

EMI CERTIFICATION REPORT

Applicant:

LG Electronics MobileComm U.S.A., Inc.
1000 Sylvan Avenue, Englewood Cliffs NJ 07632

Date of Issue: September 19, 2012

Test Report No.: HCTE1209FE30

Test Site: HCT CO., LTD.

HCT FRN: 0005-8664-21

FCC ID:

ZNFE960

Rule Part(s) / Standard(s) : FCC PART 15 Subpart B Class B

Equipment Type : Cellular/PCS GSM/GPRS/EDGE and PCS WCDMA HSPA+ with
Bluetooth, RFID and WLAN

Model Name : LG-E960

Additional Model Name : LGE960, E960

Port / Connector(s) : USB Port / Headset Port

The device bearing the trade name and model specified above, has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.4-2003. (See Test Report if any modifications were made for compliance)

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.

HCT certifies that no party to application has been subject to a denial of Federal benefits that includes FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C 862



Report prepared by
: Jeong-Hyeon Choi
Test Engineer of EMC Team



Approved by
: Sang-Jun Lee
Manager of EMC Team

DOCUMENT HISTORY

The revision history for this document is shown in table.

Version	Date	Description
HCTE1209FE30	September 19, 2012	Initial Release

TABLE OF CONTENTS

	PAGE
1. GENERAL INFORMATION	4
1.1 Product Description.....	4
1.2 Related Submittal(s) / Grant(s).....	4
1.3 Tested System Details.....	5
1.4 Cable Description.....	6
1.5 Noise Suppression Parts on Cable. (I/O cable)	6
1.6 Test Methodology.....	7
1.7 Test Facility	7
1.8 Frequency Range of Radiated Measurements	7
2. SYSTEM TEST CONFIGURATION.....	8
2.1 Configuration of Test System.....	8
3. PRELIMINARY TEST	9
3.1 Conducted Emission Test	9
3.2 Radiated Emission Test	9
4. CONDUCTED AND RADIATED EMISSION TEST SUMMARY	10
4.1 Conducted Emission Test	10
4.2 Radiated Emission Test	15
5. FIELD STRENGTH CALCULATION	17
6. TEST EQUIPMENT	18
7. CONCLUSION	19

ATTACHMENT: TEST SETUP PHOTOGRAPHS

1. GENERAL INFORMATION

1.1 Product Description

Equipment Under Test is **Cellular/PCS GSM/GPRS/EDGE and PCS WCDMA HSPA+ with Bluetooth, RFID and WLAN, Model: LG-E960** manufactured by **LG Electronics MobileComm U.S.A., Inc.** Its basic purpose is used for communications.

Model	LG-E960
Additional Model Name	LGE960, E960
FCC ID	ZNFE960
IC	2703C-E960
E.U.T Type	Cellular/PCS GSM/GPRS/EDGE and PCS WCDMA HSPA+ with Bluetooth, RFID and WLAN
TX Frequency	824.20 MHz to 848.80 MHz (GSM 850) 1 850.20 MHz to 1 909.80 MHz (GSM 1 900) 1 852.4 MHz to 1 907.6 MHz (WCDMA 1 900)
RX Frequency	869.20 MHz to 893.80 MHz (GSM 850) 1 930.20 MHz to 1 989.80 MHz (GSM 1 900) 1 932.4 MHz to 1 987.6 MHz (WCDMA 1 900)

1.2 Related Submittal(s) / Grant(s)

Original submittal only.

1.3 Tested System Details

All equipment descriptions used in the tested system (including inserted cards) are:

Device Type	Manufacturer	Model Name	FCC ID / DoC	Connected To
E.U.T	LG	LG-E960	ZNFE960	Notebook PC
Notebook PC	H.P	ProBook 6560b	DoC	E.U.T Notebook PC adaptor
Notebook PC adaptor	CHICONY POWER TECHNOLOGY	Series PPP012H-S	-	Notebook PC
Mouse	Radio shack	Series 2-button mouse	FSUGMZE3	Notebook PC
USB cable	INTERFACESA MIL	EAD62330101	-	E.U.T Notebook PC
Headset	I-SOUND	EAB62691101	-	E.U.T
Net hard	LG	N1A1DD1	Doc	Notebook PC Net hard adaptor
Net hard adaptor	Yang Ming Industrial	DA-60M12	-	Net hard
RJ45 cable	-	-	-	Net hard Notebook PC

1.4 Cable Description

Product Name	Port	Power Cord Shielded (Y/N)	I/O Cable Shielded (Y/N)	Length (m)
E.U.T	Micro USB	-	Y	(D)1.2
	Headset jack	-	N	(D)1.2
Notebook PC	RJ 45	-	N	(D)1.5
	Serial (Mouse)	-	N	(D)1.8

* The marked "(D)" means the data cable and "(P)" means the power cable.

