

FCC EVALUATION REPORT FOR CERTIFICATION

Applicant : LG Electronics Inc.

19-1, Cheongho-ri, Jinwi-myeon,

Pyeongteak-si, Gyeonggi-do, Korea.

Attn: Mr. Myoung-Kyu Lee, Chief research engineer

Date of Issue : April 13, 2010

Order Number: GETEC-C1-10-091

Test Report Number: GETEC-E3-10-042

Test Site: Gumi College EMC Center

FCC Registration Number: (100749, 443957)

FCC ID.: BEJ37LD450CUA

Applicant: LG Electronics Inc.

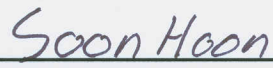
Rule Part(s)	: FCC Part 15 Subpart B
Equipment Class	: Class B computing device peripheral (JBP)
EUT Type	: LCD TV/Monitor
Type of Authority	: Certification
Model Name	: 37LD450C-UA
Trade Name	: LG

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 vest 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,


Soon-Hoon Jeong, Engineer
GUMI College EMC center


Jae-Hoon Jeong, Senior Engineer
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: 19-1, Cheongho-ri, Jinwi-myeon, Pyeongteak-si, Gyeonggi-do, Korea.

Manufacturer: LG Electronics Inc.

Manufacturer Address: 19-1, Cheongho-ri, Jinwi-myeon, Pyeongteak-si, Gyeonggi-do, Korea.

Contact Person: Mr. Myoung-Kyu Lee, Chief research engineer

Tel Number: +82-31-610-9623

- **FCC ID.** BEJ37LD450CUA
- **EUT Type** LCD TV/Monitor
- **Model Name** 37LD450C-UA
- **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** April 5 ~ 8, 2010
- **Place of Test** **Gumi College EMC Center** (FCC Registration Number: 100749, 443957)
407, Bugok-dong, Gumi-si, Gyeongbuk, Korea.
- **Test Report Number** GETEC-E3-10-042
- **Dates of Issue** April 13, 2010



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: 37LD450C-UA)**

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 §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: 37LD450C-UA)**
FCC ID.: BEJ37LD450CUA

MODELS		32LD450 (32LD450-UA), 32LD450C (32LD450C-UA)	37LD450 (37LD450-UA), 37LD450C (37LD450C-UA)
Dimensions (Width x Height x Depth)	With stand	799.0 mm x 555.0 mm x 207.0 mm (31.4 inch x 21.8 inch x 8.1 inch)	916.0 mm x 625.0 mm x 261.0 mm (36.0 inch x 24.6 inch x 10.2 inch)
	Without stand	799.0 mm x 506.0 mm x 73.5 mm (31.4 inch x 19.9 inch x 2.8 inch)	916.0 mm x 575.0 mm x 77.4 mm (36.0 inch x 22.6 inch x 3.0 inch)
Weight	With stand	9.1 kg (20.0 lbs)	12.5 kg (27.5 lbs)
	Without stand	8.1 kg (17.8 lbs)	10.8 kg (23.8 lbs)
Power requirement		AC 100-240 V – 50 / 60 Hz	
Television System		NTSC-M, ATSC, 64 & 256 QAM	
Program Coverage		VHF 2-13, UHF 14-69, CATV 1-135, DTV 2-69, CADTV 1-135	
External Antenna Impedance		75 Ω	
Environment condition	Operating Temperature	0 °C to 40 °C (32 °F to 104 °F)	
	Operating Humidity	Less than 80 %	
	Storage Temperature	-20 °C to 60 °C (-4 °F to 140 °F)	
	Storage Humidity	Less than 85 %	

-. **Maximum Frequency range** : 400 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
Joy stick	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 System configuration

Description	Manufacturer	Model Name	S/N & FCC ID.
None	-	-	-



3.2.3 Used Cable(s)

Cable Name	Condition	Description
Power cable	Connected to the EUT	1.80 m unshielded
RGB(Analog) in cable	Connected to the EUT and PC	1.80 m shielded with two ferrite cores
HDMI/DVI(Digital) in cable	Connected to the EUT and PC	2.00 m shielded
Audio(RGB/DVI) in cable	Connected to the EUT and PC	1.80 m shielded
RS-232C in (Control & service) cable	Connected to the EUT and PC	1.80 m shielded
Remote control in cable	Connected to the EUT and PC	1.80 m shielded
Component in cable	Connected to the EUT and DVD player	2.00 m shielded
Component sound in cable	Connected to the EUT and DVD player	3.00 m shielded
AV in cable	Connected to the EUT and DVD player	3.00 m shielded
Antenna in cable	Connected to the EUT and TV signal generator	10.00 m shielded
Speaker out cable	Connected to the EUT and DVD player	3.00 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, HDMI/DVI: Digital)

Conducted emission: 1 920 × 1 080 / 60 Hz (RGB: Analog, HDMI/DVI: Digital)

1 024 × 768 / 60 Hz (RGB: Analog), 640 × 480 / 60 Hz (RGB: Analog)

◆ 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

- . **USB memory stick play mode**

◆ Operating test pattern

- . Continuous playback mode with video files

“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

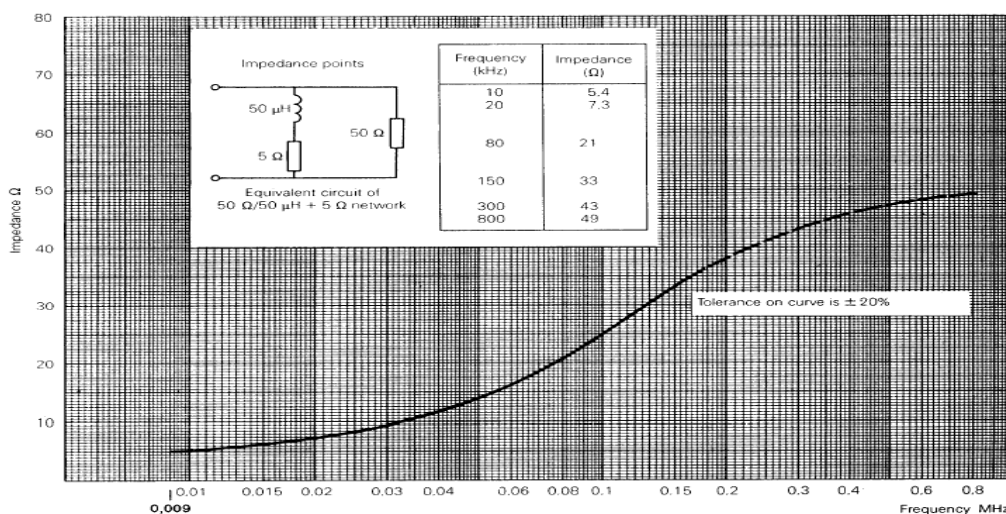


Fig 2. Impedance of LISN



4.3 Radiated Emission

Preliminary measurements were conducted 3 m semi anechoic chamber 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.

Final measurements were made 3 m chamber (FCC registration No.: 443957) and/or 10 m OATS (FCC registration No.: 100749).

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 1 MHz 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 to 4 meter and stopped at the azimuth or height producing the maximum emission.

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

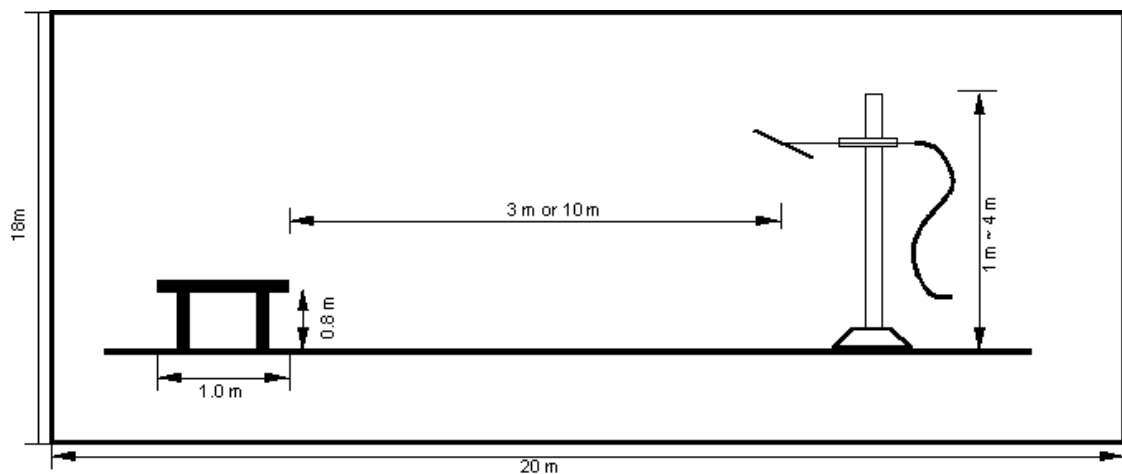


Fig 3. Dimensions of test site.



