IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

Omni MedSci, Inc., Plaintiff/Counter-Defendant, vs. Apple Inc. Defendant/Counter-Claimant.	Civil Action No. 2:18-cv-00134 Jury Trial Demanded

DEFENDANT'S INVALIDITY CONTENTIONS

Pursuant to the Docket Control Order (DI 48) and L.R. 3-3 and 3-4, Defendant Apple Inc. ("Apple") hereby provides its initial invalidity contentions relating to the Asserted Claims[1] for which plaintiff Omni MedSci, Inc. ("Omni") provided infringement contentions.

Apple's invalidity contentions are based on its present knowledge and information. However, discovery and Apple's investigation are ongoing, and Apple reserves all rights to modify and supplement these contentions without prejudice in the event that additional invalidity grounds, or additional evidence in support of the existing grounds, are identified. For example, Apple reserves its right to modify its contentions based on any additional prior art production by Omni or by third parties. Additionally, Apple reserves the right to modify its contentions in light of the Court's claim constructions. Apple further reserves the right to modify its contentions, including the right to identify additional prior art references, to the extent it is determined that any of the Asserted Patents are entitled to a priority date that is different from the earliest priority

[1] The patents identified in Omni's complaint are U.S. Patent Nos. 9,651,533 (the "'533 patent"), 9,757,040 (the "'040 patent"), 9,861,286 (the "'286 patent"), and 9,885,698 (the "'698 patent) (collectively, the "Asserted Patents"). The Asserted Claims are identified in the table in § I.A., below.

date claimed on the face of the Asserted Patents. Moreover, Apple reserves the right to assert the defense of prosecution laches based upon ongoing and future discovery.

Further, Apple's invalidity contentions may be based, in part, on Omni's view of the scope of the Asserted Claims as reflected in its infringement allegations, to the extent they are understood. However, Apple's contentions are not, and should in no way be seen as, admissions or adoptions as to any particular claim scope or construction, or an admission that any particular element is met in any particular way. Apple objects to any attempt to imply claim constructions from these contentions. To the extent Apple's invalidity contentions may take into account Omni's improper assertions of infringement and improper applications of the claims, Apple does not agree with Omni's application of the claims and denies infringement, and Apple's identification of prior art similar to the accused products is not an admission that the accused products practice the claims. Further, to the extent an accused product or feature comprises or arises from prior art, Apple contends, without admitting purported infringement, that the Asserted Patents are anticipated and/or made obvious in light of that prior art and Omni's own infringement allegations.

Apple's provision of these invalidity contentions is not an admission that Omni's current infringement allegations are proper, and Apple reserves all rights and objections with respect to Omni's infringement allegations.

In those instances where Apple asserts that the claims are invalid under 35 U.S.C. § 112 (*e.g.*, no written description, not enabled, and/or indefinite), Apple has applied the prior art in part in accordance with Apple's assumption that Omni contends those claims are definite, do find written description support in, and are enabled by the Asserted Patents. In particular, where Apple contends that a claim is indefinite under 35 U.S.C. § 112, Apple has prepared prior art

charts for the claim based in part on Omni's current infringement allegations (to the extent Apple can understand them). Apple's charting of prior art does not represent Apple's agreement or view as to the meaning, definiteness, written description support for, or enablement of any claim contained therein, or that any of the Asserted Patents adequately discloses structures corresponding to functions in claims governed by 35 U.S.C. § 112 ¶ 6.

I. Invalidity Contentions

A. Identification of Prior Art

Apple intends to rely upon at least the prior art references identified in the exhibits listed in the table below ("the Invalidity Exhibits"). The Invalidity Exhibits provide the full identity of each item of prior art.

Reference	Prior Art Status	Exhibit
Exemplary Obviousness Combinations	N/A	A-1 thru A-4
U.S. Patent No. 8,172,761 to Rulkov et al. ("Rulkov").	Rulkov was filed on October 4, 2011 and issued on May 8, 2012. It is prior art under at least 35 U.S.C. §§ 102(a), (b), and (e) (pre-AIA) and 35 U.S.C. § 102(a), (b), (d) (post-AIA).	B-1 thru B-4
U.S. Patent No. 7,648,463 to Elhag et al. ("Elhag").	Elhag issued on January 19, 2010. It is prior art under at least 35 U.S.C. §§ 102(a) and (b) (pre-AIA) and 35 U.S.C. § 102(a) and (b) (post-AIA).	C-1 thru C-4
U.S. Patent No. 5,795,300 to Bryars ("Bryars").	Bryars issued on August 18, 1998, and is prior art under at least 35 U.S.C. §§ 102(a) and (b) (pre-AIA) and 35 U.S.C. § 102(a) and (b) (post-AIA).	D-1 thru D-4
U.S. Patent No. 8,954,135 to Yuen et al. ("Yuen").	Yuen was filed on June 24, 2013, claims priority back to June 22, 2012, and issued on February 10, 2015. Yuen is prior art under at least 35 U.S.C. §§ 102(a) and (e) (pre-AIA) and 35 U.S.C. § 102(a) and (d) (post-AIA).	E-1 thru E-4
U.S. Patent No. 6,731,967 to Turcott ("Turcott").	Turcott issued on May 4, 2004, and is prior art under 35 U.S.C. §§ 102(a) and (b) (pre-AIA) and 35 U.S.C. § 102(a) and (b) (post-AIA).	F-1 thru F-4

Reference	Prior Art Status	Exhibit
U.S. Patent No. 8,755,871 to Weng et al. ("Weng").	Weng was filed November 30, 2011, and issued on June 17, 2014. It is prior art under 35 U.S.C. §§ 102(a), (b), and (e) (pre-AIA) and 35 U.S.C. § 102(a), (b), (d) (post-AIA).	G-1 thru G-4
U.S. Patent No. 8,315,682 to Such et al. ("Such").	Such was filed on December 5, 2005, and issued on November 20, 2012. It is prior art under 35 U.S.C. §§ 102(a), (b), and (e) (pre-AIA) and 35 U.S.C. § 102(a), (b), (d) (post-AIA).	H-1 thru H-4
U.S. Patent No. 6,708,048 to Chance ("Chance").	Chance issued on March 16, 2004, and is prior art under 35 U.S.C. §§ 102(a) and (b) (pre-AIA) and 35 U.S.C. § 102(a) and (b) (post-AIA).	I-1 thru I-4
U.S. Patent No. 6,701,170 to Stetson ("Stetson").	Stetson issued on March 2, 2004, and is prior art under 35 U.S.C. §§ 102(a) and (b) (pre-AIA) and 35 U.S.C. § 102(a) and (b) (post-AIA).	J-1 thru J-4
U.S. Patent No. 9,179,876 to Ochs et al. ("Ochs").	Ochs was filed on April 30, 2012, and issued on November 10, 2015. Ochs is prior art under 35 U.S.C. §§ 102(a), (b), and (e) (pre-AIA) and 35 U.S.C. § 102(a), (b), (d) (post-AIA).	K-1 thru K-4
U.S. Patent No. 6,031,603 to Fine et al. ("Fine").	Fine issued on February 29, 2000, and is prior art under 35 U.S.C. §§ 102(a) and (b) (pre-AIA) and 35 U.S.C. § 102(a) and (b) (post-AIA).	L-1 thru L-4
U.S. Patent No. 5,368,224 to Richardson et al. ("Richardson").	Richardson issued on November 29, 1994 23, 1999, and is prior art under 35 U.S.C. §§ 102(a) and (b) (pre-AIA) and 35 U.S.C. § 102(a) and (b) (post-AIA).	M-1 thru M-4
U.S. Appl. Pub. No. 2005/0049468 to Carlson et al. ("Carlson").	Carlson was published on March 3, 2005, and is prior art under 35 U.S.C. §§ 102(a) and (b) (pre-AIA) and 35 U.S.C. § 102(a) and (b) (post-AIA).	N-1 thru N-4
U.S. Appl. Pub. No. 2005/0209516 to Fraden ("Fraden").	Fraden was published on September 22, 2005, and is prior art under 35 U.S.C. §§ 102(a) and (b) (pre-AIA) and 35 U.S.C. § 102(a) and (b) (post-AIA).	O-1 thru O-4
U.S. Patent No. 9,241,676 to Lisogurski et al. ("Lisogurski").	Lisogurski was filed on May 31, 2012, and issued on January 26, 2016. It is prior art under at least 35 U.S.C. §§ 102(a), (b), and (e) (pre-AIA) and 35 U.S.C. § 102(a), (b), (d) (post-AIA).	P-1 thru P-4

