

## EMI CERTIFICATION REPORT

**Applicant:**

**LG Electronics MobileComm U.S.A., Inc.**  
1000 Sylvan Avenue, Englewood Cliffs NJ 07632

**Date of Issue: July 25, 2012**

**Test Report No.: HCTE1206FE07-3**

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

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

**FCC ID:**

**ZNFLS860**

Rule Part(s) / Standard(s) : FCC PART 15 Subpart B Class B  
Equipment Type : Cellular/PCS CDMA/EVDO and PCS LTE Phone with Bluetooth, RFID and WLAN  
Model Name : LS860  
Additional Model Name : LG-LS860, LGLS860  
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  
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Approved by  
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**DOCUMENT HISTORY**

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Report NO.	Date	Description
HCTE1206FE07	June 07, 2012	First Approval Report
HCTE1206FE07-1	June 15, 2012	Change equipment type.
HCTE1206FE07-2	July 20, 2012	<ol style="list-style-type: none"><li>1. Added that test was measured by 12 GHz at section 4.2.</li><li>2. Added the highest frequency of measured level over 1 GHz.</li><li>3. Added calibration cycle at section 6.</li></ol>
HCTE1206FE07-3	July 25, 2012	Added the measured table over 1 GHz.

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**ATTACHMENT: TEST SETUP PHOTOGRAPHS**

## 1. GENERAL INFORMATION

### 1.1 Product Description

Equipment Under Test is **Cellular/PCS CDMA/EVDO and PCS LTE Phone with Bluetooth, RFID and WLAN, Model: LS860** manufactured by **LG Electronics MobileComm U.S.A., Inc.** Its basic purpose is used for communications.

<b>Model</b>	LS860
<b>Additional Model Name</b>	LG-LS860
<b>FCC ID</b>	ZNFLS860
<b>E.U.T Type</b>	Cellular/PCS CDMA/EVDO and PCS LTE Phone with Bluetooth, RFID and WLAN
<b>TX Frequency</b>	817.9 MHz to 823.1 MHz (CDMA BC10) 824.70 MHz to 848.31 MHz (CDMA 835) 1 851.25 MHz to 1 908.75 MHz (CDMA 1 900) 1 850.00 MHz to 1 915.00 MHz (LTE B25)
<b>RX Frequency</b>	862.00 MHz to 894.00 MHz (CDMA BC10) 869.70 MHz to 893.31 MHz (CDMA 835) 1 931.25 MHz to 1 988.75 MHz (CDMA 1 900) 1 930.00 MHz to 1 995.00 MHz (LTE B25)

### 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	LS860	ZNFLS860	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	PRIMAX ELECTRONICS	MOARUO	DoC	Notebook PC
SD Card	SanDisk	8GB	-	E.U.T
USB cable	-	-	-	E.U.T Notebook PC
Headset	-	-	-	E.U.T
Net HDD	LG	N1A1DD1	Doc	Notebook PC Net HDD adaptor
Net HDD adaptor	Yang Ming Industrial	DA-60M12	-	Net HDD
RJ45 cable	-	-	-	Net HDD Notebook PC

### 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	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
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
	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

