ground 1B combines Abdul-Hafiz with Raley and Secker (Ex. 1006). *Id.* at 1. Ground 1B challenges Claims 2-4, 11-13, and 23-25. *Id.*

A. Abdul-Hafiz (U.S. Pat. Publ. No. 2004/0039272 – Ex. 1004)

48. Abdul-Hafiz is a Masimo patent publication titled “Low Noise Optical Housing.” Ex. 1004. Abdul-Hafiz relates to an enclosure or housing for the detector of a transmission pulse oximeter sensor. *See, e.g., id.* ¶¶3-4. The housing encloses a detector within a “pocket” formed by a base and folded cover. *See, e.g., id.* ¶¶5, 7. Abdul-Hafiz explains:

One aspect of a low noise optical housing is a substrate having a reflective side and an absorptive side. The substrate has a generally planar base portion and a protruding cover portion. The cover portion defines a pocket on the absorptive side. The substrate has an open position with the base portion distal the cover portion and a closed position with the base portion proximate the cover portion. The substrate is configured to enclosed a detector within the pocket in the closed position. The base portion defines an aperture generally centered within the base portion and aligned with the detector in the closed position so as to pass light through to the detector.

Id. ¶5. Abdul-Hafiz further explains that:

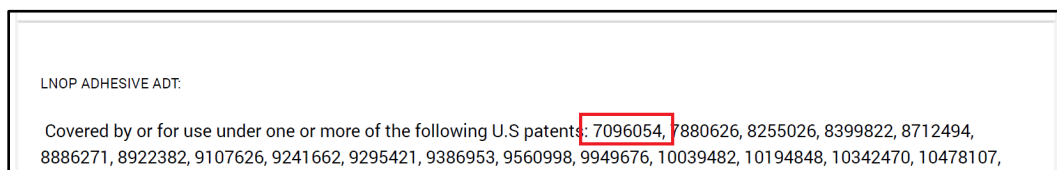
A further aspect of a low noise optical housing comprises a light reflecting cover means for shielding against ambient light and a base means for blocking piped light. The base means adjoins the cover

means. The housing also comprises a light absorbing pocket means for securing a detector. The pocket means is defined by the cover means and the base means. The housing further comprises an aperture means for allowing light transmitted through a tissue site to be received by the detector. The aperture means is defined by the base means.

Id. ¶7.

49. The housing includes an aperture (470). *See, e.g., id.* ¶¶7, 39. Abdul-Hafiz’s pulse oximeter sensor has only two LEDs and only emits light of two wavelengths (“red and infrared”). Ex. 1004 ¶2.

50. I understand that Abdul-Hafiz was invented during Masimo’s development of its LNOP (low noise optical probe) ADT sensors, which embody Abdul-Hafiz’s claimed inventions. Abdul-Hafiz issued as U.S. Patent No. 7,096,054 on August 22, 2006. Ex. 2042. Masimo’s patent marking website state that the patent issuing from Abdul-Hafiz (U.S. Patent No. 7,096,054, Ex. 2042) covers the LNOP ADT sensor. Ex. 2043.



Id.

B. Raley (U.S. Pat. No. 6,014,576 – Ex. 1005)

51. Raley is a Datex-Ohmeda patent titled “Segmented Photoplethysmographic Sensor With Universal Probe-End.” Ex. 1005. Raley relates to a partially re-usable two-piece plethysmograph transmission sensor. *See, e.g.*, Ex. 1005, 2:23-44. Raley describes a reusable interconnect cable segment (20), connector (17), and disposable probe (10) and explains that:

The reusable manufacturer specific interconnect cable can remain attached to the monitor with which it is being used until the reusable cable requires replacement. In the preferred embodiment disclosed herein, the disposable probe-end has a u-shaped channel for receipt of a u-shaped interconnect cable end portion which houses either the required LED's, laser diodes or optical fiber and mirrors for illuminating the tissue of a patient. The disposable probe-end may include a window in order to protect the patient from excess heat being emitted from the light sources and to protect the reusable interconnect cable from contamination. The required identification means is housed in the reusable interconnect cable, thus, the disposable probe-end can have truly universal application across all photoplethysmographic monitors.

Id.

52. Raley's interconnect cable segment (20) removably attaches to a separate connector (17) that is secured to the substrate (12) of the disposable probe end (10) worn by the user. *Id.*, 5:27-38. The interconnect cable segment (20) containing emitters (21-24) that “may be [LEDs].” Ex. 1005, 3:63-4:3, 2:33-37. Raley's interconnect cable segment (20) and its connector (17) are reusable and connect the monitor to the disposable portion (probe end (10)) of the sensor. *See,*

e.g., id., 3:55-57. Raley’s probe end (10) attaches to the patient and includes a photodetector (13). *See, e.g., id.*, 5:16-38.

53. Raley mentions physiological parameters beyond oxygen saturation, but does not disclose or enable measuring parameters such as carboxyhemoglobin or methemoglobin with only four wavelengths of light. *See, e.g., id.*, 3:33-36; *infra* Section XI.C.1. Raley states “[i]t is also possible to measure additional analytes in the arterial blood, such as additional dyshemoglobins, with one additional wavelength of light for each component.” *Id.* Raley also states:

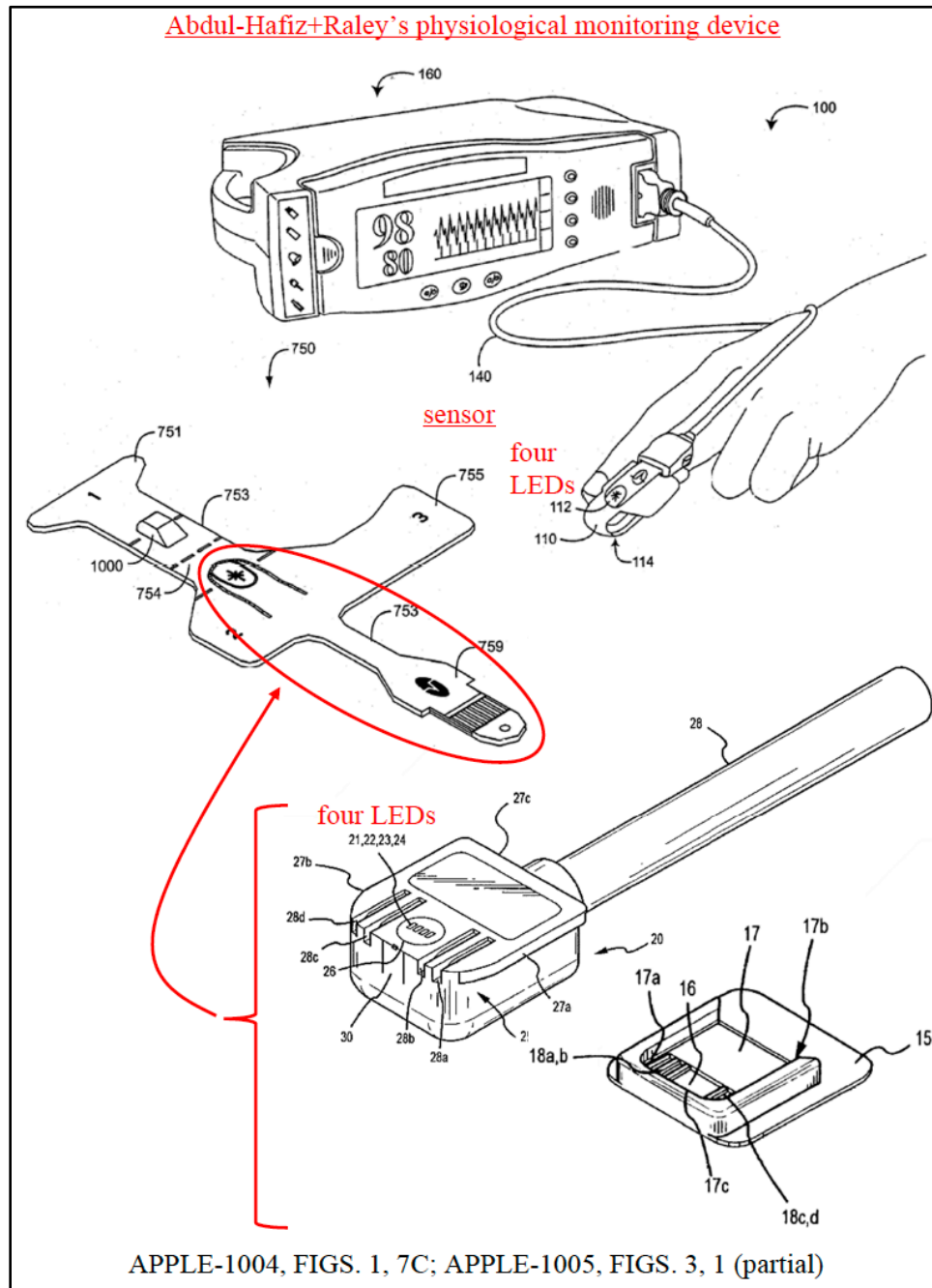
For example, ***if the monitor 100 is capable of measuring a plurality of blood analyte concentrations such as O2Hb, RHb, COHb and MetHB*** then plug 42 and interconnect 104 will contain sufficient electrical connectors 46 to interconnect probe interface 102 with a plurality of emitters 21, 22, 23 and 24 located in the connector-end 25 of interconnect cable segment 20.

Id., 3:59-65. Raley further states:

Also, the types of photoplethysmographic [“PPG”] monitors continues to increase. One of the primary uses of photoplethysmography has been the monitoring of the oxygen saturation of a patient’s blood. However, there is a desire to expand the use of photoplethysmography into the monitoring of additional blood analytes such as carboxyhemoglobin, methemoglobin and other dyshemoglobins. This proliferation of monitor types ***will*** add additional confusion in the health care environment due to the number of additional probe types which ***will*** be offered with these new monitors.

Id., 1:38-48. Overall, Raley assumes a scenario where a monitor “is capable of measuring a plurality of blood analyte concentrations” and speculates as to the impact such monitors “will” or “would” have in the future. *Id.*, 1:38-48, 3:59-65.

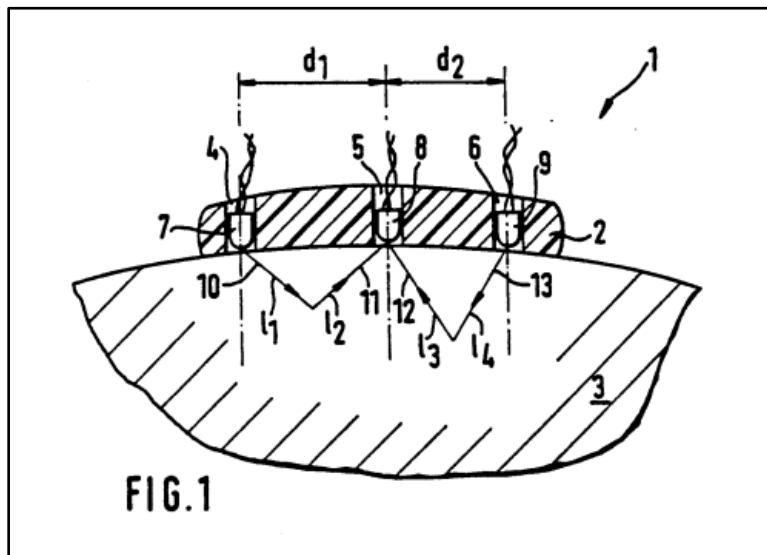
54. Apple proposes combining Abdul-Hafiz with two of Raley's LEDs (21-24), Raley's entire interconnect cable segment (20), and Raley's separate connector (17), as shown below. Petition at 14-17, 24-31.



Id., 17.

C. Secker (U.S. Pat. No. 5,188,108 – Ex. 1006)

55. Secker is a patent titled “Sensor, Apparatus and Method for Non-Invasive Measurement of Oxygen Saturation.” Ex. 1006. Secker relates to the design of a reflectance pulse oximeter, which is the sensor configuration where the light source and light detector are on the same side of the tissue, as shown in the example below:



Id., FIG. 1 (depicting reflectance pulse oximeter with two LEDs (7, 9) and one detector (8)), Abstract. Secker describes two-wavelength pulse oximetry sensors that include one or more LEDs of a first wavelength (e.g., infrared) and the same number of LEDs of a second wavelength (e.g., red), i.e., sensors with two wavelengths used to measure oxygen saturation. *See, e.g., id.*, FIGS. 1-5, 8, Abstract, 3:7-27, 4:6-25, 11:58-66, 12:56-65, 13:4-22, 13:38-49, 14:29-40, 15:29-54, claims 1, 19, 36.

VIII. CLAIM CONSTRUCTION

56. I understand that in the parties' parallel Delaware Litigation where Masimo has asserted the '911 Patent, Apple asserted express claim constructions for several claim terms of the '911 Patent: (1) a "cavity" is a "hollowed-out space" within a one-piece "solid body"; (2) "a light block..." is a "coined term" and thus limited to an exemplary embodiment in the specification; (3) "a top of the [shoebox structure/light block]" mandates a particular device orientation; and (4) an "opening" requires "empty space." Ex. 2031, 57-84. In its Petition, however, Apple states that "no express constructions are required" for the terms of the '911 Patent. Petition at 7-8. Apple's expert, Dr. Kenny, does not include a claim construction section in his report, does not discuss Apple's claim constructions in the Delaware Litigation, and does not state his opinion on the correct construction of the claim terms of the '911 Patent. *See generally* Ex. 1003.

