

FCC NFC REPORT

FCC Certification

Applicant Name:

LG Electronics MobileComm U.S.A., Inc.

Date of Issue:

April 03, 2018

Test Site/Location:

HCT CO., LTD., 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA

Address:

1000 Sylvan Avenue, Englewood Cliffs NJ 07632

Report No.: HCT-RF-1803-FC014-R1

FCC ID: ZNFX410EC

APPLICANT: LG Electronics MobileComm U.S.A., Inc.

Model: LM-X410EO

Additional model(s): LMX410EO, X410EO, LM-X410EC, LMX410EC, X410EC

EUT Type: Portable Handset

RF Output Field Strength: 19.51 dBuV/m @30 m

Frequency of Operation: 13.5603 MHz

Modulation type: ASK

FCC Classification: Low Power Communication Device – Transmitter

FCC Rule Part(s): FCC Part 15.225 Subpart C

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them.

HCT CO., LTD. Certifies that no party to this application has subject to a denial of Federal benefits that includes FCC benefits pursuant to section 5301 of the Anti-Drug Abuse Act of 1998, 21 U.S.C. 853(a)



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Approved by : Jong Seok Lee
Manager of Telecommunication testing center

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Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-1803-FC014	March 28, 2018	- First Approval Report
HCT-RF-1803-FC014-R1	April 03, 2018	- Added additional models

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1. GENERAL INFORMATION

Applicant: LG Electronics MobileComm U.S.A., Inc.
Address: 1000 Sylvan Avenue, Englewood Cliffs NJ 07632
FCC ID: ZNFX410EC
EUT Type: Portable Handset
Model: LM-X410EO
Additional model(s): LMX410EO, X410EO, LM-X410EC, LMX410EC, X410EC
Date(s) of Tests: March 12, 2018 ~ March 19, 2018
Place of Tests: HCT Co., Ltd.
74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea

2. EUT DESCRIPTION

Model:	LM-X410EO
Additional model(s):	LMX410EO, X410EO, LM-X410EC, LMX410EC, X410EC
EUT Type	Portable Handset
Power Supply	DC 3.80 V
Battery Information	Model: BL-T36 Type: Li-ion Battery
Frequency of Operation	13.5603 MHz
Transmit Power	19.51 dBuV/m @30 m
Modulation Type	ASK
Antenna Specification	Manufacturer: Marata Antenna type: FPC NEC antenna

3. TEST METHODOLOGY

The measurement procedure described in the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices (ANSI C63.10-2013) is used in the measurement of the test device.

3.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

3.2 EUT EXERCISE

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.225 under the FCC Rules Part 15 Subpart C.

3.3 GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 6.2 of ANSI C63.10. (Version :2013) Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3 m away from the receiving antenna, which varied from 1 m to 4 m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 6.3 of ANSI C63.10. (Version: 2013).

3.4 DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

4. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipments, which is traceable to recognized national standards.

Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5 (Version : 2006).

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

The 10 m semi anechoic chamber used to collect the Conducted and Radiated data is located at the 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea. Those measurement facilities are constructed in conformance with the requirements of ANSI C63.4 (Version: 2014). Detailed description of test facilities was submitted to the Commission and accepted dated July 07, 2015 (Registration Number: 90661)

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned loop, dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

6. ANTENNA REQUIREMENTS

According to FCC 47 CFR §15.203:

"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section."

* The antennas of this E.U.T are permanently attached.

*The E.U.T Complies with the requirement of §15.203

7. MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.4:2014.

All measurement uncertainty values are shown with a coverage factor of $k = 2$ to indicate a 95 % level of confidence.

Parameter	Expanded Uncertainty ($\pm$ dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.82
Radiated Disturbance (9 kHz ~ 30 MHz)	3.40
Radiated Disturbance (30 MHz ~ 1 GHz)	4.80
Radiated Disturbance (1 GHz ~ 18 GHz)	5.70

8. TEST SUMMARY

The results in this report apply only to sample tested

Regulation	Test Type	Range	Result
Title 47 of the CFR: Part 15 Subpart (c), Clause 15.225(a)	Radiated Electric Field Emissions	13.553MHz to 13.567MHz	Pass
Title 47 of the CFR: Part 15 Subpart (c), Clause 15.225(b)	Radiated Electric Field Emissions	13.410MHz to 13.553MHz and 13.567MHz to 13.710MHz	Pass
Title 47 of the CFR: Part 15 Subpart (c), Clause 15.225(c)	Radiated Electric Field Emission	13.110 MHz to 13.410 MHz and 13.710 MHz to 14.010 MHz	Pass
Title 47 of the CFR: Part 15 Subpart (c), Clause 15.209 (d)	Radiated Electric Field Emissions	9kHz to 30MHz	Pass
Title 47 of the CFR: Part 15 Subpart (c), Clause 15.209	Radiated Electric Field Emissions	30MHz to 1GHz	Pass
Title 47 of the CFR: Part 15 Subpart (c), Clause 15.207	AC power conducted emissions	150kHz to 30MHz	Pass
Title 47 of the CFR: Part 15 Subpart (c), Clause 15.225(e)	Frequency Stability	0.01% of nominal	Pass
Title 47 of the CFR: Part 15 Subpart (c), Clause 15.215(c)	20 dB Bandwidth	-	Pass

9. RADIATED EMISSION MEASUREMENT

Requirement(s): 15.209, 15.225

Except as provided elsewhere in this paragraph the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Minimum Standard: FCC Part 15.225 / 15.209

Rule Part	Frequency (MHz)	Limit
Part 15.209	0.009 ~ 0.490	2400/F(kHz) uV/m@300 m
	0.490 ~1.705	24000/F(kHz) uV/m@30 m
	1.705 ~ 30	30 uV/m@30 m
	30 ~ 88	100 ** uV/m@3 m
	88 ~ 216	150 ** uV/m@3 m
	216 ~ 960	200 ** uV/m@3 m
	Above 960	500 uV/m@3 m

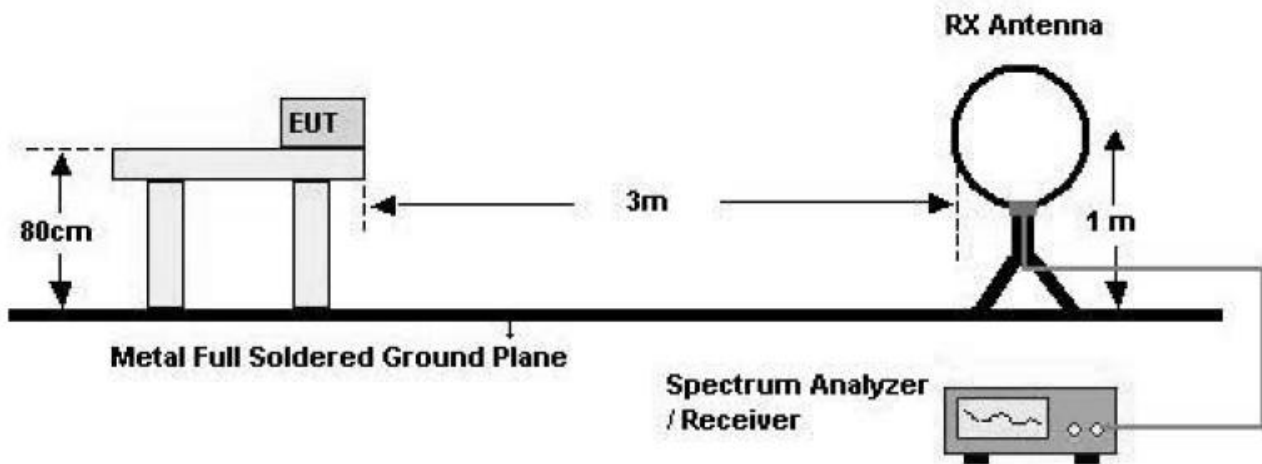
** Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.

15.225 Operation within the band 13.110 MHz – 14.010 MHz

- The field strength of any emissions within the band 13.553 MHz-13.567 MHz shall not exceed 15,848 microvolts/meter (= 84 dBuV/m) at 30 meters.
- Within the bands 13.410-13.553 MHz and 13.567 MHz-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter (=50.5dBuV/m) at 30 meters.
- Within the bands 13.110-13.410 MHz and 13.710 MHz-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter (=40.5 dBuV/m) at 30 meters.
- The field strength of any emissions appearing outside of the 13.110 MHz-14.010 MHz band shall not exceed the general radiated emission limits in § 15.209.
- The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.
- In the case of radio frequency powered tags designed to operate with a device authorized under this section, the tag may be approved with the device or be considered as a separate device subject to its own authorization. Powered tags approved with a device under a single application shall be labeled with the same identification number as the device.

