



HCT CO., LTD.

CERTIFICATION DIVISION

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EMI CERTIFICATION REPORT

Applicant:

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

Date of Issue: May 13, 2013

Test Report No.: HCTE1305FE12

Test Site: HCT CO., LTD.

HCT FRN: 0005-8664-21

FCC ID:

ZNFE410G

Rule Part(s) / Standard(s) : FCC PART 15 Subpart B Class B
Equipment Type : GSM/WCDMA Phone with Bluetooth3.0, WIFI802.11 b/g/n
Model Name : LG-E410g
Additional Model Name : LGE410g, E410g, LG-E410B, LGE410B, E410B
Port / Connector(s) : USB / Earphone Port
Date of Test : May 06, 2013 – May 10, 2013

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


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DOCUMENT HISTORY

The revision history for this document is shown in table.

Version	Date	Description
HCTE1305FE12	May 13, 2013	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 **EUT type: GSM/WCDMA Phone with Bluetooth3.0, WIFI802.11 b/g/n, Model: LG-E410g** manufactured by **LG Electronics MobileComm U.S.A., Inc.** Its basic purpose is used for communications.

Model	LG-E410g
FCC ID	ZNFE410G
Additional Model	LGE410g, E410g, LG-E410B, LGE410B, E410B
EUT Type	GSM/WCDMA Phone with Bluetooth3.0, WIFI802.11 b/g/n
TX Frequency	824.2 MHz ~ 848.80 MHz (GSM 850) 1850.20 MHz ~ 1909.80 MHz (GSM 1900) 1852.4 MHz ~ 1907.6 MHz (WCDMA B2) 826.40 MHz ~ 846.60 MHz (WCDMA B5)
RX Frequency	869.20 MHz ~ 893.80 MHz (GSM 850) 1930.20 MHz ~ 1989.80 MHz (GSM 1900) 1932.4 MHz ~ 1987.6 MHz (WCDMA B2) 871.40 MHz ~ 891.60 MHz (WCDMA B5)

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
EUT	LG	LG-E410g	ZNFE410G	Notebook PC Ear-phone
USB cable	IS	EAD62377901	-	E.U.T Notebook PC
Ear-phone	I-SOUND	EAB62808211	-	E.U.T
Notebook PC	H.P	ProBook6560b	DoC	EUT Notebook PC adaptor
Notebook PC adaptor	CHICONY POWER TECHNOLOGY	Series PPP012H-S	-	Notebook PC
Mouse	Radio shack	Series 2-button mouse	FSUGMZE3	Notebook PC
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
Micro SD card	SanDisk	8 GB	-	E.U.T

1.4 Cable Description

Product Name	Port	Power Cord Shielded (Y/N)	I/O Cable Shielded (Y/N)	Length (m)
EUT	Micro USB	Y	Y	(P,D)1.1
	Ear-phone	N/A	Y	(D)1.2
Notebook PC	RJ 45	N/A	N	(D)1.5
	Serial (Mouse)	N/A	Y	(D)1.8
	DC in	N	N/A	(P)1.8
Net hard	DC in	N	N/A	(P)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
EUT	Micro USB	N	N/A	Y	Both End
	Ear-phone	N	N/A	Y	EUT End
Notebook PC	RJ 45	N	N/A	N	N/A
	Serial (Mouse)	N	N/A	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 EUT distance of 3 m

1.7 Test Facility

Chamber used to collect the test data is located at the 74, SEOICHEON-RO, 578BEON-GIL, MAJANG-MYEON, ICHEON-SI, GYEONGGI-DO, KOREA. Those measurement facilities are constructed in conformance with the requirements of ANSI C63.4.