Reference	Prior Art Status	Exhibit
A Wearable Reflectance Pulse Oximeter for Remote Physiological Monitoring by Y. Mendelson ("Mendelson").	Mendelson was published in the Proceedings of the 28th IEEE EMBS Annual International Conference in 2006. It is prior art under 35 U.S.C. §§ 102(a) and (b) (pre-AIA) and 35 U.S.C. § 102(a) and (b) (post-AIA).	Q-1 thru Q-4
A wireless reflectance pulse oximeter with digital baseline control for unfiltered photoplethysmograms by K. Li & S. Warren ("Li").	Li was published in 2012 in IEEE Transactions on Biomedical Circuits and Systems, 6(3), 269-278. It is prior art under 35 U.S.C. §§ 102(a) and (b) (pre-AIA) and 35 U.S.C. § 102(a) and (b) (post-AIA).	R-1 thru R-4
Design of Pulse Oximeters by Webster ("Webster").	Webster was published by Institute of Physics Publishing in 1997. It is prior art under 35 U.S.C. §§ 102(a) and (b) (pre-AIA) and 35 U.S.C. § 102(a) and (b) (post-AIA).	S-1 thru S-4
"Mobile monitoring with wearable photoplethysmographic biosensors" by Asada et al. ("Asada 2003").	Asada 2003 was published in IEEE Engineering in Medicine and Biology Magazine in May/June 2003. It is prior art under 35 U.S.C. §§ 102(a) and (b) (pre-AIA) and 35 U.S.C. § 102(a) and (b) (post-AIA).	T-1 thru T-4
The Root, Radius-7, Radical-7, Radical-8, and certain pulse oximeters and pulse oximetry sensors manufactured by Masimo ("Masimo").[2]	These products were released between 2002 and December 2012. They are prior art under 35 U.S.C. §§ 102(a) and (b) (pre-AIA) and 35 U.S.C. § 102(a) and (b) (post-AIA).	U-1 thru U-4
The iSpO2 pulse oximeter manufactured by Masimo ("Masimo iSpO2").[3]	The $iSpO_2$ was released by December 12, 2012. It is prior art under 35 U.S.C. §§ 102(a) and (b) (pre-AIA) and 35 U.S.C. § 102(a) and (b) (post-AIA).	V-1 thru V-4
The WristOx pulse oximeter and certain pulse oximeters and pulse oximetry sensors manufactured by Nonin Medical ("Nonin Medical").[4]	The WristOx and other pulse oximeters were released by February 2011. They are prior art under 35 U.S.C. §§ 102(a) and (b) (pre-AIA) and 35 U.S.C. § 102(a) and (b) (post-AIA).	W-1 thru W-4

[2] These charts were prepared based on publicly available information. Apple reserves the right to supplement these charts after obtaining discovery from the relevant third party or parties.
[3] These charts were prepared based on publicly available information. Apple reserves the right to supplement these charts after obtaining discovery from the relevant third party or parties.
[4] These charts were prepared based on publicly available information. Apple reserves the right to supplement these charts after obtaining discovery from the relevant third party or parties.

Reference	Prior Art Status	Exhibit
The OxiMax, NPB-40, N-550, and certain pulse oximeters and pulse oximetry sensors manufactured by Nellcor ("Nellcor")[5]	These products were released between 2001 and December 2012. They are prior art under 35 U.S.C. §§ 102(a) and (b) (pre-AIA) and 35 U.S.C. § 102(a) and (b) (post-AIA).	X-1 thru X-4
U.S. Patent No. 9,596,990 to Park et al. ("Park").	Park was filed on Nov. 6, 2013, claims priority back to June 22, 2012, and was issued on Mar. 21, 2017. It is prior art under U.S.C. §§ 102(a) and (e) (pre-AIA) and 35 U.S.C. § 102(a) and (d) (post-AIA).	Y-1 thru Y-4
Mio Alpha heart rate watch manufactured by Mio ("Mio Alpha")[6]	The Mio Alpha was released at least by June 2012. It is prior art under 35 U.S.C. §§ 102(a) and (b) (pre-AIA) and 35 U.S.C. § 102(a) and (b) (post-AIA).	Z-1 thru Z-4
JP Appl. No. 2005270544 to Maekawa et al. ("Maekawa").	Maekawa was published on October 6, 2005, and is prior art under 35 U.S.C. §§ 102(a) and (b) (pre-AIA) and 35 U.S.C. § 102(a) and (b) (post-AIA).	*See* A-1 thru A-2
The FitBit Charge HR manufactured by FitBit ("FitBit Charge HR")[7]	The FitBit Charge HR was released between 2012 and 2014. It is prior art under 35 U.S.C. §§ 102(a) and (b) (pre-AIA) and 35 U.S.C. § 102(a) and (b) (post-AIA).	AA-1 thru AA-4
FitBit One manufactured by FitBit ("FitBit One")[8]	The FitBit One was released at least by December 2012. It is prior art under 35 U.S.C. §§ 102(a) and (b) (pre-AIA) and 35 U.S.C. § 102(a) and (b) (post-AIA).	BB-1 thru BB-4
Rhee et al., Artifact-Resistant Power-Efficient Design of Finger-Ring Plethsymographic Sensors," IEEE Transactions on Biomedical Engineering, Vol. 48, No. 7 (July 2001) ("Asada 2001")	Asada 2001 was published in IEEE Transactions on Biomedical Engineering in July 2001. It is prior art under 35 U.S.C. §§ 102(a) and (b) (pre-AIA) and 35 U.S.C. § 102(a) and (b) (post-AIA).	*See* CC-1 thru CC-4

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[6] These charts were prepared based on publicly available information. Apple reserves the right to supplement these charts after obtaining discovery from the relevant third party or parties.
[7] These charts were prepared based on publicly available information. Apple reserves the right to supplement these charts after obtaining discovery from the relevant third party or parties.
[8] These charts were prepared based on publicly available information. Apple reserves the right to supplement these charts after obtaining discovery from the relevant third party or parties.

