

EMI CERTIFICATION REPORT

Applicant:

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

Date of Receipt: September 10, 2015

Date of Issue: September 17, 2015

Test Report No. HCT-E-1509-040

HCT FRN: 0005866421

FCC ID:

ZNFVC200

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: Smart Watch
Model Name: LG-VC200
Additional Model Name: LGVC200, VC200
Test Port: USB Port
Date of Test: September 12, 2015 - September 13, 2015

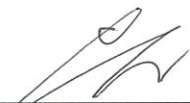
The device bearing the trade name and model specified above, has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.4-2003. (See Test Report if any modifications were made 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

Reviewed By



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DOCUMENT HISTORY

The revision history for this document is shown in table.

Version	Date	Description
HCT-E-1509-040	September 17, 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.

Model	LG-VC200
FCC ID	ZNFVC200
Additional Model	LGVC200, VC200
EUT Type	Smart Watch
TX Frequency	824.70 MHz to 848.31 MHz (CDMA 850) 1 851.25 MHz to 1 908.75 MHz (CDMA 1 900)
RX Frequency	869.70 MHz to 893.31 MHz (CDMA 850) 1 931.25 MHz to 1 988.75 MHz (CDMA 1 900)

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-VC200	LG	ZNFVC200	Notebook PC,
USB cable	EAD62377906	Ningbo Broad	-	EUT, Notebook PC
USB cable	EAD62377907	KSD	-	EUT, Notebook PC
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



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
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
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 semi anechoic chamber. 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

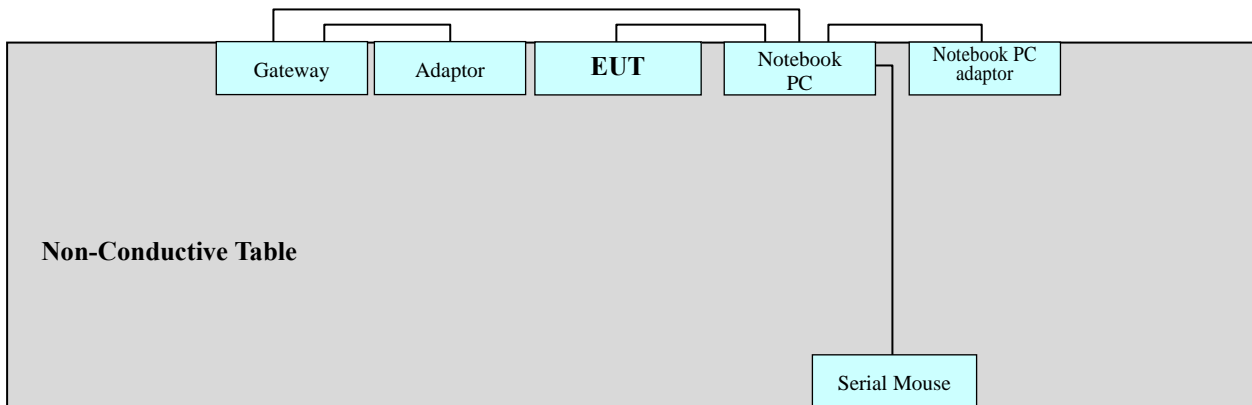


2.2.1 Frequency Range of Radiated Measurements

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 Link mode, after connecting all peripheral devices.

Operation Mode: Data Link mode

3.2 Radiated Emission Test

It was tested Data Link mode, after connecting all peripheral devices.

Operation Mode: Data Link 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:

