



FCC EVALUATION REPORT FOR CERTIFICATION

Manufacturer : LG Electronics Inc.

642, Jinpyeong-dong, Gumi-si,

Gyeongbuk, 730-360, Korea.

Attn: Mr. Sang-Wook Lee, Chief research engineer

Date of Issue : June 17, 2009

Order Number: GETEC-C1-09-143

Test Report Number: GETEC-E3-09-076

Test Site: Gumi College EMC Center

FCC Registration Number: (100749, 443957)

FCC ID.: BEJ32SL80UB

Applicant: LG Electronics Inc.

Rule Part(s)	: FCC Part 15 Subpart B
Equipment Class	: Class B computing device peripheral (JBP)
EUT Type	: LCD TV/Monitor
Type of Authority	: Certification
Model Name	: 32SL80-UB
Trade Name	: LG

This equipment has been shown to be in compliance 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 / Canadian standard ICES-003

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.

Tested by,

Reviewed by,

Jae-Hoon Jeong, Senior Engineer
GUMI College EMC center

Tae-Sig Park, Technical Manager
GUMI College EMC center



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Scope: Measurement and determination of electromagnetic emissions (EME) of radio frequency devices including intentional and / or unintentional radiators for compliance with technical rules and regulations of the Federal Communications Commission.

1. General Information

Applicant: LG Electronics Inc.

Applicant Address: 642, Jinpyeong-dong, Gumi-si, Gyeongbuk, Korea.

Manufacturer: LG Electronics Inc.

Manufacturer Address: 642, Jinpyeong-dong, Gumi-si, Gyeongbuk, Korea.

Contact Person: Mr. Sang -Wook Lee, Chief research engineer

Tel Number: +82-54-470-5430

- **FCC ID.** BEJ32SL80UB
- **EUT Type** LCD TV/Monitor
- **Model Name** 32SL80-UB
- **Trade Name** LG
- **Serial Number** Prototype
- **Rule Part(s)** FCC Part 15 Subpart B
- **Type of Authority** Certification
- **Test Procedure(s)** ANSI C63.4 (2003) / Canadian standard ICES-003
- **Dates of Test** June 12 ~ 13, 2009
- **Place of Test** **Gumi College EMC Center** (FCC Registration No.: 100749, 443957)
407, Bugok-dong, Gumi-si, Gyeongbuk, Korea.
- **Test Report Number** GETEC-E3-09-076
- **Dates of Issue** June 17, 2009



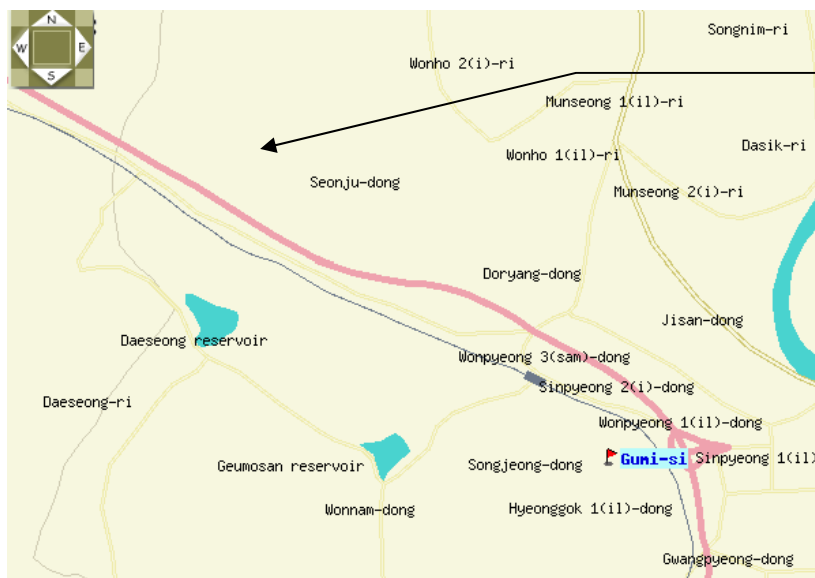
2. Introduction

The measurement procedure described in American National Standard for Methods of Measurement of Radio-Nose Emissions From Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (ASNI C63.4-2003) was used in determining radiated and conducted emissions emanating from **LG Electronics Inc. LCD TV/Monitor (Model Name: 32SL80-UB)**

These measurement tests were conducted at **Gumi College EMC Center**.

The site address is 407, Bugok-dong, Gumi-si, Gyeongbuk, Korea.

This test site is one of the highest point of Gumi 1 college at about 200 km away from Seoul city and 40 km away from Daegu city. It is located in the valley surrounded by mountains in all directions where ambient radio signal conditions are quiet and a favorable area to measure the radio frequency interference on open field test site for the computing and ISM devices manufactures. The detailed description of the measurement facility was found to be in compliance with the requirements of FCC §2.948 according to ANSI C63.4 (2003)



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Fig 1. The map above shows the Gumi College in vicinity area.



3. Product Information

3.1 Description of EUT

The Equipment under Test (EUT) is the **LG Electronics Inc. LCD TV/Monitor (Model Name: 32SL80-UB) FCC ID.: BEJ32SL80UB**

MODELS		32SL80 (32SL80-UB)	37SL80 (37SL80-UB)
Dimensions (Width x Height x Depth)	With stand	30.1 x 21.6 x 9.1 inches 764.8 x 549.0 x 230.0 mm	35.0 x 24.4 x 8.9 inches 887.6 x 618.6 x 224.8mm
	Without stand	30.1 x 19.3 x 2.0 inches 764.8 x 490.4 x 49.8 mm	35.0x 22.0 x 2.0 inches 887.6 x 559.8 x 49.8mm
Weight	With stand	14.0 lbs / 30.9 kg	16.5 kg / 36.4 lbs
	Without stand	11.2 lbs / 24.7 kg	14.8 kg / 32.6 lbs
Power requirement Television System Program Coverage External Antenna Impedance		AC100-240V ~ 50/60Hz NTSC-M, ATSC, 64 & 256 QAM VHF 2-13, UHF 14-69, CATV 1-135, DTV 2-69, CADTV 1-135 75 ohm	
Environment condition	Operating Temperature Operating Humidity	32 ~ 104°F (0 ~ 40°C) Less than 80%	
	Storage Temperature Storage Humidity	-4 ~ 140°F (-20 ~ 60°C) Less than 85%	
Maximum Frequency range:		200 MHz	



3.2 Support Equipment / Cables used

3.2.1 Used Support Equipment

Description	Manufacturer	Model Name	S/N & FCC ID
PC	Hewlett Packard	D530	S/N: CNG34800PY FCC ID: DoC
Video card	ATI	ATI RV360(9600)	S/N: SN0402017176 FCC ID: DoC
Key-board	COMPAQ	166516-AD6	S/N: B13BBOR391006D FCC ID: AQ6-23K15
PS2 mouse	LOGITECH	M-S69	S/N: 334684-108 FCC ID: JNZ211443
Joystick	Microsoft	X05-92626	S/N: 9262600296169 FCC ID: DoC
DVD player	LG Electronics Inc	LC-954	S/N: 3850R-Z674K FCC ID: DoC
Printer	Hewlett Packard	970CXI	S/N: MY9B01F1FG FCC ID: DoC
TV signal generator	FLUKE	54200	S/N: 831011 FCC ID: DoC
USB memory stick	SM Electronics	UDD-32M	S/N: N/A FCC ID: DoC

See “Appendix D– Test Setup Photographs” for actual system test set-up



3.2.2 Used Cable(s)

Cable Name	Condition	Description
Power cable	Connected to the EUT	1.8 m unshielded
RGB in (Analog)cable	Connected to the EUT and PC	1.8 m shielded with two ferrite cores
HDMI/DVI (Digital)cable	Connected to the EUT and PC	1.95 m shielded
PC sound cable	Connected to the EUT and PC	1.8 m shielded
Component cable	Connected to the EUT and DVD player	3.0 m shielded
Component sound cable	Connected to the EUT and DVD player	3.0 m shielded
AV input cable	Connected to the EUT and DVD player	1.8 m shielded
ANT cable	Connected to the EUT and TV signal generator	10.0 m shielded

3.3 Modification Item(s)

- None



4. Description of tests

4.1 Test Condition

The EUT was installed, arranged and operated in a manner that is most representative of equipment as typically used. The measurements were carried out while varying operating modes and cable positions within typically arrangement to determine maximum emission level.

The representative and worst test mode(s) were noted in the test report.

- Test Voltage / Frequency : AC 120 V / 60 Hz
- Test Mode(s)
 - . Monitor mode
 - . Radiated emission: 1 920 * 1 080 / 60 Hz (RGB: Analog), 1 920 * 1 080 / 60 Hz (HDMI/DVI: Digital)
 - . Conducted emission: 1 920 * 1 080 / 60 Hz (RGB: Analog), 1 920 * 1 080 / 60 Hz (HDMI/DVI: Digital)
1 024 * 768 / 60 Hz (RGB: Analog), 640 * 480 / 60 Hz (RGB: Analog)
 - . USB memory stick play mode: Continuous play mode of Picture file and 1 kHz audio file.
- Operating test pattern
 - . "H" character scrolling mode (Font size: 10)
 - . Black background white character
 - . Brightness and contrast was adjusted as maximum level
 - . 1 kHz sound tone with winamp player

"The verification report for TV/AV mode would be issued by LG Electronics Inc."



4.2 Conducted Emission

The Line conducted emission test facility is inside a 4 m × 8 m × 2.5 m shielded enclosure. (FCC Registration No.: 100749)

The EUT was placed on a non-conducting 1.0 m by 1.5 m table, which is 0.8 m in height and 0.4 m away from the vertical wall of the shielded enclosure.

The EUT is powered from the Rohde & Schwarz LISN (ESH2-Z5) and the support equipment is powered from the Rohde & Schwarz LISN (ESH3-Z5). Powers to the LISN are filtered by high-current high insertion loss power line filter.

Sufficient time for EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition.

The RF output of the LISN was connected to the EMI test receiver (Rohde & Schwarz, ESCS30).

The EMI test receiver was scanned from 150 kHz to 30 MHz with 20 ms sweep time to determine the frequency producing the maximum EME from the EUT. The frequency producing the maximum level was re-examined using Quasi-Peak mode of the EMI test receiver.

The bandwidth of Quasi-peak mode was set to 9 kHz. Each emission was maximized consistent with typical applications by varying the configuration of the test sample. Interface cables were connected to the available interface ports of the test unit. The effect of varying the position of cables was investigated to find the configuration that produces maximum diagram emission. Excess cable lengths were bundled at center with 30 cm ~ 40 cm.