Measurement Facilities	Reg. No.
Radiated Field strength measurement facility (3m)	90661(Mar. 02, 2011)
Radiated Field strength measurement facility (10m)	90661 (Sep. 03, 2010)

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

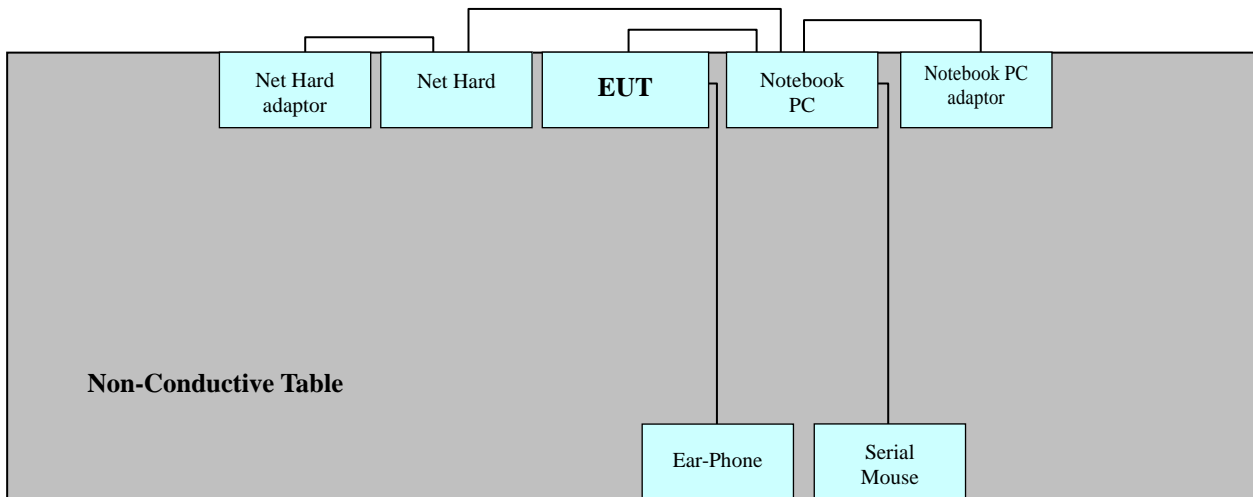
2.1.1 Conducted Emission Test

EUT 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.

2.1.2 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	: 23.4 °C
Humidity Level	: 39.1 %
Test Date	: May 10, 2013

Frequency (MHz)	Transd (dB)	Conductor	Quasi-Peak			Average		
			Limit	Measurement Level	Result Level	Limit	Measurement Level	Result Level
			(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dBuV)
0.596	9.8	H	56	25.3	35.1	46	-	-
0.724	10.0	N	56	-	-	46	13.10	23.10
0.708	9.8	H	56	-	-	46	16.50	26.30
1.076	10.1	N	56	-	-	46	14.00	24.10
1.136	10.1	N	56	-	-	46	14.30	24.40
1.468	9.9	H	56	-	-	46	16.70	26.60

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

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

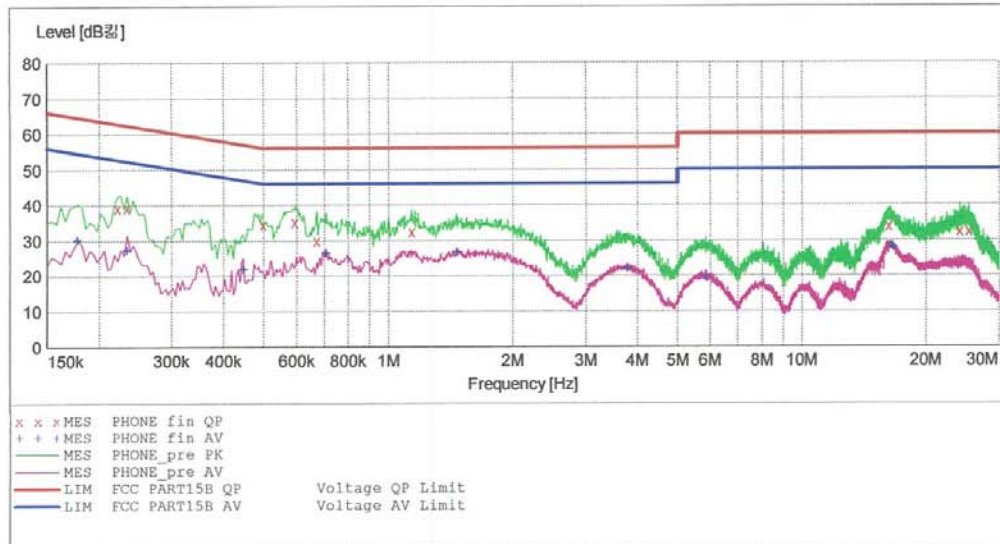
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EMC TEST LAB

