

EMI CERTIFICATION REPORT

Applicant:

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

Date of Receipt: January 08, 2015**Date of Issue: February 13, 2015****Test Report No. HCT-E-1501-F036-1****HCT FRN: 0005866421****FCC ID:****ZNFH950**

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: Multi-band GSM/EDGE/WCDMA/LTE Phone with WLAN, Bluetooth & RFID
Model Name: LG-H950
Additional Model Name: LGH950, H950
Test Port: USB / Earphone Port
Date of Test: January 16, 2015 – January 23, 2015

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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EMC Team
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DOCUMENT HISTORY

The revision history for this document is shown in table.

Version	Date	Description
HCT-E-1501-F036	January 27, 2015	Initial Release
HCT-E-1501-F036-1	February 13, 2015	Changes to text: Delete the Quick Case



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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-H950
FCC ID	ZNFH950
Additional Model	LGH950, H950
EUT Type	Multi-band GSM/EDGE/WCDMA/LTE Phone with WLAN, Bluetooth & RFID
TX Frequency	824.20 MHz to 848.80 MHz (GSM 850) 1 850.20 MHz to 1 909.80 MHz (GSM 1 900) 826.40 MHz to 846.60 MHz (WCDMA B5) 1 852.4 MHz to 1 907.6 MHz (WCDMA B2) 1 850.7 MHz to 1 909.3 MHz (LTE B2) 1 710 MHz to 1 755 MHz (LTE B4) 824 MHz to 849 MHz (LTE B5) 2 496 MHz to 2570 MHz (LTE B7) 699 MHz to 716 MHz (LTE B12) 704 MHz to 716 MHz (LTE B17)
RX Frequency	869.20 MHz to 893.80 MHz (GSM 850) 1 930.20 MHz to 1 989.80 MHz (GSM 1 900) 871.40 MHz to 891.60 MHz (WCDMA B5) 1 932.4 MHz to 1 987.6 MHz (WCDMA B2) 1 930.00 MHz to 1 990.00 MHz (LTE B2) 2 110 MHz to 2 155 MHz (LTE B4) 869 MHz to 894 MHz (LTE B5) 2 516 MHz to 2690 MHz (LTE B7) 729 MHz to 746 MHz (LTE B12) 734 MHz to 746 MHz (LTE B17)

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-H950	LG	ZNFH950	Notebook PC, Earphone
USB cable	EAD62566901	Ningbo Broad	-	EUT, Notebook PC
USB cable	EAD62626901	CRESYN	-	EUT, Notebook PC
USB cable	EAD62589701	KSD	-	EUT, Notebook PC
Earphone	EAB62950102	CRESYN	-	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	SanDisk	-	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)1.0
	Earphone	N/A	Y	(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).
If the EUT is connected to the PC through USB, the AC power-line adapter of the PC is directly connected to 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 (kHz)	Quasi-Peak (dB(μV))	Average (dB(μV))
0.15 to 0.5	9	66 to 56*	56 to 46*
0.5 to 5	9	56	46
5 to 30	9	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 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 ($\mu\text{V}/\text{m}$)	Quasi-Peak ($\text{dB}(\mu\text{V})/\text{m}$)
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 ($\text{dB}(\mu\text{V})/\text{m}$)	Average ($\text{dB}(\mu\text{V})/\text{m}$)
Above 1 000	3	74	54