Each EME reported was calibrated using the R/S signal generator

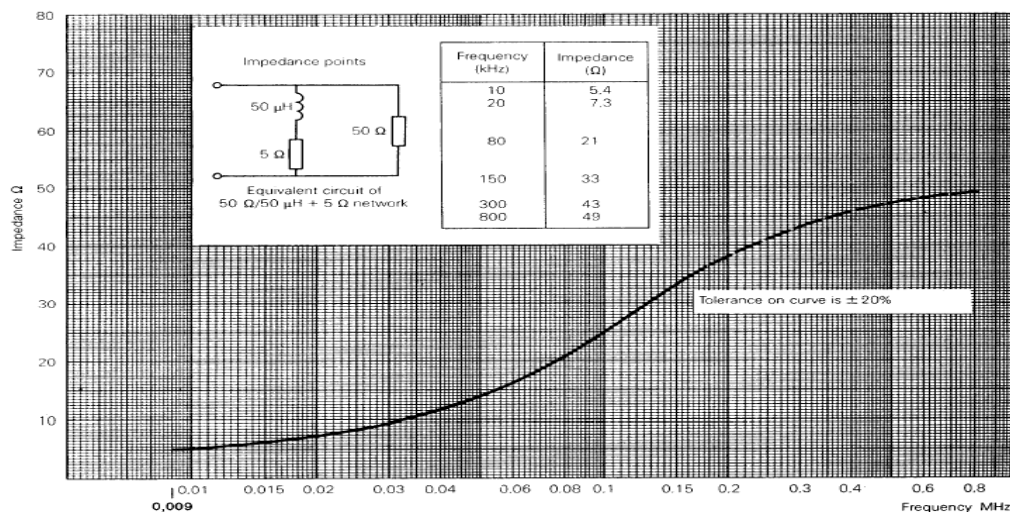


Fig 2. Impedance of LISN



4.3 Radiated Emission

The measurements were conducted 3 m anechoic chamber (FCC Registration No.: 443957) using broadband antennas to determine the frequency producing the maximum EME. Appropriate precaution was taken to ensure that all EME from the EUT were maximized and investigated. The technology configuration, mode of operation and turntable azimuth with respect to antenna was note for each frequency found.

The spectrum was scanned from 30 to 1000 MHz, using bicornical log antenna (Schwarzbeck, VULB9160).

Above 1 GHz, horn antenna (Schwarzbeck, BBHA9120D / EMCO 3160) was used.

Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition.

Each frequency found during pre-scan measurements was re-examined and investigated using EMI test receiver. The detector function was set to CISPR quasi-peak mode average mode and the bandwidth of the receiver was set to 120 kHz or 1MHz depending on the frequency or type of signal.

The EUT, support equipment and interconnecting cables were reconfigured to the setup producing the maximum emission for the frequency and were placed on top of a 0.8 m high non-metallic 1.0 m × 1.5 m table.

The turntable containing the test sample was rotated; the antenna height was varied 1 m to 4 m and stopped at the azimuth or height producing the maximum emission.

Each EME reported was calibrated using the R/S signal generator

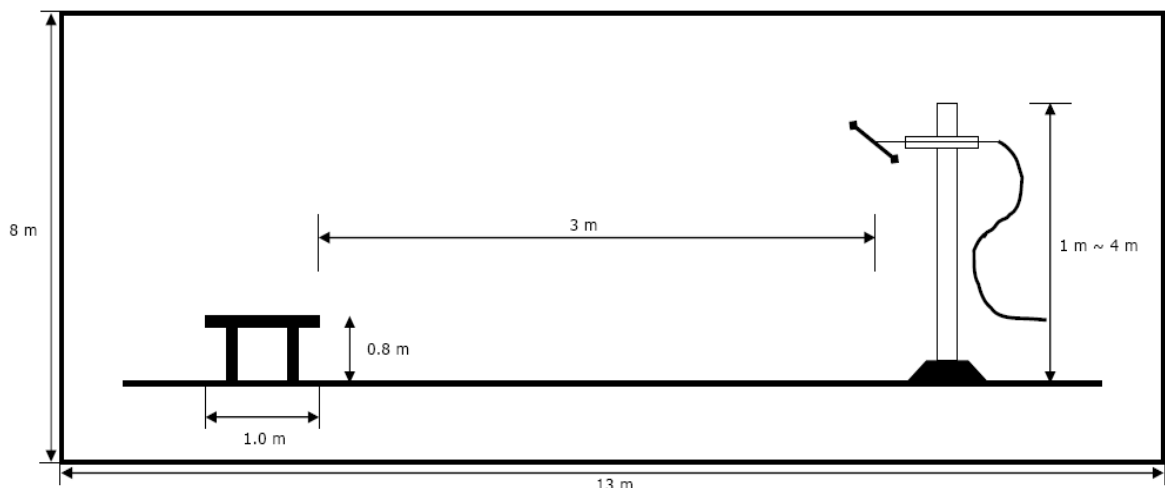


Fig 3. Dimensions of test site.



5. Conducted Emission

5.1 Operating Environment

Temperature : 24 °C
Relative Humidity : 34 % R.H.

5.2 Test Set-up

The conducted emission measurements were performed in the shielded room.

The EUT was placed on wooden table, 0.8 m heights above the floor, 0.4 m from the reference ground plane (GRP) wall and 0.8 m from AMN.

AMN is bonded on horizontal reference ground plane.

The ground plane, which was electrically bonded to the shield room, ground system and all power lines entering the shield room, were filtered.

5.3 Measurement Uncertainty

The measurement uncertainty was calculated in accordance with ISO "Guide to the expression of uncertainty in measurement."

The measurement uncertainty was given with a confidence of 95 %.

Test Items	Uncertainty	Remark
Conducted emission (9 kHz ~ 150 kHz)	± 2.97 dB	Confidence levels of 95 % (k=2)
Conducted emission (150 kHz ~ 30 MHz)	± 4.05 dB	Confidence levels of 95 % (k=2)



5.4 Limit

RFI Conducted	FCC Limit(dB) Class B	
Freq. Range	Quasi-Peak	Average
150 kHz ~ 0.5 MHz	66 ~ 56*	56 ~ 46*
0.5 MHz ~ 5 MHz	56	46
5 MHz ~ 30 MHz	60	50
*Limits decreases linearly with the logarithm of frequency.		

5.5 Test Equipment used

Model Name	Manufacturer	Description	Serial Number	Due to Calibration
■ - ESCS30	Rohde & Schwarz	EMI test receiver	839809/003	12. 13. 2009
■ - ESH3-Z5	Rohde & Schwarz	LISN	838979/020	12. 12. 2009
■ - ESH2-Z5	Rohde & Schwarz	LISN	829991/009	12. 12. 2009

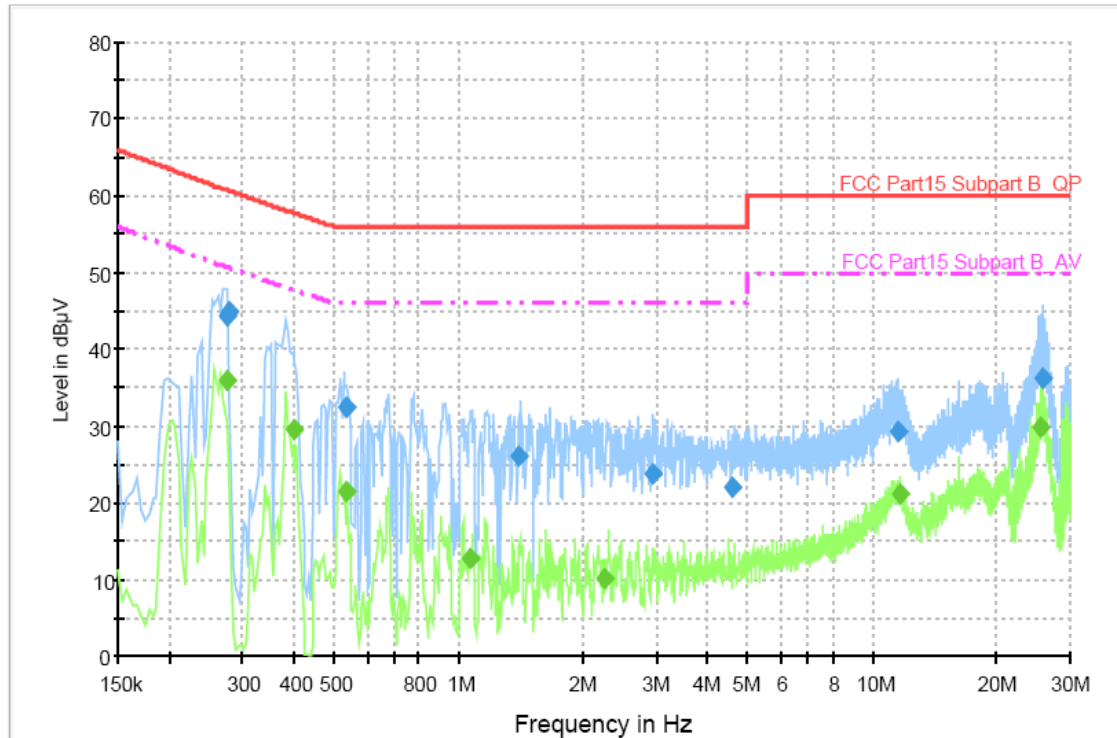
5.6 Test data for Conducted Emission

- . Test Date : June 13, 2009
- . Resolution Bandwidth : 9 kHz
- . Frequency Range : 0.15 MHz ~ 30 MHz



◆ Test resolution: 1 920 * 1 080 / 60 Hz (RGB: Analog mode)

Voltage with 4-Line-LISN_L1



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.275000	44.3	1000.000	9.000	GND	L1	10.0	16.5	60.8	
0.278500	45.0	1000.000	9.000	GND	L1	10.0	15.7	60.7	
0.534500	32.4	1000.000	9.000	GND	L1	10.0	23.6	56.0	
1.400000	26.0	1000.000	9.000	GND	L1	10.0	30.0	56.0	
2.942000	23.7	1000.000	9.000	GND	L1	10.1	32.3	56.0	
4.585500	22.1	1000.000	9.000	GND	L1	10.2	33.9	56.0	
11.544500	29.2	1000.000	9.000	GND	L1	10.4	30.8	60.0	
25.745000	36.2	1000.000	9.000	GND	L1	11.0	23.8	60.0	