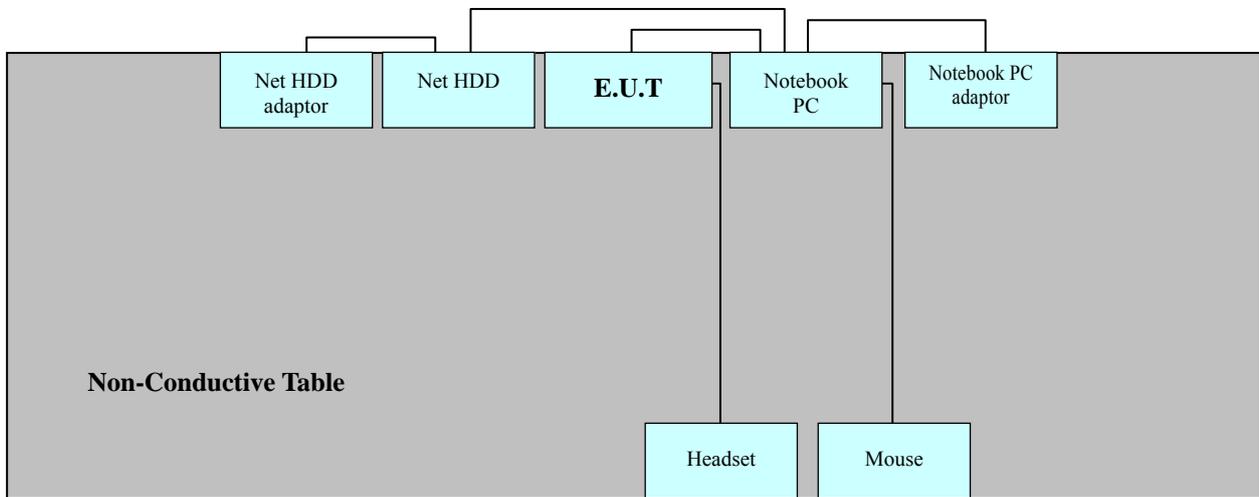
## 2. SYSTEM TEST CONFIGURATION

### 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]



Power Line: 110 VAC

### **3. PRELIMINARY TEST**

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#### **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	: 26.3 °C
Humidity Level	: 46.0 %
Test Date	: June 06, 2012

Frequency (MHz)	Transd (dB)	Conductor (H/N)	Quasi-Peak			Average		
			Limit	Measurement Level	Result Level	Limit	Measurement Level	Result Level
			(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dBuV)
0.152	10.00	H	66	39.8	49.8	56	-	-
0.154	10.00	N	66	39.7	49.7	56	-	-
19.680	11.40	N	60	29.9	41.3	50	-	-
20.784	11.50	N	60	34.7	46.2	50	28.50	40.00
20.996	11.60	H	60	33.3	44.9	50	-	-
21.112	11.60	H	60	30.0	41.6	50	-	-

※ **NOTE:** Refer to page 11 to page 14 for details.

