HCT CO., LTD.

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EMI CERTIFICATION REPORT

Applicant:
LG Electronics MobileComm U.S.A., Inc.
10101 Old Grove Road, San Diego, CA 92131

Date of Issue: September 10, 2012
Test Report No.: HCTE1209FE08
Test Site: HCT CO., LTD.
HCT FRN: 0005-8664-21

FCC ID: **ZNFE973**

Rule Part(s) / Standard(s)	: FCC PART 15 Subpart B Class B
Equipment Type	: GSM/EDGE/WCDMA/LTE Phone with WLAN, Bluetooth and NFC
Model Name	: E973
Additional Model Name	: LG-E973, LGE973
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

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ATTACHMENT: TEST SETUP PHOTOGRAPHS

1. GENERAL INFORMATION

1.1 Product Description

Equipment Under Test is **EUT type: GSM/EDGE/WCDMA/LTE Phone with WLAN, Bluetooth and NFC, model: E973** manufactured by **LG Electronics MobileComm U.S.A., Inc.** Its basic purpose is used for communications.

Model	E973
Additional Model	LG-E973, LGE973
FCC ID	ZNFE973
E.U.T Type	GSM/EDGE/WCDMA/LTE Phone with WLAN, Bluetooth and 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) 1 850.7 ㎒ to 1 909.3 ㎒ (LTE B2) 1 710 ㎒ to 1 755 ㎒ (LTE B4) 824 ㎒ to 849 ㎒ (LTE B5) 704 ㎒ to 716 ㎒ (LTE B17)
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) 1 930.00 ㎒ to 1 990.00 ㎒ (LTE B2) 2 110 ㎒ to 2 155 ㎒ (LTE B4) 869 ㎒ to 894 ㎒ (LTE B5) 734 ㎒ to 746 ㎒ (LTE B17)

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	E973	ZNFE973	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	BD	EAD61965801	-	E.U.T Notebook PC
Headset	CRESYN	SGEY0003744	-	E.U.T
Net Hard	LG	N1A1DD1	DoC	Net Hard adaptor Notebook PC
Net Hard Adaptor	Yang Ming Industrial	DA-60M12	-	Net Hard
RJ45 cable	-	-	-	Notebook PC Net Hard

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)1.1
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	N	Both End
	Serial (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

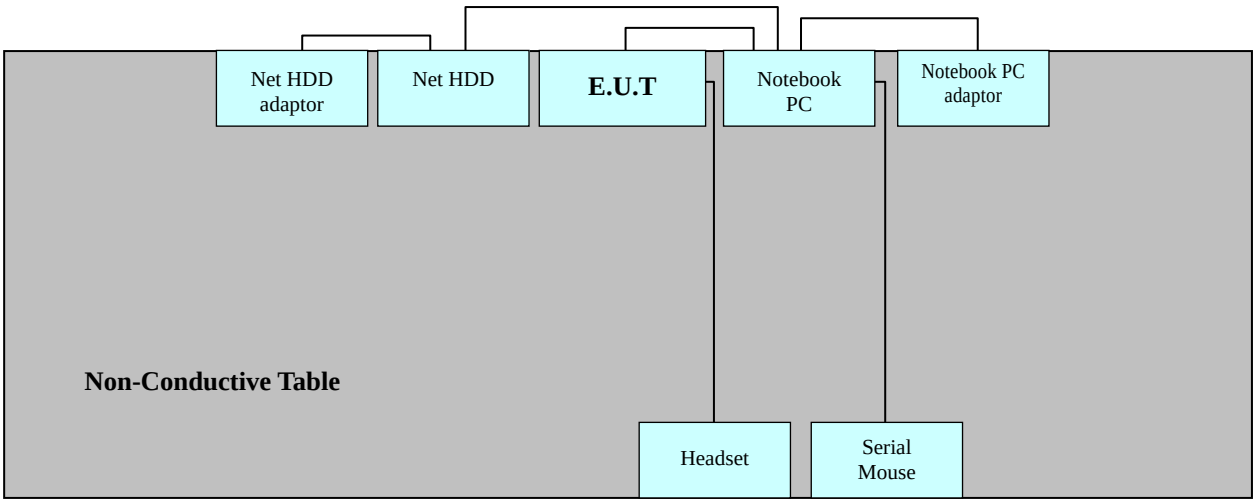
2. SYSTEM TEST CONFIGURATION

2.1 Configuration of Test System

Power Line Conducted test : E.U.T was connected to LISN via Notebook PC. 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 ㎑)
Operation Mode : Data communication mode

Temperature : 26.1 °C
Humidity Level : 46.3 %
Test Date : September 06, 2012

Frequency	Transd	Conductor	Quasi-Peak			Average		
			Limit	Measurement Level	Result Level	Limit	Measurement Level	Result Level
(MHz)	(dB)		(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dBuV]
0.154	10.0	N	66	36.9	46.9	56	-	-
0.500	10.0	N	56	24.7	34.7	46	-	-
0.504	10.0	N	56	24.1	34.1	46	-	-
1.740	9.9	H	56	-	-	46	14.00	23.90
16.044	11.1	H	60	-	-	50	14.90	26.00
16.512	11.2	H	60	-	-	50	13.90	25.10

※ **NOTE:** Refer to page 10 to page 13 for details.