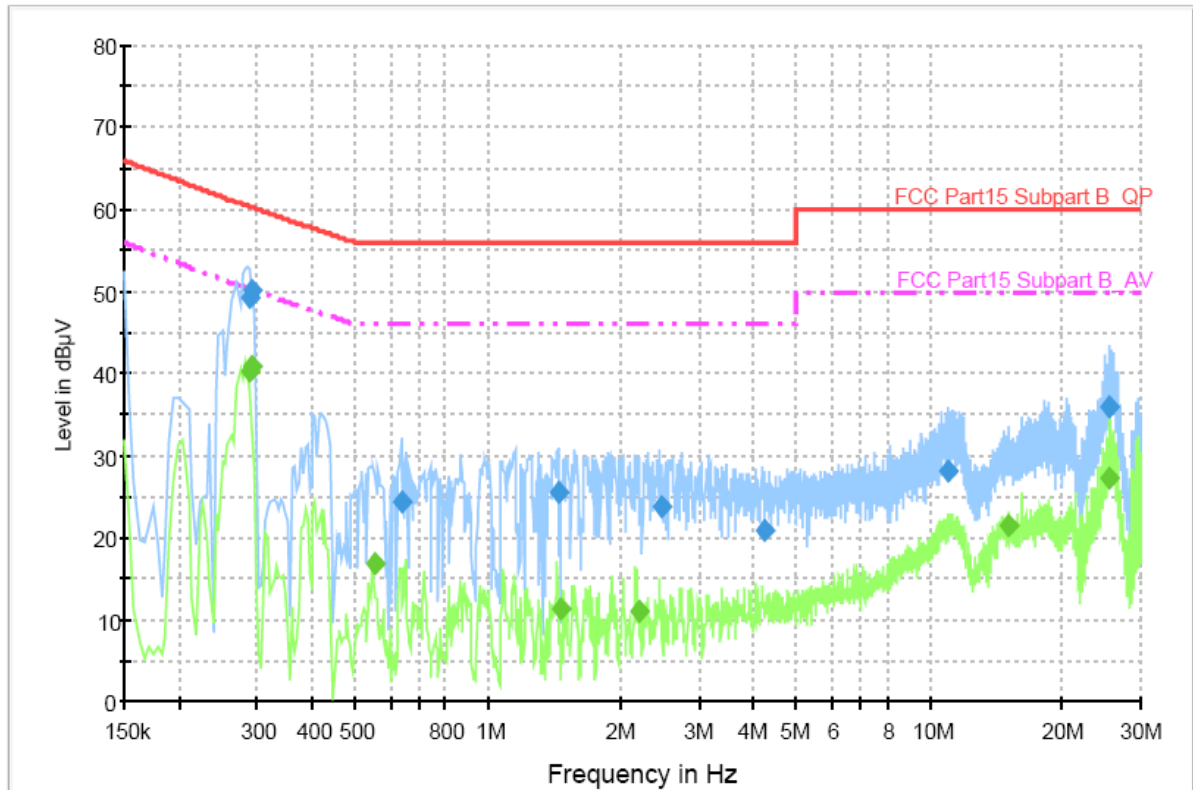
Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.275500	36.0	1000.000	9.000	GND	L1	10.0	14.7	50.7	
0.399500	29.6	1000.000	9.000	GND	L1	10.0	18.1	47.7	
0.533000	21.3	1000.000	9.000	GND	L1	10.0	24.7	46.0	
1.061500	12.6	1000.000	9.000	GND	L1	10.0	33.4	46.0	
2.248000	10.1	1000.000	9.000	GND	L1	10.1	35.9	46.0	
11.648500	21.2	1000.000	9.000	GND	L1	10.4	28.8	50.0	
25.573500	29.8	1000.000	9.000	GND	L1	11.0	20.2	50.0	

< Fig 4. Conducted emission result (Live line)>



Voltage with 4-Line-LISN_N



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.290000	49.4	1000.000	9.000	GND	N	10.0	10.9	60.3	
0.293000	50.0	1000.000	9.000	GND	N	10.0	10.2	60.2	
0.638000	24.4	1000.000	9.000	GND	N	10.0	31.6	56.0	
1.437000	25.6	1000.000	9.000	GND	N	10.1	30.4	56.0	
2.482000	23.7	1000.000	9.000	GND	N	10.1	32.3	56.0	
4.217500	20.7	1000.000	9.000	GND	N	10.2	35.3	56.0	
10.965000	28.2	1000.000	9.000	GND	N	10.3	31.8	60.0	
25.388500	36.0	1000.000	9.000	GND	N	10.8	24.0	60.0	

Final Measurement Detector 2

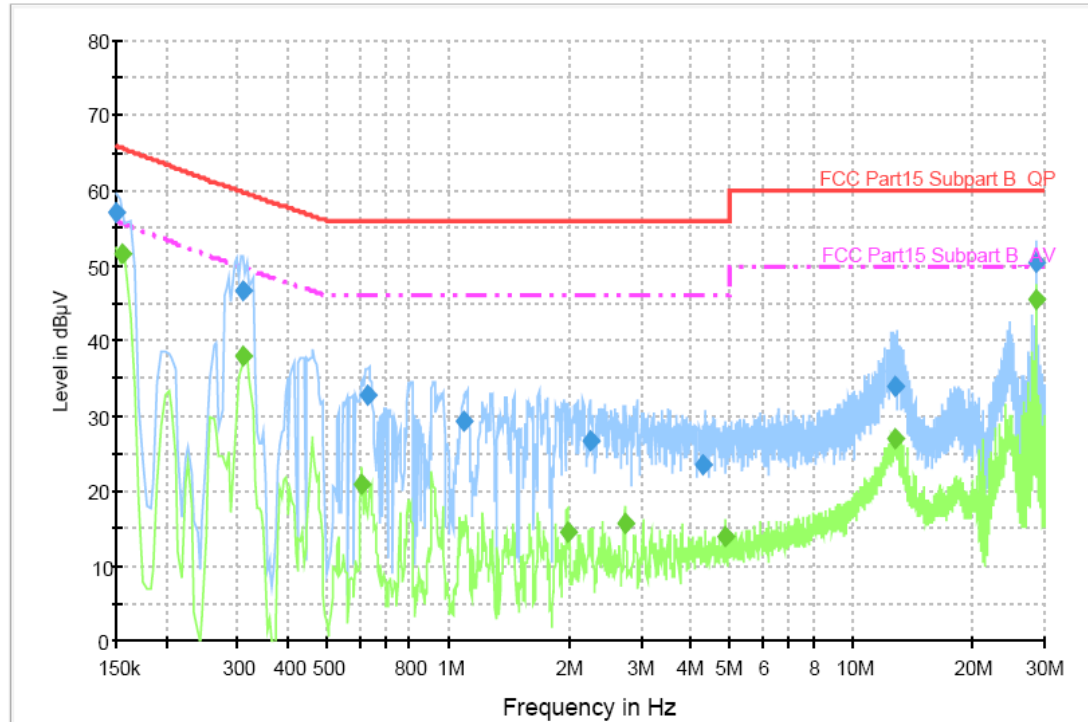
Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.288500	40.2	1000.000	9.000	GND	N	10.0	10.1	50.3	
0.290500	40.9	1000.000	9.000	GND	N	10.0	9.4	50.3	
0.554500	16.8	1000.000	9.000	GND	N	10.0	29.2	46.0	
1.456000	11.4	1000.000	9.000	GND	N	10.1	34.6	46.0	
2.186500	11.1	1000.000	9.000	GND	N	10.1	34.9	46.0	
15.086000	21.5	1000.000	9.000	GND	N	10.6	28.5	50.0	
25.616500	27.4	1000.000	9.000	GND	N	10.8	22.6	50.0	

< Fig 5. Conducted emission result (Neutral line)>



◆ Test resolution: 1 920 * 1 080 / 60 Hz (HDMI/DVI: Digital mode)

Voltage with 4-Line-LISN_L1



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.150000	57.0	1000.000	9.000	GND	L1	9.9	9.0	66.0	
0.310000	46.8	1000.000	9.000	GND	L1	10.0	13.0	59.8	
0.633500	32.9	1000.000	9.000	GND	L1	10.0	23.1	56.0	
1.092500	29.2	1000.000	9.000	GND	L1	10.0	26.8	56.0	
2.237500	26.7	1000.000	9.000	GND	L1	10.1	29.3	56.0	
4.280500	23.5	1000.000	9.000	GND	L1	10.2	32.5	56.0	
12.860500	33.9	1000.000	9.000	GND	L1	10.5	26.1	60.0	
28.665500	50.4	1000.000	9.000	GND	L1	11.1	9.6	60.0	

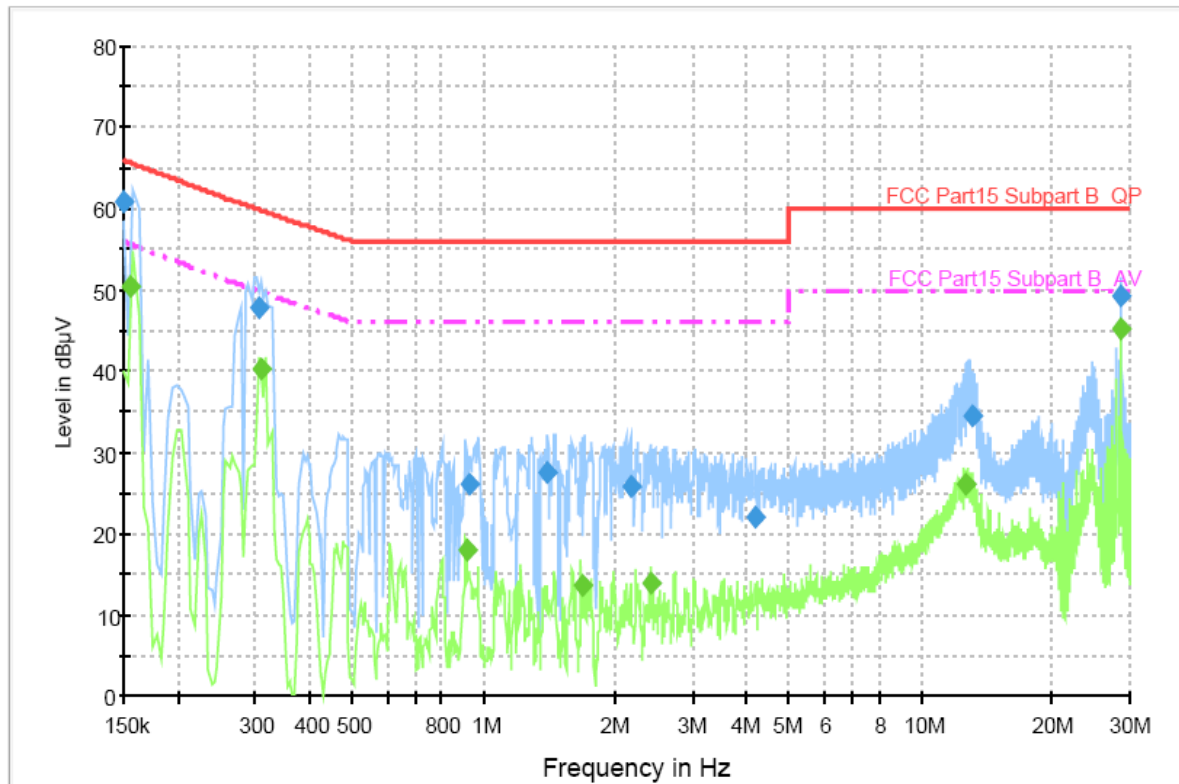
Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.154500	51.6	1000.000	9.000	GND	L1	9.9	4.1	55.7	
0.308500	37.9	1000.000	9.000	GND	L1	10.0	11.9	49.8	
0.609500	20.8	1000.000	9.000	GND	L1	10.0	25.2	46.0	
1.974000	14.4	1000.000	9.000	GND	L1	10.1	31.6	46.0	
2.729500	15.7	1000.000	9.000	GND	L1	10.1	30.3	46.0	
4.846000	14.0	1000.000	9.000	GND	L1	10.2	32.0	46.0	
12.734500	27.0	1000.000	9.000	GND	L1	10.5	23.0	50.0	
28.666000	45.6	1000.000	9.000	GND	L1	11.1	4.4	50.0	

< Fig 6. Conducted emission result (Live line)>



Voltage with 4-Line-LISN_N



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.150000	60.8	1000.000	9.000	GND	N	9.9	5.2	66.0	
0.306000	47.8	1000.000	9.000	GND	N	10.0	12.1	59.9	
0.928500	26.2	1000.000	9.000	GND	N	10.0	29.8	56.0	
1.397500	27.4	1000.000	9.000	GND	N	10.1	28.6	56.0	
2.166000	25.9	1000.000	9.000	GND	N	10.1	30.1	56.0	
4.195500	22.0	1000.000	9.000	GND	N	10.2	34.0	56.0	
13.027000	34.5	1000.000	9.000	GND	N	10.5	25.5	60.0	
28.665500	49.4	1000.000	9.000	GND	N	10.8	10.6	60.0	

