

EMI VERIFICATION REPORT

Applicant:

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

Date of Issue: November 24, 2011

Test Report No.: HCTE1111FE23

Test Site: HCT CO., LTD.
HCT FRN: 0005-8664-21

MODEL:

MS840

Rule Part(s) / Standard(s) : FCC PART 15 Subpart B Class B
Equipment Type : CDMA/LTE/AWS Phone
Model(s) Name : LG-MS840, LGMS840
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.



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1. GENERAL INFORMATION

1.1 Product Description

Equipment Under Test is **CDMA/LTE/AWS Phone, Model: MS840** manufactured by **LG Electronics Mobilecomm U.S.A., Inc.** Its basic purpose is used for communications.

Model	MS840
Additional Model	LG-MS840, LGMS840
FCC ID	ZNFMS840
E.U.T Type	CDMA/LTE/AWS Phone
TX Frequency	824.70 MHz to 848.31 MHz (CDMA 835) 1 851.25 MHz to 1 908.75 MHz (PCS CDMA) 1 711.25 MHz to 1 753.75 MHz (AWS CDMA) 1 710.7 MHz to 1 754.3 MHz (AWS LTE) 1 850.7 MHz to 1 909.3 MHz (PCS LTE)
RX Frequency	869.70 MHz to 893.31 MHz (CDMA 835) 1 931.25 MHz to 1 988.75 MHz (PCS CDMA) 2 111.25 MHz to 2 153.75 MHz (AWS CDMA) 2 111.25 MHz to 2 153.75 MHz (AWS LTE) 1 930.00 MHz to 1 990.00 MHz (PCS LTE)

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 Number	FCC ID / DoC	Connected to
CDMA/LTE/AWS Phone	LG	MS840	-	TA
Travel adaptor	SUNLIN	STA-U13WR2	-	E.U.T
USB cable	-	-	-	E.U.T, TA
Headset	-	-	-	E.U.T
SD card (2 GB)	SanDisk	-	-	E.U.T

1.4 Cable Description

Product Name	Port	Power Cord Shielded (Y/N)	I/O Cable Shielded (Y/N)	Length (m)
CDMA/LTE/AWS Phone	Micro USB	Y	N	(P)1.2
	Headset jack	-	N	(D)1.2

* 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
CDMA/LTE/AWS Phone	Micro USB	N	-	Y	Both End
	Headset jack	N	-	Y	E.U.T 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 10 m semi anechoic chamber used to collect the test data is located at the 105-1, Jangam-Ri, Majang-Myeon, Icheon-Si, Kyoungki-Do, 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 Sep. 03, 2010 (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

