



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 11, 2009

Order Number: GETEC-C1-09-260

Test Report Number: GETEC-E3-09-154

Test Site: Gumi College EMC Center

FCC Registration Number: (100749, 443957)

FCC ID.: BEJ22LE5300UE

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	: 22LE5300-UE
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,

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

Tel Number: +82-31-610-9623

- **FCC ID.** BEJ22LE5300UE
- **EUT Type** LED LCD TV/Monitor
- **Model Name** 22LE5300-UE
- **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-E3-09-154
- **Dates of Issue** December 11, 2009



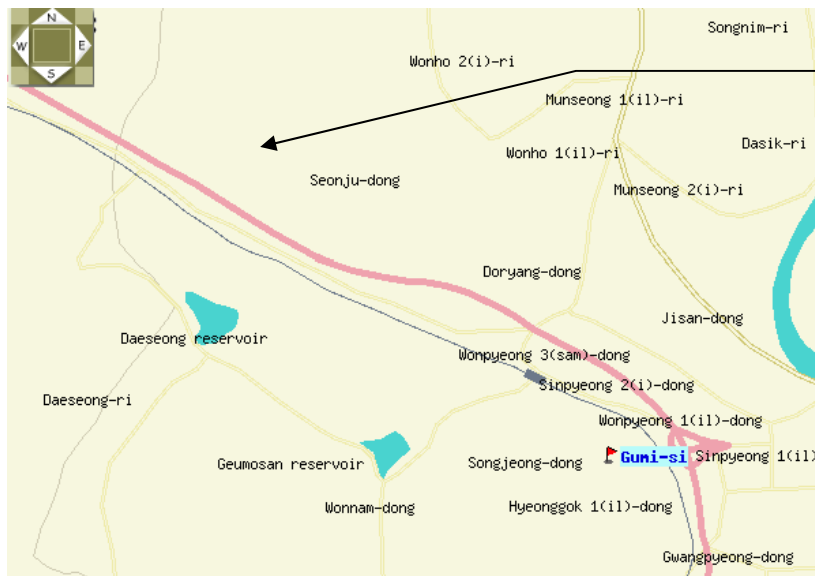
2. Introduction

The measurement procedure described in American National Standard for Methods of Measurement of Radio-Nose Emissions From Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (ASNI C63.4-2003) was used in determining radiated and conducted emissions emanating from **LG Electronics Inc. LED LCD TV/Monitor (Model Name: 22LE5300-UE)**

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: 22LE5300-UE) FCC ID.: BEJ22LE5300UE**

MODELS		19LE5300 (19LE5300-UE)	22LE5300 (22LE5300-UE)
Dimensions (Width x Height x Depth)	With stand	471.2 x 365.9 x 155.4 mm (18.6 x 14.4 x 6.1 inches)	542.9 x 407.1 x 155.4 mm (21.4 x 16.0 x 6.1 inches)
	Without stand	471.2 x 315.5 x 34.4 mm (18.6 x 12.4 x 1.4 inches)	542.9 x 357.6 x 34.4 mm (21.4 x 14.1 x 1.4 inches)
Weight	With stand	3.4 kg (7.5 lbs)	4.2 kg (9.3 lbs)
	Without stand	3.2 kg (7.1 lbs)	3.9 kg (8.6 lbs)
Power Requirement		19LE5300: DC 24V, 1.6A 22LE5300: DC 24V, 1.7A 26LE5300: DC 24V, 1.8A	
Adapter (DC Power)		In: AC100-240V ~ 50/60Hz Out: DC 24V, 3.42A * Adapter Model No.PA-1820-0 AC/DC Adapter, LITE-ON TECHNOLOGY CORPORATION	
Television System		NTSC-M, ATSC, 64 & 256 QAM	
Program Coverage		VHF 2-13, UHF 14-69, CATV 1-135, DTV 2-69, CDTV 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

Used AC/DC Adapter

: PA-1820-0(LITE-ON TECHNOLOGY CORPORATION)

Input: AC 100 V – 240 V~, 50 Hz – 60 Hz, 1.5 A

Output: DC 24 V, 3.42 A

Serial Number: L20943000513



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	INNATOR Co., Ltd.	XM2-128	S/N: N/A FCC ID: DoC

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



3.2.2 Used Cable(s)

Cable Name	Condition	Description
Power cable	Connected to the Adapter	1.8 m unshielded
Adapter cable	Connected to the EUT	1.8 m shielded a ferrite core
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
RS-232C(Service & control) input cable	Connected to the EUT and PC	1.2 m shielded with two ferrite cores
Audio input cable	Connected to the EUT and PC	1.8 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

3.3 Modification Item(s)

- None



4. Description of tests

4.1 Test Condition

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

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

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

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



4.2 Conducted Emission

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

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

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

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

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

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

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

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

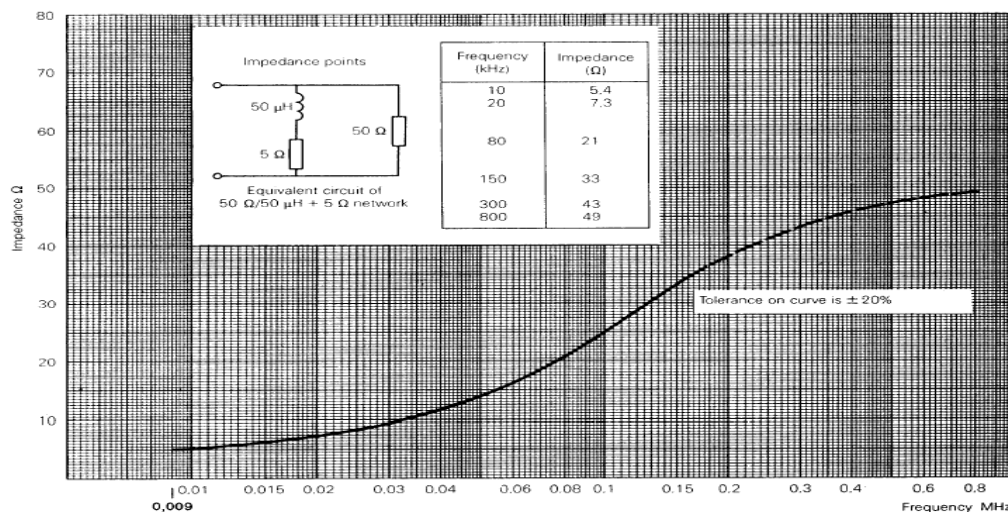


Fig 2. Impedance of LISN



4.3 Radiated Emission

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

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

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

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

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

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

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

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

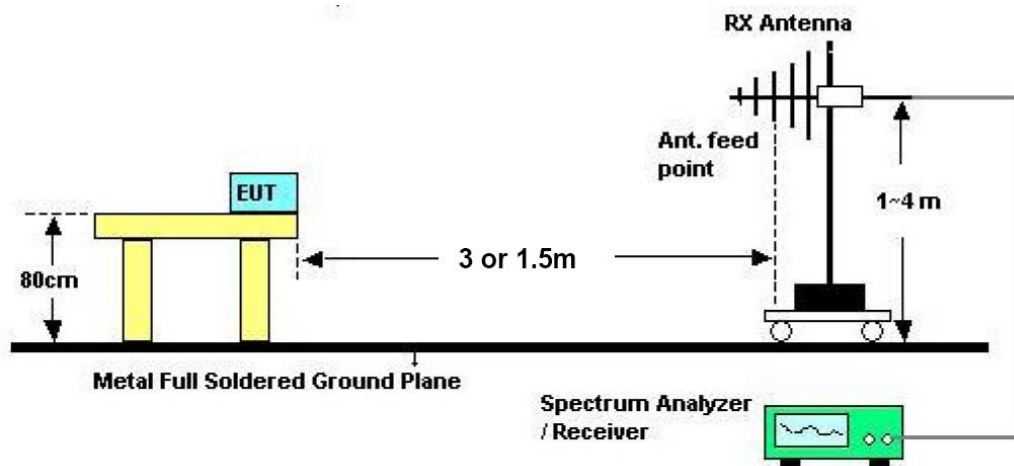


Fig 3. Dimensions of test site.



5. Conducted Emission

5.1 Operating Environment

Temperature : 25 °C
Relative Humidity : 45 % 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	
Freq. Range	Quasi-Peak	Average
150 kHz ~ 0.5 MHz	66 ~ 56*	56 ~ 46*
0.5 MHz ~ 5 MHz	56	46
5 MHz ~ 30 MHz	60	50
*Limits decreases linearly with the logarithm of frequency.		

