

EMI TEST REPORT

FCC CERTIFICATION

Applicant:**LG Electronics MobileComm U.S.A., Inc.****1000 Sylvan Avenue, Englewood Cliffs NJ 07632****Date of Receipt: June 27, 2016****Date of Issue: July 20, 2016****Test Report No. HCT-E-1607-F024-1****HCT FRN: 0005866421****FCC ID :****ZNFVS995**

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 CDMA/GSM/EDGE/WCDMA/LTE phone with WLAN, Bluetooth and RFID

Model Name: LG-VS995

Additional Model Name: LGVS995, VS995, LG-US996, LGUS996, US996, LG-H990T, LGH990T, H990T

Test Port: Micro USB / Earphone Port

Date of Test: July 05, 2016 - July 12, 2016

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 C63.4-2014. (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-1607-F024	July 18, 2016	Initial Release
HCT-E-1607-F024-1	July 20, 2016	Added additional model name.



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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-VS995
Additional Model	LGVS995, VS995, LG-US996, LGUS996, US996, LG-H990T, LGH990T, H990T
FCC ID	ZNFVS995
EUT Type	Multi-band CDMA/GSM/EDGE/WCDMA/LTE phone with WLAN, Bluetooth and RFID
TX Frequency	824.70 MHz to 848.31 MHz (CDMA BC0) 1 851.25 MHz to 1 908.75 MHz (CDMA BC1) 824.20 MHz to 848.80 MHz (GSM 850) 1 850.20 MHz to 1 909.80 MHz (GSM 1 900) 1 852.4 MHz to 1 907.6 MHz (WCDMA B2) 1712.4 MHz to 1752.6 MHz (WCDMA B4) 826.40 MHz to 846.60 MHz (WCDMA B5) 1 850 MHz to 1 910 MHz (LTE B2) 1 710 MHz to 1 755 MHz (LTE B4) 824 MHz to 849 MHz (LTE B5) 699 MHz to 716 MHz (LTE B12) 777 MHz to 787 MHz (LTE B13) 704 MHz to 716 MHz (LTE B17) 1 850 MHz to 1 915 MHz (LTE B25) 1 710 MHz to 1 780 MHz (LTE B66)
RX Frequency	869.70 MHz to 893.31 MHz (CDMA BC0) 1 931.25 MHz to 1 988.75 MHz (CDMA BC1) 869.20 MHz to 893.80 MHz (GSM 850) 1 930.20 MHz to 1 989.80 MHz (GSM 1 900) 1 932.4 MHz to 1 987.6 MHz (WCDMA B2) 2 112.4 MHz to 2 152.6 MHz (WCDMA B4) 871.40 MHz to 891.60 MHz (WCDMA B5) 1 930 MHz to 1 990 MHz (LTE B2) 2 110 MHz to 2 155 MHz (LTE B4) 869 MHz to 894 MHz (LTE B5) 729 MHz to 746 MHz (LTE B12) 746 MHz to 756 MHz (LTE B13) 734 MHz to 746 MHz (LTE B17) 1 930 MHz to 1 995 MHz (LTE B25) 2 110 MHz to 2 200 MHz (LTE B66)



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 C63.4-2014.

Measurement Facilities	Reg. No.
HCT FRN: 0005866421 Radiated Field strength measurement facility (3 m)	90661 (February 28, 2014)
HCT FRN: 0005866421 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-VS995	LG	ZNFVS995	Notebook PC, Earphone
USB cable	EAD63912805	CRESYN	-	EUT, Notebook PC
USB cable	EAD63912804	Ningbo Broad	-	EUT, Notebook PC
Earphone	EAB62910502	CRESYN	-	EUT
Notebook PC	ProBook6560b	HP	DoC	EUT, Notebook PC adaptor, RJ45 cable, Serial mouse
Notebook PC adaptor	Series PPP009L-E	LITE-ON TECHNOLOGY	-	Notebook PC
Gateway	TL-WR747N	TP-LINK	-	RJ45 cable, Gateway adaptor
Gateway adaptor	T120150-2H1	TP-LINK	-	Gateway
Serial mouse	Serial 2 button mouse	Radio shack	FSUGMZE3	Notebook PC
RJ45 cable	-	-	-	Notebook PC, Gateway
Micro SD card	16 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)1.2
	Earphone	N/A	Y	(D)1.1
Notebook PC	RJ 45	N/A	N	(D)2.5
	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	Both 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 C63.4-2014