57. I have given the claim terms of the '911 Patent their plain and ordinary meaning in my analysis herein.

IX. APPLE'S INCONSISTENT CLAIM CONSTRUCTIONS

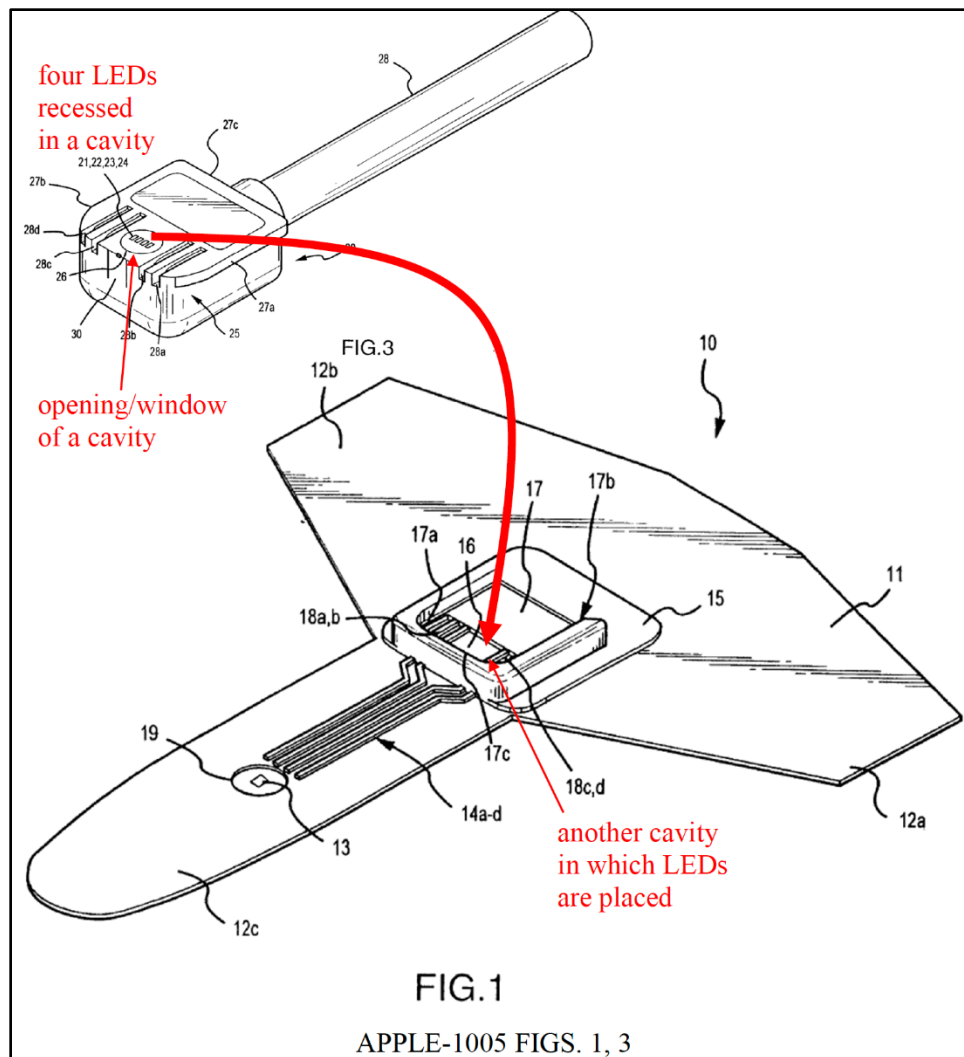
58. I understand that here and in the Delaware Litigation, Masimo submits that the claims of the '911 Patent have their plain meaning and, therefore, require no construction. Ex. 2031, 57-84. As noted above, I agree. *Supra* Section VIII.

59. I understand that Apple presents inconsistent claim constructions here and in the Delaware Litigation. In the Delaware Litigation, Apple asserted the express constructions I noted above for the disputed terms, which include: (1) a “cavity” is a “hollowed-out space” within a one-piece “solid body”; (2) “a light block...” is a “coined term” and thus limited to an exemplary embodiment in the specification; (3) “a top of the [shoebox structure/light block]” mandates a particular device orientation; and (4) an “opening” requires “empty space” despite being an opening for light. Ex. 2031, 57-84. Apple relies on these narrow constructions for noninfringement arguments. Ex. 2032 ¶¶473-474, 487-490, 498, 528-539, 512-523. Apple’s Petition, however, does not mention its constructions from the Delaware Litigation and instead states that “no express constructions are required.” Petition at 7-8.

60. As I discuss below, the references Apple asserts in its Petition do not meet its constructions in the Delaware Litigation.

A. **Raley Does Not Disclose a “Cavity” Under Apple’s Delaware Construction**

61. Apple asserts in the Delaware Litigation that “cavity” (Claims 1, 10) means “a ***hollowed-out*** space ***within a solid body***.” Ex. 2031, 57. Here, Apple relies only on Raley for the “cavity.” Specifically, relies on the following structures in Raley to disclose “at least three LEDs recessed into a cavity”:

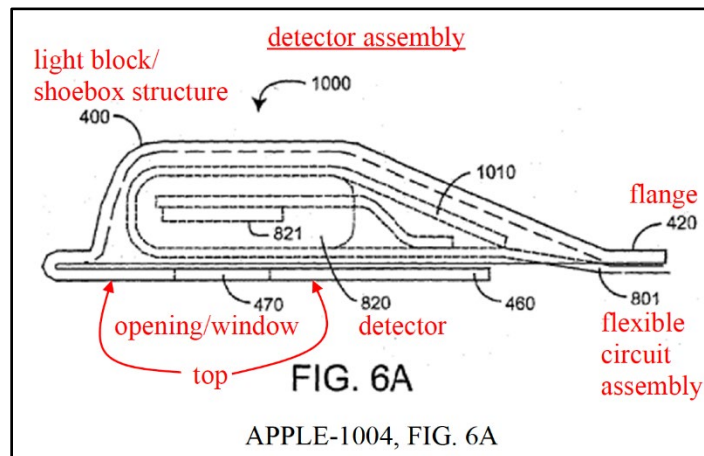


Petition at 29, 62. However, the LEDs (21-24) of Raley's interconnect cable segment (20) are flush with the window/opening (26); they are ***not recessed*** and ***not in a hollowed-out space***. Ex. 1005, FIG. 3. Further, even when Raley's segment (20) and connector (17) are assembled (e.g., FIG. 4), the LEDs (21-24) are not recessed into a hollowed-out space ***within a solid body*** because the interconnect cable segment (20) and connector (17) are separable components. Ex. 1005, FIGS. 1-4, 5:15-23, 5:38-47, 5:57-62, 6:6-12. Therefore, the only reference that Apple now

relies on for this element does not disclose a “cavity” under the construction that Apple asserts in the Delaware Litigation.

B. Abdul-Hafiz Does Not Disclose “A Top ...” Under Apple’s Delaware Construction

62. Apple asserts in the Delaware Litigation that “a top of the [shoebox structure/light block]” (Claims 1, 10, 19) means “the *uppermost* structure that covers the [shoebox structure/light block].” Ex. 2031, 68. Here, Apple relies only on Abdul-Hafiz for the alleged “top.” However, Apple asserts that Abdul-Hafiz’s *bottommost* “base 460” discloses the claimed “top,” as shown below.



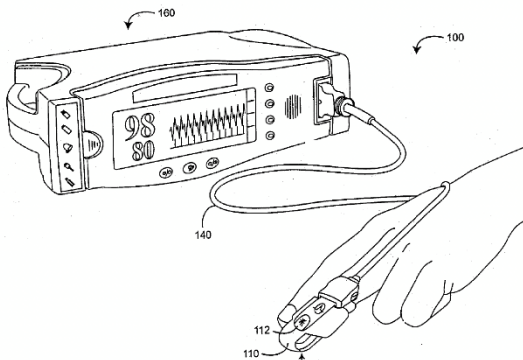
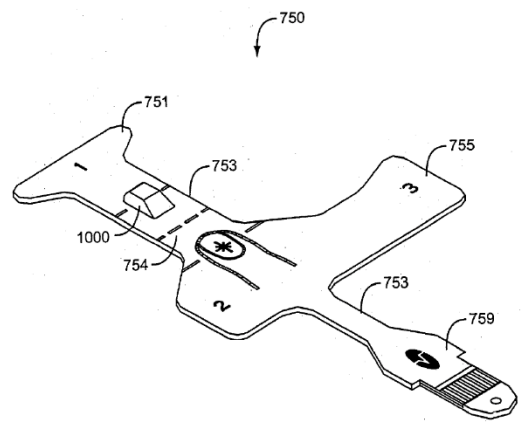
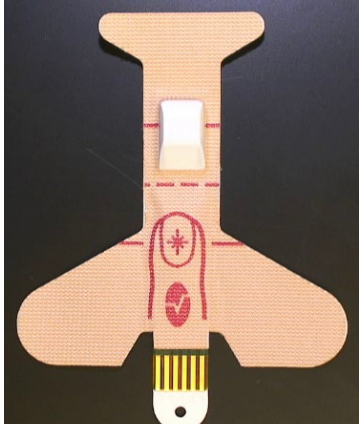
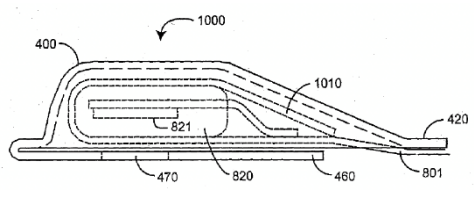
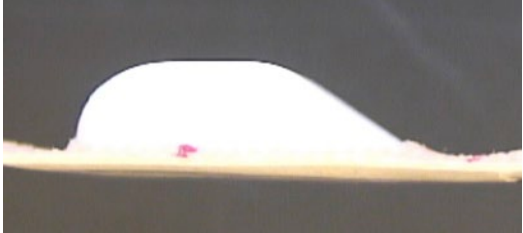
Petition at 43, 67-69, 73. As shown above, Abdul-Hafiz’s alleged “top” is not the “uppermost structure” that covers the alleged shoebox structure or light block. Therefore, the only reference Apple now relies on for this element does not disclose a “top” under the construction that Apple asserts in the Delaware Litigation.

**X. APPLE’S OVERLAPPING ’911 PATENT VALIDITY ARGUMENTS
IN THE DELAWARE LITIGATION AND THIS PETITION**

63. Apple’s Petition raises validity issues that overlap with the Delaware Litigation. I understand that Apple asks both the Board and District Court to decide validity based on printed publications. *Compare* Ex. 2028 *with* Petition at 1-2.

64. Apple’s Petition relies on a primary reference (Abdul-Hafiz) and a secondary reference (Raley) that Apple previously relied on in its initial invalidity contentions in the Delaware Litigation. Ex. 2033, Ex. 2034.

65. Apple’s primary reference in the Petition (Abdul-Hafiz) is also substantially the same as one of the primary references (the “Masimo SET System”) that Apple has elected to pursue in the Delaware Litigation. Ex. 2028. Specifically, in the Delaware Litigation, the “Masimo SET System” is one of Apple’s primary references for the ’911 Patent. Ex. 2028; Ex. 2037 (several photographs of LNOP ADT sensor). The “Masimo SET System” includes the Masimo LNOP ADT sensor. Ex. 2035. And the Masimo LNOP (low noise optical probe) ADT sensor is precisely what Apple’s primary reference in the Petition (Abdul-Hafiz) concerns. Abdul-Hafiz describes and claims the most pertinent part of the LNOP ADT sensor’s design—its low noise optical housing. Ex. 1003, FIGS. 6A, 7C, ¶¶33-41. As shown below, Abdul-Hafiz’s sensor is the LNOP ADT sensor.

Abdul-Hafiz (Asserted in Petition)	Masimo LNOP ADT Sensor (Asserted in Delaware Litigation)
 Ex. 1004, FIG. 1	 Ex. 2038
 Ex. 1004, FIG. 7C	 Ex. 2039
 Ex. 1004, FIG. 6A	 Ex. 2040

66. I understand that Apple's expert (Dr. Warren) in the Delaware Litigation relies on the LNOP ADT sensor (and larger Masimo SET System) as a primary reference, in turn showing that Masimo's LNOP ADT sensor is virtually

indistinguishable from Abdul-Hafiz. Ex. 2037. Further, Masimo’s patent marking website confirms the overlap between Apple’s primary reference here and Apple’s “Masimo SET System” primary reference in the Delaware Litigation. Abdul-Hafiz issued as U.S. Patent No. 7,096,054. Ex. 2042. And Masimo’s patent marking website states that the Abdul-Hafiz patent (U.S. Patent No. 7,096,054) covers the LNOP ADT sensor. Ex. 2043.

67. Because Abdul-Hafiz and the LNOP ADT sensor are substantially the same references, it is my opinion that both references fails to disclose or render obvious the inventions recited in the ’911 Patent claims for at least the same reasons. For example, both disclose only two LEDs, not at least three, with only two wavelengths of light, not at least three. Ex. 1004 ¶2. And both lack “only one opening through which light is configured to pass, the opening comprising an area smaller than a detection surface area” Ex. 1004, FIGS. 6A, 11B; Ex. 2044.

XI. NO GROUND ESTABLISHES OBVIOUSNESS

68. In my opinion, Apple’s Petition does not establish obviousness of any of the challenged claims of the ’911 Patent. At this preliminary stage I discuss certain problems with the Petition’s proposed obviousness arguments, but I reserve the right to provide additional analysis and identify additional deficiencies in Apple’s grounds.

