



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: April 03, 2013

Test Report No.: HCTE1304FE07

Test Site: HCT CO., LTD.

HCT FRN: 0005-8664-21

FCC ID:

ZNFE440F

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-E440f

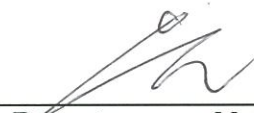
Additional Model(s) : LGE440f, E440f

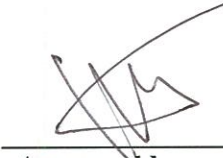
Port / Connector(s) : USB Port / Headset Port

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


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DOCUMENT HISTORY

The revision history for this document is shown in table.

Version	Date	Description
HCTE1304FE07	April 03, 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-E440f** manufactured by **LG Electronics MobileComm U.S.A., Inc.** Its basic purpose is used for communications.

Model	LG-E440f
FCC ID	ZNFE440F
Additional Model(s)	LGE440f, E440f
EUT Type	GSM/WCDMA 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) 826.40 MHz to 846.60 MHz (WCDMA 850)
RX Frequency	869.20 MHz to 893.80 MHz (GSM 850) 1 930.20 MHz to 1 989.80 MHz (GSM 1 900) 871.40 MHz to 891.60 MHz (WCDMA 850)

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-E440f	ZNFE440F	Notebook PC Headset
USB cable	Interfacesamil Co.	EAD62377901	-	E.U.T Notebook PC
Headset	I-SOUND	EAB62808711	-	E.U.T
Notebook PC	H.P	ProBook 6560b	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
	Headset jack	-	N	(D)1.2
Notebook PC	RJ 45	-	N	(D)1.5
	Serial (Mouse)	-	Y	(D)1.8
Net hard	DC in	N	-	(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
	Headset jack	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

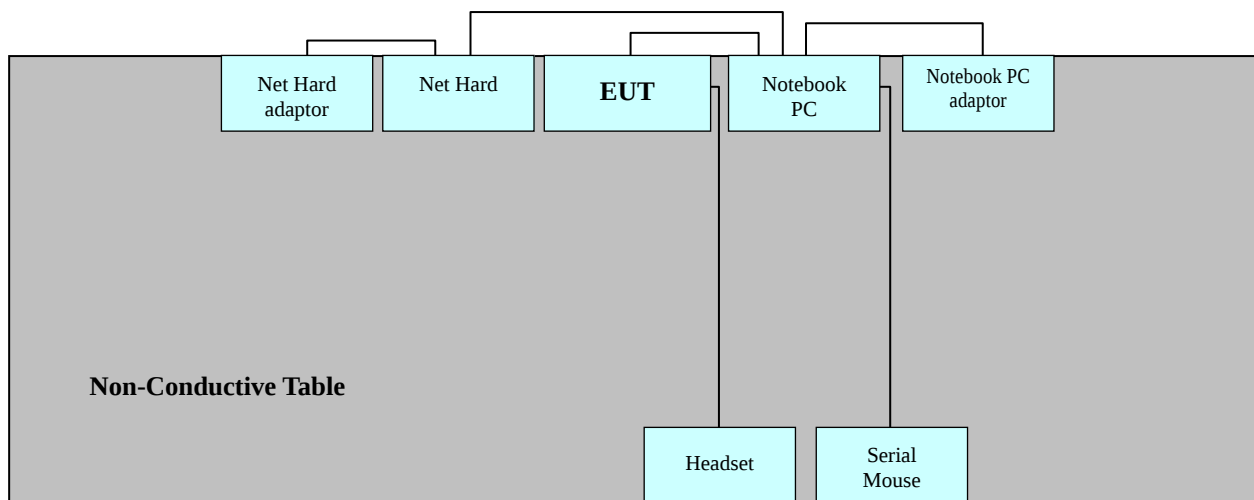
2. SYSTEM TEST CONFIGURATION

2.1 Configuration of Test System

Power Line Conducted 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.

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 mode

3. 2 Radiated Emission Test

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

Operation Mode: ☒ Data 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 mode
Temperature	: 21.4 °C
Humidity Level	: 33.7 %
Test Date	: April 03, 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)
0.584	10.0	N	56	24.4	34.4	46	-	-
0.600	10.0	N	56	24.8	34.8	46	-	-
1.752	10.1	N	56	-	-	46	15.10	25.20
2.028	9.9	H	56	-	-	46	12.70	22.60
16.056	11.1	H	60	-	-	50	14.20	25.30
23.128	11.9	H	60	-	-	50	15.20	27.10