9.1. RADIATED EMISSION 9 kHz – 30 MHz

Test Set-up



Test Procedure

The EUT was placed on a non-conductive table located on semi-anechoic chamber. The loop antenna was placed at a location 3m from the EUT. Radiated emissions were measured with the loop antenna both parallel and perpendicular to the plane of the EUT loop antenna and with x, y, z planes in EUT.

The limit is converted from microvolts/meter to decibel microvolts/meter. Sample Calculation:

Corrected Amplitude = Raw Amplitude(dB μ V/m) + ACF(dB) + Cable Loss(dB) – Distance Correction Factor

The spectrum analyzer is set to:

Frequency Range = 9 kHz ~ 1 GHz

RBW = 9 kHz (9 kHz ~ 30 MHz)

= 120 kHz (30 MHz ~ 1 GHz)

Trace Mode = max hold

Detector Mode = peak / Quasi-peak

Sweep time = auto

■ Test Results (Worst case : Z-H)

13.553 MHz-13.567 MHz						
Frequency (MHz)	Read Level (dBuV/m)@3m	Ant.Factor+Cable Loss (dB/m)	Distance Correction (dB)	Result Level (dBuV/m)@30m	Limit (dBuV/m)@30m	Margin (dB)
13.5603	39.97	19.54	-40	19.51	84	64.49
13.5601	35.41	19.54	-40	14.95	84	69.05

13.410 MHz-13.553 MHz and 13.567 MHz-13.710 MHz						
Frequency (MHz)	Read Level (dBuV/m)@3m	Ant.Factor+Cable Loss (dB/m)	Distance Correction (dB)	Result Level (dBuV/m)@30m	Limit (dBuV/m)@30m	Margin (dB)
13.553	25.19	19.54	-40	4.73	50.47	45.74
13.567	27.46	19.54	-40	7	50.47	43.47

13.110 MHz – 13.410 MHz and 13.710 MHz-14.010 MHz						
Frequency (MHz)	Read Level (dBuV/m)@3m	Ant.Factor+Cable Loss (dB/m)	Distance Correction (dB)	Result Level (dBuV/m)@30m	Limit (dBuV/m)@30m	Margin (dB)
13.1394	17.25	19.54	-40	-3.21	40.51	43.72
13.985	16.59	19.54	-40	-3.87	40.51	44.38

9 kHz -30 MHz						
Frequency (MHz)	Read Level (dBuV/m)@3m	Ant.Factor+Cable Loss (dB/m)	Distance Correction (dB)	Result Level (dBuV/m)@30m	Limit (dBuV/m)@30m	Margin (dB)
7.287	10.38	19.54	-40	-10.08	29.54	39.62
17.6877	7.52	19.54	-40	-12.94	29.54	42.48
26.74	7.92	19.99	-40	-12.09	29.54	41.63
27.006	9.55	19.99	-40	-10.46	29.54	40

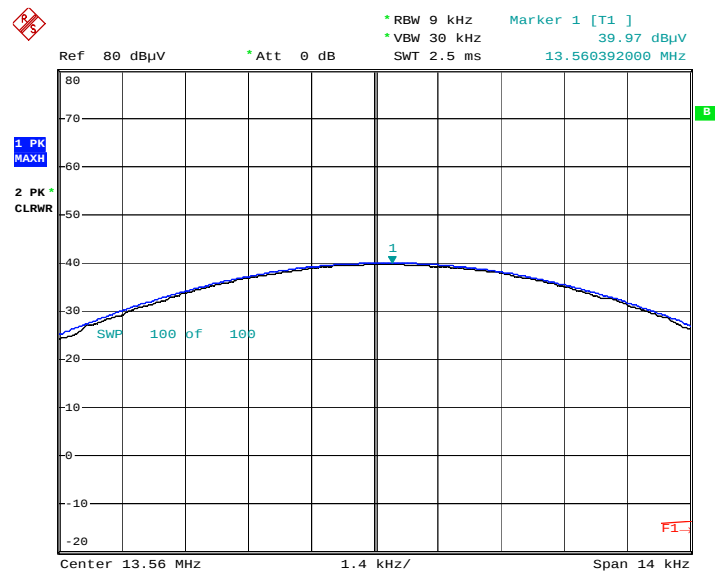
Note : The test results for below 30 MHz is correlated to an open site.

The result on OATS is about 2 dB higher than semi-anechoic chamber(10 m chamber)

1. Distance Correction Below 30 MHz = $40\log(3 \text{ m}/30 \text{ m}) = -40 \text{ dB}$
Measurement Distance : 3 m (Below 30 MHz)
2. Factor = Antenna Factor + Cable Loss
3. Result Level = Read Level + Factor + Distance Correction
4. Margin = Limit – Result Level
5. We have done x, y, z planes in EUT
6. Antenna rotated about its vertical/horizontal axis for maximum response at each azimuth position around the EUT.
7. Worst case of operating mode is type A, analog mode and 106 kbps.

■ RESULT PLOTS

Worst Plot for Radiated Emissions

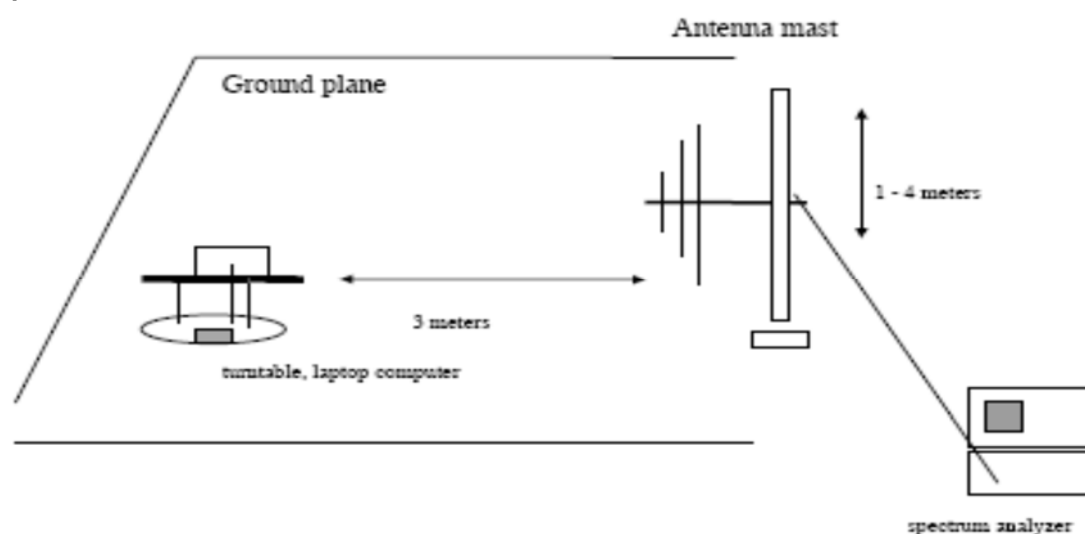


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Note : Only the worst case plots for Radiated Emissions.

9.2. RADIATED EMISSION 30 MHz – 1000 MHz

Test Set-up



Test Procedures: Radiated emissions were measured according to ANSI C63.10.

The EUT was set to transmit at the highest output power.

The EUT was set 3 meter away from the measuring antenna.

■ Test Results

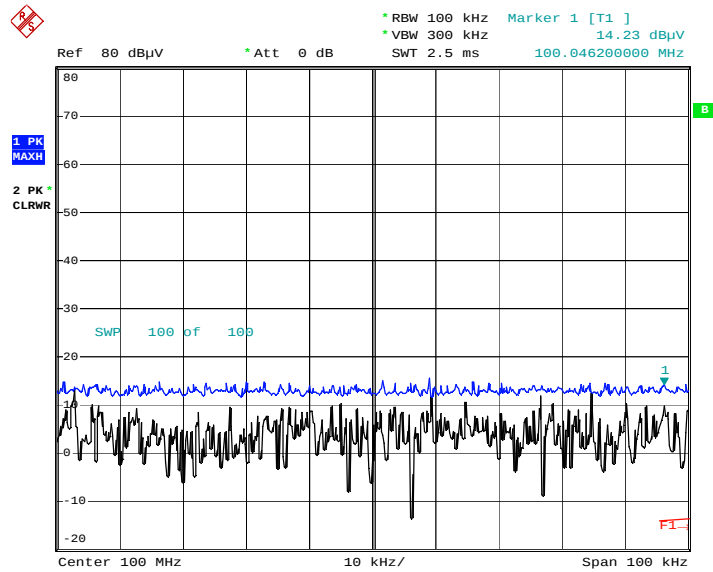
Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	dBuV	dB/m	dB	(H/V)	dBuV/m	dBuV/m	dB
37.7651	14.1	11.72	0.66	H	26.48	40	13.52
50.0628	14.16	12.38	0.7	H	27.24	40	12.76
100.0462	14.23	8.19	0.78	V	23.2	40	16.8
120.2154	13.77	11.64	0.81	H	26.22	43.5	17.28
148.62	13.12	12.84	0.88	H	26.84	43.5	16.66
180.0024	13.36	13.41	0.95	V	27.72	43.5	15.78

Remark

1. Result Level = Read Level + (Antenna Factor+ Cable Loss)
2. Margin = Limit – Result Level
3. '*' is the result for restricted band.