5. Conducted Emission

5.1 Operating Environment

Temperature : 25 °C
Relative Humidity : 43 % 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)	± 2.69 dB	Confidence levels of 95 % ($k = 2$)
Conducted emission (150 kHz ~ 30 MHz)	± 4.16 dB	Confidence levels of 95 % ($k = 2$)



5.4 Limit

RFI Conducted	FCC Limit(dB μ V/m) 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. 10. 2010
■ - ESH3-Z5	Rohde & Schwarz	LISN	838979/020	12. 10. 2010
■ - ESH2-Z5	Rohde & Schwarz	LISN	829991/009	12. 10. 2010
□ - ISN T8	TESEQ. GmbH	Impedance Network	24568	10. 16. 2010

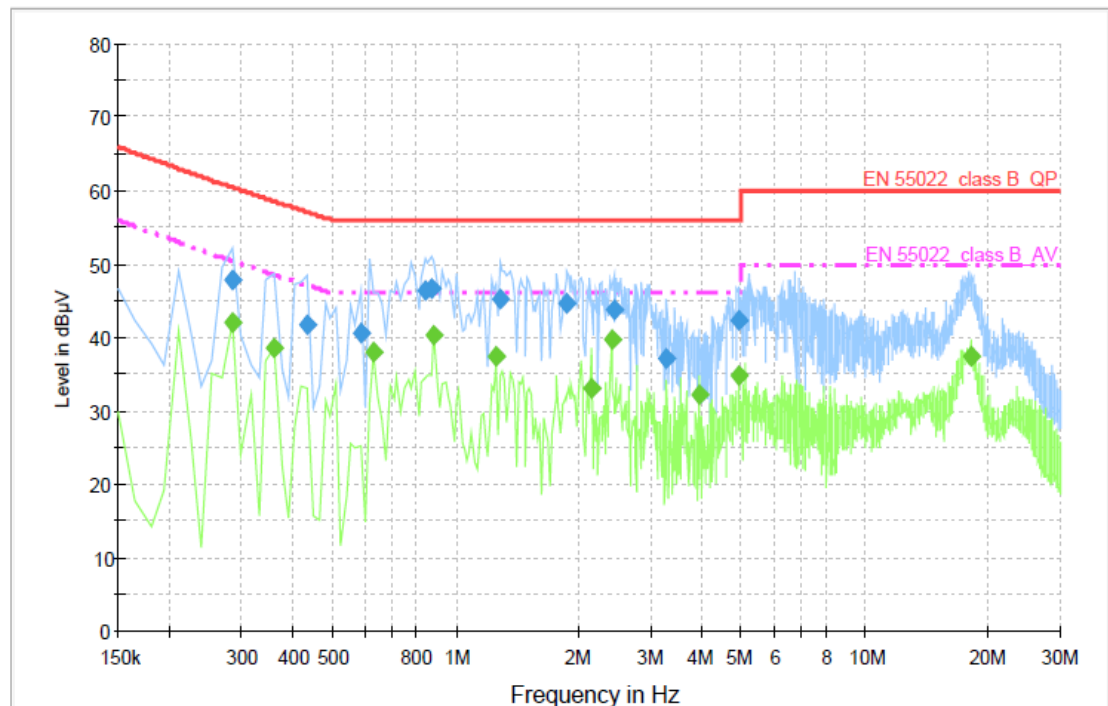
5.6 Test data for Conducted Emission

-. Test Date : April 8, 2010
-. Resolution Bandwidth : 9 kHz
-. Frequency Range : 0.15 MHz ~ 30 MHz



◆ Operating condition: 1 920 × 1 080 / 60 Hz (RGB: Analog)

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
0.285000	48.0	1000.000	9.000	GND	L1	10.0	12.5	60.5	
0.435000	41.9	1000.000	9.000	GND	L1	10.0	15.2	57.1	
0.585000	40.6	1000.000	9.000	GND	L1	10.0	15.4	56.0	
0.840000	46.3	1000.000	9.000	GND	L1	10.0	9.7	56.0	
0.870000	46.6	1000.000	9.000	GND	L1	10.0	9.4	56.0	
1.290000	45.2	1000.000	9.000	GND	L1	10.1	10.8	56.0	
1.875000	44.8	1000.000	9.000	GND	L1	10.1	11.2	56.0	
2.430000	43.8	1000.000	9.000	GND	L1	10.1	12.2	56.0	
3.285000	37.1	1000.000	9.000	GND	L1	10.1	18.9	56.0	
4.905000	42.3	1000.000	9.000	GND	L1	10.2	13.7	56.0	

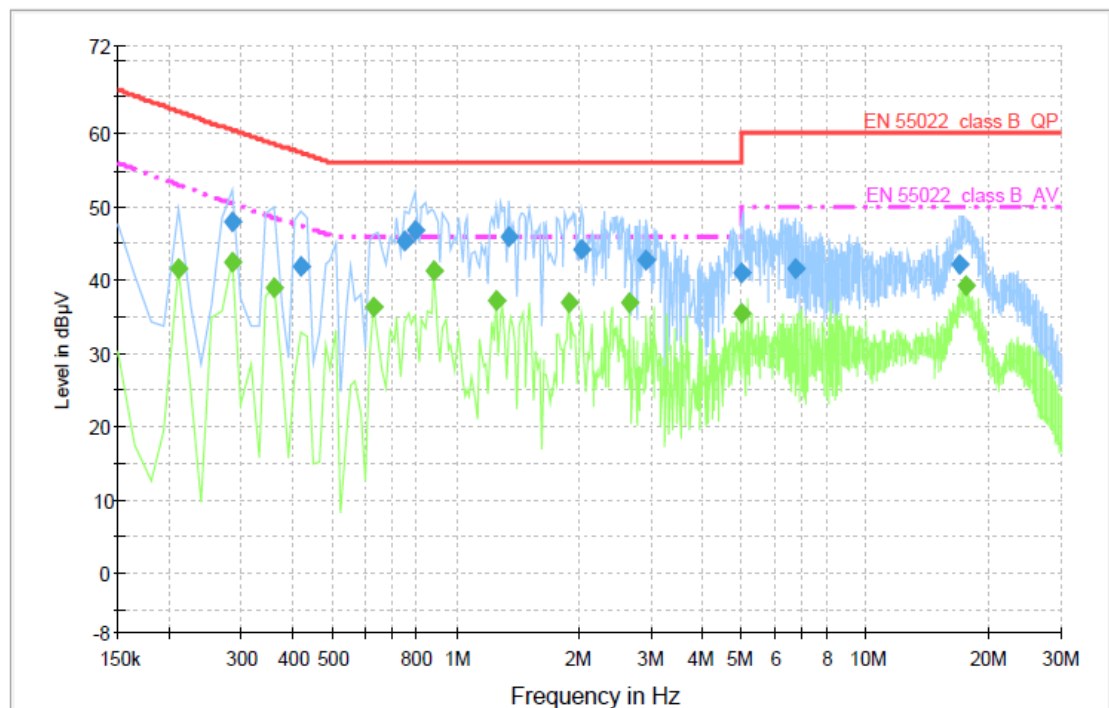
Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.285000	42.0	1000.000	9.000	GND	L1	10.0	8.4	50.4	
0.360000	38.6	1000.000	9.000	GND	L1	10.0	9.9	48.5	
0.630000	37.9	1000.000	9.000	GND	L1	10.0	8.1	46.0	
0.885000	40.2	1000.000	9.000	GND	L1	10.0	5.8	46.0	
1.260000	37.4	1000.000	9.000	GND	L1	10.1	8.6	46.0	
2.145000	32.9	1000.000	9.000	GND	L1	10.1	13.1	46.0	
2.400000	39.6	1000.000	9.000	GND	L1	10.1	6.4	46.0	
3.915000	32.2	1000.000	9.000	GND	L1	10.2	13.8	46.0	
4.905000	34.7	1000.000	9.000	GND	L1	10.2	11.3	46.0	
18.060000	37.4	1000.000	9.000	GND	L1	10.9	12.6	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
0.285000	47.9	1000.000	9.000	GND	N	10.0	12.6	60.5	
0.420000	41.9	1000.000	9.000	GND	N	10.0	15.4	57.3	
0.750000	45.3	1000.000	9.000	GND	N	10.0	10.7	56.0	
0.795000	46.9	1000.000	9.000	GND	N	10.0	9.1	56.0	
1.350000	46.0	1000.000	9.000	GND	N	10.1	10.0	56.0	
2.025000	44.2	1000.000	9.000	GND	N	10.1	11.8	56.0	
2.910000	42.8	1000.000	9.000	GND	N	10.1	13.2	56.0	
4.995000	41.0	1000.000	9.000	GND	N	10.2	15.0	56.0	
6.720000	41.7	1000.000	9.000	GND	N	10.3	18.3	60.0	
16.905000	42.3	1000.000	9.000	GND	N	10.7	17.7	60.0	

Final Measurement Detector 2

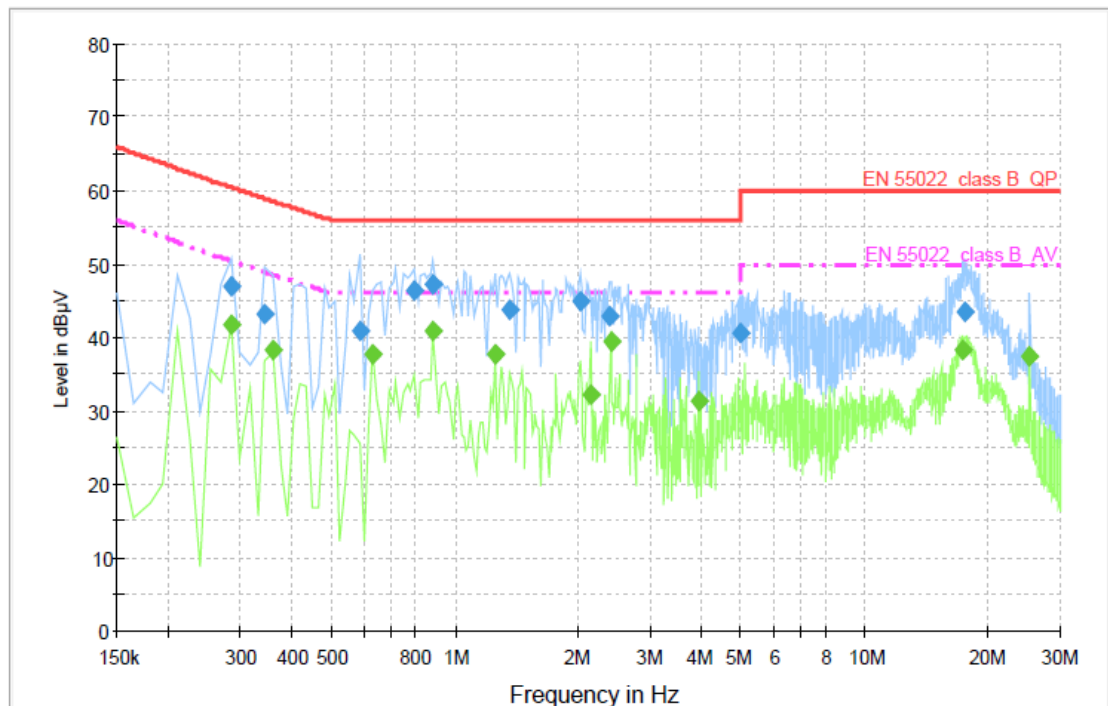
Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.210000	41.5	1000.000	9.000	GND	N	10.0	11.5	53.0	
0.285000	42.6	1000.000	9.000	GND	N	10.0	7.8	50.4	
0.360000	39.1	1000.000	9.000	GND	N	10.0	9.4	48.5	
0.630000	36.4	1000.000	9.000	GND	N	10.0	9.6	46.0	
0.885000	41.3	1000.000	9.000	GND	N	10.0	4.7	46.0	
1.260000	37.1	1000.000	9.000	GND	N	10.1	8.9	46.0	
1.890000	36.8	1000.000	9.000	GND	N	10.1	9.2	46.0	
2.655000	36.9	1000.000	9.000	GND	N	10.1	9.1	46.0	
4.965000	35.4	1000.000	9.000	GND	N	10.2	10.6	46.0	
17.550000	39.4	1000.000	9.000	GND	N	10.7	10.6	50.0	

