

EMI CERTIFICATION REPORT

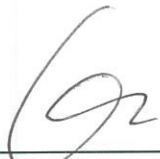
Applicant:**LG Electronics MobileComm U.S.A., Inc.**
1000 Sylvan Avenue, Englewood Cliffs NJ 07632**Date of Receipt: May 13, 2014****Date of Issue: May 28, 2014****Test Report No. HCT-E-1405-F039****HCT FRN: 0005866421****FCC ID:****ZNFVS880**

Rule Part(s) / Standard(s) : FCC CFR 47 PART 15 Subpart B Class B
FCC Classification : JBP (Part 15 B – Class B Computing Device Peripheral)
EUT Type : Cellular/PCS CDMA/EVDO and LTE Phone with Bluetooth, WLAN and NFC
Model Name : LG-VS880
Additional Model Name : LGVS880, VS880
Port(s) : USB / Earphone Port
Date of Test : May 23, 2014

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 denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C 862

Tested By

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DOCUMENT HISTORY

The revision history for this document is shown in table.

Version	Date	Description
HCT-E-1405-F039	May 28, 2014	Initial Release



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ATTACHMENT: TEST SETUP PHOTOGRAPHS



1. GENERAL INFORMATION

1.1 Description of EUT

Equipment Under Test is manufactured by **LG Electronics MobileComm U.S.A., Inc.**
Its basic purpose is used for communications.

Model	LG-VS880
FCC ID	ZNFVS880
Additional Model	LGVS880, VS880
EUT Type	Cellular/PCS CDMA/EVDO and LTE Phone with Bluetooth, WLAN and NFC
TX Frequency	824.70 MHz to 848.31 MHz (CDMA BC0) 1 851.25 MHz to 1 908.75 MHz (CDMA BC1) 1 710 MHz to 1 755 MHz (LTE B4) 777 MHz to 787 MHz (LTE B13)
RX Frequency	869.70 MHz to 893.31 MHz (CDMA BC0) 1 931.25 MHz to 1 988.75 MHz (CDMA BC1) 2 110 MHz to 2 155 MHz (LTE B4) 746 MHz to 756 MHz (LTE B13)

1.2 Related Submittal(s) / Grant(s)

Original submittal only.



1.3 Test Facility

Test site is located at 74, SEOICHEON-RO, 578BEON-GIL, MAJANG-MYEON, ICHEON-SI, GYEONGGI-DO, SOUTH KOREA. Those measurement facilities are constructed in conformance with the requirements of ANSI C63.4-2003.

Measurement Facilities	Reg. No.
Radiated Field strength measurement facility (3 m)	90661 (February 28, 2014)
Radiated Field strength measurement facility (10 m)	90661 (February 28, 2014)



1.4 Tested System Details

All equipment descriptions used in the tested system (including inserted cards) are:

Device Type	Model Name	Manufacturer	FCC ID / DoC	Connected To
EUT	LG-VS880	LG	ZNFVS880	Notebook PC, Earphone
USB cable	EAD62290202	Ningbo Broad	-	EUT, Notebook PC
USB cable	EAD62290203	CRESYN	-	EUT, Notebook PC
Earphone	SGEY003744	CRESYN	-	EUT
Notebook PC	ProBook6560b	HP	DoC	Notebook PC adaptor
Notebook PC adaptor	PPP009D	DELTA Electronics (JIANGSU)LTD	-	Notebook PC
Gateway	MV440	Axesstel	PH7MV440	Notebook PC, Adaptor
Adaptor	DA-60M12	Yang Ming Industrial	-	Gateway
Serial Mouse	Serial 2 button mouse	Radio shack	FSUGMZE3	Notebook PC
RJ45 cable	-	-	-	Notebook PC, Gateway
Micro SD card (8 GB)	-	Transcend	-	EUT



1.5 Cable Description

Product Name	Port	Power Cord Shielded (Y/N)	I/O Cable Shielded (Y/N)	Length (m)
EUT	Micro USB	Y	Y	(P,D)1.2
	Earphone	N/A	N	(D)1.2
Notebook PC	RJ 45	N/A	N	(D)1.5
	Serial (Mouse)	N/A	Y	(D)1.8
	DC in	N	N/A	(P)1.8
Gateway	DC in	N	N/A	(P)1.8

* The marked "(D)" means the data cable and "(P)" means the power cable.

