

# EMI CERTIFICATION REPORT

**Applicant:**

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

**Date of Receipt: January 15, 2015****Date of Issue: February 26, 2015****Test Report No. HCT-E-1502-F042****HCT FRN: 0005866421****FCC ID:****ZNFH440V**

**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:** GSM/WCDMA/LTE Phone with Bluetooth4.1, WIFI802.11 b/g/n(2.4GHz\_HT20), VoIP, Hotspot support  
**Model Name:** LG-H440v  
**Additional Model Name:** LGH440v, H440v  
**Test Port:** USB / Earphone Port  
**Date of Test:** February 05, 2015 - February 06, 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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**Reviewed By**

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## DOCUMENT HISTORY

The revision history for this document is shown in table.

Version	Date	Description
HCT-E-1502-F042	February 26, 2015	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>	LG-H440v
<b>FCC ID</b>	ZNFH440V
<b>Additional Model</b>	LGH440v, H440v
<b>EUT Type</b>	GSM/WCDMA/LTE Phone with Bluetooth4.1, WIFI802.11 b/g/n(2.4GHz_HT20), VoIP, Hotspot support
<b>TX Frequency</b>	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 850) 824 MHz to 849 MHz (LTE B5)
<b>RX Frequency</b>	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 850) 869 MHz to 894 MHz (LTE B5)

### 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-H440v	LG	ZNFH440V	Notebook PC, Earphone
USB cable	EAD62377902	Ningbo Broad	-	EUT, Notebook PC
Earphone	EAB62808212	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)1.1
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 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 ( $\mu\text{V}/\text{m}$ )	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