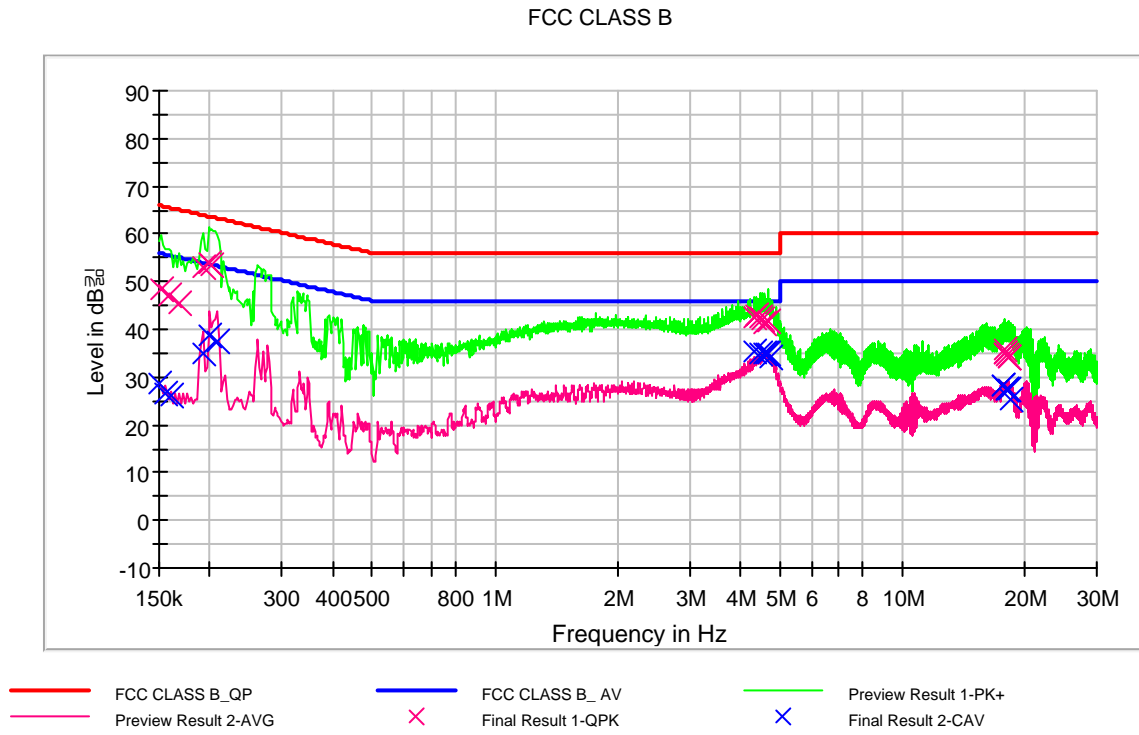
Rule Part / Standard	FCC PART 15 Subpart B Class B
Detector	Quasi-Peak, CISPR-Average
Bandwidth	9 kHz (6 dB)
Operation Mode	Data Link mode
USB Cable Type	Ningbo Broad *NOTE: The worst-case emissions are reported.
Kind of Test Site	Shielded Room
Temperature	25.2 °C
Relative Humidity	44.9 %
Test Date	September 13, 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)
0.152000	48.3	9.000	L1	9.6	17.6	65.9
0.158000	47.1	9.000	L1	9.6	18.5	65.6
0.168000	45.5	9.000	L1	9.6	19.6	65.1
0.192000	53.0	9.000	L1	9.6	10.9	63.9
0.198000	53.7	9.000	L1	9.6	10.0	63.7
0.202000	53.6	9.000	L1	9.6	9.9	63.5
4.320000	42.6	9.000	L1	9.8	13.4	56.0
4.390000	42.9	9.000	L1	9.8	13.1	56.0
4.462000	42.4	9.000	L1	9.8	13.6	56.0
4.534000	42.0	9.000	L1	9.8	14.0	56.0
4.606000	41.3	9.000	L1	9.8	14.7	56.0
4.674000	41.8	9.000	L1	9.8	14.2	56.0
17.782000	35.0	9.000	L1	10.2	25.0	60.0
17.838000	35.7	9.000	L1	10.2	24.3	60.0
17.850000	35.1	9.000	L1	10.2	24.9	60.0
18.032000	34.7	9.000	L1	10.2	25.3	60.0
18.200000	34.3	9.000	L1	10.2	25.7	60.0
18.222000	34.3	9.000	L1	10.2	25.7	60.0