5.5 Test Equipment used

Model Name	Manufacturer	Description	Serial Number	Due to Calibration
■ - ESCS30	Rohde & Schwarz	EMI test receiver	839809/003	12. 13. 2009
■ - ESH3-Z5	Rohde & Schwarz	LISN	838979/020	12. 12. 2009
■ - ESH2-Z5	Rohde & Schwarz	LISN	829991/009	12. 12. 2009
□ - ISN T8	TESEQ. GmbH	ISN	24568	10. 16. 2010

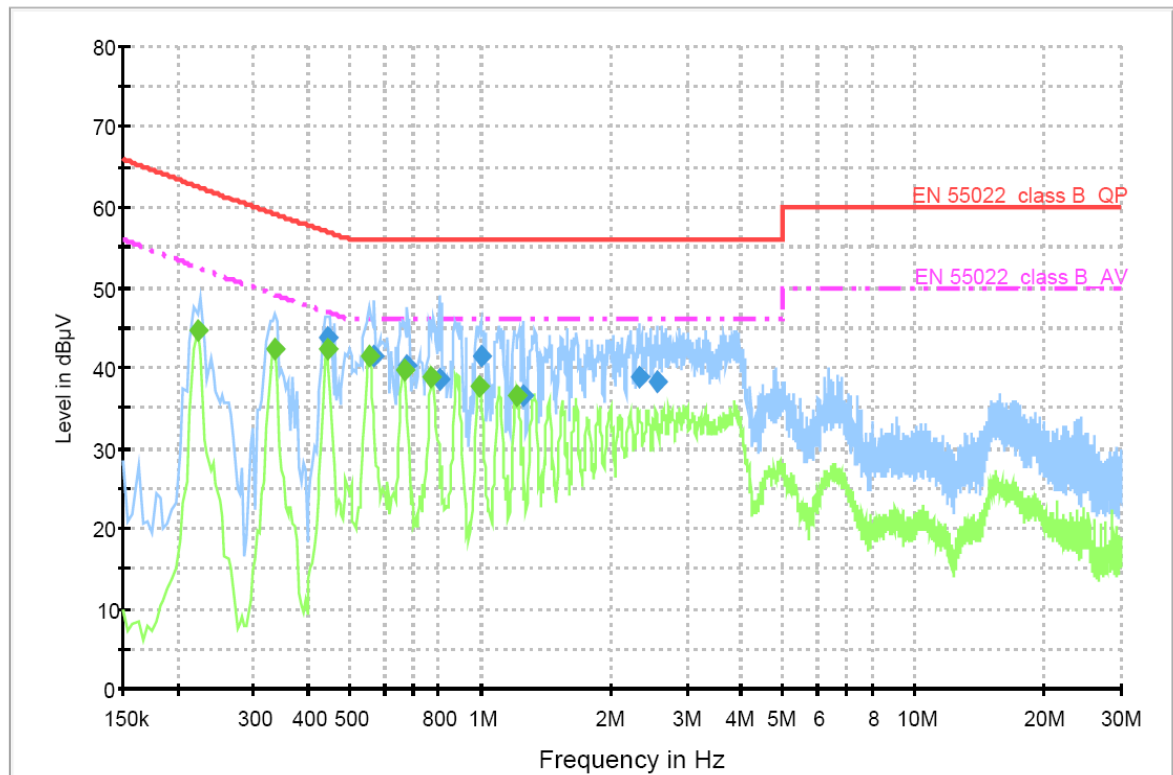
5.6 Test data for Conducted Emission

-. Test Date : December 8, 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
0.446000	43.8	1000.000	9.000	GND	L1	10.0	13.1	56.9	
0.570000	41.4	1000.000	9.000	GND	L1	10.0	14.6	56.0	
0.678000	40.4	1000.000	9.000	GND	L1	10.0	15.6	56.0	
0.802000	38.6	1000.000	9.000	GND	L1	10.0	17.4	56.0	
1.002000	41.6	1000.000	9.000	GND	L1	10.0	14.4	56.0	
1.250000	36.5	1000.000	9.000	GND	L1	10.0	19.5	56.0	
2.326000	39.0	1000.000	9.000	GND	L1	10.1	17.0	56.0	
2.558000	38.3	1000.000	9.000	GND	L1	10.1	17.7	56.0	

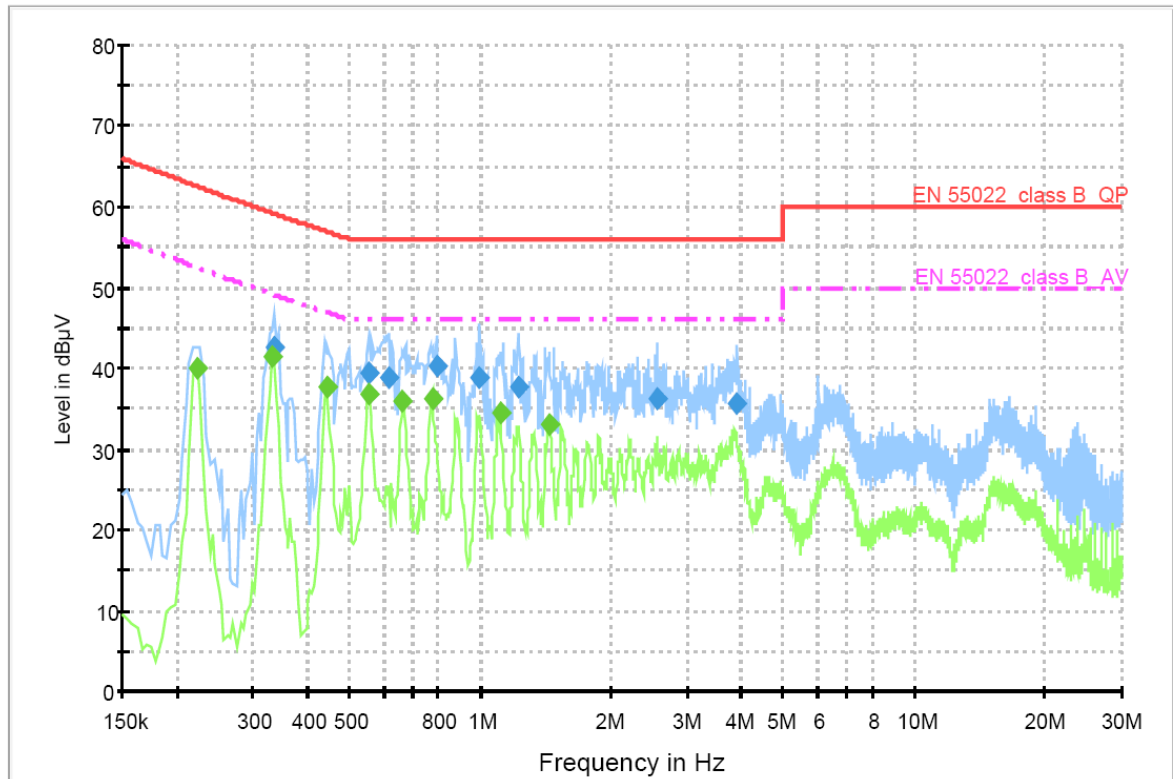
Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.222000	44.6	1000.000	9.000	GND	L1	10.0	7.9	52.5	
0.334000	42.3	1000.000	9.000	GND	L1	10.0	6.8	49.1	
0.442000	42.4	1000.000	9.000	GND	L1	10.0	4.5	46.9	
0.554000	41.6	1000.000	9.000	GND	L1	10.0	4.4	46.0	
0.666000	39.6	1000.000	9.000	GND	L1	10.0	6.4	46.0	
0.770000	38.7	1000.000	9.000	GND	L1	10.0	7.3	46.0	
0.990000	37.5	1000.000	9.000	GND	L1	10.0	8.5	46.0	
1.218000	36.6	1000.000	9.000	GND	L1	10.0	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
0.334000	42.5	1000.000	9.000	GND	N	10.0	16.7	59.2	
0.554000	39.3	1000.000	9.000	GND	N	10.0	16.7	56.0	
0.618000	38.8	1000.000	9.000	GND	N	10.0	17.2	56.0	
0.794000	40.4	1000.000	9.000	GND	N	10.0	15.6	56.0	
0.998000	38.8	1000.000	9.000	GND	N	10.0	17.2	56.0	
1.222000	37.6	1000.000	9.000	GND	N	10.1	18.4	56.0	
2.546000	36.3	1000.000	9.000	GND	N	10.1	19.7	56.0	
3.914000	35.7	1000.000	9.000	GND	N	10.2	20.3	56.0	

