

EMI TEST REPORT

FCC CERTIFICATION/ INDUSTRY CANADA

Applicant:

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

Date of Receipt: September 04, 2015**Date of Issue: September 14, 2015****Test Report No. HCT-E-1509-F014-1****HCT FRN: 0005866421****FCC ID:****IC:****ZNFH790**
2703C-H790

Rule Part(s) / Standard(s): FCC CFR 47 PART 15 Subpart B Class B
ICES-003 Issue 5 Class B

FCC Classification: JBP (Part 15 B – Class B Computing Device Peripheral)

EUT Type: Portable Handset

Model Name: LG-H790

Additional Model Name: LGH790, H790

Test Port: USB Type C / Earphone Port

Date of Test: September 07, 2015 - September 09, 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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DOCUMENT HISTORY

The revision history for this document is shown in table.

Version	Date	Description
HCT-E-1509-F014	September 11, 2015	Initial Release
HCT-E-1509-F014-1	September 14, 2015	The revision of the frequency range



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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-H790
FCC ID	ZNFH790
IC	2703C-H790
Additional Model	LGH790, H790
EUT Type	Portable Handset
TX Frequency	824.70 MHz to 848.31 MHz (CDMA BC0) 1 851.25 MHz to 1 908.75 MHz (CDMA BC1) 817.90 MHz to 823.10 MHz (CDMA BC10) 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) 2 496 MHz to 2 570 MHz (LTE B7) 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) 814 MHz to 849 MHz (LTE B26) 2 496 MHz to 2 690 MHz (LTE B41)
RX Frequency	869.70 MHz to 893.31 MHz (CDMA BC0) 1 931.25 MHz to 1 988.75 MHz (CDMA BC1) 862.00 MHz to 894.00 MHz (CDMA BC10) 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) 2 516 MHz to 2 690 MHz (LTE B7) 729 MHz to 746 MHz (LTE B12) 746 MHz to 756 MHz (LTE B13) 734 MHz to 746 MHz (LTE B17) 1 925 MHz to 1 990 MHz (LTE B25) 859 MHz to 894 MHz (LTE B26) 717 MHz to 728 MHz (LTE B29) 2 496 MHz to 2 690 MHz (LTE B41)



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.
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)
COMPANY CODE: 5944A Filing the EMI Measurement Facility (3 m Semi Anechoic Chamber and Shielded Room)	IC 5944A-4 (August 20, 2014)
COMPANY CODE: 5944A Radiated Field Strength Measurement Facility (10 m Semi-Anechoic Chamber)	IC 5944A-2 (August 30, 2012)



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-H790	LG	ZNFH790	Notebook PC
USB cable	EAD63687001	Ningbo Broad	-	EUT, Notebook PC
USB cable	EAD63687002	KSD	-	EUT, Notebook PC
Earphone	EAB64168701	Foxlink	-	EUT
Notebook PC (Chromebook Pixel 2015)	C1501W	Google	PD97260SD	USB cable, Notebook PC adaptor
Notebook PC adaptor	PA-1600-23	Lite-On Electronics (Europe) Ltd.	-	Notebook PC
USB mouse	G100s	Logitech	-	Notebook PC



1.5 Cable Description

Product Name	Port	Power Cord Shielded (Y/N)	I/O Cable Shielded (Y/N)	Length (m)
EUT	USB Type-C	Y	Y	(P,D)1.2
	Earphone	N/A	Y	(D)1.2
Notebook PC	USB Type-C (Adaptor)	N	N/A	(P)1.8
	USB Type-A (Mouse)	N/A	Y	(D)2.0

* 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	USB Type-C	N	N/A	Y	Both End
	Earphone	N	N/A	Y	EUT End
Notebook PC	USB Type-A (Mouse)	N	N/A	Y	Notebook PC End

※NOTE: This 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.