Reference	Prior Art Status	Exhibit
Asada, The MIT Ring: History, Technology, and Challenges of Wearable Health Monitoring, MIT Industrial Liaison Program 2010 R&D Conference ("Asada 2010")[9]	Asada 2010 was published and/or publicly presented at least as early as November 16, 2010 at the MIT Industrial Liaison Program 2010 R&D Conference. It is prior art under 35 U.S.C. §§ 102(a) and (b) (pre-AIA) and 35 U.S.C. § 102(a) and (b) (post-AIA).	*See* CC-1 thru CC-4
The miCoach Smart Run GPS watch and other heart rate monitors manufactured by Adidas ("Adidas")[10]	These products were released at least by 2013. They are prior art under 35 U.S.C. §§ 102(a) and (b) (pre-AIA) and 35 U.S.C. § 102(a) and (b) (post-AIA).	DD-1 thru DD-4

Apple has charted these references against the claims Omni has identified as allegedly infringed:

U.S. Patent No.	Asserted Claims
9,651,533	5, 7-10, 13, 16, 17
9,757,040	1, 2, 4
9,861,286	16-17, 19, 20
9,885,698	1, 2-3, 5

Apple reserves the right to rely on the art identified in the Invalidity Exhibits as well as the following additional prior art references to show the state of the art, to show the knowledge of those skilled in the art, to support a motivation to combine or modify other prior art, to limit the doctrine of equivalents, to prove that the prior art discloses any limitation that Omni contends is lacking in the art charted by Apple, or for any other purpose:

- U.S. Patent No. 9,241,676 to Lisogurski et al. ("Lisogurski"). Lisogurski was filed on May 31, 2012, and issued on January 26, 2016.
- U.S. Patent No. 8,172,761 to Rulkov et al. ("Rulkov"). Rulkov was filed on October 4, 2011 and issued on May 8, 2012.
- U.S. Patent No. 7,648,463 to Elhag et al. ("Elhag"). Elhag issued on January 19, 2010.
- U.S. Patent No. 5,795,300 to Bryars ("Bryars"). Bryars issued on August 18, 1998.

[9] These charts were prepared based on publicly available information. Apple reserves the right to supplement these charts after obtaining discovery from the relevant third party or parties.
[10] These charts were prepared based on publicly available information. Apple reserves the right to supplement these charts after obtaining discovery from the relevant third party or parties.

- U.S. Patent No. 8,954,135 to Yuen et al. ("Yuen"). Yuen was filed on June 24, 2013, claims priority back to June 22, 2012, and issued on February 10, 2015.
- U.S. Patent No. 6,731,967 to Turcott ("Turcott"). Turcott issued on May 4, 2004.
- U.S. Patent No. 8,755,871 to Weng et al. ("Weng"). Weng was filed November 30, 2011, and issued on June 17, 2014.
- U.S. Patent No. 8,315,682 to Such et al. ("Such"). Such was filed on December 5, 2005, and issued on November 20, 2012.
- U.S. Patent No. 6,708,048 to Chance ("Chance"). Chance issued on March 16, 2004.
- U.S. Patent No. 6,701,170 to Stetson ("Stetson"). Stetson issued on March 2, 2004.
- U.S. Patent No. 9,179,876 to Ochs et al. ("Ochs"). Ochs was filed on April 30, 2012, and issued on November 10, 2015.
- U.S. Patent No. 6,031,603 to Fine et al. ("Fine"). Fine issued on February 29, 2000.
- U.S. Patent No. 5,368,224 to Richardson et al. ("Richardson"). Richardson issued on November 29, 1994.
- U.S. Patent No. 5,746,206 to Mannheimer ("Mannheimer"). Mannheimer issued on May 5, 1998.
- U.S. Appl. Pub. No. 2005/0049468 to Carlson et al. ("Carlson"). Carlson was published on March 3, 2005.
- U.S. Appl. Pub. No. 2005/0209516 to Fraden ("Fraden"). Fraden was published on September 22, 2005.
- JP Appl. No. 2005270544 to Maekawa et al. ("Maekawa"). Maekawa is a Japanese patent that was published on October 6, 2005.
- A Wearable Reflectance Pulse Oximeter for Remote Physiological Monitoring by Y. Mendelson ("Mendelson"). Mendelson was published in the Proceedings of the 28th IEEE EMBS Annual International Conference in 2006.
- A wireless reflectance pulse oximeter with digital baseline control for unfiltered photoplethysmograms by K. Li & S. Warren ("Li"). Li was published in 2012 in IEEE Transactions on Biomedical Circuits and Systems, 6(3), 269-278.
- Design of Pulse Oximeters by Webster ("Webster"). Webster was published by Institute of Physics Publishing in 1997.
- "Mobile monitoring with wearable photoplethysmographic biosensors" by Asada et al. ("Asada 2003"). Asada was published in IEEE Engineering in Medicine and Biology Magazine in May/June 2003.
- Rhee et al., Artifact-Resistant Power-Efficient Design of Finger-Ring Plethsymographic Sensors," IEEE Transactions on Biomedical Engineering, Vol. 48, No. 7 (July 2001) ("Asada 2001"). Asada 2001 was published in IEEE Transactions on Biomedical Engineering in July 2001.
- Asada, The MIT Ring: History, Technology, and Challenges of Wearable Health Monitoring, MIT Industrial Liaison Program 2010 R&D Conference ("Asada 2010"). Asada 2010 was published and/or publicly presented at least as early as November 16, 2010 at the MIT Industrial Liaison Program 2010 R&D Conference.
- TAOS TSL260 Datasheet and TSL260 & TSL261 products ("TAOS"). It is prior art under 35 U.S.C. §§ 102(a) and (b) (pre-AIA) and 35 U.S.C. § 102(a) and (b) (post-AIA).

- Multichannel Reflective PPG Earpiece Sensor With Passive Motion Cancellation, IEEE Transaction on Biomedical Circuits and Systems, Vol. 1, No. 4, December 2007 by L. Wang et al.
- U.S. Patent No. 9,596,990 to Park et al ("Park"). Park was filed on Nov. 6, 2013, claims priority back to June 22, 2012, and was issued on Mar. 21, 2017.
- U.S. Patent No. 8,463,576 to Yuen et al ("Yuen 576"). Yuen 576 was filed on Nov. 2, 2012, claims priority back to Sept. 30, 2010, and was issued on Jun. 11, 2013.
- U.S. Patent No. 8,475,367 to Yuen et al ("Yuen 367"). Yuen 367 was filed on Jan. 9, 2012, claims priority back to Jan. 9, 2011, and was issued on Jul. 2, 2013.
- U.S. Patent No. 8,945,017 to Venkatraman et al ("Venkatraman"). Venkatraman was filed on Jun. 3, 2014, claims priority back to Jun. 22, 2012, and was issued on Feb. 3, 2015.
- U.S. Patent No. 9,142,117 to Muhsin et al ("Muhsin"). Muhsin was filed on Nov. 13, 2012, claims priority back to Oct. 14, 2010, and was issued on Sep. 22, 2015.
- U.S. Patent No. 9,192,329 to Al-Ali ("Al-Ali"). Al-Ali was filed on Oct. 12, 2007, claims priority back to Oct. 12, 2006, and was issued on Nov. 24, 2015.
- U.S. Reissued Patent No. RE44,875 to Kiani et al ("Kiani"). Kiani was filed on Mar. 14, 2011, claims priority back to Jul. 2, 2009, and was issued on Apr. 29, 2014.
- U.S. Patent No. 5,919,134 to Diab ("Diab"). Diab was filed on Jan. 12, 1998, claims priority back to Apr. 14, 1997, and was issued on Jul. 6, 1999.
- U.S. Patent No. 6,325,978 to Labuda et al ("Labuda"). Labuda was filed on Aug. 4, 1998 and was issued on Dec. 4, 2001.
- U.S. Patent No. 7,332,784 to Mills et al ("Mills"). Mills was filed on Jun. 27, 2006, claims priority back to Jan. 3, 2003, and was issued on Feb. 19, 2008.
- U.S. Patent No. 8,180,591 to Yuen et al ("Yuen 591"). Yuen 591 was filed on Sep. 27, 2011, claims priority back to Jun. 8, 2011, and was issued on May 15, 2012.
- U.S. Patent No. 8,310,336 to Muhsin et al ("Muhsin"). Muhsin was filed on Oct. 14, 2010, claims priority back to Oct. 10, 2008, and was issued on Nov. 13, 2012.
- U.S. Patent No. 8,315,682 to Such et al ("Such 682"). Such 682 was filed on Jun. 5, 2007, claims priority back to Dec. 14, 2004, and was issued on Nov. 20, 2012.
- U.S. Patent No. 7,468,036 to Rulkov et al ("Rulkov"). Rulkov was filed on Jun. 13, 2007, claims priority back to Oct. 17, 2006, and was issued on Dec. 23, 2008.
- U.S. Patent No. 9,820,658 to Tran ("Tran"). Tran was filed on Aug. 30, 2006, claims priority back to Jun. 30, 2006, and was issued on Nov. 21, 2017.
- U.S. Patent No. 6,916,096 to Eberl et al ("Eberl"). Eberl was filed on Sep. 22, 2001, claims priority back to Sep. 23, 2000, and was issued on Jul. 12, 2005.
- U.S. Patent No. 9,675,250 to Tverskoy ("Tverskoy"). Tverskoy was filed on Aug. 26, 2011, claims priority back to Nov. 1, 2010, and was issued on Jun. 13, 2017.
- U.S. Appl. Pub. No. 2011/0237911 to Lamego et al("Lamego"). Lamego was published on Sep. 29, 2011.

