



FCC EVALUATION REPORT FOR CERTIFICATION

Applicant : LG Electronics Inc.

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

Pyeongteak-si, Gyeonggi-do, Korea.

Attn: Mr. Do-Hyung Kim, Chief research engineer

Date of Issue : January 25, 2011

Order Number: GETEC-C1-11-011

Test Report Number: GETEC-E3-11-002

Test Site: Gumi College EMC Center

FCC Registration Number: (100749, 443957)

FCC ID. : BEJ65LW6500UA

Applicant : LG Electronics Inc.

Rule Part(s)	: FCC Part 15 Subpart B
Equipment Class	: Class B computing device peripheral (JBP)
EUT Type	: LED LCD TV/Monitor
Type of Authority	: Certification
Model Name	: 65LW6500-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 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,

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. Do-Hyung Kim, Chief research engineer

Tel Number: +82-31-610-9623

- **FCC ID.** BEJ65LW6500UA
- **EUT Type** LED LCD TV/Monitor
- **Model Name** 65LW6500-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** January 21 ~ 24, 2011
- **Place of Test** **Gumi College EMC Center** (FCC Registration Number: 100749, 443957)
407, Bugok-dong, Gumi-si, Gyeongbuk, Korea.
- **Test Report Number** GETEC-E3-11-002
- **Dates of Issue** January 25, 2011



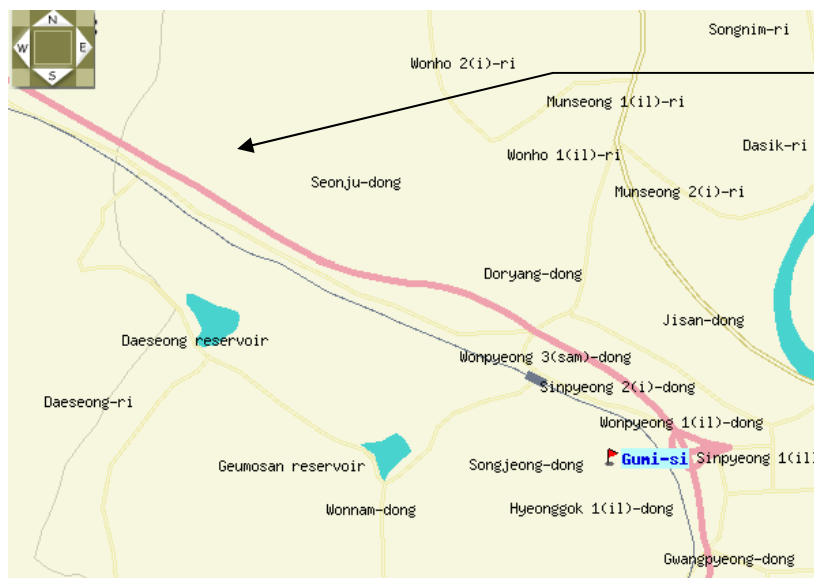
2. Introduction

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. LED LCD TV/Monitor (Model Name: 65LW6500-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. LED LCD TV/Monitor (Model Name: 65LW6500-UA) FCC ID.: BEJ65LW6500UA**

MODELS		47LW6500 (47LW6500-UA)	55LW6500 (55LW6500-UA)	65LW6500 (65LW6500-UA)
Dimensions (W x H x D)	With stand	1119.4 mm x 748.6 mm x 255.0 mm	1297.0 mm x 851.0 mm x 341.0 mm	1555.0 mm x 1012.0 mm x 341.0 mm
	Without stand	1119.4 mm x 683.8 mm x 29.9 mm	1297.0 mm x 785.0 mm x 29.9 mm	1555.0 mm x 940.0 mm x 38.1 mm
Weight	With stand	21.0 kg	27.0 kg	47.0 kg
	Without stand	18.2 kg	22.0 kg	42.0 kg
Power requirement		AC100-240V - 50/60Hz		
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 - 40°C		
	Operating Humidity	Less than 80%		
	Storage Temperature	-20 - 60°C		
	Storage Humidity	Less than 85%		

-. Maximum Frequency Range : 796 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
PS2 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
Headset	PHILIPS	SBC HL140	S/N: N/A FCC ID.: N/A
USB memory stick	LG Electronics Inc.	UM5 2GB	S/N: 003RLRZN37758 FCC ID.: N/A
TV signal generator	FLUKE	54200	S/N: 831011 FCC ID.: DoC
Wireless ready dongle	LG Electronics Inc.	N/A	S/N: N/A FCC ID.: N/A

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	-	-	S/N: - FCC ID.: -



3.2.3 Used Cable(s)

Cable Name	Condition	Description
Power cable	Connected to the EUT	1.50 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(control & service) in cable	Connected to the EUT and PC	1.80 m shielded
AV in cable	Connected to the EUT and DVD player	3.00 m shielded
AV 2 in cable	Connected to the EUT and DVD player	3.10 m shielded
Component cable	Connected to the EUT and DVD player	3.00 m shielded
Component 2 cable	Connected to the EUT and DVD player	2.10 m shielded
Headset cable	Connected to the EUT and headset	1.20 m shielded
Antenna cable	Connected to the EUT and TV signal generator	10.00 m shielded
LAN cable	Connected to the EUT and network	10.00 m unshielded
Wireless control cable	Connected to the EUT and wireless ready dongle	0.40 m shielded with a ferrite core

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
- . Continuous playback mode of 1 kHz audio file with winamp player
- . Settings and control the display via the network from a PC
- . USB memory stick was connected to the USB port

