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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: March 22, 2013

Test Report No.: HCTE1302FE24-1

Test Site: HCT CO., LTD.

HCT FRN: 0005-8664-21

FCC ID:

ZNFE980

Rule Part(s) / Standard(s) : FCC PART 15 Subpart B Class B
Equipment Type : Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSPA Phone with
PCS/AWS LTE Phone with WLAN, Bluetooth and NFC
Model Name : LG-E980
Additional Model(s) : E980, LGE980
Port / Connector(s) : USB Port / Headset Port
Date of Test : February 22, 2013 - March 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


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DOCUMENT HISTORY

The revision history for this document is shown in table.

Version	Date	Description
HCTE1302FE24	February 26, 2013	Initial Release
HCTE1302FE24-1	March 22, 2013	Add of FOLIO Cover test

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ATTACHMENT: TEST SETUP PHOTOGRAPHS

1. GENERAL INFORMATION

1.1 Product Description

Equipment Under Test is **EUT type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSPA Phone with PCS/AWS LTE Phone with WLAN, Bluetooth and NFC, Model: LG-E980** manufactured by **LG Electronics MobileComm U.S.A., Inc.** Its basic purpose is used for communications.

Model	LG-E980
FCC ID	ZNFE980
Additional Model(s)	E980, LGE980
EUT Type	Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSPA Phone with PCS/AWS 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) 1 850.7 MHz to 1 909.3 MHz (LTE B2) 1 710 MHz to 1 755 MHz (LTE B4) 824 MHz to 849 MHz (LTE B5) 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) 1 930.00 MHz to 1 990.00 MHz (LTE B2) 2 110 MHz to 2 155 MHz (LTE B4) 869 MHz to 894 MHz (LTE B5) 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
EUT	LG	LG-E980	ZNFE980	Notebook PC Headset
USB cable	IS	EAD62329301	-	E.U.T Notebook PC
Headset	LG	EAB626911	-	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
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	(P)1.1
	Headset jack	-	N	(D)1.2
Notebook PC	RJ 45	-	N	(D)1.5
	Serial (Mouse)	-	Y	(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
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)	-	-	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 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.

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

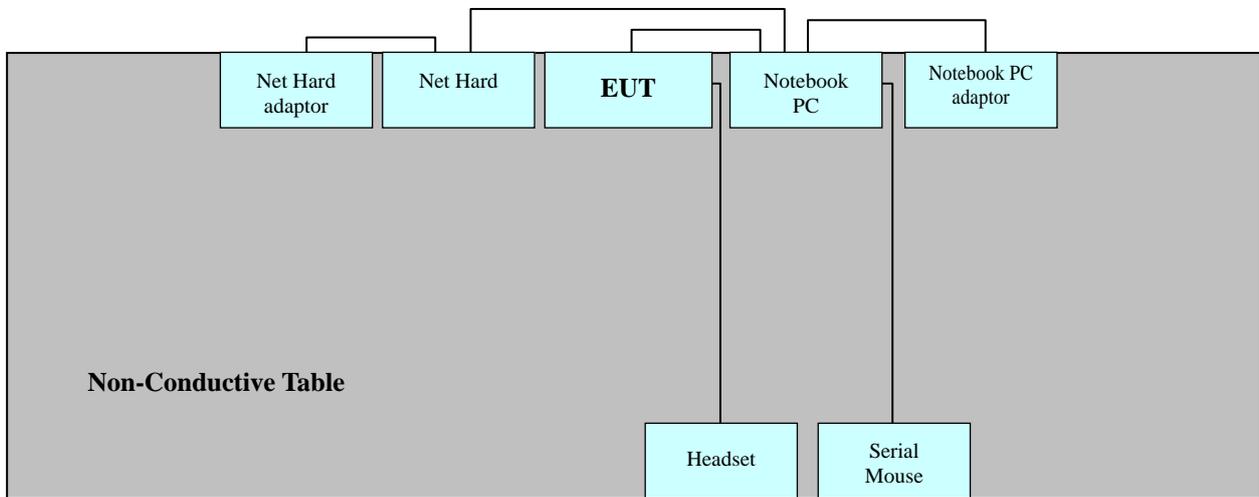
2. SYSTEM TEST CONFIGURATION

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 communication mode

Configuration of Test: Normal Cover
 FOLIO Cover

3. 2 Radiated Emission Test

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

Operation Mode: Data communication mode

Configuration of Test: Normal Cover
 FOLIO Cover

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 _ Normal Cover
Temperature	: 19.3 °C
Humidity Level	: 33.4 %
Test Date	: February 22, 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)
0.150	10.0	N	66	47.7	57.7	56	-	-
0.442	10.0	N	57	-	-	47	10.00	20.00
1.480	10.1	N	56	-	-	46	11.20	21.30
1.492	9.9	H	56	-	-	46	10.80	20.70
1.564	9.9	H	56	18.3	28.2	46	-	-
1.652	9.9	H	56	-	-	46	11.00	20.90

※ **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.

