TEST REPORT

Dt&C

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1. Report No : DRTFCC1710-0220(1)

2. Customer

- Name : LG Electronics MobileComm USA, Inc.
- Address : 1000 Sylvan Ave., Englewood Cliffs, New Jersey, United States, 07632
- 3. Use of Report : FCC Original Grant
- 4. Product Name / Model Name : Mobile Phone / L-01K FCC ID : ZNFL01K
- 5. Test Method Used : KDB789033 D02v01r04 Test Specification : FCC Part 15.407 Subpart E
- 6. Date of Test : 2017.09.11 ~ 2017.10.13
- 7. Testing Environment : Refer to appended test report.
- 8. Test Result : Refer to the attached test result.

Affirmation	Tested by	/	Technical Manager	E.o.	
	Name : SunGeun Lee	(Sighature)	Name : Geunki Son	(Signature)	
The test	results presented in this test rep	ort are limited	only to the sample suppli	ed by applicant and	
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Test Report Version

Test Report No.	Date	Description
DRTFCC1710-0220	Oct. 18, 2017	Initial issue
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1. EUT DESCRIPTION

FCC Equipment Class	Unlicensed National Information Infrastructure (UNII)	
Product	Mobile Phone	
Model Name	L-01K	
Add Model Name	NA	
Power Supply	DC 3.8 V	
Modulation type	OFDM	
Antenna Specification	Antenna type: Internal Antenna Antenna gain: Refer to the clause 7 in test report.	

5GHz Band	Mode	Tx frequency (MHz)	Max power(dBm)	
	802.11a	5180 ~ 5240	18.44	
	802.11n(HT20)	5180 ~ 5240	17.25	
	802.11ac(VHT20)	5180 ~ 5240	17.22	
O-NII I	802.11n(HT40)	5190 ~ 5230	17.33	
	802.11ac(VHT40)	5190 ~ 5230	17.38	
	802.11ac(VHT80)	5210	14.95	
	802.11a	5260 ~ 5320	18.54	
	802.11n(HT20)	5260 ~ 5320	17.36	
	802.11ac(VHT20)	5260 ~ 5320	17.33	
U-INII ZA	802.11n(HT40)	5270 ~ 5310	17.52	
	802.11ac(VHT40)	5270 ~ 5310	17.45	
	802.11ac(VHT80)	5290	13.96	
	802.11a	5500 ~ 5580	18.29	
	802.11n(HT20)	5500 ~ 5580	17.33	
	802.11ac(VHT20)	5500 ~ 5580	17.30	
	802.11n(HT40)	5510 ~ 5550	17.25	
	802.11ac(VHT40)	5510 ~ 5550	17.28	
	802.11ac(VHT80)	5530	14.75	
U-INII 2C	802.11a	5660 ~ 5720	17.98	
	802.11n(HT20)	5660 ~ 5720	16.95	
	802.11ac(VHT20)	5660 ~ 5720	16.94	
	802.11n(HT40)	5670 ~ 5710	17.03	
	802.11ac(VHT40)	5670 ~ 5710	17.02	
	802.11ac(VHT80)	5690	16.74	
	802.11a	5745 ~ 5825	18.60	
	802.11n(HT20)	5745 ~ 5825	17.56	
	802.11ac(VHT20)	5745 ~ 5825	17.53	
U-INII S	802.11n(HT40)	5755 ~ 5795	17.56	
	802.11ac(VHT40)	5755 ~ 5795	17.53	
	802.11ac(VHT80)	5775	17.01	

2. Information about test items

2.1 Transmitting configuration of EUT

	SIS	0	MIMO (CDD)	MIMO (SDM)		
Mode	Ant 1	Ant 2	Ant 1 & 2	Ant 1 & 2		
	Data rate					
802.11a	6~54Mbps	6~54Mbps	6~54Mbps	-		
802.11n(HT20)	MCS 0 ~ 7	MCS 0 ~ 7	MCS 0 ~ 7	MCS 8 ~ 15		
802.11ac(VHT20)	MCS 0 ~ 8	MCS 0 ~ 8	MCS 0 ~ 8	MCS 0 ~ 8		
802.11n(HT40)	MCS 0 ~ 7	MCS 0 ~ 7	MCS 0 ~ 7	MCS 8 ~ 15		
802.11ac(VHT40)	MCS 0 ~ 9	MCS 0 ~ 9	MCS 0 ~ 9	MCS 0 ~ 9		
802.11ac(VHT80)	MCS 0 ~ 9	MCS 0 ~ 9	MCS 0 ~ 9	MCS 0 ~ 9		