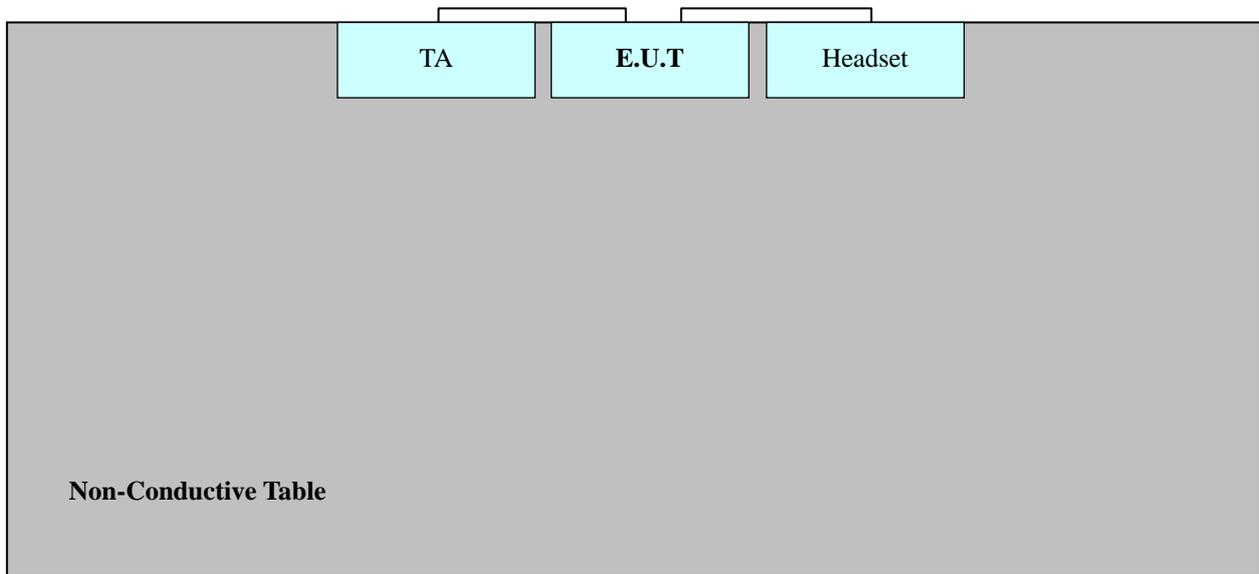
2. SYSTEM TEST CONFIGURATION

2.1 Configuration of Test System

Power Line Conducted test : E.U.T was connected to LISN, all other peripheral equipment were connected to another LISN. 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 10 m semi anechoic chamber test site.

[Configuration of Tested System]



Power Line: 110 VAC

3. PRELIMINARY TEST

3.1 Conducted Emission Test

During preliminary tests, the following operating mode was investigated:

Operation Mode	The Worst Operating Condition
Idle	
Camera (Mega, VT)	○ (MEGA)
MP3	

3.2 Radiated Emission Test

During preliminary tests, the following operating mode was investigated:

Operation Mode	The Worst Operating Condition
Idle	
Camera (Mega, VT)	○ (MEGA)
MP3	

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	: Camera (MEGA) mode
Temperature	: 22.2 °C
Humidity Level	: 49.5 %
Test Date	: November 21, 2011

※ **NOTE:** Refer to page 9 to page 12 for details.

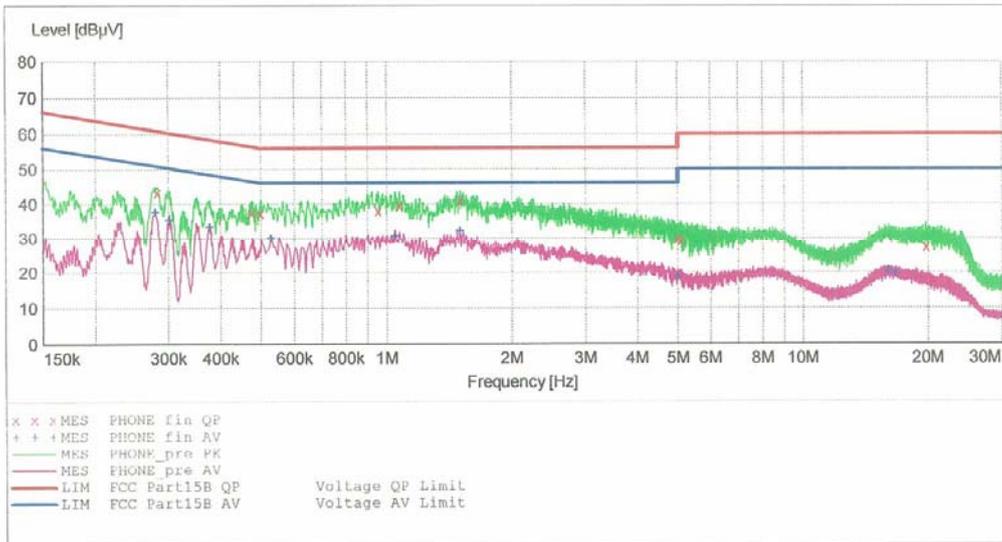
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EUT: MS840
 Manufacturer: LG
 Operating Condition: CAMERA MODE (MEGA)
 Test Site: SHIELD ROOM
 Operator: DH.RYU
 Test Specification: FCC PART15 CLASS B
 Comment: H

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"

11/21/2011 7:30PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.282010	43.40	10.1	61	17.4	---	---
0.475010	37.40	10.1	56	19.0	---	---
0.498010	37.20	10.1	56	18.9	---	---
0.956000	38.00	10.1	56	18.0	---	---
1.076000	39.60	10.1	56	16.4	---	---
1.504000	41.00	10.2	56	15.0	---	---
5.000000	29.80	10.5	56	26.2	---	---
5.092000	29.30	10.5	60	30.7	---	---
19.784000	27.40	11.9	60	32.6	---	---

MEASUREMENT RESULT: "PHONE_fin AV"

