HCT CO., LTD.

CERTIFICATE OF COMPLIANCE

FCC Certification

Applicant Name:
LG Electronics MobileComm U.S.A., Inc.

Address:
1000 Sylvan Avenue, Englewood Cliffs NJ 07632

Date of Issue:
June 05, 2012

Test Site/Location:
HCT CO., LTD., 105-1, Jangam-ri, Majang-Myeon, Icheon-si, Kyunggi-Do, Korea

Report No.: HCTR1206FR03

HCT FRN: 0005866421

FCC ID	**: ZNFE610V**
APPLICANT	**: LG Electronics MobileComm U.S.A., Inc.**

FCC Model(s):	LG-E610v
Additional FCC Model(s):	LG-E610V, E610v, E610V, LGE610v, LGE610V
EUT Type:	Cellular/PCS GSM/GPRS Phone with Bluetooth/WLAN/NFC
Max. RF Output Power:	Wi-Fi 802.11b(24.02 dBm) / Wi-Fi 802.11g (23.34 dBm) / Wi-Fi 802.11n (21.63 dBm)
Frequency Range:	2412 MHz -2462 MHz
Modulation type	CCK/DSSS/OFDM
FCC Classification:	Digital Transmission System(DTS)
FCC Rule Part(s):	Part 15.247

Engineering Statement:

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them.

HCT CO., LTD. Certifies that no party to this application has subject to a denial of Federal benefits that includes FCC benefits pursuant to section 5301 of the Anti-Drug Abuse Act of 1998,21 U.S. C.853(a)

Jong Seok Lee

Report prepared by
: Jong Seok Lee
Test engineer of RF Team

Approved by
: Sang Jun Lee
Manager of RF Team

Version

TEST REPORT NO.	DATE	DESCRIPTION
HCTR1206FR03	June 05, 2012	- First Approval Report

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1. GENERAL INFORMATION

Applicant:	LG Electronics MobileComm U.S.A., Inc.
Address:	1000 Sylvan Avenue, Englewood Cliffs NJ 07632
FCC ID:	ZNFE610V
EUT Type:	Cellular/PCS GSM/GPRS Phone with Bluetooth/WLAN/NFC
Model name(s):	LG-E610v
Additional Model name(s):	LG-E610V, E610v, E610V, LGE610v, LGE610V
Date(s) of Tests:	May 24, 2012 ~ May 31, 2012
Contact Person:	Name: Cheol Goo Lee Phone #: +82-2-2033-1111
Place of Tests:	HCT Co., Ltd. 105-1, Jangam-ri , Majang-Myeon, Icheon-si, Kyunggi-Do, 467-811, KOREA. (IC Recognition No. : 5944A-3)

2. EUT DESCRIPTION

EUT Type	Cellular/PCS GSM/GPRS Phone with Bluetooth/WLAN/NFC	
FCC Model Name	LG-E610v	
Additional FCC Model Name	LG-E610V, E610v, E610V, LGE610v, LGE610V	
Power Supply	DC 3.7 V	
Battery type	Li-ion Battery(Standard)	
Frequency Range	TX: 2412 MHz ~ 2462 MHz RX: 2412 MHz ~ 2462 MHz	
Max. RF Output Power	Peak	Wi-Fi 802.11b(24.02 dBm) / Wi-Fi 802.11g (23.34 dBm) / Wi-Fi 802.11n (21.63 dBm)
	Average	Wi-Fi 802.11b(17.40 dBm) / Wi-Fi 802.11g (13.83 dBm) / Wi-Fi 802.11n (12.46 dBm)
Modulation Type	DSSS/CCK(802.11b), OFDM(802.11g, 802.11n)	
Antenna Specification	Manufacturer: Mobitech Antenna type: Built-in Antenna Peak Gain : -1.15 dBi	

3. TEST METHODOLOGY

The measurement procedure described in the American National Standard for Testing Unlicensed Wireless Devices(ANSI C63.10-2009) and FCC KDB 558074 D01 DTS Meas Guidance V01 dated January 18, 2012 entitled “Guidance for Performing Compliance Measurements on Digital Transmission Systems(DTS) Operating Under §15.247” were used in the measurement.