RESULT PLOTS

Worst Plot for Radiated Emissions



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Note : Only the worst case plots for Radiated Emissions.

10. EMISSION BANDWIDTH PLOT

Requirement(s):

Test Set-up: The EUT was connected to a spectrum analyzer.

Test Procedure: The 20 dB bandwidth was measured by using a spectrum analyzer.

RBW = Auto

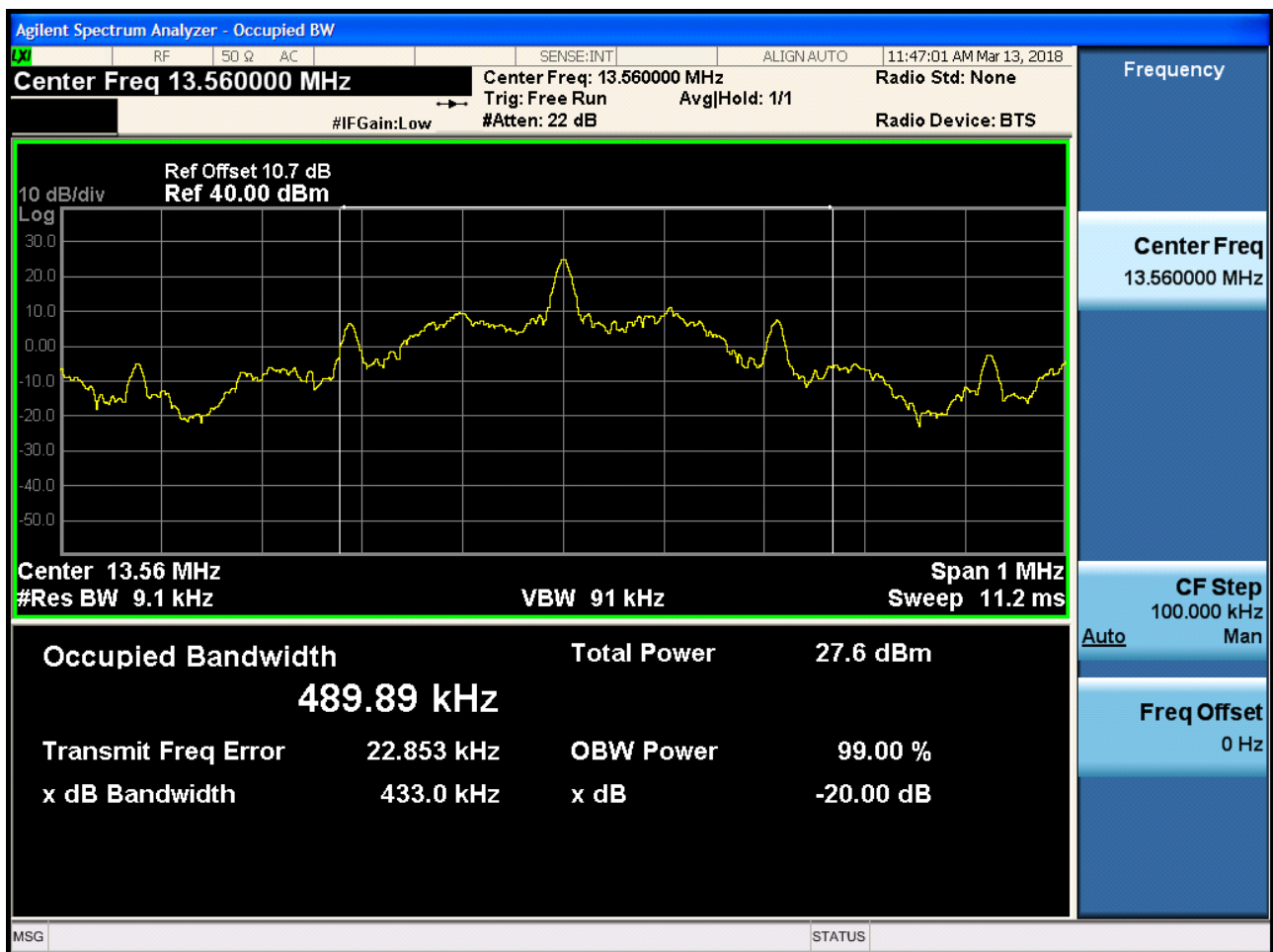
VBW = Auto

Span = Adequately in the operating Tx.

Detector = Peak

Trace mode = Max hold

Allow the trace to stabilize



11. FREQUENCY TOLERANCE

Procedure: Part 15.225, ANSI 63.10 (Version : 2013)

If required, the operating or transmitting frequency of an intentional radiator should be measured in accordance with the following procedure to ensure that the device operates outside certain precluded frequency bands and within the frequency range. No modulation needs to be supplied to the intentional radiator during these tests, unless modulation is required to produce an output, e.g., single-sideband suppressed carrier transmitters.

The frequency stability of the transmitter is measured by:

- a) Temperature: The temperature is varied from -20°C to + 50°C using an environmental chamber.
- b) For battery operated equipment, the equipment tests shall be performed using a new battery.
- c) Test Procedure
 - Turn the EUT OFF and place it inside the environmental temperature chamber. For devices that have oscillator heaters, energize only the heater circuit.
 - Set the temperature control on the chamber to the highest specified in the regulatory requirements for the type of device and allow the oscillator heater and the chamber temperature to stabilize.
 - While maintaining a constant temperature inside the environmental chamber, turn the EUT ON and record the operating frequency at startup, and at 2 minutes, 5 minutes, and 10 minutes after the EUT is energized. Four measurements in total are made.
- d) The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency.

Note : Below the measurement result is worst value of the operating frequency at startup, and at 2 minutes, 5 minutes, and 10 minutes after the EUT is energized

Startup

Measurement Result:

PERATING FREQUENCY: 13.56 MHz
REFERENCE VOLTAGE: 3.80 VDC
DEVIATION LIMIT: 0.01 % = 1356 Hz

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (MHz)	Frequency Dev. (Hz)	Frequency Dev (%)
100%	3.80	-20	13.560183	183	0.0013496
100%		-10	13.560168	168	0.0012389
100%		0	13.560153	153	0.0011283
100%		+10	13.560132	132	0.0009735
100%		+20(Ref.)	13.560122	122	0.0008997
100%		+30	13.560115	115	0.0008481
100%		+40	13.560098	98	0.0007227
100%		+50	13.560093	93	0.0006858
High	4.20	+20	13.560126	126	0.0009292
Low	3.60	+20	13.560119	119	0.0008776

2 minutes

Measurement Result:

PERATING FREQUENCY: 13.56 MHz

REFERENCE VOLTAGE: 3.80 VDC

DEVIATION LIMIT: 0.01 % = 1356 Hz

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (MHz)	Frequency Dev. (Hz)	Frequency Dev (%)
100%	3.80	-20	13.560189	189	0.0013938
100%		-10	13.560176	176	0.0012979
100%		0	13.560159	159	0.0011726
100%		+10	13.560143	143	0.0010546
100%		+20(Ref.)	13.560125	125	0.0009218
100%		+30	13.560117	117	0.0008628
100%		+40	13.560101	101	0.0007448
100%		+50	13.560091	91	0.0006711
High	4.20	+20	13.560139	139	0.0010251
Low	3.60	+20	13.560160	160	0.0011799

5 minutes

Measurement Result:

PERATING FREQUENCY: 13.56 MHz
REFERENCE VOLTAGE: 3.80 VDC
DEVIATION LIMIT: 0.01 % = 1356 Hz

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (MHz)	Frequency Dev. (Hz)	Frequency Dev (%)
100%	3.80	-20	13.560195	195	0.0014381
100%		-10	13.560183	183	0.0013496
100%		0	13.560176	176	0.0012979
100%		+10	13.560163	163	0.0012021
100%		+20(Ref.)	13.560148	148	0.0010914
100%		+30	13.560132	132	0.0009735
100%		+40	13.560126	126	0.0009292
100%		+50	13.560118	118	0.0008702
High	4.20	+20	13.560153	153	0.0011283
Low	3.60	+20	13.560146	146	0.0010767

10 minutes

Measurement Result:

PERATING FREQUENCY: 13.56 MHz
REFERENCE VOLTAGE: 3.80 VDC
DEVIATION LIMIT: 0.01 % = 1356 Hz

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (MHz)	Frequency Dev. (Hz)	Frequency Dev (%)
100%	3.80	-20	13.560203	203	0.0014971
100%		-10	13.560192	192	0.0014159
100%		0	13.560180	180	0.0013274
100%		+10	13.560161	161	0.0011873
100%		+20(Ref.)	13.560145	145	0.0010693
100%		+30	13.560133	133	0.0009808
100%		+40	13.560125	125	0.0009218
100%		+50	13.560113	113	0.0008333
High	4.20	+20	13.560138	138	0.0010177
Low	3.60	+20	13.560141	141	0.0010398

12. POWERLINE CONDUCTE EMISSIONS

LIMIT

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolt (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

Frequency Range (MHz)	Limits (dB μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

Test Configuration

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

TEST PROCEDURE

1. The EUT is placed on a wooden table 80 cm above the reference ground plane.
2. The EUT is connected via LISN to a test power supply.
3. The measurement results are obtained as described below:
4. Detectors – Quasi Peak and Average Detector.
5. The EUT is the device operating below 30 MHz.
 - For unterminated the Antenna, the AC line conducted tests are performed with the antenna connected
 - For terminated the Antenna, the AC line conducted tests are performed with a dummy load connected to the EUT antenna output terminal.