A. Apple Fails To Establish Any Reference Discloses the Claimed Light Block

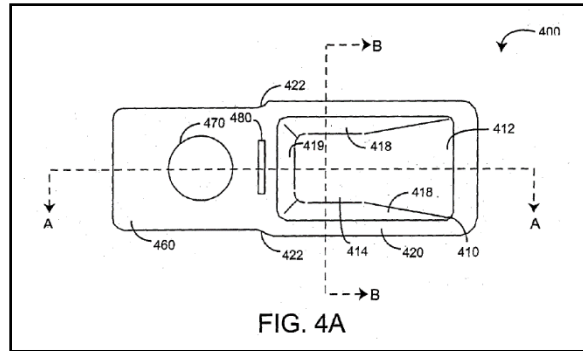
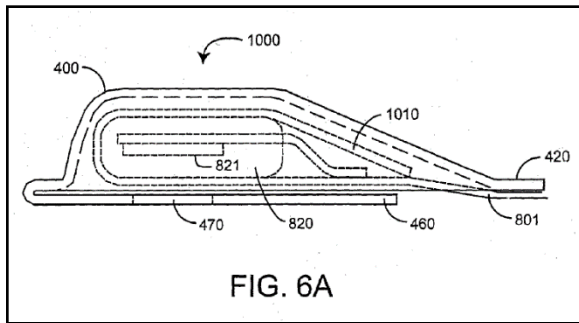
69. The independent claims recite a “light block [at least partially] surrounding the at least one detector” with numerous additional requirements.

- Claims 1 and 19 require that the “light block” has “only one opening through which light is configured to pass” to the at least one detector
- Claims 1 and 10 require that the “opening” (Claim 1) or “window” (Claim 10) has “an area smaller than a detection surface area of the at least one detector”

However, as explained below, it is my opinion that, Abdul-Hafiz does not disclose either requirement of the light block, nor would a person of ordinary skill in the art have been motivated to implement either feature in Abdul-Hafiz’s sensor. In my opinion, Grounds 1A-1B fail for the following reasons.

1. Apple Fails To Establish Any Reference Discloses A Light Block With “Only One Opening” (Claims 1, 19)

70. Abdul-Hafiz’s sensors include an optical housing (400) with an aperture (470) aligned with the photodiode (821) of the enclosed detector (820), as shown below. Ex. 1004 ¶¶37, 39, FIG. 4.

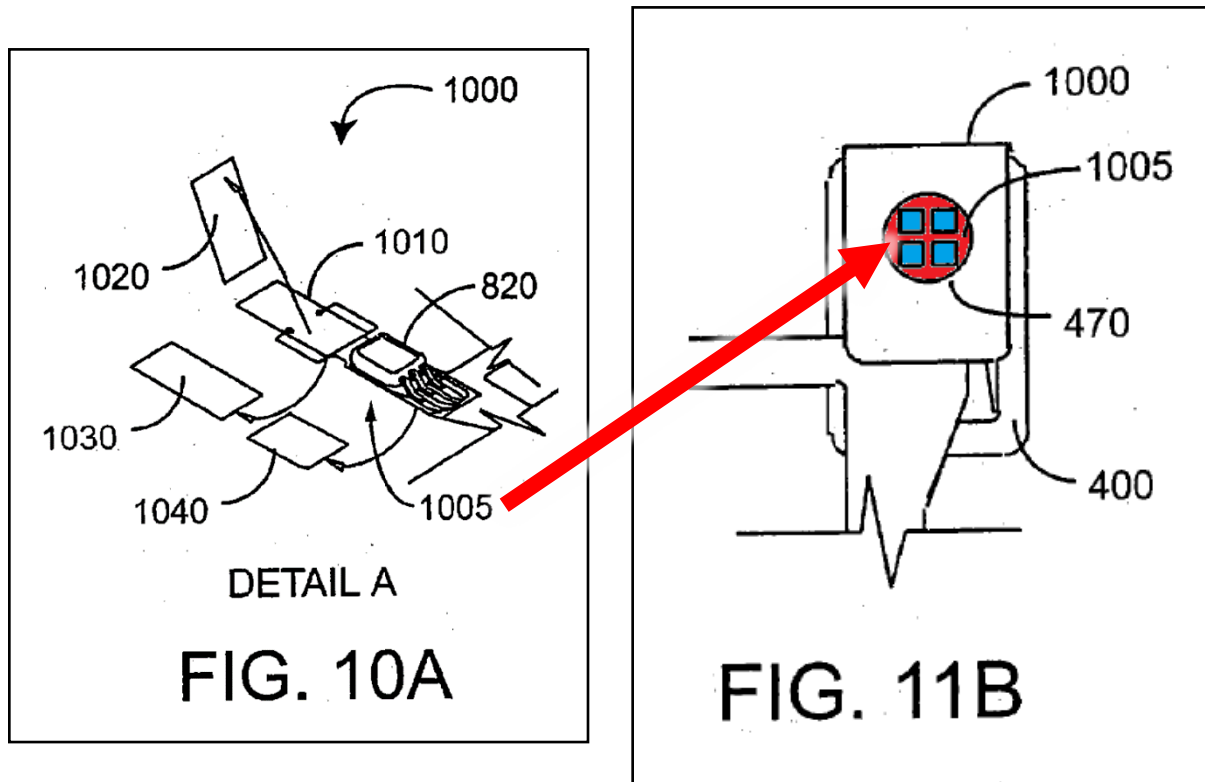


Ex. 1004, FIGS. 6A, 4A. Apple relies on optical housing (400) as the alleged “light block” and aperture (470) as the “only one opening” in its grounds. Petition at 35-43, 72-73.

71. Apple’s argument fails because Abdul-Hafiz includes more than “one opening,” *i.e.*, it has more than “only one” opening.¹ Abdul-Hafiz’s alleged light block includes four openings. The optical housing (400) includes an EMI shield (1010). Ex. 1004 ¶39, FIG. 6A. The specification explains that EMI shield (1010) has a fixed shield (1005) with four openings. *Id.* ¶47. Specifically, Abdul-Hafiz’s assembled neonate (700) and adult (750) sensors “incorporate[] a detector assembly 1000 (FIGS. 10A-C), described below, including a low noise optical housing 400 (FIGS. 6A-B), as described above.” *Id.* ¶¶40-42, FIGS. 7, 9. That optical housing (400) also includes a foldable EMI shield (1010) described with reference to FIGS.

¹ In addition, Apple relies on the ’911 Patent to support Apple’s argument that Abdul-Hafiz discloses an alleged light block with “only one opening.” Petition at 43-44. However, Apple’s reliance on the ’911 Patent is an example of its hindsight-based analysis, which I understand is improper.

10A-C as “also enclos[ing] the detector 820,” as shown above (left) in FIG. 6A. *Id.*, FIG. 6A. The EMI shield (1010) includes a fixed shield (1005), as shown below.



Id. ¶46, FIGS. 10A, 11B (excerpted). As shown above (right), the fixed shield (1005, red) has four square holes such that four corresponding square areas of the underlying photodiode (821, blue) are visible. *Id.* ¶47, FIGS. 10-11; see Petition at 65-66.

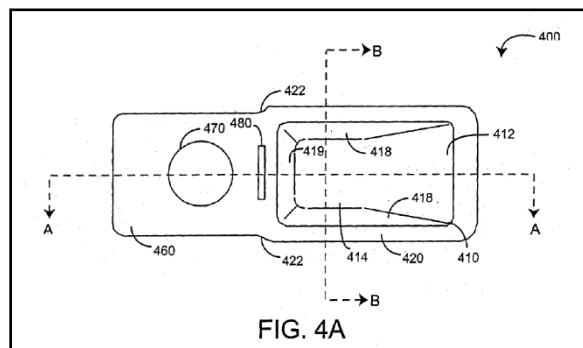
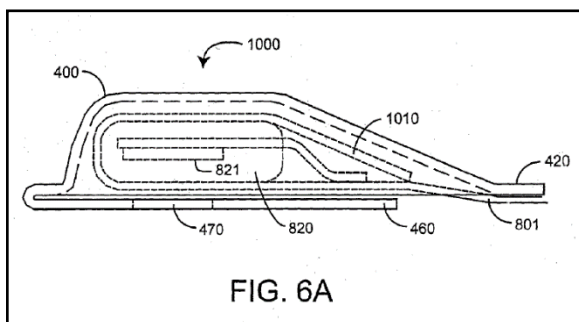
72. A person of ordinary skill in the art would have understood that detector (820) (and thus, its photodiode chip 821) was only partially obfuscated by fixed shield 1005. The '911 Patent shows that detector (820, blue above) is visible through the four openings in the fixed shield (1005, red above). *Id.*, FIG. 11B. A person of ordinary skill in the art would also have understood this because if the shield 1005

completely obfuscated the detector (820)/photodiode chip (821) such that it was no longer visible, the photodiode chip (821) would no longer be able to perform its intended purpose of detecting attenuated light from the emitter (830). *See id.* ¶2.

73. A person of ordinary skill in the art would have understood light did not pass through fixed shield (1005) itself because such EMI shielding is normally made of opaque material, such as copper or other metal. *Id.* ¶¶46-47, FIGS. 10-11. But Abdul-Hafiz shows, and a person of ordinary skill in the art would have understood, that light passed through the four holes in the shield (1005) to the photodiode (821). Ex. 1004 ¶47, FIG. 11B. Thus, a person of ordinary skill in the art would have understood that Abdul-Hafiz’s alleged light block includes *four openings* through which light is configured to pass to the detector—not “only one” as Claims 1 and 19 require.

2. Apple Fails To Establish Any Reference Discloses An Opening/Window With An Area Smaller Than A Detection Surface Area Of The At Least One Detector (Claims 1, 10)

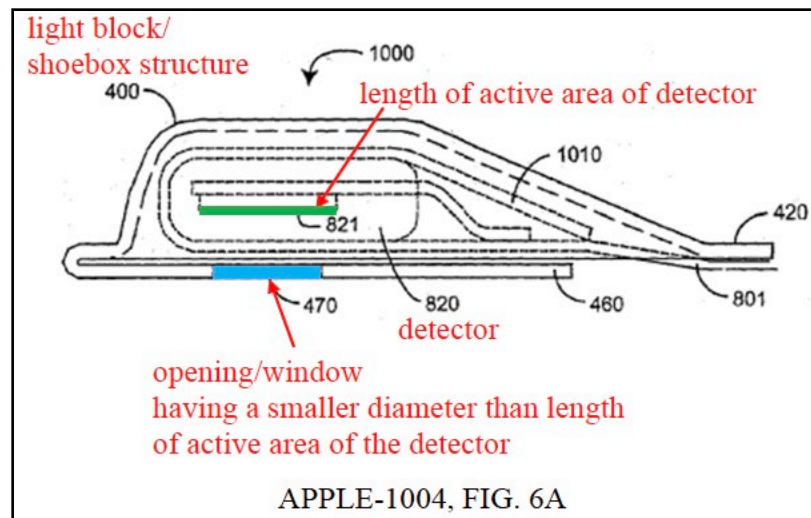
74. Apple relies on the aperture (470) in Abdul-Hafiz’s optical housing (400) as the “opening”/“window” in its grounds. Petition at 35-43, 67-69.



Ex. 1004, FIGS. 6A, 4A. But for several reasons, Abdul-Hafiz does not disclose that an “opening”/“window” with “an area smaller than a detection surface area of the at least one detector.”

a. Abdul-Hafiz’s Figures Do Not Disclose The Precise Dimensions Or Sizes Apple Relies On

75. Apple states that “Abdul-Hafiz shows figures where the aperture has a smaller diameter than the length of the active area of the detector, and thus a person of ordinary skill in the art would have understood or found it obvious that Abdul-Hafiz’s aperture [470] (opening/window) has an area smaller than the active area of the photodiode chip 821 (detection surface area).” Petition at 50.



Id., 47 (Apple’s annotations). Apple thus relies on precise dimensions and sizes inferred from Abdul-Hafiz’s figures (primarily FIGS. 6A, 10) to argue that it discloses this element. Petition at 46-51, 69. Apple is wrong about what Abdul-

Hafiz's figures disclose and, regardless, is wrong to rely on their purported disclosures.

76. A person of ordinary skill in the art would have understood that Abdul-Hafiz fails to disclose the dimensions or sizes that Apple relies on. I understand that patent drawings do not define the precise proportions of the elements and may not be relied on to show particular sizes if the specification is silent on the issue. Abdul-Hafiz's figures do not disclose an opening/window with an area smaller than a detection surface area of the detector because its specification is silent on the precise dimensions and sizes that Apple relies on.

77. Abdul-Hafiz does not explicitly disclose that its figures are drawn to scale. *See generally* Ex. 1004. Apple does not argue otherwise in its Petition. Petition at 47-51; Ex. 1003 ¶¶101-106. Therefore, Apple's reliance on Abdul-Hafiz's not-to-scale figures is incorrect. Apple and its expert have acknowledged as much. I understand that when challenging other Masimo patents, Apple and its expert have repeatedly explained the law that "***patent figures should not be interpreted as precise and drawn to scale*** unless otherwise stated." *See, e.g., Apple Inc. v. Masimo Corp.*, IPR2020-01714, Paper 20, 19 (Oct. 29, 2021); *Apple Inc. v. Masimo Corp.*, IPR2020-01714, Ex. 1047 ¶46 (Oct. 29, 2021) (same); *Apple Inc. v. Masimo Corp.*, IPR2020-01538, Paper 27, 18 (Aug. 31, 2021) (same); *Apple Inc. v. Masimo Corp.*, IPR2020-01538, Ex. 1047 ¶42 (Aug. 31, 2021) (same). Accordingly, in my opinion, Apple

cannot properly rely on Abdul-Hafiz’s figures as precise or drawn to scale, which it attempts to do in the Petition, and Apple’s reliance on Abdul-Hafiz’s figures as precise or drawn to scale does not reflect the understanding a person of ordinary skill in the art would have from Abdul-Hafiz’s figures.