Note1: SDM = Spatial Diversity Multiplexing, CDD = Cycle Delay Diversity

Note2: This device supports WiFi DBS(dual-band simultaneous) transmission operation, which allows for two SISO channels to operate independent of one another in the 2.4GHz and 5GHz bands simultaneously on each antenna. (Ant 1: 2.4GHz band transmitting & ANT 2: 5GHz band transmitting) And the test results for WiFi DBS were included in this test report.

2.2 Tested Channel Information

5GHz Band	802.11a/n(HT20)		802.11n/ac(VHT40)		802.11n/ac(VHT80)	
	Channel	Frequency [MHz]	Channel	Frequency [MHz]	Channel	Frequency [MHz]
	36	5180	38	5190	42	5210
U-NII 1	40	5200	-	-	-	-
	48	5240	46	5230	-	-
	52	5260	54	5270	58	5290
U-NII 2A	60	5300	-	-	-	-
	64	5320	62	5310	-	-
	100	5500	102	5510	106	5530
U-NII 2C	116	5580	110	5550	-	-
	144	5720	142	5710	138	5690
	149	5745	151	5755	155	5775
U-NII 3	157	5785	-	-	-	-
	165	5825	159	5795	-	-

2.3 Testing Environment

Temperature	: 20 °C ~ 27 °C
Relative humidity content	: 40 % ~ 47 % R.H.
Details of power supply	: DC 3.8 V

2.4 EMI Suppression Device(s)/Modifications

EMI suppression device(s) added and/or modifications made during testing \rightarrow None

2.5 Measurement Uncertainty

The measurement uncertainties shown below were calculated in accordance with requirements of ANSI C 63.4-2014 and ANSI C 63.10-2013. All measurement uncertainty values are shown with a coverage factor of k = 2 to indicate a 95 % level of confidence.

Test items	Measurement uncertainty
Transmitter Output Power	\pm 0.7 dB (The confidence level is about 95 %, k = 2)
Conducted spurious emission	\pm 1.0 dB (The confidence level is about 95 %, k = 2)
AC conducted emission	\pm 2.4 dB (The confidence level is about 95 %, k = 2)
Radiated spurious emission (1 GHz Below)	\pm 5.1 dB (The confidence level is about 95 %, k = 2)
Radiated spurious emission (1 GHz ~ 18 GHz)	\pm 5.4 dB (The confidence level is about 95 %, k = 2)
Radiated spurious emission (18 GHz Above)	\pm 5.3 dB (The confidence level is about 95 %, k = 2)

3. SUMMARY OF TESTS

FCC Part Section(s)	Parameter	Limit	Test Condition	Status Note 1
I. Transmitter Mode (TX)				
15.407(a)	Emission Bandwidth (26 dB Bandwidth)	N/A		С
15.407(e)	Minimum Emission Bandwidth (6 dB Bandwidth)	> 500 kHz in 5725 ~ 5850 MHz		С
15.407(a)	Maximum Conducted Output Power	5150 ~ 5250 MHz : < 23.97 dBm 5250 ~ 5350 & 5470 ~ 5725 MHz : < 250 mW or < 11 + 10 log10(B) dBm, whichever power is less. (B is the 26dB BW.) 5725 ~ 5850 MHz : < 30 dBm	Conducted	С
15.407(a)	Peak Power Spectral Density	5150 ~ 5250 MHz : 11 dBm/MHz 5250 ~ 5350 MHz : 11 dBm/MHz 5470 ~ 5725 MHz : 11 dBm/MHz 5725 ~ 5850 MHz : 30 dBm/500kHz		С
15.407(g)	Frequency Stability	N/A		С
15.407(h)	Dynamic Frequency Selection	FCC 15.407(h)		C Note 2
15.407(b)	Undesirable Emissions	5150 ~ 5725 MHz: < -27 dBm/MHz EIRP 5725 ~ 5850 MHz: < -27 dBm/MHz or < 10 dBm/MHz or 15.6 dBm/MHz < 27dBm/MHz EIRP		C Note 3, 4
15.205 15.209 15.407(b)	General Field Strength Limits(Restricted Bands and Radiated Emission Limits)		Radiated -	C Note 3, 4
15.207	AC Conducted Emissions	FCC 15.207	AC Line Conducted	С
15.203	Antenna Requirements	FCC 15.203	-	С
Note 1: C = Comply NC = Not C Note 2: Refer to the DFS test repo	Comply NT = Not Tested N.	A = Not Applicable		

