

# EMI CERTIFICATION REPORT

**Applicant:**

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

1000 Sylvan Avenue, Englewood Cliffs NJ 07632

**Date of Receipt: May 02, 2014**

**Date of Issue: May 23, 2014**

**Test Report No. HCT-E-1405-F030**

**HCT FRN: 0005866421**

**FCC ID:**

**ZNFLS620**

**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** : CDMA Phone with Bluetooth4.0, WLAN2.4GHz 802.11b/g/n  
**Model Name** : LGLS620  
**Additional Model Name** : LS620  
**Port / Connector(s)** : USB / Earphone Port  
**Date of Test** : May 19, 2014 - May 22, 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**



**Ki-Min Lee**  
**Test Engineer**  
**EMC Team**  
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**Reviewed By**



**Sang-Jun Lee**  
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## DOCUMENT HISTORY

The revision history for this document is shown in table.

Version	Date	Description
HCT-E-1405-F030	May 23, 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.

<b>Model</b>	LGLS620
<b>FCC ID</b>	ZNFLS620
<b>Additional Model</b>	LS620
<b>EUT Type</b>	CDMA Phone with Bluetooth4.0, WLAN2.4GHz 802.11b/g/n
<b>TX Frequency</b>	824.70 MHz to 848.31 MHz (CDMA BC0) 1 851.25 MHz to 1 908.75 MHz (CDMA BC1) 817.90 MHz to 823.10 MHz (CDMA BC10)
<b>RX Frequency</b>	869.70 MHz to 893.31 MHz (CDMA BC0) 1 931.25 MHz to 1 988.75 MHz (CDMA BC1) 862.00 MHz to 894.00 MHz (CDMA BC10)

### 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	LGLS620	LG	ZNFLS620	Notebook PC, Ear-phone
USB cable	EAD62786801	Ningbo Broad	-	EUT, Notebook PC
Ear-phone	EAB62209202	CRESYN	-	EUT
Battery	BL-52UH (EAC62258206)	LGC	-	EUT
Notebook PC	ProBook6560b	HP	DoC	EUT, Notebook PC adaptor
Notebook PC adaptor	PPP009D	DELTA Electronics (JIANGSU)LTD	-	Notebook PC
Gateway	MV440	Axesstel	PH7MV440	Notebook PC, Adaptor
Serial Mouse	Serial 2 button mouse	Radio shack	FSUGMZE3	Notebook PC
Adaptor	DA-60M12	Yang Ming Industrial	-	Gateway
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
	Ear-phone	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
	Ear-phone	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 $\mu$ V)	Average(dB $\mu$ 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. (below 1 GHz)

### [ Radiated Emission Limits ]

Frequency (MHz)	Antenna Distance (m)	Field Strength ( $\mu V/m$ )	Quasi-Peak (dB $\mu V/m$ )
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 $\mu V/m$ )	Average (dB $\mu V/m$ )
Above 1 000	3	74	54

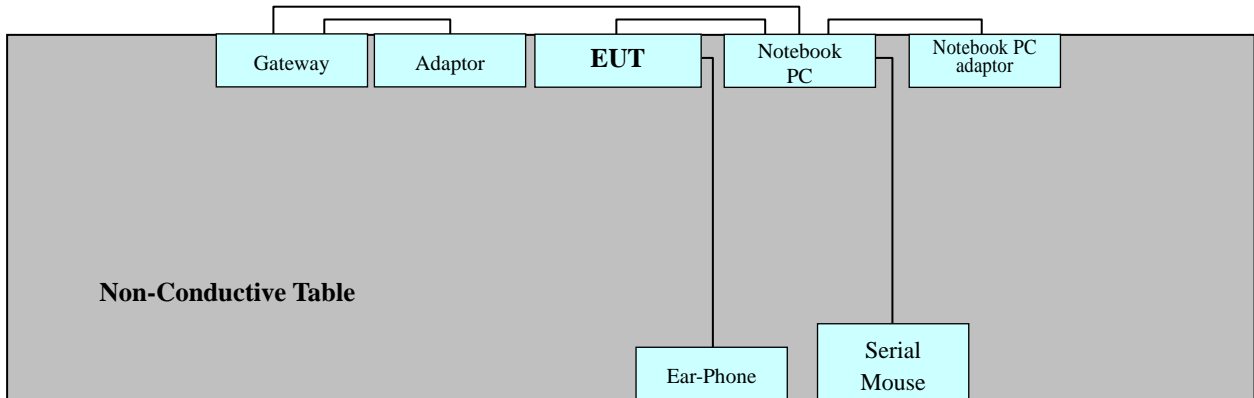


### 2.2.1 Frequency Range of Radiated Measurements

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
1 000 to 13 000	5 <sup>th</sup> 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