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

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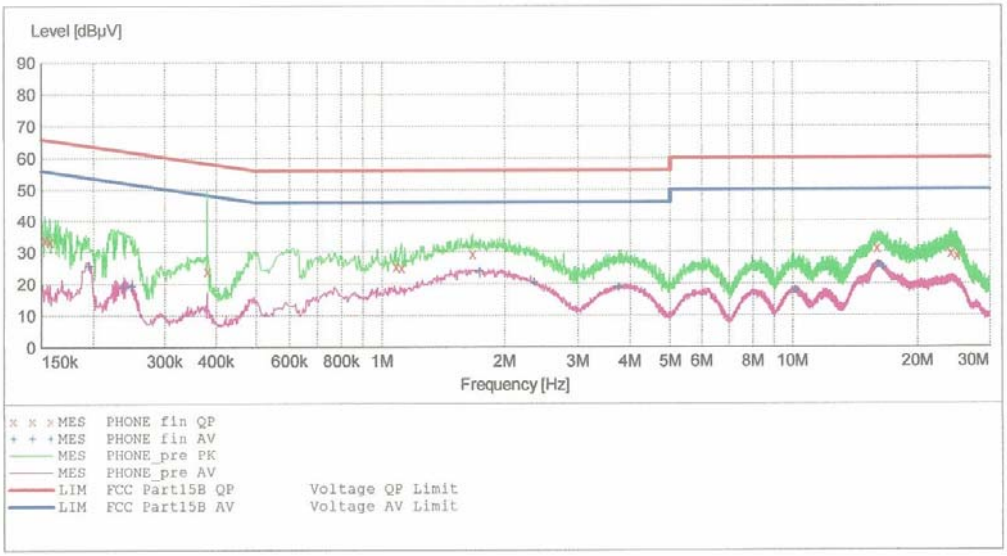
EUT: E973
Manufacturer: LG
Operating Condition: DATA MODE
Test Site: SHIELD ROOM
Operator: JH CHOI
Test Specification: FCC PART 15 B
Comment: H

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 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"

9/6/2012 2:43PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.153010	34.00	9.8	66	31.8	---	---
0.157010	33.40	9.8	66	32.3	---	---
0.381010	24.10	9.8	58	34.2	---	---
1.084000	25.60	9.8	56	30.4	---	---
1.120000	25.10	9.8	56	30.9	---	---
1.668000	29.50	9.9	56	26.5	---	---
15.936000	31.30	11.1	60	28.7	---	---
24.068000	29.70	11.9	60	30.3	---	---
24.916000	28.90	12.0	60	31.1	---	---

MEASUREMENT RESULT: "PHONE_fin AV"

9/6/2012 2:43PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.195010	25.50	9.7	54	28.4	---	---
0.238010	19.20	9.8	52	33.0	---	---
0.249010	19.20	9.8	52	32.6	---	---
1.740000	23.90	9.9	46	22.1	---	---
2.356000	20.50	10.0	46	25.5	---	---
3.760000	18.90	10.1	46	27.1	---	---
10.160000	17.80	10.5	50	32.2	---	---
16.044000	26.00	11.1	50	24.0	---	---
16.512000	25.10	11.2	50	24.9	---	---