Final Measurement Detector 2

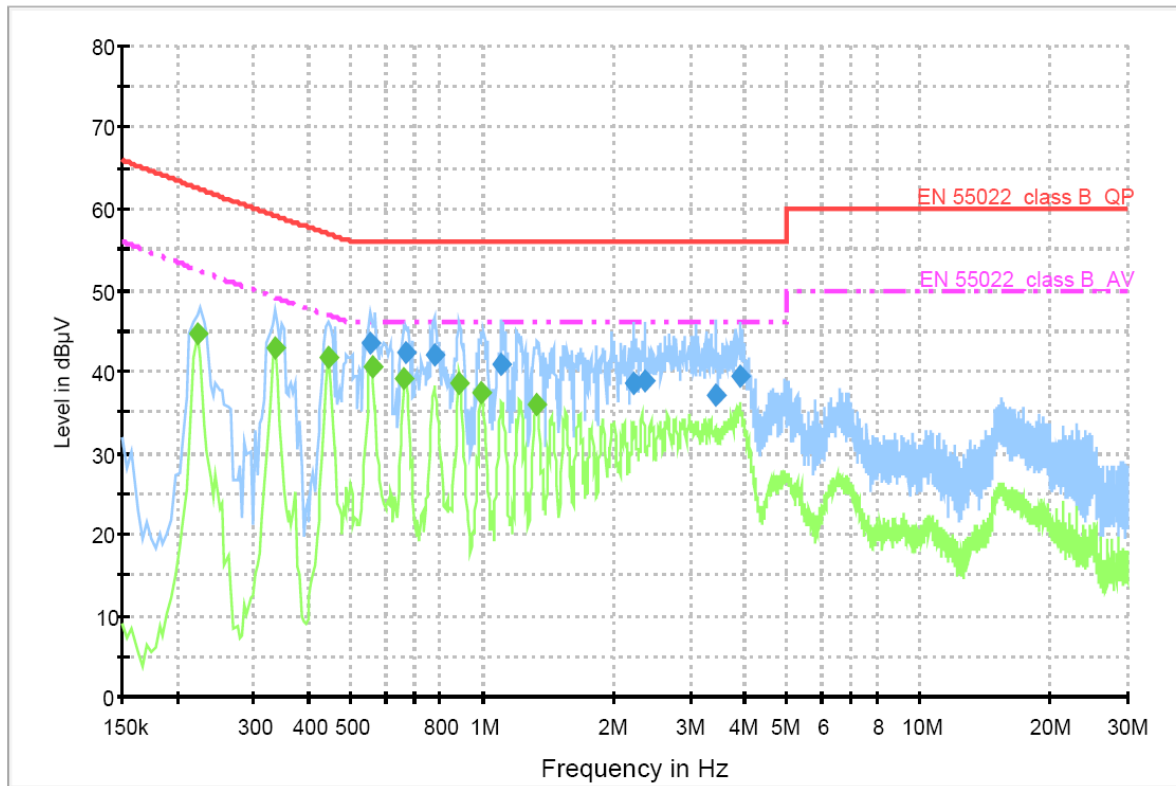
Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.222000	40.1	1000.000	9.000	GND	N	10.0	12.4	52.5	
0.330000	41.4	1000.000	9.000	GND	N	10.0	7.8	49.2	
0.442000	37.7	1000.000	9.000	GND	N	10.0	9.2	46.9	
0.554000	37.0	1000.000	9.000	GND	N	10.0	9.0	46.0	
0.662000	35.9	1000.000	9.000	GND	N	10.0	10.1	46.0	
0.774000	36.3	1000.000	9.000	GND	N	10.0	9.7	46.0	
1.110000	34.4	1000.000	9.000	GND	N	10.1	11.6	46.0	
1.442000	33.0	1000.000	9.000	GND	N	10.1	13.0	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
0.554000	43.5	1000.000	9.000	GND	L1	10.0	12.5	56.0	
0.670000	42.5	1000.000	9.000	GND	L1	10.0	13.5	56.0	
0.774000	42.2	1000.000	9.000	GND	L1	10.0	13.8	56.0	
1.106000	40.8	1000.000	9.000	GND	L1	10.0	15.2	56.0	
2.230000	38.5	1000.000	9.000	GND	L1	10.1	17.5	56.0	
2.350000	38.8	1000.000	9.000	GND	L1	10.1	17.2	56.0	
3.430000	37.2	1000.000	9.000	GND	L1	10.1	18.8	56.0	
3.906000	39.4	1000.000	9.000	GND	L1	10.2	16.6	56.0	

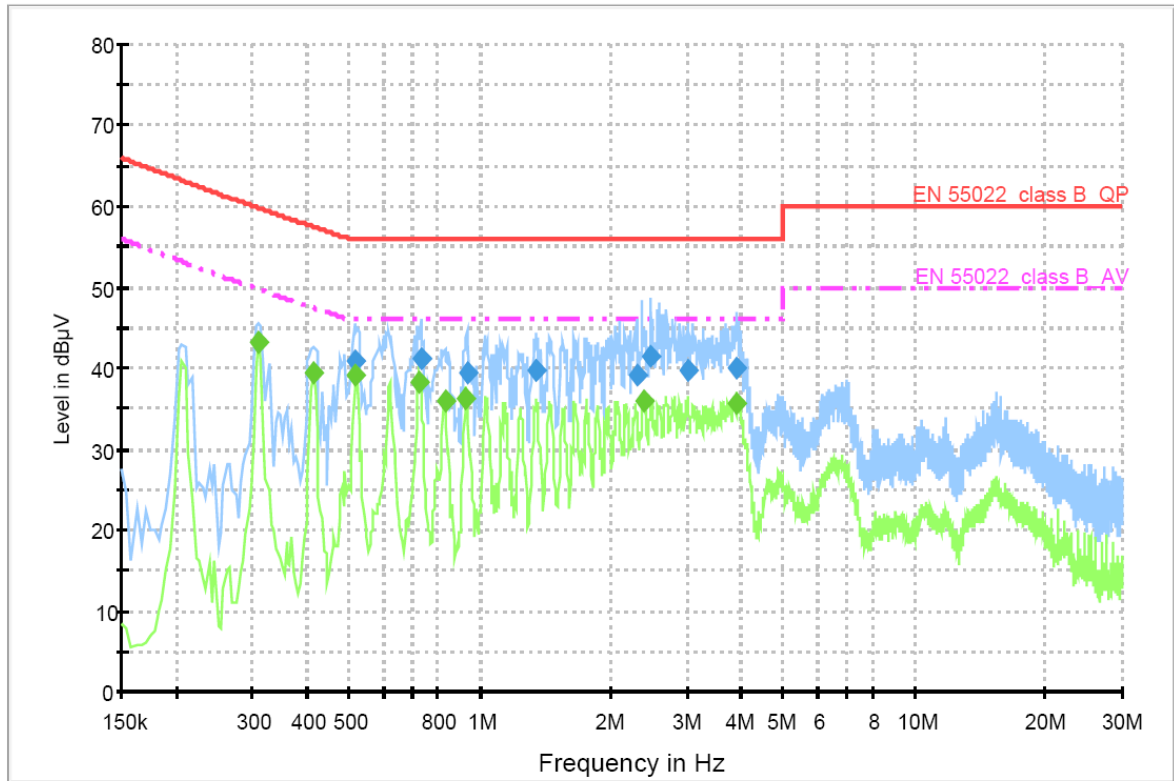
Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.222000	44.5	1000.000	9.000	GND	L1	10.0	8.0	52.5	
0.334000	43.0	1000.000	9.000	GND	L1	10.0	6.1	49.1	
0.442000	41.7	1000.000	9.000	GND	L1	10.0	5.2	46.9	
0.558000	40.5	1000.000	9.000	GND	L1	10.0	5.5	46.0	
0.662000	39.1	1000.000	9.000	GND	L1	10.0	6.9	46.0	
0.886000	38.7	1000.000	9.000	GND	L1	10.0	7.3	46.0	
0.994000	37.4	1000.000	9.000	GND	L1	10.0	8.6	46.0	
1.330000	35.8	1000.000	9.000	GND	L1	10.1	10.2	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
0.514000	40.9	1000.000	9.000	GND	N	10.0	15.1	56.0	
0.730000	41.0	1000.000	9.000	GND	N	10.0	15.0	56.0	
0.934000	39.4	1000.000	9.000	GND	N	10.0	16.6	56.0	
1.346000	39.8	1000.000	9.000	GND	N	10.1	16.2	56.0	
2.290000	39.2	1000.000	9.000	GND	N	10.1	16.8	56.0	
2.470000	41.4	1000.000	9.000	GND	N	10.1	14.6	56.0	
2.998000	39.7	1000.000	9.000	GND	N	10.1	16.3	56.0	
3.890000	40.0	1000.000	9.000	GND	N	10.2	16.0	56.0	