EUT: ~~LG-410G~~ LG-EH09
 Manufacturer: LG
 Operating Condition: DATA MODE
 Test Site: SHIELD ROOM
 Operator: GC YOON
 Test Specification: FCC PART15 B
 Comment: H

SCAN TABLE: "FCC CLASS B(H)"

Short Description:			KN22 CLASS B			
Start	Stop	Step	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"

2013-05-10 9:21오전

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.222001	39.10	9.8	63	23.6	---	---
0.234001	39.20	9.8	62	23.1	---	---
0.498001	34.50	9.8	56	21.5	---	---
0.596000	35.10	9.8	56	20.9	---	---
0.672000	30.00	9.8	56	26.0	---	---
1.140000	32.40	9.9	56	23.6	---	---
16.276000	33.90	10.8	60	26.1	---	---
24.152000	32.40	11.1	60	27.6	---	---
25.368000	32.40	11.2	60	27.6	---	---

MEASUREMENT RESULT: "PHONE_fin AV"

2013-05-10 9:21오전

Frequency MHz	Level dB _{μV}	Transd dB	Limit dB _{μV}	Margin dB	Line	PE
0.178001	30.10	9.8	55	24.4	---	---
0.234001	27.20	9.8	52	25.1	---	---
0.446001	21.90	9.8	47	25.1	---	---
0.708000	26.30	9.8	46	19.7	---	---
1.468000	26.60	9.9	46	19.4	---	---
3.784000	22.00	10.1	46	24.0	---	---
5.860000	19.60	10.2	50	30.4	---	---
16.468000	28.30	10.8	50	21.7	---	---
16.632000	28.00	10.8	50	22.0	---	---

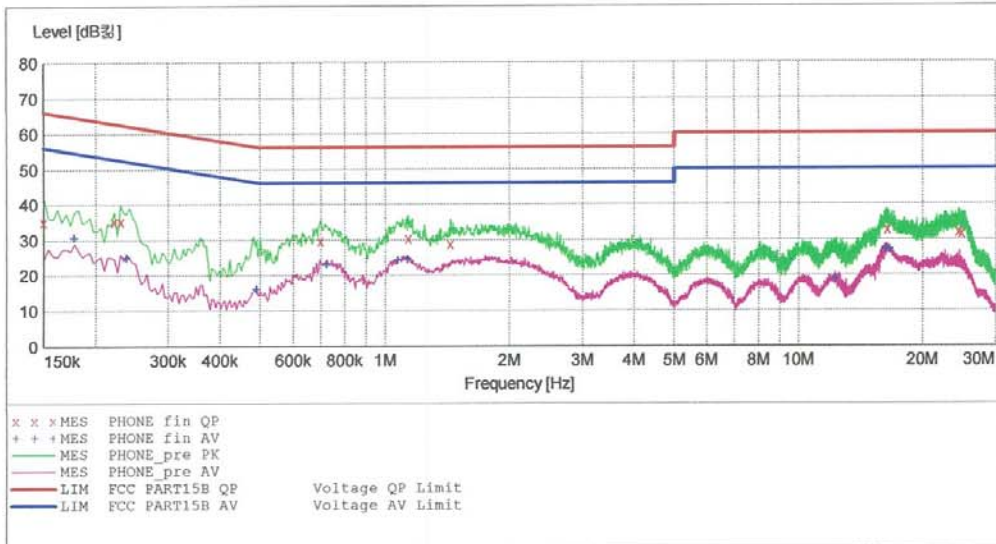
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EMC TEST LAB

