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APPLE INC. Petitioner

v.

VALENCELL, INC. Patent Owner

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Case IPR2017-00319 U.S. Patent No. 8,923,941

PETITIONER APPLE INC.'S

REPLY TO PATENT OWNER RESPONSE

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	A.	Luo and Craw are analogous art	2
	B.	The combination of Luo and Craw suggests that respiration rate can be extracted.	5
	C.	As shown in the Petition, the combination of Luo and Craw suggests limitations [1.4] and [1.5], and a POSA would have been motivated to combine Luo and Craw to render claim 1 obvious.	11
	D.	A POSA would have been motivated to combine Luo and Craw because they are directed to similar physiological monitoring devices.	14
IV.	Mau	lt and Al-Ali render claim 1 obvious	16
	A.	Mault and Al-Ali are analogous art	16
	B.	Mault discloses a single monitoring device capable of sensing both heart rate and respiration rate data.	16
	C.	Claim 1 does not require a PPG sensor capable of having its signals processed to produce a serial data output from which respiration rate can be extracted.	17
	D.	The combination of Mault and Al-Ali suggests processing signals from the at least one motion sensor and signals from the at least one PPG sensor into a serial data output of physiological information and motion-related information	18
	E.	A POSA would have had a reason to combine Mault with Al-Ali.	19
V.	PO v	vaived arguments specific to the dependent claims	
VI.	PO's	contention of unconstitutionality is not a proper request for f	
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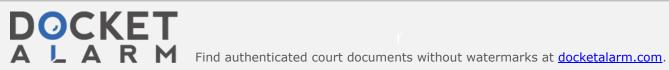


# PETITIONER'S UPDATED EXHIBIT LIST

Exhibit No.	Description
1001	U.S. Patent No. 8,923,941 to LeBoeuf et al., issued December 30,
	2014
1002	U.S. Patent No. 8,923,941 File History
1003	Declaration of Dr. Majid Sarrafzadeh
1004	Curriculum Vitae of Dr. Majid Sarrafzadeh
1005	Valencell, Inc. v. Apple Inc., Case No. 5-16-cv-00010 (E.D.N.C),
	Complaint filed January 4, 2016
1006	U.S. Patent Application Publication No. 2005/0209516 to Fraden,
	published September 22, 2005
1007	Intentionally left blank
1008	U.S. Patent Application Publication No. 2008/0081972 to Debrec-
1000	zeny, published April 3, 2008
1009	Japanese Patent Application Publication No. 2005/040261 A to
	Numaga et al., published February 17, 2005
1010	Certified English-language translation of Japanese Patent Applica-
	tion Publication No. 2005/040261 A to Numaga et al., published
4044	February 17, 2005
1011	U.S. Patent Application Publication No. 2003/0065269 to Vetter et
1010 1017	al., published April 3, 2003
1012 -1015	Intentionally left blank
1016	U.S. Patent Application Publication No. 2009/0105556 to Fricke <i>et</i>
1015	al., published April 23, 2009
1017	Intentionally left blank
1018	U.S. Patent No. 3,704,706 to Herczfeld <i>et al.</i> , issued December 5, 1972
1019	U.S. Patent No. 5,297,548 to Pologe, issued March 29, 1994
1019	Med. Sci. Series, Int'l Fed'n for Med. and Biological Eng'g and the
1020	Int'l Org. for Med. Physics, Design of Pulse Oximeters (J.G. Web-
	ster ed., Inst. of Physics Publ'g 1997)
1021	John Allen, <i>Photoplethysmography and its application in clinical</i>
	physiological measurement, Physiological Measurement 28 (2007)
1022	U.S. Patent Application Publication No. 2008/0132798 to Hong <i>et</i>
,	al., published June 5, 2008
1023	U.S. Patent Application Publication No. 2008/0177162 to Bae et
	al., published July 24, 2008



