

FCC EVALUATION REPORT FOR CERTIFICATION

Applicant : LG Electronics Inc.

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

Pyeongteak-si, Gyeonggi-do, Korea.

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

Date of Issue : December 16, 2009

Order Number: GETEC-C1-09-254

Test Report Number: GETEC-E3-09-149

Test Site: Gumi College EMC Center

FCC Registration Number: (100749, 443957)

FCC ID.: BEJ32LD550UB

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	: 32LD550-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 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,



Hyoung Seop Kim, Associate 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. Sang-Wook Lee, Chief research engineer

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- **FCC ID.** BEJ32LD550UB
- **EUT Type** LCD TV/Monitor
- **Model Name** 32LD550-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** December 8 ~ 9, 2009
- **Place of Test** **Gumi College EMC Center** (FCC Registration Number: 100749, 443957)
407, Bugok-dong, Gumi-si, Gyeongbuk, Korea.
- **Test Report Number** GETEC-E3-09-149
- **Dates of Issue** December 16, 2009

EUT Type: LCD TV/Monitor

FCC ID.: BEJ32LD550UB



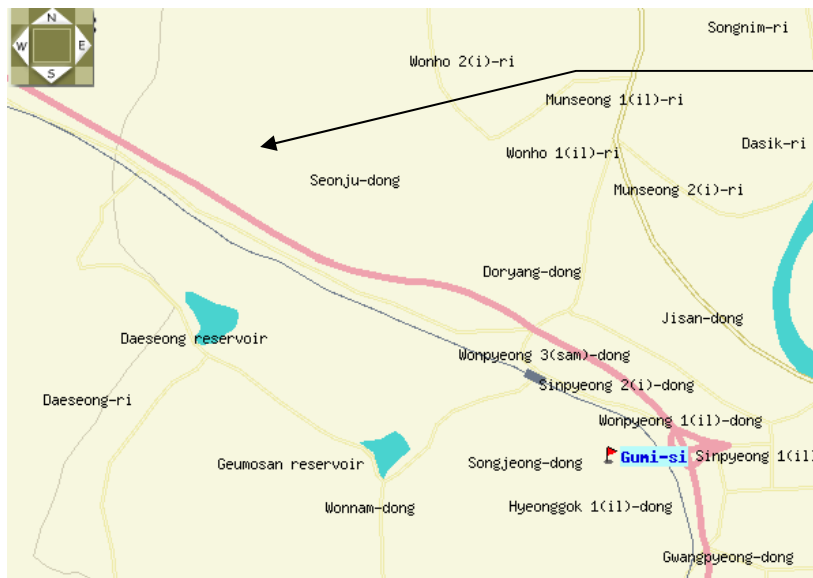
2. Introduction

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: 32LD550-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 §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: 32LD550-UB) FCC ID.: BEJ32LD550UB**

MODELS		32LD550 (32LD550-UB)	42LD550 (42LD550-UB)	46LD550 (46LD550-UB)
Dimensions (Width x Height x Depth)	With stand	31.5 x 22.2 x 8.1 inches 800.0 x 563.0 x 207.0 mm	40.3 x 27.4 x 10.3 inches 1024.0 x 695.0 x 261.0 mm	43.9 x 29.6 x 10.6 inches 1115.0 x 752.0 x 270.0 mm
	Without stand	31.5 x 19.8 x 2.9 inches 800.0 x 503.0 x 74.7 mm	40.3 x 24.9 x 3.1 inches 1024.0 x 632.0 x 78.7 mm	43.9 x 26.8 x 3.0 inches 1115.0 x 680.0 x 77.0 mm
Weight	With stand	22.4 lbs / 10.2 kg	33.9 lbs / 15.4 kg	41.0 lbs / 18.6 kg
	Without stand	20.2 lbs / 9.2 kg	30.4 lbs / 13.8 kg	36.5 lbs / 16.6 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 ohm		
Environment condition	Operating Temperature	32 ~ 104°F (0 ~ 40°C)		
	Operating Humidity	Less than 80%		
	Storage Temperature	-4 ~ 140°F (-20 ~ 60°C)		
	Storage Humidity	Less than 85%		

Maximum Frequency range : 667 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	ARI RV360(9600)	S/N: SN0402017176 FCC ID: DoC
Keyboard	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
Headset	GOWOONSORI	GW-500M	S/N: N/A 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
Wireless Ready Dongle	LG Electronics Inc.	-	S/N: N/A FCC ID: -

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
Video(RGB) input cable	Connected to the EUT and PC	1.8 m shielded with two ferrite cores
Video(HDMI/DVI) input cable	Connected to the EUT and PC	1.95 m shielded
Audio input cable	Connected to the EUT and PC	1.8 m shielded
RS-232C (Service only)	Connected to the EUT and PC	1.2 m shielded with two ferrite cores
Wireless control cable	Connected to the EUT and Wireless Ready Dongle	0.25 m shielded
Component input cable	Connected to the EUT and DVD Player	2.0 m shielded
Component sound input cable	Connected to the EUT and DVD Player	3.0 m shielded
AV input cable	Connected to the EUT and DVD Player	3.0 m shielded
Headset cable	Connected to the EUT	2.75 m shielded
Antenna cable	Connected to the EUT and TV signal generator	10.0 m shielded
LAN cable	Connected to the EUT and Network	10.0 m unshielded

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),

◆ 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
- . Network connecting

- . USB memory stick play mode

◆ Operating test pattern

- . Continuous play mode of Picture file and 1 kHz audio file.

"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

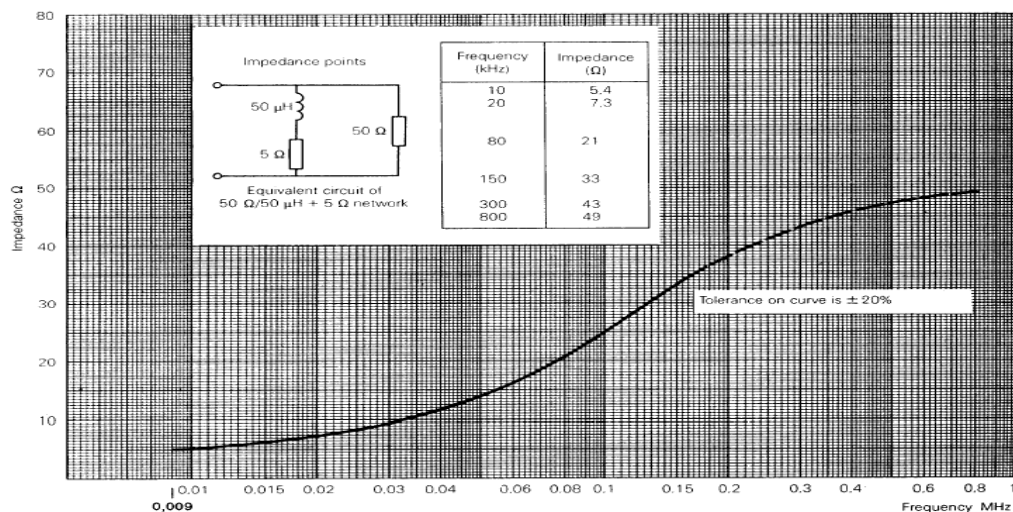


Fig 2. Impedance of LISN



4.3 Radiated Emission

The measurements were conducted in a 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 noted for each frequency found.

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

Above 1 GHz, a 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 an 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 from 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

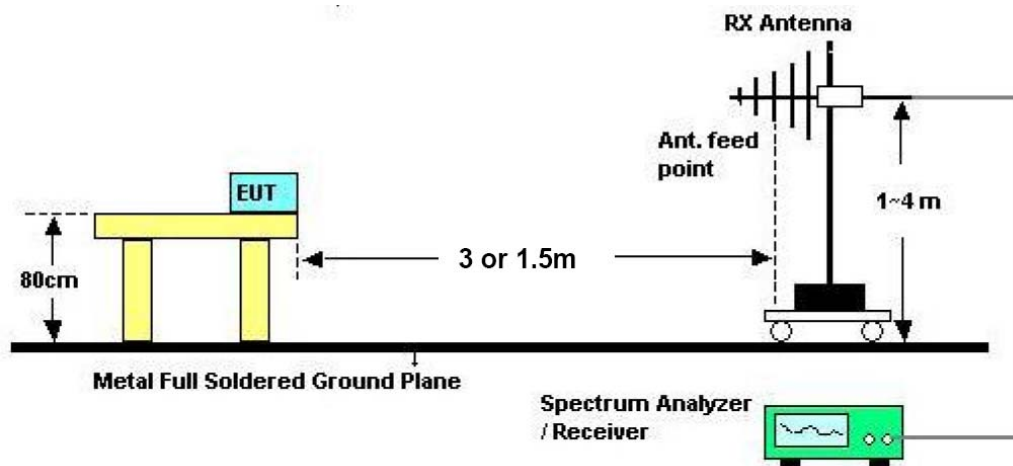


Fig 3. Dimensions of test site.