1.6 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
	Earphone	N	N/A	Y	EUT End
Notebook PC	RJ 45	N	N/A	N	N/A
	Serial (Mouse)	N	N/A	Y	Notebook PC End



2. DESCRIPTION OF TEST

2.1 Measurement of Conducted Emission

The test procedure was in accordance with ANSI C63.4-2003, Clause 7

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both conducted lines are measured in Quasi-Peak and Average mode, including the worst-case data points for each tested configuration.
- c. The frequency range from 150 kHz to 30 MHz was searched.

[Conducted Emission Limits]

Frequency (MHz)	Resolution Bandwidth	Quasi-Peak(dB μ V)	Average(dB μ V)
0.15 to 0.5	9 kHz	66 to 56*	56 to 46*
0.5 to 5	9 kHz	56	46
5 to 30	9 kHz	60	50

**Decreases with the logarithm of the frequency.*



2.2 Measurement of Radiated Emission

The test procedure was in accordance with ANSI C63.4-2003, Clause 8

- a. The EUT was placed on the top of a turn table 0.8 meters above the ground at a 3 m shield room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 m away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna height is varied from 1 m to 4 m above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 m to 4 m and the turn table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to Peak and Average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.
- g. The antenna height scans apply for both horizontal and vertical polarizations, except that for vertical polarization, the minimum height of the center of the antenna shall be increased so that the lowest point of the bottom of the lowest antenna element clears the site reference ground plane by at least 25 cm. (above 1 GHz.)

[Radiated Emission Limits]

Frequency (MHz)	Antenna Distance (m)	Field Strength ($\mu\text{V}/\text{m}$)	Quasi-Peak (dB $\mu\text{V}/\text{m}$)
30 to 88	3	100	40.0
88 to 216	3	150	43.5
216 to 960	3	200	46.0
Above 960	3	500	54.0
Frequency (MHz)	Antenna Distance (m)	Peak (dB $\mu\text{V}/\text{m}$)	Average (dB $\mu\text{V}/\text{m}$)
Above 1 000	3	74	54