Note 3: This device supports wireless charging capability.

So per KDB648474 D03 v01r04, the radiated test items were performed both normal and charging conditions. For wireless charging condition, the handset is placed on the representative charging pad under normal conditions and in a simulated call configuration. And the worst case data was reported.

Note 4: This test items were performed the all transmitting antenna configuration(SISO, MIMO). And we attached the result of MIMO mode since MIMO is the worst case.

Note 5: The sample was tested according to the following specification: KDB789033 D02v01r04, KDB662911 D01v02r01, KDB648474 D03v01r04



4. TEST METHODOLOGY

Generally the tests were performed according to the **KDB789033 D02v01r04.** And ANSI C63.10-2013 was used to reference appropriate EUT setup and maximizing procedures of radiated spurious emission and AC line conducted emission testing

4.1 EUT configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

4.2 EUT exercise

The EUT was operated in the test mode to fix the Tx frequency that was for the purpose of the measurements. According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.407 under the FCC Rules Part 15 Subpart E.

4.3 General test procedures

Conducted Emissions

The power-line conducted emission test procedure is not described on the KDB789033 D02v01r04. So this test was fulfilled with the requirements in Section 6.2 of ANSI C63.10-2013.

The EUT is placed on the wooden table, which is 0.8 m above ground plane and the conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-peak and Average detector.

Radiated Emissions

Basically the radiated tests were performed with KDB789033 D02v01r04. But some requirements and procedures like test site requirements, EUT setup and maximizing procedure were fulfilled with the requirements in Section 5 and 6 of the ANSI C63.10-2013 as stated on KDB789033 D02v01r04.

The EUT is placed on a non-conductive table, which is 0.8 m above ground plane. For emission measurements above 1 GHz, the table height is 1.5 m. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 1 or 3 m away from the receiving antenna, which varied from 1 m to 4 m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the highest emission, the relative positions of the EUT were rotated through three orthogonal axis.

4.4 Description of test modes

The EUT has been tested with all modes of operating conditions to determine the worst case emission characteristics. A test program is used to control the EUT for staying in continuous transmitting mode with maximum fixed duty cycle.



5. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

6. FACILITIES AND ACCREDITATIONS

6.1 Facilities

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The 3 m test site and conducted measurement facility used to collect the radiated data are located at the 42, Yurim-ro, 154beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea 17042. The site is constructed in conformance with the requirements.

- FCC MRA Accredited Test Firm No. : KR0034

www.dtnc.net		
Telephone	:	+ 82-31-321-2664
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6.2 Equipment

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, loop, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and peak, quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements. All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

7. ANTENNA REQUIREMENTS

According to FCC 47 CFR §15.203:

An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

The antenna is attached on the device by means of unique coupling method (Spring Tension). Therefore this E.U.T Complies with the requirement of §15.203

Directional antenna gain:

	SISO		MIMO (CDD) Note 1.	MIMO (SDM) Note 2
Bands	ANT 1 [dBi]	ANT 2 [dBi]	Directional Gain[dBi]	Directional Gain[dBi]
U-NII 1	-3.70	-2.10	+0.147	-2.827
U-NII 2A	-3.70	-2.10	+0.147	-2.827
U-NII 2C	-3.70	-2.10	+0.147	-2.827
U-NII 3	-1.90	-1.80	+1.160	-1.850