5. Conducted Emission

5.1 Operating Environment

Temperature : 26 °C
Relative Humidity : 42 % 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) Class B	
	Quasi-Peak	Average
Freq. Range		
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
■ - ISN T8	TESEQ. GmbH	ISN	24568	10. 16. 2010

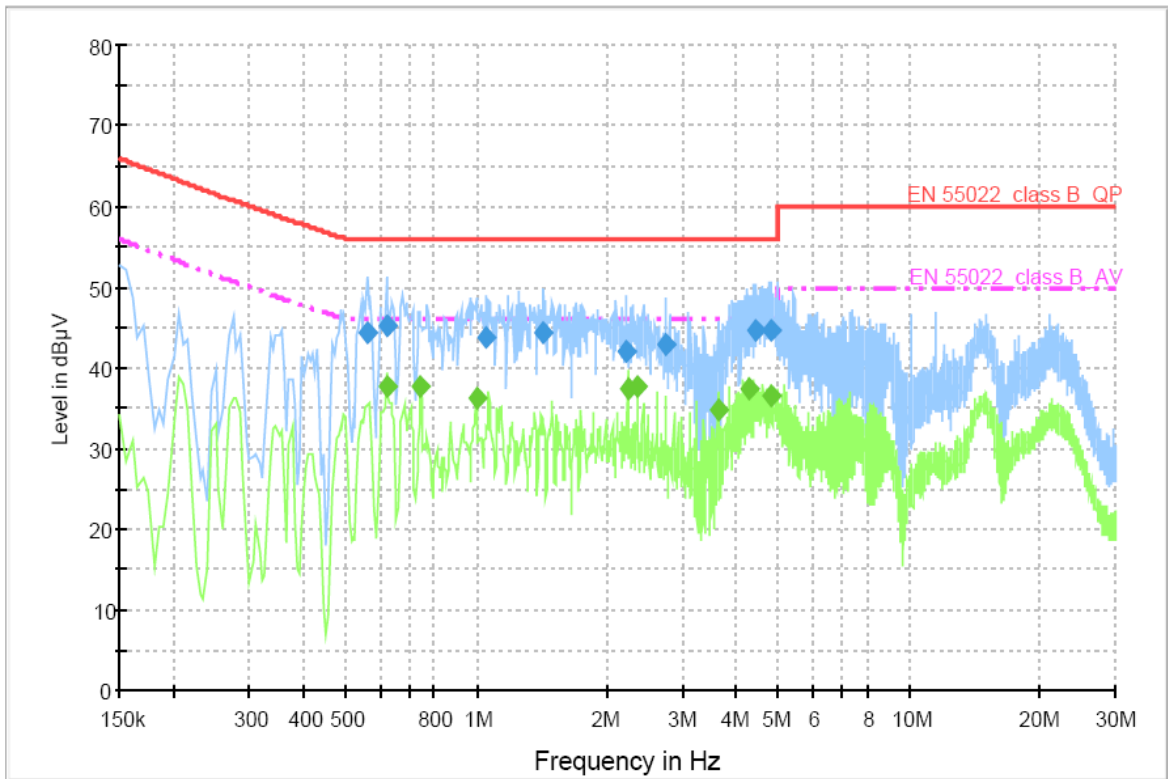
5.6 Test data for Conducted Emission

- Test Date : December 9, 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
0.560000	44.5	1000.000	9.000	GND	L1	10.0	11.5	56.0	
0.620000	45.2	1000.000	9.000	GND	L1	10.0	10.8	56.0	
1.055000	43.8	1000.000	9.000	GND	L1	10.0	12.2	56.0	
1.430000	44.3	1000.000	9.000	GND	L1	10.1	11.7	56.0	
2.215000	42.1	1000.000	9.000	GND	L1	10.1	13.9	56.0	
2.740000	42.8	1000.000	9.000	GND	L1	10.1	13.2	56.0	
4.430000	44.6	1000.000	9.000	GND	L1	10.2	11.4	56.0	
4.805000	44.6	1000.000	9.000	GND	L1	10.2	11.4	56.0	

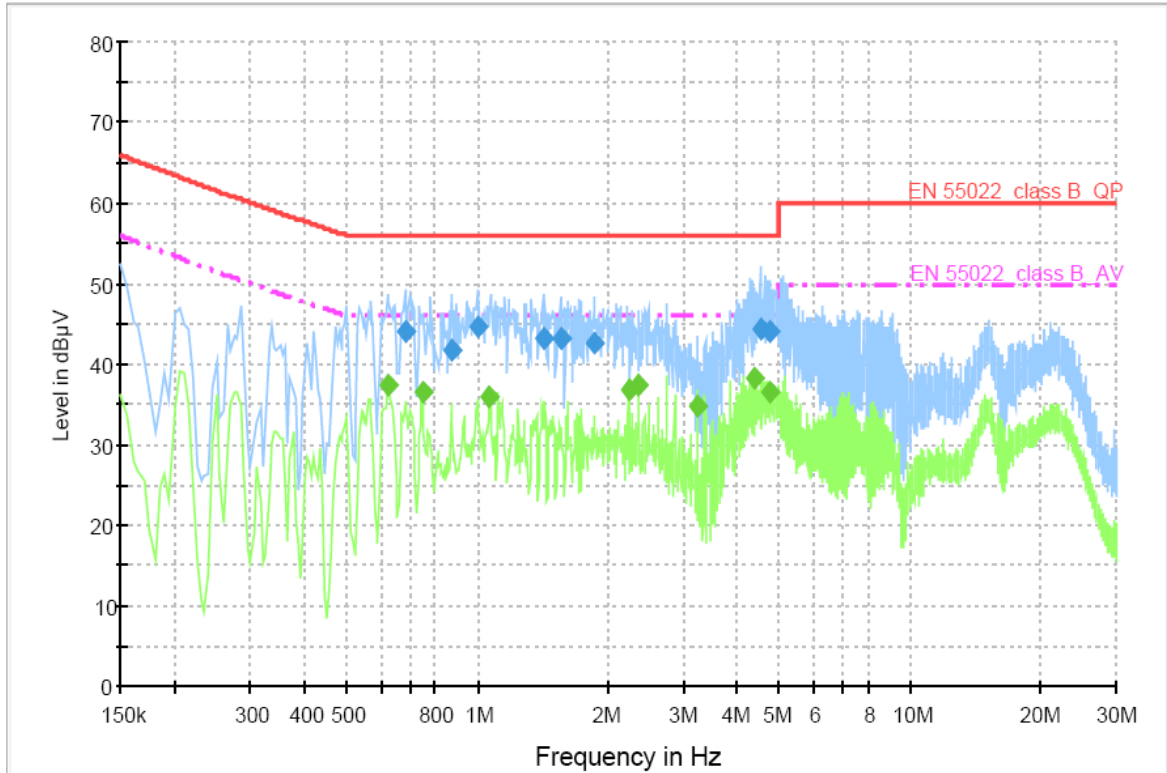
Final Measurement Detector 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.620000	37.6	1000.000	9.000	GND	L1	10.0	8.4	46.0	
0.745000	37.6	1000.000	9.000	GND	L1	10.0	8.4	46.0	
1.000000	36.2	1000.000	9.000	GND	L1	10.0	9.8	46.0	
2.240000	37.5	1000.000	9.000	GND	L1	10.1	8.5	46.0	
2.365000	37.8	1000.000	9.000	GND	L1	10.1	8.2	46.0	
3.610000	34.8	1000.000	9.000	GND	L1	10.1	11.2	46.0	
4.250000	37.3	1000.000	9.000	GND	L1	10.2	8.8	46.0	
4.805000	36.6	1000.000	9.000	GND	L1	10.2	9.4	46.0	

< 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
0.680000	44.1	1000.000	9.000	GND	N	10.0	11.9	56.0	
0.870000	41.8	1000.000	9.000	GND	N	10.0	14.2	56.0	
1.000000	44.7	1000.000	9.000	GND	N	10.0	11.3	56.0	
1.420000	43.2	1000.000	9.000	GND	N	10.1	12.8	56.0	
1.560000	43.1	1000.000	9.000	GND	N	10.1	12.9	56.0	
1.860000	42.7	1000.000	9.000	GND	N	10.1	13.3	56.0	
4.505000	44.4	1000.000	9.000	GND	N	10.2	11.6	56.0	
4.735000	44.1	1000.000	9.000	GND	N	10.2	11.9	56.0	

Final Measurement Detector 2

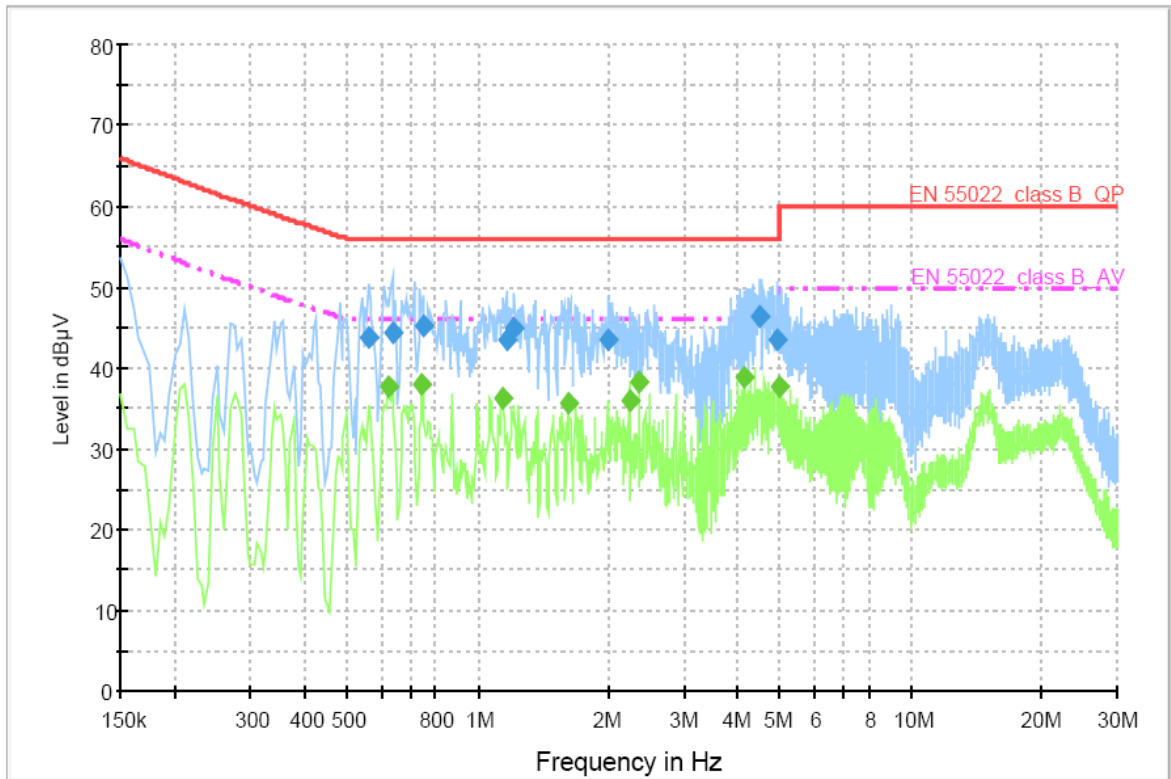
Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.620000	37.3	1000.000	9.000	GND	N	10.0	8.7	46.0	
0.750000	36.5	1000.000	9.000	GND	N	10.0	9.5	46.0	
1.070000	35.8	1000.000	9.000	GND	N	10.1	10.2	46.0	
2.240000	36.9	1000.000	9.000	GND	N	10.1	9.1	46.0	
2.365000	37.4	1000.000	9.000	GND	N	10.1	8.6	46.0	
3.235000	34.7	1000.000	9.000	GND	N	10.1	11.3	46.0	
4.360000	38.1	1000.000	9.000	GND	N	10.2	7.9	46.0	
4.735000	36.7	1000.000	9.000	GND	N	10.2	9.3	46.0	