3.1 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.

3.2 EUT EXERCISE

The EUT was operated in the engineering 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 15.247 under the FCC Rules Part 15 Subpart C.

3.3 GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 6.2 of ANSI C63.10. (Version :2009) Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 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 max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 6.3 of ANSI C63.10. (Version: 2009).

3.4 DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

Channel low, mid and high with highest data rate (worst case) is chosen for full testing.

4. 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 equipments, which is traceable to recognized national standards.

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 105-1, Jangam-ri, Majang-Myeon, Icheon-si, Kyunggi-Do, 467-811, Korea. The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2003) and CISPR Publication 22. Detailed description of test facility was submitted to the Commission and accepted dated March 02, 2011 (Registration Number: 90661)

5.2 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, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and 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.”

6. 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 antennas of this E.U.T are permanently attached.

*The E.U.T Complies with the requirement of §15.203

7. SUMMARY TEST OF RESULTS

Test Description	FCC Part Section(s)	Test Limit	Test Condition	Test Result
6 dB Bandwidth	§15.247(a)(2)	> 500 kHz	CONDUCTED	PASS
Conducted Maximum Peak Output Power	§15.247(b)(3)	< 1 Watt		PASS
Power Spectral Density	§15.247(e)	< 8 dBm / 3 kHz Band		PASS
Band Edge(Out of Band Emissions)	§15.247(d)	Conducted < 20 dBc		PASS
AC Power line Conducted Emissions	§15.207	cf. Section 8.6		PASS
Radiated Spurious Emissions	§15.205, 15.209	cf. Section 8.5.1	RADIATED	PASS
Radiated Restricted Band Edge	§15.247(d), 15.205, 15.209	cf. Section 8.5.2		PASS

8. TEST RESULT

8.1 6dB BANDWIDTH (802.11b/g/n)

Test Requirements and limit, §15.247(a)(2)

The bandwidth at 6dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the receive antenna while the EUT is operating in transmission mode at the appropriate frequencies.

The minimum permissible 6dB bandwidth is 500 kHz.

▣ TEST CONFIGURATION

▣ TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer.

The Spectrum Analyzer is set to

RBW = 1 – 5 % of the EBW

VBW = 3 * RBW

SPAN = 40 MHz

Detector = Peak

Trace mode = max hold

Sweep = auto couple

▣ TEST RESULTS

Conducted 6dB Bandwidth Measurements for 802.11b

802.11b Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
2412	1	8.792	0.500	Pass
2437	6	8.465	0.500	Pass
2462	11	8.397	0.500	Pass

Conducted 6dB Bandwidth Measurements for 802.11g

802.11g Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
2412	1	16.260	0.500	Pass
2437	6	16.390	0.500	Pass
2462	11	16.310	0.500	Pass

Conducted 6dB Bandwidth Measurements for 802.11n

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
2412	1	17.380	0.500	Pass
2437	6	17.280	0.500	Pass
2462	11	17.290	0.500	Pass

▣ RESULT PLOTS

6dB Bandwidth plot (802.11b-CH 1)

6dB Bandwidth plot (802.11b-CH 6)

6dB Bandwidth plot (802.11b-CH 11)

6dB Bandwidth plot (802.11g-CH 1)

6dB Bandwidth plot (802.11g-CH 6)

6dB Bandwidth plot (802.11g-CH 11)

6dB Bandwidth plot (802.11n-CH 1)

6dB Bandwidth plot (802.11n-CH 6)

6dB Bandwidth plot (802.11n-CH 11)

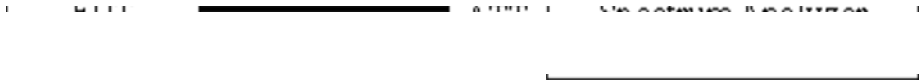
8.2 OUTPUT POWER (802.11b/g/n)

Test Requirements and limit, §15.247(b)(3)

A transmitter antenna terminal of EUT is connected to the input of a Spectrum Analyzer. Measurement is made while the EUT is operating in transmission mode at the appropriate frequencies.