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



◆ Operating condition: 1 024 × 768 / 60 Hz (RGB: Analog)

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
0.285000	47.0	1000.000	9.000	GND	L1	10.0	13.5	60.5	
0.345000	43.2	1000.000	9.000	GND	L1	10.0	15.7	58.9	
0.585000	41.0	1000.000	9.000	GND	L1	10.0	15.0	56.0	
0.795000	46.2	1000.000	9.000	GND	L1	10.0	9.8	56.0	
0.885000	47.2	1000.000	9.000	GND	L1	10.0	8.8	56.0	
1.365000	43.9	1000.000	9.000	GND	L1	10.1	12.1	56.0	
2.025000	44.9	1000.000	9.000	GND	L1	10.1	11.1	56.0	
2.385000	42.9	1000.000	9.000	GND	L1	10.1	13.1	56.0	
4.995000	40.7	1000.000	9.000	GND	L1	10.2	15.3	56.0	
17.445000	43.5	1000.000	9.000	GND	L1	10.9	16.5	60.0	

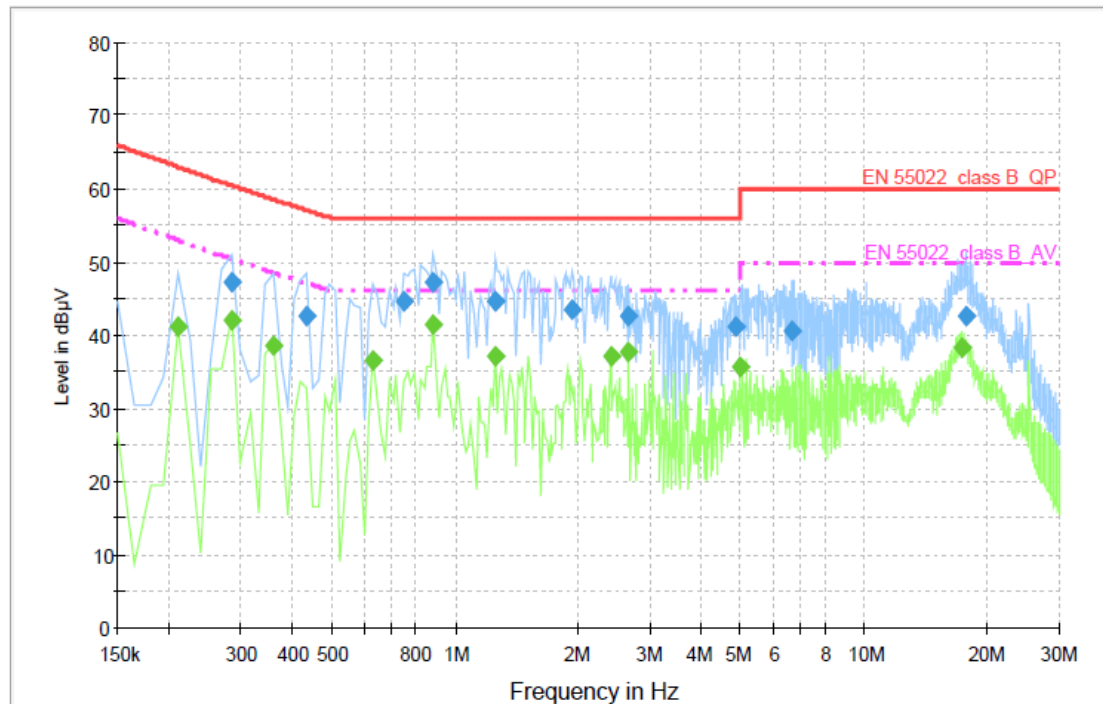
Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.285000	41.8	1000.000	9.000	GND	L1	10.0	8.6	50.4	
0.360000	38.2	1000.000	9.000	GND	L1	10.0	10.3	48.5	
0.630000	37.6	1000.000	9.000	GND	L1	10.0	8.4	46.0	
0.885000	40.9	1000.000	9.000	GND	L1	10.0	5.1	46.0	
1.260000	37.5	1000.000	9.000	GND	L1	10.1	8.5	46.0	
2.145000	32.1	1000.000	9.000	GND	L1	10.1	13.9	46.0	
2.400000	39.3	1000.000	9.000	GND	L1	10.1	6.7	46.0	
3.915000	31.3	1000.000	9.000	GND	L1	10.2	14.7	46.0	
17.370000	38.3	1000.000	9.000	GND	L1	10.9	11.7	50.0	
25.320000	37.4	1000.000	9.000	GND	L1	11.3	12.6	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
0.285000	47.2	1000.000	9.000	GND	N	10.0	13.3	60.5	
0.435000	42.5	1000.000	9.000	GND	N	10.0	14.6	57.1	
0.750000	44.6	1000.000	9.000	GND	N	10.0	11.4	56.0	
0.885000	47.3	1000.000	9.000	GND	N	10.0	8.7	56.0	
1.260000	44.8	1000.000	9.000	GND	N	10.1	11.2	56.0	
1.935000	43.4	1000.000	9.000	GND	N	10.1	12.6	56.0	
2.655000	42.7	1000.000	9.000	GND	N	10.1	13.3	56.0	
4.875000	41.1	1000.000	9.000	GND	N	10.2	14.9	56.0	
6.630000	40.5	1000.000	9.000	GND	N	10.3	19.6	60.0	
17.655000	42.6	1000.000	9.000	GND	N	10.7	17.4	60.0	

Final Measurement Detector 2

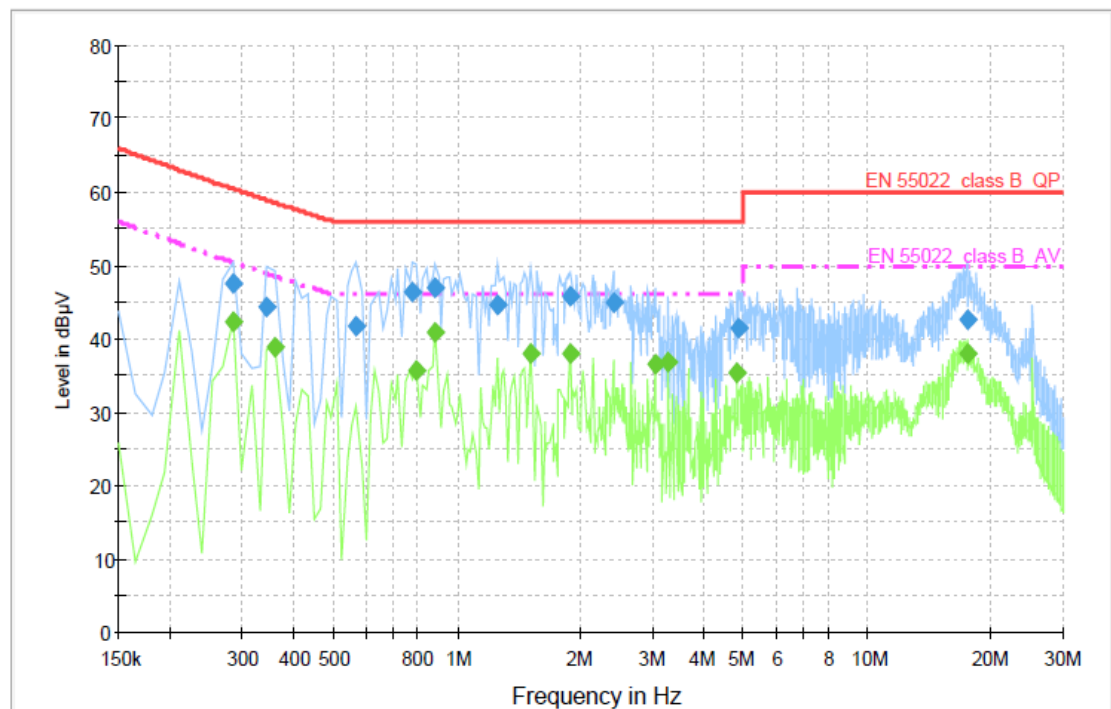
Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.210000	41.1	1000.000	9.000	GND	N	10.0	11.9	53.0	
0.285000	42.2	1000.000	9.000	GND	N	10.0	8.2	50.4	
0.360000	38.5	1000.000	9.000	GND	N	10.0	10.0	48.5	
0.630000	36.5	1000.000	9.000	GND	N	10.0	9.5	46.0	
0.885000	41.6	1000.000	9.000	GND	N	10.0	4.4	46.0	
1.260000	37.1	1000.000	9.000	GND	N	10.1	8.9	46.0	
2.400000	37.2	1000.000	9.000	GND	N	10.1	8.8	46.0	
2.655000	37.8	1000.000	9.000	GND	N	10.1	8.2	46.0	
4.965000	35.6	1000.000	9.000	GND	N	10.2	10.4	46.0	
17.340000	38.3	1000.000	9.000	GND	N	10.7	11.7	50.0	

