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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: October 11, 2012

Test Report No.: HCTE1210FE07

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

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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 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) 1 852.4 MHz to 1 907.6 MHz (WCDMA 1 900) 1 710 MHz to 1 755 MHz (LTE B4) 704 MHz to 716 MHz (LTE B17)
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) 1 932.4 MHz to 1 987.6 MHz (WCDMA 1 900) 2 110 MHz to 2 155 MHz (LTE B4) 734 MHz to 746 MHz (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	INTERFACESA MIL CO.,LTD	EAD62291001	-	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)1.0
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, Kyongki-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

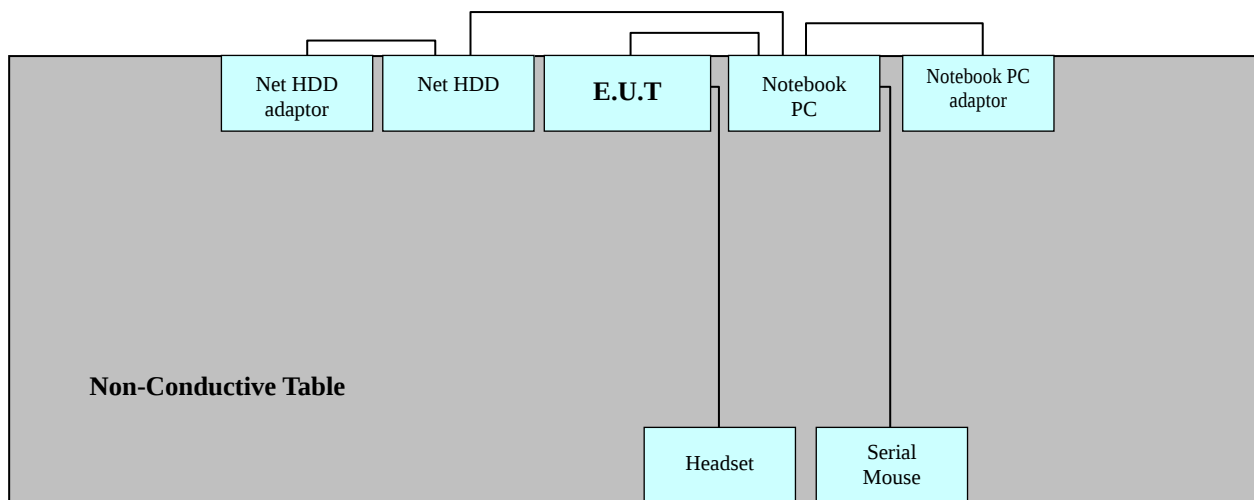
Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705 to 108	1 000
108 to 500	2 000
500 to 1 000	5 000
Above 1 000	5 th harmonic of the highest frequency or 40 GHz, whichever is lower

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 kHz)
Operation Mode	: Data communication mode
Temperature	: 23.9 °C
Humidity Level	: 45.0 %
Test Date	: October 09, 2012

Frequency (MHz)	Transd (dB)	Conductor	Quasi-Peak			Average		
			Limit	Measurement Level	Result Level	Limit	Measurement Level	Result Level
			(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dBuV)
0.504	9.8	H	56	24.3	34.1	46	-	-
0.600	9.8	H	56	24.1	33.9	46	-	-
1.580	9.9	H	56	-	-	46	15.10	25.00
2.000	10.1	N	56	-	-	46	12.20	22.30
16.372	11.5	N	60	-	-	50	14.00	25.50
16.644	11.5	N	60	-	-	50	13.90	25.40

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

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

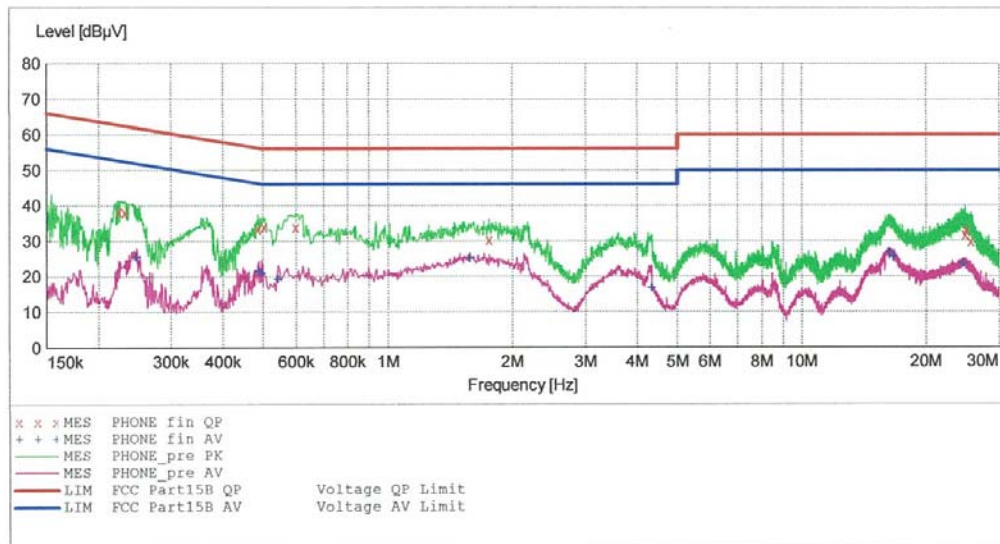
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EUT: E973
Manufacturer: LG
Operating Condition: DATA MODE
Test Site: SHIELD ROOM
Operator: JH CHOI
Test Specification: FCC PART 15 B
Comment: H

