



HCT CO., LTD.

CERTIFICATION DIVISION  
105-1, JANGAM-RI, MAJANG-MYEON, ICHEON-SI, KYOUNGKI-DO, REPUBLIC OF KOREA  
TEL: +82 31 645 6300 FAX: +82 31 645 6401

## EMI CERTIFICATION REPORT

**Applicant:**

LG Electronics MobileComm U.S.A., Inc.

10101 Old Grove Road, San Diego, CA 92131

**Date of Issue:** February 27, 2012

**Test Report No.:** HCTE1202FE16

**Test Site:** HCT CO., LTD.

**HCT FRN:** 0005-8664-21

**FCC ID:**

**ZNFLS840**

Rule Part(s) / Standard(s) : FCC PART 15 Subpart B Class B

Equipment Type : Cellular/PCS BC 10 CDMA and LTE Phone with Bluetooth and WLAN

Model Name : LS840, LGLS840, LG-LS840

Port / Connector(s) : USB Data 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

---

## TABLE OF CONTENTS

---

	<b>PAGE</b>
1. GENERAL INFORMATION .....	3
1.1 Product Description .....	3
1.2 Related Submittal(s) / Grant(s) .....	3
1.3 Tested System Details .....	4
1.4 Cable Description .....	5
1.5 Noise Suppression Parts on Cable. (I/O cable).....	5
1.6 Test Methodology.....	6
1.7 Test Facility .....	6
1.8 Frequency Range of Radiated Measurements .....	6
2. SYSTEM TEST CONFIGURATION .....	7
2.1 Configuration of Test System .....	7
3. PRELIMINARY TEST .....	8
3.1 Conducted Emission Test .....	8
3.2 Radiated Emission Test.....	8
4. CONDUCTED AND RADIATED EMISSION TEST SUMMARY .....	9
4.1 Conducted Emission Test .....	9
4.2 Radiated Emission Test.....	14
5. FIELD STRENGTH CALCULATION.....	15
6. TEST EQUIPMENT .....	16
7. CONCLUSION .....	17

**ATTACHMENT: TEST SETUP PHOTOGRAPHS**

## 1. GENERAL INFORMATION

### 1.1 Product Description

Equipment Under Test (E.U.T) is **Cellular/PCS BC 10 CDMA and LTE Phone with Bluetooth and WLAN, Model: LS840** manufactured by **LG Electronics MobileComm U.S.A., Inc.** Its basic purpose is used for communications.

<b>Model</b>	LS840
<b>Additional Model</b>	LGLS840, LG-LS840
<b>FCC ID</b>	ZNFLS840
<b>E.U.T Type</b>	Cellular/PCS BC 10 CDMA and LTE Phone with Bluetooth and WLAN
<b>TX Frequency</b>	824.70 MHz to 848.31 MHz (CDMA 835) 1 851.25 MHz to 1 908.75 MHz (CDMA 1 900) 817.90 MHz to 823.10 MHz (BC10) 1 850 MHz to 1 915 MHz (LTE Band 25)
<b>RX Frequency</b>	869.70 MHz to 893.31 MHz (CDMA 835) 1 931.25 MHz to 1 988.75 MHz (CDMA 1 900) 862.00 MHz to 894.00 MHz (BC10) 1930 MHz to 1995 MHz (LTE Band 25)

### 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
Cellular/PCS BC 10 CDMA and LTE Phone with Bluetooth and WLAN	LG	LS840	ZNFLS840	Notebook PC
Notebook PC	LG	X140-02	DoC	E.U.T Notebook PC adaptor
Notebook PC adaptor	DELTA (JIANG SU)	ADP-40PH AD	-	Notebook PC
Mouse	Microsoft	Intellimouse optical USB and PS/2 compatible	DoC	Notebook PC
Micro SD card (2 GB)	SanDisk	-	-	E.U.T
USB cable	-	-	-	E.U.T Notebook PC
Headset	-	-	-	E.U.T
RJ45 cable	-	-	-	Router Notebook PC
Router	MMCTECH	MW-2100R	-	Notebook PC
Router adaptor	Dee Van Electronics(Shenzhen)Co., Ltd.	DSA-0101F-05KA1	-	Router