“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

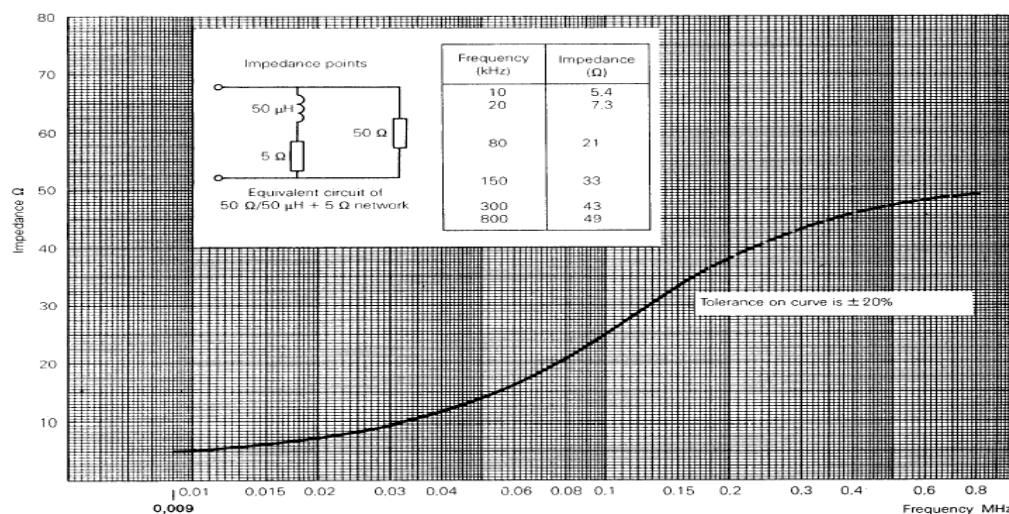


Fig 2. Impedance of LISN



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

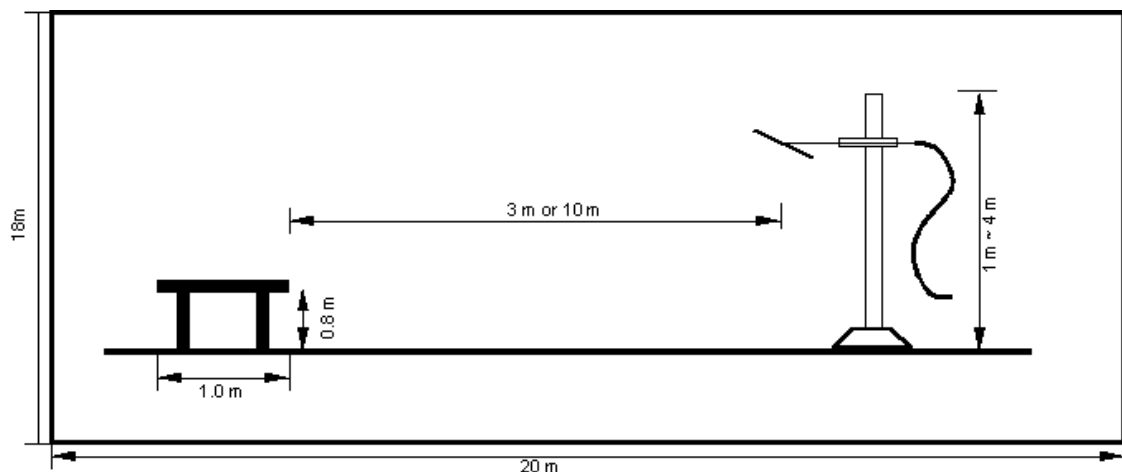


Fig 3. Dimensions of test site.



5. Conducted Emission

5.1 Operating Environment

Temperature : 23°C
Relative Humidity : 40 % 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 & ISN.

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)	± 2.71 dB	Confidence levels of 95 % ($k = 2$)
Conducted emission (150 kHz ~ 30 MHz)	± 3.34 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. 2011
■ - ESH3-Z5	Rohde & Schwarz	LISN	838979/020	12. 10. 2011
■ - ESH2-Z5	Rohde & Schwarz	LISN	829991/009	12. 10. 2011
■ - ISN T8	TESEQ. GmbH	Impedance Network	24568	11. 09. 2011

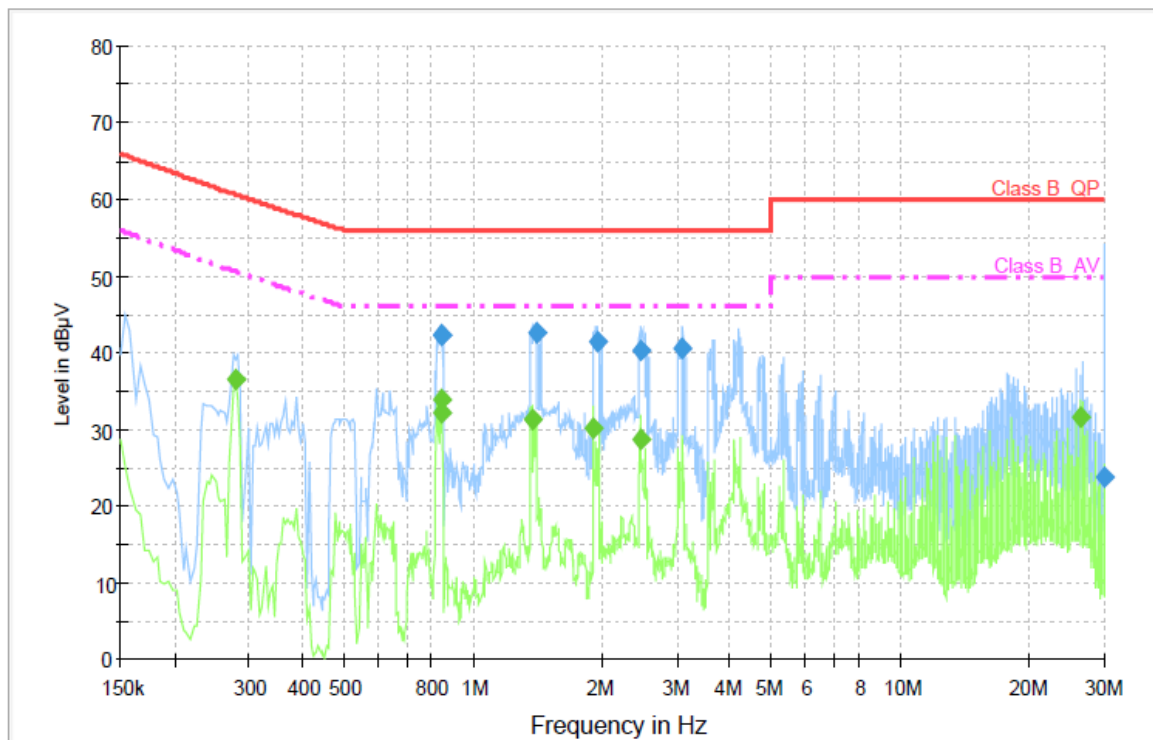
5.6 Test data for Conducted Emission

-. Test Date : January 24, 2011
-. 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
0.842000	42.3	1000.000	9.000	GND	L1	10.1	13.7	56.0	
0.846000	42.4	1000.000	9.000	GND	L1	10.1	13.6	56.0	
1.410000	42.7	1000.000	9.000	GND	L1	10.1	13.3	56.0	
1.954000	41.5	1000.000	9.000	GND	L1	10.2	14.5	56.0	
2.474000	40.4	1000.000	9.000	GND	L1	10.2	15.6	56.0	
3.098000	40.7	1000.000	9.000	GND	L1	10.2	15.3	56.0	
29.846000	23.7	1000.000	9.000	GND	L1	11.4	36.3	60.0	

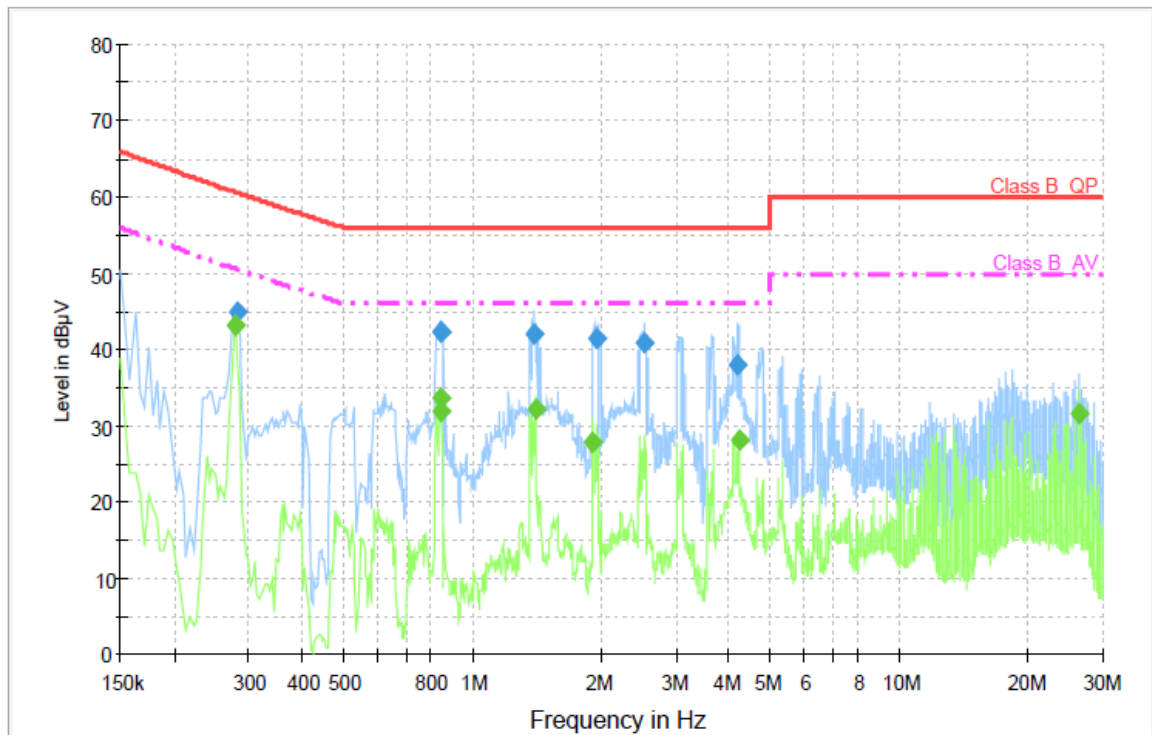
Final Measurement Detector 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.278000	36.4	1000.000	9.000	GND	L1	10.1	14.2	50.6	
0.842000	33.9	1000.000	9.000	GND	L1	10.1	12.1	46.0	
0.846000	32.1	1000.000	9.000	GND	L1	10.1	13.9	46.0	
1.370000	31.4	1000.000	9.000	GND	L1	10.1	14.6	46.0	
1.914000	30.2	1000.000	9.000	GND	L1	10.2	15.8	46.0	
2.458000	28.8	1000.000	9.000	GND	L1	10.2	17.2	46.0	
26.486000	31.6	1000.000	9.000	GND	L1	11.3	18.4	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
0.282000	44.9	1000.000	9.000	GND	N	10.1	15.7	60.6	
0.842000	42.3	1000.000	9.000	GND	N	10.1	13.7	56.0	
0.846000	42.4	1000.000	9.000	GND	N	10.1	13.6	56.0	
1.390000	42.1	1000.000	9.000	GND	N	10.1	13.9	56.0	
1.954000	41.4	1000.000	9.000	GND	N	10.2	14.6	56.0	
2.526000	40.9	1000.000	9.000	GND	N	10.2	15.1	56.0	
4.178000	37.9	1000.000	9.000	GND	N	10.3	18.1	56.0	