Sample Calculation

Quasi-peak(Final Result) = Reading Value + Correction Factor

Test Plots: LM-X410EO (NORMAL)

Underminate the Antenna

Conducted Emissions (Line 1)

EMI Auto Test(19)

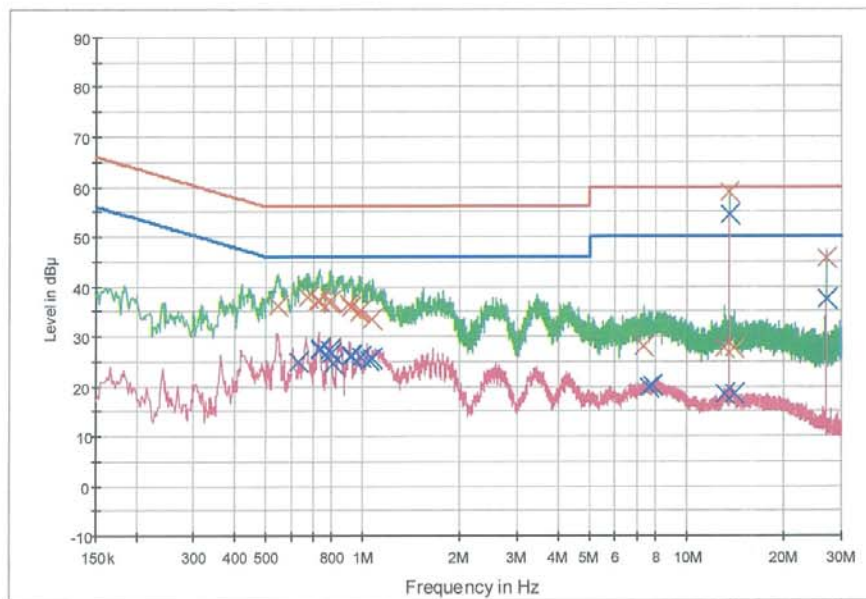
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HCT TEST Report

Common Information

EUT: LM-X410EO
Manufacturer: LG
Test Site: SHIELD ROOM
Operating Conditions: NFC INTERMINATION MODE

FCC CLASS B_Exten Cable



— FCC CLASS B_QP — FCC CLASS B_AV — Preview Result 1-PK+
— Preview Result 2-AVG × Final Result 1-QPK × Final Result 2-CAV

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.550000	36.2	9.000	Off	N	9.7	19.8	56.0
0.682000	37.7	9.000	Off	N	9.7	18.3	56.0
0.726000	37.0	9.000	Off	N	9.7	19.0	56.0
0.734000	37.1	9.000	Off	N	9.7	19.0	56.0
0.790000	36.8	9.000	Off	N	9.7	19.2	56.0
0.796000	37.3	9.000	Off	N	9.7	18.7	56.0
0.904000	36.5	9.000	Off	N	9.8	19.5	56.0
0.918000	35.8	9.000	Off	N	9.8	20.2	56.0
0.924000	35.7	9.000	Off	N	9.8	20.3	56.0
0.978000	34.7	9.000	Off	N	9.8	21.3	56.0
0.988000	35.2	9.000	Off	N	9.8	20.8	56.0
1.076000	33.5	9.000	Off	N	9.8	22.5	56.0
7.348000	28.0	9.000	Off	N	10.1	32.0	60.0
13.140000	27.7	9.000	Off	N	10.4	32.3	60.0
13.560000	58.7	9.000	Off	N	10.4	1.3	60.0
13.984000	27.7	9.000	Off	N	10.4	32.3	60.0
13.990000	27.5	9.000	Off	N	10.4	32.5	60.0
27.120000	45.8	9.000	Off	N	10.9	14.2	60.0

Final Result 2

2018-03-13

오후 2:31:01

EMI Auto Test(19)

2 / 2

Frequency (MHz)	CAverage (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.634000	25.1	9.000	Off	N	9.7	20.9	46.0
0.732000	27.5	9.000	Off	N	9.7	18.5	46.0
0.736000	27.3	9.000	Off	N	9.7	18.7	46.0
0.792000	27.1	9.000	Off	N	9.7	18.9	46.0
0.796000	26.5	9.000	Off	N	9.7	19.5	46.0
0.808000	24.7	9.000	Off	N	9.7	21.3	46.0
0.916000	26.1	9.000	Off	N	9.8	19.9	46.0
0.920000	26.0	9.000	Off	N	9.8	20.0	46.0
0.924000	26.2	9.000	Off	N	9.8	19.8	46.0
0.988000	25.8	9.000	Off	N	9.8	20.2	46.0
1.040000	25.4	9.000	Off	N	9.8	20.6	46.0
1.076000	25.6	9.000	Off	N	9.8	20.4	46.0
7.602000	19.7	9.000	Off	N	10.1	30.3	50.0
7.820000	20.1	9.000	Off	N	10.1	29.9	50.0
13.134000	18.6	9.000	Off	N	10.4	31.4	50.0
13.560000	54.4	9.000	Off	N	10.4	-4.4	50.0
13.990000	18.5	9.000	Off	N	10.4	31.5	50.0
27.120000	37.5	9.000	Off	N	10.9	12.5	50.0

2018-03-13

오후 2:31:01

Conducted Emissions (Line 2)

EMI Auto Test(19)

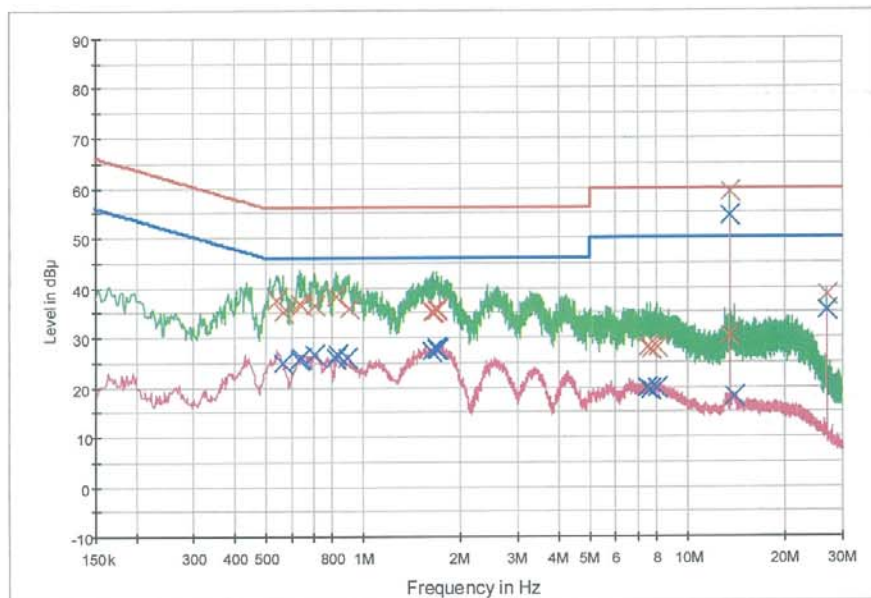
1 / 2

HCT TEST Report

Common Information

EUT: LM-X410EO
Manufacturer: LG
Test Site: SHIELD ROOM
Operating Conditions: NFC UNTERMINATION MODE

FCC CLASS B_Exten Cable



— FCC CLASS B_QP — Preview Result 2-AVG — FCC CLASS B_AV × Final Result 1-QPK × Preview Result 1-PK+ × Final Result 2-CAV

