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 22, 2013
Test Report No.: HCTE1305FE24

Test Site: HCT CO., LTD.
HCT FRN: 0005-8664-21

FCC ID: **ZNFE989**

Rule Part(s) / Standard(s)	: FCC PART 15 Subpart B Class B
Equipment Type	: GSM/WCDMA Phone with Bluetooth4.0, WIFI802.11 a/b/g/n (2.4/5GHz)/NFC
Model Name	: LG-E989
Port / Connector(s)	: USB / Earphone Port
Date of Test	: May 20, 2013 – May 22, 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

Report prepared by
: Gu-Cheol Yoon
Test Engineer of EMC Team

Approved by
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DOCUMENT HISTORY

The revision history for this document is shown in table.

Version	Date	Description
HCTE1305FE24	May 22, 2013	Initial Release

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ATTACHMENT: TEST SETUP PHOTOGRAPHS

1. GENERAL INFORMATION

1.1 Product Description

Equipment Under Test is **EUT type: GSM/WCDMA Phone with Bluetooth4.0, WIFI802.11 a/b/g/n(2.4/5GHz)/NFC, Model: LG-E989** manufactured by **LG Electronics MobileComm U.S.A., Inc.** Its basic purpose is used for communications.

Model	LG-E989
FCC ID	ZNFE989
EUT Type	GSM/WCDMA Phone with Bluetooth4.0, WIFI802.11 a/b/g/n(2.4/5GHz)/NFC
TX Frequency	824.20 ㎒ to 848.80 ㎒ (GSM 850) 1 850.20 ㎒ to 1 909.80 ㎒ (GSM 1 900) 826.40 ㎒ to 846.60 ㎒ (WCDMA 850) 1 852.4 ㎒ to 1 907.6 ㎒ (WCDMA 1 900)
RX Frequency	869.20 ㎒ to 893.80 ㎒ (GSM 850) 1 930.20 ㎒ to 1 989.80 ㎒ (GSM 1 900) 871.40 ㎒ to 891.60 ㎒ (WCDMA 850) 1 932.4 ㎒ to 1 987.6 ㎒ (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
EUT	LG	LG-E989	ZNFE989	Notebook PC Ear-phone
USB cable	CRESYN	EAD62150401	-	E.U.T Notebook PC
Ear-phone	I-SOUND	EAB62691156	-	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 ㎜

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 (㎒)	Upper frequency of measurement range (㎒)
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 ㎓, whichever is lower

