

EMI CERTIFICATION REPORT

Applicant:

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

Date of Receipt: May 29, 2014**Date of Issue: June 18, 2014****Test Report No. HCT-E-1406-F038****HCT FRN: 0005866421****FCC ID:****ZNFV490**

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 Tablet with BT/WiFi(2.4/5GHz)
Model Name: LG-V490
Additional Model Name: LGV490, V490
Test Port: USB / Earphone Port
Date of Test: June 02, 2014 - June 03, 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

Gyeong-Seon Kim
Test Engineer
EMC Team
Certification Division

Reviewed By

Sang-Jun Lee
Technical Manager
EMC Team
Certification Division

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DOCUMENT HISTORY

The revision history for this document is shown in table.

Version	Date	Description
HCT-E-1406-F038	June 18, 2014	Initial Release



TABLE OF CONTENTS

	PAGE
1. GENERAL INFORMATION	4
1.1 Description of EUT	4
1.2 Related Submittal(s) / Grant(s).....	4
1.3 Test Facility	5
1.4 Tested System Details.....	6
1.5 Cable Description	7
1.6 Noise Suppression Parts on Cable. (I/O Cable)	7
2. DESCRIPTION OF TEST	8
3. PRELIMINARY TEST	11
3.1 Conducted Emission Test	11
3. 2 Radiated Emission Test	11
4. CONDUCTED AND RADIATED EMISSION TEST SUMMARY	12
4.1 Conducted Emission Test	12
4.2 Radiated Emission Test	19
5. LIST OF TEST EQUIPMENT	21
6. CONCLUSION	22

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-V490
FCC ID	ZNFV490
Additional Model	LGV490, V490
EUT Type	GSM/WCDMA/LTE Tablet with BT/WiFi(2.4/5GHz)
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 850) 1 852.4 MHz to 1 907.6 MHz (WCDMA 1 900) 1 710 MHz to 1 755 MHz (LTE B4) 2 496 MHz to 2 570 MHz (LTE B7)
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 850) 1 932.4 MHz to 1 987.6 MHz (WCDMA 1 900) 2 110 MHz to 2 155 MHz (LTE B4) 2 516 MHz to 2 690 MHz (LTE B7)

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-V490	LG	ZNFV490	Notebook PC, Earphone
USB cable	EAD62329305	Ningbo Broad	-	EUT, Notebook PC
USB cable	EAD62588801	CRESYN	-	EUT, Notebook PC
USB cable	EAD62329704	KSD	-	EUT, Notebook PC
Earphone	EAB62729016	I-SOUND	-	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 (16 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)1.2
	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. (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