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



◆ Operating condition: 640 × 480 / 60 Hz (RGB: Analog)

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
0.285000	47.5	1000.000	9.000	GND	L1	10.0	13.0	60.5	
0.345000	44.2	1000.000	9.000	GND	L1	10.0	14.7	58.9	
0.570000	41.7	1000.000	9.000	GND	L1	10.0	14.3	56.0	
0.780000	46.3	1000.000	9.000	GND	L1	10.0	9.7	56.0	
0.885000	46.8	1000.000	9.000	GND	L1	10.0	9.2	56.0	
1.260000	44.5	1000.000	9.000	GND	L1	10.1	11.5	56.0	
1.890000	45.9	1000.000	9.000	GND	L1	10.1	10.1	56.0	
2.400000	44.8	1000.000	9.000	GND	L1	10.1	11.2	56.0	
4.875000	41.5	1000.000	9.000	GND	L1	10.2	14.5	56.0	
17.445000	42.7	1000.000	9.000	GND	L1	10.9	17.3	60.0	

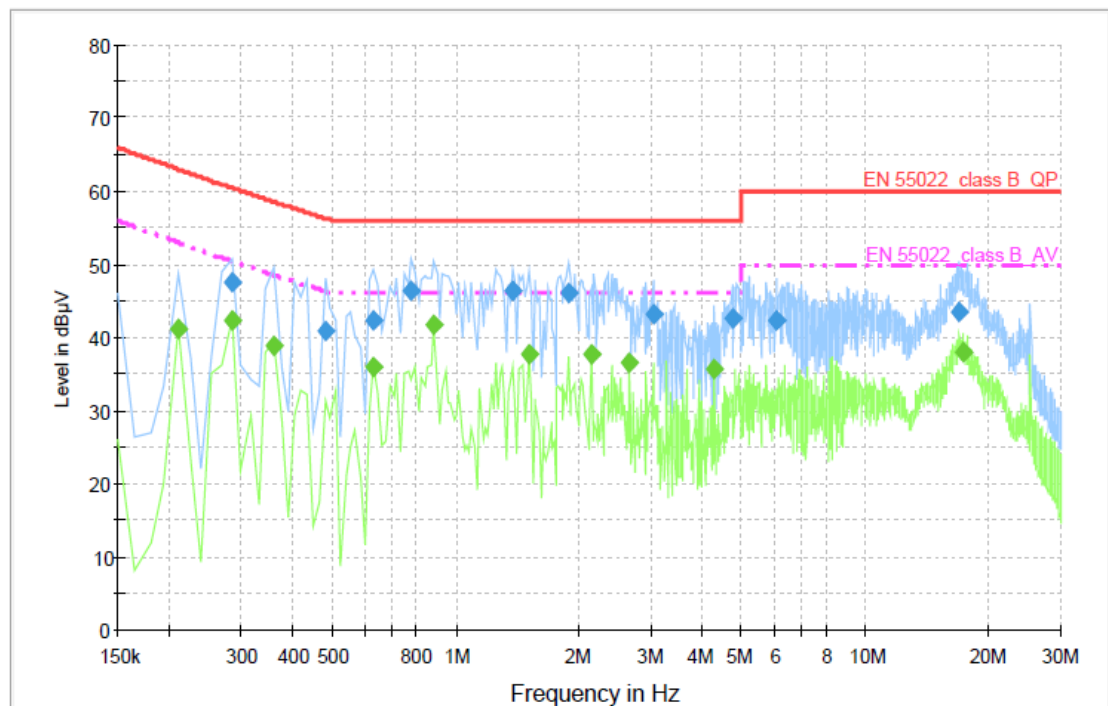
Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.285000	42.4	1000.000	9.000	GND	L1	10.0	8.0	50.4	
0.360000	38.9	1000.000	9.000	GND	L1	10.0	9.6	48.5	
0.795000	35.6	1000.000	9.000	GND	L1	10.0	10.4	46.0	
0.885000	40.8	1000.000	9.000	GND	L1	10.0	5.2	46.0	
1.515000	38.0	1000.000	9.000	GND	L1	10.1	8.0	46.0	
1.890000	38.0	1000.000	9.000	GND	L1	10.1	8.0	46.0	
3.030000	36.6	1000.000	9.000	GND	L1	10.1	9.4	46.0	
3.285000	36.7	1000.000	9.000	GND	L1	10.1	9.3	46.0	
4.800000	35.3	1000.000	9.000	GND	L1	10.2	10.7	46.0	
17.445000	38.0	1000.000	9.000	GND	L1	10.9	12.0	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
0.285000	47.6	1000.000	9.000	GND	N	10.0	12.9	60.5	
0.480000	40.9	1000.000	9.000	GND	N	10.0	15.4	56.3	
0.630000	42.3	1000.000	9.000	GND	N	10.0	13.7	56.0	
0.780000	46.4	1000.000	9.000	GND	N	10.0	9.6	56.0	
1.380000	46.4	1000.000	9.000	GND	N	10.1	9.6	56.0	
1.890000	46.0	1000.000	9.000	GND	N	10.1	10.0	56.0	
3.030000	43.3	1000.000	9.000	GND	N	10.1	12.7	56.0	
4.725000	42.5	1000.000	9.000	GND	N	10.2	13.5	56.0	
6.060000	42.3	1000.000	9.000	GND	N	10.2	17.7	60.0	
16.875000	43.6	1000.000	9.000	GND	N	10.6	16.4	60.0	

Final Measurement Detector 2

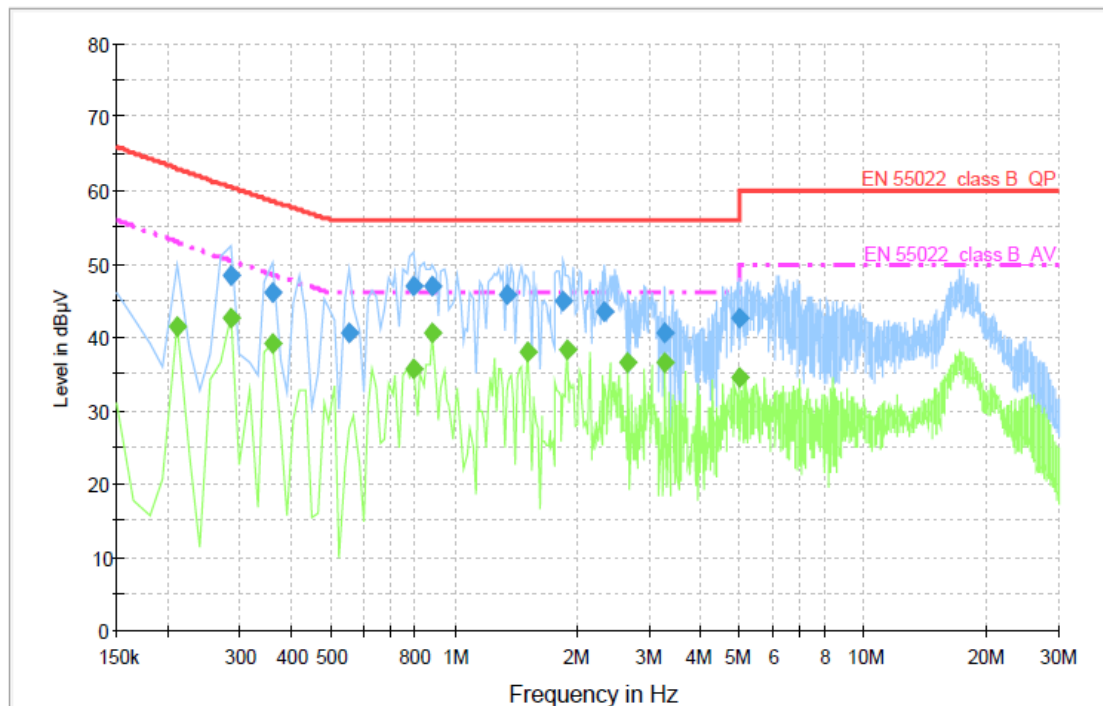
Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.210000	41.3	1000.000	9.000	GND	N	10.0	11.7	53.0	
0.285000	42.4	1000.000	9.000	GND	N	10.0	8.0	50.4	
0.360000	38.9	1000.000	9.000	GND	N	10.0	9.6	48.5	
0.630000	35.9	1000.000	9.000	GND	N	10.0	10.1	46.0	
0.885000	41.7	1000.000	9.000	GND	N	10.0	4.3	46.0	
1.515000	37.7	1000.000	9.000	GND	N	10.1	8.3	46.0	
2.145000	37.6	1000.000	9.000	GND	N	10.1	8.4	46.0	
2.655000	36.5	1000.000	9.000	GND	N	10.1	9.5	46.0	
4.290000	35.5	1000.000	9.000	GND	N	10.2	10.5	46.0	
17.385000	38.1	1000.000	9.000	GND	N	10.7	11.9	50.0	

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



◆ Operating condition: 1 920 × 1 080 / 60 Hz (HDMI/DVI: Digital)

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
0.285000	48.5	1000.000	9.000	GND	L1	10.0	12.0	60.5	
0.360000	46.0	1000.000	9.000	GND	L1	10.0	12.6	58.6	
0.555000	40.7	1000.000	9.000	GND	L1	10.0	15.4	56.0	
0.795000	47.1	1000.000	9.000	GND	L1	10.0	8.9	56.0	
0.885000	47.0	1000.000	9.000	GND	L1	10.0	9.0	56.0	
1.350000	45.7	1000.000	9.000	GND	L1	10.1	10.3	56.0	
1.845000	45.0	1000.000	9.000	GND	L1	10.1	11.0	56.0	
2.340000	43.6	1000.000	9.000	GND	L1	10.1	12.4	56.0	
3.285000	40.7	1000.000	9.000	GND	L1	10.1	15.3	56.0	
4.965000	42.6	1000.000	9.000	GND	L1	10.2	13.4	56.0	