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 μ V)	Average (dB μ V)
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 ($\mu\text{V/m}$)	Quasi-Peak (dB $\mu\text{V/m}$)
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 $\mu\text{V/m}$)	Average (dB $\mu\text{V/m}$)
Above 1 000	3	74	54

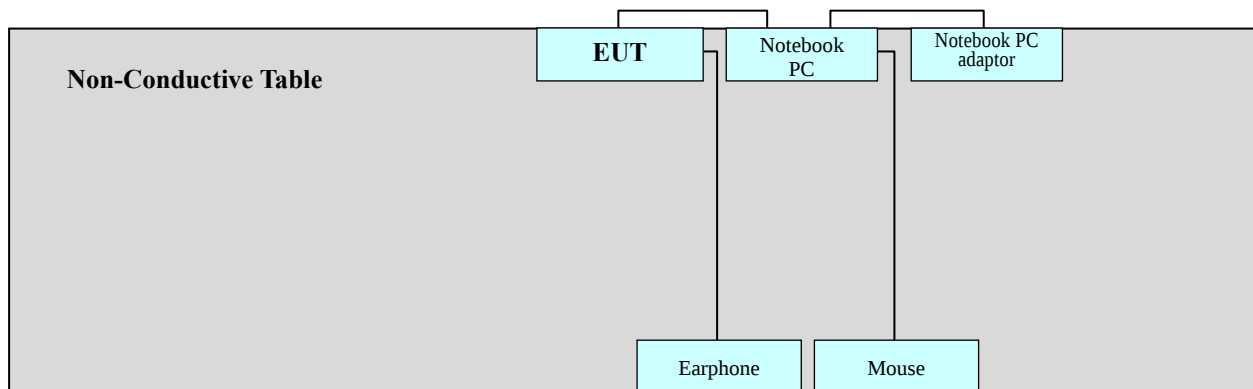


2.2.1 Frequency Range of Radiated Measurements

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

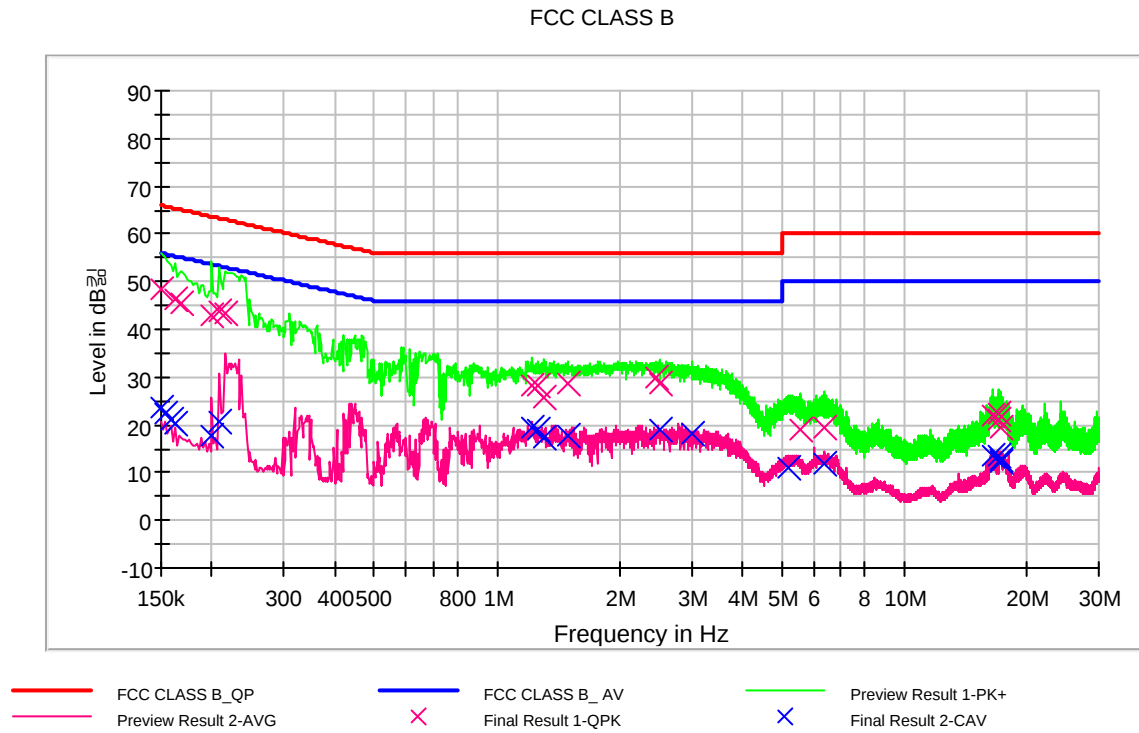
4.1 Conducted Emission Test