### 1.4 Cable Description

Product Name	Port	Power Cord Shielded (Y/N)	I/O Cable Shielded (Y/N)	Length (m)
Cellular/PCS BC 10 CDMA and LTE Phone with Bluetooth and WLAN	Micro USB	Y	Y	(P,D)1.2
	Headset jack	-	N	(D)1.1
Notebook PC	RJ 45	-	N	(D)1.5
	USB (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
Cellular/PCS BC 10 CDMA and LTE Phone with Bluetooth and WLAN	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
	USB (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 <sup>th</sup> harmonic of the highest frequency or 40 GHz, whichever is lower

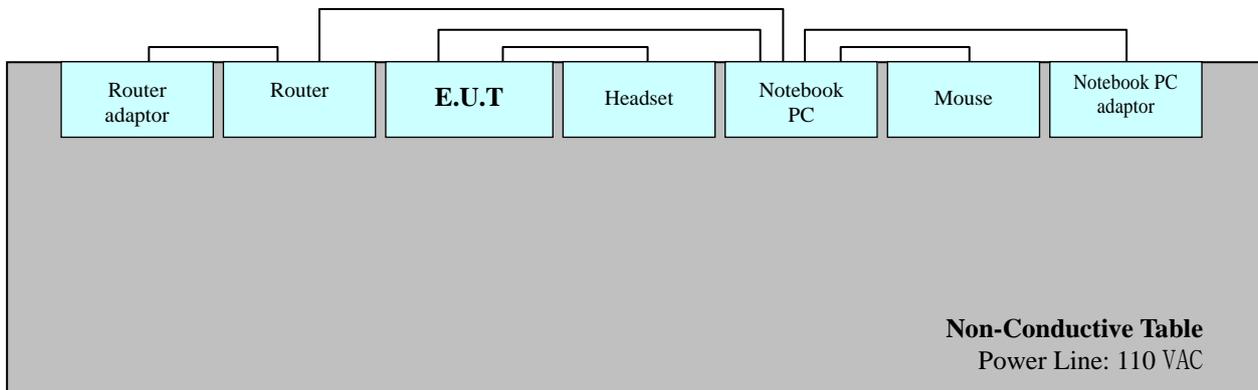
## 2. SYSTEM TEST CONFIGURATION

### 2.1 Configuration of Test System

Power Line Conducted test : E.U.T was connected to LISN via Notebook PC 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]



### **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
Frequency Range (Test Limit)	: 0.15 MHz to 0.5 MHz Quasi-Peak(66dB $\mu$ V) Average (56 dB $\mu$ V) : 0.5 MHz to 5 MHz Quasi-Peak(56dB $\mu$ V) Average (46 dB $\mu$ V) : 5 MHz to 30 MHz Quasi-Peak(60dB $\mu$ V) Average (50 dB $\mu$ V)
Detector	: Quasi-Peak, Average (6 dB Bandwidth: 9 kHz)
Operation Mode	: Data Communication mode
Temperature	:22.4 °C
Humidity Level	: 47.1 %
Test Date	: February 20, 2012