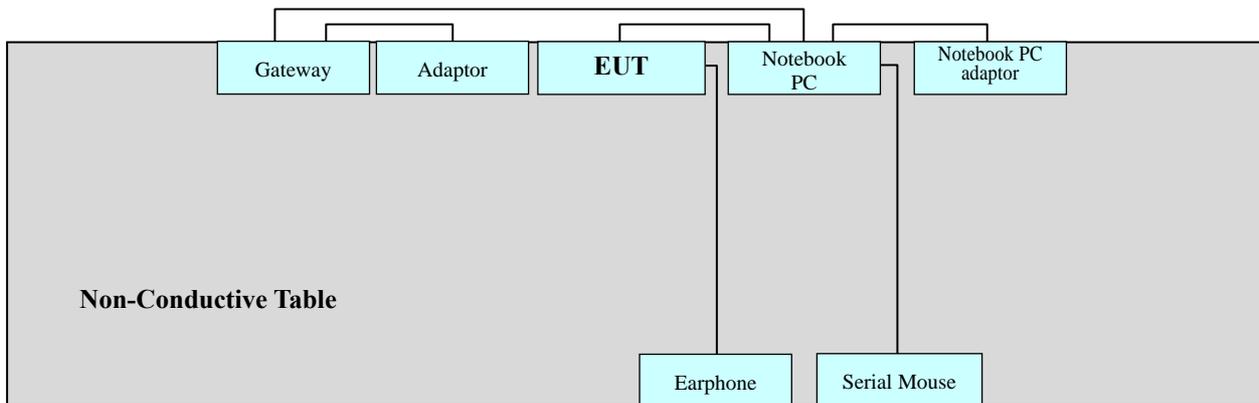


2.2.1 Frequency Range of Radiated Measurements

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 test results of conducted emission at mains ports provide the following information:

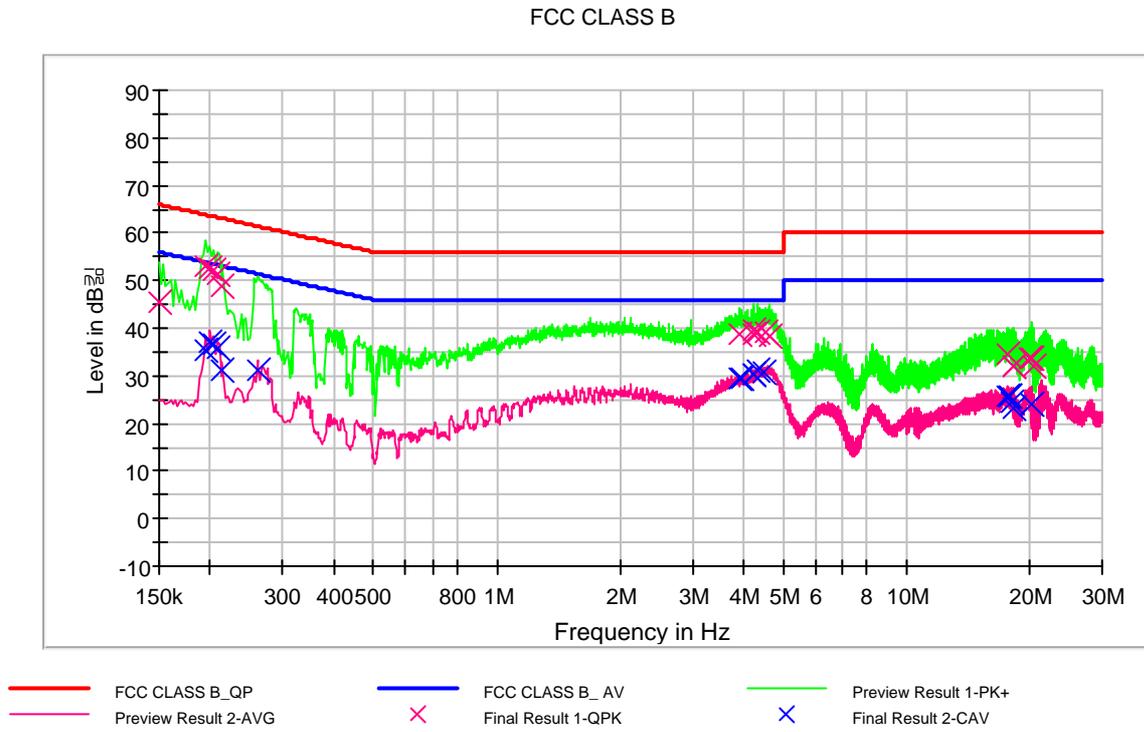
Rule Part / Standard	FCC PART 15 Subpart B Class B
Detector	Quasi-Peak, CISPR-Average
Bandwidth	9 kHz (6 dB)
Operation Mode	Data Communication mode
USB Cable Type	CRESYN (EAD62626901) *NOTE: The worst-case emissions are reported.
Kind of Test Site	Shielded Room
Temperature	20.0 °C
Relative Humidity	27.4 %
Test Date	January 23, 2015

- Calculation Formula:

1. Conductor L1 = Hot, Conductor N = Neutral
2. Corr. = LISN Factor + Cable Loss
3. QuasiPeak or CAverage= Receiver Reading + Corr.
4. Margin = Limit – QuasiPeak or CAverage



Figure 1: Spectral Diagrams, Conducted Emission, AC Main Port, Line (L1)





QuasiPeak Final Result, Line (L1)

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	45.4	9.000	L1	9.6	20.6	66.0
0.194000	53.1	9.000	L1	9.6	10.8	63.9
0.198000	52.7	9.000	L1	9.6	11.0	63.7
0.204000	52.0	9.000	L1	9.7	11.4	63.4
0.208000	51.5	9.000	L1	9.7	11.8	63.3
0.214000	48.7	9.000	L1	9.7	14.3	63.0
3.896000	38.7	9.000	L1	9.9	17.4	56.0
4.236000	38.6	9.000	L1	9.9	17.4	56.0
4.248000	39.4	9.000	L1	9.9	16.6	56.0
4.320000	39.2	9.000	L1	9.9	16.8	56.0
4.534000	39.4	9.000	L1	9.9	16.6	56.0
4.608000	38.1	9.000	L1	9.9	17.9	56.0
17.704000	34.4	9.000	L1	10.3	25.6	60.0
18.208000	32.0	9.000	L1	10.3	28.0	60.0
18.292000	31.8	9.000	L1	10.3	28.2	60.0
19.974000	33.9	9.000	L1	10.3	26.1	60.0
20.114000	33.6	9.000	L1	10.3	26.4	60.0
20.330000	32.0	9.000	L1	10.3	28.0	60.0

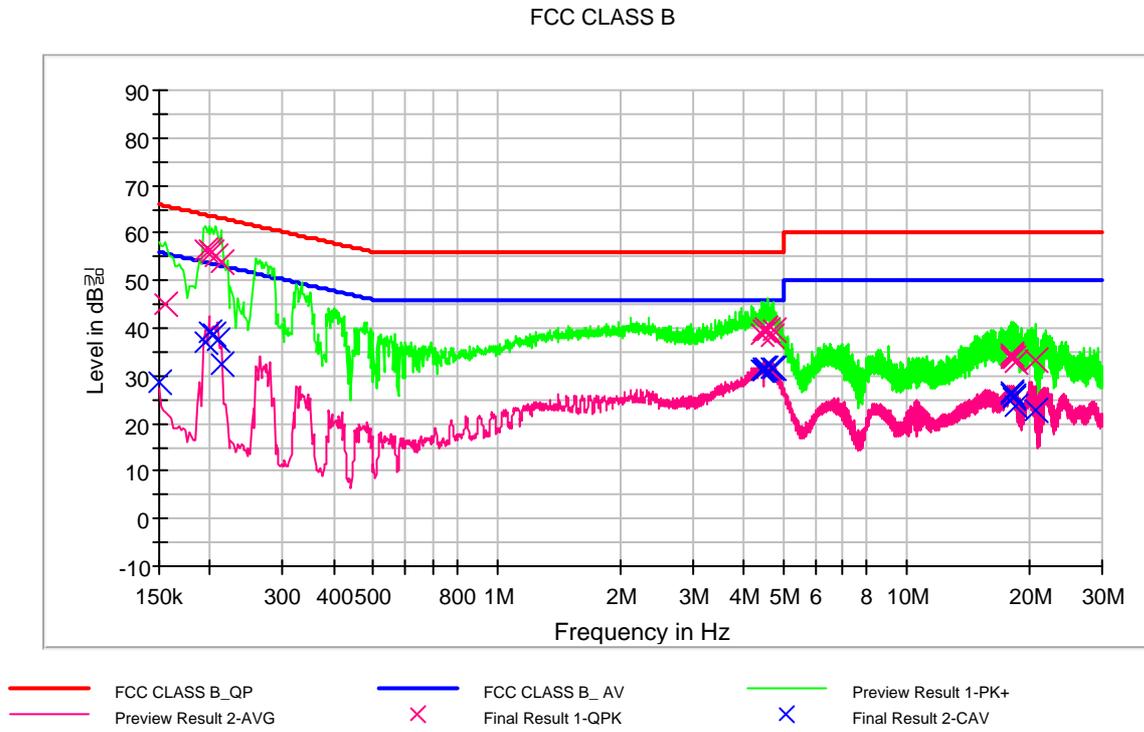


CAverage Final Result, Line (L1)