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

Short Description:			FCC PART 15 CLASS B			
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
Frequency	Frequency	Width				
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
0.224010	38.40	9.7	63	24.3	---	---
0.232010	38.10	9.8	62	24.3	---	---
0.486010	33.50	9.8	56	22.7	---	---
0.504000	34.10	9.8	56	21.9	---	---
0.600000	33.90	9.8	56	22.1	---	---
1.756000	30.30	9.9	56	25.7	---	---
24.836000	31.70	12.0	60	28.3	---	---
24.936000	33.10	12.0	60	26.9	---	---
25.632000	29.80	12.0	60	30.2	---	---

MEASUREMENT RESULT: "PHONE_fin AV"

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Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.248010	25.40	9.8	52	26.4	---	---
0.488010	21.60	9.8	46	24.6	---	---
0.496010	21.00	9.8	46	25.1	---	---
0.544000	19.40	9.8	46	26.6	---	---
1.580000	25.00	9.9	46	21.0	---	---
4.336000	16.80	10.1	46	29.2	---	---
16.272000	26.80	11.2	50	23.2	---	---
16.668000	25.40	11.2	50	24.6	---	---
24.516000	23.60	12.0	50	26.4	---	---

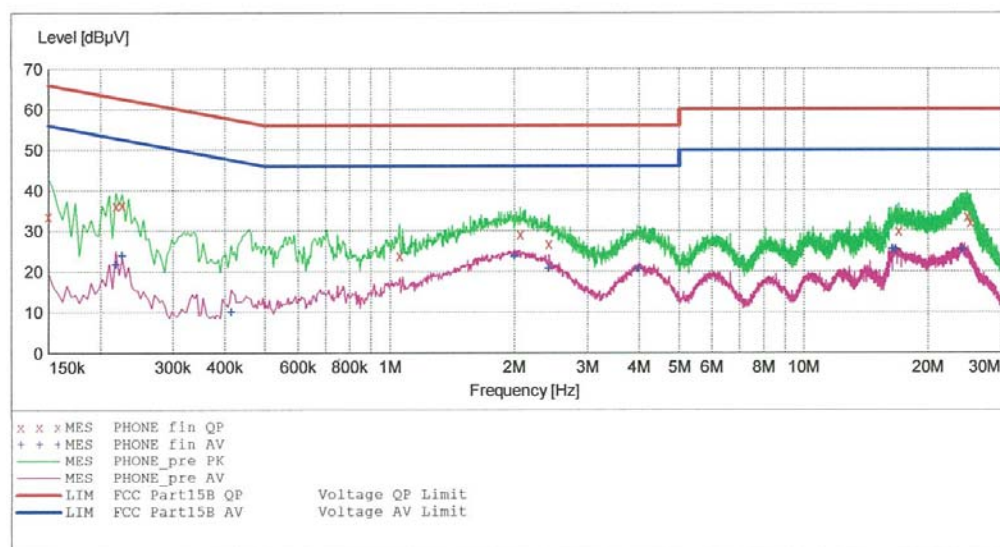
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EMC

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	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
0.150010	33.80	10.0	66	32.2	---	---
0.218010	36.30	9.9	63	26.6	---	---
0.226010	36.60	10.0	63	26.0	---	---
1.056000	23.90	10.0	56	32.1	---	---
2.064000	29.20	10.1	56	26.8	---	---
2.424000	26.90	10.2	56	29.1	---	---
16.964000	29.90	11.6	60	30.1	---	---
24.836000	33.50	12.4	60	26.5	---	---
25.292000	32.10	12.4	60	27.9	---	---

MEASUREMENT RESULT: "PHONE_fin AV"

10/9/2012 11:23AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.218010	21.80	9.9	53	31.1	---	---
0.226010	23.90	10.0	53	28.7	---	---
0.414010	10.10	10.0	48	37.5	---	---
2.000000	23.70	10.1	46	22.3	---	---
2.424000	20.80	10.2	46	25.2	---	---
3.980000	20.60	10.3	46	25.4	---	---
16.372000	25.50	11.5	50	24.5	---	---
16.644000	25.40	11.5	50	24.6	---	---
24.168000	25.30	12.3	50	24.7	---	---

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 GHz

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

Operation Mode : Data Communication mode

Temperature : 23.3 °C

Humidity Level : 53.1 %

Test Date : September 24, 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)			
37.300	12.36	V	1.2	11.89	3.45	40.0	27.7	12.3
57.200	9.46	V	1.5	12.04	3.60	40.0	25.1	14.9
133.000	14.33	V	1.5	12.47	4.00	43.5	30.8	12.7
164.200	9.39	V	1.0	12.91	4.20	43.5	26.5	17.0
216.600	16.21	V	1.0	10.52	4.37	46.0	31.1	14.9
243.800	15.59	V	1.2	11.54	4.48	46.0	31.6	14.4

-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)

Temperature : 24.3 °C

Humidity Level : 51.1 %

Test Date : October 10, 2012

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)
1.9900	52.30	74	21.7	V	29.20	54	24.8
2.1600	51.20	74	22.8	H	26.30	54	27.7

※ 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>					
☐ EMI Test Receiver	Rohde & Schwarz	ESCI	100584	1 year	2013.05.02
☒ EMI Test Receiver	Rohde & Schwarz	ESI40	831564103	1 year	2013.05.03
☐ 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
<u>Radiated Emission</u>					
☒ 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	2014.09.20
☐ 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	2013.09.11
☐ 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.