Final Measurement Detector 2

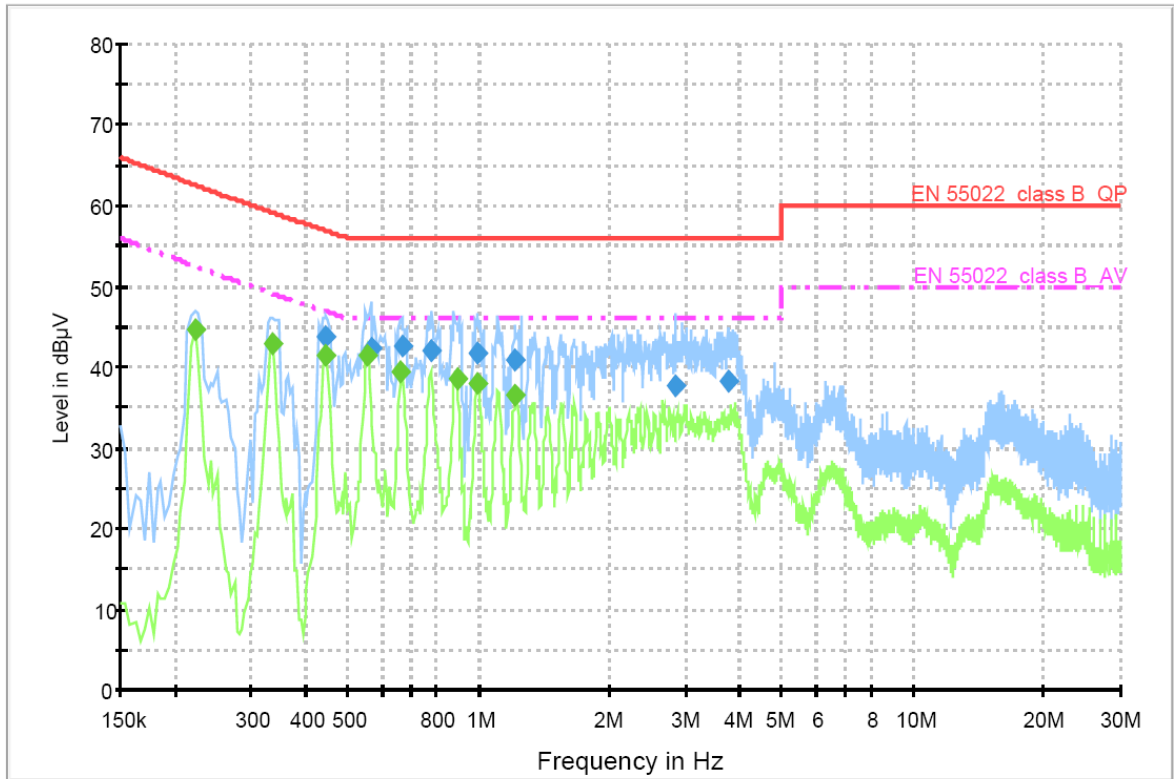
Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.310000	43.3	1000.000	9.000	GND	N	10.0	6.4	49.7	
0.414000	39.4	1000.000	9.000	GND	N	10.0	8.0	47.4	
0.518000	39.2	1000.000	9.000	GND	N	10.0	6.8	46.0	
0.726000	38.2	1000.000	9.000	GND	N	10.0	7.8	46.0	
0.830000	36.0	1000.000	9.000	GND	N	10.0	10.0	46.0	
0.930000	36.1	1000.000	9.000	GND	N	10.0	9.9	46.0	
2.378000	36.0	1000.000	9.000	GND	N	10.1	10.0	46.0	
3.906000	35.7	1000.000	9.000	GND	N	10.2	10.3	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
0.446000	43.9	1000.000	9.000	GND	L1	10.0	13.0	56.9	
0.566000	42.2	1000.000	9.000	GND	L1	10.0	13.8	56.0	
0.666000	42.8	1000.000	9.000	GND	L1	10.0	13.2	56.0	
0.782000	41.9	1000.000	9.000	GND	L1	10.0	14.1	56.0	
0.994000	41.9	1000.000	9.000	GND	L1	10.0	14.1	56.0	
1.218000	40.8	1000.000	9.000	GND	L1	10.0	15.2	56.0	
2.842000	37.8	1000.000	9.000	GND	L1	10.1	18.2	56.0	
3.738000	38.3	1000.000	9.000	GND	L1	10.2	17.7	56.0	

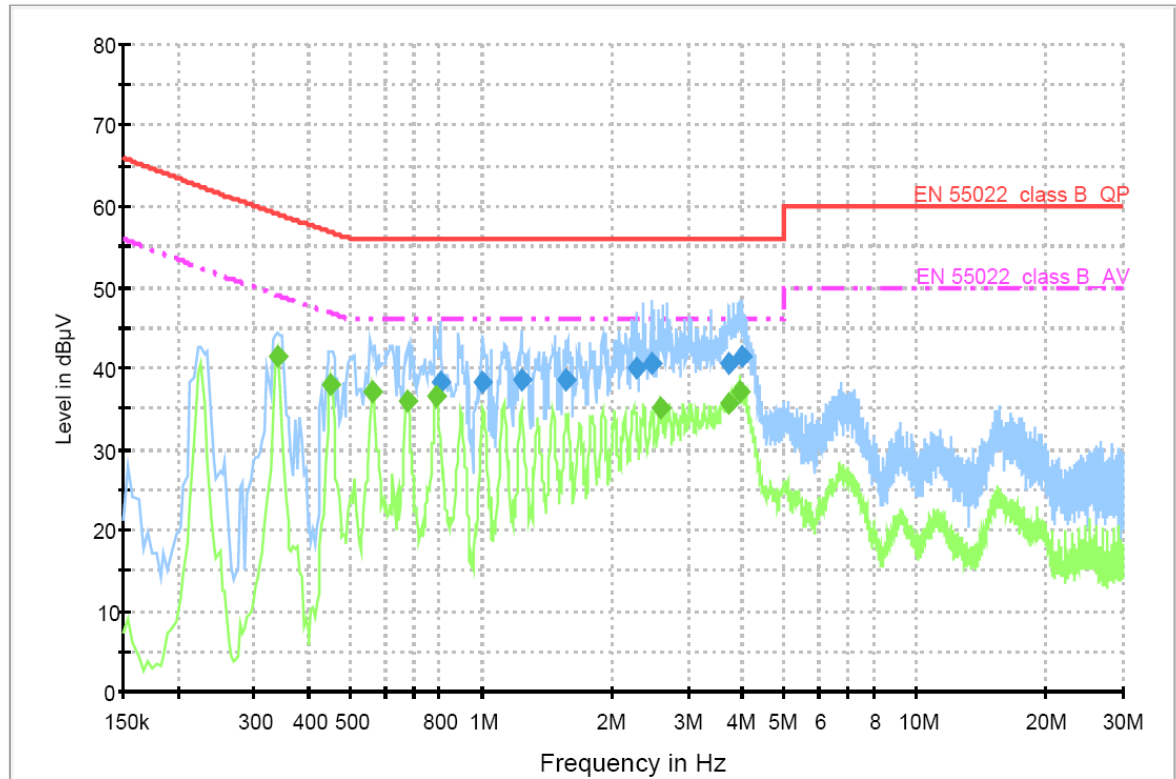
Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.222000	44.7	1000.000	9.000	GND	L1	10.0	7.8	52.5	
0.334000	43.0	1000.000	9.000	GND	L1	10.0	6.1	49.1	
0.446000	41.5	1000.000	9.000	GND	L1	10.0	5.4	46.9	
0.554000	41.5	1000.000	9.000	GND	L1	10.0	4.5	46.0	
0.662000	39.6	1000.000	9.000	GND	L1	10.0	6.4	46.0	
0.890000	38.4	1000.000	9.000	GND	L1	10.0	7.6	46.0	
0.998000	37.9	1000.000	9.000	GND	L1	10.0	8.1	46.0	
1.214000	36.6	1000.000	9.000	GND	L1	10.0	9.4	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
0.802000	38.1	1000.000	9.000	GND	N	10.0	17.9	56.0	
1.010000	38.3	1000.000	9.000	GND	N	10.0	17.7	56.0	
1.234000	38.6	1000.000	9.000	GND	N	10.1	17.4	56.0	
1.570000	38.6	1000.000	9.000	GND	N	10.1	17.4	56.0	
2.270000	40.0	1000.000	9.000	GND	N	10.1	16.0	56.0	
2.478000	40.5	1000.000	9.000	GND	N	10.1	15.5	56.0	
3.714000	40.6	1000.000	9.000	GND	N	10.2	15.4	56.0	
3.962000	41.6	1000.000	9.000	GND	N	10.2	14.4	56.0	