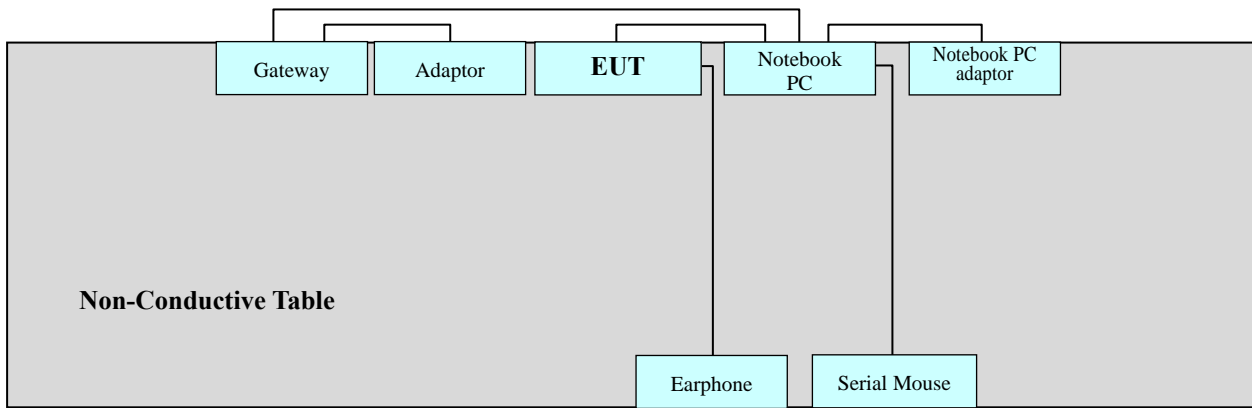


### 2.2.1 Frequency Range of Radiated Measurements

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

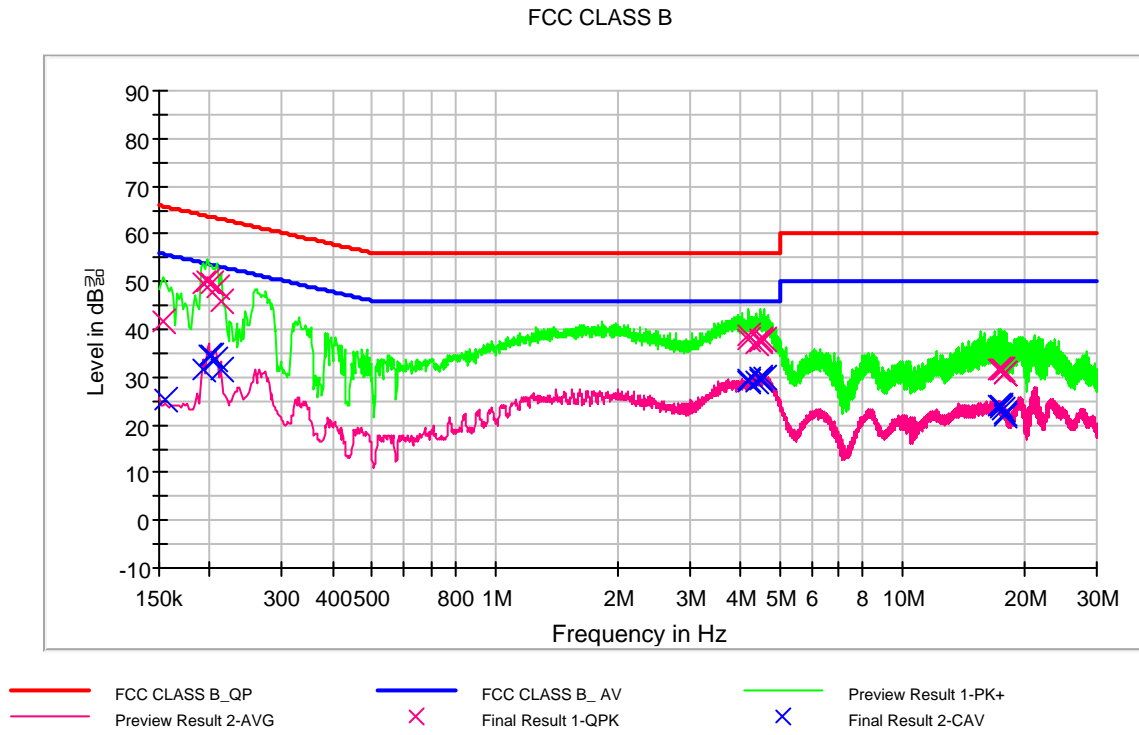
<b>Rule Part / Standard</b>	FCC PART 15 Subpart B Class B
<b>Detector</b>	Quasi-Peak, CISPR-Average
<b>Bandwidth</b>	9 kHz (6 dB)
<b>Operation Mode</b>	Data Communication mode
<b>Kind of Test Site</b>	Shielded Room
<b>Temperature</b>	20.4 °C
<b>Relative Humidity</b>	25.5 %
<b>Test Date</b>	February 06, 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)
0.154000	41.9	9.000	L1	9.6	23.9	65.8
0.192000	49.5	9.000	L1	9.6	14.4	63.9
0.196000	50.2	9.000	L1	9.6	13.6	63.8
0.202000	49.6	9.000	L1	9.7	13.9	63.5
0.208000	48.7	9.000	L1	9.7	14.6	63.3
0.214000	46.1	9.000	L1	9.7	16.9	63.0
4.176000	38.7	9.000	L1	9.9	17.3	56.0
4.180000	37.7	9.000	L1	9.9	18.3	56.0
4.402000	36.9	9.000	L1	9.9	19.1	56.0
4.462000	37.7	9.000	L1	9.9	18.3	56.0
4.492000	37.5	9.000	L1	9.9	18.5	56.0
4.600000	37.9	9.000	L1	9.9	18.1	56.0
17.200000	31.8	9.000	L1	10.2	28.2	60.0
17.340000	31.7	9.000	L1	10.2	28.3	60.0
17.414000	31.6	9.000	L1	10.2	28.4	60.0
17.696000	31.5	9.000	L1	10.3	28.5	60.0
17.838000	30.9	9.000	L1	10.3	29.1	60.0
17.910000	30.6	9.000	L1	10.3	29.4	60.0