1.5 Noise Suppression Parts on Cable. (I/O cable)

Product Name	Port	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
E.U.T	Micro USB	N	N/A	Y	Both End
	Headset jack	N	N/A	Y	E.U.T End
Notebook PC	RJ 45	N	N/A	Y	N/A
	USB (Mouse)	-	-	Y	Notebook PC End

1.6 Test Methodology

Both Conducted and Radiated testing was performed according to the procedures in ANSI C63.4/2003. Radiated testing was performed at an antenna to E.U.T distance of 3 m

1.7 Test Facility

The 3 m semi anechoic chamber used to collect the test data is located at the 105-1, Jangam-Ri, Majang-Myeon, Icheon-Si, Kyoungki-Do, Republic of Korea. Those measurement facilities are constructed in conformance with the requirements of ANSI C63.4.

Detailed description of test facilities was submitted to the Commission and accepted dated Mar 02, 2011 (Registration Number: 90661)

1.8 Frequency Range of Radiated Measurements

An unintentional radiator, including a digital device, the spectrum shall be investigated from the lowest radio frequency signal generated or used in the device, without going below the lowest frequency for which a Radiated Emission limit is specified, up to the frequency shown in the following table

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705 to 108	1 000
108 to 500	2 000
500 to 1 000	5 000
Above 1 000	5 th harmonic of the highest frequency or 40 GHz, whichever is lower

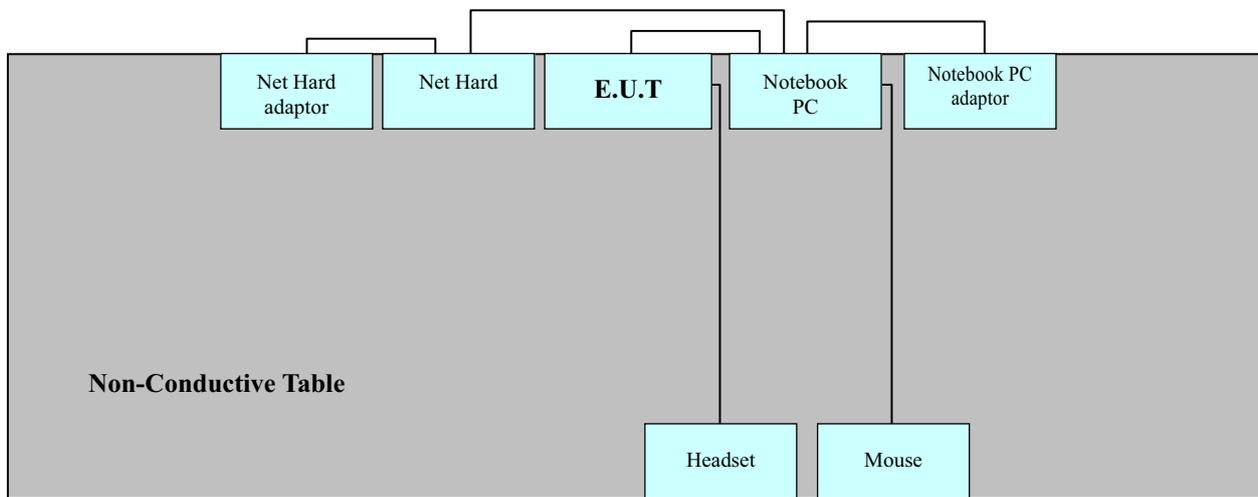
2. SYSTEM TEST CONFIGURATION

2.1 Configuration of Test System

Power Line Conducted test : E.U.T was connected to LISN via Notebook PC adaptor and Base Station. Preliminary Power Line Conducted Emission tests were performed by using the procedure in ANSI C63.4/2003 7.2.3 to determine the worst operating conditions.

Radiated Emission test : Preliminary Radiated Emission tests were performed by using the procedure in ANSI C63.4/2003 8.3.1.1 to determine the worst operating condition. Final Radiated Emission tests were performed at 3 m semi-anechoic chamber.

[Configuration of Tested System]



Power Line: 120 VAC

3. PRELIMINARY TEST

3.1 Conducted Emission Test

- It was tested Data Communication mode, after connecting all peripheral devices.

Operation Mode: Data communication mode

3. 2 Radiated Emission Test

- It was tested Data Communication mode, after connecting all peripheral devices.