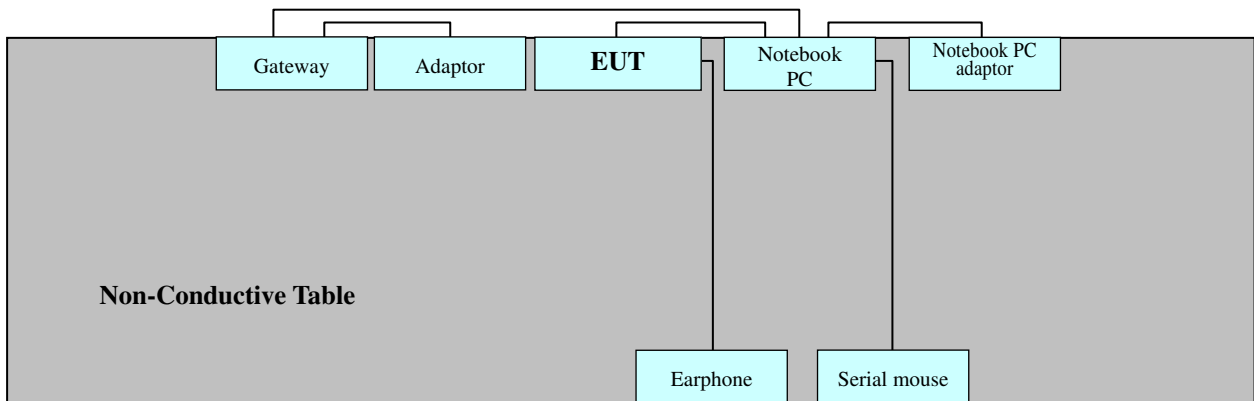


2.2.1 Frequency Range of Radiated Measurements

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

2.3 Configuration of Tested System



Power Line: 120 VAC, 60 Hz



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

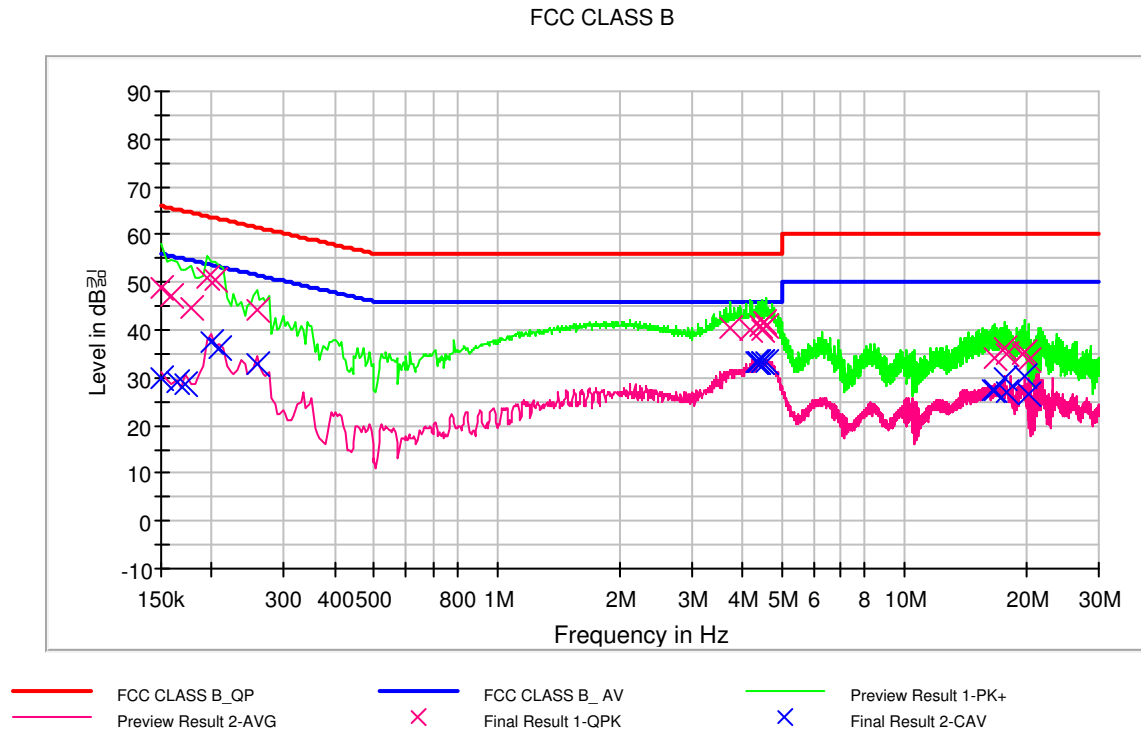
The following table shows the highest levels of conducted emissions on both polarization of hot and neutral line.

Limit Apply to	: FCC PART 15 Subpart B Class B
Detector	: Quasi-Peak, CISPR-Average
6 dB Bandwidth:	: 9 kHz
Operation Mode	: Data Communication mode
USB Cable Manufacturer	: CRESYN
	※ The worst-case emissions are reported.
Temperature	: 24.5°C
Humidity Level	: 45.2 % RH
Test Date	: May 23, 2014

※ NOTE: Refer to page 13 to page 18 for test data.



Figure 1: Spectral Diagrams, Conducted Emission, Phase (L1)



※ Calculation Formula:

1. Conductor L1 = Hot, Conductor N = Neutral
2. Corr. = LISN Factor + Cable Loss
3. Margin = Limit - Quasi-Peak



Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	48.6	9.000	L1	9.7	17.4	66.0
0.159000	47.3	9.000	L1	9.7	18.2	65.5
0.177000	44.8	9.000	L1	9.7	19.8	64.6
0.195000	51.0	9.000	L1	9.7	12.8	63.8
0.204000	50.4	9.000	L1	9.7	13.0	63.4
0.258000	44.1	9.000	L1	9.7	17.4	61.5
3.749000	40.5	9.000	L1	10.0	15.5	56.0
4.176500	39.9	9.000	L1	10.1	16.1	56.0
4.424000	41.0	9.000	L1	10.1	15.0	56.0
4.460000	40.2	9.000	L1	10.1	15.8	56.0
4.527500	41.9	9.000	L1	10.1	14.1	56.0
4.599500	40.9	9.000	L1	10.1	15.1	56.0
16.668500	33.9	9.000	L1	10.7	26.1	60.0
17.694500	36.2	9.000	L1	10.8	23.8	60.0
17.897000	34.8	9.000	L1	10.8	25.2	60.0
19.598000	35.1	9.000	L1	10.9	24.9	60.0
19.737500	35.3	9.000	L1	10.9	24.7	60.0
20.169500	33.7	9.000	L1	10.9	26.3	60.0