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.194000	35.4	9.000	L1	9.6	18.5	53.9
0.200000	36.9	9.000	L1	9.7	16.7	53.6
0.204000	36.6	9.000	L1	9.7	16.8	53.4
0.208000	35.7	9.000	L1	9.7	17.6	53.3
0.214000	31.2	9.000	L1	9.7	21.8	53.0
0.260000	31.0	9.000	L1	9.7	20.4	51.4
3.896000	29.4	9.000	L1	9.9	16.6	46.0
3.968000	29.6	9.000	L1	9.9	16.4	46.0
4.236000	30.5	9.000	L1	9.9	15.5	46.0
4.248000	30.5	9.000	L1	9.9	15.5	46.0
4.320000	31.2	9.000	L1	9.9	14.8	46.0
4.466000	30.8	9.000	L1	9.9	15.2	46.0
17.704000	25.7	9.000	L1	10.3	24.3	50.0
17.722000	25.6	9.000	L1	10.3	24.4	50.0
17.776000	25.6	9.000	L1	10.3	24.4	50.0
17.980000	24.4	9.000	L1	10.3	25.6	50.0
18.292000	23.1	9.000	L1	10.3	26.9	50.0
20.202000	24.2	9.000	L1	10.3	25.8	50.0



Figure 2: Spectral Diagrams, Conducted Emission, AC Main Port, Line (N)





QuasiPeak Final Result, Line (N)

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.156000	45.1	9.000	N	9.6	20.6	65.7
0.194000	56.3	9.000	N	9.6	7.6	63.9
0.198000	56.2	9.000	N	9.6	7.5	63.7
0.202000	55.8	9.000	N	9.6	7.7	63.5
0.206000	55.1	9.000	N	9.6	8.3	63.4
0.212000	53.9	9.000	N	9.6	9.2	63.1
4.430000	38.9	9.000	N	9.9	17.1	56.0
4.464000	39.7	9.000	N	9.9	16.3	56.0
4.534000	39.9	9.000	N	9.9	16.1	56.0
4.606000	39.6	9.000	N	9.9	16.4	56.0
4.680000	38.3	9.000	N	9.9	17.7	56.0
4.746000	39.4	9.000	N	9.9	16.6	56.0
17.996000	34.6	9.000	N	10.3	25.4	60.0
18.068000	34.3	9.000	N	10.3	25.7	60.0
18.072000	33.9	9.000	N	10.3	26.1	60.0
18.280000	33.9	9.000	N	10.3	26.1	60.0
18.492000	32.9	9.000	N	10.3	27.1	60.0
20.620000	33.4	9.000	N	10.3	26.6	60.0



CAverage Final Result, Line (N)

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	28.7	9.000	N	9.6	27.3	56.0
0.194000	37.2	9.000	N	9.6	16.7	53.9
0.198000	39.0	9.000	N	9.6	14.7	53.7
0.204000	38.9	9.000	N	9.6	14.5	53.4
0.208000	37.5	9.000	N	9.6	15.8	53.3
0.214000	32.4	9.000	N	9.6	20.6	53.0
4.432000	31.4	9.000	N	9.9	14.6	46.0
4.464000	31.5	9.000	N	9.9	14.5	46.0
4.494000	31.3	9.000	N	9.9	14.7	46.0
4.534000	31.5	9.000	N	9.9	14.5	46.0
4.678000	31.5	9.000	N	9.9	14.6	46.0
4.746000	31.4	9.000	N	9.9	14.6	46.0
17.996000	26.5	9.000	N	10.3	23.5	50.0
18.068000	26.2	9.000	N	10.3	23.8	50.0
18.170000	25.7	9.000	N	10.3	24.3	50.0
18.280000	25.1	9.000	N	10.3	24.9	50.0
18.492000	23.6	9.000	N	10.3	26.4	50.0
20.620000	22.7	9.000	N	10.3	27.3	50.0



4.2 Radiated Emission Test

The test results of radiated emission provide the following information:

-For Measurement Below 1 GHz

Rule Part / Standard	FCC PART 15 Subpart B Class B
Detector	Quasi-Peak
Bandwidth	120 kHz (6 dB)
Operation Mode	Data Communication mode
USB Cable Type	CRESYN (EAD62626901) *NOTE: The worst-case emissions are reported.
Kind of Test Site	3 m semi anechoic chamber
Temperature	23.1 °C
Relative Humidity	29.5 %
Test Date	January 16, 2015

Frequency (MHz)	Quasi Peak (dBuV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
81.341082	28.5	150.0	V	303.0	11.8	11.5	40.0
650.020200	40.7	115.0	H	331.0	26.1	5.3	46.0

- Calculation Formula:

1. POL. H = Horizontal, POL. V = Vertical
2. QuasiPeak = Reading (Receiver Reading) + Corr.
3. Corr. (Correction Factor) = Antenna Factor + Cable Loss
4. Margin = Limit - QuasiPeak



-For Measurement Above 1 GHz

Rule Part / Standard	FCC PART 15 Subpart B Class B
Detector	Peak mode: Peak (RBW: 1 MHz, VBW: 3 MHz) CISPR-Average mode: Peak (RBW: 1 MHz, VBW: 10 Hz)
Highest Operating Frequency	1.95 GHz
Testing Frequency Range	1 GHz to 10 GHz
Operation Mode	Data Communication mode
USB Cable Type	Ningbo Broad (EAD62566901) ※NOTE: The worst-case emissions are reported.
Kind of Test Site	3 m semi anechoic chamber
Temperature	18.5 °C
Relative Humidity	29.6 %
Test Date	January 20, 2015

Frequency (MHz)	Peak (dBuV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1331.112225	50.4	144.0	V	291.0	-9.3	23.6	74.0
1995.941884	56.3	100.0	V	28.0	-7.8	17.7	74.0
2657.064128	49.7	100.0	V	43.0	-4.8	24.3	74.0

Frequency (MHz)	CAverage (dBuV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1331.112225	31.7	144.0	V	291.0	-9.3	22.3	54.0
1995.941884	38.3	100.0	V	28.0	-7.8	15.7	54.0
2657.064128	33.9	100.0	V	43.0	-4.8	20.1	54.0

- Calculation Formula:

1. POL. H = Horizontal, POL. V = Vertical
2. Peak or CAverage = Reading (Receiver Reading) + Corr.
3. Corr. (Correction Factor) = Antenna Factor+ Cable Loss –Amplifier Gain
4. Margin = Limit - Peak or CAverage



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	01.13.2015
<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	01.13.2015
<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	11.17.2014
<input checked="" type="checkbox"/> Antenna master	HD GmbH	MA240	240/520	N/A	-
<input checked="" type="checkbox"/> Antenna master controller	HD GmbH	HD 100	100/637	N/A	-
<input checked="" type="checkbox"/> Turn Table	EMCO	1060-2M	-	N/A	-
<input checked="" type="checkbox"/> Turn Table controller	EMCO	2090	9702-1224	N/A	-
<input type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESU 26	100241	1 year	06.18.2014
<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"/> Antenna master controller	HD GmbH	HD 100	100/637	N/A	-
<input checked="" type="checkbox"/> Turn Table	EMCO	1060-2M	-	N/A	-
<input checked="" type="checkbox"/> Turn Table controller	EMCO	2090	9702-1224	N/A	-
<input type="checkbox"/> Power Amplifier	CERNEX	CBLU1183540	21691	1 year	07.11.2014
<input checked="" type="checkbox"/> Power Amplifier	CERNEX	CBLU5183530	24348	1 year	06.11.2014
<input checked="" type="checkbox"/> Horn Antenna	Schwarzbeck	BBHA 9120D	296	2 year	10.07.2014
<input type="checkbox"/> Horn Antenna	Schwarzbeck	BBHA 9120D	1151	2 year	07.05.2013
<input type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESU 26	100241	1 year	06.18.2014
<input type="checkbox"/> Turn Table	INNCO Systems	DT3000-3T	DT3000/69	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	07.23.2014
<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: Multi-band GSM/EDGE/WCDMA/LTE Phone with WLAN, Bluetooth & RFID, FCC ID: ZNFH950, Model: LG-H950** complies with §15.107 and §15.109 of the FCC rules.