- U.S. Appl. Pub. No. 2012/0203077 to He et al ("He"). He was filed on Jun. 22, 2011, claims priority back to Feb. 9, 2011, and was published on Aug. 9, 2012.
- U.S. Appl. Pub. No. 2013/0303921 to Chu et al ("Chu"). Chu was filed on May 11, 2012 and was published on Nov. 14, 2013.
- U.S. Appl. Pub. No. 2012/0310062 to Li et al ("Li"). Li was filed on May 31, 2011 and was published on Dec. 6, 2012.
- U.S. Patent No. 7,184,148 to Alphonse ("Alphonse"). Alphonse was filed on May 14, 2004, claims priority back to Nov. 17, 2005, and was issued on Feb. 27, 2007.
- Noncontact Simultaneous Dual Wavelength Photoplethysmography: A Further Step Toward Noncontact Pulse Oximetry, Review of Scientific Instruments 78 (2007) by K. Humphreys et al.
- Design of a Low-Power Consumption Wearable Reflectance Pulse Oximetry for Ubiquitous Healthcare System, International Conference on Control, Autpomation and Systems (2008) by S. Jung et al.
- A Wireless Monitoring System for Pulse-Oximetry Sensors, Proceedings of the 2005 Systems Communications, (2005) by M. Morón et al.
- LED Power Reduction Trade-Offs for Ambulatory Pulse Oximetry, Proceedings of the 29th Annual International Conference of the IEEE EMBS (2007) by E. Peláez et al.
- Analysis of Multi-Spectral Photoplethysmograph Biosensors, Conference Proceedings of SPIE (2013) by L. Asare et al
- Implementation of a Wireless Pulse Oximeter Based on Wrist Band Sensor, IEEE EMBS 3rd International Conference on Biomedical Engineering and Information (2010) by Q. Cai et al
- Introducing Easy Pulse: A DIY Photoplethysmographic Sensor for Measuring Heart Rate, www.Embedded-Lab.com (2012) by R-B
- Blood Oxygen Level Measurement with a chest-based Pulse Oximetry Prototype System, Computing in Cardiology (2010) by C. Schreiner et al
- BodiBeat BF-I, BF-1 Quick Guide (2007) by Yamaha Corporation
- Ohmeda TuffSat Oximeter, EMEA DOC1120798 03/12 (2012) by GE Healthcare
- TuffSat Pulse Oximeter, User's Guide and Service Manual, 6050-0006-075 (March 2005) by GE Healthcare
- Smartphone-Based Photoplethysmogram Measurement, Richard J. Duro and Fernando López Peña (Eds.), Digital Image and Signal Processing for Measurement Systems, 135-164 (2012) by Y. Kurylyak et al
- A Non-Invasive Dual-Channel OximeterBbased on Near-Infrared Spectroscopy (NIRS), IEEE (2007) by Y. Luo et al.
- Ratiometric Artifact Reduction in Low Power Reflective Photoplethysmography, IEEE Transactions On Biomedical Circuits And Systems, Vol. 5, No. 4, (2011) by J. Patterson et al.

- Branche & Mendelson, Signal Quality and Power Consumption of a New Prototype Reflectance Pulse Oximeter Sensor, Proceedings of the IEEE 31st Annual Northeast Bioengineering Conference, 2005.

Apple also reserves the right to rely on any prior art products, systems, assemblies, or methods described in the prior art references identified above, or other prior art products, systems, assemblies, or methods that it may uncover in the course of discovery, including but not limited to:

Any pulse oximetry system and sensors developed or sold by Masimo Corp., including:

- $iSpO_2$ Pulse Oximeter
- Radius-7
- Radical-7 and Radical-8
- Pronto-7
- MightySat Fingertip Pulse Oximeter
- Root
- Iris
- Optical sensors compatible with any of the Radius-7, Radical-7, Radical-8, Pronto-7, and Root including but not limited to:
    - RD rainbow SET (Adt, Pdt, Neo, Inf)
    - Rainbow R25
    - Rainbow R25-L
    - M-LNCS (includes Adtx, Blue, EI, Neo, DBI, Trauma, DO, TC1, TF1, ReSposable S-ROS 3U)
    - ReSposable S-Dos 25
- The Root, Radius-7, Radical-7, Radical-8, and certain pulse oximeters and pulse oximetry sensors manufactured by Masimo ("Masimo") were offered for sale at least between 2002 and 2012. They are prior art under 35 U.S.C. §§ 102(a) and (b) (pre-AIA) and 35 U.S.C. § 102(a) and (b) (post-AIA).
- The iSpO2 pulse oximeter manufactured by Masimo ("Masimo iSpO2") was offered for sale no later than December 13, 2012. It is prior art under 35 U.S.C. §§ 102(a) and (b) (pre-AIA) and 35 U.S.C. § 102(a) and (b) (post-AIA).

Any pulse oximetry system and sensors developed or sold by Medtronic, Nellcor, or Covidien, including:

- N series (including but not limited to N-40, N-65, N-85, N-395, N-560, N-595, N-600, N-600x)

- NPB series (including but not limited to NPB-40, NPB-70, NPB-75, NPB-195, NPB-290, NPB-295)
- PM series (including but not limited to PM10, PM10N, PM100, PM100N, PM1000, PM1000N)
- Sensors compatible with any of the N series, NPB series, and PM series, including but not limited to:
    - Max-Fast forehead sensor (including but not limited to MAX-FAST)
    - OxiMax pulse oximetery sensor (including but not limited to MAX-N, MAX-I, MAX-P, MAX-A, MAX-AL, MAX-R)
    - Durasensor finger clip sensor (including but not limited to DS-100A)
    - Oxiband reuseable sensor (including but not limited to OXI-A/N, OXI-P/I)
    - OxiCliq sensors (including but not limited to P, N, I, A)
    - Dura-Y multisite sensor (including but not limited to DS-Y, DS-YSE, DS-YSPD)
    - Softcare nonadhesive sensor (including but not limited to SC-PR, SC-NEO, SC-A)
- The pulse oximeters and pulse oximetry sensors manufactured by Medtronic et al. were offered for sale at least between 2002 and 2012. They are prior art under 35 U.S.C. §§ 102(a) and (b) (pre-AIA) and 35 U.S.C. § 102(a) and (b) (post-AIA).