The maximum permissible conducted output power is 1 Watt.

▣ TEST CONFIGURATION



▣ TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer. We use the spectrum analyzer's integrated band power measurement function. We tested according to KDB 558074(issued 1/18/2012).

This EUT TX condition is actual operating mode(not near 100 % duty cycle) by WLAN test program.

The Spectrum Analyzer is set to

- Peak Power(Measurement Procedure PK2 in KDB 558074)

RBW = 1 MHz

VBW = 3 MHz

SPAN = 5 – 30 % greater than the EBW

Detector Mode = Peak

Integrated bandwidth = EBW

Sweep = auto couple

Trace Mode = max hold

- Average Power(Measurement Procedure AVG2 in KDB 558074)

RBW = 1 MHz

VBW = 3 MHz

SPAN = 5 – 30 % greater than the EBW

Detector Mode = power averaging(RMS) or sample

Integrated bandwidth = EBW

Sweep = auto couple

Sweep Point = 1001

Trace average at least 100 traces in power averaging(RMS) mode

▣ Sample Calculation

Output Power = Reading Value + ATT loss + Cable loss(1 ea)

= 10 dBm + 10 dB + 0.8 dB = 20.8 dBm

Note :

1. Spectrum reading values are not plot data. The power results in plot is already including the actual values of loss for the attenuator and cable combination.
2. Spectrum offset = Attenuator loss + Cable loss
3. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB. Actual value of loss for the attenuator and cable combination is 10.49 dB at 2412 MHz and is 10.52 dB at 2462 MHz. So, the offset is 10.5 dB. And the offset gab in the 2.4 GHz range do not affect the conducted output power final result.

▣ TEST RESULTS-Peak

Conducted Output Power Measurements (802.11b Mode)

802.11b Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
2412	1	1 Mbps	20.30	30
		2 Mbps	20.67	30
		5.5 Mbps	21.98	30
		11 Mbps	23.59	30
2437	6	1 Mbps	20.56	30
		2 Mbps	20.67	30
		5.5 Mbps	22.33	30
		11 Mbps	24.02	30
2462	11	1 Mbps	20.67	30
		2 Mbps	20.80	30
		5.5 Mbps	22.25	30
		11 Mbps	24.01	30

Conducted Output Power Measurements (802.11g Mode)

802.11g Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
2412	1	6 Mbps	22.06	30
		9 Mbps	22.09	30
		12 Mbps	22.46	30
		18 Mbps	22.25	30
		24 Mbps	22.76	30
		36 Mbps	22.81	30
		48 Mbps	22.75	30
		54 Mbps	22.89	30
2437	6	6 Mbps	22.44	30
		9 Mbps	22.43	30
		12 Mbps	22.73	30
		18 Mbps	22.91	30
		24 Mbps	23.14	30
		36 Mbps	23.03	30
		48 Mbps	23.26	30
		54 Mbps	23.34	30
2462	11	6 Mbps	22.10	30
		9 Mbps	22.19	30
		12 Mbps	22.52	30
		18 Mbps	22.47	30
		24 Mbps	22.91	30
		36 Mbps	22.90	30
		48 Mbps	22.96	30
		54 Mbps	22.69	30

Conducted Output Power Measurements (802.11n Mode)

802.11n Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
2412	1	6.5 Mbps	21.57	30
		13 Mbps	21.30	30
		19.5 Mbps	21.42	30
		26 Mbps	21.63	30
		39 Mbps	21.59	30
		52 Mbps	21.16	30
		58.5 Mbps	21.27	30
		65 Mbps	21.08	30
2437	6	6.5 Mbps	20.85	30
		13 Mbps	20.90	30
		19.5 Mbps	21.03	30
		26 Mbps	21.47	30
		39 Mbps	21.30	30
		52 Mbps	21.28	30
		58.5 Mbps	21.24	30
		65 Mbps	21.36	30
2462	11	6.5 Mbps	20.74	30
		13 Mbps	21.01	30
		19.5 Mbps	20.83	30
		26 Mbps	21.21	30
		39 Mbps	21.14	30
		52 Mbps	21.20	30
		58.5 Mbps	21.12	30
		65 Mbps	21.04	30