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.542000	37.4	9.000	Off	L1	9.7	18.6	56.0
0.570000	35.0	9.000	Off	L1	9.7	21.0	56.0
0.638000	36.8	9.000	Off	L1	9.7	19.2	56.0
0.646000	36.5	9.000	Off	L1	9.7	19.5	56.0
0.714000	36.4	9.000	Off	L1	9.7	19.6	56.0
0.826000	38.3	9.000	Off	L1	9.7	17.7	56.0
0.904000	35.9	9.000	Off	L1	9.8	20.1	56.0
1.640000	35.0	9.000	Off	L1	9.8	21.0	56.0
1.652000	35.2	9.000	Off	L1	9.8	20.8	56.0
1.682000	35.7	9.000	Off	L1	9.8	20.3	56.0
1.692000	35.8	9.000	Off	L1	9.8	20.2	56.0
1.696000	35.3	9.000	Off	L1	9.8	20.7	56.0
7.522000	28.0	9.000	Off	L1	10.1	32.0	60.0
7.702000	27.6	9.000	Off	L1	10.1	32.4	60.0
8.114000	27.9	9.000	Off	L1	10.1	32.1	60.0
13.498000	30.3	9.000	Off	L1	10.2	29.7	60.0
13.560000	59.2	9.000	Off	L1	10.2	0.8	60.0
27.120000	38.6	9.000	Off	L1	10.5	21.4	60.0

Final Result 2

2018-03-13

오후 2:40:49

EMI Auto Test(19)

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Frequency (MHz)	CAverage (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.570000	24.8	9.000	Off	L1	9.7	21.2	46.0
0.638000	25.6	9.000	Off	L1	9.7	20.4	46.0
0.646000	26.1	9.000	Off	L1	9.7	19.9	46.0
0.714000	26.8	9.000	Off	L1	9.7	19.2	46.0
0.826000	25.9	9.000	Off	L1	9.7	20.1	46.0
0.838000	26.7	9.000	Off	L1	9.7	19.3	46.0
0.902000	25.9	9.000	Off	L1	9.8	20.1	46.0
1.640000	27.4	9.000	Off	L1	9.8	18.6	46.0
1.682000	27.7	9.000	Off	L1	9.8	18.3	46.0
1.692000	27.8	9.000	Off	L1	9.8	18.2	46.0
1.696000	27.7	9.000	Off	L1	9.8	18.3	46.0
1.708000	27.6	9.000	Off	L1	9.8	18.4	46.0
7.522000	19.8	9.000	Off	L1	10.1	30.2	50.0
7.702000	19.5	9.000	Off	L1	10.1	30.5	50.0
8.114000	19.8	9.000	Off	L1	10.1	30.2	50.0
13.560000	54.4	9.000	Off	L1	10.2	-4.4	50.0
13.982000	18.1	9.000	Off	L1	10.2	31.9	50.0
27.120000	35.6	9.000	Off	L1	10.5	14.4	50.0

2018-03-13

오후 2:40:49

Terminate the Antenna
Conducted Emissions (Line 1)

EMI Auto Test(19)

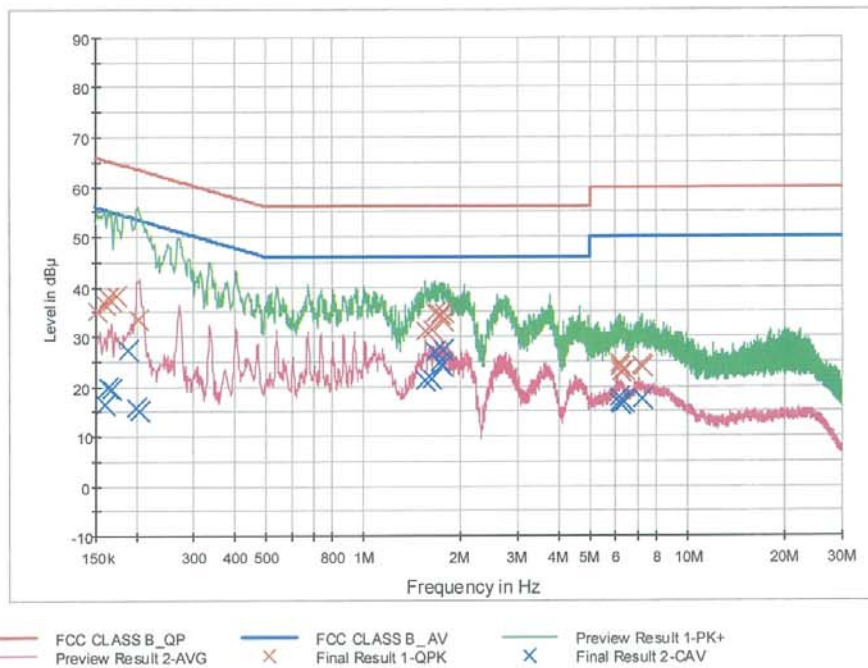
1 / 2

HCT TEST Report

Common Information

EUT: LM-X410EO
Manufacturer: LG
Test Site: SHIELD ROOM
Operating Conditions: NFC TERMINATION MODE

FCC CLASS B_Exten Cable



Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.152000	35.1	9.000	Off	N	9.7	30.8	65.9
0.160000	36.4	9.000	Off	N	9.7	29.1	65.5
0.164000	37.7	9.000	Off	N	9.7	27.5	65.3
0.168000	37.3	9.000	Off	N	9.7	27.8	65.1
0.174000	38.0	9.000	Off	N	9.7	26.8	64.8
0.204000	33.5	9.000	Off	N	9.7	29.9	63.4
1.560000	31.0	9.000	Off	N	9.8	25.0	56.0
1.626000	31.3	9.000	Off	N	9.8	24.7	56.0
1.660000	34.9	9.000	Off	N	9.8	21.1	56.0
1.728000	34.5	9.000	Off	N	9.8	21.5	56.0
1.760000	33.0	9.000	Off	N	9.8	23.0	56.0
1.772000	34.7	9.000	Off	N	9.8	21.3	56.0
6.150000	24.5	9.000	Off	N	10.1	35.5	60.0
6.220000	23.8	9.000	Off	N	10.1	36.2	60.0
6.244000	23.0	9.000	Off	N	10.1	37.0	60.0
6.426000	23.2	9.000	Off	N	10.1	36.8	60.0
7.242000	24.3	9.000	Off	N	10.1	35.7	60.0
7.262000	23.9	9.000	Off	N	10.1	36.1	60.0

Final Result 2

2018-03-13

오후 6:29:51

EMI Auto Test(19)

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Frequency (MHz)	CAverage (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.160000	16.4	9.000	Off	N	9.7	39.1	55.5
0.164000	19.7	9.000	Off	N	9.7	35.5	55.3
0.168000	19.6	9.000	Off	N	9.7	35.4	55.1
0.190000	27.3	9.000	Off	N	9.7	26.7	54.0
0.202000	15.9	9.000	Off	N	9.7	37.7	53.5
0.206000	15.0	9.000	Off	N	9.7	38.4	53.4
1.558000	21.2	9.000	Off	N	9.8	24.8	46.0
1.626000	21.4	9.000	Off	N	9.8	24.6	46.0
1.660000	26.9	9.000	Off	N	9.8	19.1	46.0
1.728000	25.0	9.000	Off	N	9.8	21.0	46.0
1.758000	24.2	9.000	Off	N	9.8	21.8	46.0
1.766000	27.4	9.000	Off	N	9.8	18.6	46.0
6.150000	17.6	9.000	Off	N	10.1	32.4	50.0
6.220000	16.9	9.000	Off	N	10.1	33.1	50.0
6.236000	16.4	9.000	Off	N	10.1	33.6	50.0
6.244000	16.3	9.000	Off	N	10.1	33.7	50.0
6.426000	16.6	9.000	Off	N	10.1	33.4	50.0
7.262000	17.6	9.000	Off	N	10.1	32.4	50.0

2018-03-13

오후 6:29:51

Conducted Emissions (Line 2)

EMI Auto Test(19)

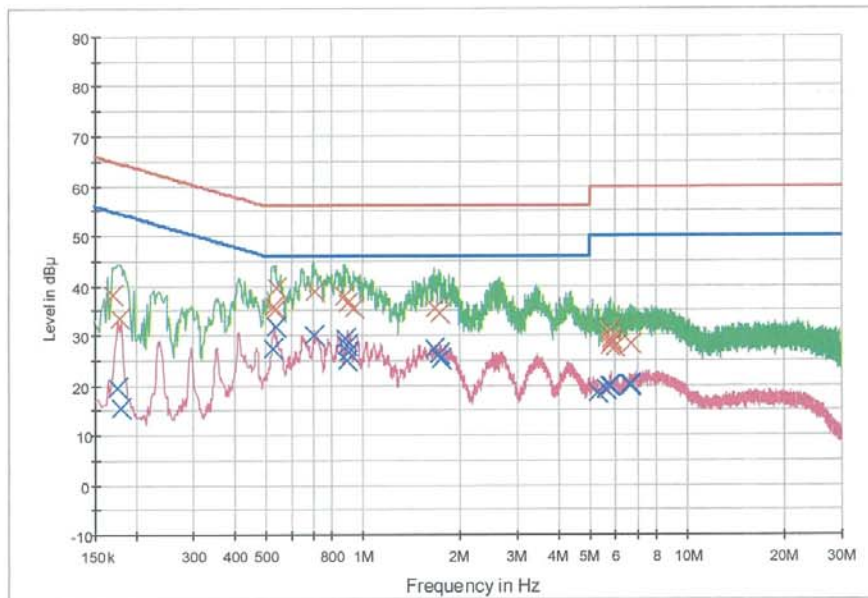
1 / 2

HCT TEST Report

Common Information

EUT: LM-X410EO
 Manufacturer: LG
 Test Site: SHIELD ROOM
 Operating Conditions: NFC TERMINATION MODE