Any pulse oximetry system and sensors developed or sold by Nonin Medical, including:

- WristOx and WristOx2 (3100 and 3150)
- Model 8500
- Series 9840
- Series 8600 (includes 8600, 8600M, 8600V, 8600FO, and 8600FM)
- Series 7500 (includes 7500 and 7500FO)
- Avant Series (includes 2120, 9600, 9700)
- PalmSAT Series (includes 2500 and 2500A)
- GO2 Series (includes Achieve)
- Onyx Vantage Model 9590
- Onyx II Model 9560
- nVision Pulse Oximetry Data Management Software
- Sensors compatible with any of the devices listed above, including but not limited to:
    - Soft Sensor 8000S Series
    - FlexiWrap 8000J, 8001J, 8008J Series
    - Ear Clip 8000Q2 Series
    - Reflectance 8000R Series
    - Cloth Sensor 6000C Series
    - Flexi-Form III 7000 Series
    - Durafoam 6500 Series
    - Clip 8000AA, 8000AP Series
    - Equanox rSO2 Sensor (includes 8003 and 8004 Series)

- The WristOx pulse oximeter and certain pulse oximeters and pulse oximetry sensors manufactured by Nonin Medical ("Nonin WristOx") were offered for sale no later than March 2012. They are prior art under 35 U.S.C. §§ 102(a) and (b) (pre-AIA) and 35 U.S.C. § 102(a) and (b) (post-AIA).

Any heart rate or activity tracking system and sensors developed or sold by FitBit, Inc., including:

- Charge HR
  - The Charge HR was on sale no later than 2014. On information and belief, prototypes or other devices were available by December 2012.
- FitBit One
  - The FitBit One was on sale no later than December 2012.

Any heart rate or activity tracking system and sensors developed or sold by Mio, Mio Global, or PAI Health, Inc., including:

- Mio Alpha
  - The Mio Alpha was offered for sale no later than June 2012, and was actually received by customers no later than December 22, 2012.

Any heart rate or activity tracking system and sensors developed, tested, or researched by Adidas including:

- The Adidas miCoach Smart Run GPS watch, on sale no later than 2013.

Any heart rate or activity tracking system and sensors developed, tested, or researched by Henry Asada including:

- The MIT Ring Sensor, first developed as early as 1996, and variations thereof developed from 1996 until 2012.

Discovery is ongoing, and Apple may rely on additional systems from other third parties based on later obtained discovery.

B. Invalidity Based on Anticipation and/or Obviousness

1. Anticipation

The Invalidity Exhibits identify prior art that anticipates each Asserted Claim expressly or inherently under 35 U.S.C. § 102, or that renders the Asserted Claims obvious, either alone or in combination with other prior art, under 35 U.S.C. § 103.

The citations to specific pages, paragraphs, or figures are made for exemplary purposes only. The entire references, and not just the cited disclosure, disclose the elements of the

Asserted Claims as set forth in the Invalidity Exhibits. While Apple has identified at least one disclosure per element or limitation for each reference identified in the charts contained in the Invalidity Exhibits, each and every disclosure of the same element or limitation in the same reference is not necessarily identified. In an effort to focus the issues, Apple cites exemplary relevant portions of identified references, even where a reference may contain additional disclosure for a particular claim element or limitation. Apple reserves all rights to rely on other portions of the identified references and other combinations of references to support their contentions and/or defenses. Persons of ordinary skill in the art generally read a prior art reference as a whole and in the context of other publications and literature. Apple may rely on uncited portions of the prior art references and on other publications and expert testimony to provide context and as aids to understanding and interpreting the portions of the prior art references that are cited.

Where Apple cites to a particular figure in a prior art reference, the citation should be understood to encompass the caption and description of the figure and any text relating to the figure in addition to the figure itself. Conversely, where a cited portion of text refers to a figure, or where the context alludes to a figure that had been mentioned earlier, the citation should be understood to include the figure as well. Any and all citations to particular figures in the Invalidity Exhibits shall be deemed to wholly incorporate the figure by reference, and include the figure as if it had been inserted into the chart itself along with any text discussing the figure.

Disclosures relating to elements of dependent claims that are based on the independent claims are disclosed in connection with the independent claims on which they depend.

To the extent that Omni contends a reference does not expressly disclose a limitation, Apple reserves the right to argue that it inherently discloses the limitation. To the extent that a

reference incorporates other references by reference, Apple contends that they are a single document for purposes of invalidity, and may treat them as such even if those references have been separately charted. *Callaway Golf v. Acushnet Co.*, 576 F.3d 1331, 1346 (Fed. Cir. 2009).

To the extent that Omni contends one or more references identified in the Invalidity Exhibits as prior art to a patent do not anticipate an Asserted Claim of the patent, Apple contends that such reference(s) alone or in combination render the Asserted Claim obvious.

2. Obviousness

Apple contends that all Asserted Claims are invalid as at least obvious under 35 U.S.C. § 103 as set forth in the Invalidity Exhibits. In addition, each anticipatory prior art reference may be combined with: (1) information known to persons skilled in the art at the time of the alleged invention; and (2) any of the other prior art references identified in this document. In addition, to the extent Omni contends that any of the charted prior art fails to disclose one or more limitations of the Asserted Claims, Apple reserves the right (1) to argue single-reference obviousness in light of the knowledge of one of ordinary skill in the art; and (2) to identify portions of additional prior art references that, when combined with other portions of the charted references, would render obvious each and every limitation of the Asserted Claims. Apple expressly reserves the right to rely on the combination of any prior art identified herein with any other prior art identified herein. Specific representative combinations and reasons to combine are provided in the Obviousness Combinations claim charts, attached hereto.

Apple contends that one of ordinary skill in the art at the time of the purported invention would have been motivated to combine one or more of the identified references together. In general, a motivation to combine any of the identified references with others exists within the references themselves, as well as within the knowledge of those of ordinary skill in the art. A

person of ordinary skill in the art at the time of the purported invention would have been motivated to modify the prior art or combine prior art references as a result of (i) his or her education and experience, (ii) the state of the prior art as a whole, (iii) the nature of the problem to be solved, (iv) common knowledge in the art, (v) common sense, (vi) design incentives, (vii) market forces, and/or (viii) a desire to tailor a solution using all of the skills, knowledge and creativity at his or her disposal. *See, e.g., KSR Int'l Co. v. Teleflex, Inc.*, 127 S. Ct. 1727 (2007); Examination Guidelines for Determining Obviousness Under 35 U.S.C. §103 in View of the Supreme Court Decision in *KSR Int'l v. Teleflex, Inc.*, Fed. Reg. 57526 (Oct. 10, 2007).