2. SYSTEM TEST CONFIGURATION

2.1 Configuration of Test System

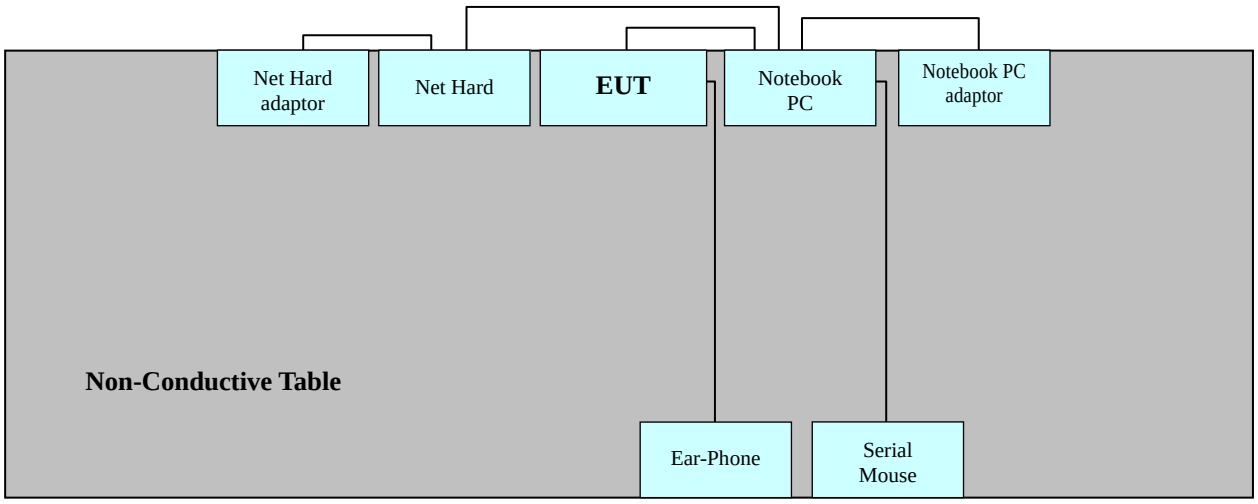
2.1.1 Conducted Emission Test

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 ㏈ Bandwidth: 9 ㎑)
Operation Mode : Data Communication mode

Temperature : 24.1 °C
Humidity Level : 45.4 %
Test Date : May 22, 2013

Frequency	Transd	Conductor	Quasi-Peak			Average		
			Limit	Measurement Level	Result Level	Limit	Measurement Level	Result Level
(MHz)	(dB)		(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dBuV]
0.772	9.8	H	56	-	-	46	14.40	24.20
1.076	10.1	N	56	-	-	46	13.40	23.50
1.140	9.9	H	56	22.9	32.8	46	-	-
1.768	9.9	H	56	-	-	46	16.20	26.10
2.096	10.2	N	56	-	-	46	14.90	25.10
2.324	10.2	N	56	-	-	46	13.60	23.80

※ **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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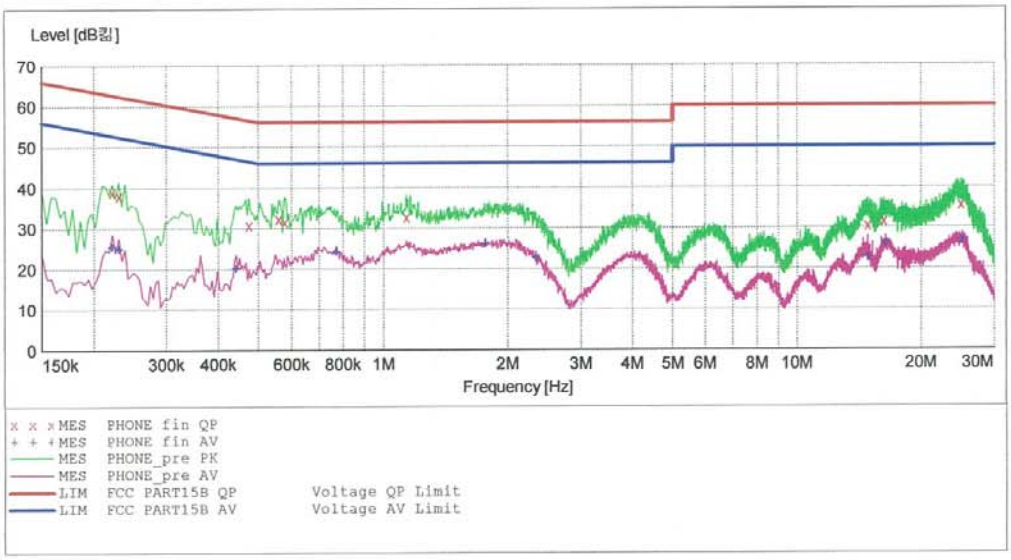
EUT: LG-E989
Manufacturer: LG
Operating Condition: DATA MODE
Test Site: SHIELD ROOM
Operator: GC YOON
Test Specification: FCC PART15 B
Comment: H

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 Average	10.0 ms	9 kHz	None
500.0 kHz	5.0 MHz	4.0 kHz	MaxPeak Average	10.0 ms	9 kHz	None
5.0 MHz	30.0 MHz	4.0 kHz	MaxPeak Average	10.0 ms	9 kHz	None



MEASUREMENT RESULT: "PHONE_fin QP"