Final Measurement Detector 2

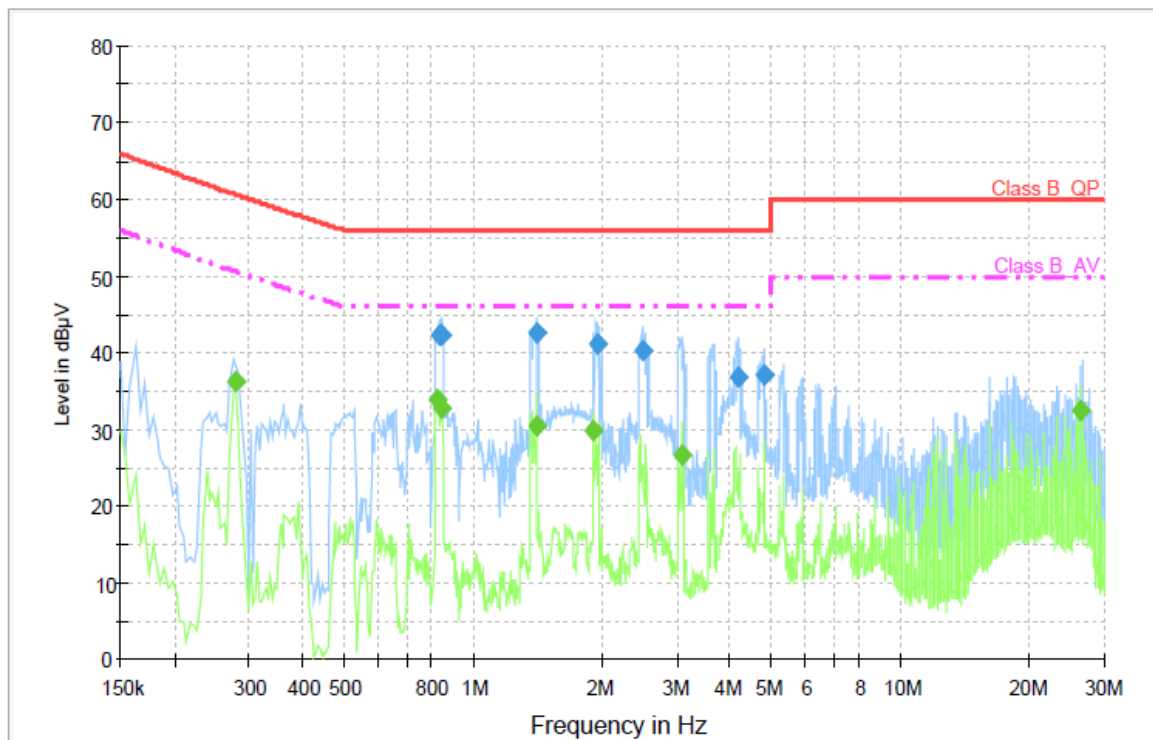
Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.278000	43.3	1000.000	9.000	GND	N	10.1	7.3	50.6	
0.842000	33.6	1000.000	9.000	GND	N	10.1	12.4	46.0	
0.846000	31.8	1000.000	9.000	GND	N	10.1	14.2	46.0	
1.406000	32.1	1000.000	9.000	GND	N	10.1	13.9	46.0	
1.910000	27.9	1000.000	9.000	GND	N	10.2	18.1	46.0	
4.226000	28.3	1000.000	9.000	GND	N	10.3	17.7	46.0	
26.486000	31.7	1000.000	9.000	GND	N	10.7	18.3	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
0.838000	42.2	1000.000	9.000	GND	L1	10.1	13.8	56.0	
0.846000	42.5	1000.000	9.000	GND	L1	10.1	13.5	56.0	
1.406000	42.6	1000.000	9.000	GND	L1	10.1	13.4	56.0	
1.950000	41.2	1000.000	9.000	GND	L1	10.2	14.8	56.0	
2.498000	40.4	1000.000	9.000	GND	L1	10.2	15.6	56.0	
4.150000	36.9	1000.000	9.000	GND	L1	10.3	19.1	56.0	
4.778000	37.2	1000.000	9.000	GND	L1	10.3	18.8	56.0	