< 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
0.560000	43.8	1000.000	9.000	GND	L1	10.0	12.2	56.0	
0.635000	44.5	1000.000	9.000	GND	L1	10.0	11.5	56.0	
0.750000	45.2	1000.000	9.000	GND	L1	10.0	10.8	56.0	
1.165000	43.4	1000.000	9.000	GND	L1	10.0	12.6	56.0	
1.215000	44.8	1000.000	9.000	GND	L1	10.0	11.2	56.0	
2.005000	43.4	1000.000	9.000	GND	L1	10.1	12.6	56.0	
4.495000	46.2	1000.000	9.000	GND	L1	10.2	9.8	56.0	
4.900000	43.6	1000.000	9.000	GND	L1	10.2	12.4	56.0	

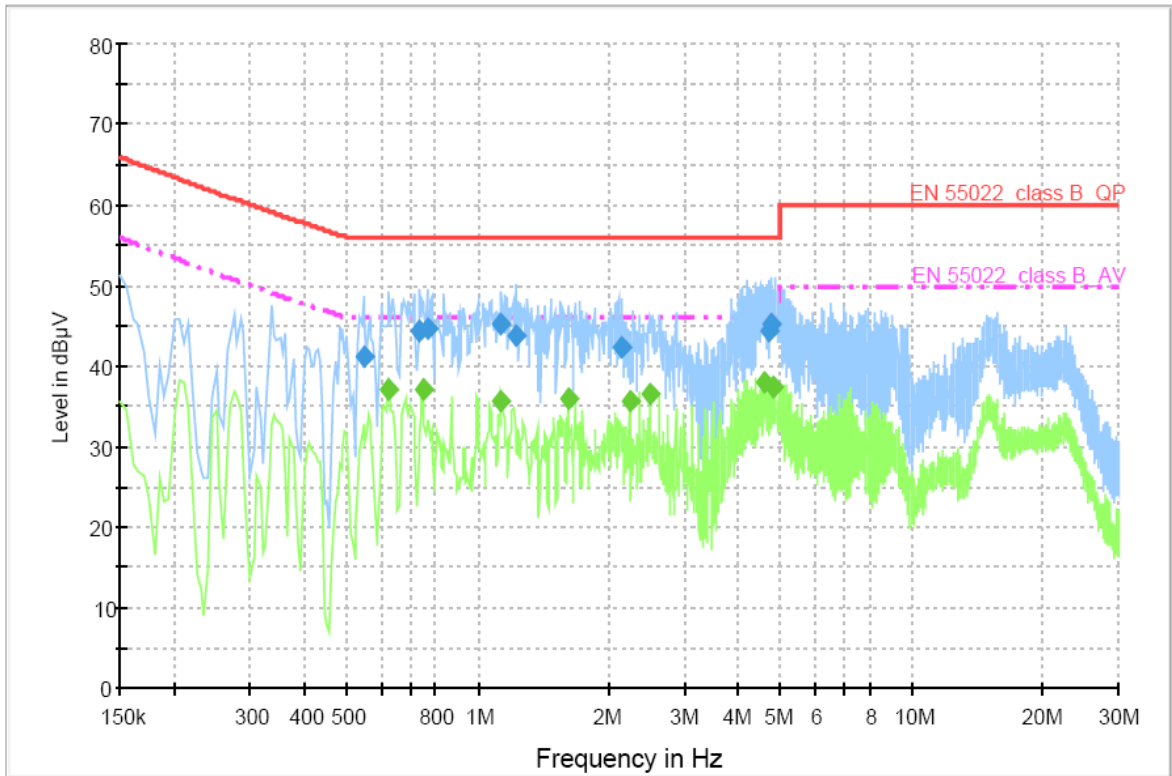
Final Measurement Detector 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.620000	37.5	1000.000	9.000	GND	L1	10.0	8.5	46.0	
0.745000	38.0	1000.000	9.000	GND	L1	10.0	8.0	46.0	
1.140000	36.2	1000.000	9.000	GND	L1	10.0	9.8	46.0	
1.620000	35.6	1000.000	9.000	GND	L1	10.1	10.4	46.0	
2.240000	36.0	1000.000	9.000	GND	L1	10.1	10.0	46.0	
2.365000	38.3	1000.000	9.000	GND	L1	10.1	7.7	46.0	
4.110000	38.9	1000.000	9.000	GND	L1	10.2	7.1	46.0	
4.945000	37.6	1000.000	9.000	GND	L1	10.2	8.4	46.0	

< 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
0.545000	41.2	1000.000	9.000	GND	N	10.0	14.8	56.0	
0.735000	44.4	1000.000	9.000	GND	N	10.0	11.6	56.0	
0.765000	44.6	1000.000	9.000	GND	N	10.0	11.4	56.0	
1.135000	45.2	1000.000	9.000	GND	N	10.1	10.8	56.0	
1.225000	43.8	1000.000	9.000	GND	N	10.1	12.2	56.0	
2.145000	42.3	1000.000	9.000	GND	N	10.1	13.7	56.0	
4.670000	44.3	1000.000	9.000	GND	N	10.2	11.7	56.0	
4.720000	45.2	1000.000	9.000	GND	N	10.2	10.8	56.0	

Final Measurement Detector 2

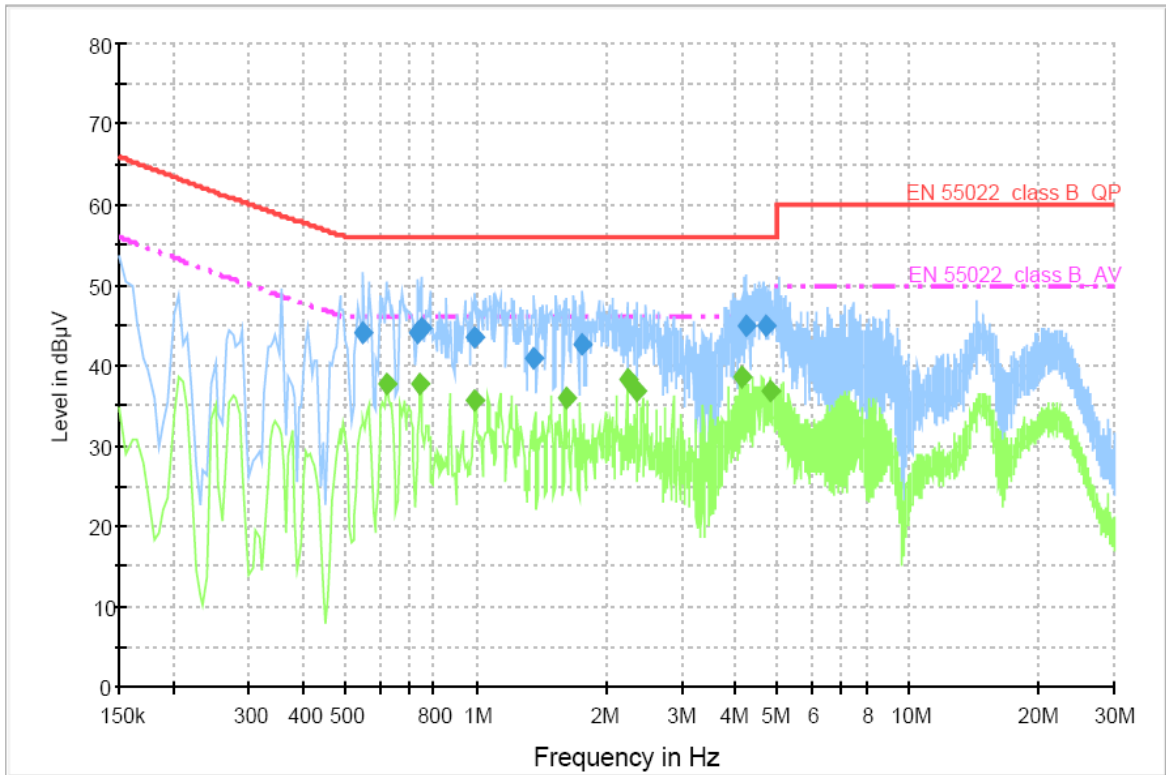
Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.625000	37.2	1000.000	9.000	GND	N	10.0	8.8	46.0	
0.750000	37.1	1000.000	9.000	GND	N	10.0	8.9	46.0	
1.135000	35.6	1000.000	9.000	GND	N	10.1	10.4	46.0	
1.620000	35.9	1000.000	9.000	GND	N	10.1	10.1	46.0	
2.240000	35.6	1000.000	9.000	GND	N	10.1	10.4	46.0	
2.490000	36.5	1000.000	9.000	GND	N	10.1	9.5	46.0	
4.605000	38.1	1000.000	9.000	GND	N	10.2	7.9	46.0	
4.810000	37.5	1000.000	9.000	GND	N	10.2	8.5	46.0	