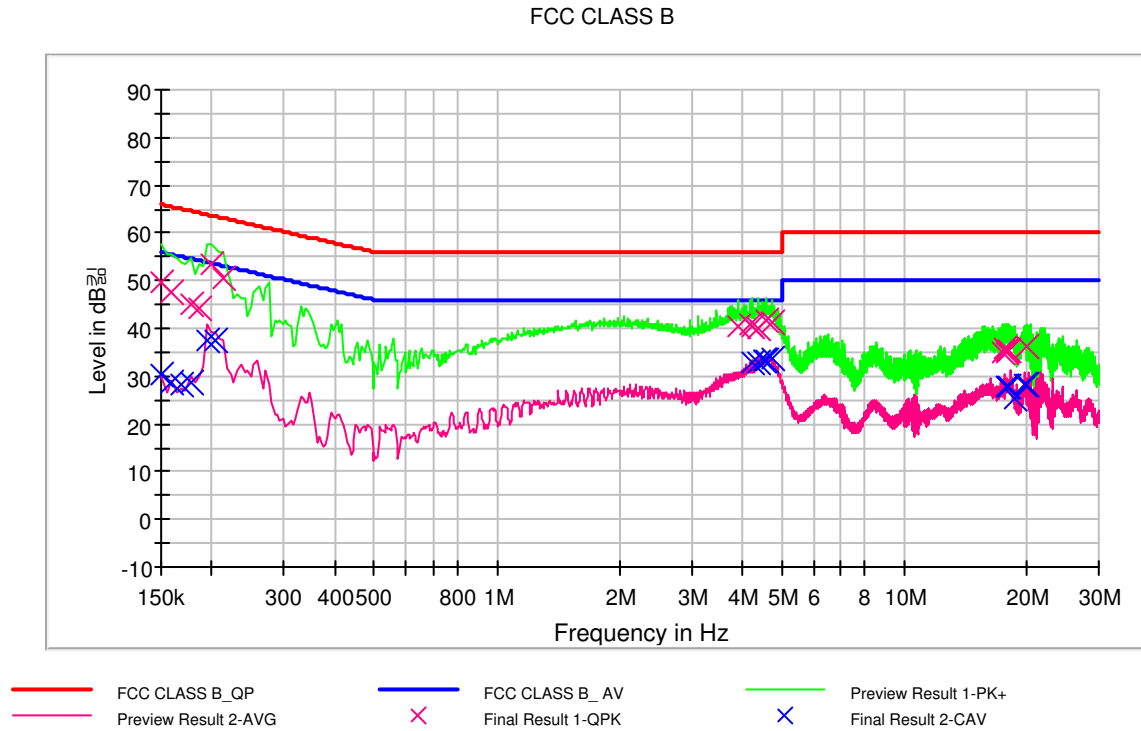


Final Result 2

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	30.1	9.000	L1	9.7	25.9	56.0
0.163500	28.9	9.000	L1	9.7	26.4	55.3
0.172500	28.7	9.000	L1	9.7	26.1	54.8
0.199500	37.5	9.000	L1	9.7	16.1	53.6
0.208500	36.3	9.000	L1	9.7	17.0	53.3
0.258000	33.0	9.000	L1	9.7	18.5	51.5
4.307000	33.3	9.000	L1	10.1	12.7	46.0
4.361000	33.3	9.000	L1	10.1	12.7	46.0
4.383500	33.5	9.000	L1	10.1	12.5	46.0
4.460000	33.2	9.000	L1	10.1	12.8	46.0
4.487000	33.4	9.000	L1	10.1	12.6	46.0
4.599500	33.5	9.000	L1	10.1	12.5	46.0
16.484000	27.5	9.000	L1	10.7	22.5	50.0
16.668500	27.6	9.000	L1	10.7	22.4	50.0
17.694500	30.0	9.000	L1	10.8	20.0	50.0
17.897000	27.0	9.000	L1	10.8	23.0	50.0
19.710500	30.5	9.000	L1	10.9	19.5	50.0
20.169500	26.6	9.000	L1	10.9	23.4	50.0