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

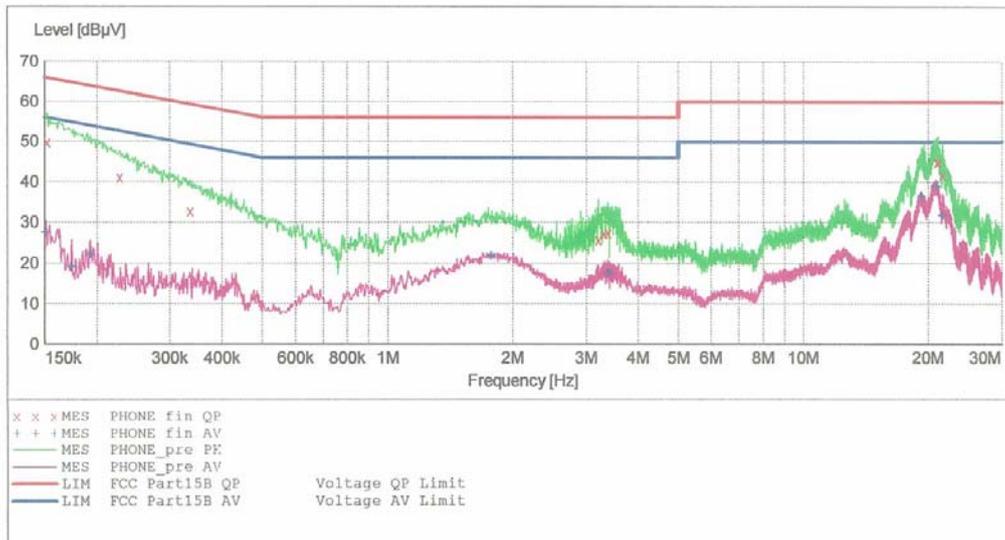
**HCT**

**EMC**

EUT: LS860  
 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"**

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.152010	49.80	10.0	66	16.1	---	---
0.227010	41.20	10.1	63	21.4	---	---
0.335010	32.80	10.1	59	26.5	---	---
3.216000	25.70	10.3	56	30.3	---	---
3.328000	27.20	10.3	56	28.8	---	---
3.384000	27.40	10.3	56	28.6	---	---
20.996000	45.00	11.6	60	15.0	---	---
21.112000	44.90	11.6	60	15.1	---	---
21.612000	41.60	11.6	60	18.4	---	---

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

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.151010	27.60	10.0	56	28.3	---	---
0.174010	19.10	10.1	55	35.7	---	---
0.193010	22.10	10.1	54	31.8	---	---
1.776000	21.80	10.2	46	24.2	---	---
3.384000	17.50	10.3	46	28.5	---	---
3.428000	17.60	10.3	46	28.4	---	---
19.232000	36.30	11.5	50	13.7	---	---
20.916000	38.80	11.6	50	11.2	---	---
21.632000	31.80	11.6	50	18.2	---	---

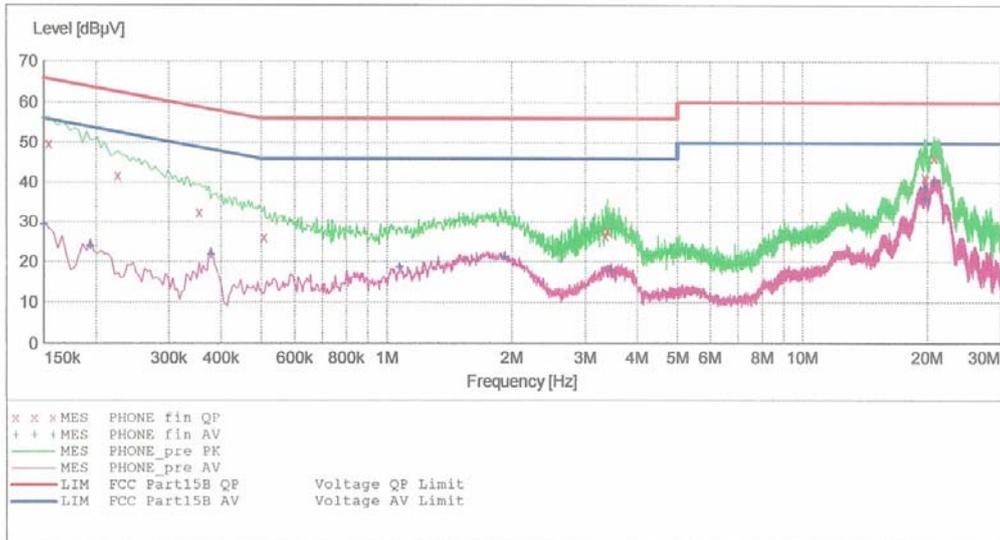
**HCT**

**EMC**

EUT: LS860  
 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"**

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.154010	49.70	10.0	66	16.1	---	---
0.226010	41.70	10.1	63	20.8	---	---
0.354010	32.50	10.1	59	26.4	---	---
0.508000	26.20	10.0	56	29.8	---	---
3.356000	26.50	10.3	56	29.5	---	---
3.396000	27.90	10.3	56	28.1	---	---
19.680000	41.30	11.4	60	18.7	---	---
19.804000	40.70	11.4	60	19.3	---	---
20.784000	46.20	11.5	60	13.8	---	---

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

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.150010	29.40	10.0	56	26.6	---	---
0.194010	24.00	10.1	54	29.9	---	---
0.378010	21.80	10.1	48	26.5	---	---
1.076000	18.70	10.1	46	27.3	---	---
1.924000	21.20	10.2	46	24.8	---	---
3.464000	17.80	10.3	46	28.2	---	---
19.772000	38.40	11.4	50	11.6	---	---
19.784000	35.60	11.4	50	14.4	---	---
20.784000	40.00	11.5	50	10.0	---	---