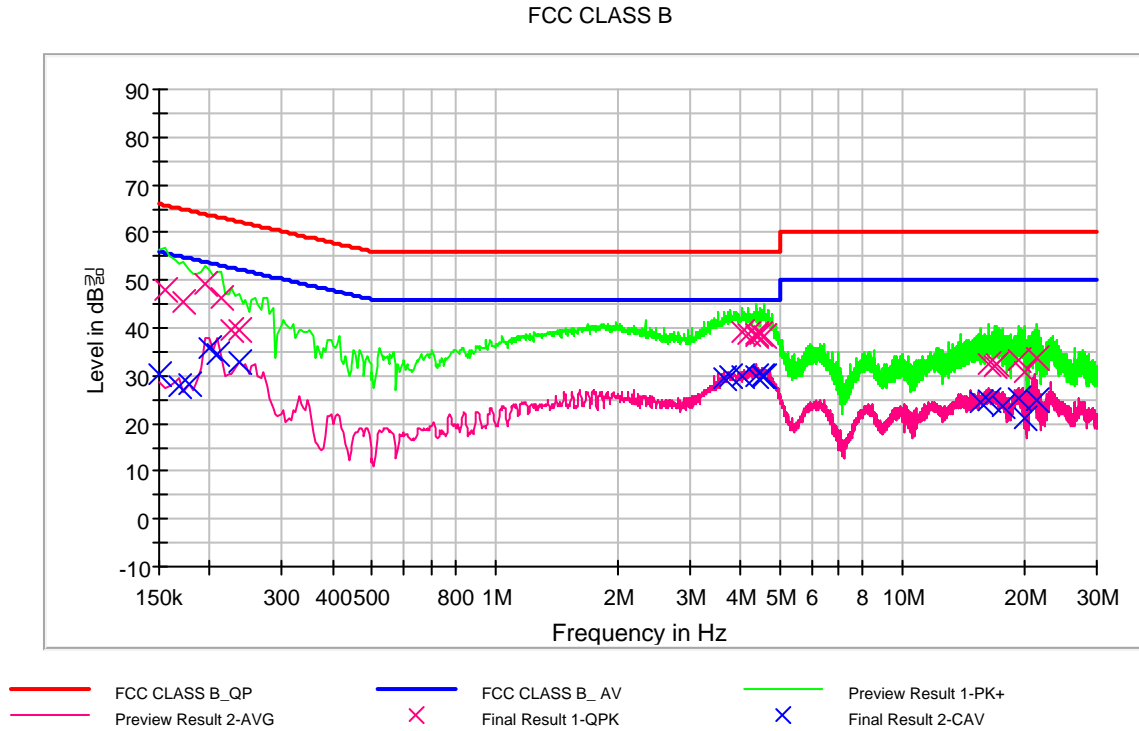
The following table shows the highest levels of conducted emissions on both polarization of hot and neutral line.

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
Temperature	: 24.2°C
Humidity Level	: 41.9 %
Test Date	: May 20, 2014

*\* NOTE: Refer to page 13 to page 18 for Measurement Test Data*



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



**※ 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)
0.154500	48.1	9.000	L1	9.7	17.7	65.8
0.172500	45.6	9.000	L1	9.7	19.2	64.8
0.195000	49.2	9.000	L1	9.7	14.6	63.8
0.213000	46.2	9.000	L1	9.7	16.9	63.1
0.226500	39.5	9.000	L1	9.7	23.1	62.6
0.235500	39.5	9.000	L1	9.7	22.8	62.3
4.037000	39.1	9.000	L1	10.1	16.9	56.0
4.176500	38.9	9.000	L1	10.1	17.1	56.0
4.361000	38.4	9.000	L1	10.1	17.6	56.0
4.388000	38.8	9.000	L1	10.1	17.2	56.0
4.460000	38.8	9.000	L1	10.1	17.2	56.0
4.599500	38.2	9.000	L1	10.1	17.8	56.0
16.272500	32.2	9.000	L1	10.7	27.8	60.0
16.916000	31.9	9.000	L1	10.7	28.1	60.0
16.983500	32.4	9.000	L1	10.8	27.6	60.0
19.386500	33.2	9.000	L1	10.9	26.8	60.0
19.886000	30.6	9.000	L1	10.9	29.4	60.0
21.438500	33.5	9.000	L1	11.0	26.5	60.0