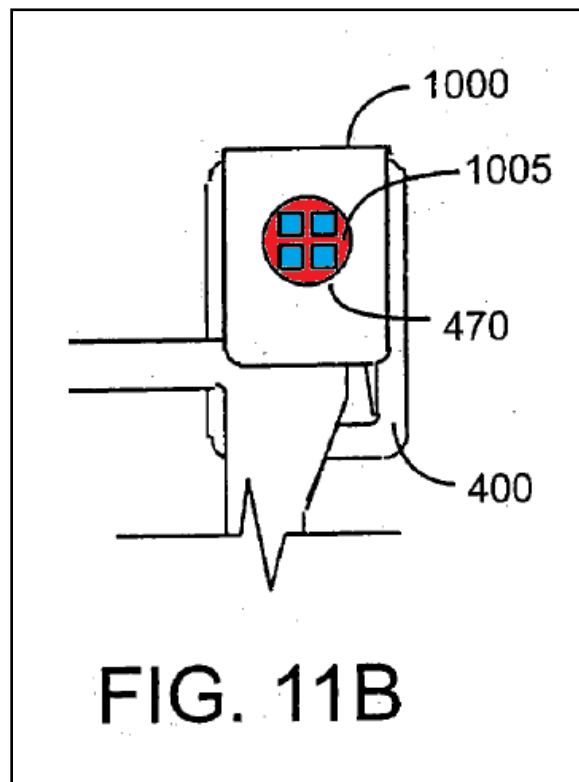
78. Additionally, Abdul-Hafiz’s specification never describes the dimensions of the features Apple relies on, i.e., the diameter of the aperture (470) and the length and width of the photodiode chip (821). Ex. 1004 ¶¶5, 7, 33-34, 37, 39, 46. It also never describes the precise sizes of those components or how those component sizes compare to one another. *Id.* Therefore, Abdul-Hafiz’s figures ***do not define the precise proportions of the elements*** and ***may not be relied on to show particular sizes*** of its aperture (470) or detector (820/821) because its specification is silent on this issue. Accordingly, in my opinion, Apple fails to show that the alleged “opening”/“window” has “an area smaller than a detection surface area of the at least one detector.”

79. Further, Apple states that FIG. 3 of Abdul-Hafiz “more clearly shows that the aperture 322 has a smaller length than the length of the detector 310.” Petition at 47-48. But FIG. 3 concerns a different embodiment—it does not include the aperture (470) and/or photodiode (821) of Apple’s “Abdul-Hafiz+Raley” combination. Ex. 1003, FIG. 3. “FIG.3 is a diagram illustrating optical noise sources and a ***prior art*** reduced noise sensor.” Ex. 1004 ¶16. And regardless, Apple does not

propose combining these different embodiments or articulate any motivation for doing so. Petition at 47-48.

b. Apple Improperly Ignores Abdul-Hafiz’s Disclosure

80. Only one figure of Abdul-Hafiz (FIG. 11B) shows both the area of the alleged “opening”/“window” (470) **and** the “detection surface area of the at least one detector” (820/821). Ex. 1004, FIG. 11B, ¶¶46-47. However, FIG. 11B shows that Abdul-Hafiz’s aperture (470) includes a fixed EMI shield (1005, red) that blocks light from reaching all but four areas of the underlying photodiode (820/821, blue). *Supra* Section XI.A.1.

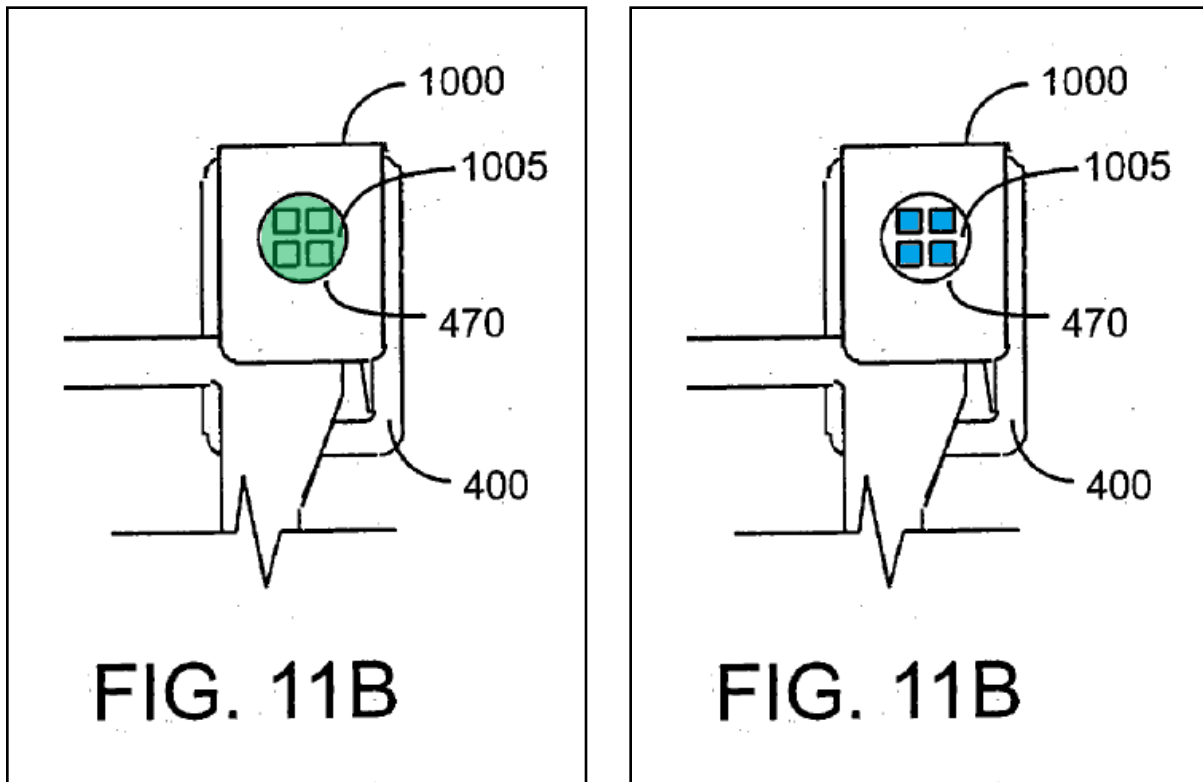


Ex. 1004, FIG. 11B. The EMI shield (1010), which includes fixed shield 1005, is directly folded over the detector (820) such that it becomes an EMI shielded detector

(820). *Id.* ¶¶46-47. A person of ordinary skill in the art would have understood that the four blue areas shown above are the detection surface area of the detector/photodiode (820/821) because the shield (1005) only permits light to reach those four areas of the detector/photodiode (820/821).

81. A person of ordinary skill in the art would have understood that detector 820 (and thus, its photodiode 821) was only partially obfuscated by fixed shield 1105. *Id.* ¶47. A person of ordinary skill in the art would have understood this because if the shield 1005 completely obfuscated the detector/photodiode (820/821) such that it was no longer visible, the detector/photodiode (820/821) would no longer be able to perform its intended purpose of detecting light from the emitter (830) that has been attenuated by tissue. *Id.* ¶3.

82. Further, as one can simply observe, and a person of ordinary skill in the art would have understood, the area of the “opening”/“window” alleged by Apple (green/left) (Petition at 48-50) is **larger** than the detection surface area (blue/right) disclosed by Abdul-Hafiz.



Ex. 1004, FIG. 11B (excerpted). A person of ordinary skill in the art would have understood the detection surface area (blue) to be approximately the same size as the four holes in the fixed shield 1005 due to fixed shield 1005's direct application onto the detector (820).

83. Apple ignores that Abdul-Hafiz's sensors include this fixed EMI shield (1005). Petition at 44-51. However, I understand that a reference must be read for all that it teaches, not selectively. Accordingly, it is my opinion that selectively ignoring Abdul-Hafiz's fixed EMI shield (1005), as Apple does in its Petition, is improper and does not reflect the understanding of that reference that a person of ordinary skill in the art would have had.

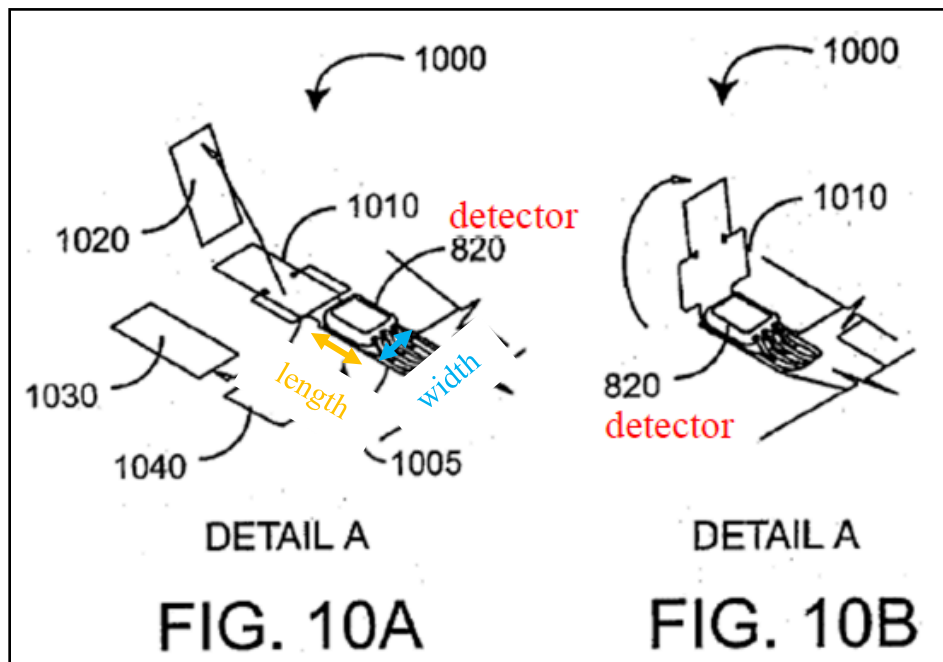
84. Accordingly, it is my opinion that Abdul-Hafiz does not disclose that the “opening”/“window” alleged by Apple has “an area smaller than a detection surface area of the at least one detector.”

**c. Apple Improperly Assumes a Detection Surface Area
From Abdul-Hafiz’s Figures**

85. Apple argues that (1) “Abdul-Hafiz shows figures [FIGS. 3, 6] where the aperture has a smaller diameter than the length of the [detection surface area] of the detector, and thus” (2) “a person of ordinary skill in the art would have understood or found it obvious that Abdul-Hafiz’s aperture (opening/window) has an area smaller than the active area of the photodiode chip 821 (detection surface area).” Petition at 46-50. However, Apple’s first argument fails because Abdul-Hafiz’s drawings do not disclose precise dimensions or sizes, as explained above. *Supra* Section XI.A.2.a.

86. Apple’s second argument is inconsistent with its first argument. Specifically, Apple’s second argument requires reading FIGS. 10A-10B of Abdul-Hafiz imprecisely (turning non-square detector 820 into a square) while Apple’s first argument requires reading FIG. 6A precisely (the diameter of the aperture (470) is smaller than the width of the detection surface area (821). Petition at 49-50. Therefore, Apple’s two arguments are inconsistent, which indicates that both arguments cannot be correct.

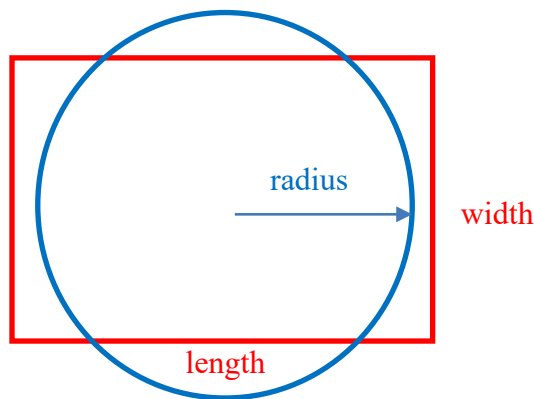
87. Apple’s second argument fails too. The figures Apple relies on to argue that Abdul-Hafiz’s aperture diameter is smaller than the length of the detection surface area show (i.e., FIGS. 3, 6) only one dimension of the detector (821)—its length. Ex. 1004, FIGS. 3, 6. Because Abdul-Hafiz does not show the width of the detector (821), Apple argues the detector is “*square* or rectangular” so that it can assume the detector’s length and width are the same. Petition at 48-50. But Apple is incorrect. Even if Abdul-Hafiz’s drawings disclosed precise dimensions or sizes (which is incorrect), FIGS. 10A-10B shows that the detector has a *non-square rectangular shape*—not a “*square or rectangular shape*” like Apple asserts.



Ex. 1004, FIGS. 10A-10B. Apple thus provides no basis for its assumption that the detection surface area of the detector (820) is a square. Apple’s unexplained

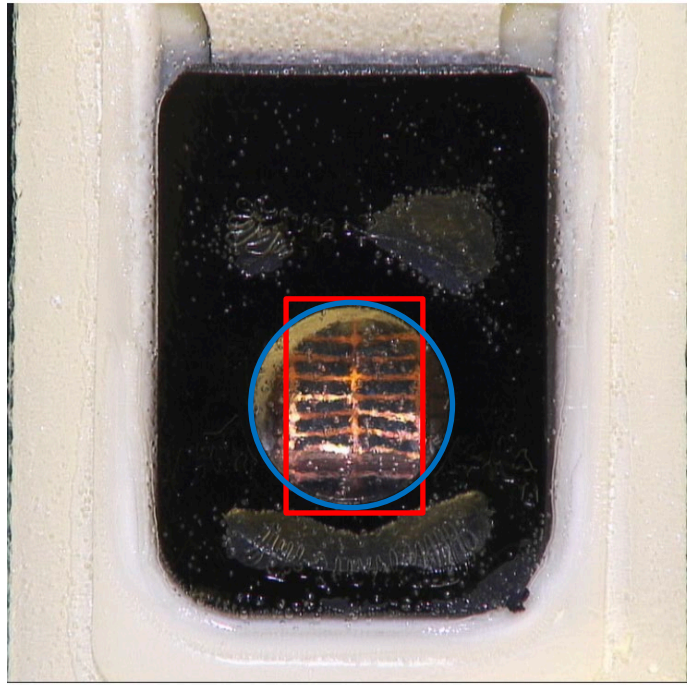
assertion that Abdul-Hafiz somehow discloses a square detector (820) reveals the underlying hindsight.