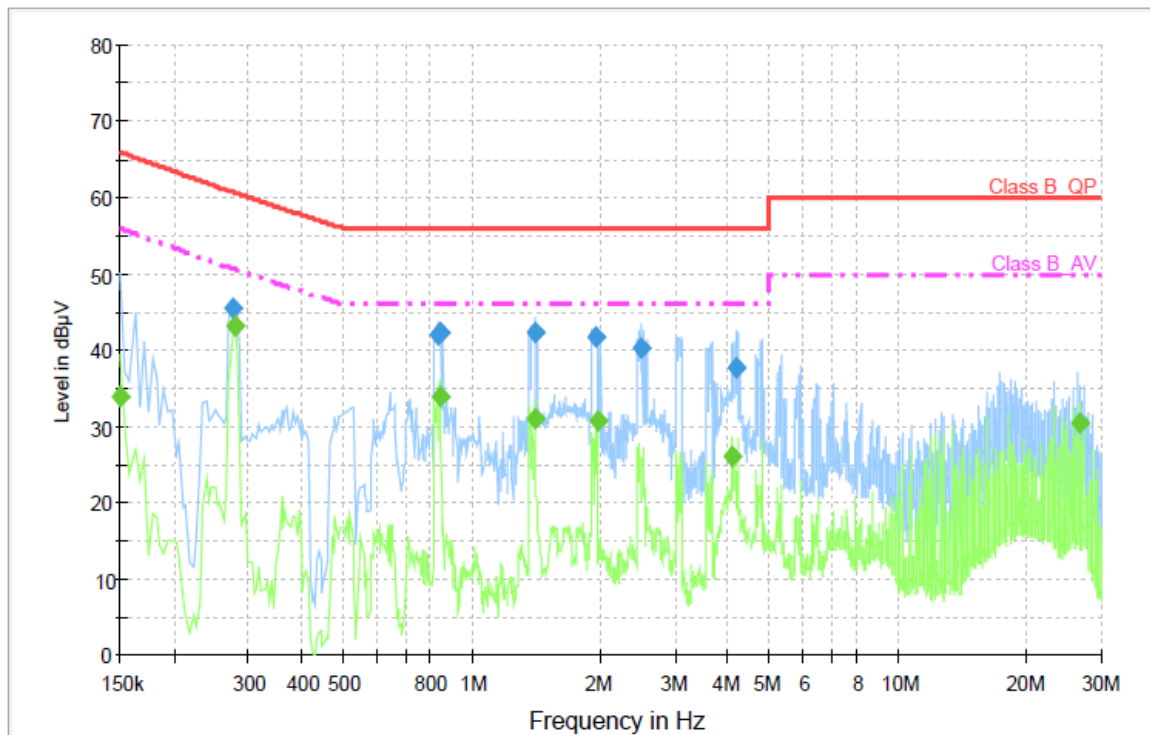
Final Measurement Detector 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.278000	36.3	1000.000	9.000	GND	L1	10.1	14.3	50.6	
0.822000	33.8	1000.000	9.000	GND	L1	10.1	12.2	46.0	
0.846000	32.6	1000.000	9.000	GND	L1	10.1	13.4	46.0	
1.410000	30.5	1000.000	9.000	GND	L1	10.1	15.5	46.0	
1.914000	29.8	1000.000	9.000	GND	L1	10.2	16.2	46.0	
3.098000	26.8	1000.000	9.000	GND	L1	10.2	19.2	46.0	
26.486000	32.6	1000.000	9.000	GND	L1	11.3	17.4	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
0.274000	45.5	1000.000	9.000	GND	N	10.1	15.3	60.8	
0.834000	42.0	1000.000	9.000	GND	N	10.1	14.0	56.0	
0.846000	42.3	1000.000	9.000	GND	N	10.1	13.7	56.0	
1.410000	42.5	1000.000	9.000	GND	N	10.1	13.5	56.0	
1.962000	41.8	1000.000	9.000	GND	N	10.2	14.2	56.0	
2.494000	40.2	1000.000	9.000	GND	N	10.2	15.8	56.0	
4.174000	37.7	1000.000	9.000	GND	N	10.3	18.3	56.0	

Final Measurement Detector 2

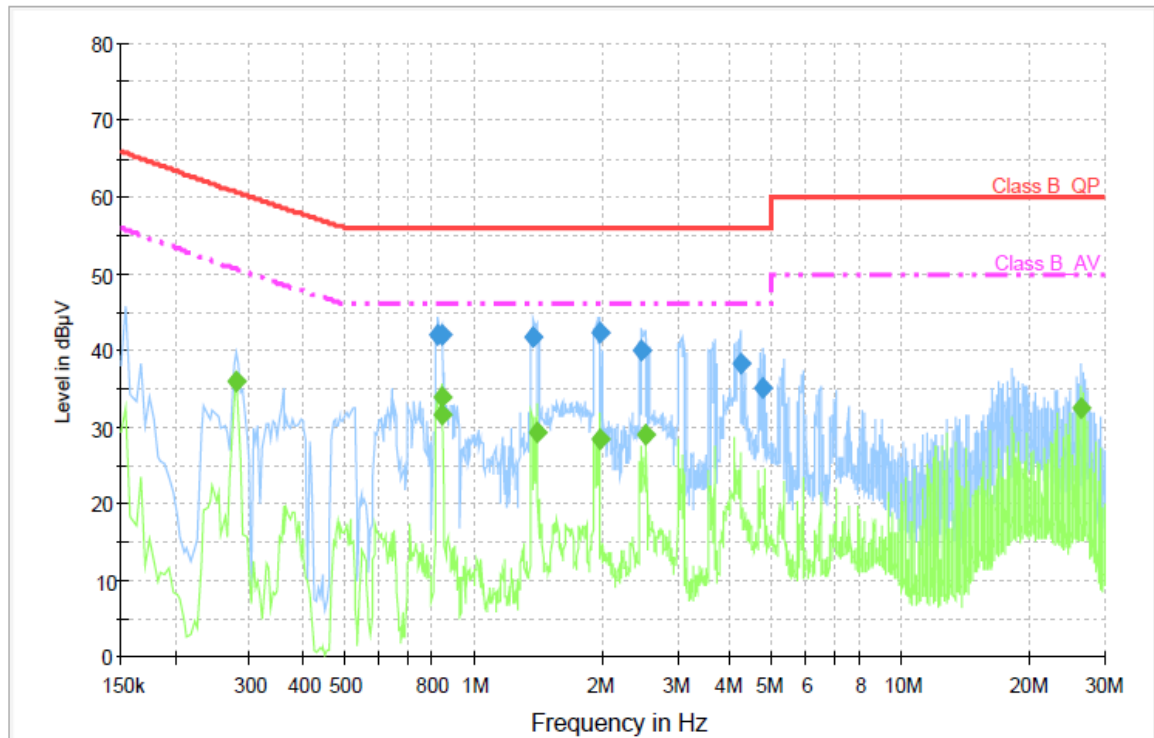
Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.150000	34.0	1000.000	9.000	GND	N	10.1	22.0	56.0	
0.278000	43.2	1000.000	9.000	GND	N	10.1	7.4	50.6	
0.842000	34.0	1000.000	9.000	GND	N	10.1	12.0	46.0	
1.410000	30.9	1000.000	9.000	GND	N	10.1	15.1	46.0	
1.970000	30.7	1000.000	9.000	GND	N	10.2	15.3	46.0	
4.098000	26.1	1000.000	9.000	GND	N	10.3	19.9	46.0	
26.546000	30.3	1000.000	9.000	GND	N	10.7	19.7	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
0.826000	41.9	1000.000	9.000	GND	L1	10.1	14.1	56.0	
0.846000	42.1	1000.000	9.000	GND	L1	10.1	13.9	56.0	
1.382000	41.8	1000.000	9.000	GND	L1	10.1	14.2	56.0	
1.970000	42.2	1000.000	9.000	GND	L1	10.2	13.8	56.0	
2.478000	40.1	1000.000	9.000	GND	L1	10.2	15.9	56.0	
4.202000	38.2	1000.000	9.000	GND	L1	10.3	17.8	56.0	
4.746000	35.0	1000.000	9.000	GND	L1	10.3	21.0	56.0	