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

Rule Part / Standard	FCC PART 15 Subpart B Class B ICES-003 Issue 5 Class B
Detector	Quasi-Peak, CISPR-Average
Bandwidth	9 kHz (6 dB)
Operation Mode	Data Communication mode
USB Cable Type	KSD ※NOTE: The worst-case emissions are reported.
Kind of Test Site	Shielded Room
Temperature	27.2 / 24.4 °C
Relative Humidity	39.7 / 45.5 %
Test Date	September 07, 2015 / September 08, 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)**



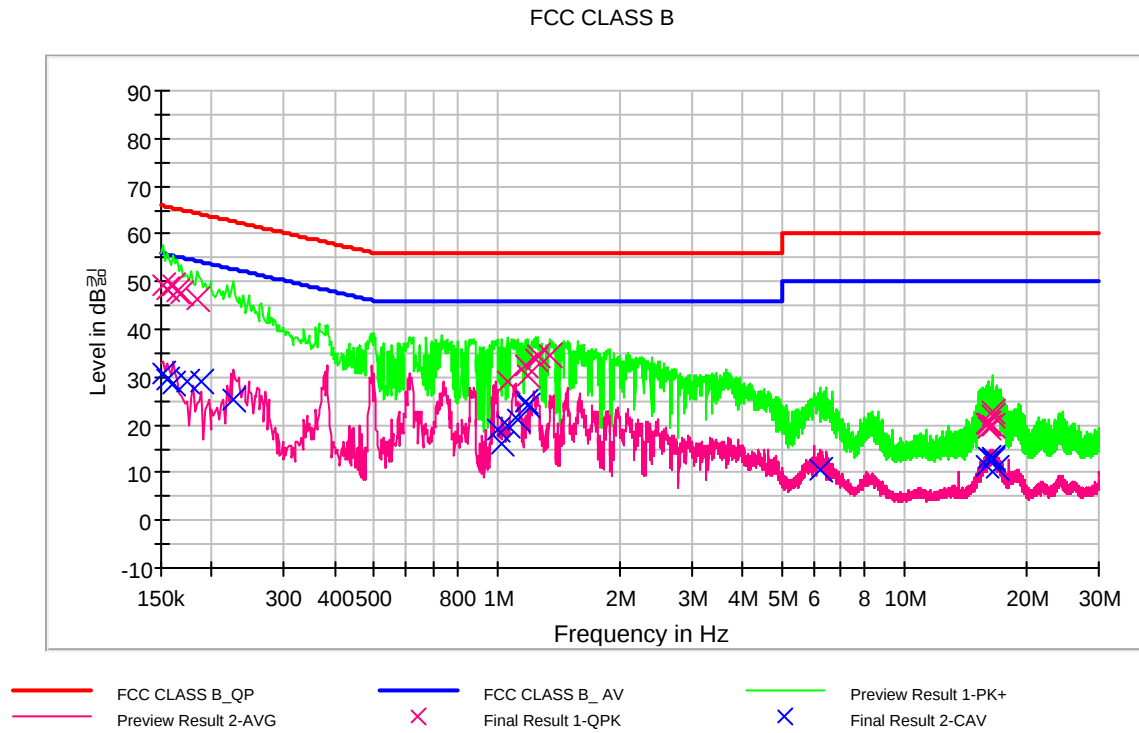
QuasiPeak Final Result, Line (L1)