FCC CLASS B_Exten Cable



— FCC CLASS B_OP — FCC CLASS B_AV — Preview Result 1-PK+
 — Preview Result 2-AVG — Final Result 1-QPK — Final Result 2-CAV

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.170000	38.2	9.000	Off	L1	9.7	26.8	65.0
0.178000	33.3	9.000	Off	L1	9.7	31.3	64.6
0.530000	35.8	9.000	Off	L1	9.7	20.2	56.0
0.534000	35.1	9.000	Off	L1	9.7	20.9	56.0
0.542000	39.6	9.000	Off	L1	9.7	16.5	56.0
0.708000	38.8	9.000	Off	L1	9.7	17.2	56.0
0.882000	37.8	9.000	Off	L1	9.7	18.2	56.0
0.896000	36.4	9.000	Off	L1	9.7	19.6	56.0
0.944000	35.4	9.000	Off	L1	9.8	20.6	56.0
1.666000	35.5	9.000	Off	L1	9.8	20.5	56.0
1.672000	35.4	9.000	Off	L1	9.8	20.6	56.0
1.728000	34.3	9.000	Off	L1	9.8	21.7	56.0
5.760000	27.8	9.000	Off	L1	10.0	32.2	60.0
5.786000	30.9	9.000	Off	L1	10.0	29.1	60.0
5.826000	28.8	9.000	Off	L1	10.0	31.2	60.0
5.832000	29.3	9.000	Off	L1	10.0	30.7	60.0
6.006000	27.6	9.000	Off	L1	10.0	32.4	60.0
6.714000	28.2	9.000	Off	L1	10.1	31.8	60.0

Final Result 2

2018-03-13

오후 6:39:29

EMI Auto Test(19)

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Frequency (MHz)	CAverage (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.176000	19.6	9.000	Off	L1	9.7	35.1	54.7
0.180000	15.4	9.000	Off	L1	9.7	39.0	54.5
0.530000	27.3	9.000	Off	L1	9.7	18.7	46.0
0.542000	31.9	9.000	Off	L1	9.7	14.1	46.0
0.708000	30.1	9.000	Off	L1	9.7	15.9	46.0
0.884000	29.3	9.000	Off	L1	9.7	16.7	46.0
0.896000	27.9	9.000	Off	L1	9.7	18.1	46.0
0.900000	25.0	9.000	Off	L1	9.8	21.0	46.0
0.904000	26.6	9.000	Off	L1	9.8	19.4	46.0
1.672000	27.1	9.000	Off	L1	9.8	18.9	46.0
1.728000	26.4	9.000	Off	L1	9.8	19.6	46.0
1.740000	25.4	9.000	Off	L1	9.8	20.6	46.0
5.290000	18.5	9.000	Off	L1	10.0	31.5	50.0
5.612000	19.2	9.000	Off	L1	10.0	30.8	50.0
5.760000	19.7	9.000	Off	L1	10.0	30.3	50.0
5.826000	19.9	9.000	Off	L1	10.0	30.1	50.0
6.698000	20.1	9.000	Off	L1	10.1	29.9	50.0
6.714000	19.7	9.000	Off	L1	10.1	30.3	50.0

2018-03-13

오후 6:39:29

Test Plots: LM-X410EC (FAST CHARGE)

Underminate the Antenna

Conducted Emissions (Line 1)

EMI Auto Test(19)

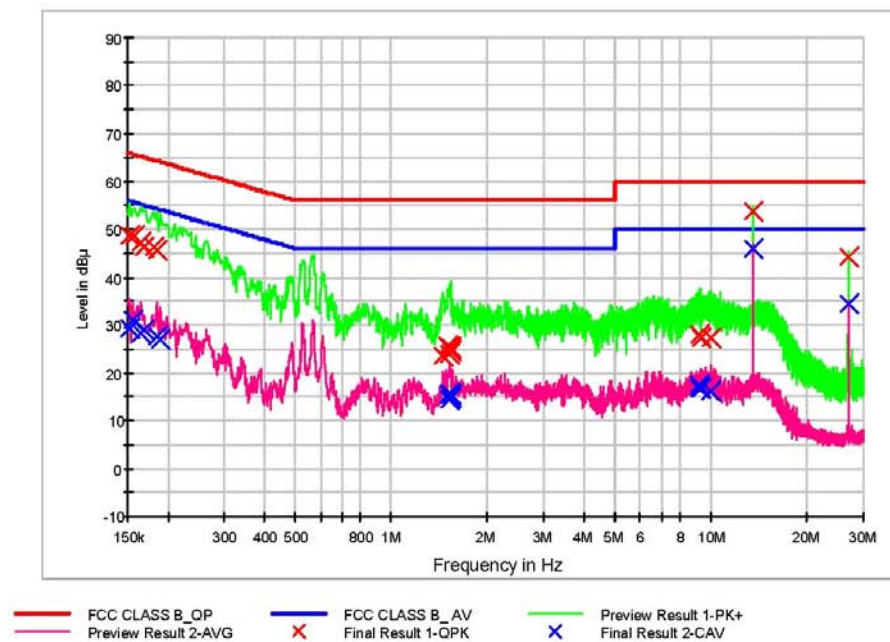
1 / 2

HCT TEST Report

Common Information

EUT: LM-X410EC
Manufacturer: LG
Test Site: SHIELD ROOM
Operating Conditions: NFC INTERMINATION MODE (Fast Charge)

FCC CLASS B_Exten Cable



Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.152000	48.7	9.000	Off	N	9.7	17.1	65.9
0.158000	48.7	9.000	Off	N	9.7	16.8	65.6
0.164000	47.1	9.000	Off	N	9.7	18.1	65.3
0.168000	46.3	9.000	Off	N	9.7	18.7	65.1
0.180000	46.2	9.000	Off	N	9.7	18.3	64.5
0.186000	45.4	9.000	Off	N	9.7	18.8	64.2
1.450000	23.5	9.000	Off	N	9.8	32.5	56.0
1.506000	25.4	9.000	Off	N	9.8	30.6	56.0
1.520000	23.9	9.000	Off	N	9.8	32.1	56.0
1.528000	25.1	9.000	Off	N	9.8	30.9	56.0
1.532000	25.1	9.000	Off	N	9.8	30.9	56.0
1.540000	24.7	9.000	Off	N	9.8	31.3	56.0
9.158000	27.8	9.000	Off	N	10.2	32.2	60.0
9.192000	28.0	9.000	Off	N	10.2	32.0	60.0
9.354000	27.2	9.000	Off	N	10.2	32.8	60.0
9.934000	27.3	9.000	Off	N	10.2	32.7	60.0
13.560000	53.6	9.000	Off	N	10.4	6.4	60.0
27.120000	44.4	9.000	Off	N	10.9	15.6	60.0

2018-03-19

오후 1:19:29

EMI Auto Test(19)

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Final Result 2

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.152000	29.3	9.000	Off	N	9.7	26.6	55.9
0.156000	31.2	9.000	Off	N	9.7	24.5	55.7
0.164000	28.4	9.000	Off	N	9.7	26.9	55.3
0.168000	29.1	9.000	Off	N	9.7	25.9	55.1
0.186000	27.5	9.000	Off	N	9.7	26.7	54.2
0.190000	26.9	9.000	Off	N	9.7	27.1	54.0
1.512000	15.5	9.000	Off	N	9.8	30.5	46.0
1.520000	14.3	9.000	Off	N	9.8	31.7	46.0
1.524000	15.8	9.000	Off	N	9.8	30.2	46.0
1.528000	15.8	9.000	Off	N	9.8	30.2	46.0
1.532000	15.5	9.000	Off	N	9.8	30.5	46.0
1.540000	14.6	9.000	Off	N	9.8	31.4	46.0
9.158000	16.9	9.000	Off	N	10.2	33.1	50.0
9.192000	17.3	9.000	Off	N	10.2	32.7	50.0
9.354000	16.7	9.000	Off	N	10.2	33.3	50.0
9.934000	16.2	9.000	Off	N	10.2	33.8	50.0
13.562000	46.1	9.000	Off	N	10.4	3.9	50.0
27.122000	34.4	9.000	Off	N	10.9	15.6	50.0

2018-03-19

오후 1:19:29

Conducted Emissions (Line 2)