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1021	1998
1025	Hyonyoung Han et al., Development of a wearable health monitor-
	ing device with motion artifact reduced algorithm, International
	Conference on Control, Automation and Systems, IEEE (2007)
1026	Intentionally left blank
1027	U.S. Patent Application Publication No. 2004/0186387 to Kosuda
	et al., published September 23, 2004
1028	U.S. Patent Application No. 2009/0287067 to Dorogusker et al.,
	published November 19, 2009
1029 - 1030	Intentionally left blank
1031	U.S. Patent Application No. 2005/059870 to Aceti, published
4022	March 17, 2005
1032	G. Comtois & Y. Mendelson, A Comparative Evaluation of Adap-
	tive Noise Cancellation Algorithms for Minimizing Motion Artifacts
1022	in a Forehead-Mounted Wearable Pulse Oximeter, IEEE (2007)
1033	Declaration of Gerard P. Grenier in support of G. Comtois & Y.  Mondelson, A Comparative Evaluation of Adaptive Noise Cancella.
	Mendelson, A Comparative Evaluation of Adaptive Noise Cancellation Algorithms for Minimizing Motion Artifacts in a Forehead-
	Mounted Wearable Pulse Oximeter, IEEE (2007) (Ex. 1032)
1034	U.S. Patent Application Publication No. 2004/0059236 to Margu-
1001	lies et al., published March 25, 2004
1035	U.S. Patent Application Publication No. 2007/0016086 to Inukai et
	al., published January 18, 2007
1036	U.S. Patent Application Publication No. 2003/0236647 to Yoon et
	al., published December 25, 2003
1037	International Patent Application Publication No. 2007/013054 to
	Schwartz, published February 1, 2007
1038	U.S. Patent No. 5,575,284 to Athan et al., issued November 19,
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1039	U.S. Patent No. 5,503,016 to Koen, issued April 2, 1996
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1042	al., published August 23, 2007
1043	U.S. Patent Application Publication No. 2005/0075542 to
	Goldreich, published April 7, 2005



<ul> <li>1044 International Patent Application Publication No. WO2007/004089 to Moroney et al., published January 11, 2007</li> <li>1045 G. Sen Gupta et al., Design of a Low-cost Physiological Parameter Measurement and Monitoring Device, Instrumentation and Measurement Technology Conference, IEEE (2007)</li> <li>1046 U.S. Patent Application Publication No. 2006/0084879 to Nazarian et al., published April 20, 2006</li> <li>1047 U.S. Patent No. 5,243,992 to Eckerle et al., issued September 14, 1993</li> </ul>
<ul> <li>to Moroney et al., published January 11, 2007</li> <li>1045 G. Sen Gupta et al., Design of a Low-cost Physiological Parameter Measurement and Monitoring Device, Instrumentation and Measurement Technology Conference, IEEE (2007)</li> <li>1046 U.S. Patent Application Publication No. 2006/0084879 to Nazarian et al., published April 20, 2006</li> <li>1047 U.S. Patent No. 5,243,992 to Eckerle et al., issued September 14,</li> </ul>
<ul> <li>Measurement and Monitoring Device, Instrumentation and Measurement Technology Conference, IEEE (2007)</li> <li>U.S. Patent Application Publication No. 2006/0084879 to Nazarian et al., published April 20, 2006</li> <li>U.S. Patent No. 5,243,992 to Eckerle et al., issued September 14,</li> </ul>
<ul> <li>urement Technology Conference, IEEE (2007)</li> <li>1046 U.S. Patent Application Publication No. 2006/0084879 to Nazarian et al., published April 20, 2006</li> <li>1047 U.S. Patent No. 5,243,992 to Eckerle et al., issued September 14,</li> </ul>
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1048 U.S. Patent No. 4,955,379 to Hall, issued September 11, 1990
1049 International Patent Application Publication No. WO 2007/122375
to Crowe <i>et al.</i> , published November 1, 2007
1050 Intentionally left blank
1051 Intentionally left blank
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Monitoring Device, Instrumentation and Measurement Technology
Conference, IEEE (2007) (Ex. 1045) and Hyonyoung Han et al.,
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artifact reduced algorithm, International Conference on Control,
Automation and Systems, IEEE (2007) (Ex. 1025)
1053 Intentionally left blank
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published August 21, 2008  1056  U.S. Patent Application Publication No. 2008/0133699 to Craw et
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<ul> <li>al., published June 5, 2008</li> <li>U.S. Patent No. 6,513,532 to Mault et al., issued February 4, 2003</li> </ul>
1057 U.S. Patent No. 0,313,332 to Mauri et al., Issued February 4, 2003  1058 U.S. Patent Application Publication No. 2003/0181798 to Al-Ali,
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IEEE Transactions on Information Technology in Biomedicine,
Vol. 11, Issue 5, September 2007
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Mobile Care System With Alert Mechanism" IEEE Transactions or
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ber 2007 (Ex. 1059)



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