88. Further, if Abdul-Hafiz’s drawings disclosed precise dimensions or sizes (which is incorrect), FIGS. 10A-10B (above) show that the width of Abdul-Hafiz’s rectangular detector is noticeably smaller than the diameter of the aperture (470). *Id.* Thus, a person of ordinary skill in the art would have understood that Abdul-Hafiz’s aperture area (blue) is not necessarily smaller—and may be larger—than its detection surface area (red).



The above depiction of Abdul-Hafiz’s aperture (blue) relative to its detection surface area (red) accurately represents the proportions/sizes from its figures. Without explanation, Apple’s depiction of these features shows a square detector, which does not accurately depict the proportions/sizes of the detector shown in Abdul-Hafiz. Petition at 49-50. Accordingly, if Abdul-Hafiz’s drawings disclosed precise dimensions or sizes, the alleged “opening”/“window” of Abdul-Hafiz would have an area that is larger, not “smaller,” than the detection surface area. The Masimo

LNOP sensor covered by the Abdul-Hafiz patent has an aperture with an area *larger than* the detection surface area, as shown below.



Ex. 2045.

89. Apple also assumes that Abdul-Hafiz’s aperture (470) has “a diameter that is equal to or smaller than each side length of [the] square or rectangle” detection surface area. Petition at 49-50. Again, Apple is wrong, for at least the reasons explained above. Abdul-Hafiz also does not disclose a “square” detection surface area. Apple also relies on Abdul-Hafiz’s statement (regarding FIG. 6A) that “[a] detector 820 is enclosed in the optical housing 400, 500 so that the active area 821 is *aligned with* the housing aperture 470, 670.” Ex. 1004 ¶¶37, 39. But “aligned with” does not teach the shape of the detector/detection surface area or even suggest that the aperture (470) is smaller than the detection surface area. *Id.* Therefore, Apple

fails to show that the area of the Abdul-Hafiz's aperture (470) is smaller than the detector surface area (821) of its detector (820).

B. Apple Fails to Establish that a POSITA Would Have Been Motivated to Modify Abdul-Hafiz to Have Only One Opening or a Smaller Opening/Window or Reasonably Expected Such Modifications to Succeed

90. Apple fails to establish that a person of ordinary skill in the art would have been motivated to modify Abdul-Hafiz to have a light block with “only one opening” (Claims 1, 19) or an “opening”/“window” with “an area smaller than a detection surface area of the at least one detector” (Claims 1, 10), or reasonably expected such modifications to succeed. In my opinion, Grounds 1A-1B fail for these reasons.

1. Modifying Abdul-Hafiz to Have Only One Opening (Claims 1, 19)

91. Abdul-Hafiz's alleged light block does not include “only one opening,” as required by Claims 1 and 19. *Supra* Section XI.A.1. Apple does not even assert, much less show, that a person of ordinary skill in the art would have been motivated to modify Abdul-Hafiz's alleged light block to include “only one opening” or reasonably expected that modification to succeed. *See generally* Petition at 44-51. Therefore, the Petition fails to establish that Claims 1 and 19 would have been obvious to a person of ordinary skill in the art.

**2. Modifying Abdul-Hafiz to Have a Smaller
Opening/Window
(Claims 1, 10)**

92. Apple relies on Abdul-Hafiz's aperture (470) as the claimed "opening"/"window." Petition at 41-43. Apple states that a person of ordinary skill in the art "would have understood or found it obvious that Abdul-Hafiz's aperture" meets the claim language. *Id.*, 50. However, as discussed above, Abdul-Hafiz does not disclose that aperture (470) has "an area smaller than a detection surface area of the at least one detector." *Supra* Section XI.A.2. And Apple does not propose modifying Abdul-Hafiz or combining it with another reference to have a smaller "opening"/"window." Petition at 50-51.

93. Apple, therefore, does not assert, much less show, that a person of ordinary skill in the art would have been motivated to modify/combine Abdul-Hafiz to have a smaller "opening"/"window," or reasonably expected any such modification/combination to succeed. Therefore, the Petition fails to establish that Claims 1 and 10 would have been obvious to a person of ordinary skill in the art.

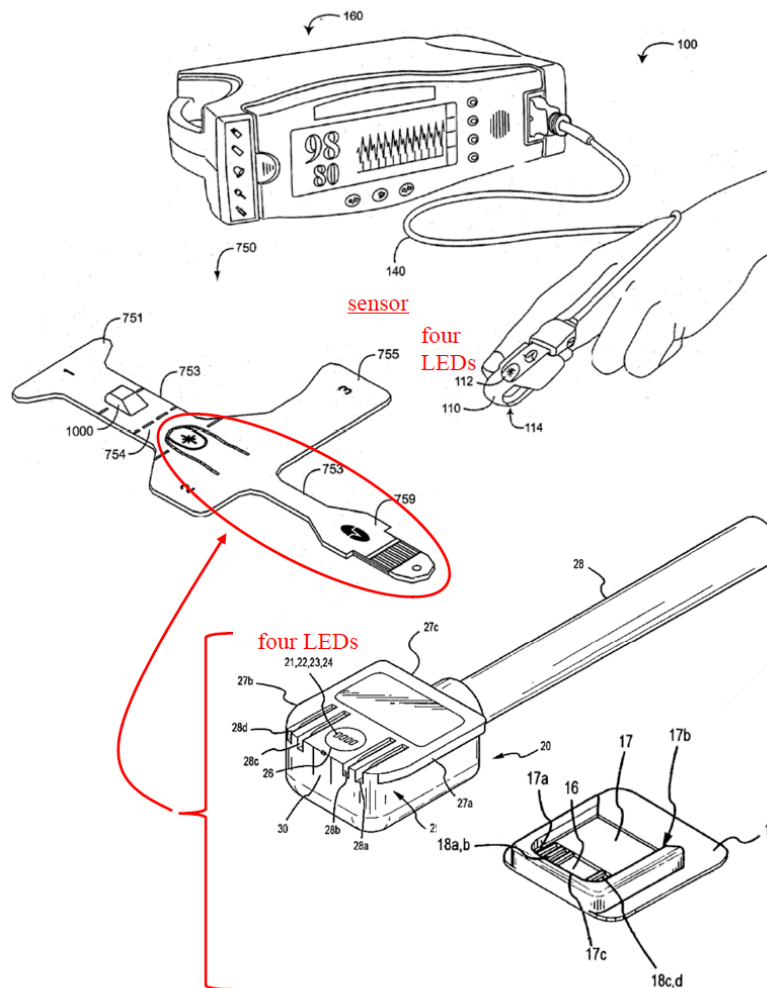
94. Accordingly, for the reasons in this Section, it is my opinion that the Petition fails to establish obviousness for Claims 1, 10, and 19 and thus Grounds 1A-1B fail.

C. The Proposed Combination Of Abdul-Hafiz And Raley Does Not Render Obvious Any Challenged Claim

95. Every independent claim requires “at least three LEDs configured to emit light of at least three different wavelengths” (Claims 1, 10) or that “at least three wavelengths of light are emitted from the at least three LEDs” (Claim 19).

96. Apple concedes that Abdul-Hafiz’s pulse oximeter has only two LEDs and only emits light of two wavelengths (“red and infrared”). Petition at 8, 19-20; Ex. 1004 ¶2. Because Abdul-Hafiz lacks the claimed LEDs, Apple proposes combining Abdul-Hafiz with Raley as shown below. Petition at 14-31. Apple asserts that (1) “measuring additional blood analytes” (namely, carboxyhemoglobin and methemoglobin)² or (2) “more accurately measuring oxygen saturation due to the presence of carboxyhemoglobin and methemoglobin in the blood in above normal levels” would have motivated combining Abdul-Hafiz with two of Raley’s LEDs (21-24). *Id.*

² Carboxyhemoglobin and methemoglobin are the only “additional” analytes Apple relies on because they are not already measured by Abdul-Hafiz’s pulse oximeter.

Abdul-Hafiz+Raley's physiological monitoring device

APPLE-1004, FIGS. 1, 7C; APPLE-1005, FIGS. 3, 1 (partial)

Id., 27.

97. Apple's arguments fail because (1) the prior art did not enable a person of ordinary skill in the art to measure carboxyhemoglobin and methemoglobin by combining Abdul-Hafiz's pulse oximeter with Raley as proposed, (2) a person of ordinary skill in the art would not have reasonably expected success in the proposed combination of Abdul-Hafiz with Raley, and (3) a person of ordinary skill in the art

would not have been motivated to combine Abdul-Hafiz with Raley as proposed.

Thus, in my opinion, Grounds 1A-1B fail for every reason in this Section.

1. The Prior Art Did Not Enable Measuring Carboxyhemoglobin and Methemoglobin By Combining Abdul-Hafiz's Pulse Oximeter With Raley As Proposed

98. I understand that the prior art must enable a person of ordinary skill in the art to make and use the specific disclosures being relied upon for obviousness. I also understand that any presumption that the prior art is enabling can be overcome by coming forward with evidence that the prior art either would not produce or would not be expected to produce the disclosure relied upon for obviousness of the claimed subject matter.

99. In the Petition, the disclosure Apple relies upon for obviousness concerns measuring carboxyhemoglobin and methemoglobin. Specifically, Apple relies on measuring carboxyhemoglobin and methemoglobin (as mentioned in Raley and some other references) as the reason to combine two of Raley's LEDs with Abdul-Hafiz's two-wavelength pulse oximeter, for a total of four wavelengths. Petition at 15-20, 25-27. However, by attempting to measure these additional analytes, Apple proposes making Abdul-Hafiz's pulse oximeter into what came to be known as a pulse ***CO-oximeter***, which is a different and much more complicated type of sensor. Ex. 1011, 45. A person of ordinary skill in the art would not have expected

to successfully measure these analytes by combining Abdul-Hafiz's pulse oximeter with two more LEDs as Apple proposes.

100. No one had developed a pulse oximeter that successfully also measured methemoglobin and carboxyhemoglobin (i.e., a pulse CO-oximeter) prior to the '911 Patent. Rather, *Masimo was the first* to make such a device, namely, the Rad-57™ pulse CO-oximeter. Ex. 2046 (March 2005 press release announcing Rad-57™ is the “**First Device** to Noninvasively Measure Carbon Monoxide in the Blood...”); Ex. 2047 (late-2006 study explaining “[t]he Masimo Rad-57 is *the first* commercially available pulse oximeter that can measure methemoglobin and carboxyhemoglobin.”). Masimo's Rad-57™ pulse CO-oximeter was not announced or released until after the '911 Patent. Ex. 2046. Additionally, a paper from “March/April 2005” acknowledged that measuring carboxyhemoglobin or methemoglobin at that time was only done invasively and required “a clinical laboratory test based on an arterial blood sample.” Ex. 2057, 129. Further, for years after the '911 Patent, Masimo's Rad-57™ remained the only pulse oximeter that could also measure carboxyhemoglobin and methemoglobin. *See, e.g.*, Ex. 2047 (2006 study); Ex. 2048 (2009 article stating that “[o]nly one prehospital device is presently capable of measuring both CO and MET: the RAD-57™....”); Ex. 2049 at 125 (2009 study). In addition, those of skill in the art recognized that a critical feature of the Rad-57™ was that it “*uses eight wavelengths of light* instead of the usual two

and is thereby able to measure more than two species of human hemoglobin.”³ Ex. 2047, 1; Ex. 2046, 1. Therefore, in my opinion, the real-world development of noninvasive monitoring confirms that a person of ordinary skill in the art at the time of the ’911 Patent would not have expected to successfully measure carboxyhemoglobin and methemoglobin by adding two LEDs (two more wavelengths) to Abdul-Hafiz’s two-wavelength pulse oximeter as Apple proposes. Any discussion of this real-world development is absent from Apple’s Petition or Dr. Kenny’s declaration. *See generally* Petition; Ex. 1003.

101. Apple generalizes that combining Abdul-Hafiz’s pulse oximeter with two more LEDs (for four total wavelengths) would have made it a “standard algebra problem” to solve four equations for four “unknowns” (“four of oxygen saturation, oxyhemoglobin, deoxyhemoglobin, carboxyhemoglobin, and methemoglobin”). Petition at 57-58. But Apple’s statement both oversimplifies the problem of combining the Abdul-Hafiz and Raley devices such that the resulting device also measured the additional blood analytes it relies on, including at least carboxyhemoglobin and methemoglobin. As explained below, Raley, Jarman, and

³ Like the Rad-57™, even Apple recognizes that the ’911 Patent describes using “*eight LEDs* ... for measuring HbCO (carboxyhemoglobin) and/or METHb (methemoglobin) in addition to SpO₂ (oxygen saturation) and pulse rate.” Petition at 4-5 (quoting Ex. 1001, 8:7-13, 2:28-30, 3:19-26).

the other prior art Apple relies on would not have enabled a person of ordinary skill in the art to successfully measure these four analytes with four wavelengths of light.