Rationales supporting the combinations of the prior art references in the Invalidity Exhibits include one or more of the following:

1. the references are within the same field, *e.g.*, optical sensors;
2. the fact that the cited references are within the field of the Asserted Patents, are directed to similar subject matter within that field and address similar technical issues, are directed at solving similar problems, disclose solutions with similar advantages, and the references existed or were invented in the same time period as each other;
3. the references are in an old and predictable art such that combining known prior art elements such as those claimed by the Asserted Patents would yield predictable results;
4. the knowledge or common sense of a person of ordinary skill in the art;
5. the prior art references themselves, many of which discuss, incorporate by reference, or cite to other prior art references;
6. the subject matter and references acknowledged as prior art in the Asserted Patents;
7. the interrelated teachings of multiple prior art references identified herein;
8. the nature of the problems purported to be solved by the Asserted Patents and the existence of similar improvements in similar applications and technologies;

9. design incentives and other market forces, including the advantages of creating superior monitor devices and systems;

10. the ability to implement the alleged invention as a predictable variation of the prior art by applying well-known methods and techniques to a known device to yield predictable results in combining the teachings of claimed elements by known methods, with no change in their respective functions;

11. the fact that the cited references explicitly or implicitly reference other prior art references, share common authors or inventors or assignees, were published in the same journals, presented at the same conferences, or were developed at common companies, organizations or industries which would motivate one of skill in the art to combine them;

12. the fact that, in some cases, these references provide explicit motivation for the technology disclosed to be used in combination with one another by virtue of cross-references to one another's solutions, incorporation by reference of one another's basic premises, or close involvement with one another in the industry;

13. the fact that most of the cited references were publicly available in electronic databases maintained by Lexis Nexis, Wiley Online, the Institute of Electrical and Electronics Engineers, the United States Patent & Trademark Office, universities, national laboratories, and other governmental, academic, and private organizations, and in other locations commonly known and accessed by academics, researchers, engineers, and scientists, such as publicly available Internet web sites; and/or

14. the fact that many of the references include teachings, suggestions, or motivations to modify the disclosed subject matter, making it obvious to lead one skilled in the art to try to modify or combine their teachings, or to choose from the multiple identified, predictable potential solutions to this recognized need and would have pursued the known potential solutions with reasonable expectation of success.

See, e.g., *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398 (2007). All motivations for such combinations would have been within the knowledge generally available to one of ordinary skill in the art or located in the references themselves.

As further evidence of the obviousness of the Asserted Claims, the subject matter of one or more of the Asserted Claims was subject to "simultaneous invention" by an independent entity. "Independently made, simultaneous inventions, made within a comparatively short space of time, are persuasive evidence that the claimed apparatus was the product only of ordinary mechanical or engineering skill." *George M. Martin Co. v. Alliance Mach. Sys. Int'l*, 618 F.3d 1294, 1305l, 618 F.3d 1294, 1305 (Fed. Cir. 2010) (internal quotes omitted).

If the '533 patent is entitled to claim benefit to a priority date prior to December 17, 2013, and Yuen and Park are not entitled to claim priority back to their earliest provisional, each of Yuen and Park are evidence of simultaneous invention of the asserted '533 claims. Yuen and Park each discloses all of the elements of the asserted '533 claims as detailed in the attached claim charts. *See* E-1 to E-4 and Y-1 to Y-4. Yuen was filed on June 24, 2013, which was just a short period before or after the asserted claims of the '533 patent were allegedly invented. Park was filed on November 6, 2013, which was just a short period before or after the asserted claims of the '533 patent were allegedly invented.

C. Priority Date

The asserted claims of the '533 patent are not entitled to claim the benefit of the priority date of the provisional patent application listed on the front of the patent. At least the following claim elements do not have adequate written description support in this provisional application:

- Claim 5
  - the light source configured to increase signal-to-noise ratio by increasing a light intensity from at least one of the plurality of semiconductor sources and by increasing a pulse rate of at least one of the plurality of semiconductor sources;
  - an apparatus comprising a plurality of lenses configured to receive a portion of the output optical beam and to deliver an analysis output beam to a sample;

- a personal device comprising a wireless receiver, a wireless transmitter, a display, a microphone, a speaker, one or more buttons or knobs, a microprocessor and a touch screen, the personal device configured to receive and process at least a portion of the output signal, wherein the personal device is configured to store and display the processed output signal, and wherein at least a portion of the processed output signal is configured to be transmitted over a wireless transmission link;
- a remote device configured to receive over the wireless transmission link an output status comprising the at least a portion of the processed output signal, to process the received output status to generate processed data and to store the processed data.

- Claim 7
  - the remote device is further configured to transmit at least a portion of the processed data to one or more other locations, wherein the one or more other locations is selected from the group consisting of the personal device, a doctor, a healthcare provider, a cloud-based server and one or more designated recipients, and wherein the remote device is capable of transmitting information related to a time and a position associated with the at least a portion of the processed data.
- Claim 8
  - the receiver is located a first distance from a first one of the plurality of light emitting diodes and a different, second distance from a second one of the plurality of light emitting diodes such that the receiver receives a first signal from the first light emitting diode and a second signal from the second light emitting diode.
- Claim 9
  - the output signal is generated in part by comparing the first and second signals.
- Claim 10
  - the output signal comprises one or more physiological parameters, and the remote device is capable of storing a history of at least a portion of the one or more physiological parameters over a specified period of time.

- Claim 13
  - a wearable measurement device for measuring one or more physiological parameters, including a light source;
  - the light source configured to increase signal-to-noise ratio by increasing a light intensity from at least one of the plurality of semiconductor sources and by increasing a pulse rate of at least one of the plurality of semiconductor sources;

    - the wearable measurement device comprising a plurality of lenses configured to receive a portion of the output optical beam and to deliver an analysis output beam to a sample;
    - the wearable measurement device further comprising a receiver;
    - a personal device comprising a wireless receiver, a wireless transmitter, a display, a microphone, a speaker, one or more buttons or knobs, a microprocessor and a touch screen, the personal device configured to receive and process at least a portion of the output signal, wherein the personal device is configured to store and display the processed output signal, and wherein at least a portion of the processed output signal is configured to be transmitted over a wireless transmission link;
    - a remote device configured to receive over the wireless transmission link an output status comprising the at least a portion of the processed output signal, to process the received output status to generate processed data and to store the processed data, and wherein the remote device is capable of storing a history of at least a portion of the received output status over a specified period of time.
- Claim 16
    - the receiver is located a first distance from a first one of the plurality of light emitting diodes and a different, second distance from a second one of the plurality of light emitting diodes such that the receiver receives a first signal from the first light emitting diode and a second signal from the second light emitting diode.
- Claim 17
    - the output signal is generated in part by comparing the first and second signals.

It is Omni's burden to prove its patents are entitled to claim the benefit of the provisional date, and Apple reserves its right to respond to any assertion made by Omni that the claims are entitled to an earlier date.

The asserted claims of the '040 patent are not entitled to claim the benefit of the priority date of the provisional patent applications listed on the front of the patent. At least the following claim elements do not have adequate written description support in the provisional applications:

- Claim 1
    - A wearable device for use with a smart phone or tablet

- the measurement device comprising one or more lenses configured to receive and to deliver a portion of the input optical beam to tissue, wherein the tissue reflects at least a portion of the input optical beam delivered to the tissue;
- the measurement device further comprising a reflective surface configured to receive and redirect at least a portion of light reflected from the tissue;
- the measurement device further comprising a receiver configured to: capture light while the LEDs are off and convert the captured light into a first signal and capture light while at least one of the LEDs is on and convert the captured light into a second signal, the captured light including at least a portion of the input optical beam reflected from the tissue;
- the measurement device configured to improve a signal-to-noise ratio of the input optical beam reflected from the tissue by differencing the first signal and the second signal; the light source configured to further improve the signal-to-noise ratio of the input optical beam reflected from the tissue by increasing the light intensity relative to the initial light intensity from at least one of the LEDs;
- the measurement device further configured to generate an output signal representing at least in part a non-invasive measurement on blood contained within the tissue;

- Claim 4
  - the receiver is located a first distance from a first one of the LEDs and a different distance from a second one of the LEDs such that the receiver can capture a third signal from the first LED and a fourth signal from the second LED, and wherein the output signal is generated in part by comparing the third and fourth signals.