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	48.2	9.000	L1	9.6	17.8	66.0
0.162000	46.5	9.000	L1	9.6	18.9	65.4
0.168000	45.5	9.000	L1	9.6	19.6	65.1
0.200000	43.0	9.000	L1	9.6	20.6	63.6
0.208000	43.7	9.000	L1	9.6	19.6	63.3
0.216000	43.3	9.000	L1	9.6	19.7	63.0
1.224000	28.2	9.000	L1	9.7	27.8	56.0
1.264000	28.2	9.000	L1	9.7	27.8	56.0
1.300000	25.7	9.000	L1	9.7	30.3	56.0
1.492000	28.7	9.000	L1	9.7	27.3	56.0
2.444000	30.1	9.000	L1	9.7	25.9	56.0
2.500000	28.7	9.000	L1	9.7	27.3	56.0
5.526000	19.2	9.000	L1	9.9	40.8	60.0
6.350000	19.3	9.000	L1	9.9	40.7	60.0
16.424000	21.7	9.000	L1	10.2	38.3	60.0
17.026000	22.4	9.000	L1	10.2	37.6	60.0
17.102000	21.2	9.000	L1	10.2	38.8	60.0
17.310000	19.5	9.000	L1	10.2	40.5	60.0



CAverage Final Result, Line (L1)

Frequency (MHz)	CAverage (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	23.8	9.000	L1	9.6	32.2	56.0
0.154000	22.2	9.000	L1	9.6	33.6	55.8
0.158000	21.0	9.000	L1	9.6	34.6	55.6
0.162000	20.4	9.000	L1	9.6	35.0	55.4
0.200000	17.8	9.000	L1	9.6	35.8	53.6
0.208000	20.8	9.000	L1	9.6	32.5	53.3
1.224000	19.2	9.000	L1	9.7	26.8	46.0
1.264000	18.9	9.000	L1	9.7	27.1	46.0
1.300000	17.5	9.000	L1	9.7	28.5	46.0
1.492000	17.8	9.000	L1	9.7	28.2	46.0
2.500000	19.1	9.000	L1	9.7	26.9	46.0
3.000000	18.1	9.000	L1	9.8	27.9	46.0
5.196000	11.1	9.000	L1	9.8	38.9	50.0
6.350000	11.7	9.000	L1	9.9	38.3	50.0
16.424000	13.7	9.000	L1	10.2	36.3	50.0
17.102000	13.4	9.000	L1	10.2	36.6	50.0
17.294000	12.9	9.000	L1	10.2	37.1	50.0
17.310000	12.2	9.000	L1	10.2	37.8	50.0

**Figure 2: Spectral Diagrams, Conducted Emission, AC Main Port, Line (N)**



QuasiPeak Final Result, Line (N)

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.152000	49.1	9.000	N	9.6	16.8	65.9
0.156000	48.5	9.000	N	9.6	17.2	65.7
0.160000	49.4	9.000	N	9.6	16.1	65.5
0.164000	48.0	9.000	N	9.6	17.3	65.3
0.168000	47.7	9.000	N	9.6	17.4	65.1
0.184000	46.1	9.000	N	9.6	18.2	64.3
1.058000	29.2	9.000	N	9.7	26.8	56.0
1.172000	32.2	9.000	N	9.7	23.8	56.0
1.194000	30.5	9.000	N	9.7	25.5	56.0
1.244000	33.5	9.000	N	9.7	22.5	56.0
1.258000	34.4	9.000	N	9.7	21.6	56.0
1.348000	34.6	9.000	N	9.7	21.4	56.0
15.874000	20.4	9.000	N	10.2	39.6	60.0
16.128000	19.6	9.000	N	10.2	40.4	60.0
16.144000	20.4	9.000	N	10.2	39.6	60.0
16.466000	22.7	9.000	N	10.2	37.3	60.0
16.488000	22.0	9.000	N	10.2	38.0	60.0
16.522000	20.0	9.000	N	10.2	40.0	60.0



CAverage Final Result, Line (N)