Final Measurement Detector 2

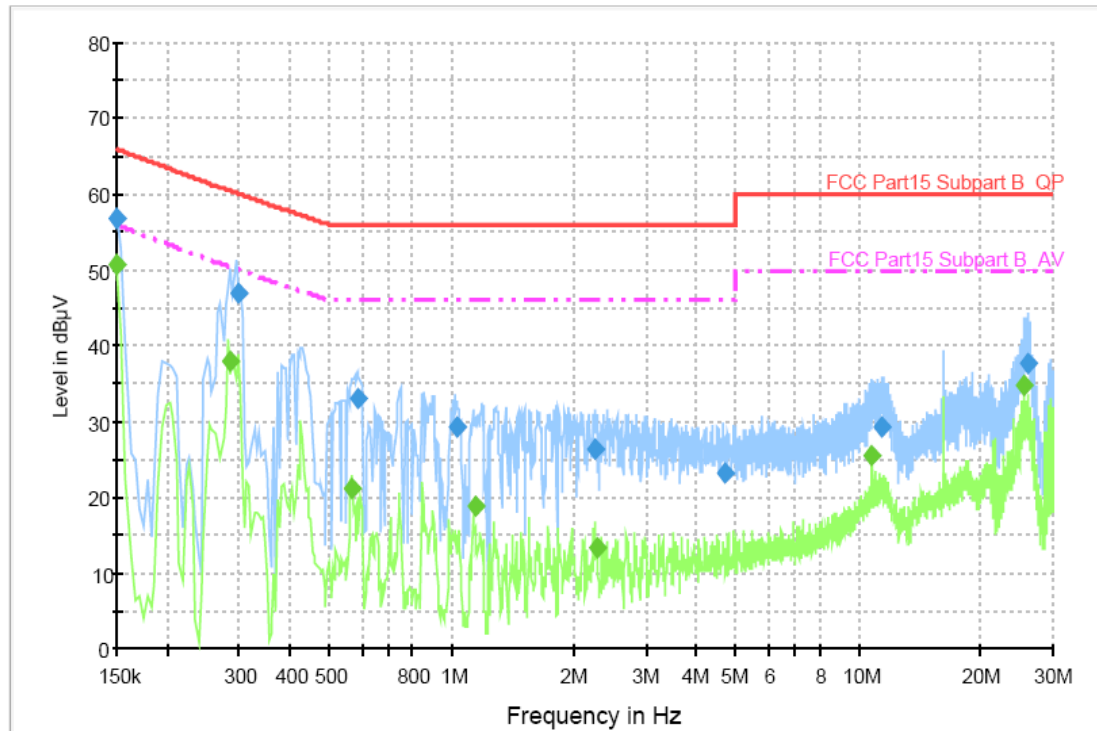
Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.154500	50.3	1000.000	9.000	GND	N	9.9	5.7	55.7	
0.308500	40.2	1000.000	9.000	GND	N	10.0	9.6	49.8	
0.914000	17.9	1000.000	9.000	GND	N	10.0	28.1	46.0	
1.670000	13.6	1000.000	9.000	GND	N	10.1	32.4	46.0	
2.426000	14.0	1000.000	9.000	GND	N	10.1	32.0	46.0	
12.578000	26.1	1000.000	9.000	GND	N	10.4	23.9	50.0	
28.666000	45.1	1000.000	9.000	GND	N	10.8	4.9	50.0	

< Fig 7. Conducted emission result (Neutral line)>



◆ Test resolution: 1 024 * 768 / 60 Hz (RGB: Analog mode)

Voltage with 4-Line-LISN_L1



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.150000	56.8	1000.000	9.000	GND	L1	9.9	9.2	66.0	
0.298000	46.8	1000.000	9.000	GND	L1	10.0	13.3	60.1	
0.586500	33.1	1000.000	9.000	GND	L1	10.0	22.9	56.0	
1.034000	29.2	1000.000	9.000	GND	L1	10.0	26.8	56.0	
2.259500	26.2	1000.000	9.000	GND	L1	10.1	29.8	56.0	
4.681000	23.2	1000.000	9.000	GND	L1	10.2	32.8	56.0	
11.422000	29.2	1000.000	9.000	GND	L1	10.4	30.8	60.0	
26.060000	37.7	1000.000	9.000	GND	L1	11.0	22.3	60.0	

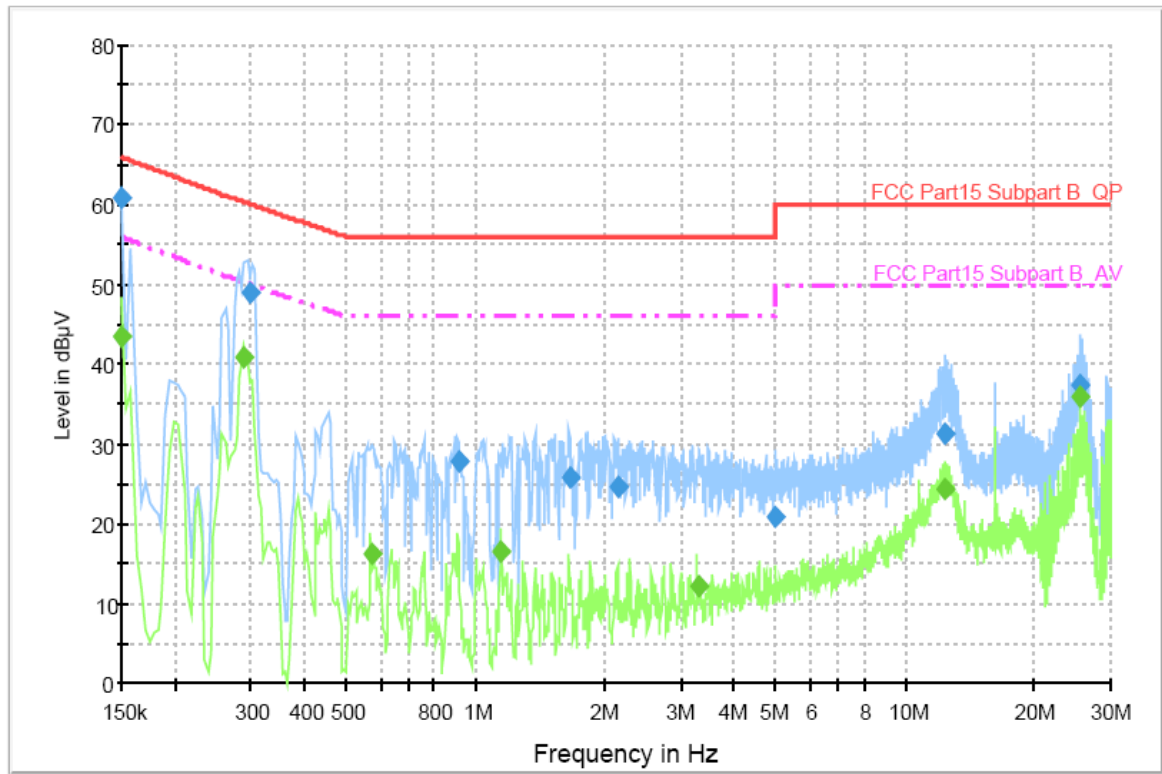
Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.150000	50.8	1000.000	9.000	GND	L1	9.9	5.2	56.0	
0.286000	38.0	1000.000	9.000	GND	L1	10.0	12.4	50.4	
0.569500	21.1	1000.000	9.000	GND	L1	10.0	24.9	46.0	
1.139000	19.0	1000.000	9.000	GND	L1	10.0	27.0	46.0	
2.268000	13.4	1000.000	9.000	GND	L1	10.1	32.6	46.0	
10.801500	25.6	1000.000	9.000	GND	L1	10.3	24.4	50.0	
25.376000	34.9	1000.000	9.000	GND	L1	11.0	15.1	50.0	

< Fig 8. Conducted emission result (Live line)>



Voltage with 4-Line-LISN_N



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.150000	60.9	1000.000	9.000	GND	N	9.9	5.1	66.0	
0.298000	49.1	1000.000	9.000	GND	N	10.0	11.0	60.1	
0.920000	27.9	1000.000	9.000	GND	N	10.0	28.1	56.0	
1.654000	25.7	1000.000	9.000	GND	N	10.1	30.3	56.0	
2.137000	24.7	1000.000	9.000	GND	N	10.1	31.3	56.0	
4.984500	21.0	1000.000	9.000	GND	N	10.2	35.0	56.0	
12.369500	31.4	1000.000	9.000	GND	N	10.4	28.6	60.0	
25.364000	37.3	1000.000	9.000	GND	N	10.8	22.7	60.0	

Final Measurement Detector 2

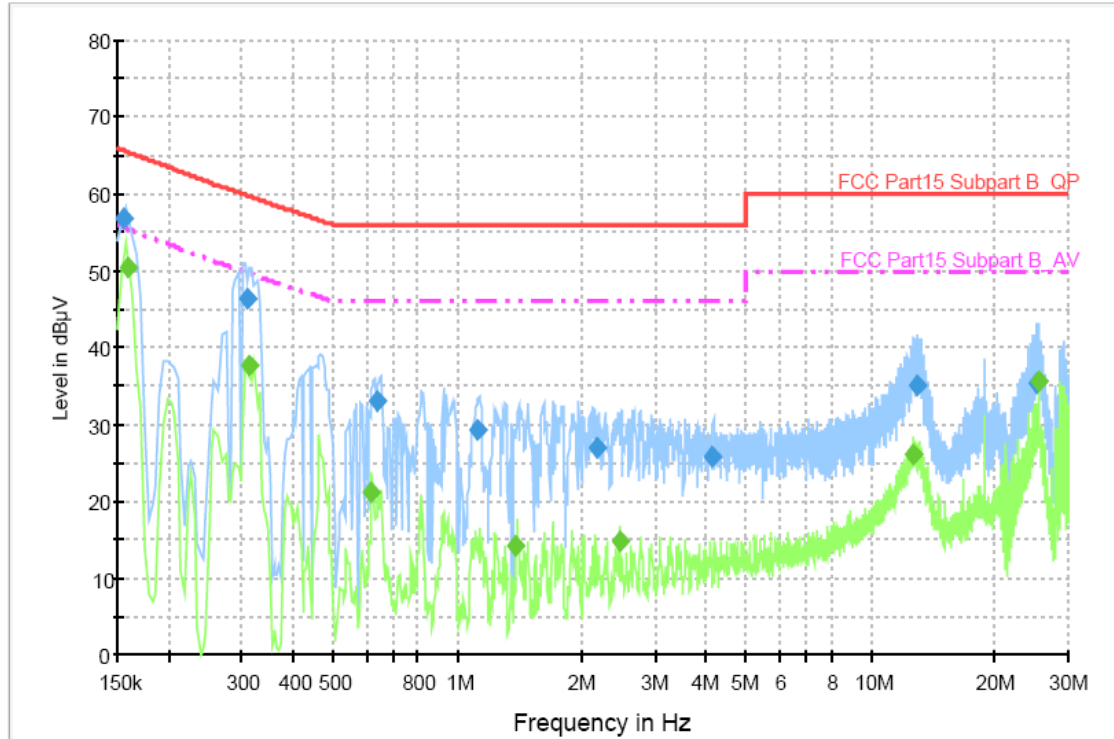
Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.150000	43.5	1000.000	9.000	GND	N	9.9	12.5	56.0	
0.289500	41.0	1000.000	9.000	GND	N	10.0	9.3	50.3	
0.574000	16.1	1000.000	9.000	GND	N	10.0	29.9	46.0	
1.146000	16.6	1000.000	9.000	GND	N	10.0	29.4	46.0	
3.291500	12.2	1000.000	9.000	GND	N	10.1	33.8	46.0	
12.428000	24.4	1000.000	9.000	GND	N	10.4	25.6	50.0	
25.369500	36.0	1000.000	9.000	GND	N	10.8	14.0	50.0	