▣ TEST RESULTS-Average

Conducted Output Power Measurements (802.11b Mode)

802.11b Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
2412	1	1 Mbps	17.28	30
		2 Mbps	17.03	30
		5.5 Mbps	17.40	30
		11 Mbps	17.20	30
2437	6	1 Mbps	17.05	30
		2 Mbps	16.91	30
		5.5 Mbps	17.21	30
		11 Mbps	17.12	30
2462	11	1 Mbps	17.07	30
		2 Mbps	16.87	30
		5.5 Mbps	17.32	30
		11 Mbps	16.94	30

Conducted Output Power Measurements (802.11g Mode)

802.11g Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
2412	1	6 Mbps	13.00	30
		9 Mbps	12.98	30
		12 Mbps	13.41	30
		18 Mbps	13.20	30
		24 Mbps	13.08	30
		36 Mbps	12.80	30
		48 Mbps	12.42	30
		54 Mbps	12.39	30
2437	6	6 Mbps	13.83	30
		9 Mbps	13.71	30
		12 Mbps	13.62	30
		18 Mbps	13.51	30
		24 Mbps	13.30	30
		36 Mbps	12.31	30
		48 Mbps	12.68	30
		54 Mbps	12.02	30
2462	11	6 Mbps	13.68	30
		9 Mbps	13.71	30
		12 Mbps	13.60	30
		18 Mbps	13.40	30
		24 Mbps	13.32	30
		36 Mbps	12.94	30
		48 Mbps	12.50	30
		54 Mbps	12.27	30

Conducted Output Power Measurements (802.11n Mode)

802.11n Mode		Rate	Measured	Limit
Frequency[MHz]	Channel No.	(Mbps)	Power(dBm)	(dBm)
2412	1	6.5 Mbps	11.73	30
		13 Mbps	12.01	30
		19.5 Mbps	11.81	30
		26 Mbps	11.69	30
		39 Mbps	11.04	30
		52 Mbps	11.12	30
		58.5 Mbps	10.61	30
		65 Mbps	11.03	30
2437	6	6.5 Mbps	12.45	30
		13 Mbps	12.26	30
		19.5 Mbps	12.09	30
		26 Mbps	11.90	30
		39 Mbps	11.64	30
		52 Mbps	11.35	30
		58.5 Mbps	11.20	30
		65 Mbps	11.08	30
2462	11	6.5 Mbps	12.46	30
		13 Mbps	12.22	30
		19.5 Mbps	12.10	30
		26 Mbps	11.81	30
		39 Mbps	11.63	30
		52 Mbps	11.22	30
		58.5 Mbps	11.15	30
		65 Mbps	11.07	30