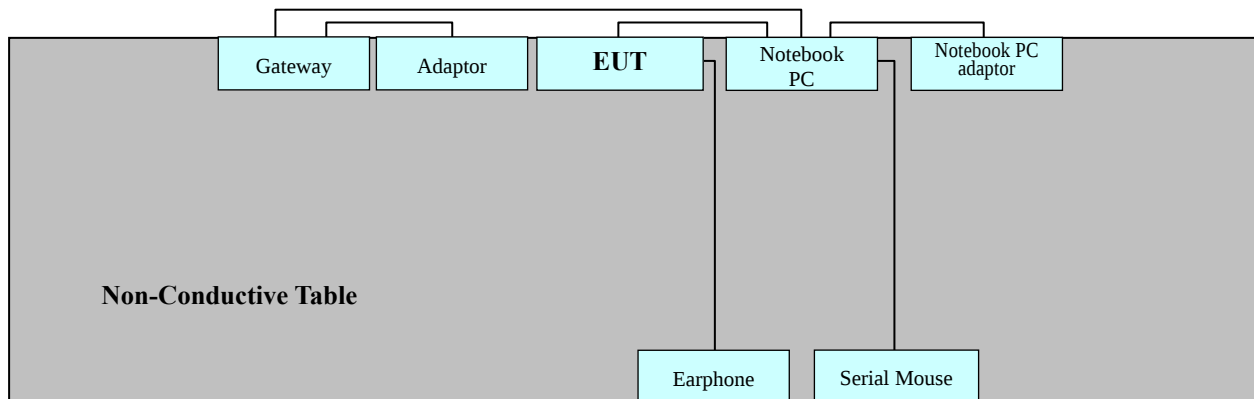


2.2.1 Frequency Range of Radiated Measurements

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

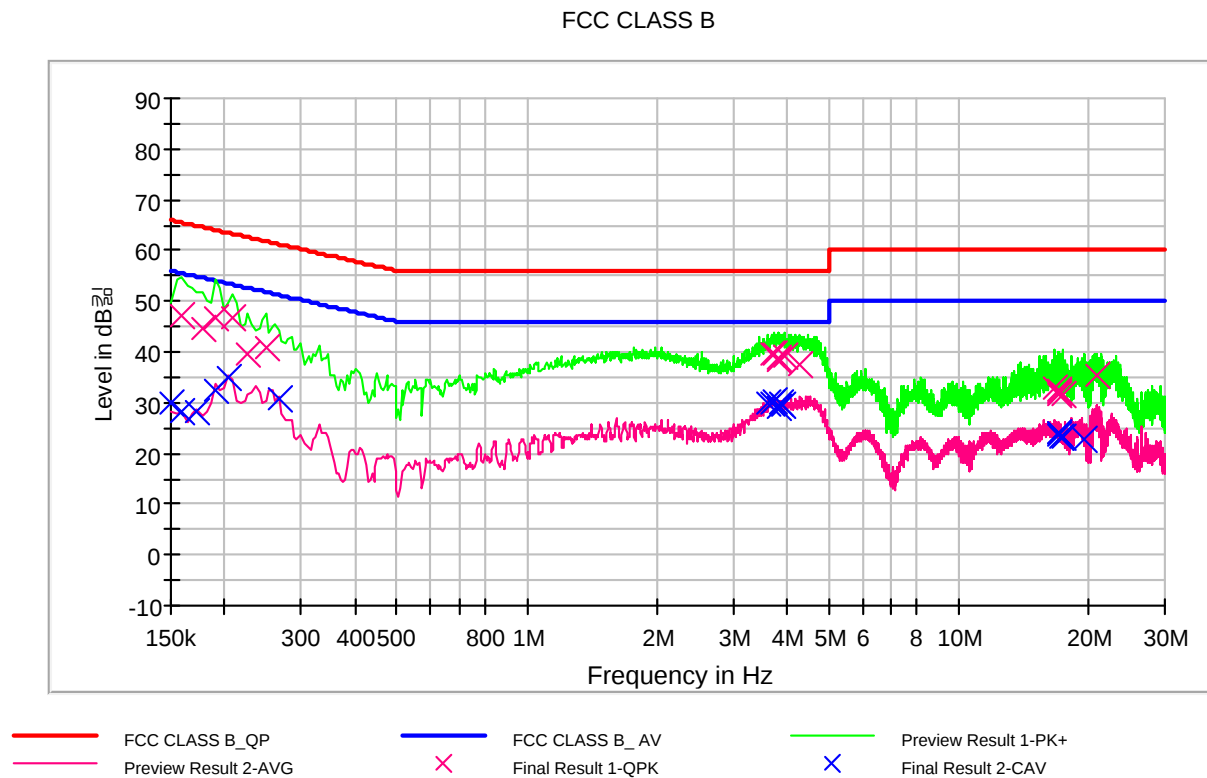
The following table shows the highest levels of conducted emissions on both polarization of hot and neutral line.

Limit Apply to	: FCC PART 15 Subpart B Class B
Detector	: Quasi-Peak, CISPR-Average
6 dB Bandwidth	: 9 kHz
Operation Mode	: Data Communication mode
USB Manufacturer	: KSD
	※ The worst-case emissions are reported.
Temperature	: 24.2°C
Relative Humidity	: 47.2 %
Test Date	: June 02, 2014

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



Figure 1: Spectral Diagrams, Conducted Emission, AC Mains (0.15 - 30)MHz, Line (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)
0.159000	47.1	9.000	L1	9.7	18.4	65.5
0.177000	44.5	9.000	L1	9.7	20.1	64.6
0.190500	46.6	9.000	L1	9.7	17.4	64.0
0.208500	46.8	9.000	L1	9.7	16.5	63.3
0.226500	39.6	9.000	L1	9.7	23.0	62.6
0.249000	40.8	9.000	L1	9.7	21.0	61.8
3.677000	39.4	9.000	L1	10.0	16.6	56.0
3.749000	39.4	9.000	L1	10.0	16.6	56.0
3.812000	38.4	9.000	L1	10.0	17.6	56.0
3.843500	38.7	9.000	L1	10.0	17.3	56.0
3.960500	39.2	9.000	L1	10.0	16.8	56.0
4.257500	37.4	9.000	L1	10.1	18.6	56.0
16.695500	32.7	9.000	L1	10.7	27.3	60.0
16.988000	31.8	9.000	L1	10.8	28.2	60.0
17.051000	32.5	9.000	L1	10.8	27.5	60.0
17.123000	31.8	9.000	L1	10.8	28.2	60.0
17.334500	31.8	9.000	L1	10.8	28.2	60.0
20.943500	35.4	9.000	L1	11.0	24.6	60.0

