



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: July 10, 2013

Test Report No.: HCTE1307FE04-1

Test Site: HCT CO., LTD.

HCT FRN: 0005-8664-21

FCC ID:


ZNFE410I

Rule Part(s) / Standard(s) : FCC PART 15 Subpart B Class B
Equipment Type : GSM Phone with Bluetooth3.0, WIFI802.11 b/g/n
Model Name : LG-E410i
Additional Model Name : LGE410i, E410i
Port / Connector(s) : USB / Earphone Port
Date of Test : June 28, 2013 - July 01, 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
HCTE1307FE04	July 02, 2013	Initial Release
HCTE1307FE04-1	July 10, 2013	Change additional model name.

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	11
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 Phone with Bluetooth3.0, WIFI802.11 b/g/n, Model: LG-E410i** manufactured by **LG Electronics MobileComm U.S.A., Inc.** Its basic purpose is used for communications.

Model Name	LG-E410i
FCC ID	ZNFE410I
Additional Model Name	LGE410i, E410i
EUT Type	GSM Phone with Bluetooth3.0, WIFI802.11 b/g/n
TX Frequency	824.20 MHz to 848.80 MHz (GSM 850) 1 850.20 MHz to 1 909.80 MHz (GSM 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)

1.2 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-E410i	ZNFE410I	Notebook PC Ear-phone
USB cable	INTERFACESAMIL	IFS00015	-	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
Adaptor	Yang Ming Industrial	DA-60M12	-	Gateway
Gateway	Axesstel	MV440R	-	Notebook PC, Adaptor
RJ45 cable	-	-	-	Notebook PC, Gateway
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)1.0
	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
Gateway	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

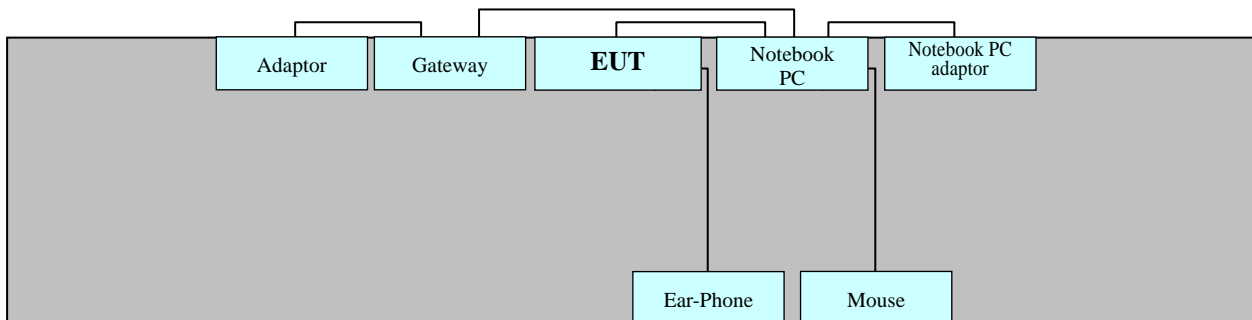
2.1.1 Conducted Emission Test

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]



Non-Conductive Table
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	: 22.9 °C
Humidity Level	: 47.3 %
Test Date	: July 01, 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)
0.490	9.8	H	56	24.5	34.3	46	-	-
0.592	9.8	H	56	24.5	34.3	46	-	-
0.720	10.0	N	56	-	-	46	14.3	24.3
1.116	9.9	H	56	-	-	46	15.4	25.3
1.480	10.1	N	56	21.8	31.9	46	15.9	26.0
16.192	11.1	N	60	-	-	50	16.9	28.0

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

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

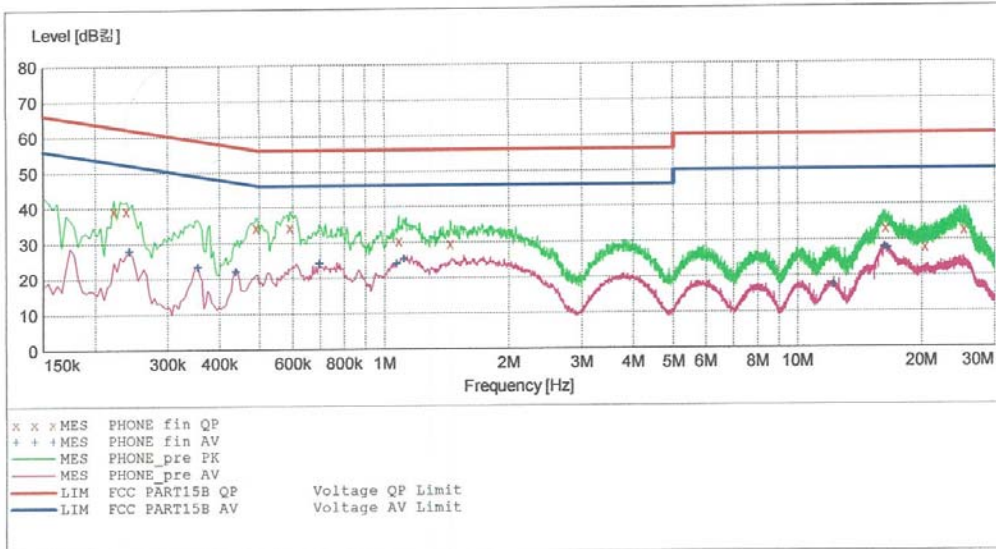
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EUT: LG-E410i
 Manufacturer: LG
 Operating Condition: DATA MODE
 Test Site: SHIELD ROOM
 Operator: GC YOON
 Test Specification: FCC PART15 B
 Comment: H

SCAN TABLE: "FCC CLASS B(H)"