It is Omni's burden to prove its patents are entitled to claim the benefit of the provisional date, and Apple reserves its right to respond to any assertion made by Omni that the claims are entitled to an earlier date.

The asserted claims of the '286 patent are not entitled to claim the benefit of the priority date of the provisional patent application listed on the front of the patent. At least the following claim elements do not have adequate written description support in the provisional application. Moreover, to the extent Omni relies on provisional application 61/747,487 even though the '286

patent does not claim priority to this provisional, these claim elements do not have adequate written description support

- Claim 16
  - A wearable device for use with a smart phone or tablet
  - the measurement device comprising one or more lenses configured to receive and to deliver a portion of the optical beam to tissue, wherein the tissue reflects at least a portion of the optical beam delivered to the tissue, and wherein the measurement device is adapted to be placed on a wrist or an ear of a user;
  - the measurement device further comprising a receiver configured to: capture light while the LEDs are off and convert the captured light into a first signal and capture light while at least one of the LEDs is on and convert the captured light into a second signal, the captured light including at least a portion of the optical beam reflected from the tissue;
  - the light source configured to further improve the signal-to-noise ratio of the optical beam reflected from the tissue by increasing the light intensity relative to the initial light intensity from at least one of the LEDs;
- Claim 20
  - the receiver is located a first distance from a first one of the LEDs and a different distance from a second one of the LEDs such that the receiver can capture a third signal from the first LED and a fourth signal from the second LED, and wherein the output signal is generated in part by comparing the third and fourth signals.

It is Omni's burden to prove its patents are entitled to claim the benefit of the provisional date, and Apple reserves its right to respond to any assertion made by Omni that the claims are entitled to an earlier date.

The asserted claims of the '698 patent are not entitled to claim the benefit of the priority date of the provisional patent application listed on the front of the patent. At least the following claim elements do not have adequate written description support in the provisional application:

- Claim 1
  - the measurement device further comprising a receiver, wherein the receiver includes a plurality of spatially separated detectors, the detectors configured to: capture light while the LEDs are off and convert the

captured light into a first signal; and capture light while at least one of the LEDs is on and convert the captured light into a second signal, the captured light including at least a portion of the input optical beam reflected from the tissue;

- modulating at least one of the LEDs has a modulation frequency, and wherein the receiver is configured to use a lock-in technique that detects the modulation frequency.

It is Omni's burden to prove its patents are entitled to claim the benefit of the provisional date, and Apple reserves its right to respond to any assertion made by Omni that the claims are entitled to an earlier date.

D. Invalidity Based on 35 U.S.C. § 112

Apple identifies below the presently known grounds upon which Apple contends the Asserted Claims of the patents are invalid for failing to comply with the requirements of 35 U.S.C. § 112.

Some or all of the Asserted Claims do not satisfy the definiteness requirement under 35 U.S.C. § 112, because those skilled in the art would not understand the full scope of the Asserted Claims when read in the light of the specification. 35 U.S.C. 112 provides that "[t]he specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention." 35 U.S.C. § 112 ¶ 2 (pre-AIA); 35 U.S.C. § 112(b) (AIA). If a claim fails to satisfy the definiteness requirement, it is invalid. *See, e.g., Bancorp Servs., L.L.C. v. Hartford Life Ins. Co.*, 359 F.3d 1367, 1371 (Fed. Cir. 2004). "[A] patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention." *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2124 (2014). "A claim is considered indefinite if it does not reasonably apprise those skilled in the art of its scope." *IPXL Holdings, LLC v. Amazon.com, Inc.*, 430 F.3d 1377,

1384 (Fed Cir. 2005) (concluding as indefinite a claim that covers both an apparatus and a method of use). "[A] means-plus-function clause is indefinite if a person of ordinary skill in the art would be unable to recognize the structure in the specification and associate it with the corresponding function in the claim." *AllVoice Computing PLC v. Nuance Communications*, 504 F.3d 1236, 1241 (Fed. Cir. 2007); *see also Pressure Prods. Med. Supplies v. Greatbatch Ltd.*, 599 F.3d 1308 (Fed. Cir. 2010).

Some or all of the Asserted Claims do not satisfy the enablement requirement under 35 U.S.C. § 112, because the specification does not teach those skilled in the art how to make and how to use the full scope of the claimed invention without undue experimentation to any extent that could fairly be construed as covering the accused subject matter. 35 U.S.C. § 112 ¶ 1 (pre-AIA); 35 U.S.C. § 112(a) (AIA). *See also Chiron Corp. v. Genentech, Inc.*, 363 F.3d 1247, 1253 (Fed. Cir. 2004).

Some or all of the Asserted Claims do not satisfy the written description requirement under 35 U.S.C. § 112, because they do not convey with reasonable clarity to those skilled in the art that, as of the filing date sought, the inventors were in possession of subject matter such as that alleged to infringe. 35 U.S.C. § 112 ¶ 1 (pre-AIA); 35 U.S.C. § 112(a) (AIA). *See also Falko-Gunter Falkner v. Inglis*, 448 F.3d 1357, 1365 (Fed. Cir. 2006).

Some or all of the Asserted Claims do not satisfy the proper dependent form requirement under 35 U.S.C. § 112 ¶ 4 (pre-AIA), 35 U.S.C. § 112(d) (AIA), because they fail to further limit the subject matter of the claim upon which they depend, or fail to include all the limitations of the claim upon which they depend. Non-compliance with this requirement renders the claims unpatentable just as non-compliance with other paragraphs of 35 U.S.C. § 112 would. *See Pfizer, Inc. v. Ranbaxy Labs., Ltd.*, 457 F.3d 1284, 1292 (Fed. Cir. 2006) (holding that a

dependent claim is invalid for failing to specify a further limitation of the subject matter of the claim to which it refers).

Many of the initial contentions below are based on Omni's apparent interpretation of the claims, based on how Omni has applied the claims in its Initial Infringement Contentions, which show that Omni is interpreting the claims in a manner not supported by the specification.

At least the following limitations of the '533 patent are indefinite, lack written description, and/or are not enabled for at least the following reasons:

- Claims 5 and 13:
    - "sample"
        - This limitation is vague and ambiguous, and a person of ordinary skill in the art could not reasonably determine its scope.
        - This element lacks written description, and Omni is applying this element in a manner not supported by the specification.
    - "increasing a pulse rate"
        - This limitation is vague and ambiguous, and a person of ordinary skill in the art could not reasonably determine its scope.
    - "wherein the personal device is configured to store and display the processed output signal"
        - This limitation is vague and ambiguous, and a person of ordinary skill in the art could not reasonably determine its scope.
    - "wherein the receiver is configured to be synchronized to the light source"
        - This limitation is vague and ambiguous, and a person of ordinary skill in the art could not reasonably determine its scope.
- Claim 13:
    - "a wearable measurement device for measuring one or more physiological parameters"
        - This element lacks written description support.
        - This element is not enabled by the specification.
    - "sample"

        - This limitation is vague and ambiguous, and a person of ordinary skill in the art could not reasonably determine its scope.
        - This element lacks written description, and Omni is applying this element in a manner not supported by the specification.
    - "increasing a pulse rate"
        - This limitation is vague and ambiguous, and a person of ordinary skill in the art could not reasonably determine its scope.
    - "wherein the wearable measurement device receiver is configured to be synchronized to pulses of the light source"
        - This limitation is vague and ambiguous, and a person of ordinary skill in the art could not reasonably determine its scope.
    - "wherein the personal device is configured to store and display the processed output signal"
        - This limitation is vague and ambiguous, and a person of ordinary skill in the art could not reasonably determine its scope.
- Claim 7:
    - "wherein the remote device is further configured to transmit at least a portion of the processed data to one or more other locations, wherein the one or more other locations is selected from the group consisting of the personal device, a doctor, a healthcare provider, a cloud-based server and one or more designated recipients, and wherein the remote device is capable of transmitting information related to a time and a position associated with the at least a portion of the processed data"
        - This limitation is vague and ambiguous, and a person of ordinary skill in the art could not reasonably determine its scope.