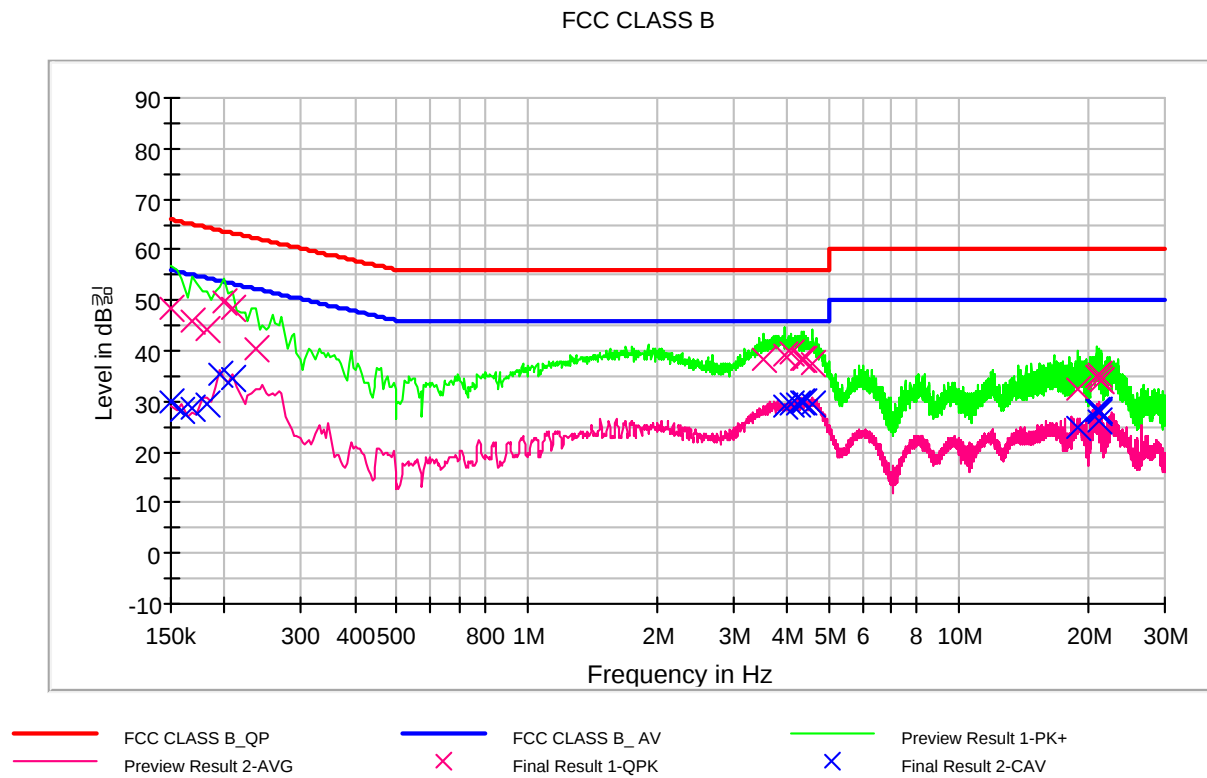


Final Result 2

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
0.159000	28.3	9.000	L1	9.7	27.2	55.5
0.172500	28.3	9.000	L1	9.7	26.5	54.8
0.190500	32.4	9.000	L1	9.7	21.6	54.0
0.204000	35.1	9.000	L1	9.7	18.3	53.4
0.267000	30.8	9.000	L1	9.7	20.4	51.2
3.609500	29.9	9.000	L1	10.0	16.1	46.0
3.677000	30.0	9.000	L1	10.0	16.0	46.0
3.749000	30.2	9.000	L1	10.0	15.8	46.0
3.839000	29.3	9.000	L1	10.0	16.7	46.0
3.875000	29.9	9.000	L1	10.0	16.1	46.0
3.893000	29.6	9.000	L1	10.0	16.4	46.0
16.988000	24.0	9.000	L1	10.8	26.0	50.0
17.046500	24.0	9.000	L1	10.8	26.0	50.0
17.123000	23.7	9.000	L1	10.8	26.3	50.0
17.258000	23.1	9.000	L1	10.8	26.9	50.0
17.334500	23.3	9.000	L1	10.8	26.7	50.0
19.620500	22.7	9.000	L1	10.9	27.3	50.0