11/21/2011 7:30PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.279010	37.60	10.1	51	13.3	---	---
0.301010	35.10	10.1	50	15.1	---	---
0.376010	33.30	10.1	48	15.1	---	---
0.528000	30.00	10.1	46	16.0	---	---
1.048000	30.60	10.1	46	15.4	---	---
1.504000	32.10	10.2	46	13.9	---	---
5.000000	18.80	10.5	46	27.2	---	---
16.052000	20.30	11.5	50	29.7	---	---
16.732000	19.70	11.6	50	30.3	---	---

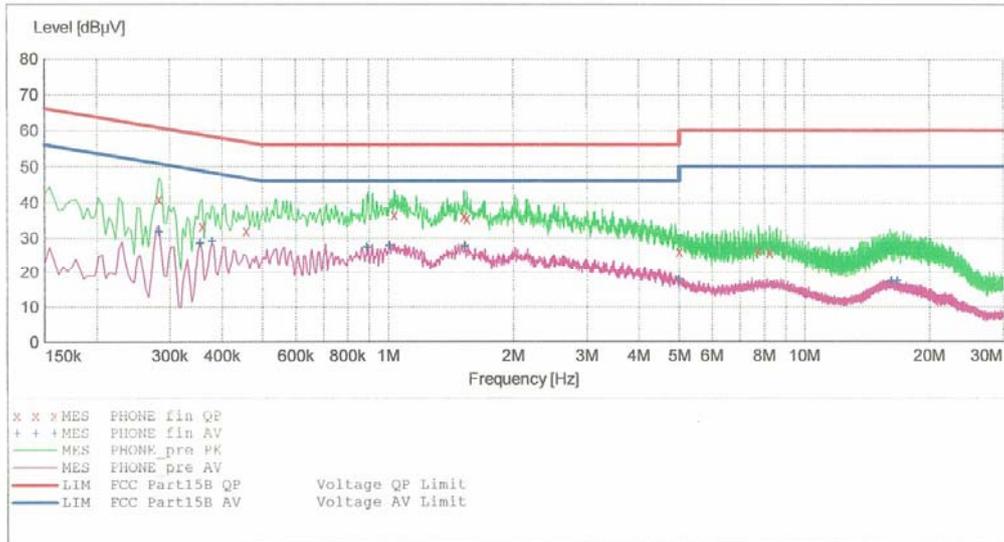
HCT

EMC

EUT: MS840
 Manufacturer: LG
 Operating Condition: CAMERA MODE (MEGA)
 Test Site: SHIELD ROOM
 Operator: DH.RYU
 Test Specification: FCC PART15 CLASS B
 Comment: N

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

Short Description:			FCC PART 15 CLASS B				Transducer
Start	Stop	Step	Detector	Meas. Time	IF Bandw.		
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
0.282010	41.10	10.3	61	19.6	---	---
0.358010	33.50	10.3	59	25.3	---	---
0.458010	32.10	10.3	57	24.6	---	---
1.036000	36.60	10.4	56	19.4	---	---
1.524000	36.30	10.4	56	19.7	---	---
1.548000	35.70	10.4	56	20.3	---	---
5.000000	26.20	10.7	56	29.8	---	---
7.752000	26.50	11.0	60	33.5	---	---
8.252000	26.00	11.0	60	34.0	---	---

MEASUREMENT RESULT: "PHONE_fin AV"

11/21/2011 7:34PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.282010	31.70	10.3	51	19.1	---	---
0.354010	28.50	10.3	49	20.4	---	---
0.378010	29.10	10.3	48	19.2	---	---
0.892000	27.50	10.4	46	18.5	---	---
1.008000	28.00	10.4	46	18.0	---	---
1.532000	27.60	10.4	46	18.4	---	---
5.000000	17.90	10.7	46	28.1	---	---
16.168000	17.50	11.5	50	32.5	---	---
16.692000	17.50	11.5	50	32.5	---	---

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 : Camera (MEGA) mode

-For measurement above 1 GHz

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

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

Temperature : 24.2 °C

Humidity Level : 49.3 %

Test Date : November 15, 2011

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)			
33.9	9.12	V	1.0	11.11	0.97	40.0	21.2	18.8
60.2	12.21	V	1.0	11.20	1.29	40.0	24.7	15.3
99.6	6.86	V	1.0	9.24	1.71	43.5	17.8	25.7
134.6	7.38	H	1.5	12.22	2.00	43.5	21.6	21.9
139.5	6.04	V	1.0	12.53	2.04	43.5	20.6	22.9
176.3	3.28	H	2.0	11.73	2.29	43.5	17.3	26.2