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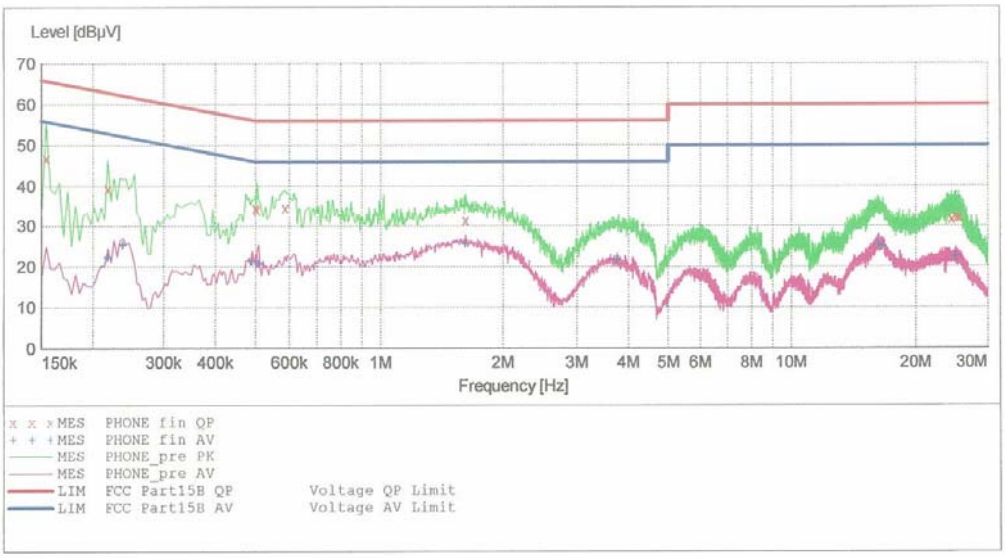
EUT: E973
Manufacturer: LG
Operating Condition: DATA MODE
Test Site: SHIELD ROOM
Operator: JH CHOI
Test Specification: FCC PART 15 CLASS B
Comment: N

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 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"

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Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.154010	46.90	10.0	66	18.9	---	---
0.218010	39.30	9.9	63	23.6	---	---
0.500000	34.70	10.0	56	21.3	---	---
0.504000	34.10	10.0	56	21.9	---	---
0.588000	34.70	10.0	56	21.3	---	---
1.624000	31.40	10.1	56	24.6	---	---
24.396000	31.80	12.3	60	28.2	---	---
25.016000	32.20	12.4	60	27.8	---	---
25.472000	32.20	12.4	60	27.8	---	---

MEASUREMENT RESULT: "PHONE_fin AV"

9/6/2012 2:54PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.218010	22.30	9.9	53	30.6	---	---
0.238010	25.40	10.0	52	26.8	---	---
0.490010	21.30	10.0	46	24.9	---	---
0.508000	20.80	10.0	46	25.2	---	---
1.624000	25.60	10.1	46	20.4	---	---
3.760000	21.60	10.3	46	24.4	---	---
16.216000	25.30	11.4	50	24.7	---	---
16.564000	24.80	11.5	50	25.2	---	---
24.976000	22.40	12.4	50	27.6	---	---

4.2 Radiated Emission Test

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

Limit Apply to : FCC PART 15 Subpart B Class B

-For measurement below 1 ㎓

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

Operation Mode : Data Communication mode

Temperature : 25.9 °C

Humidity Level : 56.4 %

Test Date : September 05, 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)			
69.200	15.74	V	1.7	10.57	3.69	40.0	30.0	10.0
122.900	21.80	V	1.1	12.00	4.00	43.5	37.8	5.7
131.000	21.52	V	1.0	12.38	4.00	43.5	37.9	5.6
140.800	18.57	V	1.2	12.82	4.01	43.5	35.4	8.1
241.800	17.47	V	1.0	11.46	4.47	46.0	33.4	12.6
249.900	23.83	H	1.7	11.77	4.50	46.0	40.1	5.9

-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 ㎐)

Temperature : 23.4 °C
Humidity Level : 57.7 %
Test Date : September 06, 2012

Frequency (㎓)	Peak			POL	Average		
	Total (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)		Total (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
1.9900	54.00	74	20.0	V	36.20	54	17.8
2.9900	49.80	74	24.2	H	29.50	54	24.5

※ 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	2013.05.02
☐ LISN	Rohde & Schwarz	ESH3-Z5	100282	1 year	2013.07.04
☒ LISN	Rohde & Schwarz	ENV216	100073	1 year	2013.02.09
☒ LISN	EMCO	3816/2SH	9706-1070	1 year	2013.05.02
☐ Attenuator	Rohde & Schwarz	ESH3-Z2	357.8810.352	1 year	2013.07.31
Radiated Emission					
☒ EMI Test Receiver	Rohde & Schwarz	ESI40	831564103	1 year	2013.05.03
☐ EMI Test Receiver	Rohde & Schwarz	ESU26	100241	1 year	2013.07.30
☒ Trilog Antenna	Schwarzbeck	VULB9160	3301	2 year	2012.09.13
☐ Antenna master	INNCO Systems	MA4000-EP	MA4000/283	N/A	-
☒ 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	2012.09.19
☒ Horn Antenna	Schwarzbeck	BBHA 9120D	937	2 year	2013.10.17
☒ Horn Antenna	Schwarzbeck	BBHA 9120D	296	2 year	2014.02.20

7. CONCLUSION

The data collected shows that the **EUT type: GSM/EDGE/WCDMA/LTE Phone with WLAN, Bluetooth and NFC, Model: E973, FCC ID: ZNFE973** complies with §15.107 and §15.109 of the FCC rules.