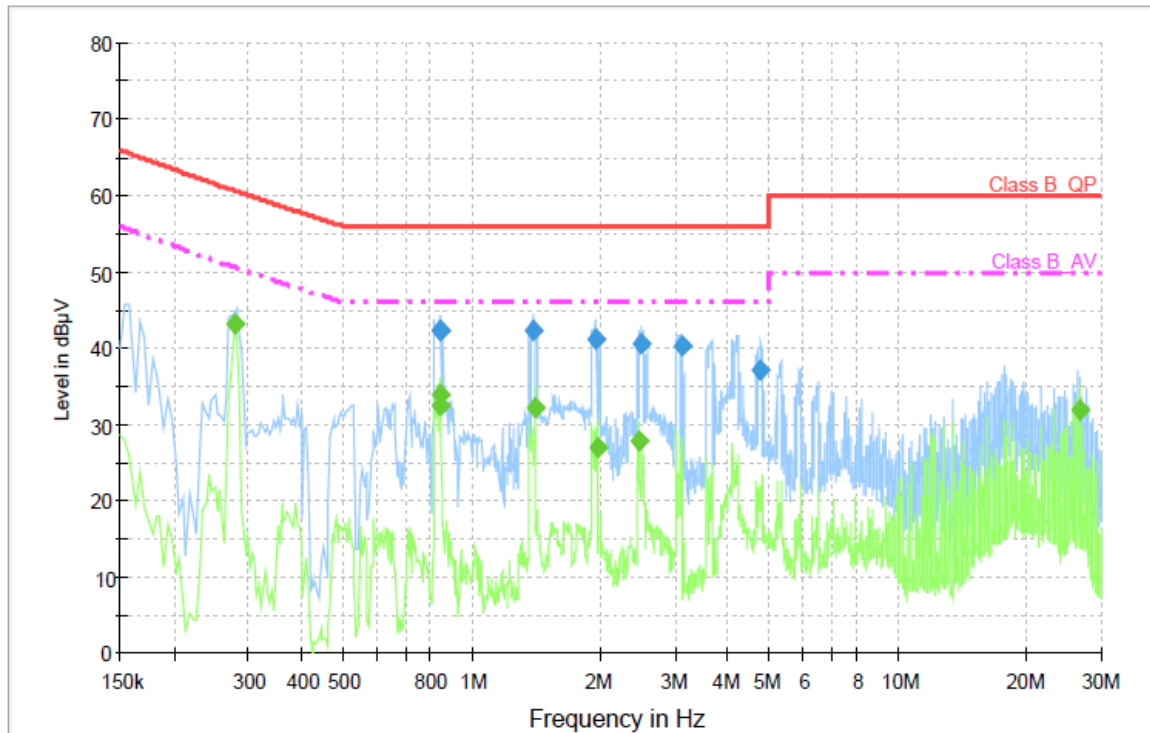
Final Measurement Detector 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.278000	36.0	1000.000	9.000	GND	L1	10.1	14.6	50.6	
0.842000	34.0	1000.000	9.000	GND	L1	10.1	12.0	46.0	
0.846000	31.5	1000.000	9.000	GND	L1	10.1	14.5	46.0	
1.410000	29.3	1000.000	9.000	GND	L1	10.1	16.7	46.0	
1.974000	28.5	1000.000	9.000	GND	L1	10.2	17.5	46.0	
2.534000	29.1	1000.000	9.000	GND	L1	10.2	16.9	46.0	
26.486000	32.5	1000.000	9.000	GND	L1	11.3	17.5	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
0.842000	42.4	1000.000	9.000	GND	N	10.1	13.6	56.0	
0.846000	42.3	1000.000	9.000	GND	N	10.1	13.7	56.0	
1.398000	42.2	1000.000	9.000	GND	N	10.1	13.8	56.0	
1.946000	41.2	1000.000	9.000	GND	N	10.2	14.8	56.0	
2.506000	40.5	1000.000	9.000	GND	N	10.2	15.5	56.0	
3.102000	40.2	1000.000	9.000	GND	N	10.2	15.8	56.0	
4.770000	37.1	1000.000	9.000	GND	N	10.3	18.9	56.0	

Final Measurement Detector 2

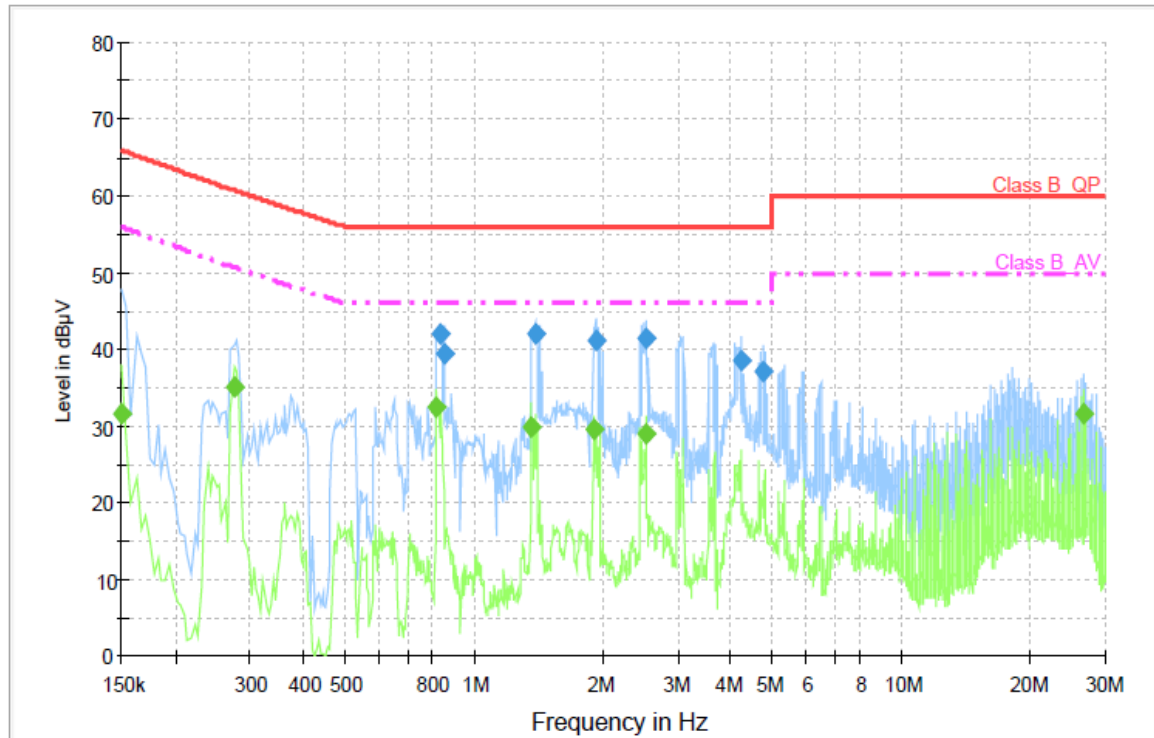
Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.278000	43.2	1000.000	9.000	GND	N	10.1	7.4	50.6	
0.842000	34.0	1000.000	9.000	GND	N	10.1	12.0	46.0	
0.846000	32.4	1000.000	9.000	GND	N	10.1	13.6	46.0	
1.406000	32.3	1000.000	9.000	GND	N	10.1	13.7	46.0	
1.974000	27.1	1000.000	9.000	GND	N	10.2	18.9	46.0	
2.458000	27.8	1000.000	9.000	GND	N	10.2	18.2	46.0	
26.610000	31.8	1000.000	9.000	GND	N	10.7	18.2	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
0.834000	42.0	1000.000	9.000	GND	L1	10.1	14.0	56.0	
0.850000	39.3	1000.000	9.000	GND	L1	10.1	16.7	56.0	
1.390000	41.9	1000.000	9.000	GND	L1	10.1	14.1	56.0	
1.922000	41.2	1000.000	9.000	GND	L1	10.2	14.8	56.0	
2.530000	41.4	1000.000	9.000	GND	L1	10.2	14.6	56.0	
4.210000	38.6	1000.000	9.000	GND	L1	10.3	17.4	56.0	
4.766000	37.2	1000.000	9.000	GND	L1	10.3	18.8	56.0	