At least the following limitations of the '040 patent are indefinite, lack written description, and/or are not enabled for at least the following reasons:

- Claim 1:
    - "wearable device"
        - This element lacks written description support.

        - This element is not enabled by the specification.
    - “reflective surface configured to receive and redirect at least a portion of light reflected from the tissue”
        - This limitation is vague and ambiguous, and a person of ordinary skill in the art could not reasonably determine its scope.
        - This element lacks written description, and Omni is applying this element in a manner not supported by the specification.
    - “wherein the smart phone or tablet is configured to store and display the processed output signal”
        - This limitation is vague and ambiguous, and a person of ordinary skill in the art could not reasonably determine its scope.
- Claim 2
    - “wherein the receiver is configured to be synchronized to the modulation of the at least one of the LEDs”
        - This limitation is vague and ambiguous, and a person of ordinary skill in the art could not reasonably determine its scope.

At least the following limitations of the ’286 patent are indefinite, lack written description, and/or are not enabled for at least the following reasons:

- Claim 16
    - “wearable device”
        - This element lacks written description support.
        - This element is not enabled by the specification.
    - “the measurement device is adapted to be placed on a wrist or an ear of a user”
        - This limitation is vague and ambiguous, and a person of ordinary skill in the art could not reasonably determine its scope.
        - This element lacks written description support.
        - This element is not enabled by the specification.
- Claim 17

- "wherein at least one LED emits at a first wavelength and at least another LED emits at a second wavelength, and wherein the first wavelength has a first penetration depth into the tissue and wherein the second wavelength has a second penetration depth into the tissue different from the first penetration depth"
    - This limitation is vague and ambiguous, and a person of ordinary skill in the art could not reasonably determine its scope.
    - This element lacks written description support.
    - This element is not enabled by the specification.

At least the following limitations of the '698 patent are indefinite, lack written description, and/or are not enabled for at least the following reasons:

- Claim 1:
    - "wearable device"
        - This element lacks written description support.
        - This element is not enabled by the specification.
    - "an output signal representing at least in part a non-invasive measurement on blood contained within the tissue"
        - This limitation is vague and ambiguous, and a person of ordinary skill in the art could not reasonably determine its scope.
    - "wherein the modulating at least one of the LEDs has a modulation frequency, and wherein the receiver is configured to use a lock-in technique that detects the modulation frequency"
        - This limitation is vague and ambiguous, and a person of ordinary skill in the art could not reasonably determine its scope.
        - This element lacks written description, and Omni is applying this element in a manner not supported by the specification.
- Claim 3
    - "wherein the receiver is configured to be synchronized to at least one of the LEDs"

        - This limitation is vague and ambiguous, and a person of ordinary skill in the art could not reasonably determine its scope.
- Claim 5:
    - "wherein the smart phone or tablet is configured to store and display the processed output signal"
        - This limitation is vague and ambiguous, and a person of ordinary skill in the art could not reasonably determine its scope.

II. Ineligibility Contentions Under 35 U.S.C. § 101

Apple identifies below the presently known grounds upon which Apple contends the Asserted Claims of the patents are unpatentable for claiming ineligible subject matter under 35 U.S.C. § 101.

Some or all of the Asserted Claims are ineligible under 35 U.S.C. § 101 because (1) they are directed to non-statutory subject matter, and/or they claim patent-ineligible concepts, including abstract ideas, and/or (2) the claim elements, considered both individually and as an ordered combination, lack an inventive concept sufficient to transform the nature of the claim into a patent-eligible application. *See, e.g.*, *Alice Corp. v. CLS Bank Int'l*, 134 S. Ct. 2347 (2014); *Mayo Collaborative Services v. Prometheus Laboratories, Inc.*, 132 S. Ct. 1289 (2012).

One or more asserted claims of the '533 Patent is invalid for failing to claim patent eligible subject matter as required by 35 U.S.C. § 101. Each such claim lacks an inventive concept and is directed towards an abstract idea, such as, for example, the monitoring of a physiological characteristic using well-known hardware and software components. The additional elements recited in the claims (*e.g.*, a light source configured to increase a signal-to-noise ratio, a receiver, a personal device, and a remote device) were conventional, well-known elements and do not make the claim patent eligible.

One or more asserted claims of the ’040 Patent is invalid for failing to claim patent eligible subject matter as required by 35 U.S.C. § 101. Each such claim lacks an inventive concept and is directed towards an abstract idea, such as, for example, the monitoring of a physiological characteristic using well-known hardware and software components. The additional elements recited in the claims (*e.g.*, a measurement device including a light source configured to increase a signal-to-noise ratio, a receiver, and a smart phone or tablet) were conventional, well-known elements and do not make the claim patent eligible.

One or more asserted claims of the ’286 Patent is invalid for failing to claim patent eligible subject matter as required by 35 U.S.C. § 101. Each such claim lacks an inventive concept and is directed towards an abstract idea, such as, for example, the monitoring of a physiological characteristic using well-known hardware and software components. The additional elements recited in the claims (*e.g.*, a measurement device including a light source configured to increase a signal-to-noise ratio, and a receiver with a plurality of spatially separated detectors) were conventional, well-known elements and do not make the claim patent eligible.

One or more asserted claims of the ’698 Patent is invalid for failing to claim patent eligible subject matter as required by 35 U.S.C. § 101. Each such claim lacks an inventive concept and is directed towards an abstract idea, such as, for example, the monitoring of a physiological characteristic using well-known hardware and software components. The additional elements recited in the claims (*e.g.*, a measurement device including a light source configured to increase a signal-to-noise ratio, and a receiver with a plurality of spatially separated detectors that is configured to use a lock-in technique) were conventional, well-known elements and do not make the claim patent eligible.

III. Accompanying Document Production

In accordance with P.R. 3-4(a), Defendants produced APL-OMNI_00012421 - APL-OMNI_00073152, which include documentation sufficient to show the operation of any aspects or elements of an Accused Instrumentality identified by the patent claimant in its P.R. 3-1(c) chart.

In accordance with P.R. 3-4(b) and 3-6, Defendants have produced APL-OMNI_00000001 - APL-OMNI_00012420, which includes prior art references and evidence concerning prior art systems, to the extent such evidence is available to Apple at this time. Apple reserves the right to supplement its contentions regarding any prior art systems after obtaining discovery from the relevant third parties. These prior art references and evidence are cited in and support the accompanying invalidity claim charts, and are evidence of the state of the art at the time of the purported invention.

Apple's search for prior art references, additional documentation, and/or corroborating evidence concerning prior art systems is ongoing. Accordingly, Apple reserves the right to continue to supplement its production as Apple obtains additional prior art references, documentation, and/or evidence concerning invalidity during the course of discovery.

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CERTIFICATE OF SERVICE

The undersigned certifies that all counsel of record were served with a true and correct copy of the foregoing by email on August 28, 2018.

/s/ Melinda Hanhan
Melinda Hanhan