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

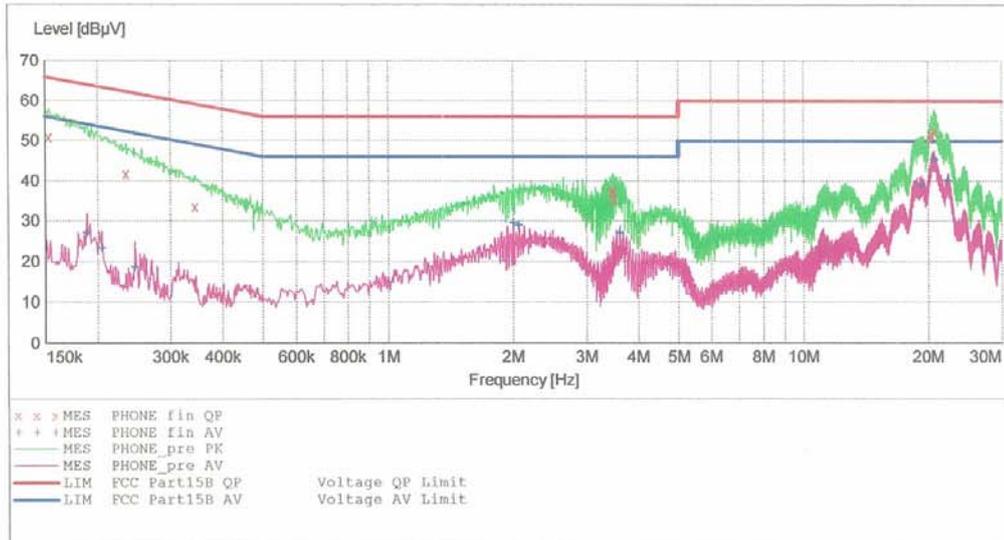
**HCT**

**EMC**

EUT: LS840  
 Manufacturer: LG  
 Operating Condition: DATA MODE  
 Test Site: SHIELD ROOM  
 Operator: JH CHOI  
 Test Specification: FCC PART15 CLASS 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"**

2/20/2012 7:41PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.153010	50.90	10.1	66	15.0	---	---
0.235010	41.70	10.1	62	20.6	---	---
0.344010	33.70	10.1	59	25.4	---	---
3.464000	37.30	10.3	56	18.7	---	---
3.488000	37.70	10.3	56	18.3	---	---
3.500000	35.30	10.3	56	20.7	---	---
20.324000	50.60	11.9	60	9.4	---	---
20.360000	51.70	11.9	60	8.3	---	---
20.680000	52.50	11.9	60	7.5	---	---

**MEASUREMENT RESULT: "PHONE\_fin AV"**

2/20/2012 7:41PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.189010	27.00	10.1	54	27.0	---	---
0.205010	23.30	10.1	53	30.1	---	---
0.246010	18.60	10.1	52	33.3	---	---
2.004000	29.50	10.2	46	16.5	---	---
2.068000	28.90	10.2	46	17.1	---	---
3.616000	27.00	10.4	46	19.0	---	---
19.256000	38.90	11.8	50	11.1	---	---
20.724000	45.40	11.9	50	4.6	---	---
22.296000	40.10	12.0	50	9.9	---	---

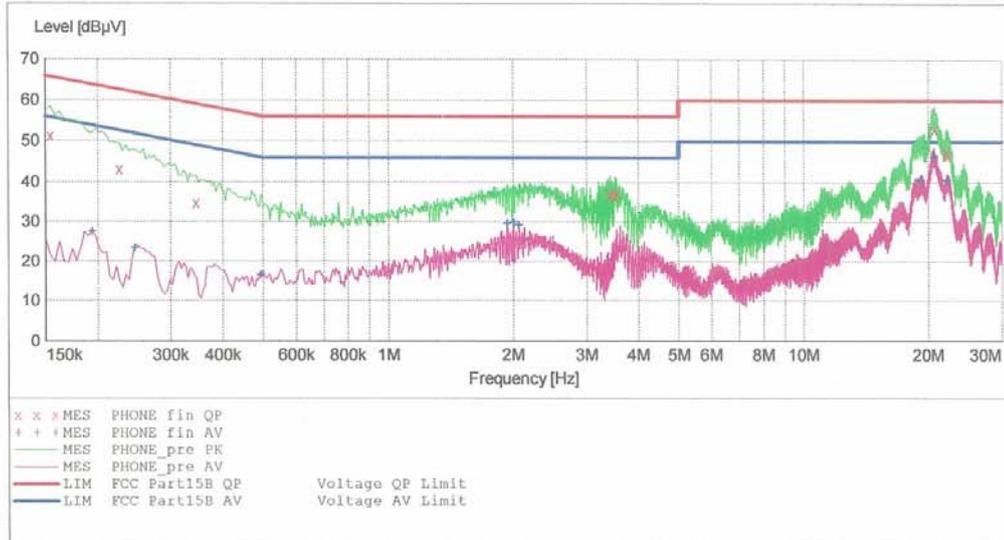
**HCT**

**EMC**

EUT: LS840  
 Manufacturer: LG  
 Operating Condition: DATA MODE  
 Test Site: SHIELD ROOM  
 Operator: JH CHOI  
 Test Specification: FCC PART15 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
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"**

2/20/2012 7:44PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.154010	51.30	10.3	66	14.4	---	---
0.226010	43.20	10.3	63	19.4	---	---
0.346010	34.80	10.3	59	24.2	---	---
3.424000	36.90	10.6	56	19.1	---	---
3.524000	36.40	10.6	56	19.6	---	---
3.552000	37.30	10.6	56	18.7	---	---
20.696000	53.10	11.7	60	6.9	---	---
22.056000	47.50	11.7	60	12.5	---	---
22.256000	46.50	11.8	60	13.5	---	---