Operation Mode: Data communication mode

4. CONDUCTED AND RADIATED EMISSION TEST SUMMARY

4.1 Conducted Emission Test

The following table shows the highest levels of conducted emissions on both polarization of hot and neutral line.

Limit Apply to	: FCC PART 15 Subpart B Class B
Detector	: Quasi-Peak, Average (6 dB Bandwidth: 9 kHz)
Operation Mode	: Data communication mode
Temperature	: 25.3 °C
Humidity Level	: 52.8 %
Test Date	: September 18, 2012

Frequency (MHz)	Transd (dB)	Conductor	Quasi-Peak			Average		
			Limit	Measurement Level	Result Level	Limit	Measurement Level	Result Level
			(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dBuV)
0.366	9.8	H	59	-	-	49	24.20	34.00
0.499	9.8	H	56	-	-	46	20.10	29.90
0.608	10.0	N	56	-	-	46	17.40	27.40
0.864	9.8	H	56	-	-	46	18.70	28.50
1.304	10.0	N	56	-	-	46	19.40	29.40
2.448	10.2	N	56	-	-	46	19.40	29.60

※ **NOTE:** Refer to page 11 to page 14 for details.

1. Line H = Hot, Line N = Neutral
2. Transd = LISN factor + Cable Loss factor

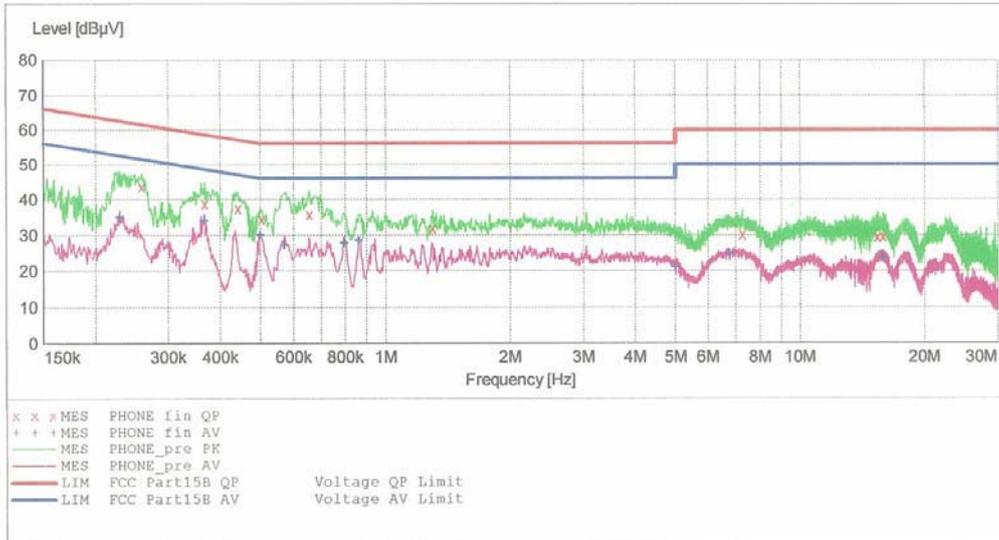
HCT

EMC

EUT: E960
 Manufacturer: LG
 Operating Condition: DATA MODE
 Test Site: SHIELD ROOM
 Operator: JH CHOI
 Test Specification: FCC PART 15 B
 Comment: H

SCAN TABLE: "FCC PART 15 B(H)"

Short Description:			FCC PART 15 CLASS B			
Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	500.0 kHz	1.0 kHz	MaxPeak	10.0 ms	9 kHz	None
500.0 kHz	5.0 MHz	4.0 kHz	Average	10.0 ms	9 kHz	None
5.0 MHz	30.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			



MEASUREMENT RESULT: "PHONE_fin QP"

9/18/2012 4:35PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.259010	43.70	9.8	62	17.8	---	---
0.367010	38.90	9.8	59	19.7	---	---
0.442010	37.50	9.8	57	19.5	---	---
0.504000	34.40	9.8	56	21.6	---	---
0.656000	35.80	9.8	56	20.2	---	---
1.304000	31.80	9.8	56	24.2	---	---
7.264000	30.10	10.3	60	29.9	---	---
15.364000	29.40	11.0	60	30.6	---	---
15.852000	29.50	11.1	60	30.5	---	---

MEASUREMENT RESULT: "PHONE_fin AV"

