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SAR EVALUATION REPORT

Applicant Name:
LG Electronics MobileComm U.S.A., Inc.
1000 Sylvan Avenue
Englewood Cliffs, NJ 07632
United States

Date of Testing:
10/5/2017
Test Site/Location:
PCTEST Lab, Columbia, MD, USA
Document Serial No.:
1M1710060269-01.ZNF

FCC ID:	**ZNFH932**
APPLICANT:	**LG ELECTRONICS MOBILECOMM U.S.A., INC.**

DUT Type:	Portable Handset
Application Type:	Class II Permissive Change
FCC Rule Part(s):	CFR §2.1093
Model:	LG-H932
Additional Model(s):	LGH932, H932, LG-H932PR, LGH932PR, H932PR
Permissive Change(s):	Enabling TDWR channels

Note: The following test data was evaluated for the current test report. Please refer to RF Exposure Technical Report S/N 1M1707110215-01-R1.ZNF for original compliance evaluation.

This wireless portable device has been shown to be capable of compliance for localized specific absorption rate (SAR) for uncontrolled environment/general population exposure limits specified in ANSI/IEEE C95.1-1992 and has been tested in accordance with the measurement procedures specified in Section 1.4 of this report; for North American frequency bands only.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them. Test results reported herein relate only to the item(s) tested.

Randy Ortanez
President

The SAR Tick is an initiative of the Mobile Manufacturers Forum (MMF). While a product may be considered eligible, use of the SAR Tick logo requires an agreement with the MMF. Further details can be obtained by emailing: sartick@mmfai.info.

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1 DEVICE UNDER TEST

1.1 Device Overview

Band & Mode	Operating Modes	Tx Frequency
GSM/GPRS/EDGE 850	Voice/Data	824.20 - 848.80 MHz
GSM/GPRS/EDGE 1900	Voice/Data	1850.20 - 1909.80 MHz
UMTS 850	Voice/Data	826.40 - 846.60 MHz
UMTS 1750	Voice/Data	1712.4 - 1752.6 MHz
UMTS 1900	Voice/Data	1852.4 - 1907.6 MHz
LTE Band 71	Voice/Data	665.5 - 695.5 MHz
LTE Band 12	Voice/Data	699.7 - 715.3 MHz
LTE Band 5 (Cell)	Voice/Data	824.7 - 848.3 MHz
LTE Band 66 (AWS)	Voice/Data	1710.7 - 1779.3 MHz
LTE Band 4 (AWS)	Voice/Data	1710.7 - 1754.3 MHz
LTE Band 2 (PCS)	Voice/Data	1850.7 - 1909.3 MHz
LTE Band 41	Voice/Data	2498.5 - 2687.5 MHz
2.4 GHz WLAN	Voice/Data	2412 - 2462 MHz
U-NII-1	Voice/Data	5180 - 5240 MHz
U-NII-2A	Voice/Data	5260 - 5320 MHz
U-NII-2C	Voice/Data	5500 - 5720 MHz
U-NII-3	Voice/Data	5745 - 5825 MHz
Bluetooth	Data	2402 - 2480 MHz
NFC	Data	13.56 MHz

1.2 Nominal and Maximum Output Power Specifications

This device operates using the following maximum and nominal output power specifications for 5 GHz WLAN. See RF Exposure Technical Report S/N 1M1707110215-01-R1.ZNF for complete maximum and nominal output power specifications.

Mode / Band		Modulated Average (dBm)		
		20 MHz Bandwidth		
		Antenna 1	Antenna 2	MIMO
IEEE 802.11a (5 GHz)	Maximum	**17.0**	**16.5**	**19.7**
	Nominal	**16.0**	**15.5**	**18.7**
IEEE 802.11n (5 GHz)	Maximum	**17.0**	**16.5**	**19.7**
	Nominal	**16.0**	**15.5**	**18.7**
IEEE 802.11ac (5 GHz)	Maximum	**17.0**	**16.5**	**19.7**
	Nominal	**16.0**	**15.5**	**18.7**

Mode / Band		Modulated Average - Single Tx Chain (dBm)								Modulated Average - MIMO (dBm)			
		40 MHz Bandwidth											
		Antenna 1				Antenna 2				MIMO			
		Ch 38	Ch 46, 54	Ch 62, 102	Ch 110 - 159	Ch 38	Ch 46, 54	Ch 62, 102	Ch 110 - 159	Ch 38	Ch 46, 54	Ch 62, 102	Ch 110 - 159
IEEE 802.11n (5 GHz)	Maximum	**14.0**	**16.0**	**14.0**	**16.0**	**13.5**	**15.5**	**13.5**	**15.5**	**16.7**	**18.7**	**16.7**	**18.7**
	Nominal	**13.0**	**15.0**	**13.0**	**15.0**	**12.5**	**14.5**	**12.5**	**14.5**	**15.7**	**17.7**	**15.7**	**17.7**
IEEE 802.11ac (5 GHz)	Maximum	**14.0**	**16.0**	**14.0**	**16.0**	**13.5**	**15.5**	**13.5**	**15.5**	**16.7**	**18.7**	**16.7**	**18.7**
	Nominal	**13.0**	**15.0**	**13.0**	**15.0**	**12.5**	**14.5**	**12.5**	**14.5**	**15.7**	**17.7**	**15.7**	**17.7**