※ NOTE:

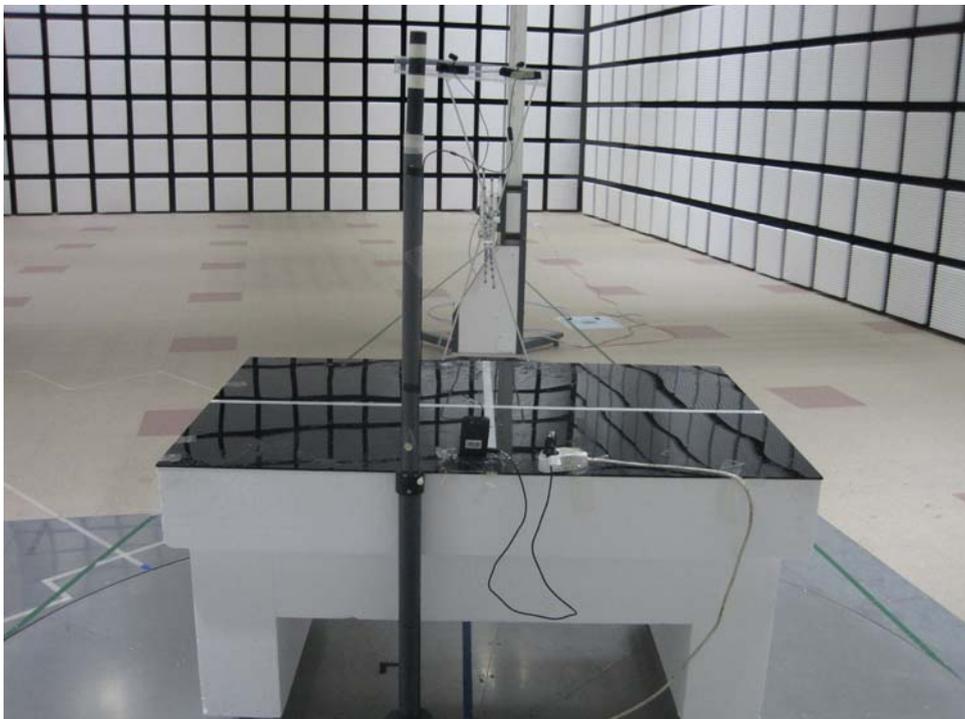
1. Measurement above 1 GHz was performed from 1 GHz to the 5th harmonic of highest fundamental frequency. The highest fundamental frequency is PCS LTE center frequency.
2. For measurement above 1 GHz, Emission noise was not founded over the ambient noise.

4.3 Test Setup Photos

[Conducted Emission]



[Radiated Emission]



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 Number</u>	<u>Serial Number</u>	<u>Next CAL Date</u>
<u>Conducted Emission</u>				
<input type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESI40	831564103	2012.05.26
<input checked="" type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESCI	100584	2012.05.03
<input checked="" type="checkbox"/> LISN	Rohde & Schwarz	ESH3-Z5	100282	2012.02.01
<input 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
<u>Radiated Emission</u>				
<input checked="" type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESU26	100241	2012.08.02
<input checked="" type="checkbox"/> Trilog Antenna	Schwarzbeck	VULB9160	3125	2013.05.03
<input checked="" type="checkbox"/> Antenna master	INNCO Systems	MA4000-EP	MA4000/283	-
<input checked="" type="checkbox"/> Turn Table	INNCO Systems	DT3000-3T	DT3000/69	-
<input type="checkbox"/> Communication Antenna	Schwarzbeck	USLP9142	9142-248	-
<input checked="" type="checkbox"/> Horn Antenna	Schwarzbeck	BBHA 9120D	-	2012.04.13
<input checked="" type="checkbox"/> Power Amplifier	Rohde & Schwarz	SCU-18	10094	2012.09.19
<input type="checkbox"/> Base Station	Rohde & Schwarz	CMU 200	1100000802	2012.02.16

7. CONCLUSION

The data collected shows that the **CDMA/LTE/AWS Phone, Model: MS840** complies with §15.107 and §15.109 of the FCC rules.