< Fig 9. Conducted emission result (Neutral line)>



◆ Test resolution: 640 * 480 / 60 Hz (RGB: Analog mode)

Voltage with 4-Line-LISN_L1



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.154500	56.9	1000.000	9.000	GND	L1	9.9	8.8	65.7	
0.310000	46.5	1000.000	9.000	GND	L1	10.0	13.3	59.8	
0.636000	32.9	1000.000	9.000	GND	L1	10.0	23.1	56.0	
1.116500	29.4	1000.000	9.000	GND	L1	10.0	26.6	56.0	
2.180000	27.0	1000.000	9.000	GND	L1	10.1	29.0	56.0	
4.145000	25.7	1000.000	9.000	GND	L1	10.2	30.3	56.0	
12.893000	35.0	1000.000	9.000	GND	L1	10.5	25.0	60.0	
25.176500	35.4	1000.000	9.000	GND	L1	11.0	24.6	60.0	

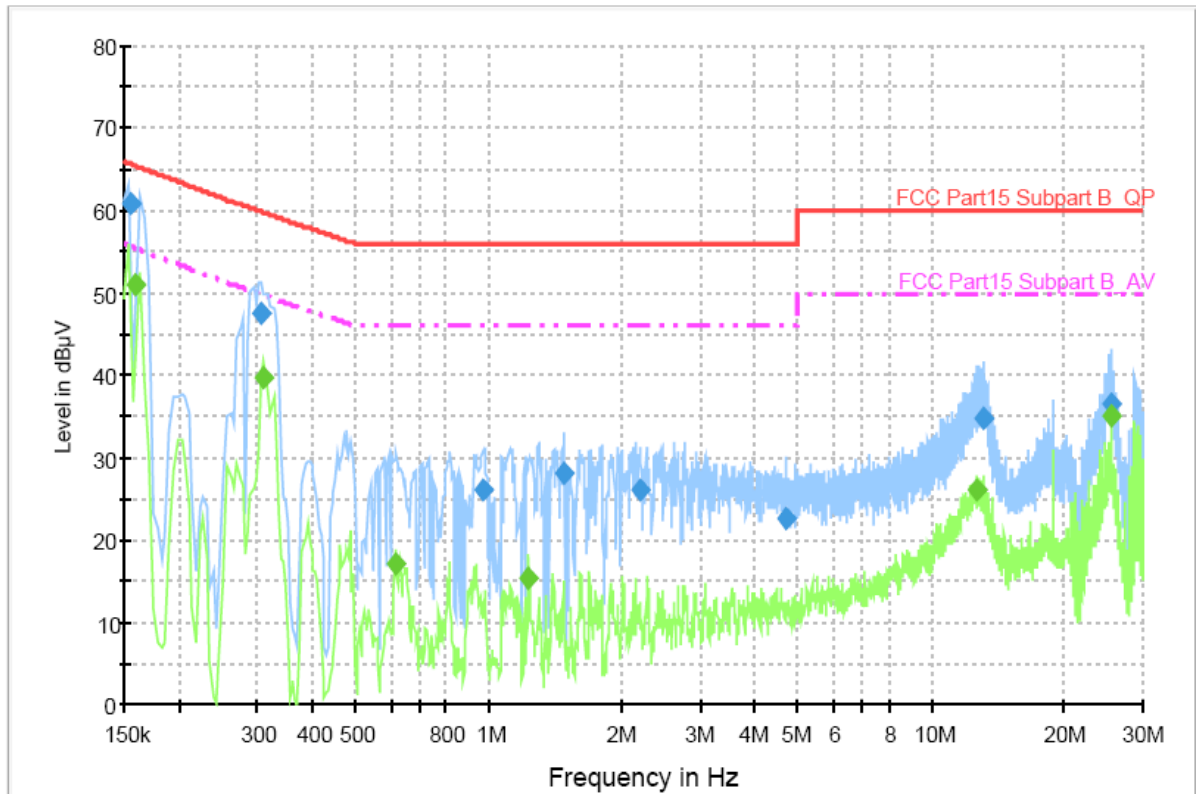
Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.159000	50.5	1000.000	9.000	GND	L1	9.9	5.0	55.5	
0.312500	37.8	1000.000	9.000	GND	L1	10.0	11.9	49.7	
0.617500	21.2	1000.000	9.000	GND	L1	10.0	24.8	46.0	
1.384500	14.3	1000.000	9.000	GND	L1	10.0	31.7	46.0	
2.457500	14.8	1000.000	9.000	GND	L1	10.1	31.2	46.0	
12.588000	26.1	1000.000	9.000	GND	L1	10.5	23.9	50.0	
25.373500	35.7	1000.000	9.000	GND	L1	11.0	14.3	50.0	

< Fig 10. Conducted emission result (Live line)>



Voltage with 4-Line-LISN_N



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.154500	60.9	1000.000	9.000	GND	N	9.9	4.8	65.7	
0.305500	47.5	1000.000	9.000	GND	N	10.0	12.5	59.9	
0.973000	26.2	1000.000	9.000	GND	N	10.0	29.8	56.0	
1.477500	28.2	1000.000	9.000	GND	N	10.1	27.8	56.0	
2.187000	26.2	1000.000	9.000	GND	N	10.1	29.8	56.0	
4.709500	22.5	1000.000	9.000	GND	N	10.2	33.5	56.0	
13.033000	34.7	1000.000	9.000	GND	N	10.5	25.3	60.0	
25.593000	36.5	1000.000	9.000	GND	N	10.8	23.5	60.0	

Final Measurement Detector 2

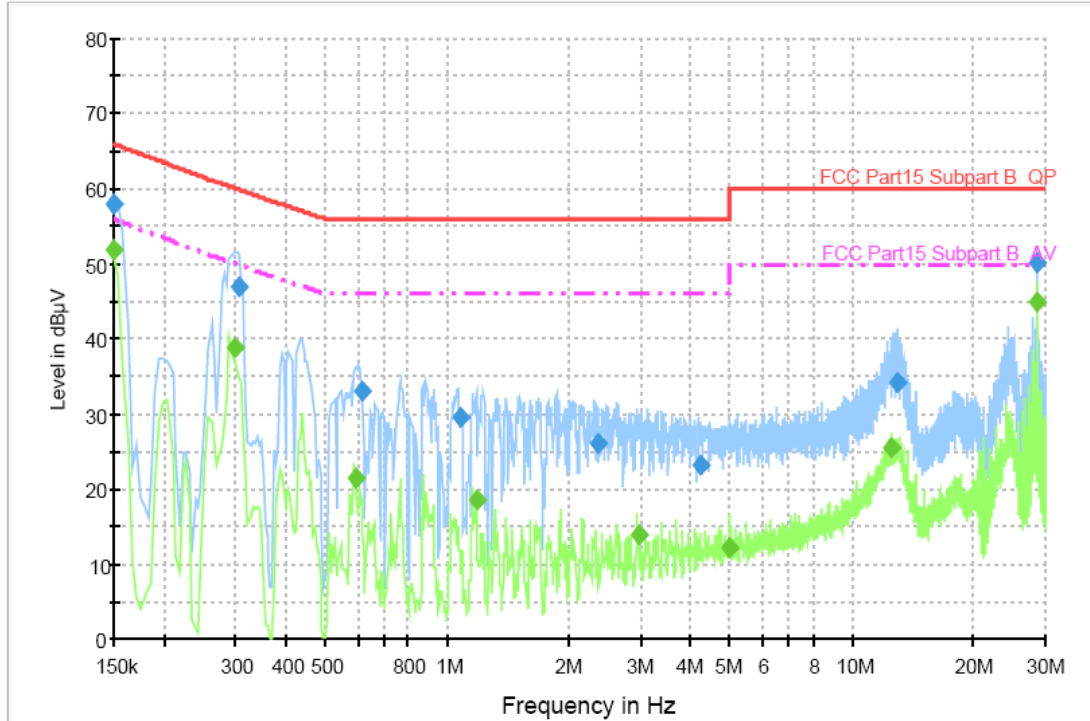
Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.159000	50.9	1000.000	9.000	GND	N	9.9	4.6	55.5	
0.309500	39.7	1000.000	9.000	GND	N	10.0	10.0	49.7	
0.618000	17.0	1000.000	9.000	GND	N	10.0	29.0	46.0	
1.229500	15.3	1000.000	9.000	GND	N	10.0	30.7	46.0	
12.584500	26.0	1000.000	9.000	GND	N	10.4	24.0	50.0	
25.369500	35.1	1000.000	9.000	GND	N	10.8	14.9	50.0	

< Fig 11. Conducted emission result (Neutral line)>



◆ Test resolution: USB play mode

Voltage with 4-Line-LISN_L1



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.150000	57.9	1000.000	9.000	GND	L1	9.9	8.1	66.0	
0.306000	47.1	1000.000	9.000	GND	L1	10.0	12.9	59.9	
0.615000	33.0	1000.000	9.000	GND	L1	10.0	23.0	56.0	
1.075000	29.5	1000.000	9.000	GND	L1	10.0	26.5	56.0	
2.354500	26.0	1000.000	9.000	GND	L1	10.1	30.0	56.0	
4.214500	23.2	1000.000	9.000	GND	L1	10.2	32.8	56.0	
12.967500	34.2	1000.000	9.000	GND	L1	10.5	25.8	60.0	
28.665500	50.1	1000.000	9.000	GND	L1	11.1	9.9	60.0	