< 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
0.550000	43.9	1000.000	9.000	GND	L1	10.0	12.1	56.0	
0.735000	44.0	1000.000	9.000	GND	L1	10.0	12.0	56.0	
0.750000	44.7	1000.000	9.000	GND	L1	10.0	11.3	56.0	
0.995000	43.6	1000.000	9.000	GND	L1	10.0	12.4	56.0	
1.365000	40.7	1000.000	9.000	GND	L1	10.1	15.3	56.0	
1.770000	42.7	1000.000	9.000	GND	L1	10.1	13.3	56.0	
4.220000	45.0	1000.000	9.000	GND	L1	10.2	11.0	56.0	
4.700000	44.8	1000.000	9.000	GND	L1	10.2	11.2	56.0	

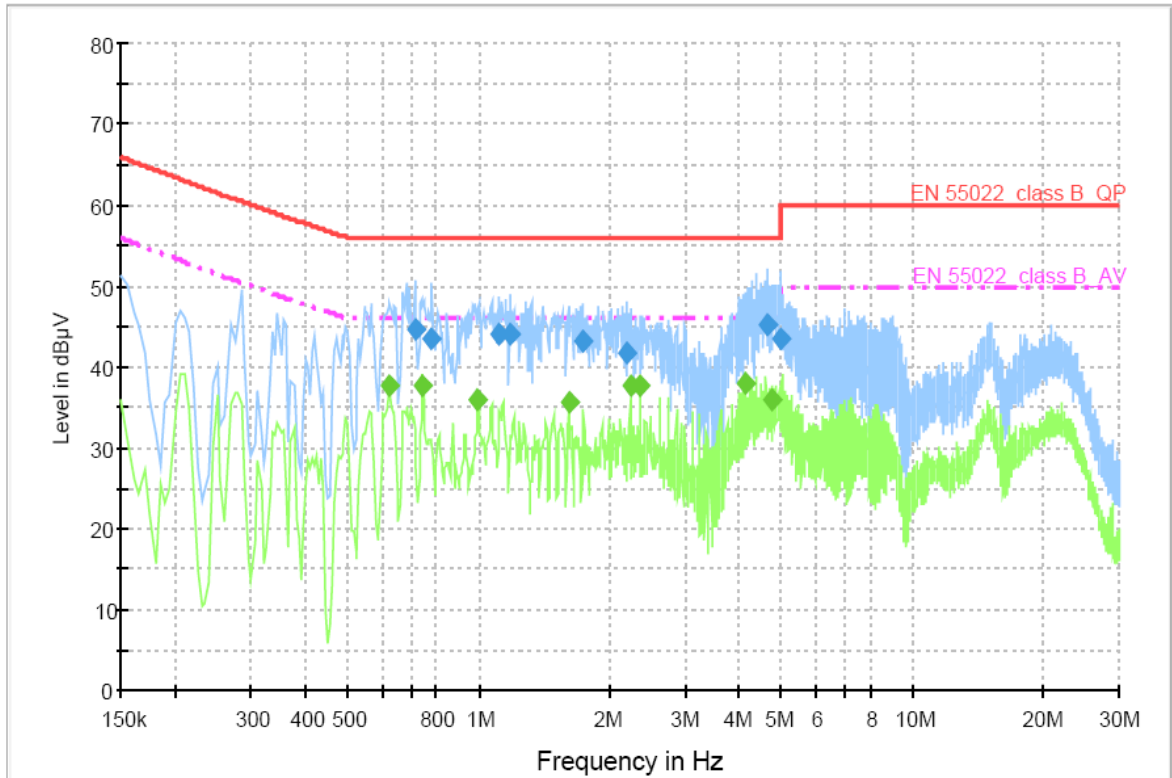
Final Measurement Detector 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.620000	37.8	1000.000	9.000	GND	L1	10.0	8.2	46.0	
0.745000	37.8	1000.000	9.000	GND	L1	10.0	8.2	46.0	
0.995000	35.6	1000.000	9.000	GND	L1	10.0	10.4	46.0	
1.620000	36.0	1000.000	9.000	GND	L1	10.1	10.0	46.0	
2.240000	38.4	1000.000	9.000	GND	L1	10.1	7.6	46.0	
2.365000	36.9	1000.000	9.000	GND	L1	10.1	9.1	46.0	
4.110000	38.4	1000.000	9.000	GND	L1	10.2	7.6	46.0	
4.810000	36.8	1000.000	9.000	GND	L1	10.2	9.2	46.0	

< 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
0.715000	44.6	1000.000	9.000	GND	N	10.0	11.4	56.0	
0.780000	43.5	1000.000	9.000	GND	N	10.0	12.5	56.0	
1.115000	44.1	1000.000	9.000	GND	N	10.1	11.9	56.0	
1.185000	44.0	1000.000	9.000	GND	N	10.1	12.0	56.0	
1.740000	43.2	1000.000	9.000	GND	N	10.1	12.8	56.0	
2.195000	41.7	1000.000	9.000	GND	N	10.1	14.3	56.0	
4.630000	45.1	1000.000	9.000	GND	N	10.2	10.9	56.0	
4.960000	43.5	1000.000	9.000	GND	N	10.2	12.5	56.0	

Final Measurement Detector 2

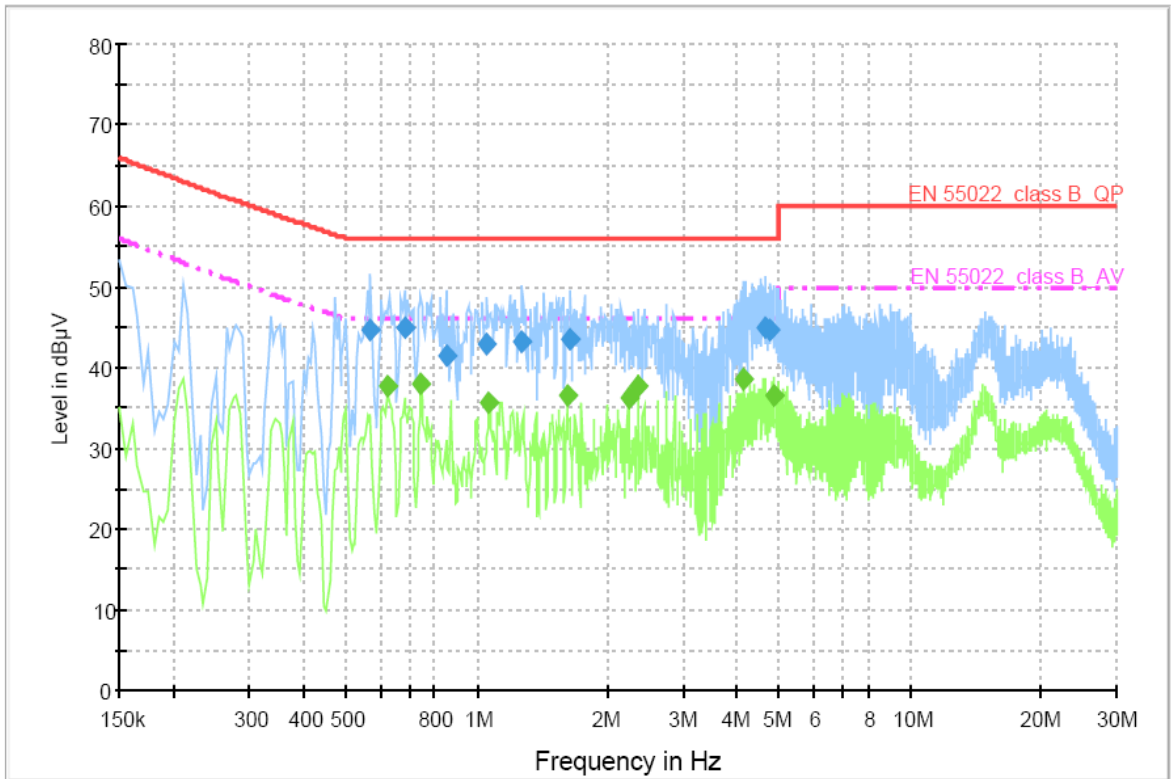
Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.625000	37.6	1000.000	9.000	GND	N	10.0	8.4	46.0	
0.745000	37.7	1000.000	9.000	GND	N	10.0	8.3	46.0	
0.995000	36.0	1000.000	9.000	GND	N	10.0	10.0	46.0	
1.615000	35.7	1000.000	9.000	GND	N	10.1	10.3	46.0	
2.240000	37.6	1000.000	9.000	GND	N	10.1	8.4	46.0	
2.365000	37.7	1000.000	9.000	GND	N	10.1	8.3	46.0	
4.110000	37.9	1000.000	9.000	GND	N	10.2	8.1	46.0	
4.730000	35.9	1000.000	9.000	GND	N	10.2	10.1	46.0	