▣ RESULT PLOTS-Peak

Conducted Output Power (802.11b-CH 1) 1Mbps

Conducted Output Power (802.11b-CH 1) 2Mbps

Conducted Output Power (802.11b-CH 1) 5.5Mbps

Conducted Output Power (802.11b-CH 1) 11Mbps

Conducted Output Power (802.11b-CH 6) 1Mbps

Conducted Output Power (802.11b-CH 6) 2Mbps

Conducted Output Power (802.11b-CH 6) 5.5Mbps

Conducted Output Power (802.11b-CH 6) 11Mbps

Conducted Output Power (802.11b-CH 11) 1Mbps

Conducted Output Power (802.11b-CH 11) 2Mbps

Conducted Output Power (802.11b-CH 11) 5.5Mbps

Conducted Output Power (802.11b-CH 11) 11Mbps

Conducted Output Power (802.11g-CH 1) 6Mbps

Conducted Output Power (802.11g-CH 1) 9Mbps

Conducted Output Power (802.11g-CH 1) 12Mbps

Conducted Output Power (802.11g-CH 1) 18Mbps

Conducted Output Power (802.11g-CH 1) 24Mbps

Conducted Output Power (802.11g-CH 1) 36Mbps

Conducted Output Power (802.11g-CH 1) 48Mbps

Conducted Output Power (802.11g-CH 1) 54Mbps

Conducted Output Power (802.11g-CH 6) 6Mbps

Conducted Output Power (802.11g-CH 6) 9Mbps

Conducted Output Power (802.11g-CH 6) 12Mbps

Conducted Output Power (802.11g-CH 6) 18Mbps

Conducted Output Power (802.11g-CH 6) 24Mbps

Conducted Output Power (802.11g-CH 6) 36Mbps

Conducted Output Power (802.11g-CH 6) 48Mbps

Conducted Output Power (802.11g-CH 6) 54Mbps

Conducted Output Power (802.11g-CH 11) 6Mbps

Conducted Output Power (802.11g-CH 11) 9Mbps

Conducted Output Power (802.11g-CH 11) 12Mbps

Conducted Output Power (802.11g-CH 11) 18Mbps

Conducted Output Power (802.11g-CH 11) 24Mbps

Conducted Output Power (802.11g-CH 11) 36Mbps

Conducted Output Power (802.11g-CH 11) 48Mbps

Conducted Output Power (802.11g-CH 11) 54Mbps

Conducted Output Power (802.11n-CH 1) 6.5Mbps

Conducted Output Power (802.11n-CH 1) 13Mbps

Conducted Output Power (802.11n-CH 1) 19.5Mbps

Conducted Output Power (802.11n-CH 1) 26Mbps

Conducted Output Power (802.11n-CH 1) 39Mbps

Conducted Output Power (802.11n-CH 1) 52Mbps

Conducted Output Power (802.11n-CH 1) 58.5Mbps

Conducted Output Power (802.11n-CH 1) 65Mbps

Conducted Output Power (802.11n-CH 6) 6.5Mbps

Conducted Output Power (802.11n-CH 6) 13Mbps

Conducted Output Power (802.11n-CH 6) 19.5Mbps

Conducted Output Power (802.11n-CH 6) 26Mbps

Conducted Output Power (802.11n-CH 6) 39Mbps

Conducted Output Power (802.11n-CH 6) 52Mbps

Conducted Output Power (802.11n-CH 6) 58.5Mbps

Conducted Output Power (802.11n-CH 6) 65Mbps

Conducted Output Power (802.11n-CH 11) 6.5Mbps

Conducted Output Power (802.11n-CH 11) 13Mbps

Conducted Output Power (802.11n-CH 11) 19.5Mbps

Conducted Output Power (802.11n-CH 11) 26Mbps

Conducted Output Power (802.11n-CH 11) 39Mbps

Conducted Output Power (802.11n-CH 11) 52Mbps

Conducted Output Power (802.11n-CH 11) 58.5Mbps

Conducted Output Power (802.11n-CH 11) 65Mbps

▣ RESULT PLOTS-Average

Conducted Output Power (802.11b-CH 1) 1Mbps

Conducted Output Power (802.11b-CH 1) 2Mbps

Conducted Output Power (802.11b-CH 1) 5.5Mbps

Conducted Output Power (802.11b-CH 1) 11Mbps

Conducted Output Power (802.11b-CH 6) 1Mbps

Conducted Output Power (802.11b-CH 6) 2Mbps

Conducted Output Power (802.11b-CH 6) 5.5Mbps

Conducted Output Power (802.11b-CH 6) 11Mbps

Conducted Output Power (802.11b-CH 11) 1Mbps

Conducted Output Power (802.11b-CH 11) 2Mbps

Conducted Output Power (802.11b-CH 11) 5.5Mbps

Conducted Output Power (802.11b-CH 11) 11Mbps

Conducted Output Power (802.11g-CH 1) 6Mbps

Conducted Output Power (802.11g-CH 1) 9Mbps

Conducted Output Power (802.11g-CH 1) 12Mbps

Conducted Output Power (802.11g-CH 1) 18Mbps