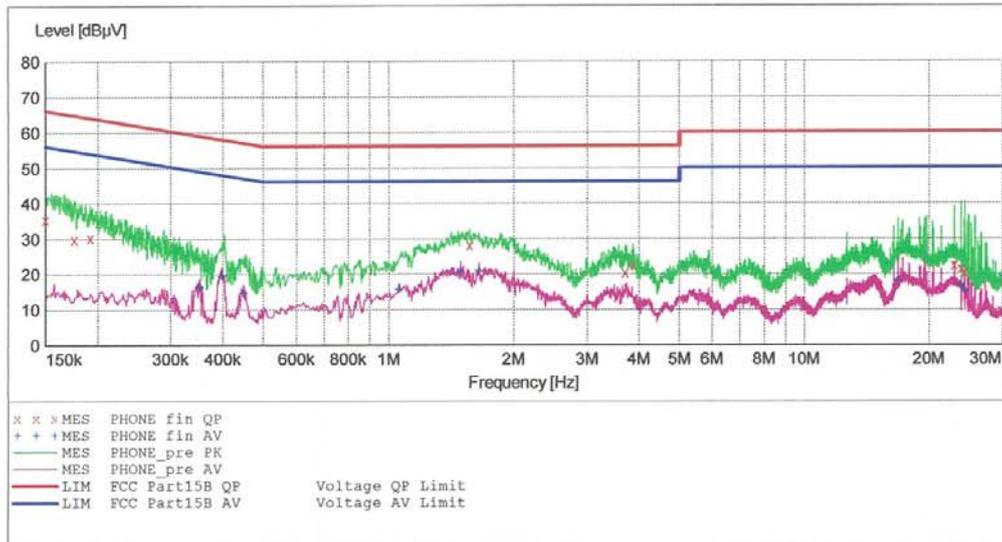
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EUT: LG-E980
 Manufacturer: LG
 Operating Condition:
 Test Site: SHIELD ROOM
 Operator: GC YOON
 Test Specification: FCC PART 15 B
 Comment: H

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

Short Description:	FCC PART 15	CLASS B				
Start	Stop	Step	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
0.150010	35.50	9.8	66	30.5	---	---
0.176010	29.80	9.7	65	34.8	---	---
0.192010	30.20	9.7	64	33.8	---	---
1.564000	28.20	9.9	56	27.8	---	---
3.712000	20.40	10.1	56	35.6	---	---
3.868000	22.60	10.1	56	33.4	---	---
22.972000	22.40	11.9	60	37.6	---	---
23.836000	21.40	11.9	60	38.6	---	---
24.356000	20.40	12.0	60	39.6	---	---

MEASUREMENT RESULT: "PHONE_fin AV"

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Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.351010	16.40	9.7	49	32.5	---	---
0.398010	19.30	9.8	48	28.6	---	---
0.448010	14.60	9.8	47	32.4	---	---
1.060000	15.80	9.8	46	30.2	---	---
1.492000	20.70	9.9	46	25.3	---	---
1.652000	20.90	9.9	46	25.1	---	---
16.788000	17.90	11.2	50	32.1	---	---
23.836000	16.70	11.9	50	33.3	---	---
24.356000	15.10	12.0	50	34.9	---	---

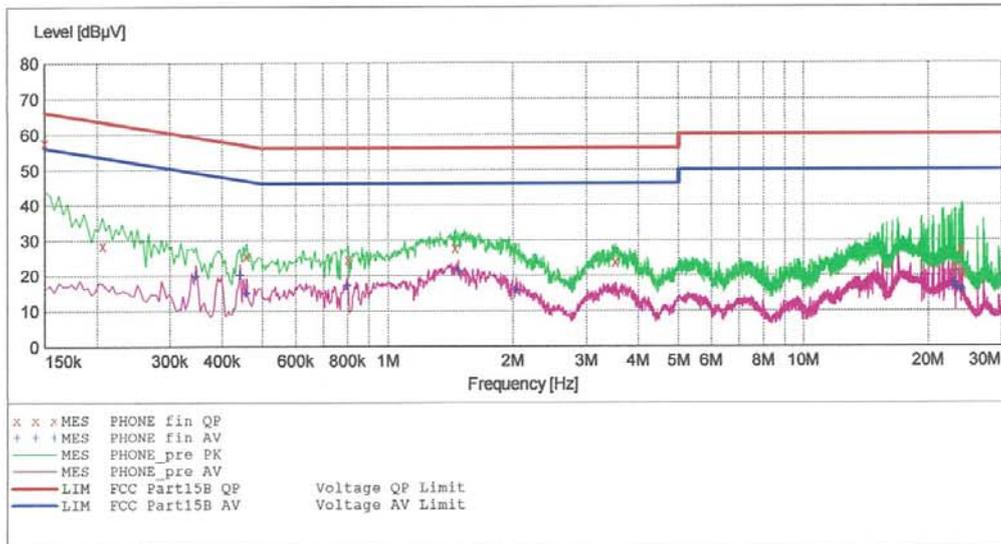
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EMC