Note 1. Directional gain(correlated signal with unequal antenna gain and equal transmit power) 10 log [(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})²/N^{ANT}] dBi

Note 2. Directional gain(completely uncorrelated signal with unequal antenna gain and equal transmit power) $10 \log \left[(10^{G1/10} + 10^{G2/10} + ... + 10^{GN/10}) / N^{ANT} \right] dBi$

8. TEST RESULT

8.1 Emission Bandwidth (26 dB Bandwidth)

Test Requirements

The bandwidth at 26 dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating in transmission mode at the appropriate frequencies. The 26 dB bandwidth is used to determine the conducted output power limit.

Test Configuration

Refer to the APPENDIX I.

Test Procedure

The transmitter output is connected to the Spectrum Analyzer and used following test procedure of KDB789033 D02v01r04.

- 1. Set resolution bandwidth (RBW) = approximately 1 % of the EBW.
- 2. Set the video bandwidth (VBW) > RBW.
- 3. Detector = **Peak**.
- 4. Trace mode = **max hold**.

Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

TEST RESULTS: Comply

Mode	Band	Channel	Frequency [MHz]	Test Result [MHz]		
				ANT 1	ANT 2	
802.11a	U-NII 1	36	5180	21.53	21.20	
		40	5200	21.41	21.76	
		48	5240	21.69	21.23	
	U-NII 2A	52	5260	20.70	20.82	
		60	5300	21.05	21.33	
		64	5320	20.76	21.01	
	U-NII 2C	100	5500	21.04	21.00	
		116	5580	20.86	20.53	
		144	5720	21.05	21.52	
802.11n (HT20)	U-NII 1	36	5180	21.11	20.95	
		40	5200	20.94	20.86	
		48	5240	21.28	21.59	
	U-NII 2A	52	5260	20.86	21.31	
		60	5300	20.77	20.78	
		64	5320	21.33	20.83	
	U-NII 2C	100	5500	21.34	21.06	
		116	5580	21.33	21.57	
		144	5720	21.28	21.42	
802.11n (HT40)	U-NII 1	38	5190	40.10	40.45	
		46	5230	40.00	40.15	
	U-NII 2A	54	5270	40.10	39.81	
		62	5310	39.97	40.25	
	U-NII 2C	102	5510	39.83	39.43	
		110	5550	40.22	39.96	
		142	5710	40.16	40.39	
802.11ac (VHT80)	U-NII 1	42	5210	81.45	81.50	
		-	-	-	-	
	U-NII 2A	58	5290	81.62	81.77	
		-	-	-	-	
	U-NII 2C	106	5530	81.31	81.23	
		138	5690	81.48	81.63	

Result Plots

26 dB Bandwidth

Test Mode: 802.11a & ANT 1 & Ch.36



26 dB Bandwidth



Test Mode: 802.11a & ANT 1 & Ch.48



26 dB Bandwidth



Test Mode: 802.11a & ANT 1 & Ch.60



26 dB Bandwidth



Test Mode: 802.11a & ANT 1 & Ch.100



26 dB Bandwidth







Test Mode: 802.11n HT20 & ANT 1 & Ch.36



26 dB Bandwidth



Test Mode: 802.11n HT20 & ANT 1 & Ch.48



26 dB Bandwidth



Test Mode: 802.11n HT20 & ANT 1 & Ch.60



26 dB Bandwidth



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Test Mode: 802.11n HT20 & ANT 1 & Ch.100



26 dB Bandwidth





Test Mode: 802.11n HT40 & ANT 1 & Ch.38



26 dB Bandwidth



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Test Mode: 802.11n HT40 & ANT 1 & Ch.54



26 dB Bandwidth



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Test Mode: 802.11n HT40 & ANT 1 & Ch.102



26 dB Bandwidth



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Test Mode: 802.11ac VHT80 & ANT 1 & Ch.42