Final Measurement Detector 2

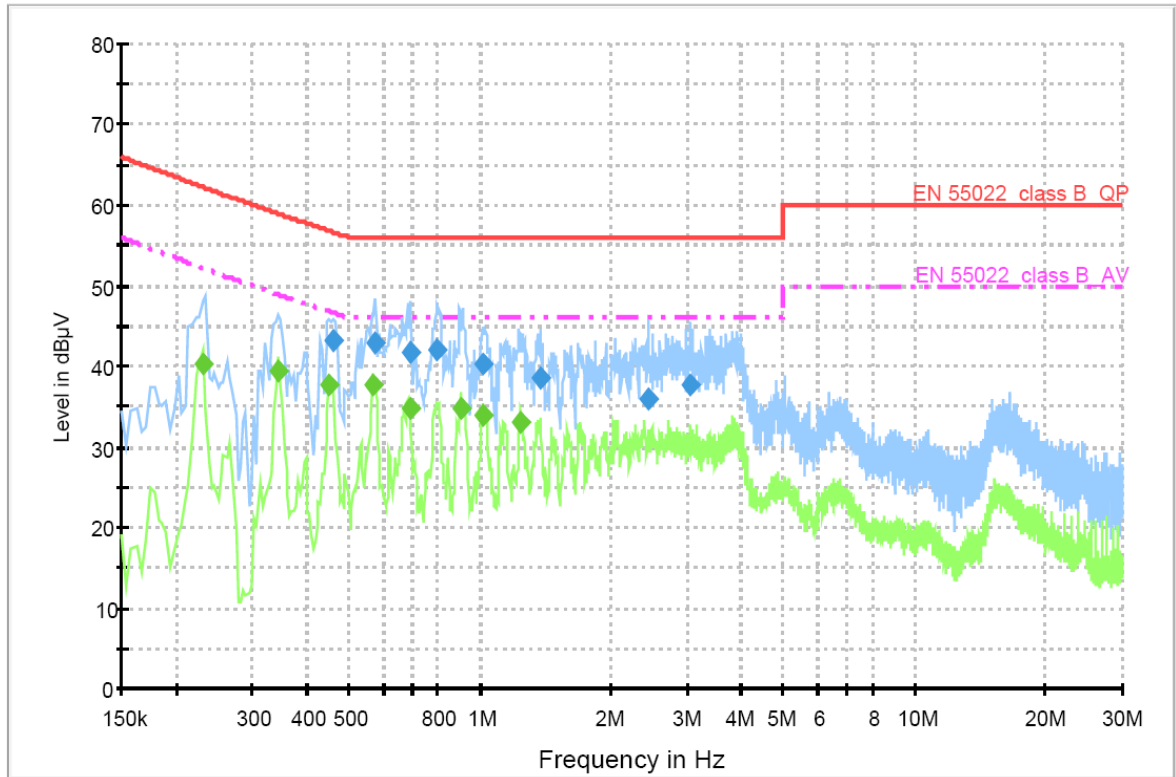
Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.338000	41.5	1000.000	9.000	GND	N	10.0	7.5	49.0	
0.450000	38.0	1000.000	9.000	GND	N	10.0	8.8	46.8	
0.562000	37.1	1000.000	9.000	GND	N	10.0	8.9	46.0	
0.674000	36.0	1000.000	9.000	GND	N	10.0	10.0	46.0	
0.790000	36.5	1000.000	9.000	GND	N	10.0	9.5	46.0	
2.582000	35.0	1000.000	9.000	GND	N	10.1	11.0	46.0	
3.706000	35.7	1000.000	9.000	GND	N	10.2	10.3	46.0	
3.930000	37.1	1000.000	9.000	GND	N	10.2	8.9	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
0.458000	43.1	1000.000	9.000	GND	L1	10.0	13.6	56.7	
0.574000	42.9	1000.000	9.000	GND	L1	10.0	13.1	56.0	
0.690000	41.8	1000.000	9.000	GND	L1	10.0	14.2	56.0	
0.798000	41.9	1000.000	9.000	GND	L1	10.0	14.1	56.0	
1.018000	40.3	1000.000	9.000	GND	L1	10.0	15.7	56.0	
1.378000	38.4	1000.000	9.000	GND	L1	10.1	17.6	56.0	
2.434000	36.0	1000.000	9.000	GND	L1	10.1	20.0	56.0	
3.062000	37.6	1000.000	9.000	GND	L1	10.1	18.4	56.0	

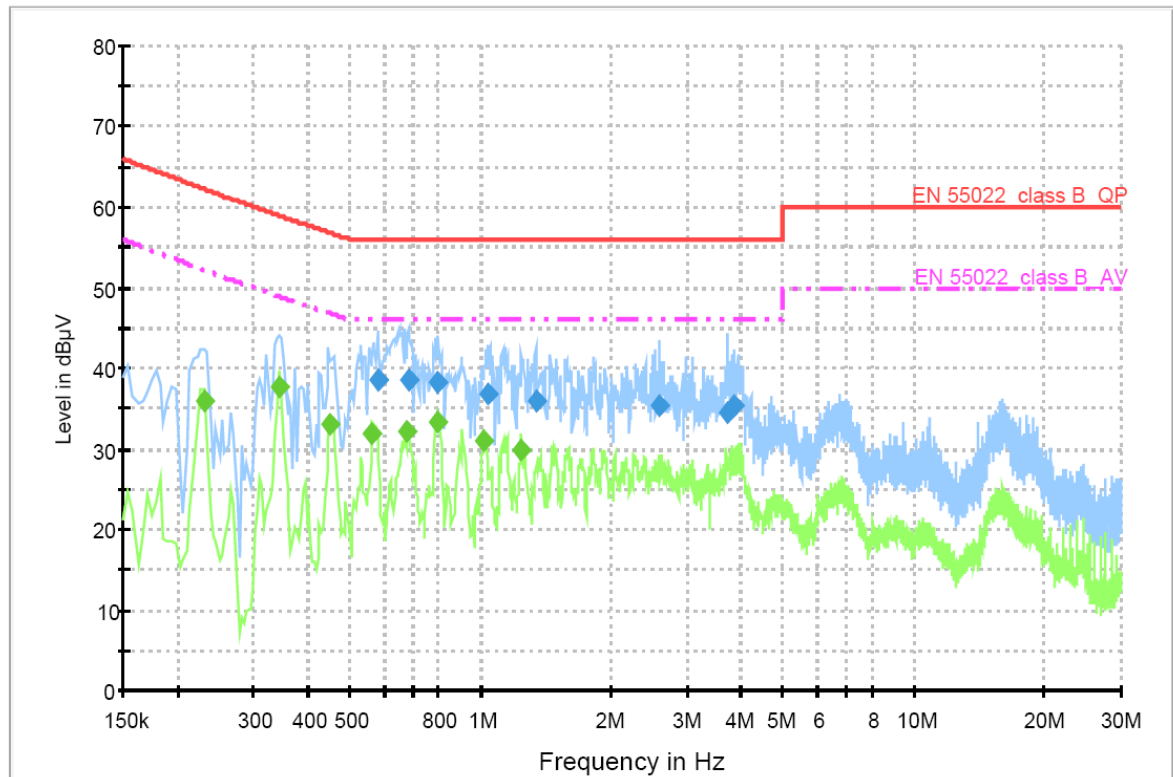
Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.230000	40.1	1000.000	9.000	GND	L1	10.0	12.1	52.2	
0.342000	39.3	1000.000	9.000	GND	L1	10.0	9.6	48.9	
0.450000	37.8	1000.000	9.000	GND	L1	10.0	9.0	46.8	
0.570000	37.7	1000.000	9.000	GND	L1	10.0	8.4	46.0	
0.690000	34.9	1000.000	9.000	GND	L1	10.0	11.1	46.0	
0.902000	34.8	1000.000	9.000	GND	L1	10.0	11.2	46.0	
1.014000	33.9	1000.000	9.000	GND	L1	10.0	12.1	46.0	
1.246000	33.0	1000.000	9.000	GND	L1	10.0	13.0	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
0.578000	38.5	1000.000	9.000	GND	N	10.0	17.5	56.0	
0.682000	38.5	1000.000	9.000	GND	N	10.0	17.5	56.0	
0.798000	38.3	1000.000	9.000	GND	N	10.0	17.7	56.0	
1.038000	36.8	1000.000	9.000	GND	N	10.1	19.2	56.0	
1.338000	35.9	1000.000	9.000	GND	N	10.1	20.1	56.0	
2.586000	35.4	1000.000	9.000	GND	N	10.1	20.6	56.0	
3.718000	34.6	1000.000	9.000	GND	N	10.2	21.4	56.0	
3.854000	35.5	1000.000	9.000	GND	N	10.2	20.5	56.0	

Final Measurement Detector 2

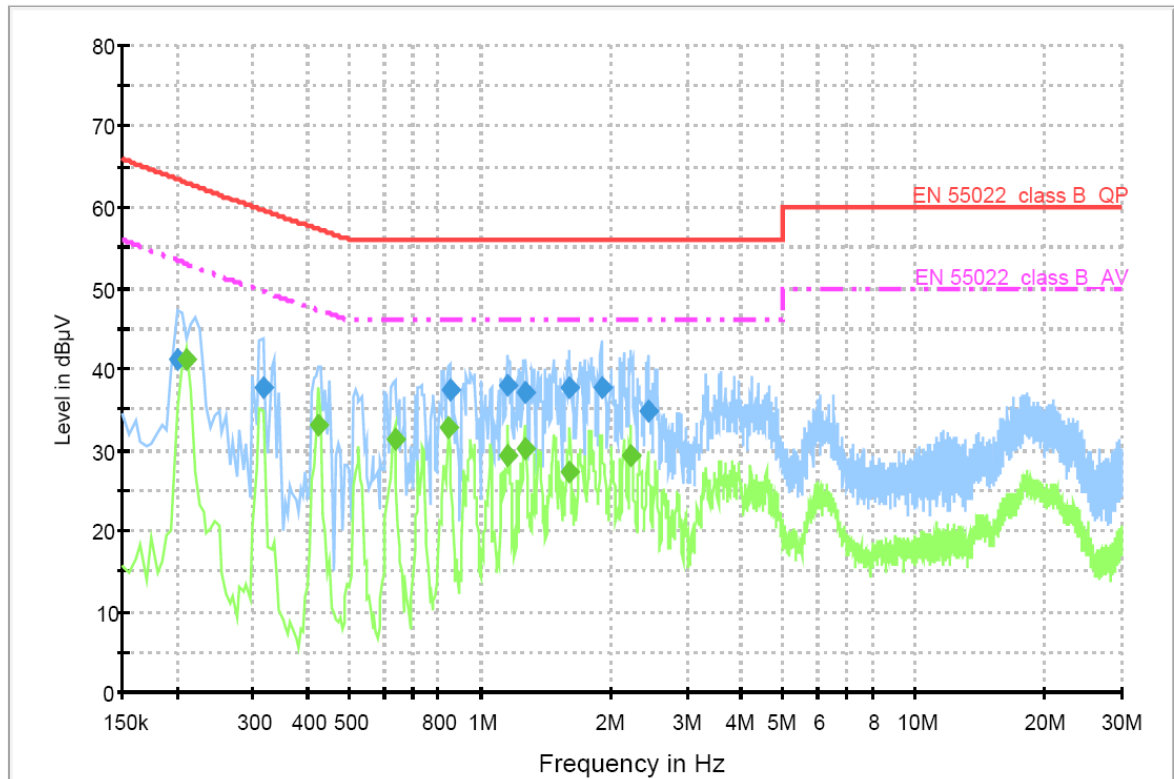
Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.230000	36.1	1000.000	9.000	GND	N	10.0	16.1	52.2	
0.342000	37.6	1000.000	9.000	GND	N	10.0	11.3	48.9	
0.450000	33.1	1000.000	9.000	GND	N	10.0	13.7	46.8	
0.562000	31.8	1000.000	9.000	GND	N	10.0	14.2	46.0	
0.678000	32.1	1000.000	9.000	GND	N	10.0	13.9	46.0	
0.798000	33.5	1000.000	9.000	GND	N	10.0	12.5	46.0	
1.018000	31.1	1000.000	9.000	GND	N	10.0	14.9	46.0	
1.246000	29.9	1000.000	9.000	GND	N	10.1	16.1	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
0.200000	41.3	1000.000	9.000	GND	L1	10.0	22.2	63.5	
0.315000	37.6	1000.000	9.000	GND	L1	10.0	22.0	59.6	
0.850000	37.4	1000.000	9.000	GND	L1	10.0	18.6	56.0	
1.155000	38.0	1000.000	9.000	GND	L1	10.0	18.0	56.0	
1.275000	37.2	1000.000	9.000	GND	L1	10.1	18.8	56.0	
1.605000	37.8	1000.000	9.000	GND	L1	10.1	18.2	56.0	
1.900000	37.7	1000.000	9.000	GND	L1	10.1	18.3	56.0	
2.430000	34.6	1000.000	9.000	GND	L1	10.1	21.4	56.0	