102. Apple relies on Raley (its secondary reference in Ground 1A) and Jarman (not a ground reference in Grounds 1A-1B), Petition at 15-20, 25-27, which are both Datex-Ohmeda references. *Compare* Ex. 1005, 1 *with* Ex. 1007, 1 *and* Ex. 2050. Raley mentions that its probe (40) could be used with a monitor (100) that executed “data processing instructions stored in memory ... to determine an estimate of the blood analyte levels.” Ex. 1005, 3:52-4:46. Raley also mentions that its FIG. 3 sensor embodiment with four emitters (21-24) theoretically “would be useful” in a device capable of measuring “blood analytes such as such as oxyhemoglobin, deoxyhemoglobin, carboxyhemoglobin and methemoglobin.” *Id.*, 5:63-6:2, 3:52-4:13, 1:41-45. But Raley does not disclose such a device or explain how to measure the four blood analytes it mentions using LEDs of only four different wavelengths. *See generally id.* And Jarman, like Raley, indicates to a person of ordinary skill in the art only that four LEDs of different wavelengths mathematically “could” be used to measure the concentration of four analytes—“O₂Hb [oxyhemoglobin], RHb [deoxyhemoglobin], COHb [carboxyhemoglobin], and MetHb [methemoglobin].” Ex. 1007, 3:21-27, 5:21-6:16. A person of ordinary skill in the art would not have expected success in measuring four blood analytes including carboxyhemoglobin and

methemoglobin from the vague and theoretical discussions provided in Raley and Jarman.

103. A person of ordinary skill in the art would not have expected to successfully measure four analytes including carboxyhemoglobin and methemoglobin using only four different wavelengths as Apple now proposes.

104. To begin, a person of ordinary skill in the art would have understood that measuring these four complex analyte concentrations depends on more than four variables (or “unknowns” as Apple calls them), including, as one example, the path length of light passing through tissue before being detected. Ex. 1007, 5:38-40; Ex. 2051, 8:53-60; Ex. 2052, 3:37-55. Raley does not address path length. *See generally* Ex. 1005. Further, Jarman mentions path length (ΔL) but, without explanation, assumes it is constant and then ignores it. Ex. 1007, 5:21-6:28. However, a person of ordinary skill in the art would have understood that path length readily changes for various reasons, including differences in tissue structure and motion, and therefore path length is one example of another unknown (variable) in the calculation of the multiple blood analytes that Apple proposes. Ex. 2051, 7:20-22 (explaining that changes in the scattering coefficient “may be brought about by compression of tissue or motion artifact”); 8:53-60 (“The accuracy of measurements made using pulse oximetry depends, in part, on the extent to which the paths traveled by the different colors of light are the same. The mean path length and penetration depth of light at a

particular wavelength traveling through tissue is strongly affected by the absorption and scattering coefficients of tissue at that wavelength.”); Ex. 2052, 3:37-55 (“The finger comprises skin, tissue, muscle, both arterial blood and venous blood, fat, etc., each of *which absorbs light energy differently due to different absorption coefficients, different concentrations, different thicknesses, and changing optical pathlengths.*”; “[W]hen the patient moves, perturbations such as changing optical pathlengths occur. . . . [and] [t]herefore, the measured signal becomes erratic. Erratic, motion induced noise typically cannot be predetermined and subtracted from the measured signal via traditional filtering techniques.”).

105. Apple and Dr. Kenny fail to address this unknown variable. *See generally* Petition, Ex. 1003. However, because of the number of unknown variables in the multiple blood analyte measurements that Apple proposes and the above-discussed fact that such analytes (including at least carboxyhemoglobin and methemoglobin) had never been successfully noninvasively measured at that time outside of Masimo, a person of ordinary skill in the art would not have expected the “Abdul-Hafiz+Raley” system Apple proposes to successfully measure four analytes including carboxyhemoglobin and methemoglobin at the time of the ’911 Patent.

106. Additionally, both before and after the ’911 Patent, Datex-Ohmeda’s pulse oximeters could not measure carboxyhemoglobin or methemoglobin. Ex. 2041, 1-5 (2002 manual stating “Datex-Ohmeda pulse oximeters use two

wavelengths”); Ex. 2063, 9 (2005 manual confirming Datex-Ohmeda’s pulse oximeters are “***not able to correctly measure*** oxygen content of the arterial blood at elevated carboxyhemoglobin or methemoglobin levels”); Ex. 2053, 6-5 (2007 manual confirming same). In addition, a person of ordinary skill in the art would have recognized that Datex-Ohmeda never released a device (with four wavelengths, or any number of wavelengths) that measured oxygen saturation and the analytes, including carboxyhemoglobin and methemoglobin, that Apple now relies on in its Petition. Therefore, a person of ordinary skill in the art would not have expected Apple’s proposed four-wavelength device based on Datex-Ohmeda patents (Raley, Jarman) to successfully measure those analytes.

107. Moreover, the remainder of the prior art did not enable a person of ordinary skill in the art to measure carboxyhemoglobin and methemoglobin with four wavelengths as Apple proposes. Abdul-Hafiz concerns a pulse oximeter and does not mention these other blood analytes that Apple relies on for its alleged motivations to combine. *See generally* Ex. 1004. Aoyagi and Kuenster both discuss measuring the analytes Apple proposes with five wavelengths of light, not four as Apple now proposes. Ex. 1010, 7:33-8:22, 8:47-51; Ex. 1012, 4:30-38, 5:27-29, 4:5-17. Barthelemy has three wavelengths, not four as Apple now proposes. Ex. 1008, Figure, 6:35-49. And Apple states that measuring both carboxyhemoglobin and methemoglobin (and at least two other blood analytes) with four wavelengths would

have motivated its proposed combination, but Apple overlooks that Barthelemy's device uses only three wavelengths and does not measure methemoglobin. *Id.* Further, as Jarman explains, Barthelemy's three-wavelength device was not implemented in a "commercially acceptable [PPG] device for the measurement of oxyhemoglobin, carboxyhemoglobin, and deoxyhemoglobin." Ex. 1007, 2:36-41. Apple also cites Webster. Petition at 18-20 (citing Ex. 1011). Webster, however, only mentions the project of his student (Buinevicius), which was a "three wavelength pulse oximeter" that did not calculate methemoglobin. Ex. 1011, 54-55; Ex. 2056, 3 (explaining device use "theoretical approximations and calculations"), 15 (confirming no measurement of methemoglobin).

108. Accordingly, in my opinion, a person of ordinary skill in the art would not have expected to successfully measure analytes including carboxyhemoglobin and methemoglobin (and at least two others as Apple proposes) by combining Abdul-Hafiz's two-wavelength pulse oximeter with LEDs of two more wavelengths from Raley as Apple proposes. Therefore, in my opinion, the prior art did not enable the combination Apple relies on, and thus Grounds 1A-1B fail. Further, in my opinion, Apple's assertion that a person of ordinary skill in the art would have combined Abdul-Hafiz and Raley to achieve these measurements indicates the hindsight in Apple's analysis because the same person of ordinary skill in the art would not have

expected that those analytes could be successfully measured with four wavelengths, as explained above.

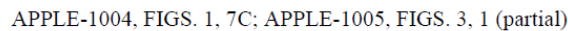
2. A POSITA Would Not Have Reasonably Expected the Proposed Combination of Abdul-Hafiz with Raley's Interconnect Cable Segment/Connector to Succeed

109. For several reasons, a person of ordinary skill in the art would not have reasonably expected Apple's proposed combination of Abdul-Hafiz and Raley to succeed.

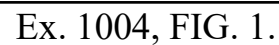
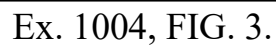
110. For the same reasons that Apple's proposed combination is not enabled, a person of ordinary skill in the art would not have reasonably expected to successfully measure methemoglobin and carboxyhemoglobin by combining Abdul-Hafiz with Raley as Apple proposes. *Supra* Section XI.C.1.

111. Additionally, a person of ordinary skill in the art would not have reasonably expected Apple's combination to succeed because the combined structure would inject sources of inaccuracy into Abdul-Hafiz's sensor.

112. Apple broadly and generically proposes combining Raley's entire interconnect cable segment (20) and connector (17) with Abdul-Hafiz, as shown below. Petition at 14-31. However, Apple never identifies where the connector (17) would supposedly be added to Abdul-Hafiz. *Id.*

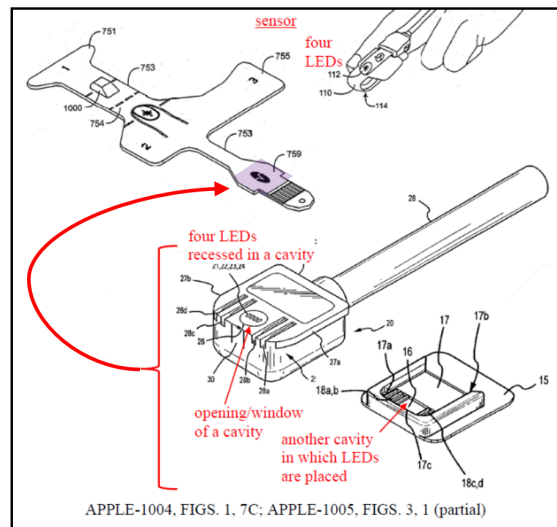


transmission pulse oximetry illustrates this:



Ex. 1004, FIGS. 3, 1. Thus, for the Abdul-Hafiz sensor to work, the light source (LEDs) must be located as indicated in Abdul-Hafiz to ensure the LEDs and detector are aligned on opposed sides of the tissue when in use. *Id.*

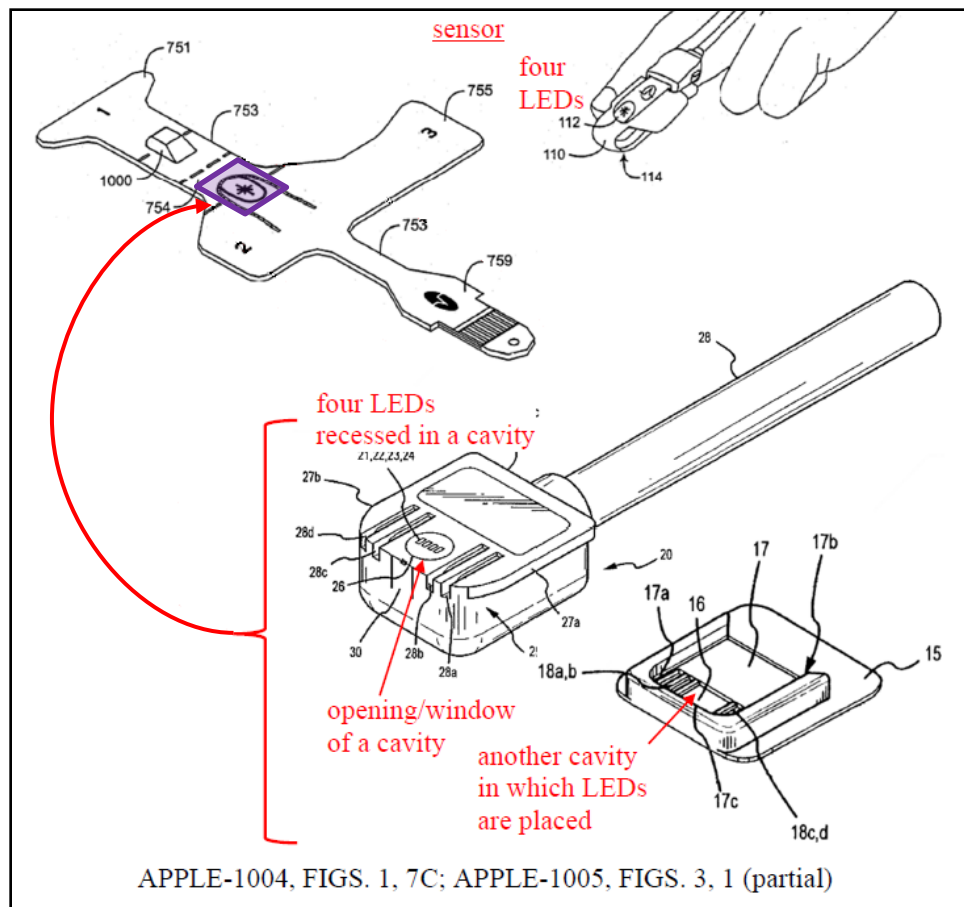
113. Conversely, if LEDs were positioned on Abdul-Hafiz's connector end (759, indicated with purple below), the LEDs would no longer be aligned with the detector when the sensor was attached to the user's finger.



APPLE-1004, FIGS. 1, 7C; APPLE-1005, FIGS. 3, 1 (partial)

Petition 27 (excerpt).

Thus, a person of ordinary skill in the art would have understood that if Abul-Hafiz and Raley were combined (which they would not be), Raley's connector (17) would be located where Abdul-Hafiz's existing LEDs are (purple, as shown below) to ensure that when Raley's interconnect cable segment (20) is secured in the connector (17), the LEDs within the interconnect cable segment (20) were aligned with Abdul-Hafiz's



Petition at 27 (modified excerpt).

114. A person of ordinary skill in the art would not have reasonably expected Apple's proposed combination to succeed. As shown above (upper left), Abdul-Hafiz purposefully separates the sensor portion of the device (the detector (1000) and LEDs (purple)) from the end (connector end (759)) that connects to the patient cable with a flexible body (703 in FIG. 7A; 753 in FIG. 7C). Ex. 1004 ¶¶39-42, FIGS. 7A-7C. A person of ordinary skill in the art would have understood that this flexible body region acts as a buffer between the patient cable (140) and the sensor, accommodating, absorbing, and thus reducing much of the force that would otherwise

be applied to the sensor by the cable. *Id.* A person of ordinary skill in the art would have also understood that if force from the patient cable were able to move the sensor relative to the patient's tissue, that could change the amount of light that is attenuated by tissue or change the path length of emitted light before it is detected, thereby introducing measurement error. Ex. 2057, 128 ("Motion artifact is the most common cause of unreliable readings resulting in a high incidence of false positive alarms."). Therefore, a person of ordinary skill in the art would have understood that the existing configuration of Abdul-Hafiz avoided or reduced such measurement errors.