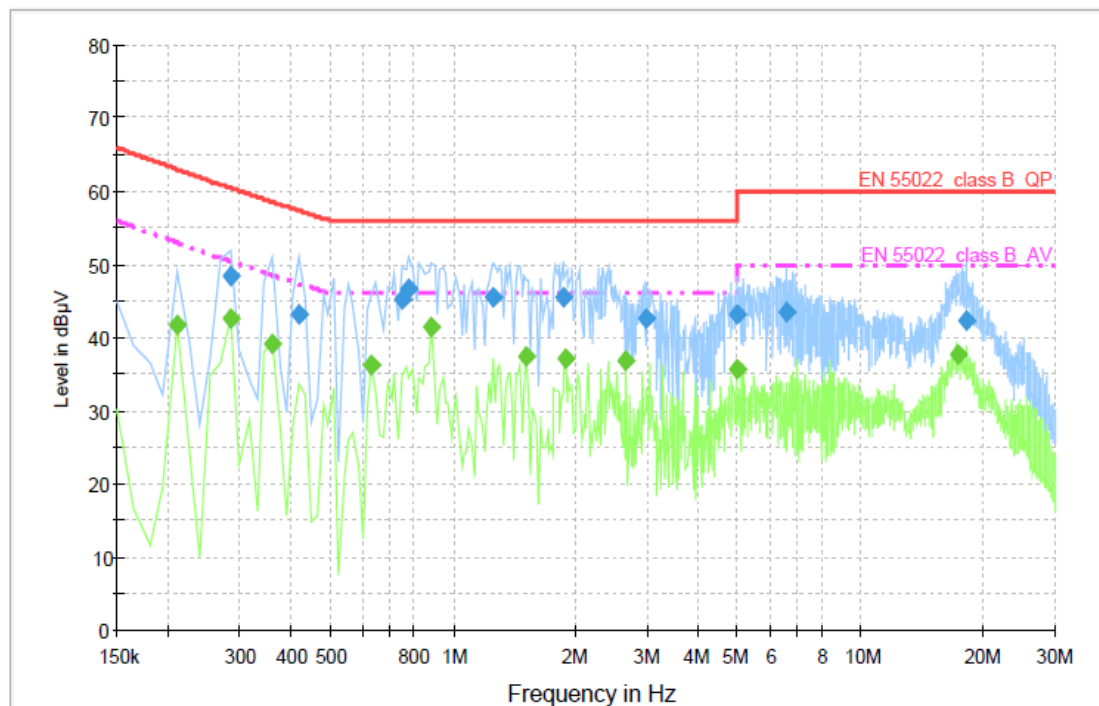
Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.210000	41.4	1000.000	9.000	GND	L1	10.0	11.6	53.0	
0.285000	42.6	1000.000	9.000	GND	L1	10.0	7.8	50.4	
0.360000	39.2	1000.000	9.000	GND	L1	10.0	9.3	48.5	
0.795000	35.7	1000.000	9.000	GND	L1	10.0	10.3	46.0	
0.885000	40.7	1000.000	9.000	GND	L1	10.0	5.3	46.0	
1.515000	37.9	1000.000	9.000	GND	L1	10.1	8.1	46.0	
1.890000	38.4	1000.000	9.000	GND	L1	10.1	7.6	46.0	
2.655000	36.6	1000.000	9.000	GND	L1	10.1	9.4	46.0	
3.285000	36.4	1000.000	9.000	GND	L1	10.1	9.6	46.0	
4.965000	34.6	1000.000	9.000	GND	L1	10.2	11.4	46.0	

< 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
0.285000	48.4	1000.000	9.000	GND	N	10.0	12.1	60.5	
0.420000	43.2	1000.000	9.000	GND	N	10.0	14.1	57.3	
0.750000	45.3	1000.000	9.000	GND	N	10.0	10.7	56.0	
0.780000	46.7	1000.000	9.000	GND	N	10.0	9.3	56.0	
1.260000	45.5	1000.000	9.000	GND	N	10.1	10.5	56.0	
1.860000	45.6	1000.000	9.000	GND	N	10.1	10.4	56.0	
2.985000	42.7	1000.000	9.000	GND	N	10.1	13.3	56.0	
4.965000	43.2	1000.000	9.000	GND	N	10.2	12.8	56.0	
6.570000	43.4	1000.000	9.000	GND	N	10.3	16.6	60.0	
18.180000	42.3	1000.000	9.000	GND	N	10.7	17.7	60.0	

Final Measurement Detector 2

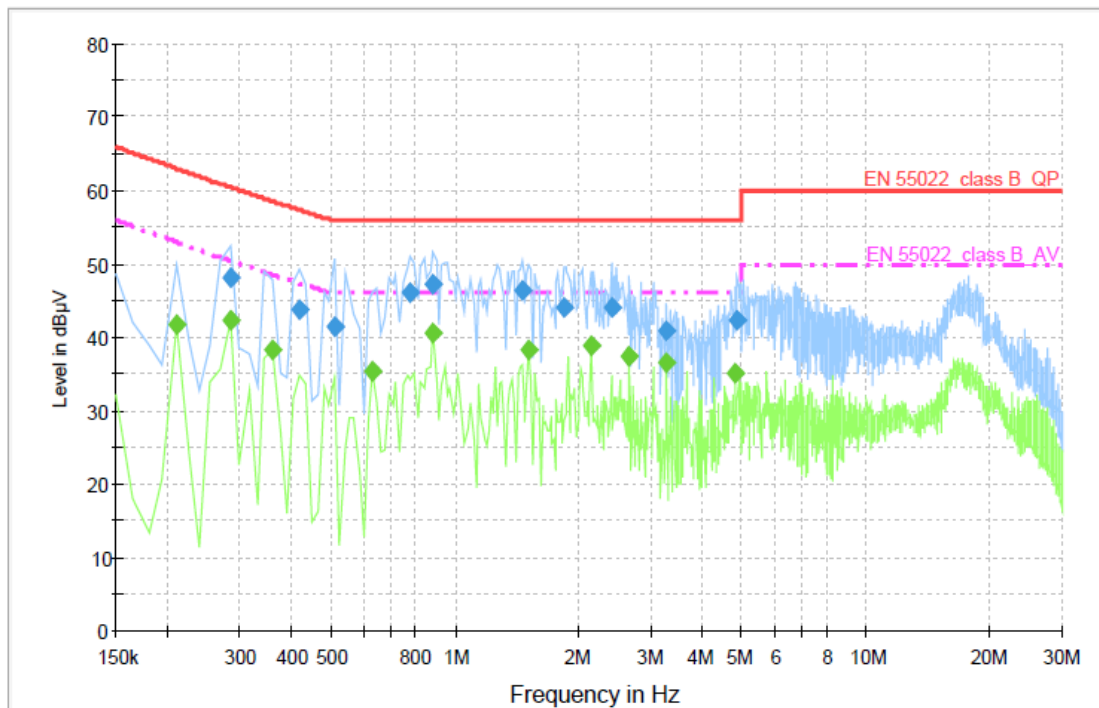
Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.210000	41.6	1000.000	9.000	GND	N	10.0	11.4	53.0	
0.285000	42.6	1000.000	9.000	GND	N	10.0	7.8	50.4	
0.360000	39.1	1000.000	9.000	GND	N	10.0	9.4	48.5	
0.630000	36.2	1000.000	9.000	GND	N	10.0	9.8	46.0	
0.885000	41.6	1000.000	9.000	GND	N	10.0	4.4	46.0	
1.515000	37.5	1000.000	9.000	GND	N	10.1	8.5	46.0	
1.890000	37.2	1000.000	9.000	GND	N	10.1	8.8	46.0	
2.655000	36.8	1000.000	9.000	GND	N	10.1	9.2	46.0	
4.965000	35.5	1000.000	9.000	GND	N	10.2	10.5	46.0	
17.310000	37.6	1000.000	9.000	GND	N	10.7	12.4	50.0	

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



◆ Operating condition: 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
0.285000	48.2	1000.000	9.000	GND	L1	10.0	12.3	60.5	
0.420000	43.8	1000.000	9.000	GND	L1	10.0	13.5	57.3	
0.510000	41.6	1000.000	9.000	GND	L1	10.0	14.4	56.0	
0.780000	46.1	1000.000	9.000	GND	L1	10.0	9.9	56.0	
0.885000	47.3	1000.000	9.000	GND	L1	10.0	8.7	56.0	
1.455000	46.5	1000.000	9.000	GND	L1	10.1	9.5	56.0	
1.845000	43.9	1000.000	9.000	GND	L1	10.1	12.1	56.0	
2.400000	44.0	1000.000	9.000	GND	L1	10.1	12.0	56.0	
3.285000	40.9	1000.000	9.000	GND	L1	10.1	15.1	56.0	
4.875000	42.2	1000.000	9.000	GND	L1	10.2	13.8	56.0	