< 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
0.570000	44.6	1000.000	9.000	GND	L1	10.0	11.4	56.0	
0.680000	45.0	1000.000	9.000	GND	L1	10.0	11.0	56.0	
0.850000	41.5	1000.000	9.000	GND	L1	10.0	14.5	56.0	
1.055000	43.0	1000.000	9.000	GND	L1	10.0	13.0	56.0	
1.275000	43.2	1000.000	9.000	GND	L1	10.1	12.8	56.0	
1.650000	43.6	1000.000	9.000	GND	L1	10.1	12.4	56.0	
4.635000	44.8	1000.000	9.000	GND	L1	10.2	11.2	56.0	
4.770000	44.6	1000.000	9.000	GND	L1	10.2	11.4	56.0	

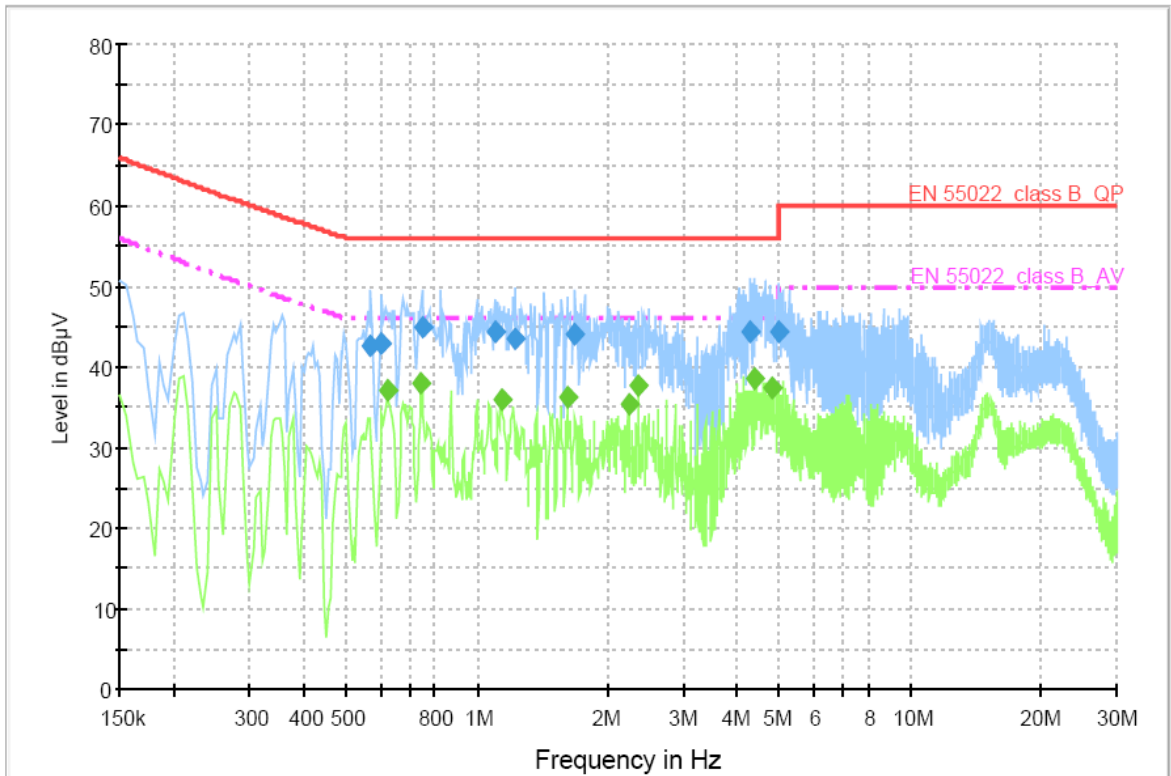
Final Measurement Detector 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.625000	37.6	1000.000	9.000	GND	L1	10.0	8.4	46.0	
0.745000	37.8	1000.000	9.000	GND	L1	10.0	8.2	46.0	
1.070000	35.8	1000.000	9.000	GND	L1	10.0	10.2	46.0	
1.620000	36.7	1000.000	9.000	GND	L1	10.1	9.3	46.0	
2.245000	36.2	1000.000	9.000	GND	L1	10.1	9.8	46.0	
2.365000	37.6	1000.000	9.000	GND	L1	10.1	8.4	46.0	
4.110000	38.5	1000.000	9.000	GND	L1	10.2	7.5	46.0	
4.880000	36.6	1000.000	9.000	GND	L1	10.2	9.4	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
0.570000	42.7	1000.000	9.000	GND	N	10.0	13.3	56.0	
0.605000	43.0	1000.000	9.000	GND	N	10.0	13.0	56.0	
0.750000	45.1	1000.000	9.000	GND	N	10.0	10.9	56.0	
1.100000	44.2	1000.000	9.000	GND	N	10.1	11.8	56.0	
1.225000	43.3	1000.000	9.000	GND	N	10.1	12.7	56.0	
1.685000	44.1	1000.000	9.000	GND	N	10.1	11.9	56.0	
4.285000	44.4	1000.000	9.000	GND	N	10.2	11.6	56.0	
4.990000	44.4	1000.000	9.000	GND	N	10.2	11.6	56.0	

Final Measurement Detector 2

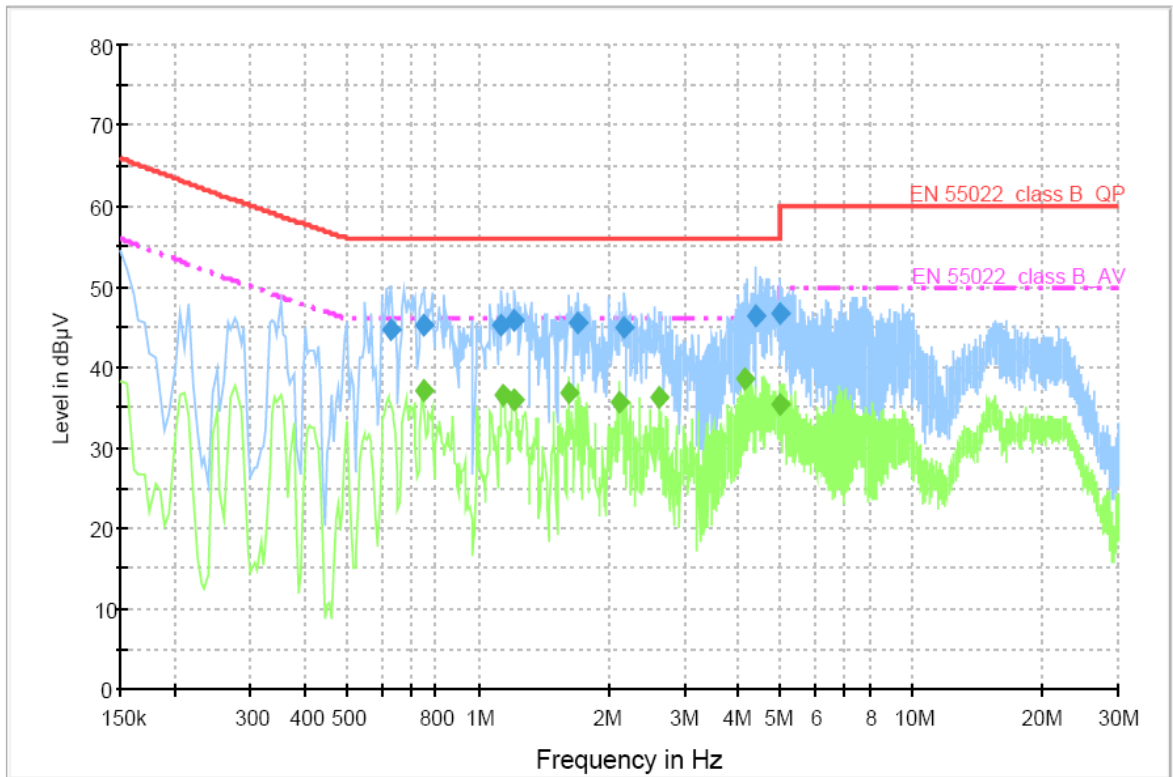
Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.620000	37.1	1000.000	9.000	GND	N	10.0	8.9	46.0	
0.745000	38.0	1000.000	9.000	GND	N	10.0	8.0	46.0	
1.140000	35.8	1000.000	9.000	GND	N	10.1	10.2	46.0	
1.620000	36.2	1000.000	9.000	GND	N	10.1	9.8	46.0	
2.245000	35.4	1000.000	9.000	GND	N	10.1	10.6	46.0	
2.365000	37.6	1000.000	9.000	GND	N	10.1	8.4	46.0	
4.360000	38.5	1000.000	9.000	GND	N	10.2	7.5	46.0	
4.810000	37.4	1000.000	9.000	GND	N	10.2	8.6	46.0	

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



◆ Test resolution: USB memory stick 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
0.630000	44.8	1000.000	9.000	GND	L1	10.0	11.2	56.0	
0.755000	45.3	1000.000	9.000	GND	L1	10.0	10.7	56.0	
1.135000	45.3	1000.000	9.000	GND	L1	10.0	10.7	56.0	
1.215000	45.8	1000.000	9.000	GND	L1	10.0	10.2	56.0	
1.705000	45.4	1000.000	9.000	GND	L1	10.1	10.6	56.0	
2.180000	44.9	1000.000	9.000	GND	L1	10.1	11.1	56.0	
4.360000	46.4	1000.000	9.000	GND	L1	10.2	9.6	56.0	
4.975000	46.6	1000.000	9.000	GND	L1	10.2	9.4	56.0	