115. Combining Raley's connector (17) and cable segment (20) with Abdul-Hafiz would eliminate this benefit. Raley's cable segment (20) with its LEDs (21-24) fits into Raley's connector (17). Ex. 1005, FIGS. 1-4, 5:35-62. But Raley's patient cable (28) attaches *directly* to the portion of Raley's device containing its LEDs (21-24)—Raley's interconnect cable segment (20). *Id.* Therefore, in Apple's proposed combination, the patient cable and Raley's bulky interconnect cable segment (20) would be attached directly to the portion of the Abdul-Hafiz sensor holding the LEDs, which would eliminate the force absorbing/reducing buffer previously provided by separating these components with the flexible body of Abdul-Hafiz's device. Ex. 1004, FIGS. 7A-7C; Ex. 1005, FIGS. 1-4. The LEDs of Apple's proposed combination device would, therefore, be directly exposed (and more susceptible) to forces imposed by the patient cable onto the sensor without any

mitigation, leading to sensor motion. *Id.*; Ex. 2057, 128. Specifically, Apple’s proposed combination would allow the LEDs to easily move relative to the patient’s tissue when subjected to forces from the patient cable, causing the associated measurement errors that I have described above. Ex. 1004, FIGS. 7A-7C; Ex. 1005, FIGS. 1-4; Ex. 2057, 128 (explaining that motion-induced error is caused by “mechanically altering the distance between the LEDs and the detector”). Therefore, a person of ordinary skill in the art would not have been motivated to make Apple’s proposed combination of Abdul-Hafiz with Raley or expected it to succeed because he or she would have understood that the proposed combination introduces a source of error into the sensor of Abdul-Hafiz. *Id.*

116. Further, a person of ordinary skill in the art would not have reasonably expected success in the proposed combination of Abdul-Hafiz and Raley because *no one*, not even Datex-Ohmeda (the company behind Raley and Jarman), successfully developed a device that could measure oxygen saturation, carboxyhemoglobin, and methemoglobin prior to before the ’911 Patent. *Supra* Section XI.C.1.

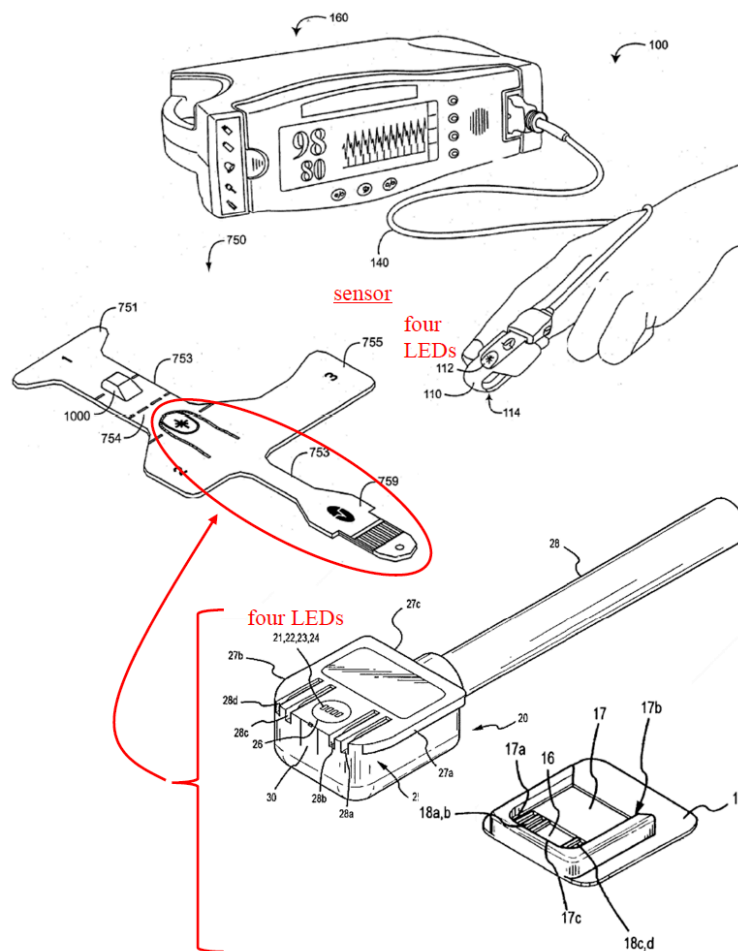
3. A POSITA Would Not Have Been Motivated to Combine Abdul-Hafiz With Raley as Proposed

117. A person of ordinary skill in the art would not have been motivated to combine Abdul-Hafiz with Raley as Apple proposes for at least the reasons that a person of ordinary skill in the art would not have been able to measure or reasonably expected success in measuring carboxyhemoglobin and methemoglobin with Apple’s

proposed combination. *Supra* Sections XI.C.1-2. A person of ordinary skill in the art also would not have been motivated to combine Abdul-Hafiz with Raley as Apple proposes for the reasons explained below.

a. Apple Fails to Provide a Motivation to Combine Abdul-Hafiz With Raley’s Entire “Interconnect Cable Segment” and “Connector” As Proposed

118. Raley describes a probe (40) with an interconnect cable segment (20) containing emitters (21-24) that “may be [LEDs].” Ex. 1005, 3:63-4:3, 2:33-37. The interconnect cable segment (20) removably attaches to a separate connector (17) that is secured to the substrate (12) worn by the user. *Id.*, 5:27-38. Because Abdul-Hafiz lacks the claimed LEDs, Apple proposes combining Abdul-Hafiz with two of Raley’s LEDs (21-24). Petition at 14-31. But, in addition to Raley’s LEDs (21-24), Apple also combines Raley’s *entire interconnect cable segment* (20) **and** *separate connector* (17) with Abdul-Hafiz, as shown below.

Abdul-Hafiz+Raley's physiological monitoring device

APPLE-1004, FIGS. 1, 7C; APPLE-1005, FIGS. 3, 1 (partial)

Id., 27.

119. Apple never articulates a motivation to also combine Abdul-Hafiz with Raley's *entire interconnect cable segment* (20) and *separate connector* (17) as it proposes. *Id.*, 14-31. Instead, Apple assumes these peripheral features of Raley would have been included when combining Abdul-Hafiz with two of Raley's LEDs without explanation, and asserts that the resulting combination meets other elements. *Id.*, 29-30 ("[I]n the Abdul-Hafiz+Raley's system, the four LEDs are recessed into a cavity."). The unexplained aspects of Apple's combination and Apple's unexplained

motivations shows its analysis is based on hindsight. Accordingly, in my opinion, Apple fails to provide, much less show, a motivation to combine Abdul-Hafiz with Raley as it proposes, and Grounds 1A-1B fail for this reason.

b. “Measuring Additional Blood Analytes” Contradicts Abdul-Hafiz’s Purpose And Would Not Have Motivated The Proposed Combination

120. Apple asserts that measuring two additional blood analytes—carboxyhemoglobin and methemoglobin—would have motivated a person of ordinary skill in the art to combine Abdul-Hafiz with Raley as proposed. Petition at 18-20, 25-27. But for multiple reasons, Apple fails to establish that measuring these additional analytes would have motivated the combination it proposes.

121. Apple speculates that “[a]n accurate measurement of carboxy[*]*hemoglobin [*sic*] ... *may* be needed when the patient is a smoker or if carbon monoxide poisoning is suspected” and “elevated methemoglobin levels in the blood *can* be caused by various medications, illegal drugs, and certain pathological conditions such as sickle cell anemia.” *Id.* However, in my opinion, Apple’s assertions that these other measurements may, can, or could be useful do not show that a person of ordinary skill in the art *would have been motivated* to combine these functionalities with Abdul-Hafiz.

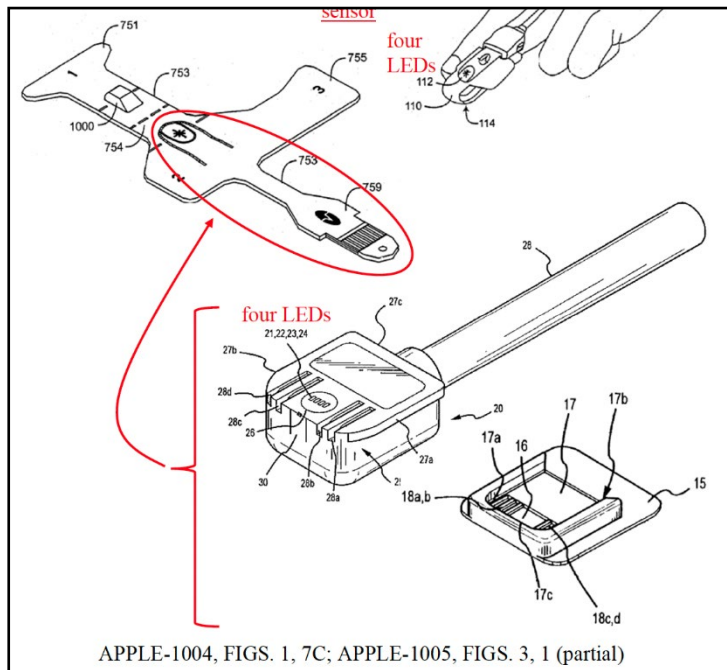
122. Apple also argues that a person of ordinary skill in the art would have been motivated to combine Abdul-Hafiz’s pulse oximeter with two LEDs (two more

wavelengths) from Raley because doing so could be “useful” in certain fringe cases (e.g., “when the patient is a smoker” or has taken “illegal drugs”) where carboxyhemoglobin or methemoglobin levels may be “elevated.” Petition at 18-20. But as explained above, a person of ordinary skill in the art would not have expected Apple’s proposed combination to successfully measure carboxyhemoglobin and methemoglobin. *Supra* Section XI.C.2. Therefore, for at least those reasons, it is my opinion that a person of ordinary skill in the art would not have been motivated to combine Abdul-Hafiz with Raley as Apple proposes to measure elevated levels of carboxyhemoglobin and methemoglobin.

123. Additionally, Abdul-Hafiz, like the Masimo LNOP sensor it covers, was intended to be a low-cost disposable sensor. Ex. 1004, FIGS. 7A-7C, claim 20 (“20. The optical housing according to claim 17 further comprising a flange means disposed around said cover means adapted to attach said housing to a tape stock layer of a disposable sensor.”); Ex. 2038. Low-cost disposable sensors were preferable to hospitals because they reduced the risk of cross-contamination between patients. Ex. 2058; Ex. 2067, 5:34-38; Ex. 1005, 1:22-25. Another advantage was that disposable sensors like Abdul-Hafiz reduced the logistical complexity of patient care—the sensor could simply be thrown away rather than cleaned, tracked, stored, and reused. Ex. 2067. A person of ordinary skill in the art would have known that

Abdul-Hafiz, like the Masimo LNOP, accurately measured oxygen saturation while keeping costs low enough to achieve the benefits of a disposable sensor.

124. Apple’s proposed combination (below, right) would frustrate this purpose of Abdul-Hafiz. Apple’s proposal to combine Abdul-Hafiz with two of Raley’s LEDs, the entire “interconnect cable segment” (20) housing those LEDs and its connector (17), as well as “two more sets of circuits and [processing] instructions” (Petition at 14-20) would have increased the cost and complexity of Abdul-Hafiz’s sensor. Abdul-Hafiz’s design avoided such needless cost and complexity by including the LEDs inside the flexible fabric of the sensor. Ex. 1004, FIGS. 1, 7C. Further, including the LEDs in a separate, bulky, reusable component (cable segment (20))



as Apple proposes would require part of the resulting device to be inspected and cleaned between patients, eliminating the utility of Abdul-Hafiz being a fully disposable sensor. *Id.* Thus, a person of ordinary skill in the art would not have been motivated to combine Abdul-Hafiz with Raley as proposed. *Henny Penny*, 938 F.3d at 1332 (affirming PTAB’s finding of no motivation to combine where combination

“would introduce ‘additional plumbing and complexity’ and lead to ‘decreased efficiency.’”).

**c. “More Accurately Measuring Oxygen Saturation”
Would Not Have Motivated The Proposed Combination**

125. Apple’s argues that “compensat[ing] for errors in the measurement of oxygen saturation due to the presence of carboxyhemoglobin and methemoglobin” would have motivated a person of ordinary skill in the art to combine Abdul-Hafiz and Raley. Petition at 18. But for numerous reasons, Apple is incorrect.

126. A person of ordinary skill in the art would not have been motivated to combine Abdul-Hafiz with Raley to somehow compensate for carboxyhemoglobin and methemoglobin levels because a person of ordinary skill in the art would not have expected Apple’s proposed combination to successfully measure either of these analytes. *Supra* Section XI.C.2.

127. Further, person of ordinary skill in the art would have known that measuring carboxyhemoglobin and methemoglobin could not be used to improve the accuracy of oxygen saturation measurements because the achievable error in carboxyhemoglobin and methemoglobin measurements is ***larger than*** the achievable error in oxygen saturation measurements. In the only device that could actually measure these parameters around the time of the ’911 Patent (i.e., Masimo’s Rad-57™ pulse CO-oximeter, discussed above), the error for measuring carboxyhemoglobin (SpCO) of $\pm 3\%$ was greater than the error for measuring oxygen

saturation (SpO₂) of $\pm 2\%$. Ex. 2059 (Rad-57™ manual); Ex. 2060 (2013 study finding “*clearly, measurement of SpCO is less accurate than for SpO₂*”). Accordingly, a person of ordinary skill in the art would not have had the motivation Apple suggests because he or she would have known that a source of even greater error could and would not be used to improve the accuracy of oxygen saturation measurements. Therefore, in my opinion, it is not surprising that Apple’s Petition does not explain how measuring carboxyhemoglobin and methemoglobin could somehow improve oxygen saturation measurement accuracy. *See generally* Petition.