- 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 C63.4-2014

- The EUT was placed on the top of a turn table 0.8 meters above the ground at a semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 m away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- 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.
- 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.
- 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.
- 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.
- Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response.(1 GHz to 40 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

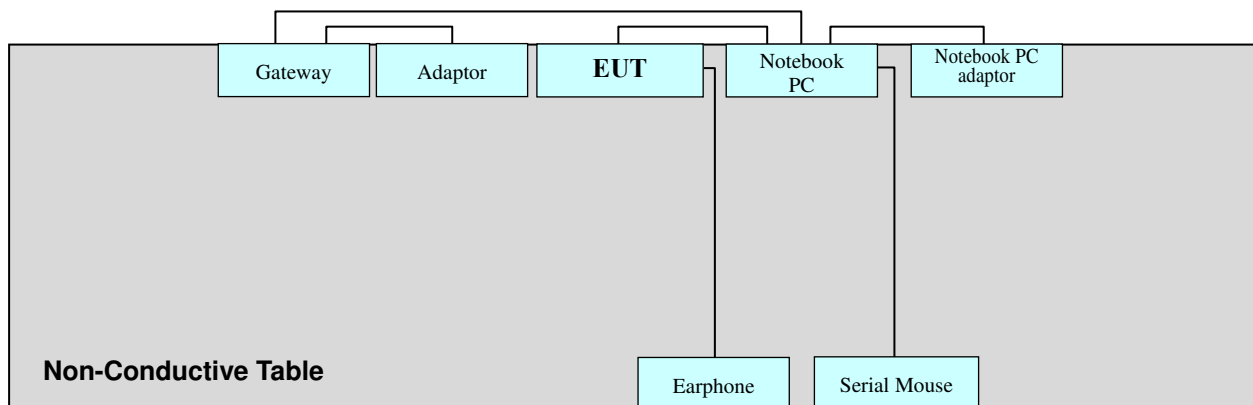


2.2.1 Frequency Range of Radiated Measurements

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

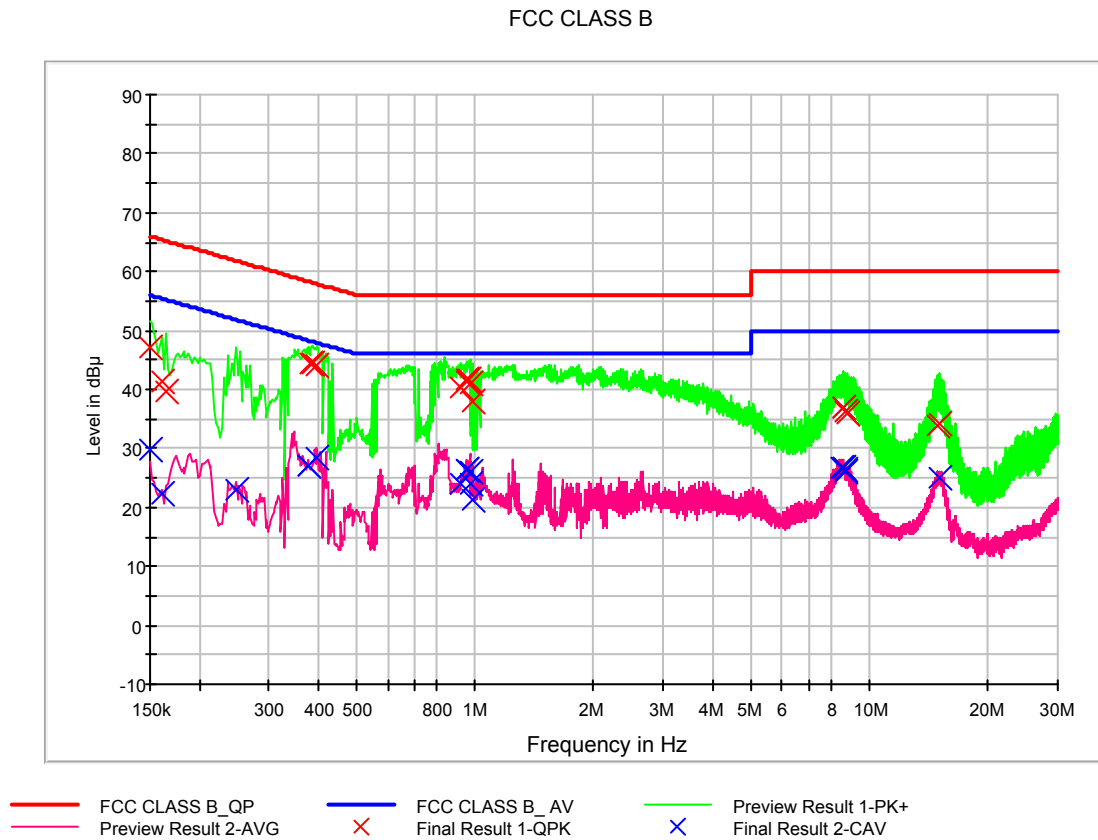
4.1 Conducted Emission Test

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 of Worst Case	EAD63912804 (Ningbo Broad)
Kind of Test Site	Shielded Room
Temperature	24.2 / 24.8 °C
Relative Humidity	48.0 / 47.4 %
Test Date	July 11 / July 12, 2016

- 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)**



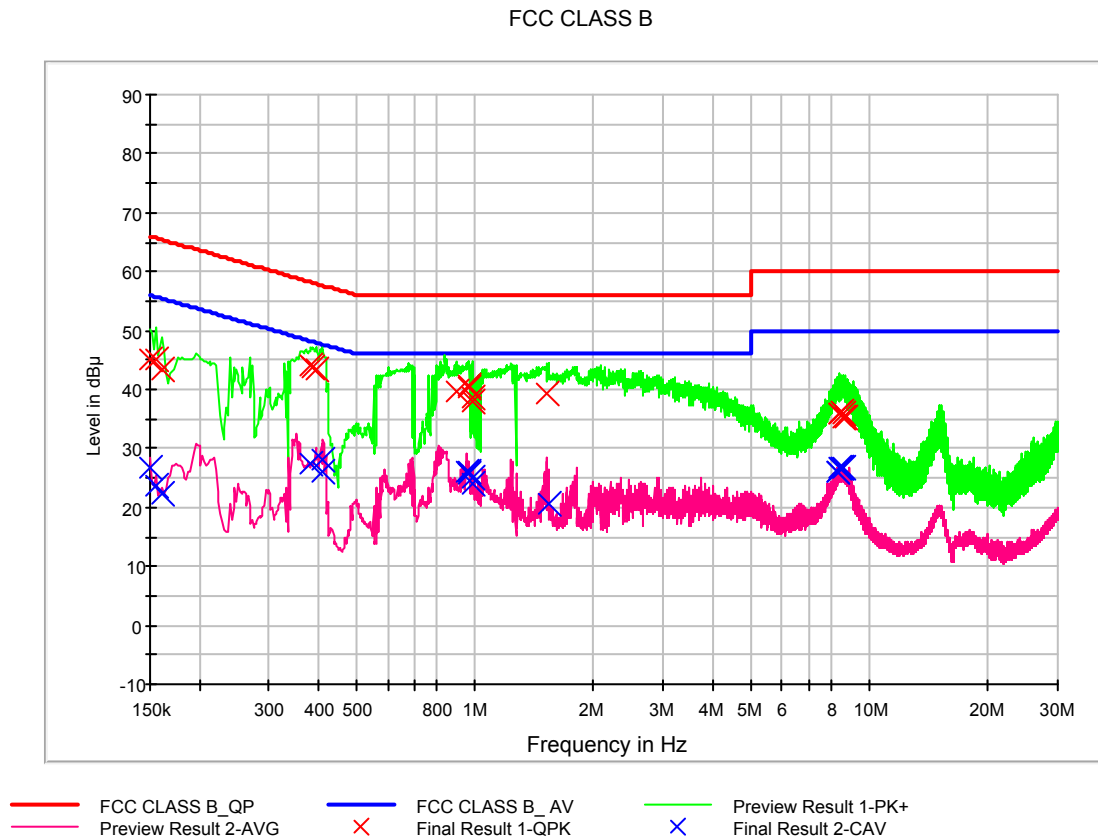
QuasiPeak Final Result, Line (L1)