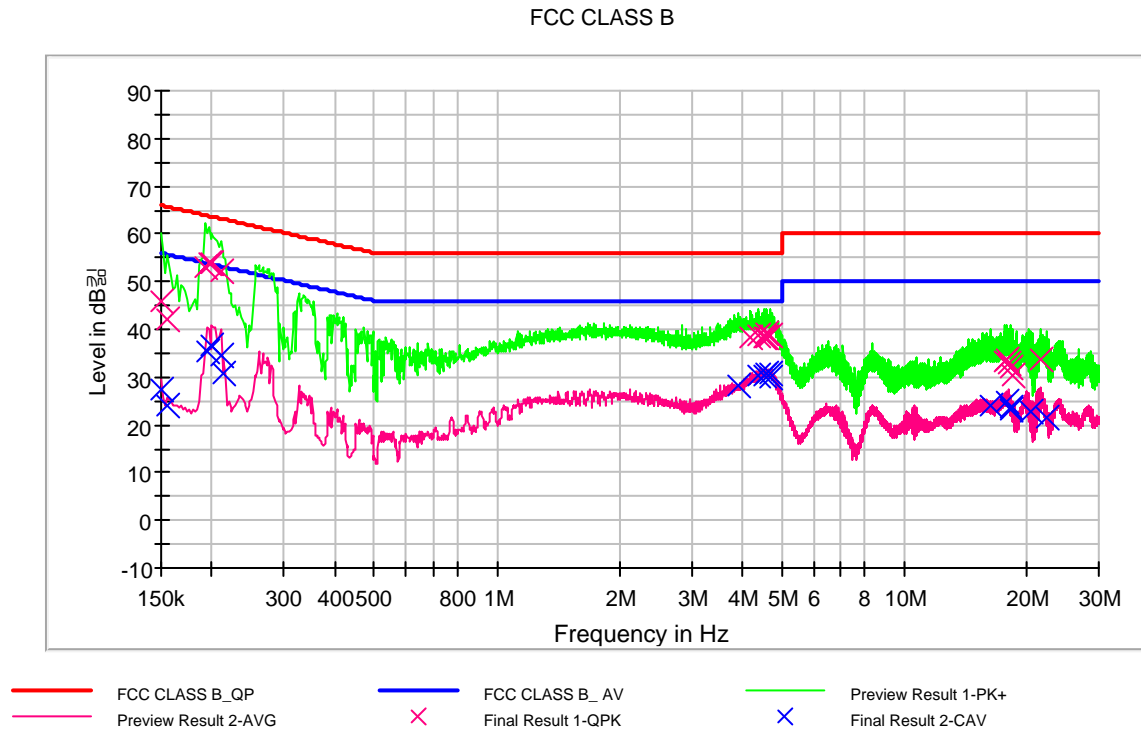


## CAverage Final Result, Line (L1)

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.156000	25.3	9.000	L1	9.6	30.4	55.7
0.192000	31.7	9.000	L1	9.6	22.2	53.9
0.198000	34.7	9.000	L1	9.6	19.0	53.7
0.202000	34.6	9.000	L1	9.7	18.9	53.5
0.206000	33.8	9.000	L1	9.7	19.6	53.4
0.212000	31.5	9.000	L1	9.7	21.6	53.1
4.176000	29.7	9.000	L1	9.9	16.3	46.0
4.180000	29.2	9.000	L1	9.9	16.8	46.0
4.402000	29.0	9.000	L1	9.9	17.0	46.0
4.462000	29.6	9.000	L1	9.9	16.4	46.0
4.492000	29.8	9.000	L1	9.9	16.2	46.0
4.600000	29.8	9.000	L1	9.9	16.2	46.0
17.200000	23.9	9.000	L1	10.2	26.1	50.0
17.340000	23.9	9.000	L1	10.2	26.1	50.0
17.414000	23.5	9.000	L1	10.2	26.5	50.0
17.696000	23.2	9.000	L1	10.3	26.8	50.0
17.838000	22.3	9.000	L1	10.3	27.7	50.0
17.910000	22.1	9.000	L1	10.3	27.9	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)
0.150000	45.8	9.000	N	9.6	20.2	66.0
0.156000	42.3	9.000	N	9.6	23.5	65.7
0.192000	53.2	9.000	N	9.6	10.7	63.9
0.196000	53.9	9.000	N	9.6	9.9	63.8
0.200000	53.7	9.000	N	9.6	9.9	63.6
0.210000	52.3	9.000	N	9.6	10.9	63.2
4.180000	38.3	9.000	N	9.8	17.7	56.0
4.392000	38.9	9.000	N	9.9	17.1	56.0
4.534000	38.5	9.000	N	9.9	17.5	56.0
4.602000	39.3	9.000	N	9.9	16.7	56.0
4.606000	38.4	9.000	N	9.9	17.6	56.0
4.674000	38.8	9.000	N	9.9	17.2	56.0
17.708000	33.5	9.000	N	10.3	26.5	60.0
17.848000	33.6	9.000	N	10.3	26.4	60.0
18.064000	32.7	9.000	N	10.3	27.3	60.0
18.204000	31.9	9.000	N	10.3	28.1	60.0
18.488000	30.5	9.000	N	10.3	29.5	60.0
21.530000	33.7	9.000	N	10.3	26.3	60.0