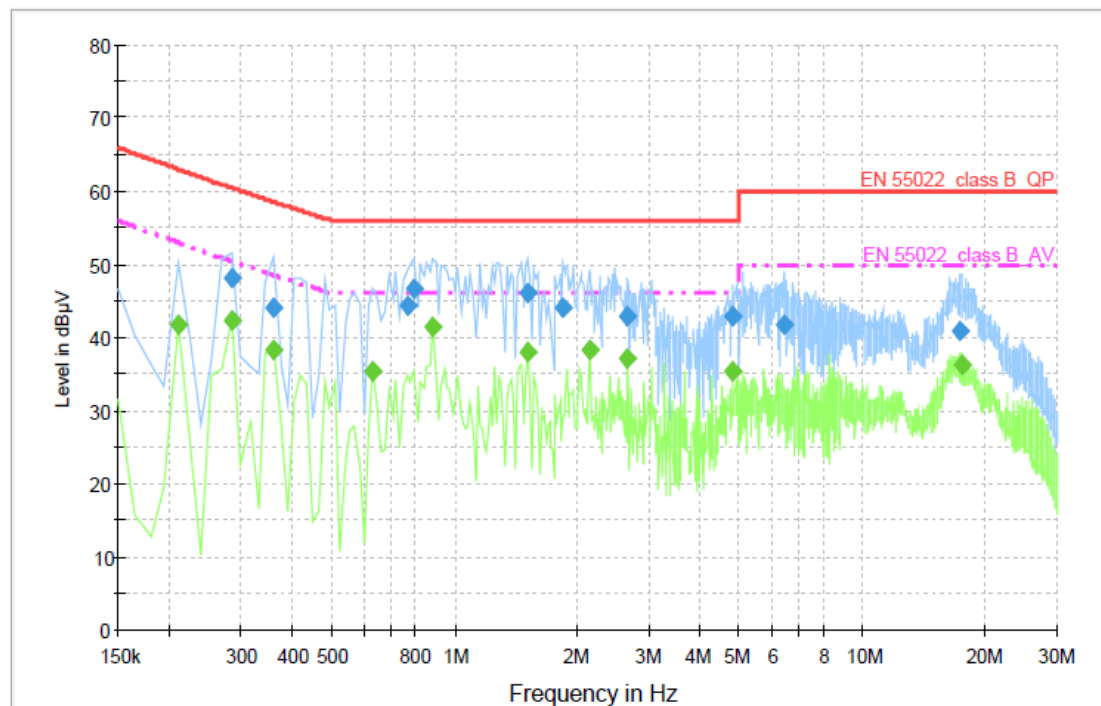
Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.210000	41.6	1000.000	9.000	GND	L1	10.0	11.4	53.0	
0.285000	42.2	1000.000	9.000	GND	L1	10.0	8.2	50.4	
0.360000	38.3	1000.000	9.000	GND	L1	10.0	10.2	48.5	
0.630000	35.3	1000.000	9.000	GND	L1	10.0	10.7	46.0	
0.885000	40.7	1000.000	9.000	GND	L1	10.0	5.3	46.0	
1.515000	38.2	1000.000	9.000	GND	L1	10.1	7.8	46.0	
2.145000	38.9	1000.000	9.000	GND	L1	10.1	7.1	46.0	
2.655000	37.2	1000.000	9.000	GND	L1	10.1	8.8	46.0	
3.285000	36.5	1000.000	9.000	GND	L1	10.1	9.5	46.0	
4.800000	35.0	1000.000	9.000	GND	L1	10.2	11.0	46.0	

< 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
0.285000	48.2	1000.000	9.000	GND	N	10.0	12.3	60.5	
0.360000	44.2	1000.000	9.000	GND	N	10.0	14.4	58.6	
0.765000	44.4	1000.000	9.000	GND	N	10.0	11.6	56.0	
0.795000	46.5	1000.000	9.000	GND	N	10.0	9.5	56.0	
1.515000	46.1	1000.000	9.000	GND	N	10.1	9.9	56.0	
1.845000	44.0	1000.000	9.000	GND	N	10.1	12.0	56.0	
2.655000	43.0	1000.000	9.000	GND	N	10.1	13.0	56.0	
4.800000	42.8	1000.000	9.000	GND	N	10.2	13.2	56.0	
6.405000	41.8	1000.000	9.000	GND	N	10.3	18.2	60.0	
17.385000	41.0	1000.000	9.000	GND	N	10.7	19.0	60.0	

Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.210000	41.8	1000.000	9.000	GND	N	10.0	11.2	53.0	
0.285000	42.4	1000.000	9.000	GND	N	10.0	8.0	50.4	
0.360000	38.3	1000.000	9.000	GND	N	10.0	10.2	48.5	
0.630000	35.4	1000.000	9.000	GND	N	10.0	10.6	46.0	
0.885000	41.6	1000.000	9.000	GND	N	10.0	4.4	46.0	
1.515000	37.8	1000.000	9.000	GND	N	10.1	8.2	46.0	
2.145000	38.3	1000.000	9.000	GND	N	10.1	7.7	46.0	
2.655000	37.0	1000.000	9.000	GND	N	10.1	9.0	46.0	
4.800000	35.4	1000.000	9.000	GND	N	10.2	10.6	46.0	
17.610000	36.3	1000.000	9.000	GND	N	10.7	13.7	50.0	

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



6. Radiated Emission

6.1 Operating Environment

Temperature : 24 °C
Relative Humidity : 43 % 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(Chamber)	Uncertainty	Remark
Radiated emission (30 MHz ~ 300 MHz, 3 m, Vertical)	± 4.32 dB	Confidence levels of 95 % ($k = 2$)
Radiated emission (30 MHz ~ 300 MHz, 3 m, Horizontal)	± 4.21 dB	Confidence levels of 95 % ($k = 2$)
Radiated emission (300 MHz ~ 1 000 MHz, 3 m, Vertical)	± 3.96 dB	Confidence levels of 95 % ($k = 2$)
Radiated emission (300 MHz ~ 1 000 MHz, 3 m, Horizontal)	± 3.97 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

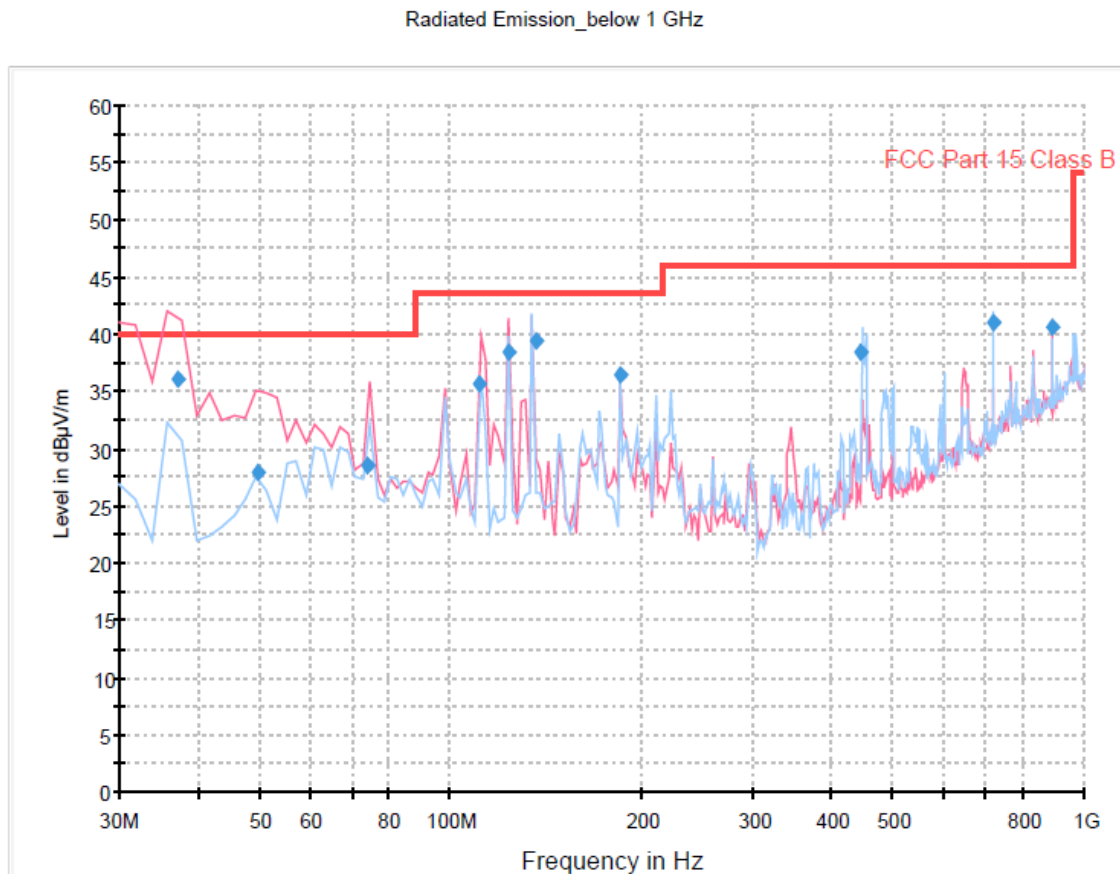
Model Name	Manufacturer	Description	Serial Number	Due to Calibration
■ - ESIB26	Rohde & Schwarz	EMI Test Receiver	830482/010	12. 11. 2010
■ - VULB9160	Schwarzbeck	Broadband Test Antenna	3193	03. 11. 2012
■ - BBHA9120D	Schwarzbeck	Horn ANT	207	12. 22. 2011
■ - MCU066	maturo GmbH	Position Controller	1390306	N/A
■ - TT2.5SI	maturo GmbH	Turntable	1390307	N/A
■ - AM 4.0	maturo GmbH	Antenna Mast	1390308	N/A
■ - AFS 44 00101800-25-10P-44	MITEQ	Preamplifier	1258943	11. 12. 2010

6.6 Test data for Radiated Emission

- Test Date : April 5, 2010
- Resolution Bandwidth : 120 kHz/1 MHz
- Frequency Range : 30 MHz ~ 2 000 MHz
- Measurement Distance : 3 m
- Note : The highest frequency of the internal source of the EUT is between 108 MHz and 500 MHz (400 MHz). The measurement was made up to 2 000 MHz



- ◆ Operating Condition: 1 920 × 1 080 / 60 Hz (RGB: Analog)
Red trace: Vertical polarization, Blue trace: Horizontal polarization