EMI Auto Test(19)

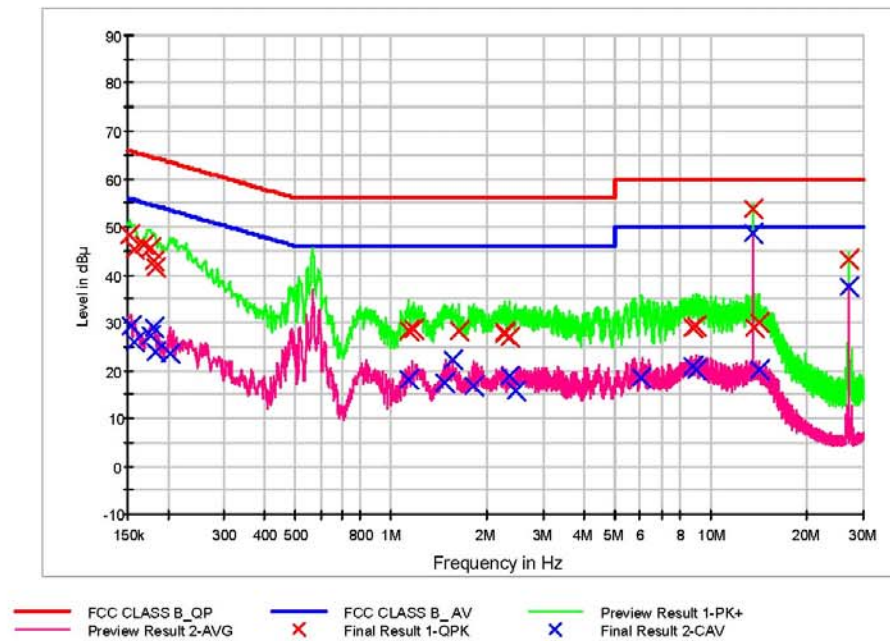
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HCT TEST Report

Common Information

EUT: LM-X410EC
 Manufacturer: LG
 Test Site: SHIELD ROOM
 Operating Conditions: NFC INTERMINATION MODE (Fast Charge)

FCC CLASS B_Exten Cable



Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.152000	48.4	9.000	Off	L1	9.7	17.5	65.9
0.158000	45.2	9.000	Off	L1	9.7	20.4	65.6
0.168000	46.2	9.000	Off	L1	9.7	18.9	65.1
0.176000	45.6	9.000	Off	L1	9.7	19.1	64.7
0.180000	42.7	9.000	Off	L1	9.7	21.8	64.5
0.184000	41.6	9.000	Off	L1	9.7	22.7	64.3
1.132000	28.2	9.000	Off	L1	9.8	27.8	56.0
1.176000	28.7	9.000	Off	L1	9.8	27.3	56.0
1.624000	28.4	9.000	Off	L1	9.8	27.6	56.0
2.258000	27.7	9.000	Off	L1	9.8	28.3	56.0
2.262000	28.1	9.000	Off	L1	9.8	27.9	56.0
2.334000	26.8	9.000	Off	L1	9.8	29.2	56.0
8.742000	29.1	9.000	Off	L1	10.1	30.9	60.0
8.970000	29.4	9.000	Off	L1	10.1	30.6	60.0
13.560000	53.8	9.000	Off	L1	10.2	6.2	60.0
13.642000	29.0	9.000	Off	L1	10.2	31.0	60.0
14.124000	30.0	9.000	Off	L1	10.2	30.0	60.0
27.120000	43.3	9.000	Off	L1	10.5	16.7	60.0

2018-03-19

오후 1:30:12

EMI Auto Test(19)

2 / 2

Final Result 2

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.154000	29.4	9.000	Off	L1	9.7	26.3	55.8
0.158000	26.0	9.000	Off	L1	9.7	29.5	55.6
0.176000	27.1	9.000	Off	L1	9.7	27.5	54.7
0.180000	29.0	9.000	Off	L1	9.7	25.4	54.5
0.184000	23.8	9.000	Off	L1	9.7	30.5	54.3
0.204000	23.7	9.000	Off	L1	9.7	29.8	53.4
1.136000	18.2	9.000	Off	L1	9.8	27.8	46.0
1.472000	17.5	9.000	Off	L1	9.8	28.5	46.0
1.550000	22.2	9.000	Off	L1	9.8	23.8	46.0
1.814000	16.9	9.000	Off	L1	9.8	29.1	46.0
2.334000	18.7	9.000	Off	L1	9.8	27.3	46.0
2.460000	15.9	9.000	Off	L1	9.8	30.1	46.0
6.060000	18.6	9.000	Off	L1	10.0	31.4	50.0
8.742000	20.7	9.000	Off	L1	10.1	29.3	50.0
8.970000	20.3	9.000	Off	L1	10.1	29.7	50.0
13.562000	48.6	9.000	Off	L1	10.2	1.4	50.0
14.124000	20.2	9.000	Off	L1	10.2	29.8	50.0
27.122000	37.4	9.000	Off	L1	10.5	12.6	50.0

2018-03-19

오후 1:30:12

Terminate the Antenna Conducted Emissions (Line 1)

EMI Auto Test(19)

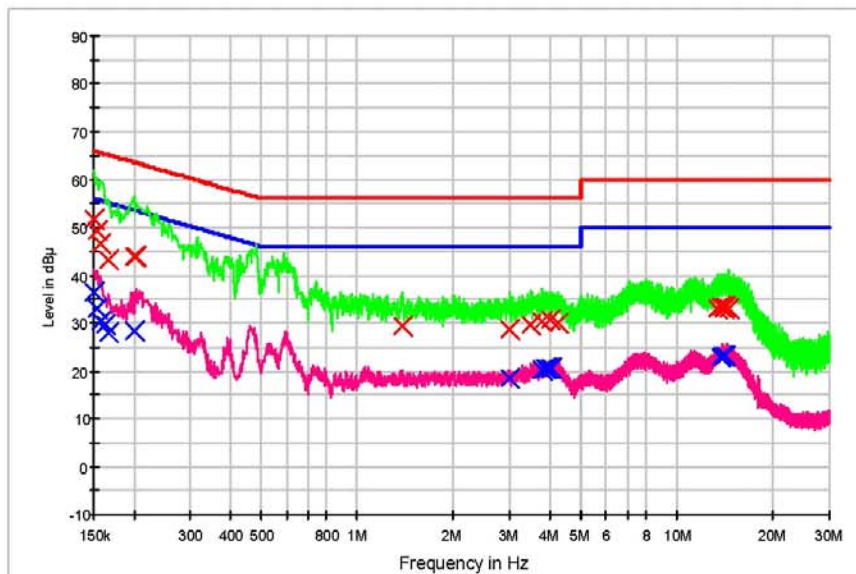
1 / 2

HCT TEST Report

Common Information

EUT: LM-X410EC
Manufacturer: LG
Test Site: SHIELD ROOM
Operating Conditions: NFC TERMINATION MODE (Fast Charge)

FCC CLASS B_Exten Cable



— FCC CLASS B_OP — FCC CLASS B_AV — Preview Result 1-PK+
— Preview Result 2-AVG — Final Result 1-QPK — Final Result 2-CAV

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	51.6	9.000	Off	N	9.7	14.4	66.0
0.154000	49.3	9.000	Off	N	9.7	16.5	65.8
0.158000	46.5	9.000	Off	N	9.7	19.1	65.6
0.166000	43.3	9.000	Off	N	9.7	21.9	65.2
0.200000	43.9	9.000	Off	N	9.7	19.7	63.6
0.204000	43.9	9.000	Off	N	9.7	19.5	63.4
1.392000	29.4	9.000	Off	N	9.8	26.6	56.0
3.002000	28.6	9.000	Off	N	9.9	27.4	56.0
3.506000	29.5	9.000	Off	N	9.9	26.5	56.0
3.794000	30.2	9.000	Off	N	9.9	25.8	56.0
3.992000	30.7	9.000	Off	N	9.9	25.4	56.0
4.248000	29.9	9.000	Off	N	10.0	26.1	56.0
13.436000	32.9	9.000	Off	N	10.4	27.1	60.0
13.624000	33.4	9.000	Off	N	10.4	26.6	60.0
13.990000	33.2	9.000	Off	N	10.4	26.8	60.0
14.020000	33.6	9.000	Off	N	10.4	26.4	60.0
14.224000	33.2	9.000	Off	N	10.4	26.8	60.0
14.612000	32.9	9.000	Off	N	10.5	27.1	60.0

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EMI Auto Test(19)