128. Additionally, Apple assumes there was an accuracy problem with Abdul-Hafiz’s oxygen saturation measurements. Petition at 18-20. But that is incorrect. Abdul-Hafiz covers the Masimo LNOP sensor, as explained above. *Supra* Section X. And the accuracy of the Abdul-Hafiz design—Masimo’s LNOP sensors—was known among persons of ordinary skill in the art and highly regarded in the industry. A Masimo SET publication that Apple relies upon elsewhere shows a Masimo LNOP sensor in explaining that “more than 60% of the world’s pulse oximetry manufacturers have licensed Masimo SET technology to make Signal Extraction Pulse Oximetry available to clinicians worldwide.” Ex. 2061 (Masimo SET Publication) at 3 (“Over 40 clinical studies have been published and presented in internationally respected forums documenting the significantly superior performance of Masimo SET Pulse Oximetry.”; showing Masimo SET outperformed

competitors; “This [Masimo SET] technology is most impressive and should be valuable in all oximeters.”; “Masimo SET should become the ‘Dolby’ of pulse oximeters.”), 5 (“Masimo SET should clearly become the new standard for pulse oximetry.”). Other documents confirm the accuracy of the LNOP sensors. *See, e.g.*, Ex. 2038 (Masimo LNOP brochure) at 1 (“Masimo SET – offering the best performing pulse oximetry system for your hospital.”), 2 (The signal integrity of Masimo LNOP sensors and the advanced signal processing of Masimo SET combine to provide accurate and reliable tracking of the patient’s true physiology, even during motion and low perfusion.”; “Masimo SET pulse oximetry provides accurate monitoring for all levels of patient care.... Clinicians can rely upon accurate measurements and true alarms from a trustworthy source.”); Ex. 2062 (Masimo SET technical bulletin) at 1 (“The superior performance of Masimo SET pulse oximetry has been clinically validated. The table below summarizes the results of one such study.”). In view of the widely acclaimed accuracy of the Abdul-Hafiz sensor design, a person of ordinary skill in the art would not have been motivated to combine Abdul-Hafiz with Raley (in any way) to somehow improve measurement accuracy.

129. Further, in my opinion, Apple’s assertion in the Petition that solving an oxygen saturation accuracy problem with Abdul-Hafiz that did not exist with an unexplained “compensation” based on carboxyhemoglobin and methemoglobin levels shows the hindsight in Apple’s (and Dr. Kenny’s) analysis. Overall, Apple’s

“improve the accuracy” motivation amounts to a generic and theoretical benefit or the possibility of achieving a beneficial result, which would not have motivated a person of ordinary skill in the art to make the combination Apple proposes.

130. Moreover, Apple’s proposed combination is based on Raley, which is a Datex-Ohmeda reference as explained above. Petition at 23-30; Ex. 1005. But a person of ordinary skill in the art would have recognized that Datex-Ohmeda’s pulse oximeters were calibrated to be “more insensitive to changes of carboxyhemoglobin and methemoglobin concentrations in blood.” Ex. 2063, 9. Given that devices like Raley were “more insensitive” to carboxyhemoglobin and methemoglobin, Apple fails to explain why a person of ordinary skill in the art still would have been motivated to combine Abdul-Hafiz with Raley to “compensate for errors in the measurement of oxygen saturation due to [these analytes].” Petition at 14-31. In view of the acclaimed accuracy of Abdul-Hafiz’s sensor design and Raley’s calibration, a person of ordinary skill in the art would not have been motivated to combine Abdul-Hafiz with Raley (in any way) to somehow improve measurement accuracy.

131. For at least the reasons in this Section, it is my opinion that a person of ordinary skill in the art would not have been motivated to combine Abdul-Hafiz and Raley as Apple proposes, and thus Grounds 1A-1B fail.

D. Objective Indicia of Nonobviousness Warrants Denying Institution

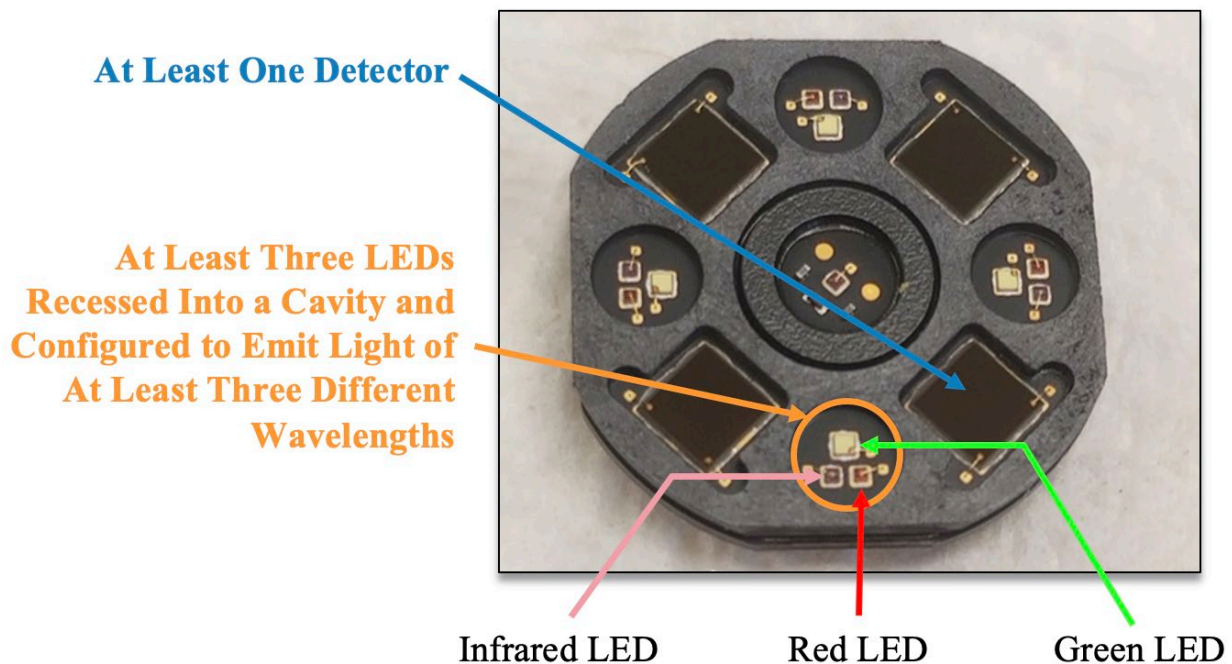
132. I understand that in the Delaware Litigation, Masimo identified objective indicia of nonobviousness for the claims of the '911 Patent. Ex. 2064. However, Apple and Dr. Kenny did not address that evidence here. *See generally* Petition; Ex. 1003.

133. I understand that Masimo presented evidence in the Delaware Litigation that the Apple Watch Series 6, 7, 8, 9, Ultra, and Ultra 2 accused of infringing the '911 Patent have been commercially successful since their release (which started with Apple Watch Series 6 in September 2020). *See* EX2064. There is a nexus between the commercial success of those accused products and the '911 Patent claims because the accused Apple Watches embody the claimed features, as shown below with respect to Claim 1 of the '911 Patent.

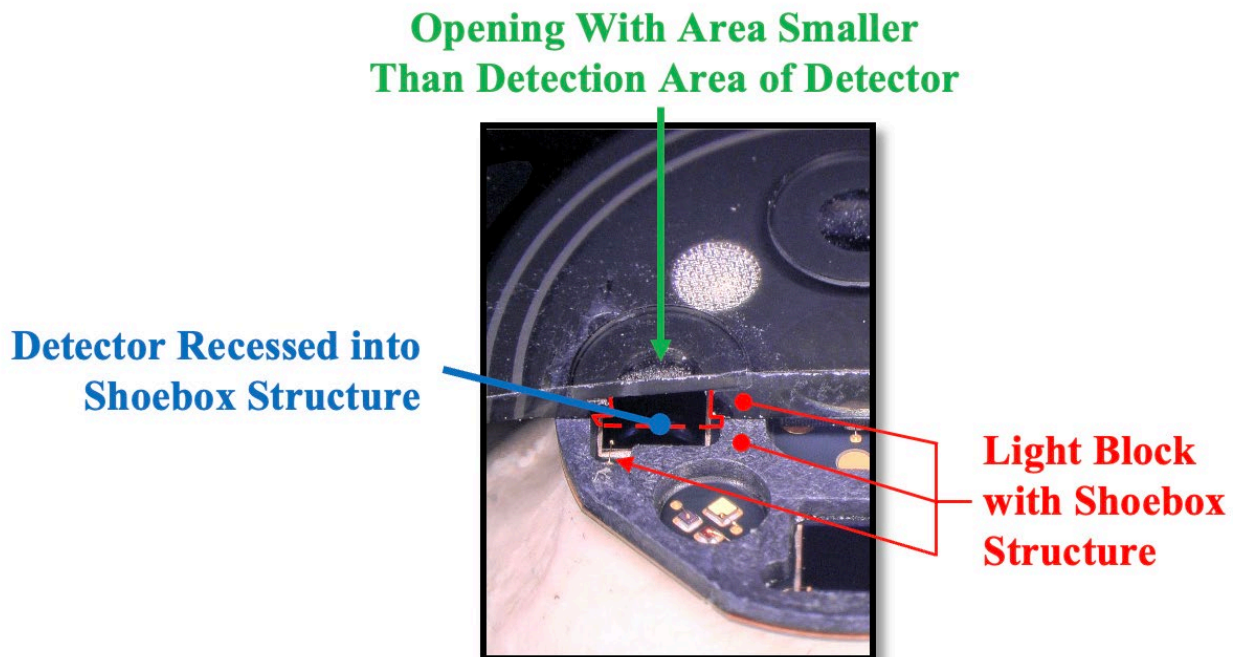


**Physiological Monitoring Device
with Processor Configured to
Receive Detector Signals and
Determine Physiological Parameter
of User Responsive to those Signals**

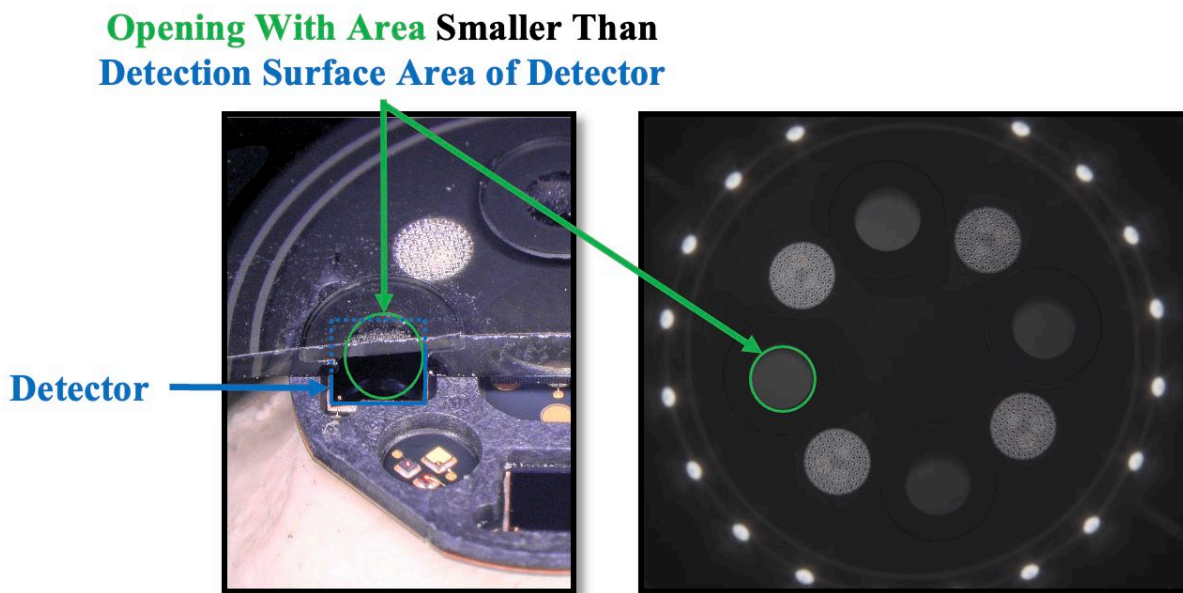
Ex. 2077 (part 3) at 2:44; *see generally id.* (discussing and showing operation of accused blood oxygen feature).



Ex. 2054 at 4.



Ex. 2055 at 2.



Id. (left); Ex. 2077 (part 1) at 0:21 (right). Accordingly, the commercial success of Apple's accused Apple Watch products (the first of which (Apple Watch Series 6) was released in September 2020) supports my opinion that the devices and methods

recited in the challenged claims would not have been obvious to a person of ordinary skill in the art over fifteen years earlier in March 2005.

E. Ground 1B Fails For At Least The Same Reasons As Ground 1A

134. For at least the reasons discussed above that Ground 1A of the Petition does not establish that independent Claims 1, 10, and 19 of the '911 Patent would have been obvious to a person of ordinary skill in the art over the asserted references, it is my opinion that the Petition also does not to establish obviousness as to any of the challenged claims addressed in Ground 1B (Claims 2-4, 11-13, and 23-25, all of which are dependent claims).

XII. CONCLUSION

135. For at least the reasons I have explained, Apple's Petition does not show that any of the challenged claims of the '911 Patent would have been obvious to a person of ordinary skill in the art at the relevant time in March 2005.