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	47.2	9.000	L1	9.7	18.8	66.0
0.160000	41.3	9.000	L1	9.6	24.1	65.5
0.164000	39.7	9.000	L1	9.6	25.6	65.3
0.384000	44.4	9.000	L1	9.7	13.8	58.2
0.388000	44.3	9.000	L1	9.7	13.8	58.1
0.394000	44.1	9.000	L1	9.7	13.9	58.0
0.918000	40.4	9.000	L1	9.7	15.6	56.0
0.948000	41.3	9.000	L1	9.7	14.7	56.0
0.956000	41.6	9.000	L1	9.7	14.4	56.0
0.966000	41.6	9.000	L1	9.7	14.4	56.0
0.970000	41.1	9.000	L1	9.7	14.9	56.0
0.990000	38.0	9.000	L1	9.7	18.0	56.0
8.548000	37.0	9.000	L1	10.0	23.0	60.0
8.588000	36.8	9.000	L1	10.0	23.2	60.0
8.702000	36.1	9.000	L1	10.0	23.9	60.0
8.794000	35.9	9.000	L1	10.0	24.1	60.0
14.840000	33.9	9.000	L1	10.1	26.2	60.0
15.020000	34.2	9.000	L1	10.2	25.8	60.0



CAverage Final Result, Line (L1)

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	29.7	9.000	L1	9.7	26.3	56.0
0.160000	22.4	9.000	L1	9.6	33.1	55.5
0.248000	22.9	9.000	L1	9.6	28.9	51.8
0.376000	27.1	9.000	L1	9.7	21.3	48.4
0.380000	27.2	9.000	L1	9.7	21.0	48.3
0.398000	28.4	9.000	L1	9.7	19.5	47.9
0.918000	23.9	9.000	L1	9.7	22.1	46.0
0.948000	26.4	9.000	L1	9.7	19.6	46.0
0.956000	26.6	9.000	L1	9.7	19.4	46.0
0.970000	25.9	9.000	L1	9.7	20.1	46.0
0.978000	23.9	9.000	L1	9.7	22.1	46.0
0.990000	21.5	9.000	L1	9.7	24.5	46.0
8.518000	26.8	9.000	L1	10.0	23.2	50.0
8.544000	26.9	9.000	L1	10.0	23.1	50.0
8.548000	26.9	9.000	L1	10.0	23.1	50.0
8.676000	26.3	9.000	L1	10.0	23.7	50.0
8.702000	26.1	9.000	L1	10.0	23.9	50.0
15.020000	25.0	9.000	L1	10.2	25.0	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	45.0	9.000	N	9.6	21.0	66.0
0.156000	45.3	9.000	N	9.6	20.4	65.7
0.160000	43.5	9.000	N	9.6	21.9	65.5
0.384000	44.0	9.000	N	9.6	14.2	58.2
0.388000	43.6	9.000	N	9.6	14.5	58.1
0.396000	43.6	9.000	N	9.6	14.4	57.9
0.894000	39.8	9.000	N	9.7	16.2	56.0
0.960000	40.7	9.000	N	9.7	15.3	56.0
0.968000	40.4	9.000	N	9.7	15.6	56.0
0.982000	38.7	9.000	N	9.7	17.3	56.0
0.988000	38.1	9.000	N	9.7	17.9	56.0
1.528000	39.4	9.000	N	9.7	16.6	56.0
8.356000	36.0	9.000	N	9.9	24.0	60.0
8.418000	35.9	9.000	N	9.9	24.1	60.0
8.500000	36.2	9.000	N	9.9	23.8	60.0
8.570000	35.9	9.000	N	9.9	24.1	60.0
8.618000	35.4	9.000	N	9.9	24.6	60.0
8.656000	35.4	9.000	N	9.9	24.6	60.0



CAverage Final Result, Line (N)