## 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

Test Date : June 06, 2012

Temperature : 23.5 °C

Humidity Level : 46.8 %

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)			
30.400	12.15	V	1.0	11.45	3.40	40.0	27.0	13.0
53.500	15.57	V	1.0	12.23	3.60	40.0	31.4	8.6
68.800	15.79	V	1.2	10.62	3.69	40.0	30.1	9.9
107.700	17.43	H	1.5	10.30	3.88	43.5	31.6	11.9
333.200	15.34	H	1.2	14.13	4.73	46.0	34.2	11.8
376.300	13.00	V	1.7	15.09	4.91	46.0	33.0	13.0

**-For measurement above 1 GHz**

Limit Apply to : FCC PART 15 Subpart B Class B

Detector : Peak mode: Peak (RBW: 1 MHz)  
 : Average mode: Peak (RBW: 1 MHz)

Frequency Range : 1 GHz to 12 GHz

Operation Mode : Data communication mode

Test Date : June 06, 2012

Temperature : 23.5 °C

Humidity Level : 46.8 %

Frequency (GHz)	Peak			ANT. POL	Average		
	Total	Limit	Margin		Total	Limit	Margin
	(dB $\mu$ N/m)	(dB $\mu$ N/m)	(dB)		(dB $\mu$ N/m)	(dB $\mu$ N/m)	(dB)
1.2152	45.2	74	28.8	V	33.70	54	20.3
1.6514	45.0	74	29.0	V	29.60	54	24.4
2.0774	47.2	74	26.8	V	31.70	54	22.3

※ **NOTE:** Measurement above 1 GHz was performed from 1 GHz to the 5<sup>th</sup> harmonic of highest fundamental frequency.

## 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 Name</u>	<u>Serial Number</u>	<u>Calibration Cycle</u>	<u>Next CAL Date</u>
<b><u>Conducted Emission</u></b>					
<input checked="" type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESCI	100584	1 year	2013.05.02
<input checked="" type="checkbox"/> LISN	Rohde & Schwarz	ESH3-Z5	100282	1 year	2013.02.03
<input type="checkbox"/> LISN	Rohde & Schwarz	ENV216	100073	1 year	2013.02.09
<input checked="" type="checkbox"/> LISN	EMCO	3816/2SH	9706-1070	1 year	2013.05.02
<input checked="" type="checkbox"/> Attenuator	Rohde & Schwarz	ESH3-Z2	357.8810.352	1 year	2012.08.01
<b><u>Radiated Emission</u></b>					
<input checked="" type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESI40	831564103	1 year	2013.05.03
<input type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESU26	100241	1 year	2012.08.02
<input type="checkbox"/> Trilog Antenna	Schwarzbeck	VULB9160	3125	2 year	2013.05.03
<input checked="" type="checkbox"/> Trilog Antenna	Schwarzbeck	VULB9160	3301	2 year	2012.09.13
<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"/> Antenna master	HD GmbH	MA240	240/520	N/A	-
<input type="checkbox"/> Antenna master controller	HD GmbH	HD100	100/637BJ:00	N/A	-
<input checked="" type="checkbox"/> Turn Table	HD GmbH	2090	9702/1224	N/A	-
<input checked="" type="checkbox"/> Power Amplifier	Rohde & Schwarz	SCU-18	10094	1 year	2012.09.19
<input type="checkbox"/> Communication Antenna	Schwarzbeck	USLP9142	9142-248	N/A	-
<input checked="" type="checkbox"/> Horn Antenna	Schwarzbeck	BBHA 9120D	937	2 year	2013.10.17

## **7. CONCLUSION**

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The data collected shows that the **Cellular/PCS CDMA/EVDO and PCS LTE Phone with Bluetooth, RFID and WLAN, Model: LS860, FCC ID: ZNFLS860** complies with §15.107 and §15.109 of the FCC rules.