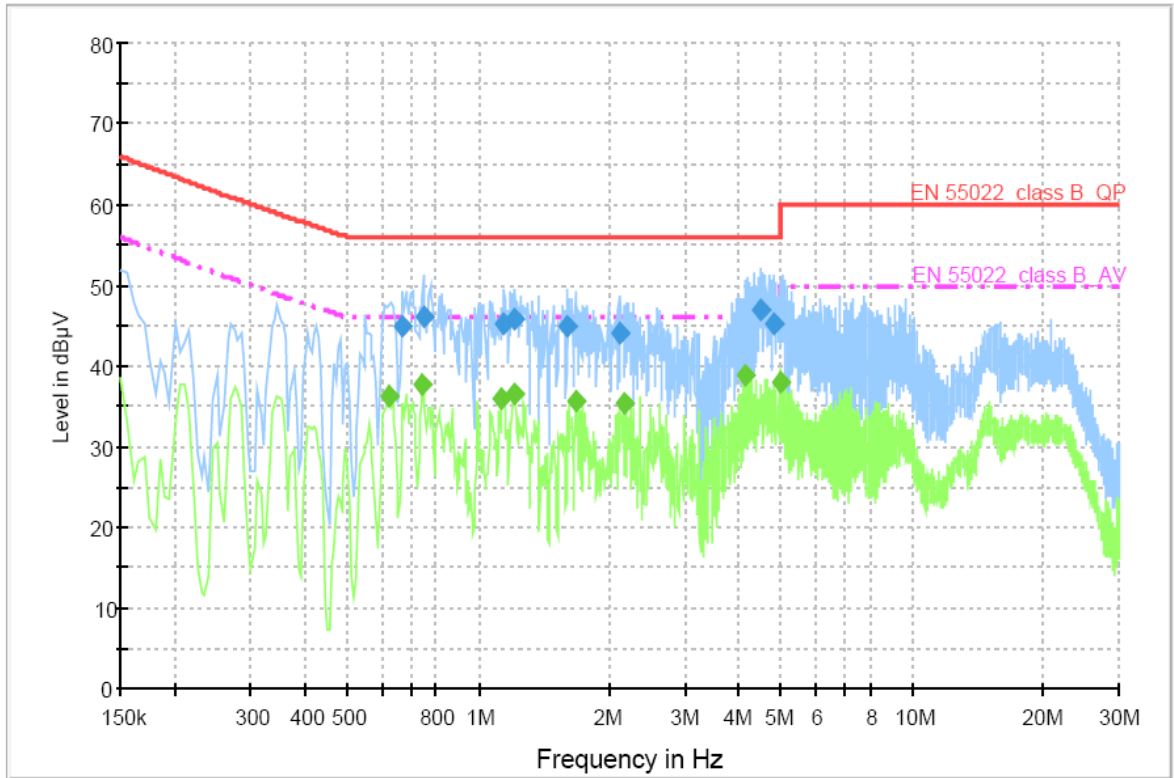
Final Measurement Detector 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.750000	37.0	1000.000	9.000	GND	L1	10.0	9.0	46.0	
1.140000	36.4	1000.000	9.000	GND	L1	10.0	9.6	46.0	
1.215000	36.0	1000.000	9.000	GND	L1	10.0	10.0	46.0	
1.620000	36.8	1000.000	9.000	GND	L1	10.1	9.2	46.0	
2.115000	35.6	1000.000	9.000	GND	L1	10.1	10.4	46.0	
2.615000	36.1	1000.000	9.000	GND	L1	10.1	9.9	46.0	
4.115000	38.5	1000.000	9.000	GND	L1	10.2	7.5	46.0	
4.975000	35.5	1000.000	9.000	GND	L1	10.2	10.5	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
0.670000	44.9	1000.000	9.000	GND	N	10.0	11.1	56.0	
0.750000	46.1	1000.000	9.000	GND	N	10.0	9.9	56.0	
1.145000	45.3	1000.000	9.000	GND	N	10.1	10.7	56.0	
1.215000	45.7	1000.000	9.000	GND	N	10.1	10.3	56.0	
1.605000	45.0	1000.000	9.000	GND	N	10.1	11.0	56.0	
2.130000	44.1	1000.000	9.000	GND	N	10.1	11.9	56.0	
4.480000	46.9	1000.000	9.000	GND	N	10.2	9.1	56.0	
4.820000	45.3	1000.000	9.000	GND	N	10.2	10.7	56.0	

Final Measurement Detector 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.625000	36.2	1000.000	9.000	GND	N	10.0	9.8	46.0	
0.745000	37.7	1000.000	9.000	GND	N	10.0	8.3	46.0	
1.135000	35.8	1000.000	9.000	GND	N	10.1	10.2	46.0	
1.205000	36.4	1000.000	9.000	GND	N	10.1	9.6	46.0	
1.685000	35.6	1000.000	9.000	GND	N	10.1	10.4	46.0	
2.180000	35.3	1000.000	9.000	GND	N	10.1	10.7	46.0	
4.110000	38.8	1000.000	9.000	GND	N	10.2	7.2	46.0	
4.945000	37.9	1000.000	9.000	GND	N	10.2	8.1	46.0	

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



6. Radiated Emission

6.1 Operating Environment

Temperature : 21 °C
Relative Humidity : 48 % 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 Antenna	3193	12. 11. 2009
■ - BBHA9120D	Schwarzbeck	Horn ANT	207	12. 26. 2009
■ - MCU066	matur GmbH	MCU066	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. 2010

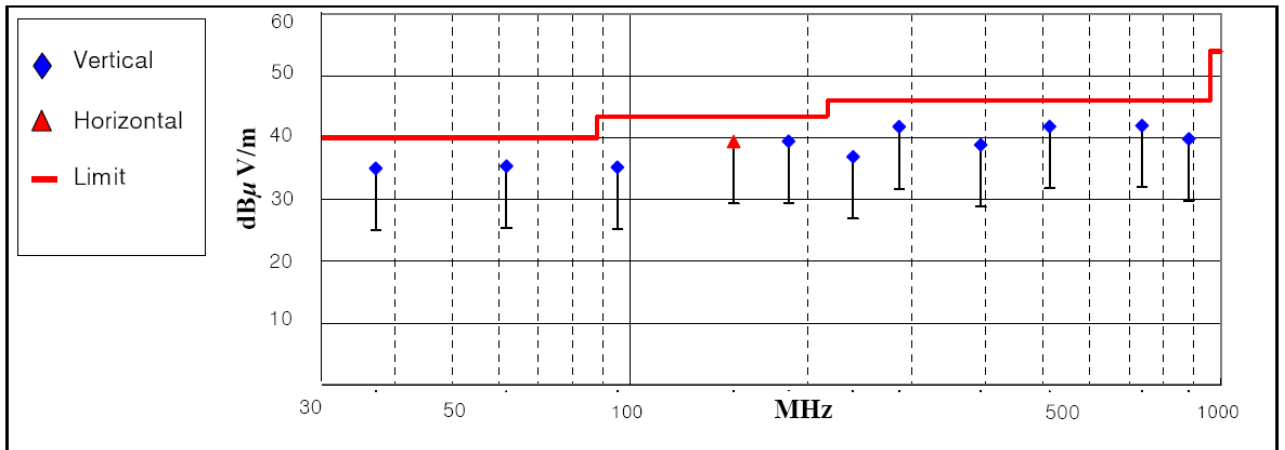
6.6 Test data for Radiated Emission

- Test Date : December 8, 2009
- 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 1000 MHz (667 MHz). The measurement was made up to 5 000 MHz



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

Frequency (MHz)	Measurement Level				Limit (dBμ V/m)	Margin (dB)	Positioning System		
	Reading	Antenna	Cable	Test Result			Pol. (H/V)	Height (cm)	Angle (°)
	Value(dBμ V)	Factor(dB/m)	Loss(dB)	(dBμ V/m)					
37.14	21.89	11.14	2.03	35.06	40.00	4.94	V	100	90
61.85	21.82	11.07	2.54	35.43	40.00	4.57	V	100	0
95.27	23.79	8.45	3.00	35.24	43.50	8.26	V	106	3
149.89	23.08	12.64	3.69	39.41	43.50	4.09	H	224	187
185.65	24.85	10.51	4.08	39.44	43.50	4.06	V	106	180
238.72	21.35	10.76	4.80	36.91	46.00	9.09	V	204	185
285.47	24.09	12.28	5.43	41.80	46.00	4.20	V	211	0
392.65	16.93	14.65	7.27	38.85	46.00	7.15	V	104	169
513.00	17.75	17.03	7.04	41.82	46.00	4.18	V	218	181
735.36	12.77	21.00	8.21	41.98	46.00	4.02	V	117	173
882.90	8.41	22.34	9.06	39.81	46.00	6.19	V	100	180