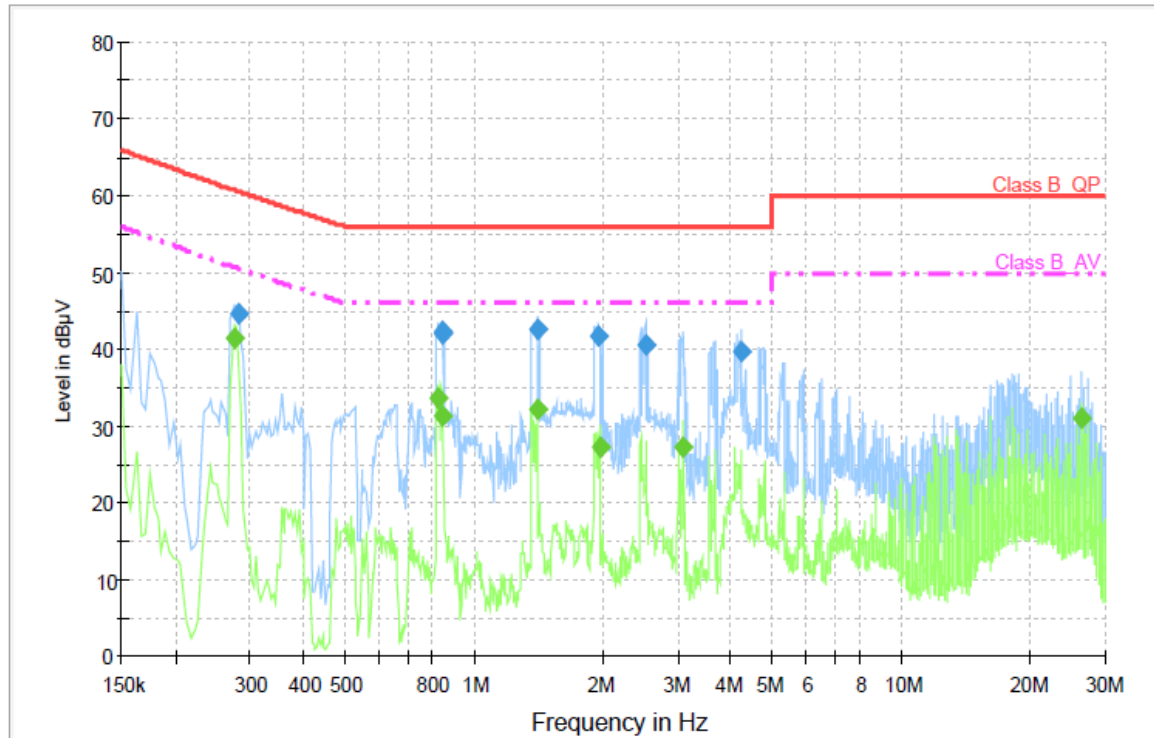
Final Measurement Detector 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.150000	31.7	1000.000	9.000	GND	L1	10.1	24.3	56.0	
0.274000	35.2	1000.000	9.000	GND	L1	10.1	15.6	50.8	
0.818000	32.6	1000.000	9.000	GND	L1	10.1	13.4	46.0	
1.362000	29.7	1000.000	9.000	GND	L1	10.1	16.3	46.0	
1.910000	29.6	1000.000	9.000	GND	L1	10.2	16.4	46.0	
2.530000	29.0	1000.000	9.000	GND	L1	10.2	17.0	46.0	
26.610000	31.7	1000.000	9.000	GND	L1	11.3	18.3	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
0.282000	44.7	1000.000	9.000	GND	N	10.1	15.9	60.6	
0.842000	42.3	1000.000	9.000	GND	N	10.1	13.7	56.0	
0.846000	42.1	1000.000	9.000	GND	N	10.1	13.9	56.0	
1.406000	42.6	1000.000	9.000	GND	N	10.1	13.4	56.0	
1.966000	41.9	1000.000	9.000	GND	N	10.2	14.1	56.0	
2.514000	40.6	1000.000	9.000	GND	N	10.2	15.4	56.0	
4.222000	39.7	1000.000	9.000	GND	N	10.3	16.3	56.0	

Final Measurement Detector 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.274000	41.5	1000.000	9.000	GND	N	10.1	9.3	50.8	
0.822000	33.5	1000.000	9.000	GND	N	10.1	12.5	46.0	
0.846000	31.2	1000.000	9.000	GND	N	10.1	14.8	46.0	
1.406000	32.1	1000.000	9.000	GND	N	10.1	13.9	46.0	
1.974000	27.2	1000.000	9.000	GND	N	10.2	18.8	46.0	
3.094000	27.3	1000.000	9.000	GND	N	10.2	18.7	46.0	
26.486000	31.2	1000.000	9.000	GND	N	10.7	18.8	50.0	

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



6. Radiated Emission

6.1 Operating Environment

Temperature : 24 °C
Relative Humidity : 36 % 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(Anechoic 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

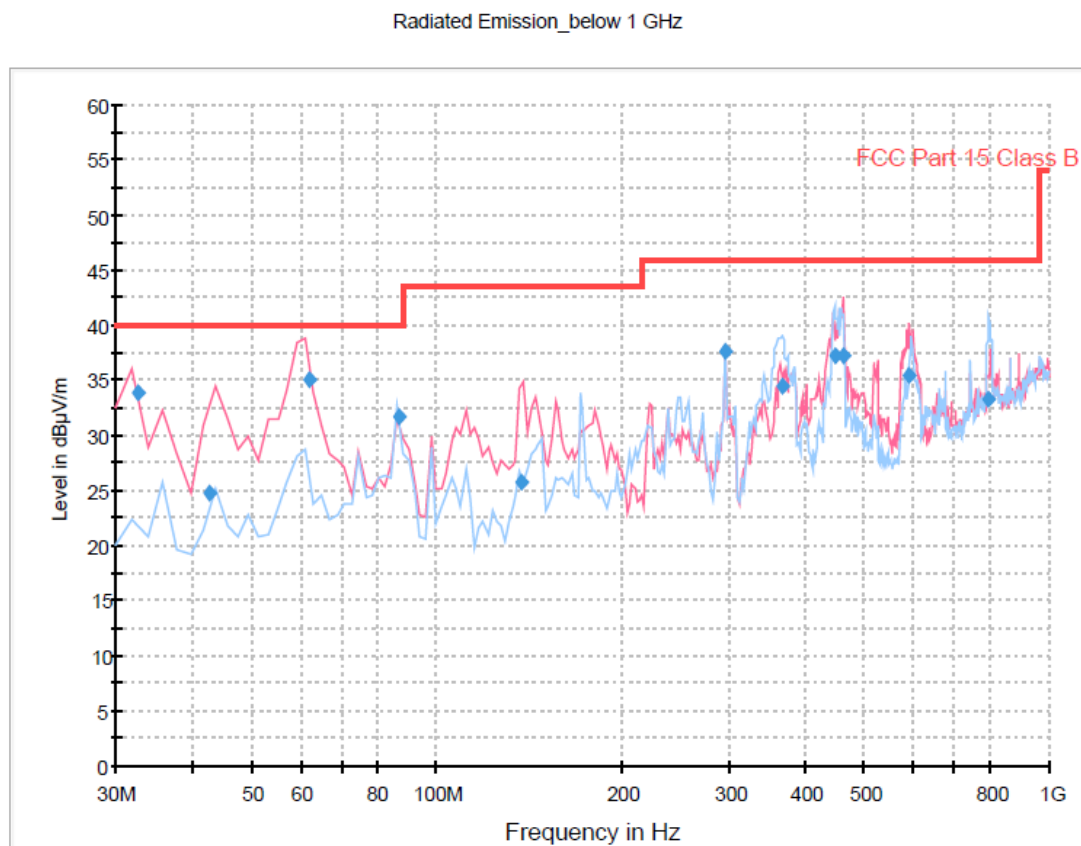
Model Name	Manufacturer	Description	Serial Number	Due to Calibration
■ - ESIB26	Rohde & Schwarz	EMI Test Receiver	830482/010	12. 11. 2011
■ - VULB9160	Schwarzbeck	Broadband Test Antenna	3193	03. 15. 2012
■ - BBHA9120D	Schwarzbeck	Horn ANT	207	12. 22. 2011
■ - MCU066	matur GmbH	Position Controller	1390306	N/A
■ - TT2.5SI	matur GmbH	Turntable	1390307	N/A
■ - AM 4.0	matur GmbH	Antenna Mast	1390308	N/A
■ - AFS 44 00101800-25-10P-44	MITEQ	Preamplifier	1258943	11. 12. 2011