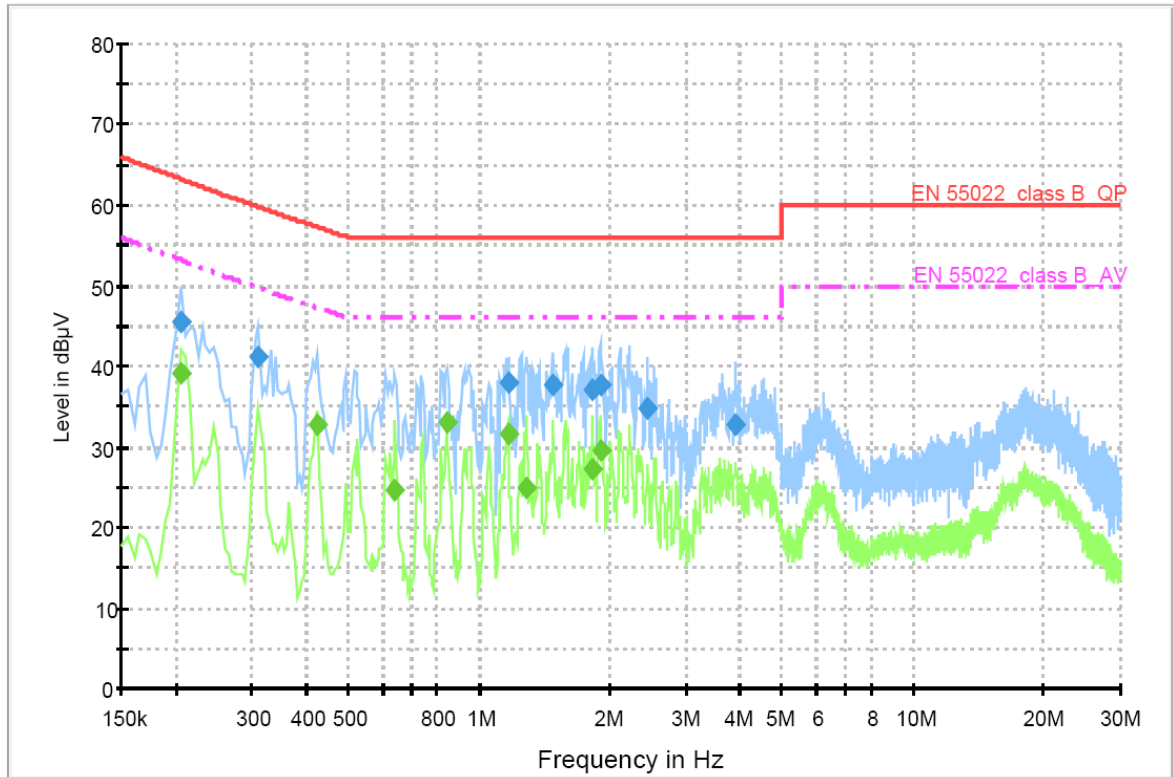
Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.210000	41.0	1000.000	9.000	GND	L1	10.0	12.0	53.0	
0.425000	33.1	1000.000	9.000	GND	L1	10.0	14.1	47.2	
0.635000	31.3	1000.000	9.000	GND	L1	10.0	14.8	46.0	
0.845000	32.6	1000.000	9.000	GND	L1	10.0	13.4	46.0	
1.155000	29.2	1000.000	9.000	GND	L1	10.0	16.8	46.0	
1.265000	30.0	1000.000	9.000	GND	L1	10.1	16.0	46.0	
1.610000	27.2	1000.000	9.000	GND	L1	10.1	18.8	46.0	
2.225000	29.2	1000.000	9.000	GND	L1	10.1	16.8	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
0.205000	45.4	1000.000	9.000	GND	N	10.0	17.8	63.2	
0.310000	41.1	1000.000	9.000	GND	N	10.0	18.7	59.8	
1.165000	38.1	1000.000	9.000	GND	N	10.1	17.9	56.0	
1.470000	37.8	1000.000	9.000	GND	N	10.1	18.2	56.0	
1.820000	37.0	1000.000	9.000	GND	N	10.1	19.0	56.0	
1.900000	37.6	1000.000	9.000	GND	N	10.1	18.4	56.0	
2.435000	34.7	1000.000	9.000	GND	N	10.1	21.3	56.0	
3.885000	32.9	1000.000	9.000	GND	N	10.2	23.1	56.0	

Final Measurement Detector 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.205000	39.0	1000.000	9.000	GND	N	10.0	14.2	53.2	
0.425000	32.8	1000.000	9.000	GND	N	10.0	14.4	47.2	
0.640000	24.5	1000.000	9.000	GND	N	10.0	21.5	46.0	
0.840000	33.0	1000.000	9.000	GND	N	10.0	13.0	46.0	
1.165000	31.5	1000.000	9.000	GND	N	10.1	14.5	46.0	
1.285000	25.0	1000.000	9.000	GND	N	10.1	21.0	46.0	
1.825000	27.3	1000.000	9.000	GND	N	10.1	18.8	46.0	
1.900000	29.6	1000.000	9.000	GND	N	10.1	16.4	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	maturo GmbH	MCU066	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

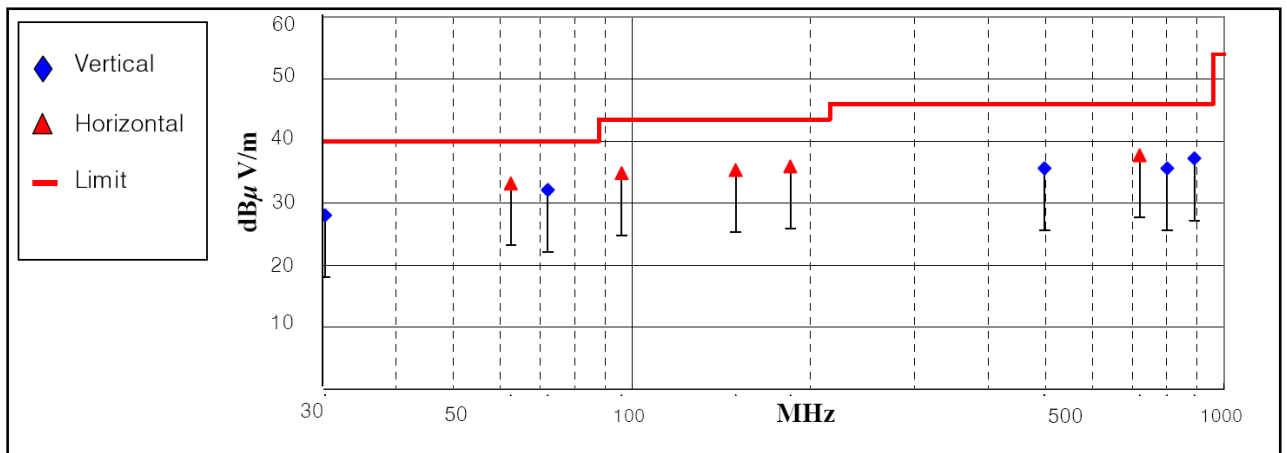
6.6 Test data for Radiated Emission

- Test Date : 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 (dB μ V/m)	Margin (dB)	Positioning System		
	Reading	Antenna	Cable	Test Result			Pol.	Height	Angle
	Value(dB μ V)	Factor(dB/m)	Loss(dB)	(dB μ V/m)			(H/V)	(cm)	(°)
30.33	15.11	11.01	1.89	28.01	40.00	11.99	V	110	276
62.44	19.64	10.97	2.55	33.16	40.00	6.84	H	200	250
72.09	20.14	9.29	2.70	32.13	40.00	7.87	V	213	36
96.10	23.26	8.56	3.01	34.83	43.50	8.67	H	210	301
149.66	19.00	12.64	3.69	35.33	43.50	8.17	H	200	270
185.23	21.29	10.55	4.07	35.91	43.50	7.59	H	162	291
497.66	11.88	16.70	7.02	35.60	46.00	10.40	V	110	250
720.00	9.06	20.55	8.10	37.71	46.00	8.29	H	126	189
801.96	5.37	21.63	8.60	35.60	46.00	10.40	V	105	13
891.00	5.72	22.37	9.11	37.20	46.00	8.80	V	116	42