Figure 2: Spectral Diagrams, Conducted Emission, AC Mains (0.15 - 30)MHz, Line (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	48.4	9.000	N	9.7	17.6	66.0
0.168000	45.8	9.000	N	9.7	19.3	65.1
0.181500	44.4	9.000	N	9.7	20.0	64.4
0.199500	49.5	9.000	N	9.7	14.1	63.6
0.208500	48.4	9.000	N	9.7	14.9	63.3
0.235500	40.3	9.000	N	9.7	22.0	62.3
3.537500	38.1	9.000	N	10.0	17.9	56.0
3.960500	39.0	9.000	N	10.1	17.0	56.0
4.104500	39.6	9.000	N	10.1	16.4	56.0
4.316000	38.3	9.000	N	10.1	17.7	56.0
4.383500	38.2	9.000	N	10.1	17.8	56.0
4.599500	37.6	9.000	N	10.1	18.4	56.0
18.815000	32.6	9.000	N	10.8	27.4	60.0
20.799500	35.0	9.000	N	10.8	25.0	60.0
20.871500	35.2	9.000	N	10.8	24.8	60.0
21.006500	34.6	9.000	N	10.9	25.4	60.0
21.083000	35.3	9.000	N	10.9	24.7	60.0
21.434000	34.1	9.000	N	10.9	25.9	60.0



Final Result 2

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	30.0	9.000	N	9.7	26.0	56.0
0.159000	28.4	9.000	N	9.7	27.1	55.5
0.168000	28.5	9.000	N	9.7	26.6	55.1
0.181500	29.6	9.000	N	9.7	24.8	54.4
0.195000	35.2	9.000	N	9.7	18.6	53.8
0.208500	34.7	9.000	N	9.7	18.6	53.3
3.965000	29.0	9.000	N	10.1	17.0	46.0
4.100000	29.7	9.000	N	10.1	16.3	46.0
4.253000	29.5	9.000	N	10.1	16.5	46.0
4.316000	29.9	9.000	N	10.1	16.1	46.0
4.383500	29.8	9.000	N	10.1	16.2	46.0
4.599500	29.6	9.000	N	10.1	16.4	46.0
18.815000	24.9	9.000	N	10.8	25.1	50.0
20.871500	28.2	9.000	N	10.8	21.8	50.0
21.083000	28.1	9.000	N	10.9	21.9	50.0
21.141500	26.0	9.000	N	10.9	24.0	50.0
21.159500	28.0	9.000	N	10.9	22.0	50.0
21.218000	27.9	9.000	N	10.9	22.1	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 Manufacture : Ningbo Broad
※ The worst-case emissions are reported.

Temperature : 24.7°C

Relative Humidity : 51.9 %

Test Date : June 03, 2014

Frequency (MHz)	Quasi Peak (dBuV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBuV/m)
77.173307	30.3	400.0	H	62.0	12.4	9.7	40.0
367.996473	37.7	100.0	H	217.0	19.7	8.3	46.0
624.989659	37.3	100.0	V	193.0	25.4	8.7	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

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 Manufacture : KSD

※ The worst-case emissions are reported.

Temperature : 24.7°C

Relative Humidity : 51.9 %

Test Date : June 03, 2014

Frequency (MHz)	Peak (dBuV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1327.505010	49.5	100.0	V	168.0	-14.3	24.5	74.0
1998.346693	54.4	100.0	V	217.0	-12.7	19.6	74.0
2654.959920	52.1	100.0	V	158.0	-9.0	21.9	74.0

Frequency (MHz)	CAverage (dBuV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1327.505010	31.5	100.0	V	168.0	-14.3	22.5	54.0
1998.346693	37.9	100.0	V	217.0	-12.7	16.1	54.0
2654.959920	33.1	100.0	V	158.0	-9.0	20.9	54.0

※ Calculation Formula:

1. POL. H = Horizontal, POL. V = Vertical
2. QuasiPeak 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>					
☒ EMI Test Receiver	Rohde & Schwarz	ESCI	100584	1 year	01.24. 2014
☒ LISN	EMCO	3816/2SH	9706-1070	1 year	04.07. 2014
☒ LISN	Rohde & Schwarz	ENV216	100073	1 year	01.29. 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	-	-	-

Radiated Emission

-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	-
☒ Antenna master controller	HD GmbH	HD 100	100/637	N/A	-
☒ Turn Table	EMCO	1060-2M	-	N/A	-
☒ Turn Table controller	EMCO	2090	9702-1224	N/A	-
☐ EMI Test Receiver	Rohde & Schwarz	ESU 26	100241	1 year	06.18.2014
☐ 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	-
☒ Antenna master controller	HD GmbH	HD 100	100/637	N/A	-
☒ Turn Table	EMCO	1060-2M	-	N/A	-
☒ Turn Table controller	EMCO	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	06.18.2014
☐ Turn Table	INNCO Systems	DT3000-3T	DT3000/69	N/A	-
☐ Antenna master	INNCO Systems	MA4000-EP	MA4000/283	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: GSM/WCDMA/LTE Tablet with BT/WiFi(2.4/5GHz), FCC ID: ZNFV490, Model: LG-V490** complies with §15.107 and §15.109 of the FCC rules.