## CAverage Final Result, Line (N)

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	27.6	9.000	N	9.6	28.4	56.0
0.156000	24.2	9.000	N	9.6	31.5	55.7
0.194000	35.3	9.000	N	9.6	18.6	53.9
0.200000	36.7	9.000	N	9.6	16.9	53.6
0.210000	34.5	9.000	N	9.6	18.7	53.2
0.214000	30.8	9.000	N	9.6	22.2	53.0
3.898000	28.2	9.000	N	9.8	17.8	46.0
4.366000	30.5	9.000	N	9.9	15.5	46.0
4.534000	30.5	9.000	N	9.9	15.5	46.0
4.606000	30.7	9.000	N	9.9	15.3	46.0
4.674000	30.7	9.000	N	9.9	15.3	46.0
4.688000	30.0	9.000	N	9.9	16.0	46.0
16.364000	24.1	9.000	N	10.2	25.9	50.0
17.848000	25.0	9.000	N	10.3	25.0	50.0
18.200000	23.2	9.000	N	10.3	26.8	50.0
18.204000	23.7	9.000	N	10.3	26.3	50.0
20.398000	22.7	9.000	N	10.3	27.3	50.0
22.382000	21.4	9.000	N	10.4	28.6	50.0



## 4.2 Radiated Emission Test

The test results of radiated emission provide the following information:

### -For Measurement Below 1 GHz

<b>Rule Part / Standard</b>	FCC PART 15 Subpart B Class B
<b>Detector</b>	Quasi-Peak
<b>Bandwidth</b>	120 kHz (6 dB)
<b>Operation Mode</b>	Data Communication mode
<b>Kind of Test Site</b>	3 m semi anechoic chamber
<b>Temperature</b>	21.0 °C
<b>Relative Humidity</b>	25.7 %
<b>Test Date</b>	February 05, 2015

Frequency (MHz)	Quasi Peak (dBuV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
60.142204	23.9	100.0	V	0.0	15.4	16.1	40.0
265.570421	31.3	150.0	H	101.0	16.8	14.7	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

<b>Rule Part / Standard</b>	FCC PART 15 Subpart B Class B
<b>Detector</b>	Peak mode: Peak (RBW: 1 MHz, VBW: 3 MHz) CISPR-Average mode: Peak (RBW: 1 MHz, VBW: 10 Hz)
<b>Highest Operating Frequency</b>	1.2 GHz
<b>Testing Frequency Range</b>	1 GHz to 6 GHz
<b>Operation Mode</b>	Data Communication mode
<b>Kind of Test Site</b>	3 m semi anechoic chamber
<b>Temperature</b>	22.1 °C
<b>Relative Humidity</b>	25.9 %
<b>Test Date</b>	February 05, 2015

Frequency (MHz)	Peak (dBuV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBuV/m)
1333.116233	50.6	100.0	V	13.0	-9.3	23.4	74.0
1995.741483	54.5	100.0	V	41.0	-7.8	19.5	74.0
2655.561122	48.2	100.0	V	41.0	-4.9	25.8	74.0

Frequency (MHz)	CAverage (dBuV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBuV/m)
1333.116233	31.6	100.0	V	13.0	-9.3	22.4	54.0
1995.741483	35.9	100.0	V	41.0	-7.8	18.1	54.0
2655.561122	33.3	100.0	V	41.0	-4.9	20.7	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>
<b><u>Conducted Emission</u></b>					
<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	-	-	-
<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	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	-	-	-
<b>-For measurement above 1 GHz</b>					
<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	12.13. 2012
<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: GSM/WCDMA/LTE Phone with Bluetooth4.1, WIFI802.11 b/g/n(2.4GHz\_HT20), VoIP, Hotspot support, FCC ID: ZNFH440V, Model: LG-H440v** complies with §15.107 and §15.109 of the FCC rules.