9/18/2012 4:35PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.229010	34.90	9.8	53	17.6	---	---
0.366010	34.00	9.8	49	14.6	---	---
0.499010	29.90	9.8	46	16.1	---	---
0.572000	27.10	9.8	46	18.9	---	---
0.796000	27.80	9.8	46	18.2	---	---
0.864000	28.50	9.8	46	17.5	---	---
5.000000	21.10	10.2	46	24.9	---	---
6.744000	24.70	10.3	50	25.3	---	---
15.852000	23.80	11.1	50	26.2	---	---

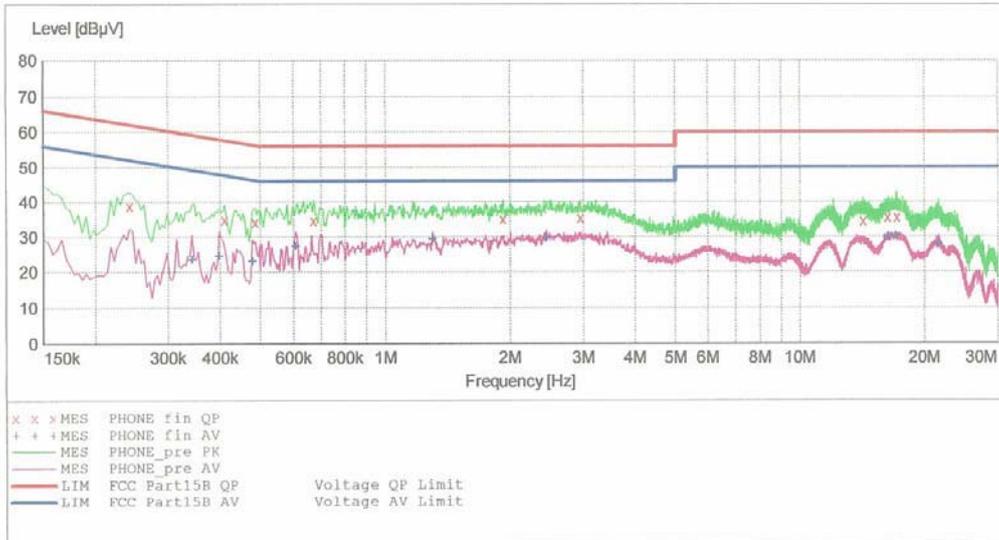
HCT

EMC

EUT: E960
 Manufacturer: LG
 Operating Condition: DATA MODE
 Test Site: SHIELD ROOM
 Operator: JH CHOI
 Test Specification: FCC PART 15 CLASS B
 Comment: N

SCAN TABLE: "FCC PART 15 B(N)"

Short Description:			FCC PART 15 CLASS B			
Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	500.0 kHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			
500.0 kHz	5.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			
5.0 MHz	30.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			



MEASUREMENT RESULT: "PHONE_fin QP"

9/18/2012 4:27PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.242010	38.80	10.0	62	23.2	---	---
0.410010	34.90	10.0	58	22.8	---	---
0.486010	34.20	10.0	56	22.0	---	---
0.672000	34.60	10.0	56	21.4	---	---
1.924000	35.00	10.1	56	21.0	---	---
2.960000	35.40	10.2	56	20.6	---	---
14.228000	34.40	11.2	60	25.6	---	---
16.320000	35.50	11.5	60	24.5	---	---
17.120000	35.60	11.6	60	24.4	---	---

MEASUREMENT RESULT: "PHONE_fin AV"

9/18/2012 4:27PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.342010	23.60	9.9	49	25.5	---	---
0.398010	24.60	10.0	48	23.3	---	---
0.478010	23.20	10.0	46	23.2	---	---
0.608000	27.40	10.0	46	18.6	---	---
1.304000	29.40	10.0	46	16.6	---	---
2.448000	29.60	10.2	46	16.4	---	---
16.300000	29.80	11.5	50	20.2	---	---
17.036000	30.10	11.6	50	19.9	---	---
21.628000	27.90	12.2	50	22.1	---	---

4.2 Radiated Emission Test

The following table shows the highest levels of Radiated Emissions on both polarization of horizontal and vertical.