Mode / Band		Modulated Average - Single Tx Chain (dBm)						Modulated Average - MIMO (dBm)		
		80 MHz Bandwidth								
		Antenna 1			Antenna 2			MIMO		
		Ch 42	Ch 58	Ch 106 - 155	Ch 42	Ch 58	Ch 106 - 155	Ch 42	Ch 58	Ch 106 - 155
IEEE 802.11ac (5 GHz)	Maximum	**13.0**	**11.0**	**13.0**	**12.5**	**10.5**	**12.5**	**15.7**	**13.7**	**15.7**
	Nominal	**12.0**	**10.0**	**12.0**	**11.5**	**9.5**	**11.5**	**14.7**	**12.7**	**14.7**

1.3 SAR Test Exclusion

Additional SAR measurements were not required based on the conducted power measurements and the SAR Test configuration and channel selection requirements outlined in FCC KDB 248227 D01v02r02, Section 5. Please see RF Exposure Technical Report S/N 1M1707110215-01-R1.ZNF for full SAR compliance evaluation.

1.4 Guidance Applied

- IEEE 1528-2013
- FCC KDB Publication 248227 D01v02r02 (SAR Considerations for 802.11 Devices)
- FCC KDB Publication 447498 D01v06 (General SAR Guidance)
- FCC KDB Publication 865664 D01v01r04, D02v01r02 (SAR Measurements up to 6 GHz)

2 FCC MEASUREMENT PROCEDURES

2.1 SAR Testing with 802.11 Transmitters

The normal network operating configurations of 802.11 transmitters are not suitable for SAR measurements. Unpredictable fluctuations in network traffic and antenna diversity conditions can introduce undesirable variations in SAR results. The SAR for these devices should be measured using chipset based test mode software to ensure the results are consistent and reliable. See KDB Publication 248227 D01v02r02 for more details.

2.1.1 General Device Setup

Chipset based test mode software is hardware dependent and generally varies among manufacturers. The device operating parameters established in test mode for SAR measurements must be identical to those programmed in production units, including output power levels, amplifier gain settings and other RF performance tuning parameters.

A periodic duty factor is required for current generation SAR systems to measure SAR. When 802.11 frame gaps are accounted for in the transmission, a maximum transmission duty factor of 92 - 96% is typically achievable in most test mode configurations. A minimum transmission duty factor of 85% is required to avoid certain hardware and device implementation issues related to wide range SAR scaling. The reported SAR is scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit.

2.1.2 U-NII-1 and U-NII-2A

For devices that operate in both U-NII-1 and U-NII-2A bands, when the same maximum output power is specified for both bands, SAR measurement using OFDM SAR test procedures is not required for U-NII-1 unless the highest reported SAR for U-NII-2A is > 1.2 W/kg. When different maximum output powers are specified for the bands, SAR measurement for the U-NII band with the lower maximum output power is not required unless the highest reported SAR for the U-NII band with the higher maximum output power, adjusted by the ratio of lower to higher specified maximum output power for the two bands, is > 1.2 W/kg. When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

2.1.3 U-NII-2C and U-NII-3

The frequency range covered by U-NII-2C and U-NII-3 is 380 MHz (5.47 – 5.85 GHz), which requires a minimum of at least two SAR probe calibration frequency points to support SAR measurements. When Terminal Doppler Weather Radar (TDWR) restriction applies, the channels at 5.60 – 5.65 GHz in U-NII-2C band must be disabled with acceptable mechanisms and documented in the equipment certification. Unless band gap channels are permanently disabled, SAR must be considered for these channels. Each band is tested independently according to the normally required OFDM SAR measurement and probe calibration frequency points requirements.

3 RF CONDUCTED POWERS

3.1 WLAN Conducted Powers

Table 3-1
5 GHz WLAN Ant 1 Maximum RF Power

5GHz (20MHz) Conducted Power [dBm]				
Freq [MHz]	Channel	IEEE Transmission Mode		
		802.11a	802.11n	802.11ac
5180	36	16.85	16.71	16.70
5200	40	16.84	16.69	16.65
5220	44	16.84	16.65	16.61
5240	48	16.71	16.59	16.52
5260	52	16.73	16.62	16.50
5280	56	16.90	16.74	16.71
5300	60	16.72	16.57	16.48
5320	64	16.76	16.63	16.53
5500	100	16.57	16.38	16.33
5580	116	16.38	16.17	16.19
5600	120	16.49	16.33	16.33
5620	124	16.57	16.35	16.36
5640	128	16.44	16.33	16.31
5660	132	16.48	16.33	16.34
5720	144	16.49	16.32	16.29
5745	149	16.55	16.39	16.40
5785	157	16.28	16.13	16.12
5825	165	16.30	16.14	16.14