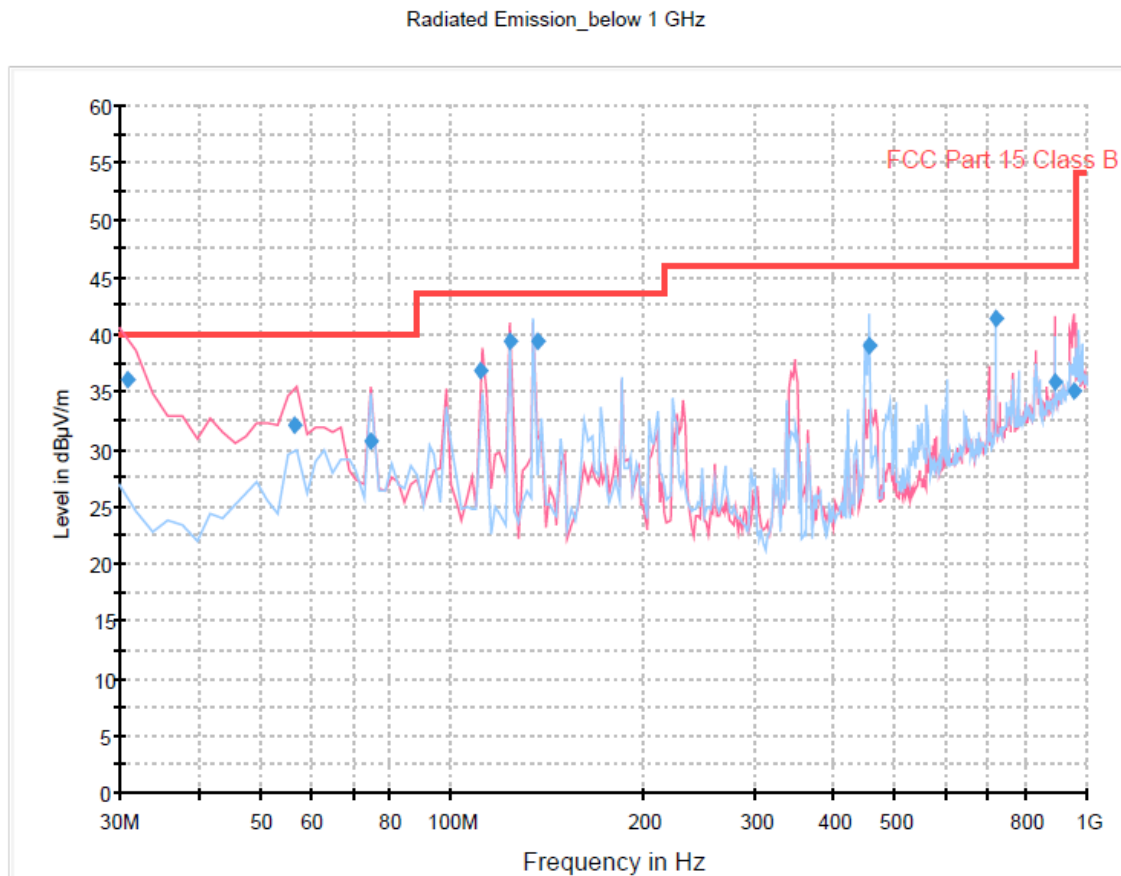
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
37.171663	36.0	1000.0	120.000	100.0	V	307.0	12.9	4.0	40.0
49.698878	27.8	1000.0	120.000	100.0	V	325.0	13.6	12.2	40.0
74.289419	28.5	1000.0	120.000	112.0	V	0.0	10.7	11.5	40.0
111.383287	35.7	1000.0	120.000	103.0	V	237.0	12.3	7.8	43.5
123.766613	38.4	1000.0	120.000	100.0	V	52.0	13.5	5.1	43.5
136.109940	39.5	1000.0	120.000	243.0	H	146.0	14.4	4.0	43.5
185.611022	36.4	1000.0	120.000	150.0	H	105.0	13.4	7.1	43.5
445.371984	38.5	1000.0	120.000	147.0	H	135.0	20.6	7.5	46.0
720.020160	41.0	1000.0	120.000	100.0	H	156.0	26.7	5.0	46.0
891.002285	40.6	1000.0	120.000	283.0	V	325.0	29.2	5.4	46.0

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



- ◆ Operating Condition: 1 920 × 1 080 / 60 Hz (HDMI/DVI: Digital)
Red trace: Vertical polarization, Blue trace: Horizontal polarization



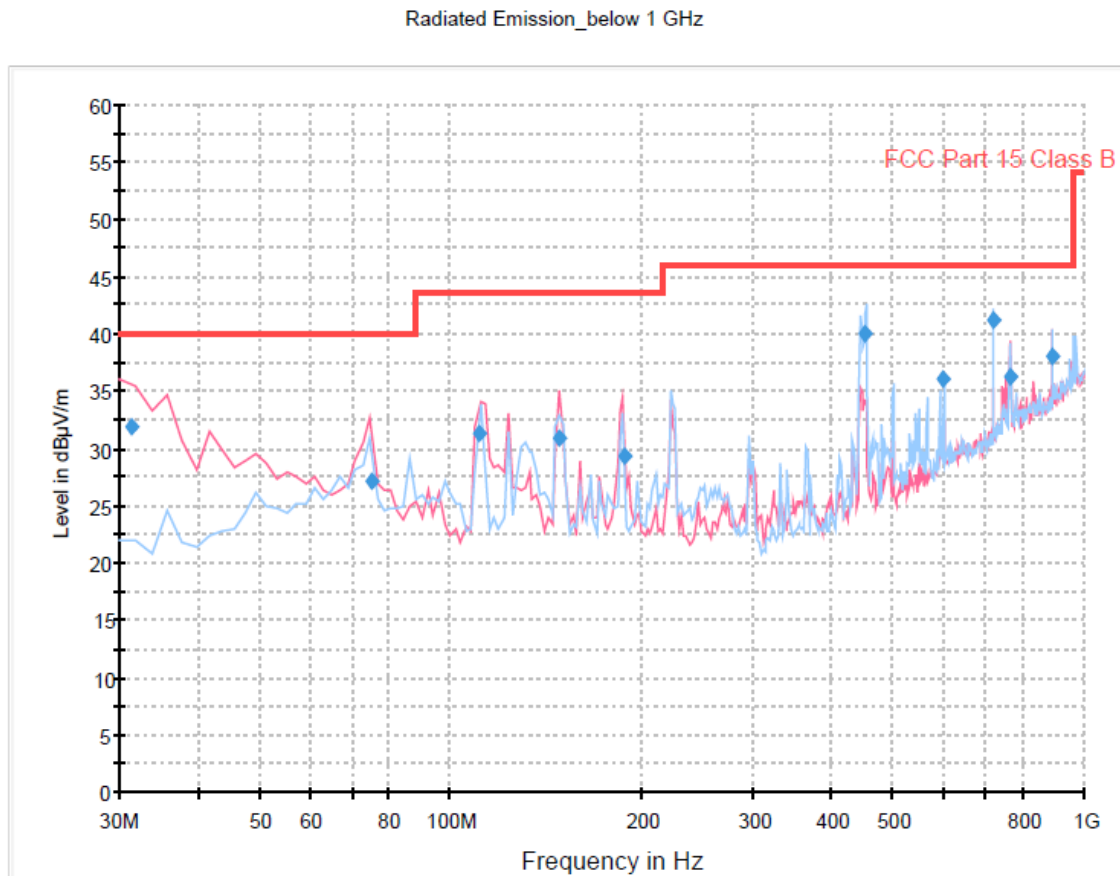
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
31.040000	36.0	1000.0	120.000	100.0	V	158.0	12.9	4.0	40.0
56.754429	32.0	1000.0	120.000	100.0	V	316.0	13.5	8.0	40.0
74.449419	30.6	1000.0	120.000	100.0	V	0.0	10.7	9.4	40.0
111.383287	36.9	1000.0	120.000	102.0	V	70.0	12.3	6.6	43.5
123.726613	39.4	1000.0	120.000	100.0	V	209.0	13.5	4.1	43.5
136.109940	39.5	1000.0	120.000	215.0	H	112.0	14.4	4.0	43.5
454.491423	39.0	1000.0	120.000	143.0	H	132.0	20.8	7.0	46.0
720.020160	41.3	1000.0	120.000	100.0	H	154.0	26.7	4.7	46.0
890.922285	35.9	1000.0	120.000	291.0	V	311.0	29.2	10.1	46.0
954.846693	35.1	1000.0	120.000	138.0	V	158.0	31.0	10.9	46.0

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



- ◆ Operating Condition: USB play mode
Red trace: Vertical polarization, Blue trace: Horizontal polarization



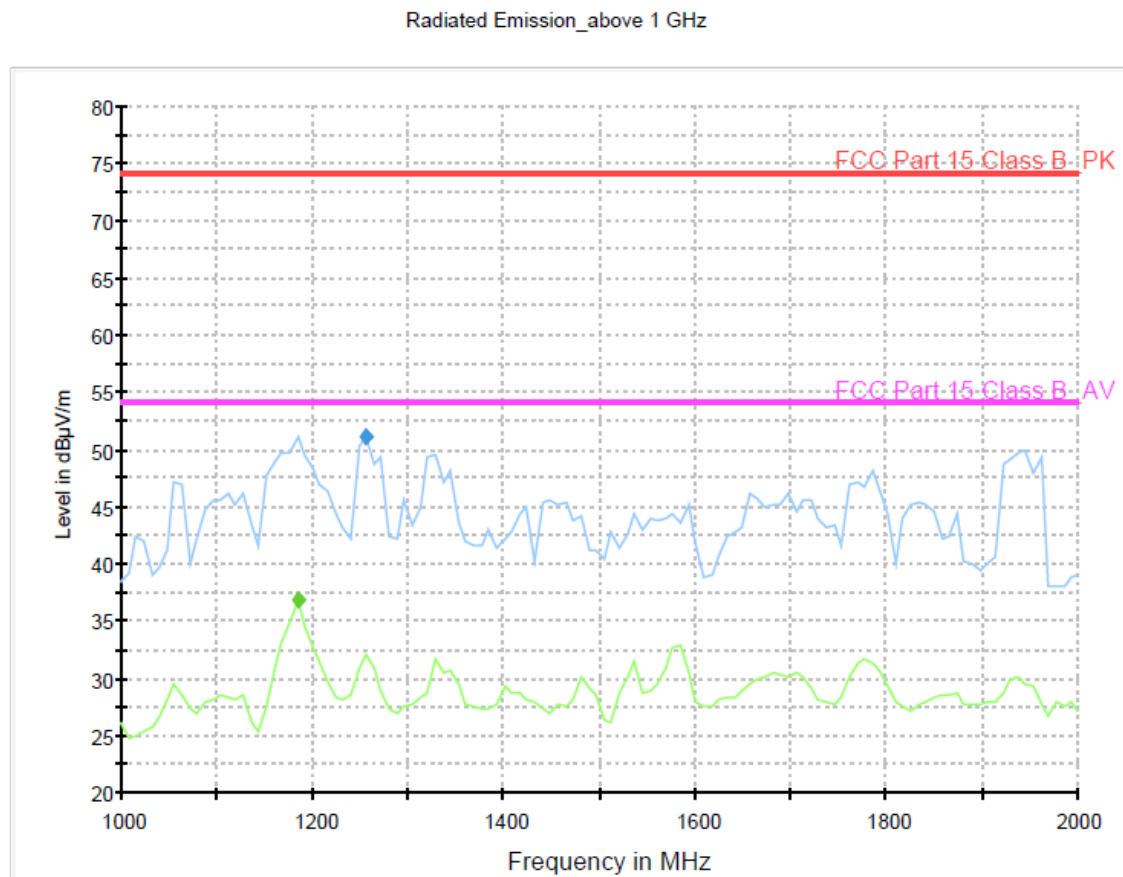
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
31.360000	31.9	1000.0	120.000	100.0	V	181.0	12.9	8.1	40.0
75.409419	27.1	1000.0	120.000	103.0	V	4.0	10.5	12.9	40.0
111.343287	31.2	1000.0	120.000	100.0	V	22.0	12.3	12.3	43.5
148.117154	31.0	1000.0	120.000	100.0	V	357.0	14.8	12.5	43.5
188.394910	29.3	1000.0	120.000	251.0	V	149.0	13.1	14.2	43.5
452.547535	40.0	1000.0	120.000	153.0	H	123.0	20.8	6.0	46.0
600.003006	36.0	1000.0	120.000	100.0	H	228.0	24.6	10.0	46.0
720.020160	41.1	1000.0	120.000	117.0	H	157.0	26.7	4.9	46.0
763.105691	36.2	1000.0	120.000	100.0	V	0.0	27.7	9.8	46.0
890.962285	38.0	1000.0	120.000	148.0	H	176.0	29.2	8.0	46.0