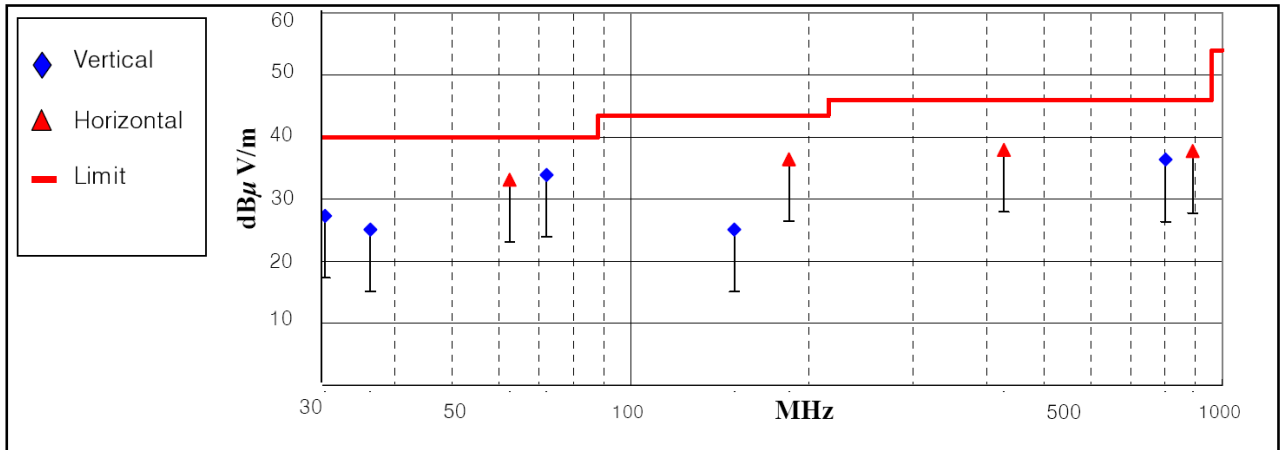


< Fig 14. Radiated emission result (30 MHz ~ 1 000 MHz)>



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

Frequency (MHz)	Measurement Level				Limit (dB μ V/m)	Margin (dB)	Positioning System		
	Reading	Antenna	Cable	Test Result			Pol.	Height	Angle
	Value(dB μ V)	Factor(dB/m)	Loss(dB)	(dB μ V/m)			(H/V)	(cm)	(°)
30.45	14.43	11.01	1.89	27.33	40.00	12.67	V	100	266
36.31	12.11	11.04	2.01	25.16	40.00	14.84	V	105	285
62.44	19.63	10.97	2.55	33.15	40.00	6.85	H	216	277
72.10	21.97	9.29	2.70	33.96	40.00	6.04	V	185	25
149.67	8.80	12.64	3.69	25.13	43.50	18.37	V	100	220
185.26	21.87	10.54	4.07	36.48	43.50	7.02	H	156	286
427.43	15.12	15.63	7.24	37.99	46.00	8.01	H	100	188
801.85	6.17	21.63	8.60	36.40	46.00	9.60	V	127	15
890.96	6.32	22.37	9.11	37.80	46.00	8.20	H	110	277

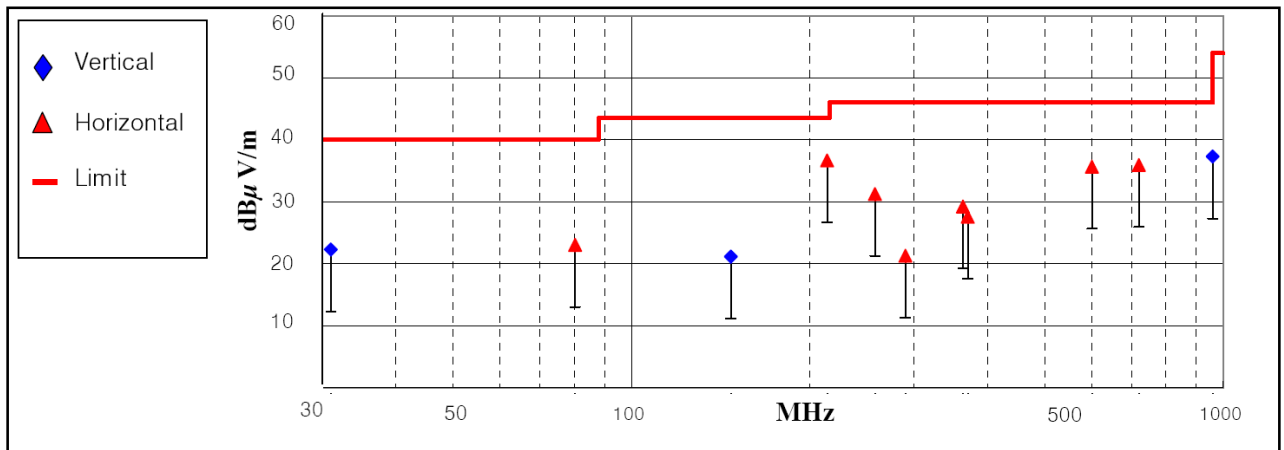


< Fig 15. Radiated emission result (30 MHz ~ 1 000 MHz)>



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

Frequency (MHz)	Measurement Level				Limit (dB μ V/m)	Margin (dB)	Positioning System		
	Reading	Antenna	Cable	Test Result			Pol.	Height	Angle
	Value(dB μ V)	Factor(dB/m)	Loss(dB)	(dB μ V/m)			(H/V)	(cm)	(°)
31.03	9.41	10.99	1.91	22.31	40.00	17.69	V	101	260
80.29	12.36	7.81	2.85	23.02	40.00	16.98	H	222	101
147.21	4.86	12.64	3.66	21.16	43.50	22.34	V	100	33
214.16	22.30	9.87	4.48	36.65	43.50	6.85	H	100	21
258.03	14.78	11.42	5.06	31.26	46.00	14.74	H	117	126
290.45	3.38	12.43	5.49	21.30	46.00	24.70	H	126	137
363.30	8.05	14.07	7.09	29.21	46.00	16.79	H	100	85
369.93	6.25	14.20	7.13	27.58	46.00	18.42	H	105	77
599.99	9.02	19.23	7.41	35.66	46.00	10.34	H	100	189
720.00	7.25	20.55	8.10	35.90	46.00	10.10	H	100	190
960.01	4.41	23.31	9.59	37.31	54.00	16.69	V	216	185

