

EMI CERTIFICATION REPORT

Applicant:

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

Date of Receipt: May 27, 2014**Date of Issue: June 23, 2014****Test Report No. HCT-E-1406-F012-1****HCT FRN: 0005866421****FCC ID:****ZNFV410**

Rule Part(s) / Standard(s): FCC PART 15 Subpart B Class B
EUT Type: Portable Tablet with Multi-band WCDMA/LTE, WLAN and Bluetooth
Model Name: LG-V410
Additional Model Name: LGV410, V410
Port: USB / Ear-phone Port
Date of Test: May 29, 2014 - May 30, 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-1406-F012	June 03, 2014	Initial Release
HCT-E-1406-F012-1	June 23, 2014	1. Revise the EUT type 2. Add testing frequency range to measurement above 1 GHz in Section 4.2



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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-V410
FCC ID	ZNFV410
Additional Model	LGV410, V410
EUT Type	Portable Tablet with Multi-band WCDMA/LTE, WLAN and Bluetooth
TX Frequency	826.40 MHz to 846.60 MHz (WCDMA 850) 1 852.4 MHz to 1 907.6 MHz (WCDMA 1 900) 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) 704 MHz to 716 MHz (LTE B17)
RX Frequency	871.40 MHz to 891.60 MHz (WCDMA 850) 1 932.4 MHz to 1 987.6 MHz (WCDMA 1 900) 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) 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-V410	LG	ZNFV410	Notebook PC, Ear-phone
USB cable	EAD62572501	CRESYN	-	EUT, Notebook PC
USB cable	EAD62572502	Ningbo Broad	-	EUT, Notebook PC
Ear-phone	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
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

※**NOTE:** This tablet device does not contain the minimum number of ports required for personal computer testing per ANSI C63.4, but the EUT is attached to a computer through its only available port, which represents worst case emissions. All other aspects of ANSI C63.4 testing requirements were maintained.



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
	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.
Emission levels over 10dB under the prescribed limits could not be reported.

[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. (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

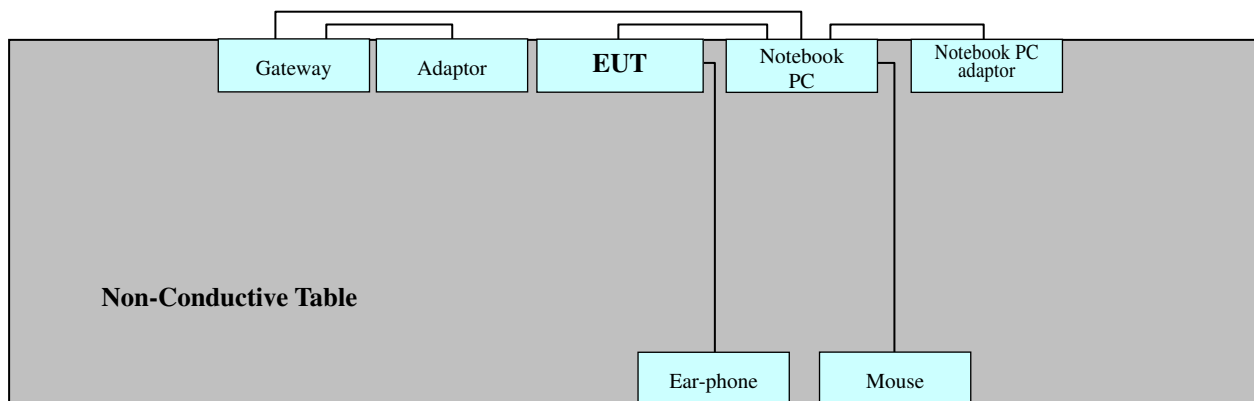


2.2.1 Frequency Range of Radiated Measurements

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
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