Figure 2: Spectral Diagrams, Conducted Emission, Phase (N)



※ Calculation Formula:

1. Conductor L1 = Hot, Conductor N = Neutral
2. Corr. = LISN Factor + Cable Loss
3. Margin = Limit - Quasi-Peak



Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	49.7	9.000	N	9.7	16.3	66.0
0.159000	47.6	9.000	N	9.7	17.9	65.5
0.177000	45.2	9.000	N	9.7	19.4	64.6
0.186000	44.4	9.000	N	9.7	19.8	64.2
0.199500	53.3	9.000	N	9.7	10.3	63.6
0.213000	50.5	9.000	N	9.7	12.6	63.1
3.893000	40.2	9.000	N	10.0	15.8	56.0
4.176500	40.9	9.000	N	10.1	15.2	56.0
4.248500	40.5	9.000	N	10.1	15.5	56.0
4.392500	40.1	9.000	N	10.1	15.9	56.0
4.599500	41.6	9.000	N	10.1	14.4	56.0
4.743500	41.1	9.000	N	10.1	14.9	56.0
17.384000	34.9	9.000	N	10.7	25.1	60.0
17.690000	35.6	9.000	N	10.7	24.4	60.0
17.843000	35.4	9.000	N	10.7	24.6	60.0
17.897000	35.0	9.000	N	10.7	25.0	60.0
17.960000	35.4	9.000	N	10.7	24.6	60.0
19.845500	36.1	9.000	N	10.8	23.9	60.0



Final Result 2

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	30.4	9.000	N	9.7	25.6	56.0
0.159000	28.5	9.000	N	9.7	27.0	55.5
0.168000	28.2	9.000	N	9.7	26.9	55.1
0.177000	28.7	9.000	N	9.7	25.9	54.6
0.195000	37.3	9.000	N	9.7	16.5	53.8
0.204000	37.5	9.000	N	9.7	15.9	53.4
4.253000	32.8	9.000	N	10.1	13.2	46.0
4.392500	32.9	9.000	N	10.1	13.1	46.0
4.532000	33.4	9.000	N	10.1	12.6	46.0
4.554500	33.4	9.000	N	10.1	12.6	46.0
4.604000	33.5	9.000	N	10.1	12.5	46.0
4.743500	33.5	9.000	N	10.1	12.5	46.0
17.843000	27.9	9.000	N	10.7	22.1	50.0
17.897000	27.8	9.000	N	10.7	22.2	50.0
17.960000	27.6	9.000	N	10.7	22.4	50.0
18.549500	25.4	9.000	N	10.8	24.6	50.0
19.796000	28.1	9.000	N	10.8	21.9	50.0
20.061500	28.2	9.000	N	10.8	21.8	50.0



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:	: RBW 120 kHz, VBW 300 kHz
Operation Mode	: Data Communication mode
USB Cable Manufacturer	: Ningbo Broad ※ The worst-case emissions are reported.
Temperature	: 23.2°C
Humidity Level	: 42.2 % RH
Test Date	: May 23, 2014

Frequency (MHz)	Reading (dBUV)	Polarity (H/V)	Antenna Height (m)	Correction Factor		Limit (dBUV/m)	Total Level (dBUV/m)	Margin (dB)
				Antenna (dB/m)	Cable (dB)			
59.2	13.6	V	1.0	11.8	3.5	40.0	29.0	11.0
85.5	20.3	H	3.5	7.7	3.7	40.0	31.7	8.3
108.8	19.3	H	2.7	10.3	3.8	43.5	33.5	10.0
267.2	16.2	H	3.0	12.3	4.4	46.0	33.0	13.0
375.0	16.4	H	1.0	15.1	4.8	46.0	36.3	9.7
625.0	12.8	V	1.0	20.0	5.4	46.0	38.2	7.8

※ Calculation Formula:

1. Polarity H = Horizontal, Polarity V = Vertical
2. Reading (Receiver Reading) = Total Level – Correction Factor
3. Margin = Limit - Total Level
4. Total Level = Quasi-Peak



-For Measurement Above 1 GHz

Limit Apply to : FCC PART 15 Subpart B Class B

Detector : Peak mode: Peak (RBW: 1 MHz, VBW: 3 MHz)
 Average mode: Peak (RBW: 1 MHz, VBW: 10 Hz)

Highest Operating Frequency : 1.2 GHz
 ※ This product was tested up to the 5th harmonic above frequency.