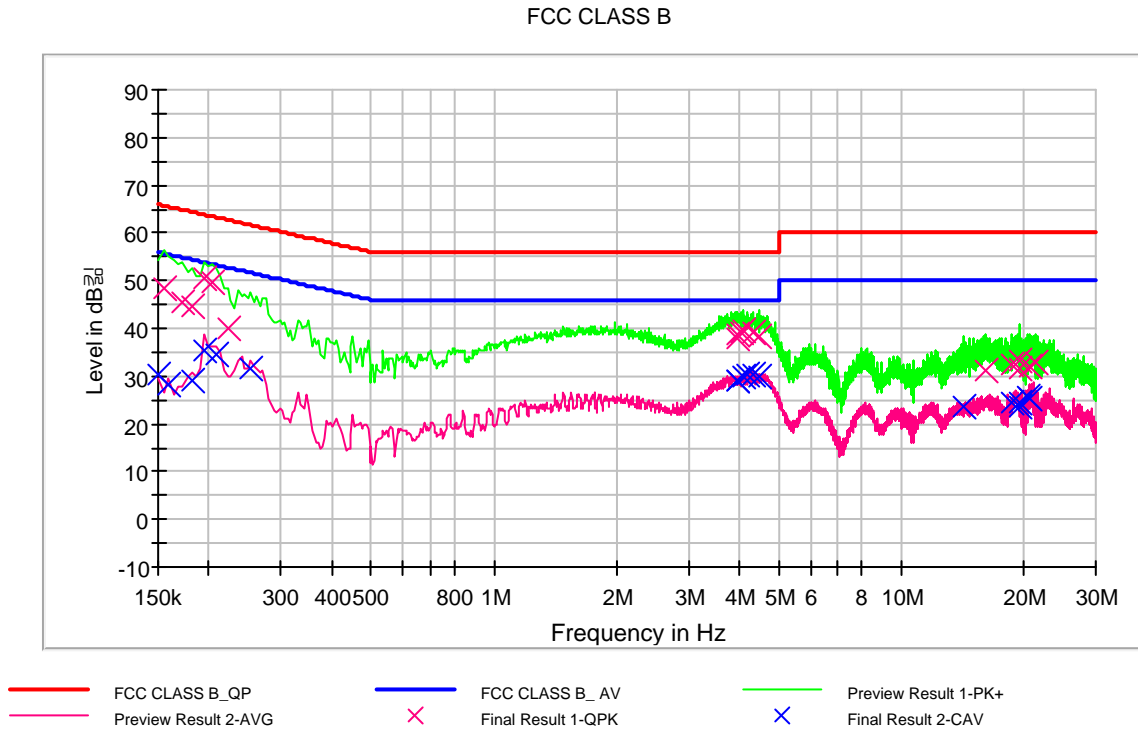


## Final Result 2

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
0.168000	27.9	9.000	L1	9.7	27.2	55.1
0.177000	28.2	9.000	L1	9.7	26.4	54.6
0.199500	35.6	9.000	L1	9.7	18.0	53.6
0.208500	34.5	9.000	L1	9.7	18.8	53.3
0.235500	32.7	9.000	L1	9.7	19.6	52.3
3.654500	29.7	9.000	L1	10.0	16.4	46.0
3.785000	30.0	9.000	L1	10.0	16.0	46.0
4.032500	30.0	9.000	L1	10.1	16.0	46.0
4.388000	30.1	9.000	L1	10.1	15.9	46.0
4.532000	29.8	9.000	L1	10.1	16.2	46.0
4.599500	29.9	9.000	L1	10.1	16.1	46.0
15.570500	24.6	9.000	L1	10.7	25.4	50.0
16.272500	25.0	9.000	L1	10.7	25.0	50.0
17.622500	23.5	9.000	L1	10.8	26.5	50.0
19.386500	25.1	9.000	L1	10.9	24.9	50.0
19.886000	21.2	9.000	L1	10.9	28.8	50.0
21.438500	24.8	9.000	L1	11.0	25.2	50.0



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



**※ 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)
0.154500	48.5	9.000	N	9.7	17.3	65.8
0.172500	45.3	9.000	N	9.7	19.5	64.8
0.181500	44.7	9.000	N	9.7	19.7	64.4
0.195000	50.4	9.000	N	9.7	13.4	63.8
0.204000	49.7	9.000	N	9.7	13.7	63.4
0.222000	40.1	9.000	N	9.7	22.6	62.7
3.942500	38.1	9.000	N	10.1	17.9	56.0
3.965000	38.6	9.000	N	10.1	17.4	56.0
4.032500	39.0	9.000	N	10.1	17.0	56.0
4.104500	39.5	9.000	N	10.1	16.5	56.0
4.316000	39.0	9.000	N	10.1	17.0	56.0
4.460000	38.3	9.000	N	10.1	17.7	56.0
16.164500	31.3	9.000	N	10.6	28.7	60.0
18.720500	32.3	9.000	N	10.8	27.7	60.0
19.526000	33.3	9.000	N	10.8	26.7	60.0
19.607000	31.6	9.000	N	10.8	28.4	60.0
20.610500	32.1	9.000	N	10.8	27.9	60.0
21.438500	32.9	9.000	N	10.9	27.1	60.0