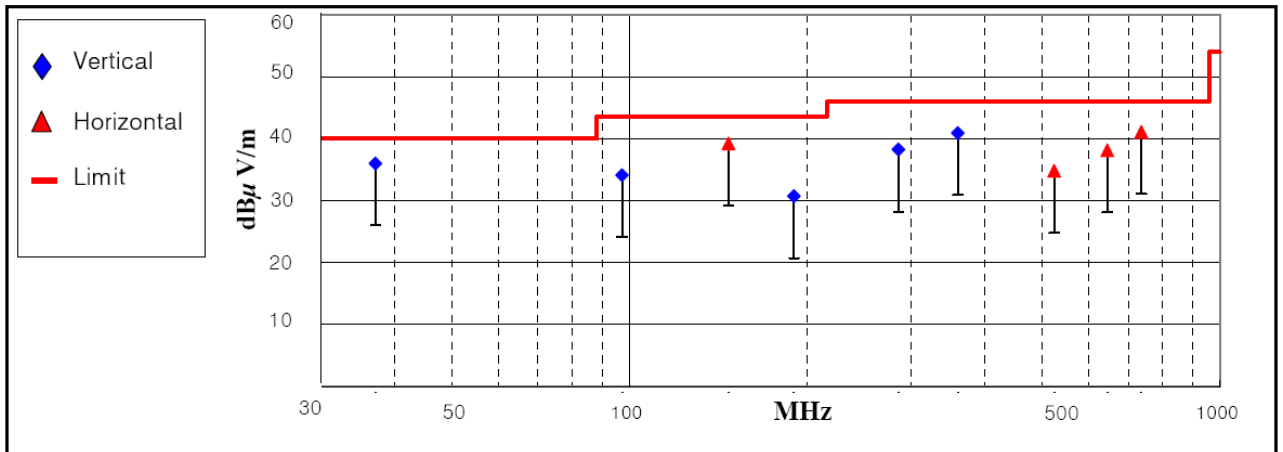


< Fig 14. Radiated emission result (30 MHz ~ 1 000 MHz)>



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

Frequency (MHz)	Measurement Level				Limit (dBμ V/m)	Margin (dB)	Positioning System		
	Reading	Antenna	Cable	Test Result			Pol. (H/V)	Height (cm)	Angle (°)
	Value(dBμ V)	Factor(dB/m)	Loss(dB)	(dBμ V/m)					
37.14	22.83	11.14	2.03	36.00	40.00	4.00	V	100	180
97.20	22.39	8.70	3.03	34.12	43.50	9.38	V	100	0
147.18	22.94	12.64	3.66	39.24	43.50	4.26	H	226	182
189.95	16.43	10.16	4.14	30.73	43.50	12.77	V	216	180
285.71	20.56	12.28	5.43	38.27	46.00	7.73	V	213	0
360.06	19.83	14.00	7.07	40.90	46.00	5.10	V	100	180
524.40	10.45	17.30	7.07	34.82	46.00	11.18	H	106	184
644.87	11.00	19.46	7.68	38.14	46.00	7.86	H	100	180
736.37	11.87	21.03	8.22	41.12	46.00	4.88	H	100	152

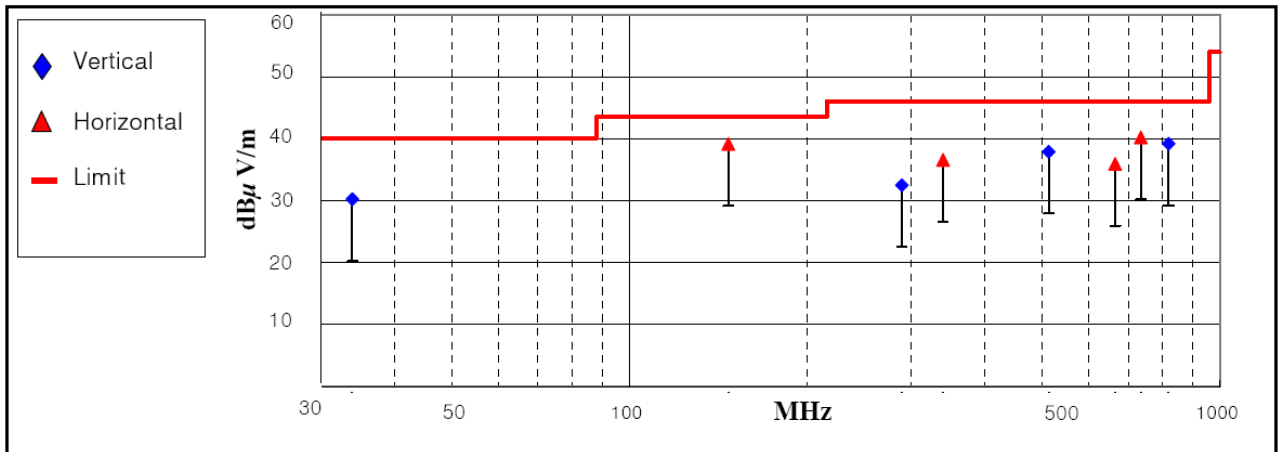


< Fig 15. Radiated emission result (30 MHz ~ 1 000 MHz)>



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

Frequency (MHz)	Measurement Level				Limit (dBμ V/m)	Margin (dB)	Positioning System		
	Reading	Antenna	Cable	Test Result			Pol. (H/V)	Height (cm)	Angle (°)
	Value(dBμ V)	Factor(dB/m)	Loss(dB)	(dBμ V/m)					
33.95	17.38	10.91	1.96	30.25	40.00	9.75	V	100	270
147.06	22.81	12.64	3.66	39.11	43.50	4.39	H	225	180
289.33	14.58	12.40	5.48	32.46	46.00	13.54	V	211	0
339.85	16.26	13.58	6.73	36.57	46.00	9.43	H	108	184
513.00	13.80	17.03	7.04	37.87	46.00	8.13	V	220	186
664.80	8.50	19.63	7.78	35.91	46.00	10.09	H	169	206
734.75	11.00	20.99	8.21	40.20	46.00	5.80	H	143	233
819.56	8.62	21.84	8.70	39.16	46.00	6.84	V	156	199

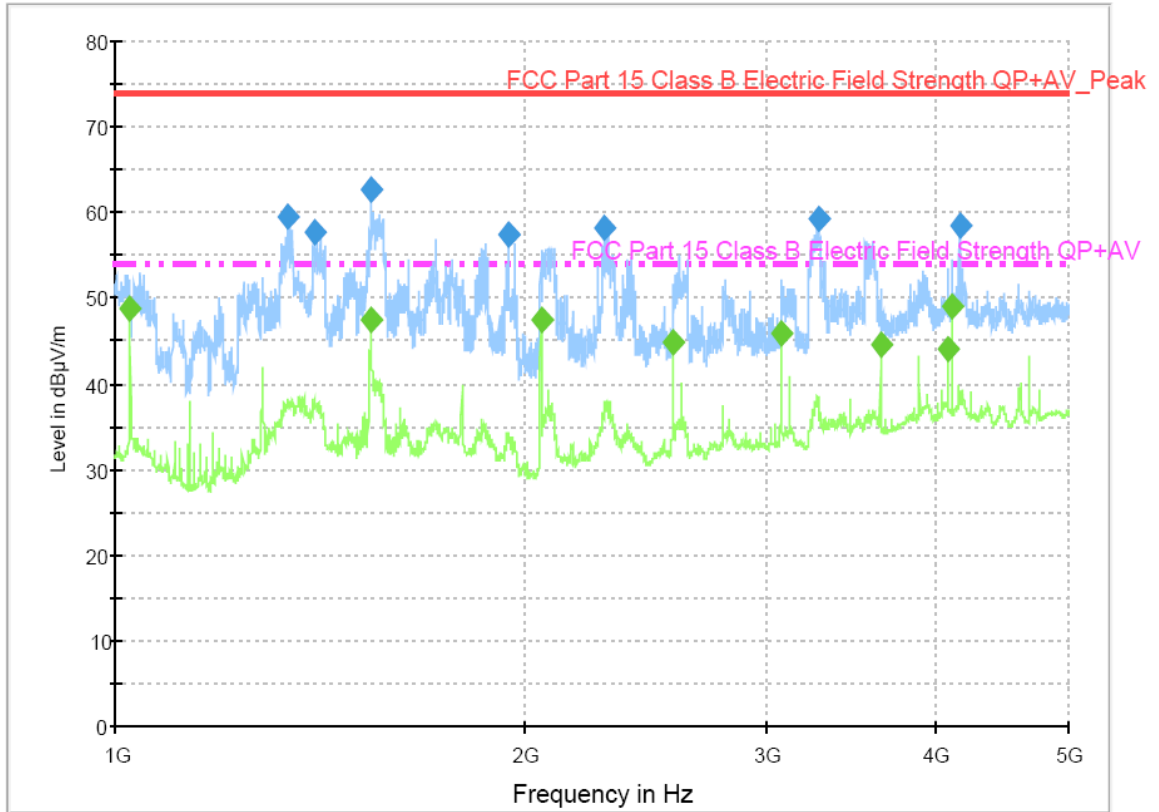


< Fig 16. Radiated emission result (30 MHz ~ 1 000 MHz)>



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

FCC_ESIB_Preamplifier_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
1340.400000	59.6	200.0	V	180.0	-14.6	14.4	74.0	
1399.600000	57.7	150.0	V	180.0	-14.6	16.3	74.0	
1538.800000	62.8	100.0	H	180.0	-14.2	11.2	74.0	
1941.200000	57.5	150.0	H	180.0	-12.8	16.5	74.0	
2284.000000	58.3	100.0	V	180.0	-11.3	15.7	74.0	
3283.200000	59.2	150.0	H	180.0	-7.3	14.8	74.0	
4158.000000	58.4	150.0	V	180.0	-3.3	15.6	74.0	

Final Result 2

Frequency (MHz)	Average-MaxHold (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
1026.000000	48.8	150.0	V	180.0	-16.0	5.2	54.0	
1538.800000	47.5	100.0	H	180.0	-14.2	6.5	54.0	
2052.000000	47.4	150.0	H	180.0	-12.3	6.6	54.0	
2564.800000	45.0	200.0	V	180.0	-10.1	9.0	54.0	
3078.000000	45.9	150.0	V	180.0	-8.1	8.1	54.0	
3638.400000	44.7	150.0	V	180.0	-5.7	9.3	54.0	
4084.000000	44.1	150.0	V	180.0	-3.2	9.9	54.0	
4104.000000	49.1	100.0	V	180.0	-3.2	4.9	54.0	