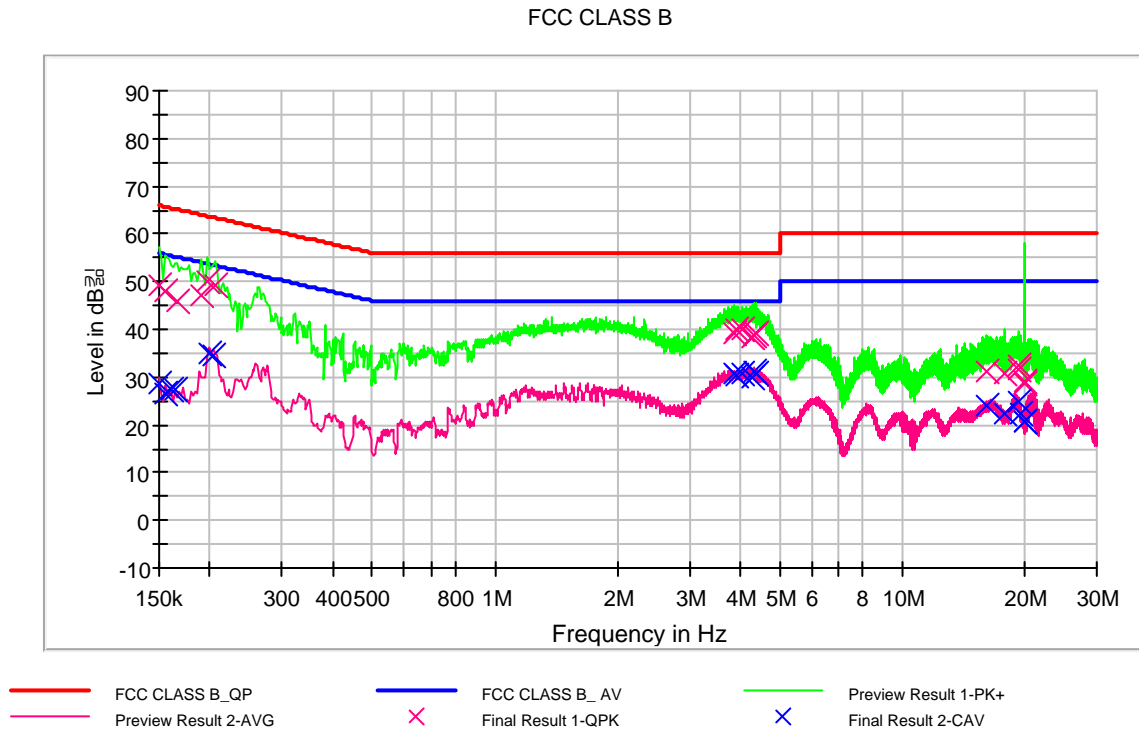


CAverage Final Result, Line (L1)

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	28.7	9.000	L1	9.6	27.3	56.0
0.156000	26.6	9.000	L1	9.6	29.1	55.7
0.160000	26.3	9.000	L1	9.6	29.2	55.5
0.192000	35.1	9.000	L1	9.6	18.8	53.9
0.200000	38.7	9.000	L1	9.6	14.9	53.6
0.208000	37.3	9.000	L1	9.6	16.0	53.3
4.320000	35.5	9.000	L1	9.8	10.5	46.0
4.464000	35.0	9.000	L1	9.8	11.0	46.0
4.606000	35.0	9.000	L1	9.8	11.0	46.0
4.620000	35.0	9.000	L1	9.8	11.0	46.0
4.676000	34.8	9.000	L1	9.8	11.2	46.0
4.746000	34.3	9.000	L1	9.8	11.7	46.0
17.646000	28.2	9.000	L1	10.2	21.8	50.0
17.712000	28.3	9.000	L1	10.2	21.7	50.0
18.032000	27.4	9.000	L1	10.2	22.6	50.0
18.098000	27.3	9.000	L1	10.2	22.7	50.0
18.128000	27.3	9.000	L1	10.2	22.7	50.0
18.484000	25.3	9.000	L1	10.2	24.7	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	49.1	9.000	N	9.6	16.9	66.0
0.156000	47.9	9.000	N	9.6	17.8	65.7
0.166000	46.0	9.000	N	9.6	19.2	65.2
0.190000	47.1	9.000	N	9.6	16.9	64.0
0.196000	50.2	9.000	N	9.6	13.6	63.8
0.206000	49.3	9.000	N	9.6	14.1	63.4
3.878000	39.2	9.000	N	9.8	16.8	56.0
3.890000	39.9	9.000	N	9.8	16.1	56.0
4.034000	40.0	9.000	N	9.8	16.0	56.0
4.270000	38.1	9.000	N	9.8	17.9	56.0
4.316000	38.9	9.000	N	9.8	17.1	56.0
4.384000	39.2	9.000	N	9.8	16.8	56.0
16.052000	31.2	9.000	N	10.2	28.8	60.0
17.750000	30.7	9.000	N	10.2	29.3	60.0
19.236000	32.5	9.000	N	10.3	27.5	60.0
19.374000	31.8	9.000	N	10.3	28.2	60.0
19.922000	28.9	9.000	N	10.3	31.1	60.0
19.992000	29.2	9.000	N	10.3	30.8	60.0