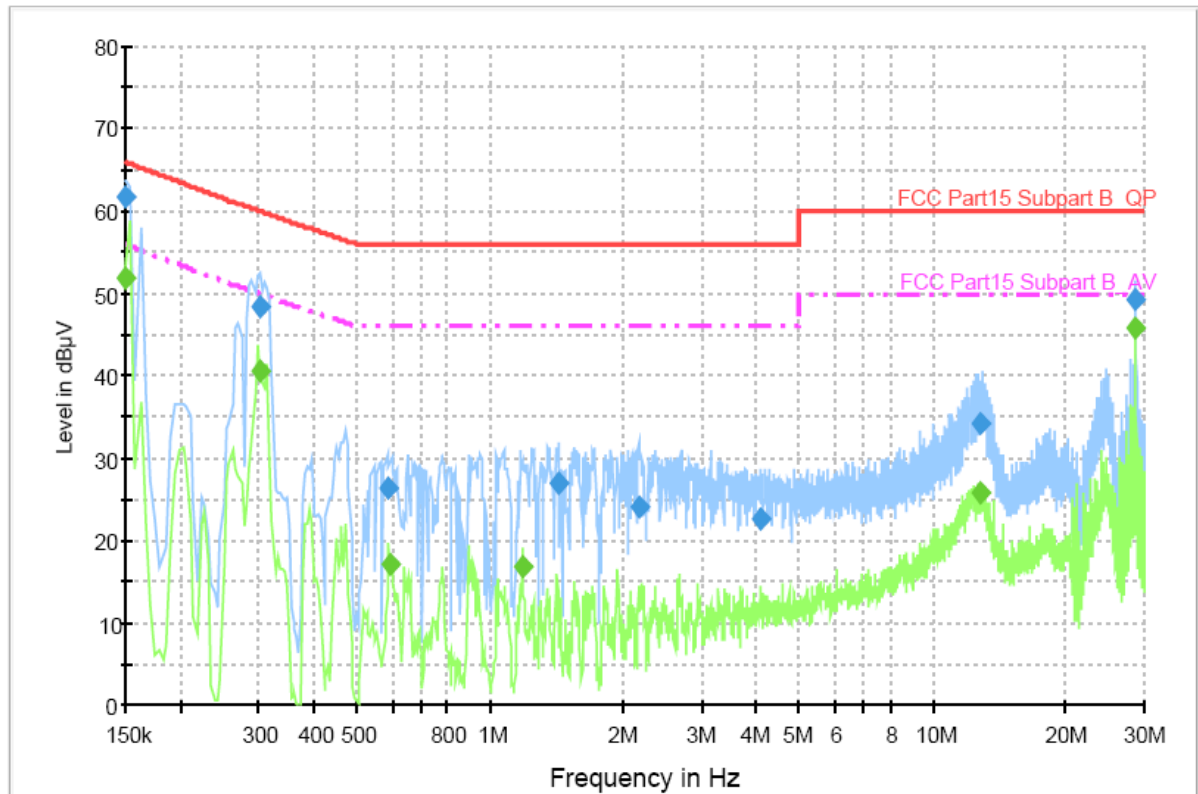
Final Measurement Detector 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.150000	51.8	1000.000	9.000	GND	L1	9.9	4.2	56.0	
0.298500	38.7	1000.000	9.000	GND	L1	10.0	11.3	50.0	
0.594500	21.5	1000.000	9.000	GND	L1	10.0	24.5	46.0	
1.184500	18.5	1000.000	9.000	GND	L1	10.0	27.5	46.0	
2.963000	14.0	1000.000	9.000	GND	L1	10.1	32.0	46.0	
4.993500	12.2	1000.000	9.000	GND	L1	10.2	33.8	46.0	
12.572500	25.6	1000.000	9.000	GND	L1	10.5	24.4	50.0	
28.665500	44.9	1000.000	9.000	GND	L1	11.1	5.1	50.0	

< Fig 12. Conducted emission result (Live line)>



Voltage with 4-Line-LISN_N



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.150000	61.6	1000.000	9.000	GND	N	9.9	4.4	66.0	
0.301500	48.4	1000.000	9.000	GND	N	10.0	11.6	60.0	
0.590000	26.5	1000.000	9.000	GND	N	10.0	29.5	56.0	
1.425500	27.1	1000.000	9.000	GND	N	10.1	28.9	56.0	
2.161500	24.1	1000.000	9.000	GND	N	10.1	31.9	56.0	
4.071500	22.7	1000.000	9.000	GND	N	10.2	33.3	56.0	
12.850000	34.2	1000.000	9.000	GND	N	10.4	25.8	60.0	
28.665500	49.3	1000.000	9.000	GND	N	10.8	10.7	60.0	

Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.150000	51.9	1000.000	9.000	GND	N	9.9	4.1	56.0	
0.302000	40.7	1000.000	9.000	GND	N	10.0	9.2	49.9	
0.594000	17.1	1000.000	9.000	GND	N	10.0	28.9	46.0	
1.186000	16.8	1000.000	9.000	GND	N	10.0	29.2	46.0	
12.728000	25.8	1000.000	9.000	GND	N	10.4	24.2	50.0	
28.665500	45.7	1000.000	9.000	GND	N	10.8	4.3	50.0	

< Fig 13. Conducted emission result (Neutral line)>



6. Radiated Emission

6.1 Operating Environment

Temperature : 20 °C
Relative Humidity : 46 % R.H.

6.2 Test Set-up

A preliminary and final measurement was at 3 m Anechoic chamber.

The EUT was placed on a non-conductive turntable approximately 0.8 m above the ground plane.

The turntable with EUT was rotated 360°, and the antenna was varied in height between 1.0 m and 4.0 m in order to determine the maximum emission levels.

This procedure was performed for both horizontal and vertical polarization of the receiving antenna.

6.3 Measurement Uncertainty

The measurement uncertainty was calculated in accordance with ISO “Guide to the expression of uncertainty in measurement”.

The measurement uncertainty was given with a confidence of 95 %.

Test Items	Uncertainty	Remark
Radiated emission (30 MHz ~ 300 MHz, 3 m, Vertical)	± 3.54 dB	Confidence levels of 95 % (k=2)
Radiated emission (30 MHz ~ 300 MHz, 3 m, Horizontal)	± 3.49 dB	Confidence levels of 95 % (k=2)
Radiated emission (300 MHz ~ 1 000 MHz, 3 m, Vertical)	± 3.85 dB	Confidence levels of 95 % (k=2)
Radiated emission (300 MHz ~ 1 000 MHz, 3 m, Horizontal)	± 3.76 dB	Confidence levels of 95 % (k=2)
Radiated emission (30 MHz ~ 300 MHz, 10 m, Vertical)	± 3.21 dB	Confidence levels of 95 % (k=2)
Radiated emission (30 MHz ~ 300 MHz, 10 m, Horizontal)	± 3.32 dB	Confidence levels of 95 % (k=2)
Radiated emission (300 MHz ~ 1 000 MHz, 10 m, Vertical)	± 3.77 dB	Confidence levels of 95 % (k=2)
Radiated emission (300 MHz ~ 1 000 MHz, 10 m, Horizontal)	± 3.84 dB	Confidence levels of 95 % (k=2)



6.4 Limit

Frequency (MHz)	FCC Limit @ 3 m. dB μ V/m	CISPR Limit @ 10 m. dB μ V/m
30 ~ 88	40.0	30.0
88 ~ 216	43.5	30.0
216 ~ 230	46.0	30.0
230 ~ 960	46.0	37.0
960 ~ 1 000	54.0	37.0
> 1 000	54.0	No Specified limit

6.5 Test Equipment used

Model Name	Manufacturer	Description	Serial Number	Due to Calibration
■ - ESI	Rohde & Schwarz	EMI test receiver	830482/010	12. 14. 2009
■ - VULB9160	Schwarzbeck	Broadband Test ANT	3193	12. 11. 2009
■ - BBHA9120D	Schwarzbeck	Horn ANT	207	12. 26. 2009
■ - MCU066	Maturo GmbH	Position Controller	1390306	N/A
■ - AM 4.0	Maturo GmbH	Antenna Mast	1390308	N/A
■ - TT2.5SI	Maturo GmbH	Turntable	1390307	N/A
■ - AFS 44 00101800- 25-10P-44	MITEQ	Preamplifier	1258943	11. 11. 2009

6.6 Test data for Radiated Emission

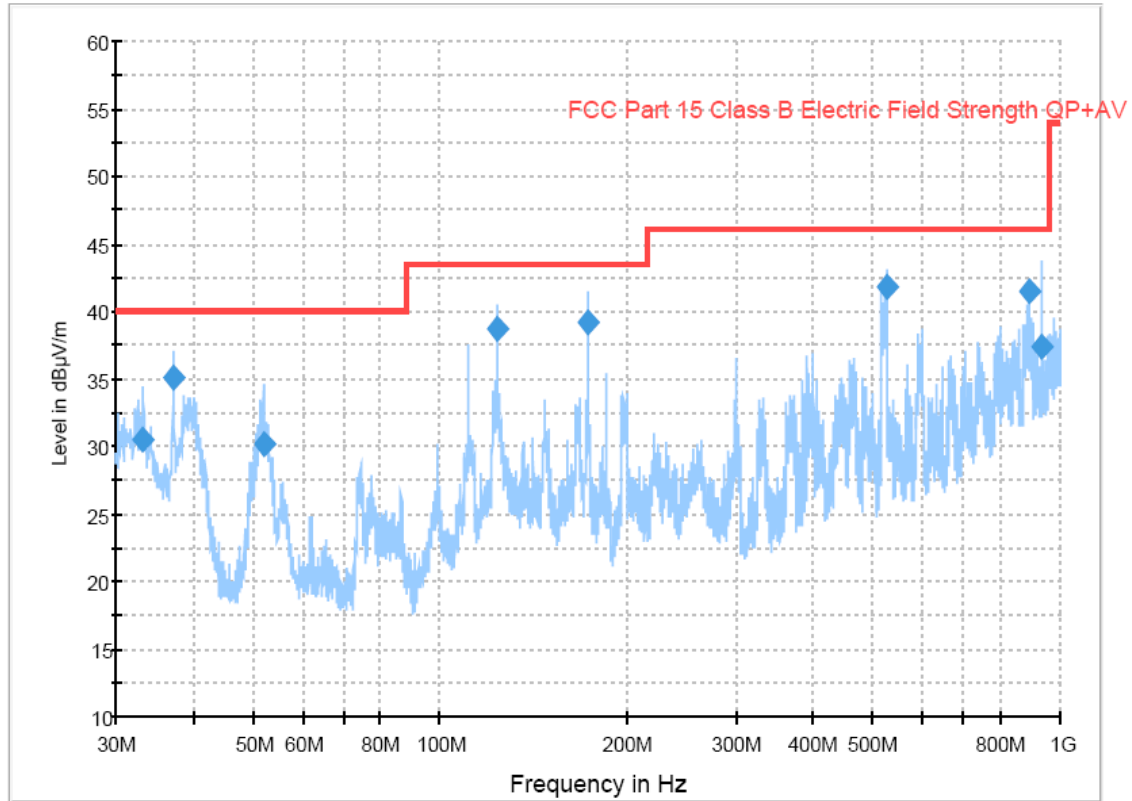
-. Test Date : June 13, 2009
-. Resolution Bandwidth : 120 kHz/ 1 MHz
-. Frequency Range : 30 MHz ~ 2 000 MHz
-. Measurement Distance : 3 m



◆ Operating Condition: 1 920 * 1 080 / 60 Hz (RGB: Analog mode)