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



- ◆ Operating Condition: 1 920 × 1 080 / 60 Hz (RGB: Analog)
Green trace: Average detector, Blue trace: Peak detector



Final Result 1

Frequency (MHz)	MaxPeak-MaxHold (dBμV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
1256.513000	51.1	100.0	H	123.0	-9.8	22.8	73.9	

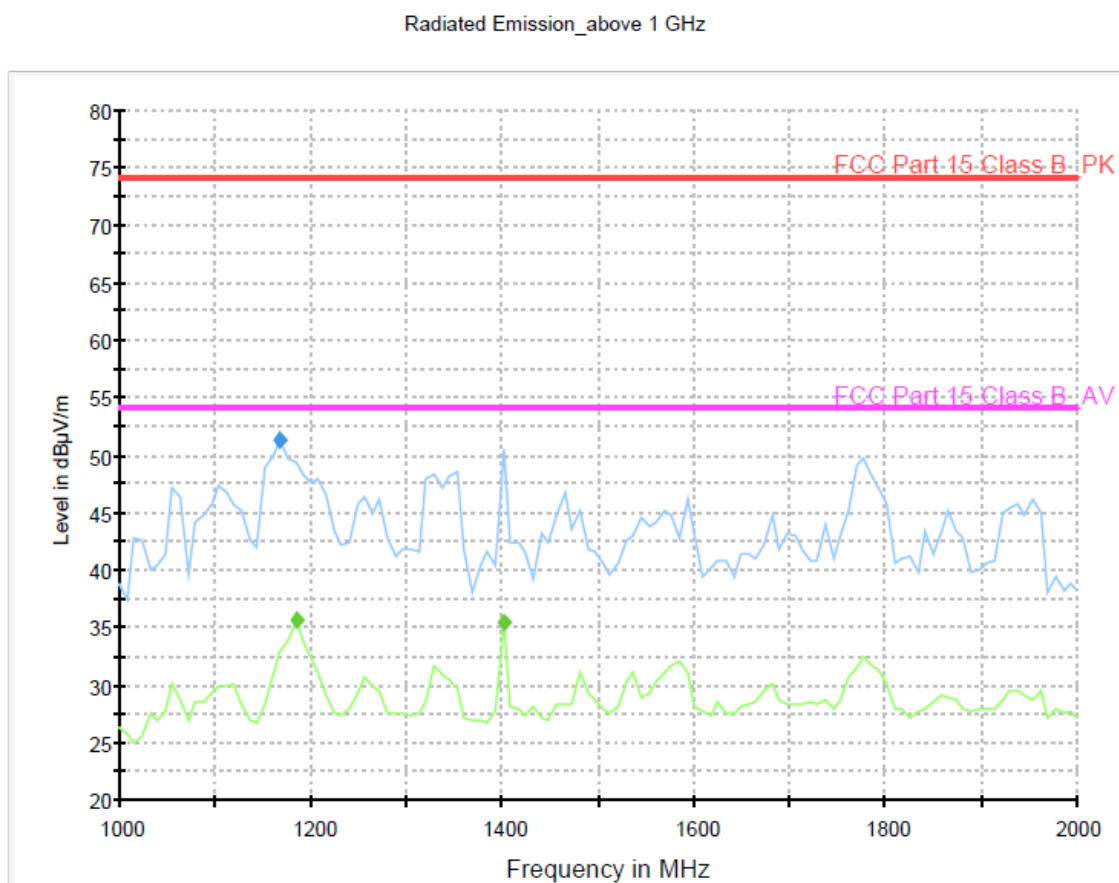
Final Result 2

Frequency (MHz)	Average-MaxHold (dBμV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
1184.368738	36.8	241.0	V	340.0	-15.1	17.1	53.9	

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



- ◆ Operating Condition: 1 920 × 1 080 / 60 Hz (HDMI/DVI: Digital)
Green trace: Average detector, Blue trace: Peak detector



Final Result 1

Frequency (MHz)	MaxPeak-MaxHold (dBμV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
1168.336000	51.2	100.0	H	123.0	-9.8	22.7	73.9	

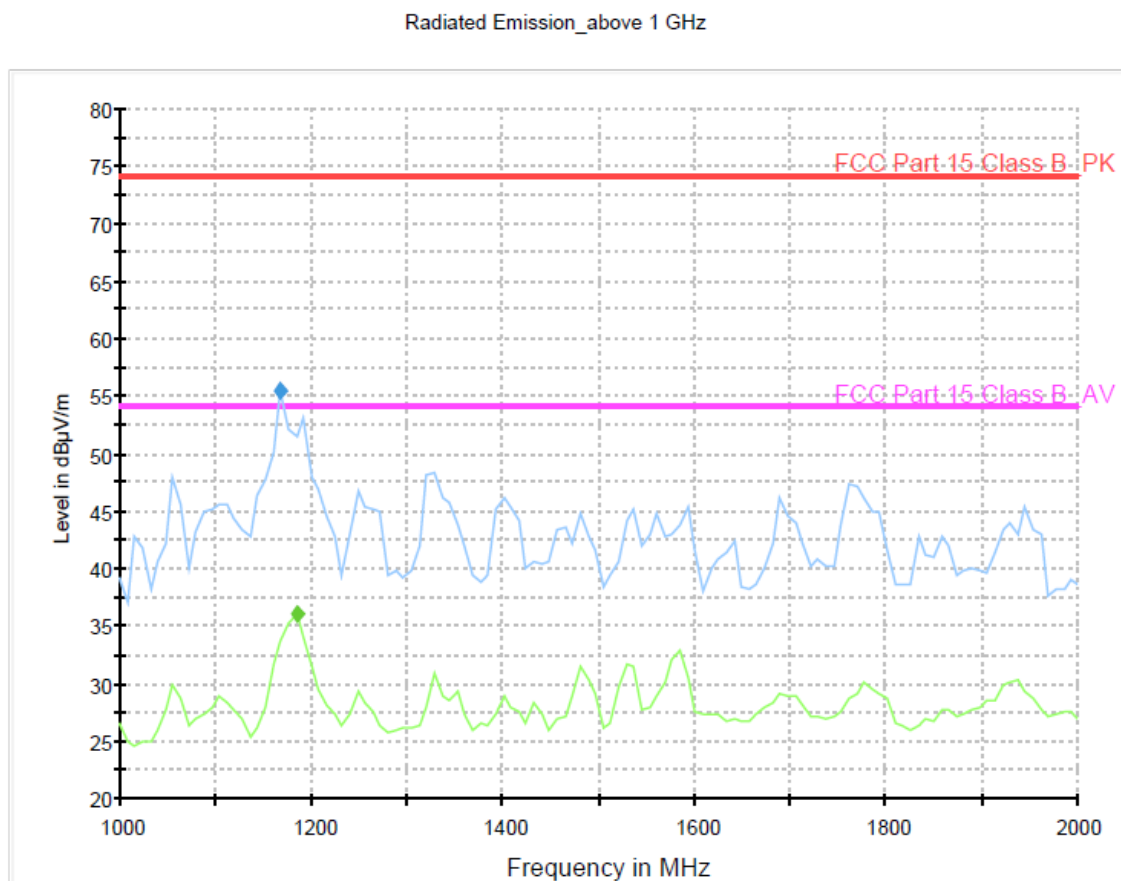
Final Result 2

Frequency (MHz)	Average-MaxHold (dBμV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
1184.368738	35.6	197.0	V	333.0	-15.1	18.3	53.9	
1400.801603	35.5	100.0	V	155.0	-14.5	18.4	53.9	

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



- ◆ Operating Condition: USB play mode
Green trace: Average detector, Blue trace: Peak detector



Final Result 1

Frequency (MHz)	MaxPeak-MaxHold (dBμV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
1168.336673	55.4	100.0	V	162.0	-15.1	18.5	73.9	

Final Result 2

Frequency (MHz)	Average-MaxHold (dBμV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
1184.368738	36.1	100.0	V	155.0	-15.1	17.8	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: 37LD450C-UA)** was complies with §15.107 and 15.109 of the FCC Rules.