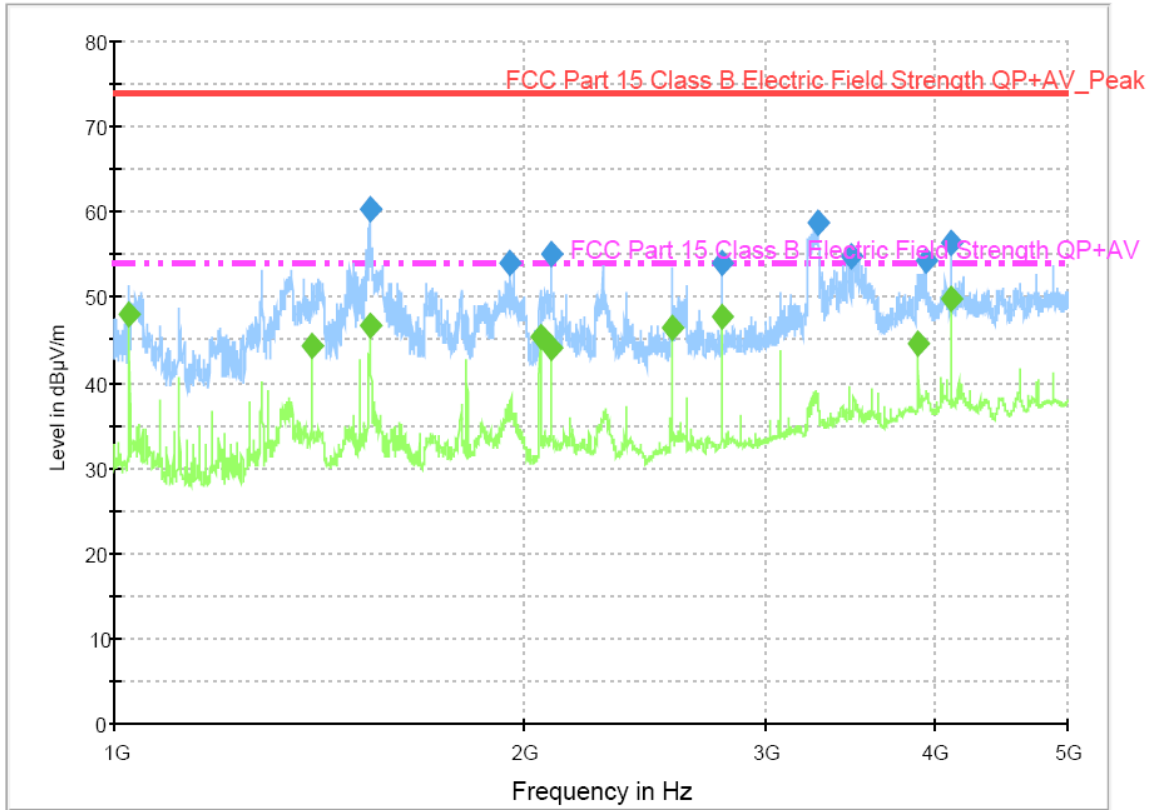
< Fig 17. Radiated emission result (1 000 MHz ~ 5 000 MHz)>



◆ 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
1538.400000	60.2	100.0	H	180.0	-14.2	13.8	74.0	
1950.000000	54.2	100.0	H	90.0	-12.8	19.8	74.0	
2092.400000	55.2	100.0	V	180.0	-12.2	18.8	74.0	
2790.000000	54.0	100.0	V	180.0	-9.2	20.0	74.0	
3275.600000	58.7	100.0	H	180.0	-7.4	15.3	74.0	
3473.600000	54.9	100.0	H	180.0	-6.7	19.1	74.0	
3935.600000	54.2	100.0	V	180.0	-3.7	19.8	74.0	
4104.000000	56.3	100.0	V	180.0	-3.2	17.7	74.0	

Final Result 2

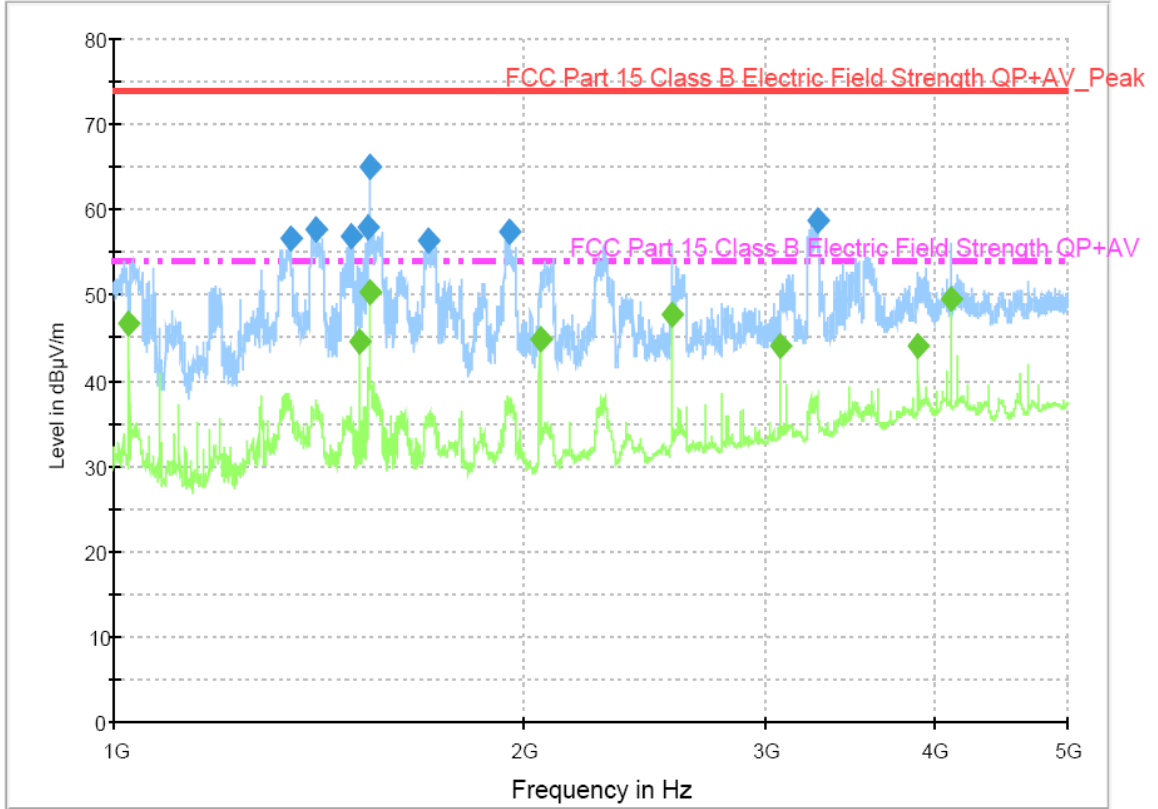
Frequency (MHz)	Average-MaxHold (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
1026.000000	47.9	100.0	V	180.0	-16.0	6.1	54.0	
1395.200000	44.3	100.0	V	180.0	-14.6	9.7	54.0	
1539.200000	46.7	100.0	V	180.0	-14.2	7.3	54.0	
2052.000000	45.4	200.0	H	180.0	-12.3	8.6	54.0	
2092.800000	44.1	100.0	V	180.0	-12.2	9.9	54.0	
2565.200000	46.4	100.0	H	180.0	-10.1	7.6	54.0	
2790.000000	47.9	100.0	V	180.0	-9.2	6.1	54.0	
3888.400000	44.5	100.0	V	180.0	-4.0	9.5	54.0	
4104.000000	49.8	100.0	V	180.0	-3.2	4.2	54.0	

< Fig 18. Radiated emission result (1 000 MHz ~ 5 000 MHz)>



- ◆ Operating Condition: USB memory stick 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
1348.400000	56.7	200.0	V	180.0	-14.6	17.3	74.0	
1408.000000	57.7	200.0	V	180.0	-14.6	16.3	74.0	
1491.200000	57.0	100.0	V	180.0	-14.4	17.0	74.0	
1535.200000	58.0	100.0	H	180.0	-14.2	16.0	74.0	
1539.200000	65.2	100.0	H	180.0	-14.2	8.8	74.0	
1702.000000	56.4	200.0	V	180.0	-13.6	17.6	74.0	
1950.800000	57.4	100.0	H	90.0	-12.8	16.6	74.0	
3281.600000	58.9	100.0	H	180.0	-7.4	15.1	74.0	

Final Result 2

Frequency (MHz)	Average-MaxHold (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
1026.000000	46.8	100.0	V	180.0	-16.0	7.2	54.0	
1512.000000	44.6	100.0	H	180.0	-14.3	9.4	54.0	
1539.200000	50.4	100.0	H	180.0	-14.2	3.6	54.0	
2052.000000	44.8	200.0	H	180.0	-12.3	9.2	54.0	
2564.800000	47.7	100.0	H	180.0	-10.1	6.3	54.0	
3078.000000	44.1	100.0	H	180.0	-8.1	9.9	54.0	
3888.400000	44.0	100.0	V	180.0	-4.0	10.0	54.0	
4104.000000	49.5	100.0	V	180.0	-3.2	4.5	54.0	

< Fig 19. 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 dBμV
Reading	= 39.2 dBμV
10^(39.2dB$\mu\text{V}/20$)	= 91.2 μV
Margin	= 48 dBμV - 39.2 dBμV
	= 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 dBμV
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: 32LD550-UB)** was complies with §15.107 and 15.109 of the FCC Rules.