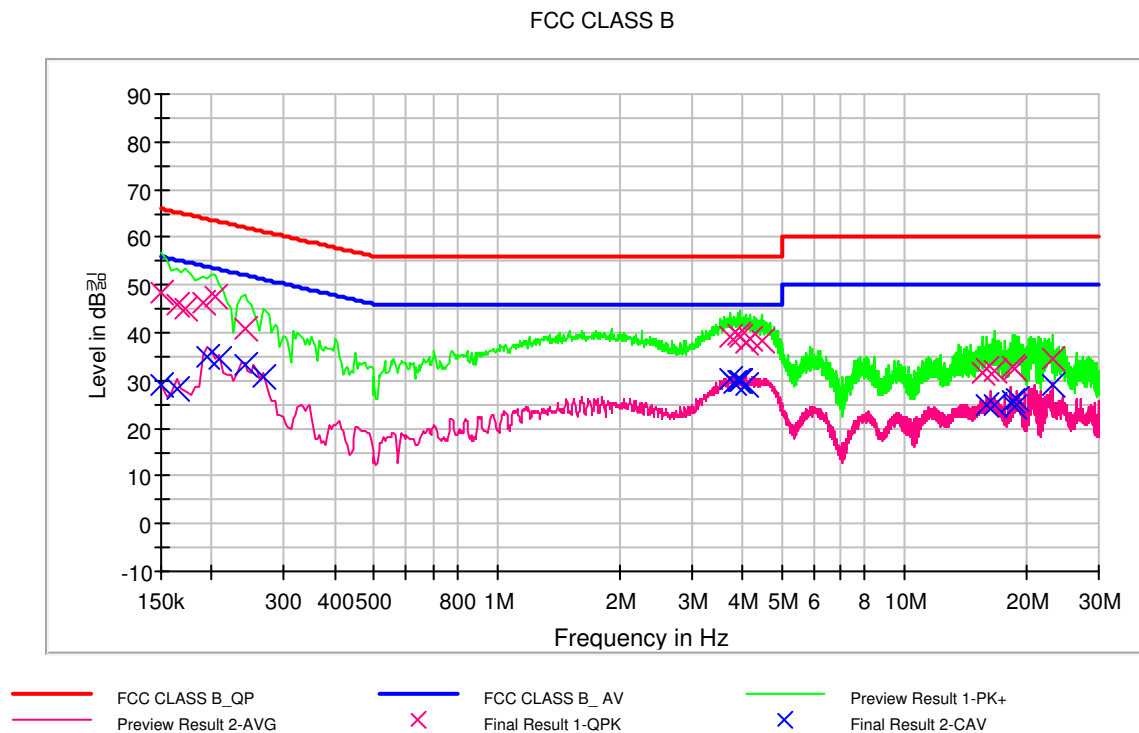
The following table shows the highest levels of conducted emissions on both polarization of hot and neutral line.

Limit Apply to	: FCC PART 15 Subpart B Class B
Detector	: Quasi-Peak, Average (6 dB Bandwidth: 9 kHz)
Operation Mode	: Data Communication mode
USB Cable Manufacturer	: Ningbo Broad
	※ The worst-case emissions are reported.
Temperature	: 24.2°C
Humidity Level	: 46.1 % R.H.
Test Date	: May 29, 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. QuasiPeak or CAverage= Receiver Reading + Corr.
4. Margin = Limit – QuasiPeak or CAverage



Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	48.2	9.000	L1	9.7	17.8	66.0
0.163500	46.1	9.000	L1	9.7	19.2	65.3
0.172500	45.0	9.000	L1	9.7	19.8	64.8
0.190500	46.1	9.000	L1	9.7	17.9	64.0
0.204000	47.4	9.000	L1	9.7	16.0	63.4
0.240000	40.8	9.000	L1	9.7	21.3	62.1
3.749000	39.3	9.000	L1	10.0	16.7	56.0
3.888500	39.4	9.000	L1	10.0	16.6	56.0
3.960500	39.4	9.000	L1	10.0	16.6	56.0
4.086500	37.7	9.000	L1	10.1	18.3	56.0
4.172000	38.9	9.000	L1	10.1	17.1	56.0
4.455500	38.3	9.000	L1	10.1	17.7	56.0
15.629000	31.7	9.000	L1	10.7	28.3	60.0
15.840500	32.3	9.000	L1	10.7	27.7	60.0
16.691000	31.9	9.000	L1	10.7	28.1	60.0
18.491000	32.8	9.000	L1	10.8	27.2	60.0
18.594500	32.4	9.000	L1	10.8	27.6	60.0
23.130500	34.6	9.000	L1	11.1	25.4	60.0