**MEASUREMENT RESULT: "PHONE\_fin AV"**

2/20/2012 7:44PM

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Line	PE
0.194010	27.60	10.3	54	26.3	---	---
0.246010	23.50	10.3	52	28.4	---	---
0.494010	16.60	10.3	46	29.5	---	---
1.940000	29.50	10.4	46	16.5	---	---
2.004000	29.90	10.4	46	16.1	---	---
2.068000	29.10	10.4	46	16.9	---	---
19.196000	40.50	11.7	50	9.5	---	---
20.652000	46.30	11.7	50	3.7	---	---
22.176000	40.40	11.8	50	9.6	---	---

## 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 GHz**

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

Operation Mode : Data Communication mode

**-For measurement above 1 GHz**

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

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

Operation Mode : Data Communication mode

Temperature : 24.3 °C

Humidity Level : 47.6 %

Test Date : February 09, 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)			
64.800	19.35	V	1.0	11.20	3.65	40.0	34.2	5.8
78.500	21.98	H	1.2	8.33	3.78	40.0	34.1	5.9
105.300	19.15	H	3.0	9.99	3.85	43.5	33.0	10.5
138.400	19.98	V	1.0	12.72	4.00	43.5	36.7	6.8
236.000	20.61	V	1.0	11.25	4.44	46.0	36.3	9.7
484.800	13.87	H	1.2	17.38	5.25	46.0	36.5	9.5

**※ NOTE:**

1. Measurement above 1 GHz was performed from 1 GHz to the 5<sup>th</sup> harmonic of highest fundamental frequency. The highest fundamental frequency is LTE B25 center frequency.
2. For measurement above 1 GHz, Emission noise was not founded over the ambient noise.

## 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 $\mu$ V is obtained. The antenna factor of 7.4 dB/m and a cable factor of 1.1 dB are added. The 30 dB $\mu$ V/m value is mathematically converted to its corresponding level in  $\mu$ 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	
	$\mu$ V/m	dB $\mu$ 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 Number</u>	<u>Serial Number</u>	<u>Next CAL Date</u>
<b><u>Conducted Emission</u></b>				
<input checked="" type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESCI	100584	2012.05.03
<input checked="" type="checkbox"/> LISN	Rohde & Schwarz	ESH3-Z5	100282	2013.02.03
<input checked="" type="checkbox"/> LISN	Rohde & Schwarz	ENV216	100073	2012.04.01
<input checked="" type="checkbox"/> Attenuator	Rohde & Schwarz	ESH3-Z2	357.8810.352	2012.08.01
<b><u>Radiated Emission</u></b>				
<input checked="" type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESI40	831564103	2012.05.26
<input type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESU26	100241	2012.08.02
<input type="checkbox"/> Trilog Antenna	Schwarzbeck	VULB9160	3125	2013.05.03
<input checked="" type="checkbox"/> Trilog Antenna	Schwarzbeck	VULB9160	3301	2012.09.13
<input type="checkbox"/> Antenna master	INNCO Systems	MA4000-EP	MA4000/283	-
<input type="checkbox"/> Turn Table	INNCO Systems	DT3000-3T	DT3000/69	-
<input checked="" type="checkbox"/> Antenna master	HD GmbH	MA240	240/520	-
<input checked="" type="checkbox"/> Antenna master controller	HD GmbH	HD100	100/637BJ:00	-
<input checked="" type="checkbox"/> Turn Table	HD GmbH	2090	9702/1224	-
<input checked="" type="checkbox"/> Power Amplifier	Rohde & Schwarz	SCU-18	10094	2012.09.19
<input type="checkbox"/> Communication Antenna	Schwarzbeck	USLP9142	9142-248	-
<input type="checkbox"/> Horn Antenna	Schwarzbeck	BBHA 9120D	-	2012.04.13
<input checked="" type="checkbox"/> Horn Antenna	Schwarzbeck	BBHA 9120D	937	2013.10.17

## **7. CONCLUSION**

---

The data collected shows that the **Cellular/PCS BC 10 CDMA and LTE Phone with Bluetooth and WLAN, Model: LS840, FCC ID: ZNFLS840** complies with §15.107 and §15.109 of the FCC rules.