2013-05-22 8:58오전

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.222001	39.00	9.8	63	23.7	---	---
0.230001	38.10	9.8	62	24.4	---	---
0.474001	30.80	9.8	56	25.6	---	---
0.560000	32.40	9.8	56	23.6	---	---
0.580000	31.60	9.8	56	24.4	---	---
1.140000	32.80	9.9	56	23.2	---	---
14.848000	30.50	10.8	60	29.5	---	---
16.196000	31.60	10.8	60	28.4	---	---
24.968000	35.50	11.1	60	24.5	---	---

MEASUREMENT RESULT: "PHONE_fin AV"

2013-05-22 8:58오전

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.222001	25.50	9.8	53	27.2	---	---
0.230001	24.90	9.8	52	27.5	---	---
0.442001	20.10	9.8	47	26.9	---	---
0.772000	24.20	9.8	46	21.8	---	---
1.768000	26.10	9.9	46	19.9	---	---
2.340000	22.70	10.0	46	23.3	---	---
14.840000	22.70	10.8	50	27.3	---	---
16.380000	25.80	10.8	50	24.2	---	---
25.068000	26.70	11.1	50	23.3	---	---

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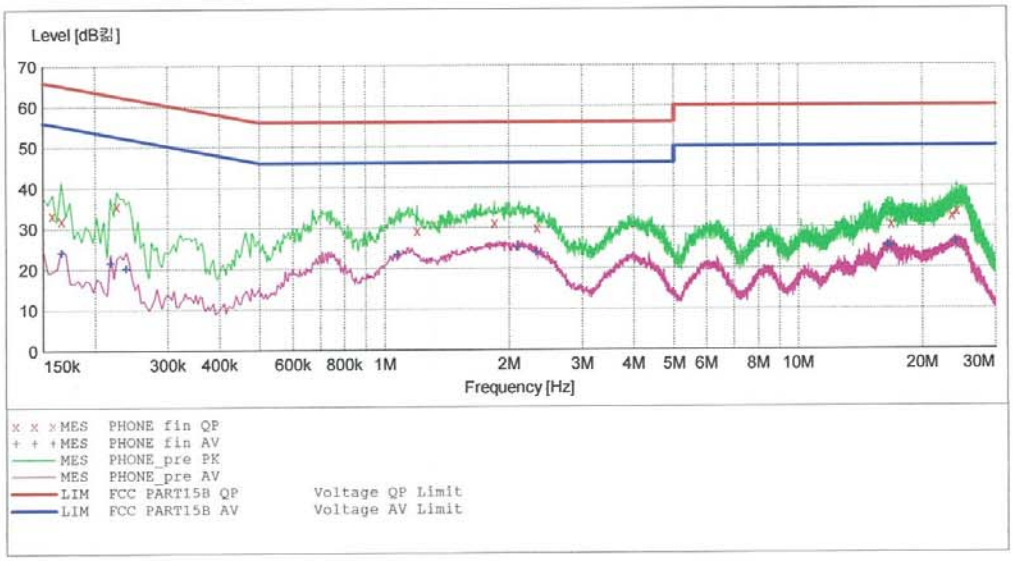
EMC

EUT: LG-E989
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 Average	10.0 ms	9 kHz	None
500.0 kHz	5.0 MHz	4.0 kHz	MaxPeak Average	10.0 ms	9 kHz	None
5.0 MHz	30.0 MHz	4.0 kHz	MaxPeak Average	10.0 ms	9 kHz	None



MEASUREMENT RESULT: "PHONE_fin QP"

2013-05-22 9:01오전

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.158001	33.40	10.0	66	32.2	---	---
0.166001	32.10	10.0	65	33.1	---	---
0.226001	35.70	10.0	63	26.9	---	---
1.200000	29.30	10.1	56	26.7	---	---
1.848000	31.20	10.1	56	24.8	---	---
2.340000	29.90	10.2	56	26.1	---	---
16.788000	30.70	11.1	60	29.3	---	---
23.544000	32.70	11.5	60	27.3	---	---
24.196000	33.90	11.5	60	26.1	---	---