EUT: LG-E980
 Manufacturer: LG
 Operating Condition:
 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 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"

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Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.150010	57.70	10.0	66	8.3	---	---
0.206010	28.60	9.9	63	34.7	---	---
0.458010	25.70	10.0	57	31.1	---	---
0.804000	24.60	10.0	56	31.4	---	---
1.456000	27.70	10.1	56	28.3	---	---
3.528000	23.90	10.3	56	32.1	---	---
23.232000	22.40	12.3	60	37.6	---	---
23.944000	27.30	12.3	60	32.7	---	---
24.120000	20.50	12.3	60	39.5	---	---

MEASUREMENT RESULT: "PHONE_fin AV"

2/22/2013 2:26PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.346010	19.80	9.9	49	29.3	---	---
0.442010	20.00	10.0	47	27.1	---	---
0.458010	15.00	10.0	47	31.7	---	---
0.800000	17.10	10.0	46	28.9	---	---
1.480000	21.30	10.1	46	24.7	---	---
2.036000	15.90	10.1	46	30.1	---	---
23.108000	17.60	12.3	50	32.4	---	---
23.232000	16.60	12.3	50	33.4	---	---
23.944000	15.90	12.3	50	34.1	---	---

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 _ Normal Cover

Temperature : 19.2 °C

Humidity Level : 34.1 %

Test Date : February 22, 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)			
53.300	8.71	V	1.0	12.20	3.59	40.0	24.5	15.5
125.200	10.76	V	1.0	12.02	4.02	43.5	26.8	16.7
245.700	15.01	H	1.2	11.60	4.49	46.0	31.1	14.9
250.000	22.43	H	1.7	11.77	4.50	46.0	38.7	7.3
482.700	11.51	H	1.0	17.28	5.21	46.0	34.0	12.0
805.700	5.43	H	1.0	22.62	5.75	46.0	33.8	12.2

※ **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 communication mode _ Normal Cover

Temperature : 19.2 °C

Humidity Level : 34.1 %

Test Date : February 22, 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)
2.0000	45.90	74	28.1	V	27.00	54	27.0
2.9900	50.30	74	23.7	V	33.20	54	20.8
1.8000	49.50	74	24.5	H	32.10	54	21.9

※ 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>					
<input checked="" type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESCI	100584	1 year	2013.05.02
<input type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESCI	100033	1 year	2013.06.18
<input type="checkbox"/> LISN	Rohde & Schwarz	ESH3-Z5	100282	1 year	2013.07.04
<input checked="" type="checkbox"/> LISN	EMCO	3816/2SH	9706-1070	1 year	2013.05.02
<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
<u>Radiated Emission</u>					
<input type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESU26	100241	1 year	2013.07.30
<input type="checkbox"/> Antenna master	INNCO Systems	MA4000-EP	MA4000/283	N/A	-
<input type="checkbox"/> Turn Table	INNCO Systems	DT3000-3T	DT3000/69	N/A	-
<input checked="" type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESI40	831564103	1 year	2013.05.03
<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 type="checkbox"/> Trilog Antenna	Schwarzbeck	VULB9160	3125	2 year	2013.05.03
<input checked="" type="checkbox"/> Trilog Antenna	Schwarzbeck	VULB9160	3301	2 year	2014.12.17
<input type="checkbox"/> Horn Antenna	Schwarzbeck	BBHA 9120D	147	2 year	2013.05.15
<input type="checkbox"/> Horn Antenna	Schwarzbeck	BBHA 9120D	937	2 year	2013.10.17
<input checked="" type="checkbox"/> Horn Antenna	Schwarzbeck	BBHA 9120D	296	2 year	2014.12.13
<input checked="" type="checkbox"/> Power Amplifier	Rohde & Schwarz	SCU-18	10094	1 year	2013.09.11

7. CONCLUSION

The data collected shows that the **EUT type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSPA Phone with PCS/AWS LTE Phone with WLAN, Bluetooth and NFC, Model: LG-E980, FCC ID: ZNFE980** complies with §15.107 and §15.109 of the FCC rules.