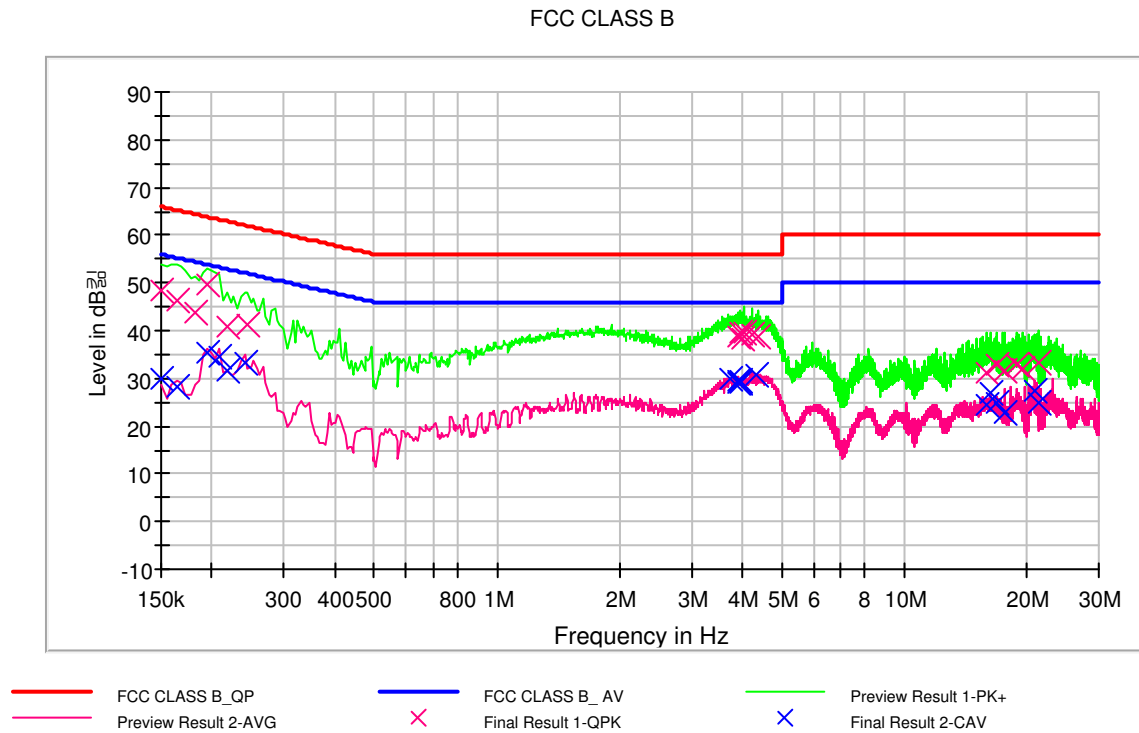


Final Result 2

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	29.2	9.000	L1	9.7	26.8	56.0
0.163500	28.3	9.000	L1	9.7	27.0	55.3
0.195000	35.2	9.000	L1	9.7	18.6	53.8
0.208500	34.4	9.000	L1	9.7	18.9	53.3
0.240000	33.2	9.000	L1	9.7	18.9	52.1
0.267000	30.8	9.000	L1	9.7	20.4	51.2
3.735500	30.2	9.000	L1	10.0	15.8	46.0
3.834500	29.3	9.000	L1	10.0	16.7	46.0
3.888500	29.9	9.000	L1	10.0	16.1	46.0
3.960500	29.8	9.000	L1	10.0	16.2	46.0
3.974000	29.9	9.000	L1	10.0	16.1	46.0
4.086500	29.2	9.000	L1	10.1	16.8	46.0
15.840500	24.7	9.000	L1	10.7	25.3	50.0
16.691000	24.8	9.000	L1	10.7	25.2	50.0
18.491000	25.7	9.000	L1	10.8	24.3	50.0
18.594500	24.4	9.000	L1	10.8	25.6	50.0
18.959000	26.0	9.000	L1	10.9	24.0	50.0
23.130500	29.2	9.000	L1	11.1	20.8	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. QuasiPeak or CAverage= Receiver Reading + Corr.
4. Margin = Limit – QuasiPeak or CAverage



Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	48.6	9.000	N	9.7	17.4	66.0
0.163500	46.5	9.000	N	9.7	18.8	65.3
0.181500	43.9	9.000	N	9.7	20.5	64.4
0.195000	49.9	9.000	N	9.7	13.9	63.8
0.217500	40.9	9.000	N	9.7	22.0	62.9
0.244500	41.3	9.000	N	9.7	20.6	61.9
3.906500	38.8	9.000	N	10.0	17.2	56.0
3.960500	39.4	9.000	N	10.1	16.6	56.0
3.983000	38.4	9.000	N	10.1	17.6	56.0
4.032500	39.4	9.000	N	10.1	16.6	56.0
4.244000	39.1	9.000	N	10.1	16.9	56.0
4.383500	38.9	9.000	N	10.1	17.1	56.0
15.845000	31.2	9.000	N	10.6	28.8	60.0
16.758500	32.7	9.000	N	10.7	27.3	60.0
17.541500	31.6	9.000	N	10.7	28.4	60.0
18.815000	33.0	9.000	N	10.8	27.0	60.0
19.593500	31.8	9.000	N	10.8	28.2	60.0
21.425000	33.4	9.000	N	10.9	26.6	60.0