## Final Result 2

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	30.3	9.000	N	9.7	25.7	56.0
0.159000	28.1	9.000	N	9.7	27.4	55.5
0.181500	29.2	9.000	N	9.7	25.2	54.4
0.195000	35.4	9.000	N	9.7	18.4	53.8
0.208500	34.7	9.000	N	9.7	18.6	53.3
0.253500	31.8	9.000	N	9.7	19.8	51.6
3.942500	29.1	9.000	N	10.1	16.9	46.0
3.965000	29.2	9.000	N	10.1	16.8	46.0
4.100000	30.1	9.000	N	10.1	15.9	46.0
4.167500	30.2	9.000	N	10.1	15.8	46.0
4.316000	30.3	9.000	N	10.1	15.7	46.0
4.460000	30.0	9.000	N	10.1	16.0	46.0
14.220500	23.5	9.000	N	10.6	26.5	50.0
18.720500	24.4	9.000	N	10.8	25.6	50.0
19.526000	24.7	9.000	N	10.8	25.3	50.0
19.607000	23.6	9.000	N	10.8	26.4	50.0
20.516000	25.6	9.000	N	10.8	24.4	50.0
20.610500	25.2	9.000	N	10.8	24.8	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
Temperature	: 23.6°C
Humidity Level	: 38.3 %
Test Date	: May 19, 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)			
92.9	19.3	H	3.3	8.0	3.7	43.5	31.0	12.5
201.6	18.8	H	1.2	9.9	4.2	43.5	32.8	10.7
625.0	10.4	V	1.0	20.0	5.4	46.0	35.8	10.2

#### ※ 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)

Operation Mode : Data Communication mode

Temperature : 23.8°C

Humidity Level : 42.8 %

Test Date : May 22, 2014

Frequency (GHz)	Polarity (H/V)	Antenna Height (m)	Peak			Average		
			Total Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Total Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)
1.3289	V	1.0	49.7	74	24.3	31.7	54	22.3
1.9944	V	1.0	57.1	74	16.9	38.7	54	15.3
2.6603	V	1.0	51.0	74	23.0	33.5	54	20.5

**※ 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>Next CAL Date</u>
<b><u>Conducted Emission</u></b>					
<input checked="" type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESCI	100584	1 year	2015.01.24
<input checked="" type="checkbox"/> LISN	EMCO	3816/2SH	9706-1070	1 year	2015.04.07
<input checked="" type="checkbox"/> LISN	Rohde & Schwarz	ENV216	100073	1 year	2015.01.29
<input type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESCI	100033	1 year	2014.06.23
<input type="checkbox"/> LISN	Rohde & Schwarz	ESH3-Z5	100282	1 year	2014.07.03
<input type="checkbox"/> Attenuator	Rohde & Schwarz	ESH3-Z2	357.8810.352	1 year	2014.07.03
<input checked="" type="checkbox"/> Software	Rohde & Schwarz	EMC32	-	-	-
<b><u>Radiated Emission</u></b>					
<b>-For measurement below 1 GHz</b>					
<input checked="" type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESI40	831564103	1 year	2015.04.07
<input checked="" type="checkbox"/> Trilog Antenna	Schwarzbeck	VULB9160	3301	2 year	2014.12.17
<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	2014.07.01
<input type="checkbox"/> Trilog Antenna	Schwarzbeck	VULB9168	185	2 year	2015.04.16
<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	-	-	-
<b>-For measurement above 1 GHz</b>					
<input checked="" type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESI40	831564103	1 year	2015.04.07
<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	2014.07.24
<input type="checkbox"/> Power Amplifier	CERNEX	CBLU1183540	21690	1 year	2014.07.12
<input checked="" type="checkbox"/> Horn Antenna	Schwarzbeck	BBHA 9120D	296	2 year	2014.12.13
<input type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESU 26	100241	1 year	2014.07.01
<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	2014.10.30
<input type="checkbox"/> Power Amplifier	CERNEX	CBL18265035	22966	1 year	2014.07.24
<input type="checkbox"/> Power Amplifier	CERNEX	CBL26405040	19660	1 year	2015.04.04
<input checked="" type="checkbox"/> Software	Rohde & Schwarz	EMC32	-	-	-



## 6. CONCLUSION

The data collected shows that the **EUT type: CDMA Phone with Bluetooth4.0, WLAN2.4GHz 802.11b/g/n, FCC ID: ZNFLS620, Model: LGLS620** complies with §15.107 and §15.109 of the FCC rules.