Frequency (MHz)	CAverage (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.152000	30.8	9.000	N	9.6	25.1	55.9
0.156000	29.4	9.000	N	9.6	26.3	55.7
0.160000	28.7	9.000	N	9.6	26.8	55.5
0.174000	28.9	9.000	N	9.6	25.9	54.8
0.188000	28.9	9.000	N	9.6	25.2	54.1
0.226000	25.4	9.000	N	9.6	27.2	52.6
1.004000	19.0	9.000	N	9.7	27.0	46.0
1.026000	16.1	9.000	N	9.7	29.9	46.0
1.058000	19.7	9.000	N	9.7	26.3	46.0
1.128000	20.9	9.000	N	9.7	25.1	46.0
1.172000	24.8	9.000	N	9.7	21.2	46.0
1.194000	23.9	9.000	N	9.7	22.1	46.0
6.232000	10.6	9.000	N	9.9	39.4	50.0
15.874000	11.5	9.000	N	10.2	38.5	50.0
16.172000	12.9	9.000	N	10.2	37.1	50.0
16.466000	13.0	9.000	N	10.2	37.0	50.0
16.522000	12.7	9.000	N	10.2	37.3	50.0
16.820000	11.2	9.000	N	10.2	38.8	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 ICES-003 Issue 5 Class B
Detector	Quasi-Peak
Bandwidth	120 kHz (6 dB)
Operation Mode	Data Communication mode
USB Cable Type	Ningbo Broad ※NOTE: The worst-case emissions are reported.
Kind of Test Site	3 m semi anechoic chamber
Temperature	23.8 °C
Relative Humidity	51.6 %
Test Date	September 07, 2015

Frequency (MHz)	Quasi Peak (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
32.823888	24.7	100.0	V	62.0	14.9	15.3	40.0
156.072705	22.4	253.0	H	41.0	17.2	21.1	43.5
172.343808	18.7	250.0	H	-1.0	16.4	24.8	43.5
213.949339	28.9	100.0	H	85.0	14.7	14.6	43.5

- 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 ICES-003 Issue 5 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	1.8 GHz
Testing Frequency Range	1 GHz to 9 GHz
Operation Mode	Data Communication mode
USB Cable Type	KSD ※NOTE: The worst-case emissions are reported.
Kind of Test Site	3 m semi anechoic chamber
Temperature	23.8 / 22.7 °C
Relative Humidity	51.6 / 50.6 %
Test Date	September 07, 2015 / September 09, 2015

Frequency (MHz)	Peak (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
2338.927856	43.1	100.0	H	98.0	-6.2	30.9	74.0
2924.398797	43.8	212.0	H	200.0	-5.5	30.2	74.0
3364.979960	45.0	100.0	H	170.0	-4.4	29.0	74.0

Frequency (MHz)	CAverage (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
2338.927856	30.4	100.0	H	98.0	-6.2	23.6	54.0
2924.398797	30.8	212.0	H	200.0	-5.5	23.2	54.0
3364.979960	32.4	100.0	H	170.0	-4.4	21.6	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	01.13.2015
☒ LISN	Rohde & Schwarz	ENV216	100073	1 year	01.13.2015
☒ LISN	Rohde & Schwarz	ESH3-Z5	100282	1 year	06.11.2015
☒ Software	Rohde & Schwarz	EMC32	-	-	-
<u>Radiated Emission</u>					
-For measurement below 1 GHz					
☒ EMI Test Receiver	Rohde & Schwarz	ESI40	831564103	1 year	04.01.2015
☒ Trilog Antenna	Schwarzbeck	VULB9160	3301	2 year	11.17.2014
☒ 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	-
☐ EMI Test Receiver	Rohde & Schwarz	ESU 26	100241	1 year	06.05.2015
☐ 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	04.01.2015
☒ 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	07.06.2015
☒ Power Amplifier	CERNEX	CBLU5183530	24348	1 year	06.15.2015
☒ Horn Antenna	Schwarzbeck	BBHA 9120D	296	2 year	10.07.2014
☐ EMI Test Receiver	Rohde & Schwarz	ESU 26	100241	1 year	06.05.2015
☐ Turn Table	INNCO Systems	DT3000-3T	DT3000/69	N/A	-
☒ Software	Rohde & Schwarz	EMC32	-	-	-



6. CONCLUSION

The data collected shows that the **EUT Type: Portable Handset, Model: LG-H790, FCC ID: ZNFH790, IC: 2703C-H790** complies with §15.107 and §15.109 of the FCC rules and ICES-003 Issue 5 of the IC rules.