Detector mode: Quasi- peak detector mode

FCC_ESIB_Direct_RE with Scans



Final Result 1

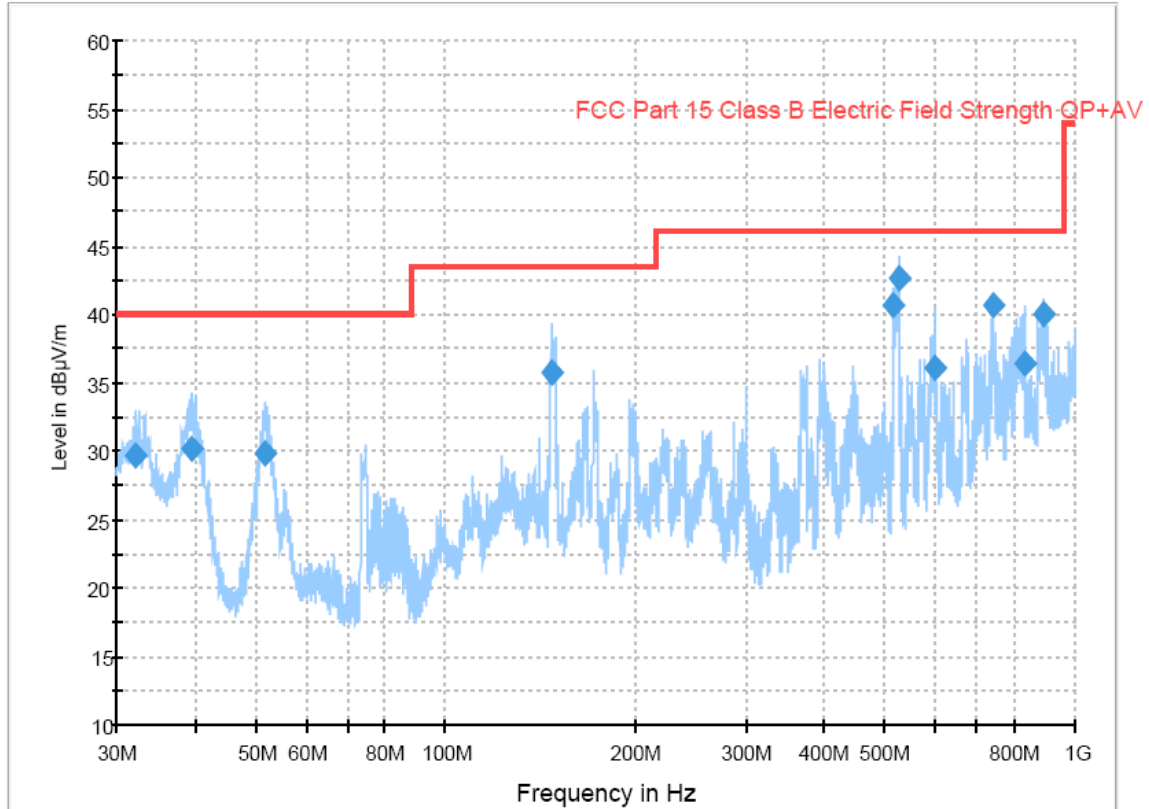
Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
33.080000	30.5	1000.0	120.000	100.0	V	291.0	12.0	9.5	40.0
37.120000	35.1	1000.0	120.000	100.0	V	-4.0	12.3	4.9	40.0
51.880000	30.1	1000.0	120.000	100.0	V	305.0	13.6	9.9	40.0
123.720000	38.7	1000.0	120.000	100.0	V	315.0	13.2	4.8	43.5
173.240000	39.1	1000.0	120.000	150.0	H	273.0	13.8	4.4	43.5
524.200000	41.8	1000.0	120.000	100.0	V	194.0	21.0	4.2	46.0
891.000000	41.5	1000.0	120.000	191.0	H	233.0	27.8	4.5	46.0
931.640000	37.4	1000.0	120.000	135.0	H	243.0	28.5	8.6	46.0

< Fig 14. Radiated emission result (30 MHz ~ 1 000 MHz)>



- ◆ Operating Condition: 1 920 * 1 080 / 60 Hz (HDMI/DVI: Digital mode)
Detector mode: Quasi- peak detector mode

FCC_ESIB_Direct_RE with Scans



Final Result 1

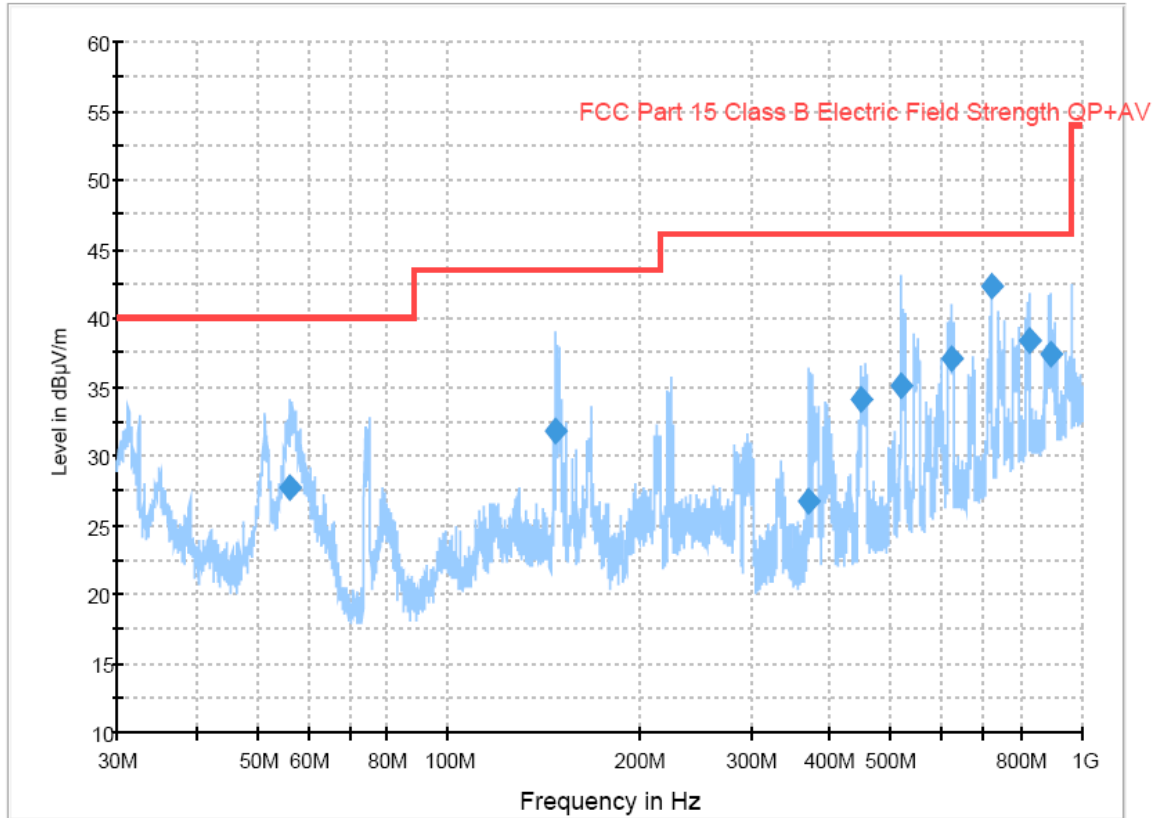
Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
32.240000	29.7	1000.0	120.000	100.0	V	-39.0	12.0	10.3	40.0
39.400000	30.1	1000.0	120.000	100.0	V	57.0	12.6	9.9	40.0
51.800000	29.9	1000.0	120.000	100.0	V	310.0	13.6	10.1	40.0
147.080000	35.7	1000.0	120.000	100.0	V	6.0	14.7	7.8	43.5
514.440000	40.7	1000.0	120.000	100.0	V	203.0	20.8	5.3	46.0
524.200000	42.7	1000.0	120.000	100.0	V	192.0	21.0	3.3	46.0
600.040000	36.0	1000.0	120.000	114.0	H	196.0	23.4	10.0	46.0
742.480000	40.6	1000.0	120.000	147.0	H	177.0	26.0	5.4	46.0
830.480000	36.4	1000.0	120.000	100.0	V	178.0	27.2	9.6	46.0
891.000000	40.1	1000.0	120.000	100.0	V	2.0	27.8	6.0	46.0

< Fig 15. Radiated emission result (30 MHz ~ 1 000 MHz)>



- ◆ Operating Condition: USB play mode
Detector mode: Quasi- peak detector mode

FCC_ESIB_Direct_RE with Scans



Final Result 1

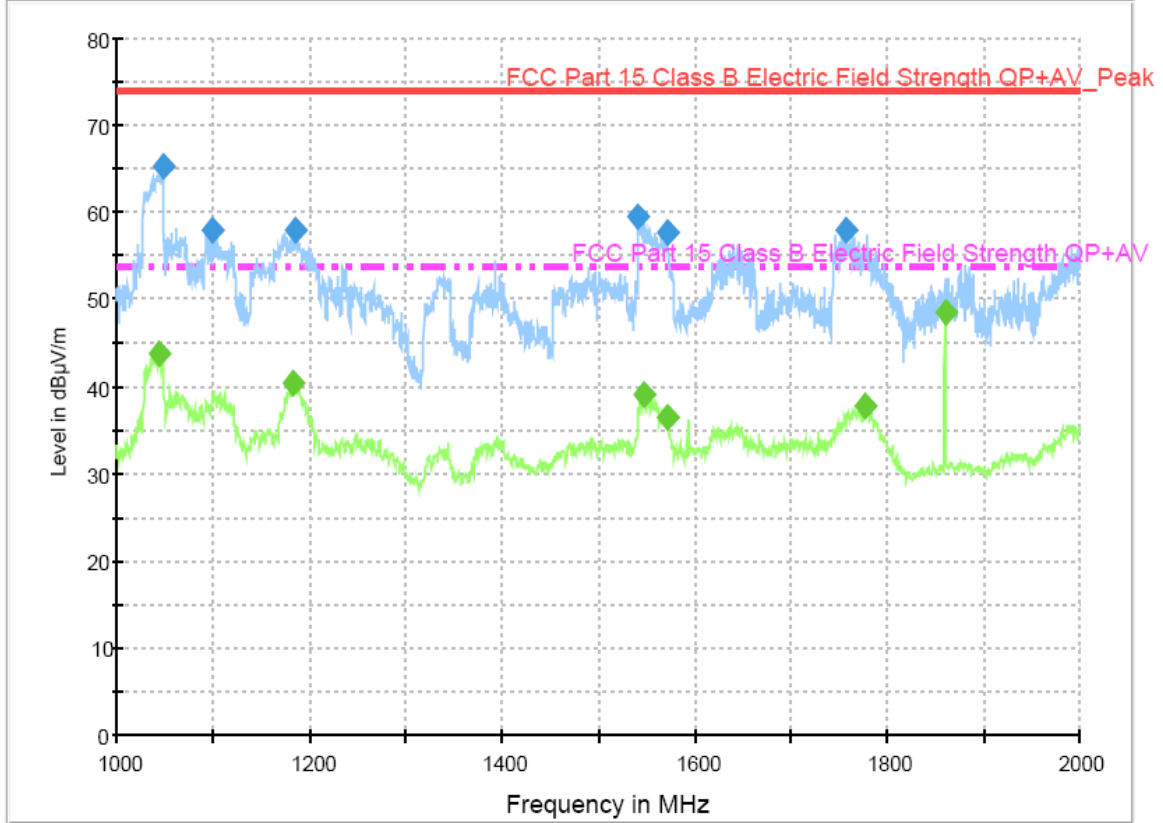
Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
56.240000	27.7	1000.0	120.000	100.0	V	203.0	13.2	12.3	40.0
147.640000	31.8	1000.0	120.000	100.0	V	13.0	14.7	11.7	43.5
368.680000	26.8	1000.0	120.000	114.0	V	180.0	17.4	19.2	46.0
448.200000	34.1	1000.0	120.000	150.0	H	217.0	19.8	11.9	46.0
516.160000	35.1	1000.0	120.000	100.0	V	201.0	20.8	10.9	46.0
624.160000	37.1	1000.0	120.000	111.0	H	182.0	23.6	8.9	46.0
720.000000	42.3	1000.0	120.000	100.0	H	189.0	25.3	3.7	46.0
827.040000	38.4	1000.0	120.000	158.0	V	219.0	27.1	7.6	46.0
893.920000	37.3	1000.0	120.000	153.0	V	225.0	27.8	8.7	46.0

< Fig 16. Radiated emission result (30 MHz ~ 1 000 MHz)>



- ◆ Operating Condition: 1 920 * 1 080 / 60 Hz (RGB: Analog mode)
Detector mode: Peak detector mode / Average detector mode