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

1. Line H = Hot, Line N = Neutral
2. Transd = LISN factor + Cable Loss factor
3. The worst-case emissions are reported.

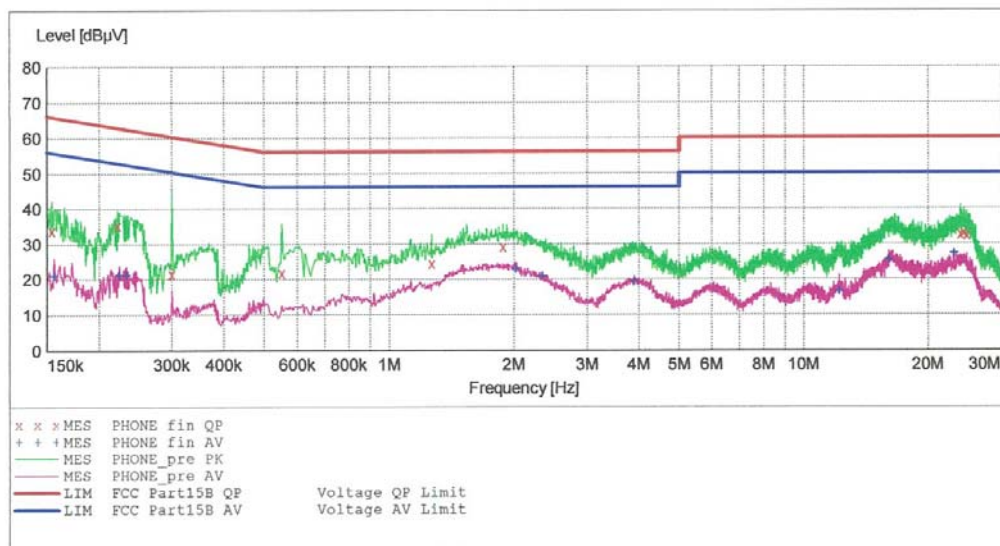
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EUT: LG-E440f
Manufacturer: LG
Operating Condition: DATA MODE
Test Site: SHIELD ROOM
Operator: GC YOON
Test Specification: FCC PART 15 B
Comment: H

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
			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"

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Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.154010	33.70	9.8	66	32.1	---	---
0.222010	35.30	9.7	63	27.4	---	---
0.300010	21.50	9.7	60	38.8	---	---
0.552000	21.80	9.8	56	34.2	---	---
1.268000	24.40	9.8	56	31.6	---	---
1.884000	29.10	9.9	56	26.9	---	---
23.852000	32.50	11.9	60	27.5	---	---
24.344000	33.10	12.0	60	26.9	---	---
24.752000	32.30	12.0	60	27.7	---	---

MEASUREMENT RESULT: "PHONE_fin AV"

4/3/2013 9:12AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.156010	21.00	9.8	56	34.7	---	---
0.224010	21.20	9.7	53	31.5	---	---
0.233010	21.10	9.8	52	31.2	---	---
2.028000	22.60	9.9	46	23.4	---	---
2.344000	20.80	10.0	46	25.2	---	---
3.908000	19.20	10.1	46	26.8	---	---
12.192000	16.50	10.7	50	33.5	---	---
16.056000	25.30	11.1	50	24.7	---	---
23.128000	27.10	11.9	50	22.9	---	---

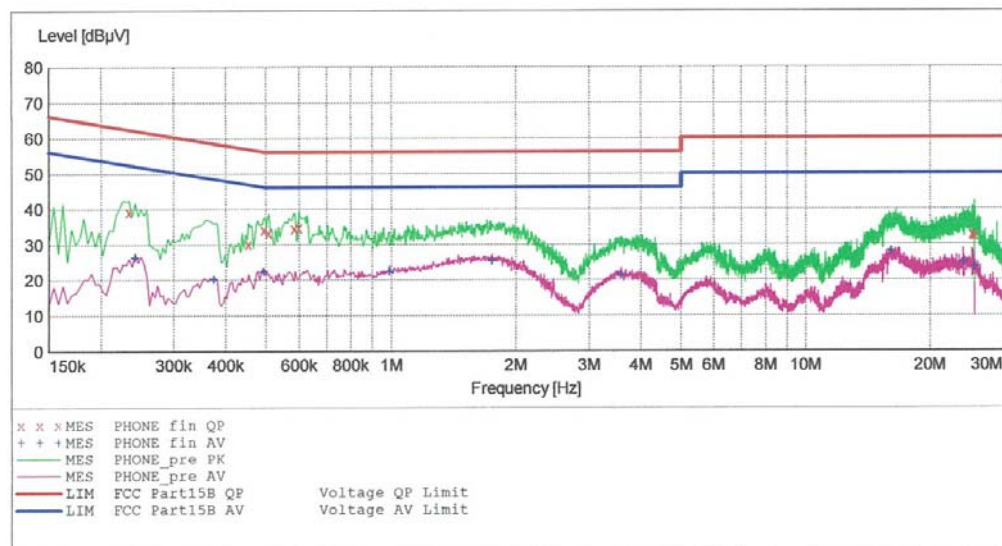
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EMC