Table 3-2
5 GHz WLAN Ant 2 Maximum RF Power

5GHz (20MHz) Conducted Power [dBm]				
Freq [MHz]	Channel	IEEE Transmission Mode		
		802.11a	802.11n	802.11ac
5180	36	16.06	15.85	15.81
5200	40	16.19	16.03	15.98
5220	44	16.10	15.92	15.91
5240	48	16.31	16.17	16.15
5260	52	16.27	16.11	16.07
5280	56	16.07	15.92	15.86
5300	60	16.25	16.07	16.09
5320	64	16.16	16.00	16.02
5500	100	16.01	15.87	15.85
5580	116	16.24	16.08	16.08
5600	120	16.01	15.83	15.81
5620	124	15.97	15.68	15.67
5640	128	15.75	15.57	15.55
5660	132	16.20	16.05	16.02
5720	144	16.16	15.98	16.00
5745	149	16.29	16.13	16.13
5785	157	16.31	16.13	16.12
5825	165	16.25	16.13	16.11

Table 3-3
5 GHz WLAN MIMO 802.11n Maximum Average RF Power

5GHz (20MHz) Conducted Power [dBm]				
Freq [MHz]	Channel	ANT1	ANT2	MIMO
5180	36	16.71	15.85	19.31
5200	40	16.69	16.03	19.38
5220	44	16.65	15.92	19.31
5240	48	16.59	16.17	19.40
5260	52	16.62	16.11	19.38
5280	56	16.74	15.92	19.36
5300	60	16.57	16.07	19.34
5320	64	16.63	16.00	19.34
5500	100	16.38	15.87	19.14
5580	116	16.17	16.08	19.14
5600	120	16.33	15.83	19.10
5620	124	16.35	15.68	19.04
5640	128	16.33	15.57	18.98
5660	132	16.33	16.05	19.20
5720	144	16.32	15.98	19.16
5745	149	16.39	16.13	19.27
5785	157	16.13	16.13	19.14
5825	165	16.14	16.13	19.15

Justification for test configurations for WLAN per KDB Publication 248227 D01v02r02:

- Power measurements were performed for the transmission mode configuration with the highest maximum output power specified for production units.
- For transmission modes with the same maximum output power specification, powers were measured for the largest channel bandwidth, lowest order modulation and lowest data rate.
- For transmission modes with identical maximum specified output power, channel bandwidth, modulation and data rates, power measurements were required for all identical configurations.
- For each transmission mode configuration, powers were measured for the highest and lowest channels; and at the mid-band channel(s) when there were at least 3 channels supported. For configurations with multiple mid-band channels, due to an even number of channels, both channels were measured. Additional channels were evaluated for conducted power measurements per manufacturer request.

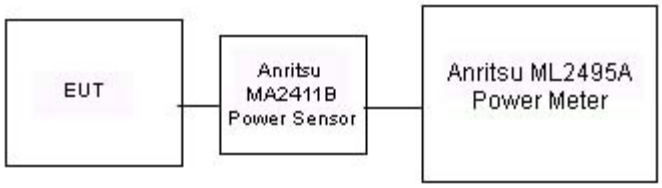

Figure 3-1
Power Measurement Setup

4 EQUIPMENT LIST

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Mini-Circuits	BW-N20W5	Power Attenuator	CBT	N/A	CBT	1226
Anritsu	ML2495A	Power Meter	10/16/2015	Biennial	10/16/2017	941001
Anritsu	MA2411B	Pulse Power Sensor	2/10/2017	Annual	2/10/2018	1339018
Seekonk	NC-100	Torque Wrench	11/6/2015	Biennial	11/6/2017	22313

CBT (Calibrated Before Testing). Prior to testing, the measurement paths containing a cable, amplifier, attenuator, coupler or filter were connected to a calibrated source (i.e. a signal generator) to determine the losses of the measurement path. The power meter offset was then adjusted to compensate for the measurement system losses. This level offset is stored within the power meter before measurements are made. This calibration verification procedure applies to the system verification and output power measurements. The calibrated reading is then taken directly from the power meter after compensation of the losses for all final power measurements.

5 CONCLUSION

5.1 Measurement Conclusion

The SAR evaluation indicates that the EUT complies with the RF radiation exposure limits of the FCC and Innovation, Science, and Economic Development Canada, with respect to all parameters subject to this test. These measurements were taken to simulate the RF effects of RF exposure under worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests. The results and statements relate only to the item(s) tested.

Please note that the absorption and distribution of electromagnetic energy in the body are very complex phenomena that depend on the mass, shape, and size of the body, the orientation of the body with respect to the field vectors, and the electrical properties of both the body and the environment. Other variables that may play a substantial role in possible biological effects are those that characterize the environment (e.g. ambient temperature, air velocity, relative humidity, and body insulation) and those that characterize the individual (e.g. age, gender, activity level, debilitation, or disease). Because various factors may interact with one another to vary the specific biological outcome of an exposure to electromagnetic fields, any protection guide should consider maximal amplification of biological effects as a result of field-body interactions, environmental conditions, and physiological variables. [3]

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