Short Description:			KN22 CLASS B				
Start 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"

2013-07-01 11:01오전

Frequency MHz	Level dB	Transd dB	Limit dB	Margin dB	Line	PE
0.222001	39.20	9.8	63	23.5	---	---
0.238001	39.20	9.8	62	22.9	---	---
0.490001	34.30	9.8	56	21.8	---	---
0.592000	34.30	9.8	56	21.7	---	---
1.084000	30.30	9.9	56	25.7	---	---
1.448000	29.50	9.9	56	26.5	---	---
16.340000	33.20	10.8	60	26.8	---	---
20.384000	27.70	10.9	60	32.3	---	---
25.296000	32.50	11.2	60	27.5	---	---

MEASUREMENT RESULT: "PHONE_fin AV"

2013-07-01 11:01오전

Frequency MHz	Level dB _{μV}	Transd dB	Limit dB _{μV}	Margin dB	Line	PE
0.242001	27.90	9.8	52	24.1	---	---
0.354001	23.30	9.8	49	25.6	---	---
0.438001	22.00	9.8	47	25.1	---	---
0.696000	24.20	9.8	46	21.8	---	---
1.072000	24.00	9.8	46	22.0	---	---
1.116000	25.30	9.9	46	20.7	---	---
12.216000	17.30	10.6	50	32.7	---	---
16.212000	27.90	10.8	50	22.1	---	---
16.516000	27.50	10.8	50	22.5	---	---

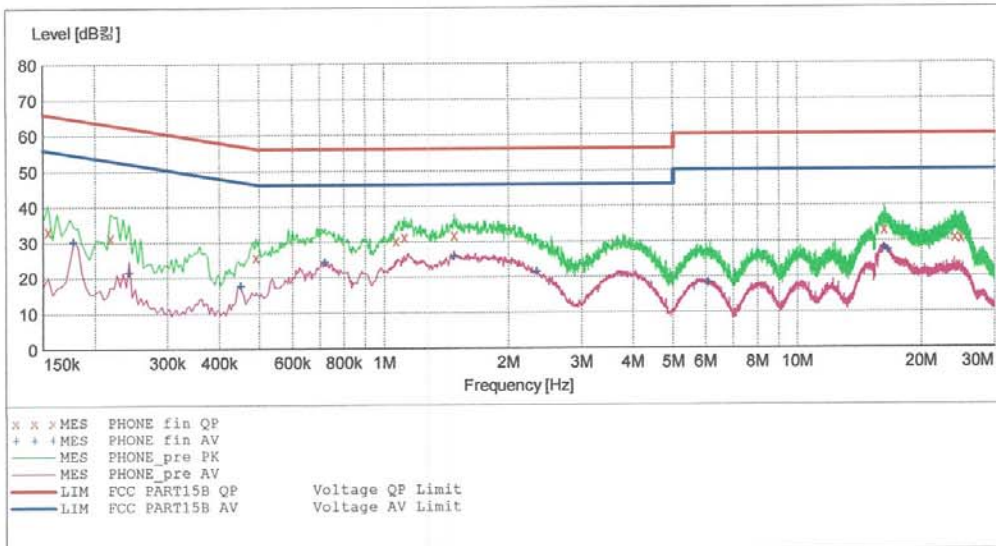
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EMC

EUT: LG-E410i
 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"

2013-07-01 11:05오전

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.154001	33.40	10.0	66	32.4	---	---
0.218001	31.50	10.0	63	31.4	---	---
0.490001	25.80	10.0	56	30.4	---	---
1.068000	30.50	10.1	56	25.5	---	---
1.120000	31.40	10.1	56	24.6	---	---
1.480000	31.90	10.1	56	24.1	---	---
16.204000	33.20	11.1	60	26.8	---	---
24.068000	31.00	11.5	60	29.0	---	---
24.920000	30.80	11.5	60	29.2	---	---

MEASUREMENT RESULT: "PHONE_fin AV"

2013-07-01 11:05오전

Frequency MHz	Level dB _{μV}	Transd dB	Limit dB _{μV}	Margin dB	Line	PE
0.178001	30.20	10.0	55	24.4	---	---
0.242001	21.60	10.0	52	30.4	---	---
0.450001	17.60	10.0	47	29.2	---	---
0.720000	24.30	10.0	46	21.7	---	---
1.480000	26.00	10.1	46	20.0	---	---
2.340000	21.50	10.2	46	24.5	---	---
6.088000	18.20	10.4	50	31.8	---	---
16.192000	28.00	11.1	50	22.0	---	---
16.596000	27.20	11.1	50	22.8	---	---

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 : 24.0 °C

Humidity Level : 53.1 %

Test Date : June 28, 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)			
43.500	15.08	V	1.0	12.29	3.52	40.0	30.9	9.1
48.900	14.14	V	1.0	12.40	3.56	40.0	30.1	9.9
61.000	11.77	V	1.0	11.68	3.65	40.0	27.1	12.9
84.600	19.75	V	1.3	7.77	3.78	40.0	31.3	8.7
120.300	14.31	H	1.0	11.78	4.01	43.5	30.1	13.4
264.400	11.32	V	1.0	12.24	4.54	46.0	28.1	17.9

-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 : 24.0 °C

Humidity Level : 53.1 %

Test Date : June 28, 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)
1.9722	46.20	74	27.8	V	29.40	54	24.6

※ 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 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

Radiated Emission

-For measurement below 1 GHz

<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	-

-For measurement above 1 GHz

<input checked="" type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESI40	831564103	1 year	2014.04.16
<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 Phone with Bluetooth3.0, WIFI802.11 b/g/n, FCC ID: ZNFE410I, Model: LG-E410i** complies with §15.107 and §15.109 of the FCC rules.