EUT: LG-E440f
Manufacturer: LG
Operating Condition: DATA MODE
Test Site: SHIELD ROOM
Operator: GC YOON
Test Specification: FCC PART 15 CLASS B
Comment: N

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

Short Description:			FCC PART 15 CLASS B			
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
Frequency	Frequency	Width				
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"

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Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.234010	39.10	10.0	62	23.2	---	---
0.454010	30.10	10.0	57	26.7	---	---
0.494010	34.20	10.0	56	21.9	---	---
0.508000	33.30	10.0	56	22.7	---	---
0.584000	34.40	10.0	56	21.6	---	---
0.600000	34.80	10.0	56	21.2	---	---
25.208000	32.60	12.4	60	27.4	---	---
25.272000	33.00	12.4	60	27.0	---	---
25.604000	32.30	12.4	60	27.7	---	---

MEASUREMENT RESULT: "PHONE_fin AV"

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Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.242010	26.20	10.0	52	25.8	---	---
0.374010	20.00	10.0	48	28.4	---	---
0.494010	22.30	10.0	46	23.8	---	---
0.992000	22.20	10.0	46	23.8	---	---
1.752000	25.20	10.1	46	20.8	---	---
3.588000	21.30	10.3	46	24.7	---	---
16.064000	28.00	11.4	50	22.0	---	---
24.040000	24.70	12.3	50	25.3	---	---
25.604000	23.50	12.4	50	26.5	---	---

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 mode

Temperature : 19.7 °C

Humidity Level : 33.1 %

Test Date : April 02, 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)			
44.400	12.80	V	1.0	12.37	3.53	40.0	28.7	11.3
53.300	9.01	V	3.7	12.20	3.59	40.0	24.8	15.2
61.500	8.43	V	1.7	11.62	3.65	40.0	23.7	16.3
74.000	12.09	V	1.0	9.58	3.74	40.0	25.4	14.6
78.000	16.80	V	1.0	8.55	3.75	40.0	29.1	10.9
267.200	13.52	V	1.0	12.33	4.55	46.0	30.4	15.6

※ NOTE:

1. The worst-case emissions are reported.

-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 mode

Temperature : 20.4 °C

Humidity Level : 34.2 %

Test Date : April 03, 2013

Frequency (GHz)	Peak			POL	Average		
	Total (dBμV/m)	Limit (dBμV/m)	Margin (dB)		Total (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1.9117	49.90	74	24.1	V	37.80	54	16.2

※ NOTE:

1. The worst-case emissions are reported.
2. 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>					
☒ EMI Test Receiver	Rohde & Schwarz	ESCI	100584	1 year	2013.05.02
☐ EMI Test Receiver	Rohde & Schwarz	ESCI	100033	1 year	2013.06.18
☐ LISN	Rohde & Schwarz	ESH3-Z5	100282	1 year	2013.07.04
☒ LISN	EMCO	3816/2SH	9706-1070	1 year	2013.05.02
☒ LISN	Rohde & Schwarz	ENV216	100073	1 year	2014.02.06
☐ Attenuator	Rohde & Schwarz	ESH3-Z2	357.8810.352	1 year	2013.07.31
<u>Radiated Emission</u>					
☐ EMI Test Receiver	Rohde & Schwarz	ESU26	100241	1 year	2013.07.30
☐ Antenna master	INNCO Systems	MA4000-EP	MA4000/283	N/A	-
☐ Turn Table	INNCO Systems	DT3000-3T	DT3000/69	N/A	-
☒ EMI Test Receiver	Rohde & Schwarz	ESI40	831564103	1 year	2013.05.03
☒ Antenna master	HD GmbH	MA240	240/520	N/A	-
☒ Turn Table	HD GmbH	2090	9702/1224	N/A	-
☐ Trilog Antenna	Schwarzbeck	VULB9160	3125	2 year	2013.05.03
☒ Trilog Antenna	Schwarzbeck	VULB9160	3301	2 year	2014.12.17
☐ Horn Antenna	Schwarzbeck	BBHA 9120D	147	2 year	2013.05.15
☐ Horn Antenna	Schwarzbeck	BBHA 9120D	937	2 year	2013.10.17
☒ Horn Antenna	Schwarzbeck	BBHA 9120D	296	2 year	2014.12.13
☒ Power Amplifier	Rohde & Schwarz	SCU-18	10094	1 year	2013.09.11

7. CONCLUSION

The data collected shows that the **EUT type: GSM/WCDMA Phone with Bluetooth3.0, WIFI802.11 b/g/n, Model: LG-E440f, FCC ID: ZNFE440F** complies with §15.107 and §15.109 of the FCC rules.