6.6 Test data for Radiated Emission

- Test Date : January 21, 2011
- Resolution Bandwidth : 120 kHz/1 MHz
- Frequency Range : 30 MHz ~ 5 000 MHz
- Measurement Distance : 3 m
- Note : The highest frequency of the internal source of the EUT is between 500 MHz and 1 000 MHz (796 MHz). The measurement was made up to 5 000 MHz



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



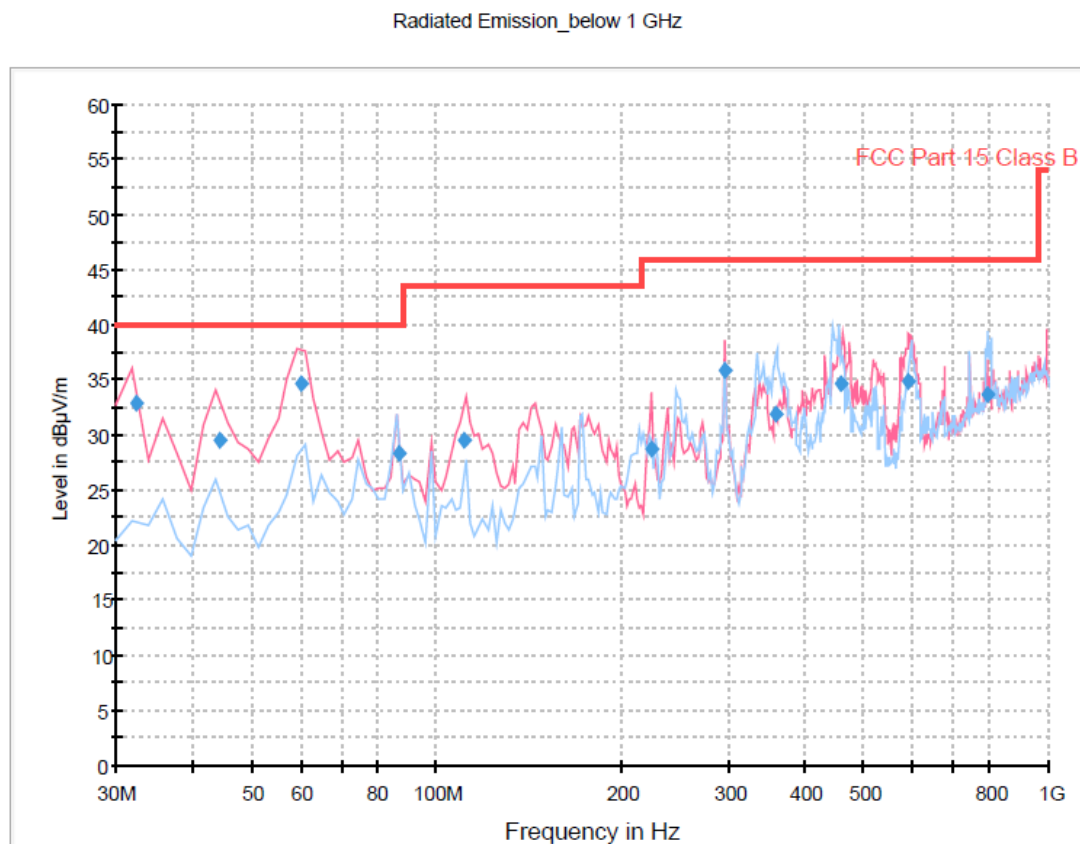
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
32.603888	33.9	1000.0	120.000	100.0	V	10.0	12.9	6.1	40.0
42.507214	24.8	1000.0	120.000	100.0	V	15.0	13.3	15.2	40.0
61.882204	35.0	1000.0	120.000	100.0	V	297.0	13.2	5.0	40.0
86.632745	31.8	1000.0	120.000	224.0	H	15.0	9.9	8.2	40.0
138.157715	25.8	1000.0	120.000	100.0	V	292.0	14.7	17.7	43.5
296.972625	37.7	1000.0	120.000	100.0	H	173.0	16.4	8.3	46.0
367.472585	34.5	1000.0	120.000	100.0	H	312.0	18.4	11.5	46.0
445.891984	37.1	1000.0	120.000	100.0	H	310.0	20.9	8.9	46.0
460.683086	37.3	1000.0	120.000	100.0	V	92.0	21.2	8.7	46.0
590.523567	35.4	1000.0	120.000	185.0	V	334.0	24.5	10.6	46.0
795.551784	33.3	1000.0	120.000	174.0	H	251.0	28.5	12.7	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)
32.483888	32.8	1000.0	120.000	100.0	V	272.0	12.9	7.2	40.0
44.227214	29.5	1000.0	120.000	100.0	V	284.0	13.4	10.5	40.0
60.098317	34.6	1000.0	120.000	100.0	V	329.0	13.5	5.4	40.0
86.632745	28.4	1000.0	120.000	213.0	H	15.0	9.9	11.6	40.0
111.383287	29.5	1000.0	120.000	100.0	V	-11.0	12.5	14.0	43.5
224.648778	28.8	1000.0	120.000	200.0	V	356.0	13.1	17.2	46.0
296.972625	35.7	1000.0	120.000	100.0	V	-5.0	16.4	10.3	46.0
358.960922	31.8	1000.0	120.000	116.0	H	303.0	18.2	14.2	46.0
456.411423	34.7	1000.0	120.000	100.0	H	310.0	21.2	11.3	46.0
590.323567	34.8	1000.0	120.000	100.0	V	309.0	24.5	11.2	46.0
795.831784	33.6	1000.0	120.000	160.0	H	303.0	28.5	12.4	46.0

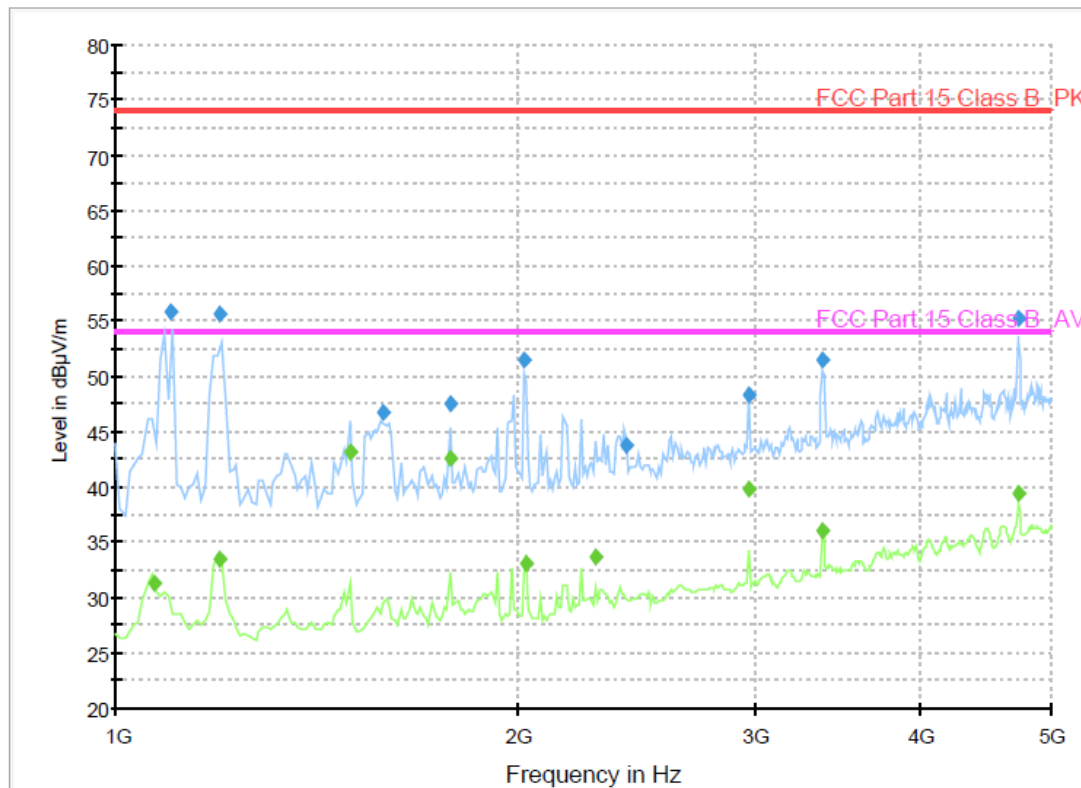
< Fig 15. Radiated emission result (30 MHz ~ 1 000 MHz) >