Final Result 2

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	29.8	9.000	N	9.7	26.2	56.0
0.163500	28.4	9.000	N	9.7	26.9	55.3
0.195000	35.4	9.000	N	9.7	18.4	53.8
0.208500	34.6	9.000	N	9.7	18.7	53.3
0.217500	31.6	9.000	N	9.7	21.3	52.9
0.240000	33.4	9.000	N	9.7	18.7	52.1
3.735500	29.8	9.000	N	10.0	16.2	46.0
3.902000	29.1	9.000	N	10.0	16.9	46.0
3.911000	29.5	9.000	N	10.1	16.5	46.0
3.942500	29.2	9.000	N	10.1	16.8	46.0
3.960500	29.5	9.000	N	10.1	16.5	46.0
4.316000	30.6	9.000	N	10.1	15.4	46.0
15.845000	24.6	9.000	N	10.6	25.4	50.0
16.227500	27.0	9.000	N	10.6	23.0	50.0
16.758500	24.8	9.000	N	10.7	25.2	50.0
17.541500	22.9	9.000	N	10.7	27.1	50.0
20.795000	27.4	9.000	N	10.8	22.6	50.0
21.425000	25.0	9.000	N	10.9	25.0	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	: CRESYN ※The worst-case emissions are reported.
Temperature	: 24.1°C
Humidity Level	: 46.9 % R.H.
Test Date	: May 30, 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)			
60.8	9.8	V	1.0	11.7	3.5	40.0	25.0	15.0
81.1	22.0	H	4.0	8.0	3.7	40.0	33.6	6.4
111.6	18.1	H	2.8	10.7	3.8	43.5	32.6	10.9
260.5	17.4	H	1.0	12.1	4.4	46.0	33.9	12.1

※ 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

Testing Frequency Range : 1 GHz - 6 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 : 24.1°C

Humidity Level : 46.9 % R.H.

Test Date : May 30, 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	1.5	48.3	74	25.7	30.2	54	23.8
1.9919	V	1.0	55.4	74	18.6	38.3	54	15.7
2.6655	V	1.0	51.4	74	22.6	33.3	54	20.7

※ 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>					
☒ EMI Test Receiver	Rohde & Schwarz	ESCI	100584	1 year	01.24. 2014
☒ LISN	Rohde & Schwarz	ENV216	100073	1 year	01.29. 2014
☒ LISN	EMCO	3816/2SH	9706-1070	1 year	04.07. 2014
☐ EMI Test Receiver	Rohde & Schwarz	ESCI	100033	1 year	06.23. 2013
☐ LISN	Rohde & Schwarz	ESH3-Z5	100282	1 year	07.03. 2013
☐ Attenuator	Rohde & Schwarz	ESH3-Z2	357.8810.352	1 year	07.03. 2013
☒ Software	Rohde & Schwarz	EMC32	-	-	-
<u>Radiated Emission</u>					
-For measurement below 1 GHz					
☒ EMI Test Receiver	Rohde & Schwarz	ESI40	831564103	1 year	04.07. 2014
☒ Trilog Antenna	Schwarzbeck	VULB9160	3301	2 year	12.17. 2012
☒ Antenna master	HD GmbH	MA240	240/520	N/A	-
☒ Turn Table	HD GmbH	2090	9702/1224	N/A	-
☐ EMI Test Receiver	Rohde & Schwarz	ESU 26	100241	1 year	07.01. 2013
☐ Trilog Antenna	Schwarzbeck	VULB9168	185	2 year	04.16. 2013
☐ Antenna master	INNCO Systems	MA4000-EP	MA4000/283	N/A	-
☐ Turn Table	INNCO Systems	DT3000-3T	DT3000/69	N/A	-
☒ Software	Rohde & Schwarz	EMC32	-	-	-
-For measurement above 1 GHz					
☒ EMI Test Receiver	Rohde & Schwarz	ESI40	831564103	1 year	04.07. 2014
☒ Antenna master	HD GmbH	MA240	240/520	N/A	-
☒ Turn Table	HD GmbH	2090	9702/1224	N/A	-
☒ Power Amplifier	CERNEX	CBLU1183540	21691	1 year	07.24. 2013
☒ Horn Antenna	Schwarzbeck	BBHA 9120D	296	2 year	12.13. 2012
☐ EMI Test Receiver	Rohde & Schwarz	ESU 26	100241	1 year	07.01. 2013
☐ Antenna master	INNCO Systems	MA4000-EP	MA4000/283	N/A	-
☐ Turn Table	INNCO Systems	DT3000-3T	DT3000/69	N/A	-
☐ Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170124	2 year	10.30. 2013
☐ Power Amplifier	CERNEX	CBL18265035	22966	1 year	07.24. 2013
☐ Power Amplifier	CERNEX	CBL26405040	19660	1 year	04.04. 2014
☒ Software	Rohde & Schwarz	EMC32	-	-	-



6. CONCLUSION

The data collected shows that the **EUT type: Portable Tablet with Multi-band WCDMA/LTE, WLAN and Bluetooth, FCC ID: ZNFV410, Model: LG-V410** complies with §15.107 and §15.109 of the FCC rules.