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	26.6	9.000	N	9.6	29.4	56.0
0.156000	23.6	9.000	N	9.6	32.1	55.7
0.160000	22.3	9.000	N	9.6	33.1	55.5
0.384000	27.3	9.000	N	9.6	20.9	48.2
0.408000	28.0	9.000	N	9.6	19.7	47.7
0.412000	26.2	9.000	N	9.6	21.4	47.6
0.950000	26.1	9.000	N	9.7	19.9	46.0
0.960000	26.1	9.000	N	9.7	19.9	46.0
0.968000	25.8	9.000	N	9.7	20.2	46.0
0.982000	24.9	9.000	N	9.7	21.1	46.0
0.988000	24.0	9.000	N	9.7	22.0	46.0
1.532000	20.7	9.000	N	9.7	25.3	46.0
8.308000	26.0	9.000	N	9.9	24.0	50.0
8.318000	26.1	9.000	N	9.9	23.9	50.0
8.418000	26.7	9.000	N	9.9	23.3	50.0
8.446000	26.7	9.000	N	9.9	23.3	50.0
8.522000	26.8	9.000	N	9.9	23.2	50.0
8.618000	26.6	9.000	N	9.9	23.4	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 of Worst Case	EAD63912804 (Ningbo Broad)
Kind of Test Site	3 m semi anechoic chamber
Temperature	22.9 °C
Relative Humidity	53.4 %
Test Date	July 05, 2016

Frequency (MHz)	Quasi Peak (dBuV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
54.086653	35.2	100.0	V	84.0	15.8	4.8	40.0
85.348858	32.9	250.0	H	87.0	11.6	7.1	40.0
313.887615	30.2	127.0	H	31.0	18.5	15.8	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	2.15 GHz
Testing Frequency Range	1 GHz to 10.75 GHz
Operation Mode	Data Communication mode
USB Cable of Worst Case	EAD63912804 (Ningbo Broad)
Kind of Test Site	3 m semi anechoic chamber
Temperature	23.7 °C
Relative Humidity	51.1 %
Test Date	July 12, 2016

Frequency (MHz)	Peak (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1399.949900	49.5	400.2	V	24.0	-8.9	24.5	74.0
1998.847696	49.4	99.9	V	212.0	-8.4	24.6	74.0

Frequency (MHz)	CAverage (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1399.949900	47.2	400.2	V	24.0	-8.9	6.8	54.0
1998.847696	32.5	99.9	V	212.0	-8.4	21.5	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>					
☒ EMI Test Receiver	Rohde & Schwarz	ESCI	100584	1 year	12.28.2015
☒ LISN	Rohde & Schwarz	ESH3-Z5	100282	1 year	06.09.2016
☒ LISN	Rohde & Schwarz	ENV216	100073	1 year	12.28.2015
☒ Software	Rohde & Schwarz	EMC32	-	-	-
<u>Radiated Emission</u>					
-For measurement below 1 GHz					
☒ EMI Test Receiver	Rohde & Schwarz	ESI40	831564103	1 year	03.30.2016
☐ Trilog Antenna	Schwarzbeck	VULB9160	3301	2 year	11.17.2014
☒ Trilog Antenna	Schwarzbeck	VULB9168	255	2 year	03.23.2016
☒ 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	05.27.2016
☐ 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	03.30.2016
☐ Antenna master	HD GmbH	MA240	240/520	N/A	-
☐ Antenna master controller	HD GmbH	HD 100	100/637	N/A	-
☒ Antenna master	INNCO Systems	MA4000-XP-ET	48709515	N/A	-
☒ Antenna master controller	INNCO Systems	CO 3000	CO 3000/870/ 35990515	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	07.04.2016
☒ Power Amplifier	CERNEX	CBLU5183530	24348	1 year	06.07.2016
☒ Horn Antenna	Schwarzbeck	BBHA 9120D	296	2 year	10.07.2014
☐ EMI Test Receiver	Rohde & Schwarz	ESU 26	100241	1 year	05.27.2016
☐ Turn Table	INNCO Systems	DT3000-3T	DT3000/69	N/A	-
☒ Software	Rohde & Schwarz	EMC32	-	-	-



6. CONCLUSION

The data collected shows that the **EUT Type: Multi-band CDMA/GSM/EDGE/WCDMA/LTE phone with WLAN, Bluetooth and RFID, Model: LG-VS995, FCC ID: ZNFVS995** complies with §15.107 and §15.109 of the FCC rules.