CAverage Final Result, Line (N)

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	28.6	9.000	N	9.6	27.4	56.0
0.156000	26.6	9.000	N	9.6	29.1	55.7
0.160000	27.6	9.000	N	9.6	27.9	55.5
0.164000	27.6	9.000	N	9.6	27.7	55.3
0.200000	35.1	9.000	N	9.6	18.5	53.6
0.204000	34.7	9.000	N	9.6	18.7	53.4
3.878000	30.8	9.000	N	9.8	15.2	46.0
3.890000	30.4	9.000	N	9.8	15.6	46.0
4.034000	30.7	9.000	N	9.8	15.3	46.0
4.270000	29.9	9.000	N	9.8	16.1	46.0
4.316000	31.3	9.000	N	9.8	14.7	46.0
4.384000	30.9	9.000	N	9.8	15.1	46.0
16.052000	24.1	9.000	N	10.2	25.9	50.0
17.750000	22.3	9.000	N	10.2	27.7	50.0
19.236000	24.7	9.000	N	10.3	25.3	50.0
19.592000	22.1	9.000	N	10.3	27.9	50.0
19.922000	20.8	9.000	N	10.3	29.2	50.0
19.992000	20.6	9.000	N	10.3	29.4	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 Link mode
USB Cable Type	Ningbo Broad ※NOTE: The worst-case emissions are reported.
Kind of Test Site	3 m semi anechoic chamber
Temperature	22.4 °C
Relative Humidity	50.5 %
Test Date	September 12, 2015

Frequency (MHz)	Quasi Peak (dBuV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
36.751663	28.2	100.0	V	186.0	15.1	11.8	40.0
69.237756	27.6	150.0	H	54.0	14.2	12.4	40.0
85.932745	24.4	175.0	V	330.0	11.6	15.6	40.0
266.554309	33.0	125.0	H	146.0	16.9	13.0	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	480 MHz
Testing Frequency Range	1 GHz to 6 GHz
Operation Mode	Data Link mode
USB Cable Type	KSD ※NOTE: The worst-case emissions are reported.
Kind of Test Site	3 m semi anechoic chamber
Temperature	22.4 °C
Relative Humidity	50.5 %
Test Date	September 12, 2015

Frequency (MHz)	Peak (dBuV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBuV/m)
1330.010020	49.7	100.0	V	324.0	-9.7	24.3	74.0
1996.042084	56.8	100.0	V	224.0	-7.9	17.2	74.0
2655.460922	50.4	100.0	V	223.0	-5.4	23.6	74.0

Frequency (MHz)	CAverage (dBuV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBuV/m)
1330.010020	31.8	100.0	V	324.0	-9.7	22.2	54.0
1996.042084	38.7	100.0	V	224.0	-7.9	15.3	54.0
2655.460922	33.9	100.0	V	223.0	-5.4	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	Rohde & Schwarz	ESH3-Z5	100282	1 year	06.11.2015
<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	04.01.2015
<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	06.05.2015
<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	04.01.2015
<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 checked="" type="checkbox"/> Power Amplifier	CERNEX	CBLU5183530	24348	1 year	06.15.2015
<input checked="" type="checkbox"/> Horn Antenna	Schwarzbeck	BBHA 9120D	296	1 year	10.07.2014
<input type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESU 26	100241	1 year	06.05.2015
<input type="checkbox"/> Turn Table	INNCO Systems	DT3000-3T	DT3000/69	N/A	-
<input type="checkbox"/> Antenna master	INNCO Systems	MA4000-EP	MA4000/283	N/A	-
<input checked="" type="checkbox"/> Software	Rohde & Schwarz	EMC32	-	-	-



6. CONCLUSION

The data collected shows that the **EUT Type: Smart Watch, FCC ID: ZNFVC200, Model: LG-VC200** complies with §15.107 and §15.109 of the FCC rules.