MEASUREMENT RESULT: "PHONE_fin AV"

2013-05-22 9:01오전

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.166001	24.10	10.0	55	31.0	---	---
0.218001	21.50	10.0	53	31.4	---	---
0.238001	20.20	10.0	52	31.9	---	---
1.076000	23.50	10.1	46	22.5	---	---
2.096000	25.10	10.2	46	20.9	---	---
2.324000	23.80	10.2	46	22.2	---	---
16.504000	25.40	11.1	50	24.6	---	---
16.768000	25.20	11.1	50	24.8	---	---
24.016000	26.20	11.5	50	23.8	---	---

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 ㎓

Limit Apply to : FCC PART 15 Subpart B Class B

Detector : Quasi-Peak (6 ㏈ Bandwidth: 120 ㎑)
Operation Mode : Data Communication mode

Temperature : 23.6 °C
Humidity Level : 46.0 %
Test Date : May 20, 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)			
36.600	9.31	V	1.0	11.64	3.45	40.0	24.4	15.6
44.400	12.20	V	1.0	12.37	3.53	40.0	28.1	11.9
54.800	12.09	V	1.2	12.11	3.60	40.0	27.8	12.2
59.700	10.94	V	1.0	11.82	3.64	40.0	26.4	13.6
480.000	8.97	H	1.0	17.23	5.20	46.0	31.4	14.6
806.500	3.72	H	1.0	22.62	5.76	46.0	32.1	13.9

-For measurement above 1 ㎓

Limit Apply to : FCC PART 15 Subpart B Class B

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

: Average mode: Peak (RBW: 1 ㎒, VBW: 10 ㎐)

Operation Mode : Data Communication mode

Temperature : 22.4 °C

Humidity Level : 39.1 %

Test Date : May 21, 2013

Frequency (㎓)	Peak			POL	Average		
	Total (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)		Total (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
1.9211	47.10	74	26.9	V	30.40	54	23.6

※ **NOTE:**

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

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 dBμV is obtained. The antenna factor of 7.4 dB/m and a cable factor of 1.1 dB are added. The 30 dBμV/m value is mathematically converted to its corresponding level in μV/m.

FS = 21.5 + 7.4 + 1.1 = 30 dBμV/m

[Radiated Emission Limits]

Frequency of Emission (㎒)	Field Strength	
	μV/m	dBμV/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

Type	Manufacturer	Model Name	Serial Number	Calibration Cycle	Next CAL Date
Conducted Emission					
☒ EMI Test Receiver	Rohde & Schwarz	ESCI	100584	1 year	2014.04.25
☐ 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	2014.04.26
☒ LISN	Rohde & Schwarz	ENV216	100073	1 year	2014.02.06
☐ Attenuator	Rohde & Schwarz	ESH3-Z2	357.8810.352	1 year	2013.07.31
Radiated Emission					
-For measurement below 1 ㎓					
☒ EMI Test Receiver	Rohde & Schwarz	ESI40	831564103	1 year	2014.04.16
☒ Trilog Antenna	Schwarzbeck	VULB9160	3301	2 year	2014.12.17
☒ Antenna master	HD GmbH	MA240	240/520	N/A	-
☒ Turn Table	HD GmbH	2090	9702/1224	N/A	-
-For measurement above 1 ㎓					
☒ EMI Test Receiver	Rohde & Schwarz	ESI40	831564103	1 year	2014.04.16
☒ Antenna master	HD GmbH	MA240	240/520	N/A	-
☒ Turn Table	HD GmbH	2090	9702/1224	N/A	-
☒ Power Amplifier	Rohde & Schwarz	SCU-18	10094	1 year	2013.09.11
☒ 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 Bluetooth4.0, WIFI802.11 a/b/g/n(2.4/5GHz)/NFC, FCC ID: ZNFE989, Model: LG-E989** complies with §15.107 and §15.109 of the FCC rules.