26 dB Bandwidth





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Test Mode: 802.11ac VHT80 & ANT 1 & Ch.106



26 dB Bandwidth



Test Mode: 802.11a & ANT 2 & Ch.36



26 dB Bandwidth



Test Mode: 802.11a & ANT 2 & Ch.48



26 dB Bandwidth



Test Mode: 802.11a & ANT 2 & Ch.60



26 dB Bandwidth



Test Mode: 802.11a & ANT 2 & Ch.100



26 dB Bandwidth







Test Mode: 802.11n HT20 & ANT 2 & Ch.36



26 dB Bandwidth





Test Mode: 802.11n HT20 & ANT 2 & Ch.48



26 dB Bandwidth



Test Mode: 802.11n HT20 & ANT 2 & Ch.60



26 dB Bandwidth



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Test Mode: 802.11n HT20 & ANT 2 & Ch.100



26 dB Bandwidth





Test Mode: 802.11n HT40 & ANT 2 & Ch.38



26 dB Bandwidth





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Test Mode: 802.11n HT40 & ANT 2 & Ch.54



26 dB Bandwidth



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Test Mode: 802.11n HT40 & ANT 2 & Ch.102



26 dB Bandwidth





Test Mode: 802.11ac VHT80 & ANT 2 & Ch.42



26 dB Bandwidth



Test Mode: 802.11ac VHT80 & ANT 2 & Ch.106



26 dB Bandwidth



8.2 Minimum Emission Bandwidth (6 dB Bandwidth)

Test Requirements

Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

Test Configuration

Refer to the APPENDIX I.

TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer and used following test procedure of

KDB789033 D02v01r04.

- 1. Set resolution bandwidth (RBW) = 100 kHz
- 2. Set the video bandwidth \geq 3 x RBW.
- 3. Detector = **Peak**.
- 4. Trace mode = **max hold**.

Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Modo	Band	Channel	Frequency	Test Result [MHz]	
Wode	Ballu		[MHz]	ANT 1	ANT 2
802.11a	U-NII 3	149	5745	15.05	15.08
		157	5785	15.09	15.10
		165	5825	15.04	15.07
802.11n (HT20)	U-NII 3	149	5745	15.07	15.10
		157	5785	15.10	15.05
		165	5825	15.02	15.10
802.11n (HT40)	U-NII 3	151	5755	33.88	33.87
		159	5795	33.86	33.87
802.11ac (VHT80)	U-NII 3	155	5775	72.64	72.52

TEST RESULTS: Comply

RESULT PLOTS

6 dB Bandwidth

Test Mode: 802.11a & ANT 1 & Ch.149



6 dB Bandwidth





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Test Mode: 802.11n HT20 & ANT 1 & Ch.149



6 dB Bandwidth



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Test Mode: 802.11n HT40 & ANT 1 & Ch.151



6 dB Bandwidth



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Test Mode: 802.11a & ANT 2 & Ch.149

Test Mode: 802.11a & ANT 2 & Ch.157



6 dB Bandwidth

ALIGNAUT Center Freq: 5.785000000 GHz Trig: FreqRun Avg|Hold: 300/300 #IFGain:Low #Atten: 30 dB ALIGN AUTO 05:20:04 PM Sep 28, 2017 Radio Std: None Frequency Radio Device: BTS Ref 30.00 dBm **Center Freq** 5 785000000 GHz will work hopports www.lo monter MAN when MA CF Step 4.000000 MHz Span 40 MHz Sweep 3.867 ms Center 5.785 GHz #Res BW 100 kHz <u>Auto</u> Man #VBW 300 kHz Total Power 20.8 dBm Occupied Bandwidth Freq Offset 0 Hz 16.488 MHz Transmit Freq Error 26.165 kHz **OBW Power** 99.00 % 15.10 MHz x dB Bandwidth -6.00 dB x dB



Test Mode: 802.11n HT20 & ANT 2 & Ch.149



6 dB Bandwidth



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Test Mode: 802.11n HT40 & ANT 2 & Ch.151



6 dB Bandwidth