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Final Result 2

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	36.5	9.000	Off	N	9.7	19.5	56.0
0.154000	33.2	9.000	Off	N	9.7	22.6	55.8
0.158000	30.4	9.000	Off	N	9.7	25.2	55.6
0.162000	29.8	9.000	Off	N	9.7	25.6	55.4
0.166000	28.0	9.000	Off	N	9.7	27.2	55.2
0.200000	28.4	9.000	Off	N	9.7	25.3	53.6
3.002000	18.5	9.000	Off	N	9.9	27.5	46.0
3.794000	20.1	9.000	Off	N	9.9	25.9	46.0
3.896000	20.5	9.000	Off	N	9.9	25.5	46.0
3.900000	20.4	9.000	Off	N	9.9	25.6	46.0
3.992000	20.5	9.000	Off	N	9.9	25.5	46.0
4.070000	20.6	9.000	Off	N	9.9	25.4	46.0
13.624000	23.0	9.000	Off	N	10.4	27.0	50.0
13.800000	23.2	9.000	Off	N	10.4	26.8	50.0
13.990000	23.3	9.000	Off	N	10.4	26.7	50.0
14.020000	23.3	9.000	Off	N	10.4	26.7	50.0
14.224000	23.1	9.000	Off	N	10.4	26.9	50.0
14.258000	23.3	9.000	Off	N	10.4	26.7	50.0

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Conducted Emissions (Line 2)

EMI Auto Test(19)

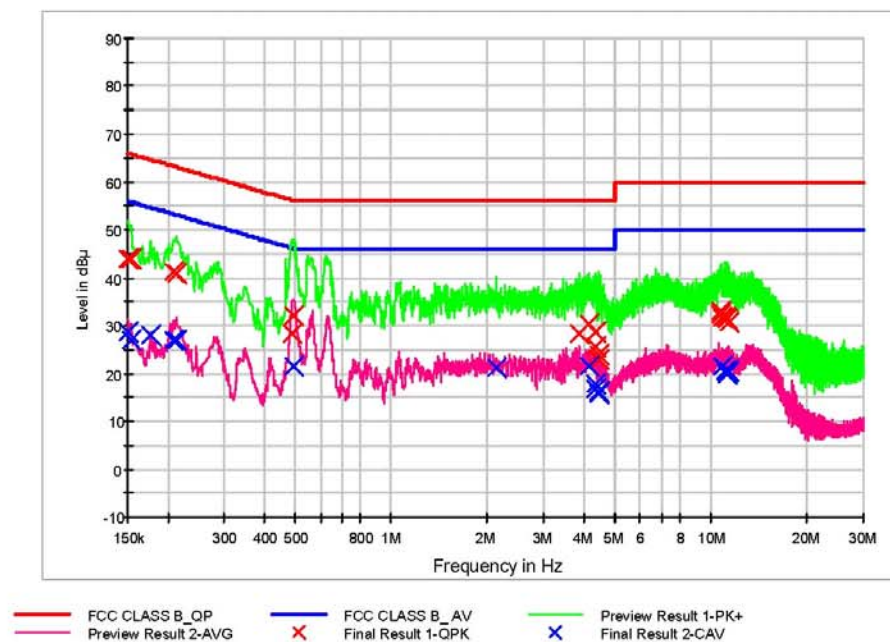
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HCT TEST Report

Common Information

EUT: LM-X410EC
 Manufacturer: LG
 Test Site: SHIELD ROOM
 Operating Conditions: NFC TERMINATION MODE (Fast Charge)

FCC CLASS B_Exten Cable



Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	44.0	9.000	Off	L1	9.7	22.0	66.0
0.154000	43.8	9.000	Off	L1	9.7	22.0	65.8
0.208000	41.0	9.000	Off	L1	9.7	22.3	63.3
0.212000	41.0	9.000	Off	L1	9.7	22.2	63.1
0.486000	28.4	9.000	Off	L1	9.7	27.8	56.2
0.496000	32.0	9.000	Off	L1	9.7	24.1	56.1
3.882000	28.4	9.000	Off	L1	9.9	27.6	56.0
4.174000	30.4	9.000	Off	L1	9.9	25.6	56.0
4.336000	28.8	9.000	Off	L1	9.9	27.2	56.0
4.358000	25.5	9.000	Off	L1	9.9	30.5	56.0
4.444000	22.9	9.000	Off	L1	10.0	33.1	56.0
4.448000	23.9	9.000	Off	L1	10.0	32.1	56.0
10.672000	32.5	9.000	Off	L1	10.2	27.6	60.0
10.752000	33.0	9.000	Off	L1	10.2	27.0	60.0
10.828000	31.7	9.000	Off	L1	10.2	28.3	60.0
11.116000	31.6	9.000	Off	L1	10.2	28.4	60.0
11.262000	31.2	9.000	Off	L1	10.2	28.8	60.0
11.388000	30.6	9.000	Off	L1	10.2	29.4	60.0

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EMI Auto Test(19)

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Final Result 2

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	28.7	9.000	Off	L1	9.7	27.3	56.0
0.154000	26.9	9.000	Off	L1	9.7	28.9	55.8
0.176000	28.1	9.000	Off	L1	9.7	26.6	54.7
0.208000	26.9	9.000	Off	L1	9.7	26.4	53.3
0.212000	26.9	9.000	Off	L1	9.7	26.3	53.1
0.494000	21.4	9.000	Off	L1	9.7	24.7	46.1
2.144000	21.2	9.000	Off	L1	9.8	24.8	46.0
4.154000	21.5	9.000	Off	L1	9.9	24.5	46.0
4.336000	17.9	9.000	Off	L1	9.9	28.1	46.0
4.352000	16.8	9.000	Off	L1	9.9	29.2	46.0
4.442000	15.9	9.000	Off	L1	10.0	30.1	46.0
4.448000	16.1	9.000	Off	L1	10.0	29.9	46.0
10.828000	21.4	9.000	Off	L1	10.2	28.6	50.0
11.116000	20.5	9.000	Off	L1	10.2	29.5	50.0
11.210000	20.2	9.000	Off	L1	10.2	29.8	50.0
11.262000	20.1	9.000	Off	L1	10.2	29.9	50.0
11.286000	19.8	9.000	Off	L1	10.2	30.2	50.0
11.388000	20.6	9.000	Off	L1	10.2	29.4	50.0

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13. LIST OF TEST EQUIPMENT

13.1 LIST OF TEST EQUIPMENT(Conducted Test)

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Rohde & Schwarz	ENV216 / LISN	12/20/2017	Annual	102245
Rohde & Schwarz	ESCI / Test Receiver	06/27/2017	Annual	100033
ESPAC	SU-642 /Temperature Chamber	03/31/2017	Annual	0093008124
Agilent	N9020A / Signal Analyzer	06/13/2017	Annual	MY51110085
Agilent	N9030A / Signal Analyzer	11/22/2017	Annual	MY49431210
Hewlett Packard	E3632A / DC Power Supply	06/30/2017	Annual	KR75303960
Agilent	8493C / Attenuator(10 dB)	07/10/2017	Annual	07560
Rohde & Schwarz	EMC32 / Software	N/A	N/A	N/A

13.2 LIST OF TEST EQUIPMENT(Radiated Test)

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Innco system	CO3000 / Controller(Antenna mast)	N/A	N/A	CO3000-4p
Innco system	MA4000-EP / Antenna Position Tower	N/A	N/A	N/A
Audix	EM1000 / Controller	N/A	N/A	060520
Audix	Turn Table	N/A	N/A	N/A
Rohde & Schwarz	Loop Antenna	04/19/2017	Biennial	1513-175
Schwarzbeck	VULB 9168 / Hybrid Antenna	04/06/2017	Biennial	760
Schwarzbeck	BBHA 9120D / Horn Antenna	05/02/2017	Biennial	9120D-937
Schwarzbeck	BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz)	12/04/2017	Biennial	BBHA9170541
Rohde & Schwarz	FSP(9 kHz ~ 30 GHz) / Spectrum Analyzer	09/06/2017	Annual	100688
Rohde & Schwarz	FSV40-N / Spectrum Analyzer	09/27/2017	Annual	101068-SZ
Wainwright Instruments	WHK3.0/18G-10EF / High Pass Filter	06/12/2017	Annual	8
Wainwright Instruments	WHFX7.0/18G-8SS / High Pass Filter	05/15/2017	Annual	29
Wainwright Instruments	WRCJV2400/2483.5-2370/2520-60/12SS / Band Reject Filter	06/30/2017	Annual	2
Wainwright Instruments	WRCJV5100/5850-40/50-8EEK / Band Reject Filter	01/03/2018	Annual	2
Api tech.	18B-03 / Attenuator (3 dB)	06/12/2017	Annual	1
Agilent	8493C-10 / Attenuator(10 dB)	07/19/2017	Annual	08285
CERNEX	CBLU1183540 / Power Amplifier	07/11/2017	Annual	22964
CERNEX	CBL06185030 / Power Amplifier	07/11/2017	Annual	22965
CERNEX	CBL18265035 / Power Amplifier	01/10/2018	Annual	22966
CERNEX	CBL26405040 / Power Amplifier	06/30/2017	Annual	25956