-For measurement below 1 GHz

Limit Apply to : FCC PART 15 Subpart B Class B

Detector : Quasi-Peak (6 dB Bandwidth: 120 kHz)

Operation Mode : Data communication mode

Temperature : 25.0 °C

Humidity Level : 51.3 %

Test Date : September 12, 2012

Frequency (MHz)	Reading (dBuV)	Polarity (H/V)	Antenna Height (m)	Correction Factor		Limit (dBuV/m)	Level (dBuV/m)	Margin (dB)
				Antenna (dB/m)	Cable (dB)			
41.600	13.29	V	1.0	13.31	3.50	40.0	30.1	9.9
57.200	11.23	V	1.2	13.47	3.60	40.0	28.3	11.7
117.400	19.25	V	1.5	11.07	3.97	43.5	34.3	9.2
126.700	15.84	V	1.1	11.66	4.00	43.5	31.5	12.0
144.600	16.78	V	1.0	12.47	4.05	43.5	33.3	10.2
232.100	15.05	V	1.5	11.52	4.43	46.0	31.0	15.0

-For measurement above 1 GHz

Limit Apply to : FCC PART 15 Subpart B Class B

Detector : Peak mode: Peak (RBW: 1 MHz, VBW: 1 MHz)
 : Average mode: Peak (RBW: 1 MHz, VBW: 1 MHz)

Temperature : 25.0 °C

Humidity Level : 51.3 %

Test Date : September 12, 2012

Frequency (GHz)	Peak			POL	Average		
	Total (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)		Total (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
2.0000	49.90	74	24.1	V	30.00	54	24.0
5.4300	51.70	74	22.3	V	35.90	54	18.1

※ NOTE:

1. Measurement above 1 GHz was performed from 1 GHz to the 5th harmonic of highest fundamental frequency. Test was measured by 12 GHz.

5. FIELD STRENGTH CALCULATION

The field strength is calculated by adding the antenna factor and cable factor.
The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF$$

Where FS = Field Strength

RA = Receiver Amplitude

AF = Antenna Factor

CF = Cable Attenuation Factor

Assume a receiver reading of 21.5 dB μ V is obtained. The antenna factor of 7.4 dB/m and a cable factor of 1.1 dB are added. The 30 dB μ V/m value is mathematically converted to its corresponding level in μ V/m.

$$FS = 21.5 + 7.4 + 1.1 = 30 \text{ dB}\mu\text{V/m}$$

[Radiated Emission Limits]

Frequency of Emission (MHz)	Field Strength	
	μ V/m	dB μ V/m
30 to 88	100	40.0
88 to 216	150	43.5
216 to 960	200	46.0
Above 960	500	54.0

6. TEST EQUIPMENT

<u>Type</u>	<u>Manufacturer</u>	<u>Model Name</u>	<u>Serial Number</u>	<u>Calibration Cycle</u>	<u>Next CAL Date</u>
<u>Conducted Emission</u>					
<input checked="" type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESCI	100584	1 year	2013.05.02
<input type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESCI	100033	1 year	2013.06.18
<input type="checkbox"/> LISN	Rohde & Schwarz	ESH3-Z5	100282	1 year	2013.07.04
<input checked="" type="checkbox"/> LISN	Rohde & Schwarz	ENV216	100073	1 year	2013.02.09
<input checked="" type="checkbox"/> LISN	EMCO	3816/2SH	9706-1070	1 year	2013.05.02
<input type="checkbox"/> Attenuator	Rohde & Schwarz	ESH3-Z2	357.8810.352	1 year	2013.07.31
<u>Radiated Emission</u>					
<input checked="" type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESI40	831564103	1 year	2013.05.03
<input type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESU26	100241	1 year	2013.07.30
<input type="checkbox"/> Trilog Antenna	Schwarzbeck	VULB9160	3125	2 year	2013.05.03
<input checked="" type="checkbox"/> Trilog Antenna	Schwarzbeck	VULB9168	185	2 year	2013.02.08
<input checked="" type="checkbox"/> Antenna master	HD GmbH	MA240	240/520	N/A	-
<input type="checkbox"/> Antenna master	INNCO Systems	MA4000-EP	MA4000/283	N/A	-
<input type="checkbox"/> Turn Table	INNCO Systems	DT3000-3T	DT3000/69	N/A	-
<input checked="" type="checkbox"/> Turn Table	HD GmbH	2090	9702/1224	N/A	-
<input checked="" type="checkbox"/> Power Amplifier	Rohde & Schwarz	SCU-18	10094	1 year	2013.09.11
<input type="checkbox"/> Horn Antenna	Schwarzbeck	BBHA 9120D	147	2 year	2013.05.15
<input type="checkbox"/> Horn Antenna	Schwarzbeck	BBHA 9120D	937	2 year	2013.10.17
<input checked="" type="checkbox"/> Horn Antenna	Schwarzbeck	BBHA 9120D	296	2 year	2014.02.20

7. CONCLUSION

The data collected shows that the **E.U.T Type: Cellular/PCS GSM/GPRS/EDGE and PCS WCDMA HSPA+ with Bluetooth, RFID and WLAN, Model: LG-E960, FCC ID: ZNFE960** complies with §15.107 and §15.109 of the FCC rules.