FCC_ESIB_Preampl_RE with Scans



Final Result 1

Frequency (MHz)	MaxPeak-MaxHold (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
1048.000000	65.2	100.0	V	180.0	-15.7	8.7	73.9	
1100.000000	57.9	100.0	V	180.0	-15.4	16.0	73.9	
1184.400000	58.0	100.0	V	180.0	-15.3	15.9	73.9	
1541.600000	59.6	100.0	V	180.0	-14.0	14.3	73.9	
1572.400000	57.7	150.0	H	180.0	-13.8	16.2	73.9	
1756.800000	58.0	150.0	V	180.0	-13.3	15.9	73.9	

Final Result 2

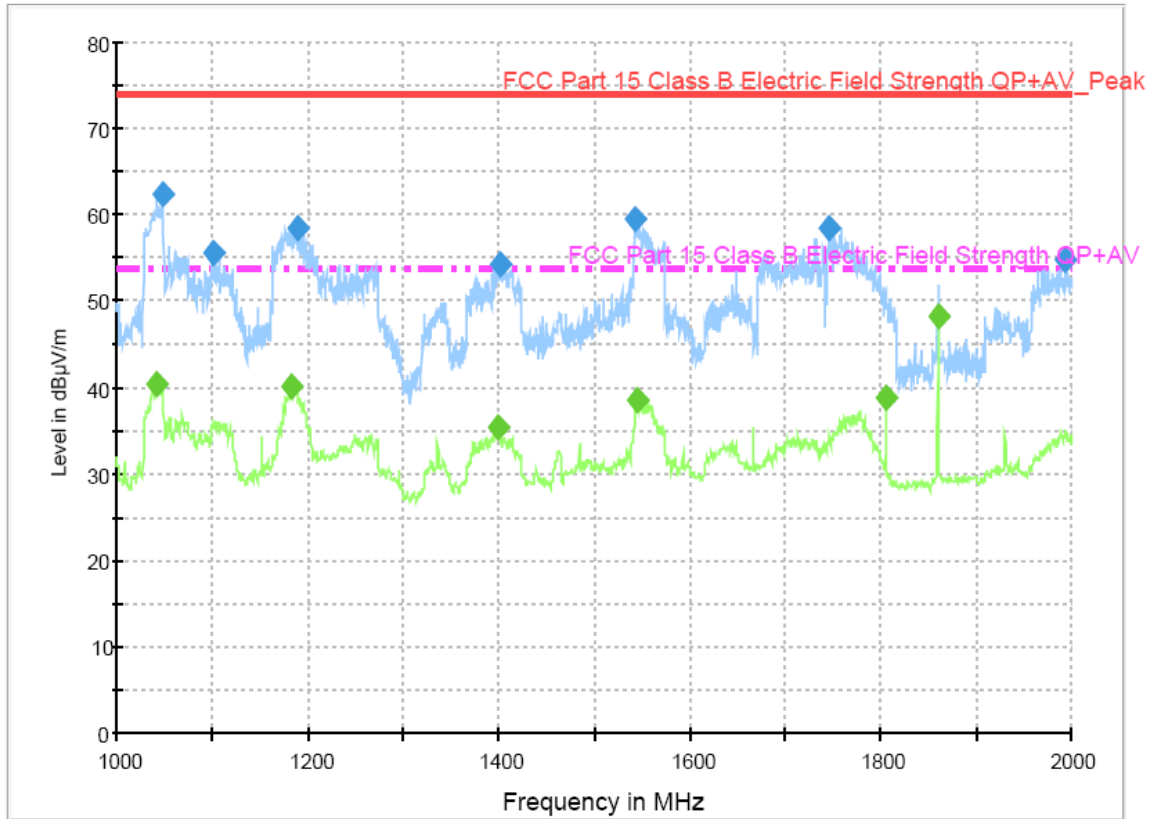
Frequency (MHz)	Average-MaxHold (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
1043.200000	43.8	100.0	V	180.0	-15.7	10.1	53.9	
1183.200000	40.4	100.0	V	180.0	-15.3	13.5	53.9	
1547.600000	39.2	100.0	V	180.0	-13.9	14.7	53.9	
1571.200000	36.4	100.0	V	180.0	-13.8	17.5	53.9	
1777.200000	37.7	150.0	V	180.0	-13.2	16.2	53.9	
1860.000000	48.6	100.0	V	0.0	-13.0	5.3	53.9	

< Fig 17. Radiated emission result (1 000 MHz ~ 2 000 MHz)>



- ◆ Operating Condition: 1 920 * 1 080 / 60 Hz (HDMI/DVI: Digital mode)
Detector mode: Peak detector mode / Average detector mode

FCC_ESIB_Preamplifier with Scans



Final Result 1

Frequency (MHz)	MaxPeak-MaxHold (dBμV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
1048.800000	62.4	100.0	V	180.0	-15.7	11.5	73.9	
1100.800000	55.6	100.0	V	180.0	-15.4	18.3	73.9	
1188.800000	58.5	100.0	V	180.0	-15.2	15.4	73.9	
1400.800000	54.3	100.0	V	180.0	-14.4	19.6	73.9	
1542.800000	59.5	100.0	V	180.0	-13.9	14.4	73.9	
1746.800000	58.5	150.0	V	180.0	-13.3	15.4	73.9	
1993.600000	54.8	100.0	V	180.0	-12.6	19.1	73.9	

Final Result 2

Frequency (MHz)	Average-MaxHold (dBμV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
1042.800000	40.4	100.0	V	180.0	-15.7	13.5	53.9	
1184.000000	40.2	100.0	V	180.0	-15.3	13.7	53.9	
1398.800000	35.4	100.0	V	180.0	-14.4	18.5	53.9	
1546.000000	38.6	100.0	V	180.0	-13.9	15.3	53.9	
1805.200000	38.9	250.0	V	0.0	-13.1	15.0	53.9	
1860.400000	48.2	100.0	V	0.0	-13.0	5.7	53.9	

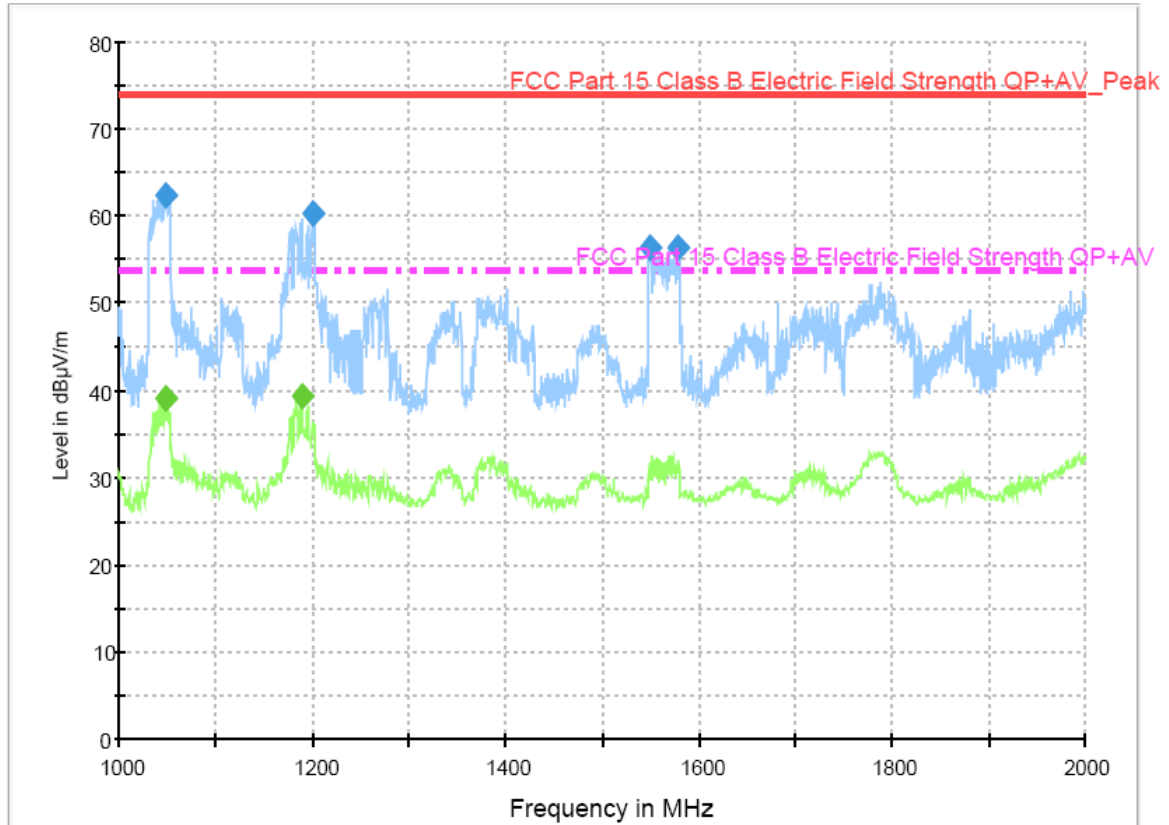
< Fig 18. Radiated emission result (1 000 MHz ~ 2 000 MHz)>



◆ Operating Condition: USB play mode

Detector mode: Peak detector mode / Average detector mode

FCC_ESIB_Preamp_RE with Scans



Final Result 1

Frequency (MHz)	MaxPeak-MaxHold (dBμV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
1048.000000	62.4	100.0	V	180.0	-15.7	11.5	73.9	
1201.600000	60.2	100.0	V	180.0	-15.2	13.7	73.9	
1549.200000	56.5	100.0	V	180.0	-13.9	17.4	73.9	
1577.600000	56.5	100.0	H	180.0	-13.8	17.4	73.9	

Final Result 2

Frequency (MHz)	Average-MaxHold (dBμV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
1048.000000	39.0	100.0	V	180.0	-15.7	14.9	53.9	
1190.000000	39.3	100.0	V	180.0	-15.2	14.6	53.9	

< Fig 19. Radiated emission result (1 000 MHz ~ 2 000 MHz)>



7. Sample Calculations

$$\begin{aligned} \text{dB}\mu\text{V} &= 20 \text{ Log}_{10}(\mu\text{V}/\text{m}) \\ \text{dB}\mu\text{V} &= \text{dBm} + 107 \\ \mu\text{V} &= 10^{(\text{dB}\mu\text{V}/20)} \end{aligned}$$

7.1 Example 1 :

■ 20.3 MHz

Class B Limit	= 250 μV = 48 dB μV
Reading	= 39.2 dB μV
$10^{(39.2\text{dB}\mu\text{V}/20)}$	= 91.2 μV
Margin	= 48 dB μV - 39.2 dB μV = 8.8 dB

7.2 Example 2 :

■ 66.7 MHz

Class B Limit	= 100 $\mu\text{V}/\text{m}$ = 40.0 dB $\mu\text{V}/\text{m}$
Reading	= 31.0 dB μV
Antenna Factor + Cable Loss = 5.8 dB	
Total	= 36.8 dB $\mu\text{V}/\text{m}$
Margin	= 40.0 dB $\mu\text{V}/\text{m}$ – 36.8 dB $\mu\text{V}/\text{m}$ = 3.2 dB



8. Recommendation & Conclusion

The data collected shows that the **LG Electronics Inc. LCD TV/Monitor (Model Name: 32SL80-UB)** was complies with §15.107 and 15.109 of the FCC Rules.