EUT: LG-E410g
 Manufacturer: LG
 Operating Condition: DATA MODE
 Test Site: SHIELD ROOM
 Operator: GC YOON
 Test Specification: FCC PART15 B
 Comment: N

SCAN TABLE: "FCC CLASS B(N)"

Short Description:			KN22 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
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	10.0 ms	9 kHz	None



MEASUREMENT RESULT: "PHONE_fin_QP"

2013-05-10 9:24오전

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.150001	35.00	10.0	66	31.0	---	---
0.222001	35.20	10.0	63	27.6	---	---
0.230001	35.30	10.0	62	27.2	---	---
0.700000	29.60	10.0	56	26.4	---	---
1.140000	30.40	10.1	56	25.6	---	---
1.444000	28.80	10.1	56	27.2	---	---
16.424000	32.70	11.1	60	27.3	---	---
24.396000	32.00	11.5	60	28.0	---	---
24.828000	31.70	11.5	60	28.3	---	---

MEASUREMENT RESULT: "PHONE_fin AV"

2013-05-10 9:24오전

Frequency MHz	Level dB _{μV}	Transd dB	Limit dB _{μV}	Margin dB	Line	PE
0.178001	30.60	10.0	55	24.0	---	---
0.238001	24.80	10.0	52	27.4	---	---
0.490001	16.10	10.0	46	30.0	---	---
0.724000	23.10	10.0	46	22.9	---	---
1.076000	24.10	10.1	46	21.9	---	---
1.136000	24.40	10.1	46	21.6	---	---
12.252000	18.80	10.9	50	31.2	---	---
16.196000	27.10	11.1	50	22.9	---	---
16.628000	27.00	11.1	50	23.0	---	---

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 : 24.7 °C

Humidity Level : 37.0 %

Test Date : May 06, 2013

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)			
46.000	13.94	V	1.1	12.42	3.54	40.0	29.9	10.1
47.600	17.34	V	1.0	12.41	3.55	40.0	33.3	6.7
49.100	16.74	V	1.0	12.40	3.56	40.0	32.7	7.3
51.000	12.49	V	1.1	12.34	3.57	40.0	28.4	11.6
59.000	13.51	V	1.0	11.86	3.63	40.0	29.0	11.0
824.400	3.83	H	1.0	22.77	5.80	46.0	32.4	13.6

-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: 10 Hz)

Operation Mode : Data Communication mode

Temperature : 23.8 °C

Humidity Level : 40.2 %

Test Date : May 09, 2013

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)
1.3307	44.80	74	29.2	V	32.10	54	21.9
2.9941	47.20	74	26.8	V	35.40	54	18.6

※ 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	2014.04.25
<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	EMCO	3816/2SH	9706-1070	1 year	2014.04.26
<input checked="" type="checkbox"/> LISN	Rohde & Schwarz	ENV216	100073	1 year	2014.02.06
<input type="checkbox"/> Attenuator	Rohde & Schwarz	ESH3-Z2	357.8810.352	1 year	2013.07.31
<u>Radiated Emission</u>					
<input type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESU26	100241	1 year	2013.07.30
<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"/> EMI Test Receiver	Rohde & Schwarz	ESI40	831564103	1 year	2014.04.16
<input checked="" type="checkbox"/> Trilog Antenna	Schwarzbeck	VULB9160	3301	2 year	2014.12.17
<input checked="" type="checkbox"/> Antenna master	HD GmbH	MA240	240/520	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 checked="" type="checkbox"/> Horn Antenna	Schwarzbeck	BBHA 9120D	296	2 year	2014.12.13

7. CONCLUSION

The data collected shows that the **EUT type: GSM/WCDMA Phone with Bluetooth3.0, WIFI802.11 b/g/n, Model: LG-E410g, FCC ID: ZNFE410G** complies with §15.107 and §15.109 of the FCC rules.