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

Green trace: Average detector, Blue trace: Peak detector

Radiated Emission_above 1 GHz



Final Result 1

Frequency (MHz)	MaxPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1101.208417	55.9	100.0	1000.000	100.0	V	0.0	-14.1	18.1	74.0
1195.800802	55.6	100.0	1000.000	100.0	V	24.0	-13.7	18.4	74.0
1582.154309	46.8	100.0	1000.000	100.0	H	233.0	-12.7	27.2	74.0
1782.555110	47.5	100.0	1000.000	200.0	H	203.0	-12.2	26.5	74.0
2021.036072	51.4	100.0	1000.000	100.0	V	219.0	-11.6	22.6	74.0
2406.605611	43.7	100.0	1000.000	200.0	H	331.0	-9.8	30.3	74.0
2970.143888	48.3	100.0	1000.000	100.0	V	357.0	-7.5	25.7	74.0
3373.345491	51.4	100.0	1000.000	100.0	H	302.0	-6.0	22.6	74.0
4720.038878	55.2	100.0	1000.000	100.0	H	240.0	-1.8	18.8	74.0

Final Result 2

Frequency (MHz)	Average (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1068.728257	31.2	100.0	1000.000	100.0	V	0.0	-14.2	22.8	54.0
1196.584770	33.5	100.0	1000.000	100.0	V	24.0	-13.7	20.5	54.0
1500.393988	43.2	100.0	1000.000	139.0	H	42.0	-13.0	10.8	54.0
1782.555110	42.7	100.0	1000.000	200.0	H	203.0	-12.2	11.3	54.0
2023.452104	33.0	100.0	1000.000	121.0	V	297.0	-11.5	21.0	54.0
2286.765130	33.7	100.0	1000.000	130.0	V	199.0	-10.3	20.3	54.0
2969.743888	39.9	100.0	1000.000	100.0	H	68.0	-7.5	14.2	54.0
3372.545491	35.9	100.0	1000.000	100.0	H	302.0	-6.0	18.1	54.0
4721.238878	39.4	100.0	1000.000	100.0	H	240.0	-1.8	14.6	54.0

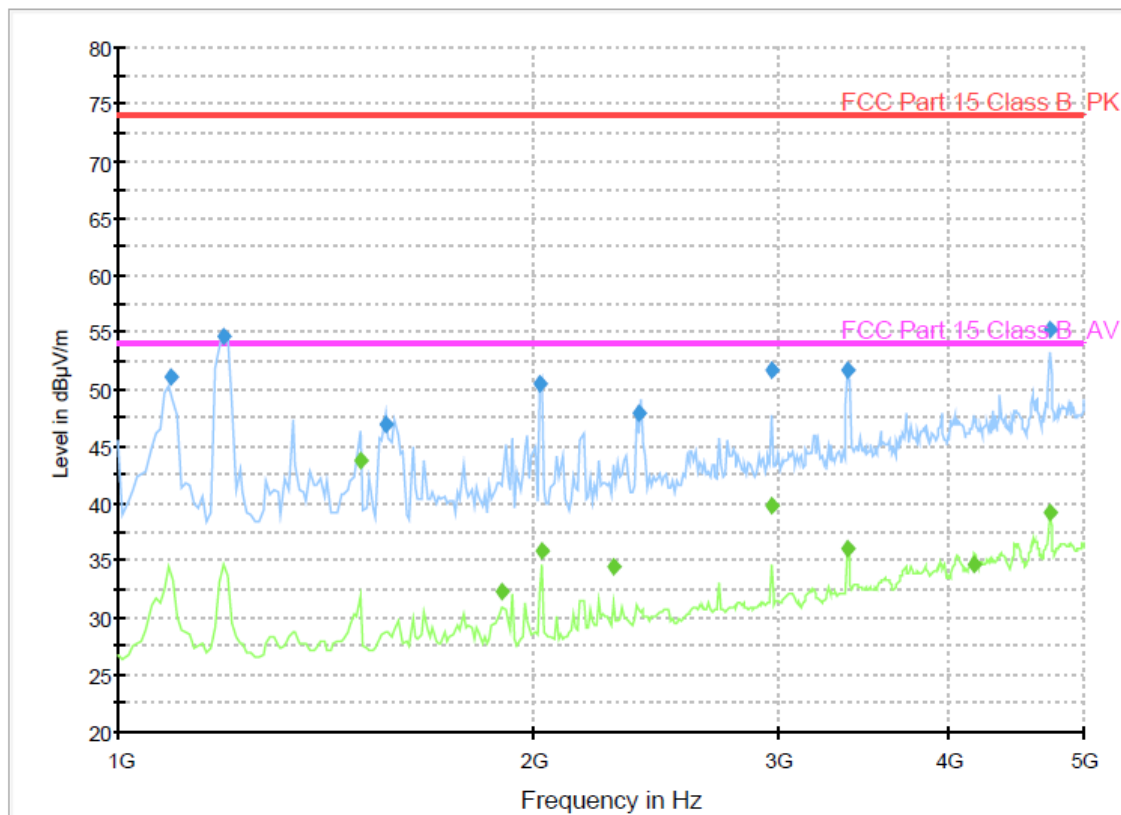
< Fig 17. Radiated emission result (1 000 MHz ~ 5 000 MHz) >



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

Green trace: Average detector, Blue trace: Peak detector

Radiated Emission_above 1 GHz



Final Result 1

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1089.976353	51.1	100.0	1000.000	100.0	V	0.0	-14.1	22.9	74.0
1193.784770	54.7	100.0	1000.000	100.0	V	30.0	-13.7	19.3	74.0
1562.522245	47.0	100.0	1000.000	122.0	V	9.0	-12.8	27.0	74.0
2021.452104	50.6	100.0	1000.000	100.0	H	0.0	-11.5	23.4	74.0
2385.373547	48.0	100.0	1000.000	100.0	H	85.0	-9.9	26.0	74.0
2970.143888	51.7	100.0	1000.000	182.0	H	72.0	-7.5	22.3	74.0
3372.945491	51.8	100.0	1000.000	100.0	H	302.0	-6.0	22.2	74.0
4722.454910	55.2	100.0	1000.000	130.0	H	220.0	-1.8	18.8	74.0

Final Result 2

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1500.393988	43.9	100.0	1000.000	188.0	H	38.0	-13.0	10.1	54.0
1893.195591	32.3	100.0	1000.000	147.0	H	206.0	-12.1	21.7	54.0
2023.452104	35.8	100.0	1000.000	100.0	V	219.0	-11.5	18.2	54.0
2286.765130	34.5	100.0	1000.000	100.0	V	212.0	-10.3	19.5	54.0
2969.743888	39.8	100.0	1000.000	173.0	H	72.0	-7.5	14.2	54.0
3372.545491	36.0	100.0	1000.000	100.0	H	302.0	-6.0	18.0	54.0
4168.132665	34.7	100.0	1000.000	200.0	H	0.0	-3.0	19.3	54.0
4722.454910	39.2	100.0	1000.000	130.0	H	220.0	-1.8	14.8	54.0

< Fig 18. Radiated emission result (1 000 MHz ~ 5 000 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. LED LCD TV/Monitor (Model Name: 65LW6500-UA)** was complies with §15.107 and 15.109 of the FCC Rules.