Operation Mode : Data Communication mode
 USB Cable Manufacturer : CRESYN
 ※ The worst-case emissions are reported.

Temperature : 23.2°C
 Humidity Level : 42.2 % RH
 Test Date : May 23, 2014

Frequency (GHz)	Polarity (H/V)	Antenna Height (m)	Peak			Average		
			Total Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Total Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1.3276	V	1.0	49.1	74	24.9	30.6	54	23.4
1.9991	V	1.0	57.2	74	16.8	38.8	54	15.2
2.6666	V	1.0	50.1	74	23.9	32.3	54	21.7

※ Calculation Formula:

1. Polarity H = Horizontal, Polarity V = Vertical
2. Margin = Limit - Total Level



5. LIST OF TEST EQUIPMENT

<u>Type</u>	<u>Manufacturer</u>	<u>Model Name</u>	<u>Serial Number</u>	<u>Calibration Cycle</u>	<u>CAL Date</u>
<u>Conducted Emission</u>					
<input checked="" type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESCI	100584	1 year	01.24. 2014
<input checked="" type="checkbox"/> LISN	EMCO	3816/2SH	9706-1070	1 year	04.07. 2014
<input checked="" type="checkbox"/> LISN	Rohde & Schwarz	ENV216	100073	1 year	01.29. 2014
<input type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESCI	100033	1 year	06.23. 2013
<input type="checkbox"/> LISN	Rohde & Schwarz	ESH3-Z5	100282	1 year	07.03. 2013
<input type="checkbox"/> Attenuator	Rohde & Schwarz	ESH3-Z2	357.8810.352	1 year	07.03. 2013
<input checked="" type="checkbox"/> Software	Rohde & Schwarz	EMC32	-	-	-
<u>Radiated Emission</u>					
-For measurement below 1 GHz					
<input checked="" type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESI40	831564103	1 year	04.07. 2014
<input checked="" type="checkbox"/> Trilog Antenna	Schwarzbeck	VULB9160	3301	2 year	12.17. 2012
<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"/> EMI Test Receiver	Rohde & Schwarz	ESU 26	100241	1 year	07.01. 2013
<input type="checkbox"/> Trilog Antenna	Schwarzbeck	VULB9168	185	2 year	04.16. 2013
<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"/> Software	Rohde & Schwarz	EMC32	-	-	-
-For measurement above 1 GHz					
<input checked="" type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESI40	831564103	1 year	04.07. 2014
<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 checked="" type="checkbox"/> Power Amplifier	CERNEX	CBLU1183540	21691	1 year	07.24. 2013
<input checked="" type="checkbox"/> Horn Antenna	Schwarzbeck	BBHA 9120D	296	2 year	12.13. 2012
<input type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESU 26	100241	1 year	07.01. 2013
<input type="checkbox"/> Turn Table	INNCO Systems	DT3000-3T	DT3000/69	N/A	-
<input type="checkbox"/> Antenna master	INNCO Systems	MA4000-EP	MA4000/283	N/A	-
<input type="checkbox"/> Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170124	2 year	10.30. 2013
<input type="checkbox"/> Power Amplifier	CERNEX	CBL18265035	22966	1 year	07.24. 2013
<input type="checkbox"/> Power Amplifier	CERNEX	CBL26405040	19660	1 year	04.04. 2014
<input checked="" type="checkbox"/> Software	Rohde & Schwarz	EMC32	-	-	-



6. CONCLUSION

The data collected shows that the **EUT type: Cellular/PCS CDMA/EVDO and LTE Phone with Bluetooth, WLAN and NFC, FCC ID: ZNFVS880, Model: LG-VS880** complies with §15.107 and §15.109 of the FCC rules.