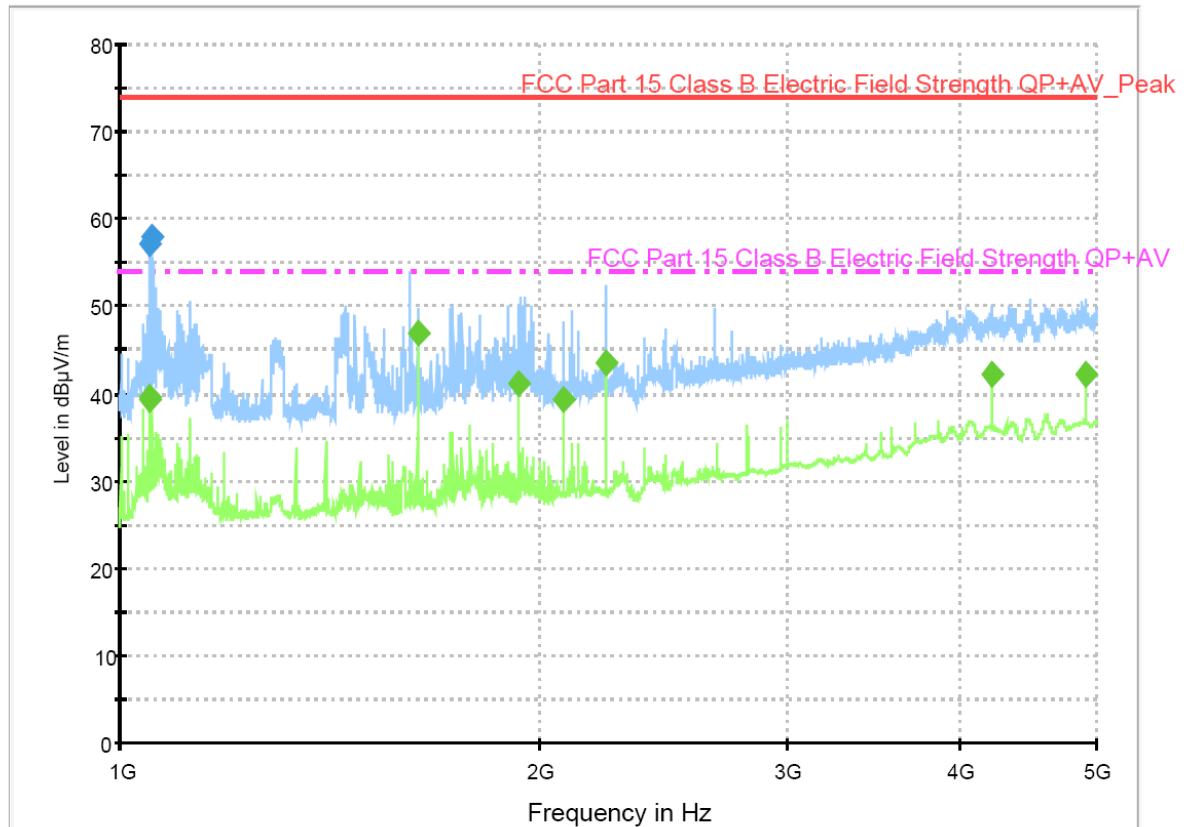


< Fig 16. Radiated emission result (30 MHz ~ 1 000 MHz)>



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

FCC_ESIB_Preamplifier with Scans



Final Result 1

Frequency (MHz)	MaxPeak-MaxHold (dBμV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
1049.600000	57.2	100.0	V	270.0	-15.8	16.8	74.0	
1053.600000	57.9	100.0	V	270.0	-15.8	16.1	74.0	

Final Result 2

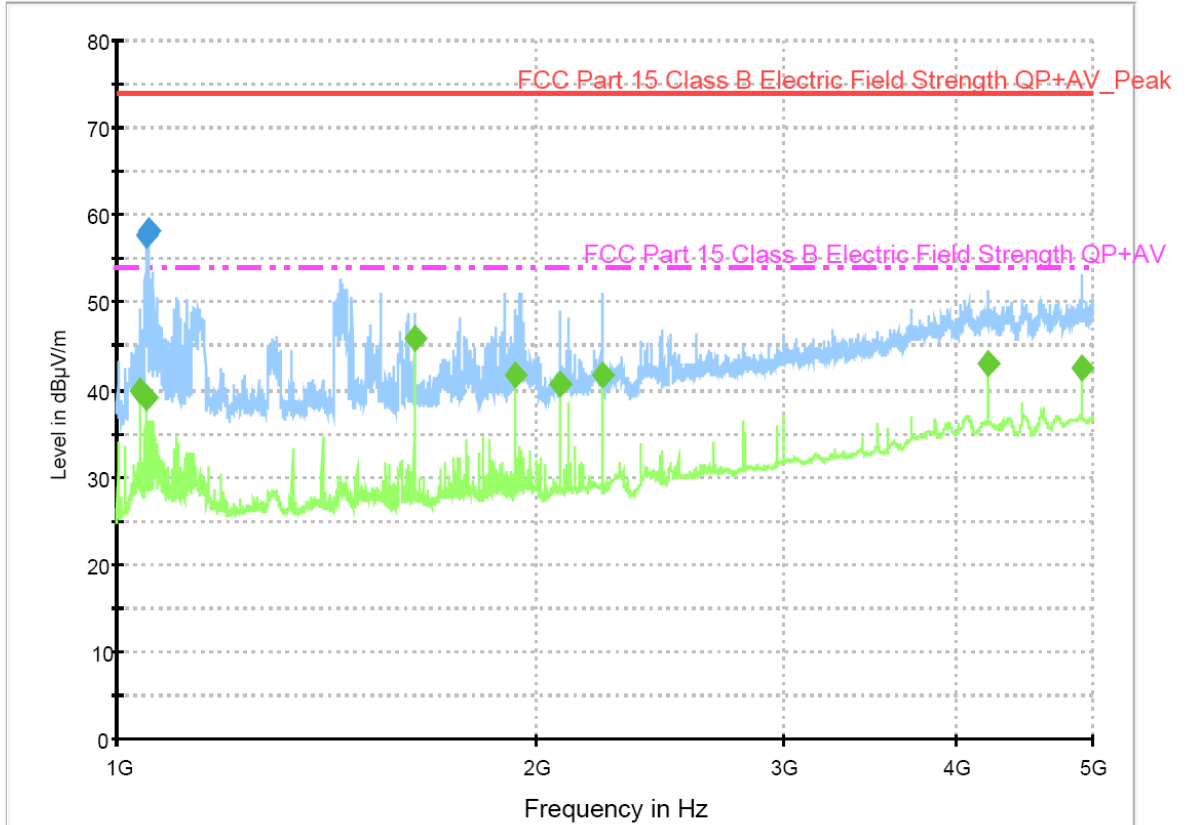
Frequency (MHz)	Average-MaxHold (dBμV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
1049.600000	39.4	100.0	V	270.0	-15.8	14.6	54.0	
1051.600000	39.5	100.0	V	270.0	-15.8	14.5	54.0	
1633.600000	47.0	200.0	V	180.0	-13.7	7.0	54.0	
1930.400000	41.1	200.0	V	180.0	-12.9	12.9	54.0	
2078.800000	39.4	100.0	V	180.0	-12.2	14.6	54.0	
2227.600000	43.6	200.0	V	180.0	-11.5	10.4	54.0	
4212.000000	42.3	100.0	H	270.0	-3.3	11.7	54.0	
4914.000000	42.2	100.0	H	270.0	-2.7	11.8	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
1050.400000	57.7	200.0	V	0.0	-15.8	16.3	74.0	
1052.800000	58.2	100.0	V	270.0	-15.8	15.8	74.0	

Final Result 2

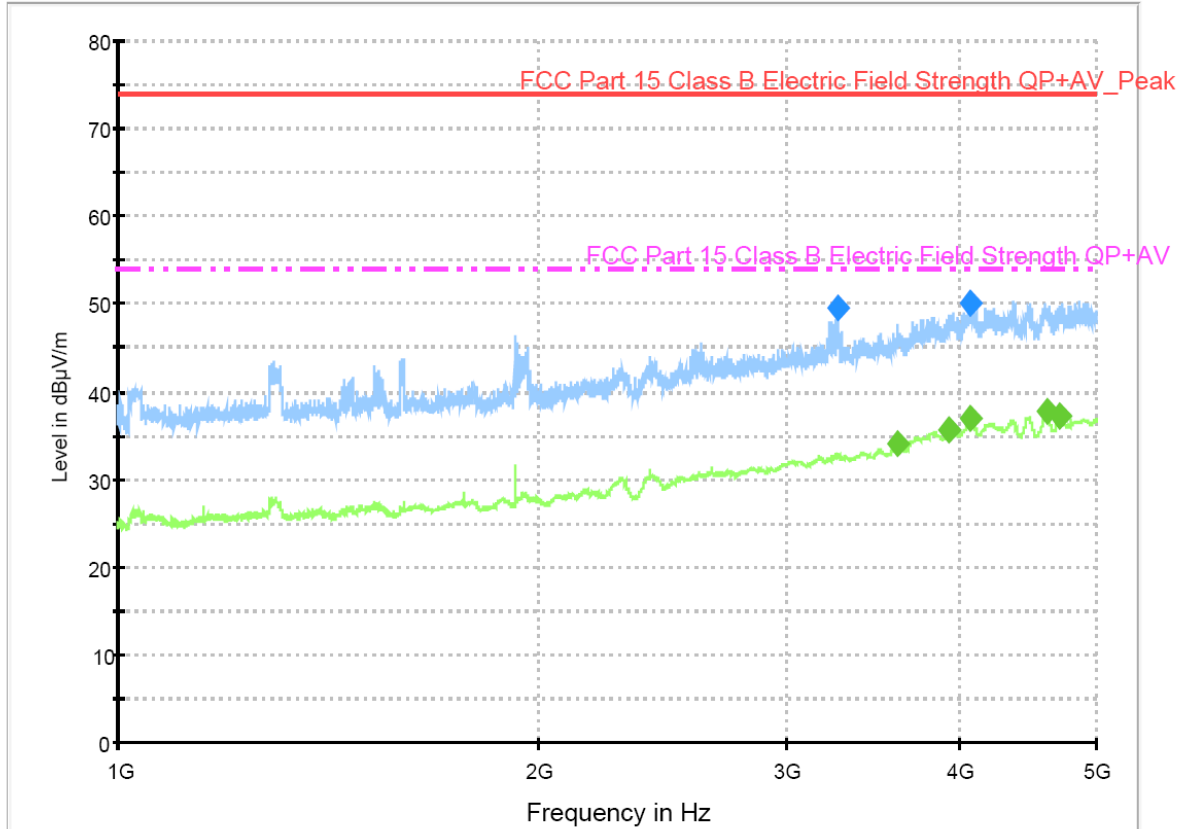
Frequency (MHz)	Average-MaxHold (dBμV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
1039.200000	39.8	200.0	V	0.0	-15.9	14.2	54.0	
1050.400000	39.1	200.0	V	0.0	-15.8	14.9	54.0	
1633.600000	46.0	200.0	V	180.0	-13.7	8.0	54.0	
1930.400000	41.6	100.0	H	180.0	-12.9	12.4	54.0	
2079.200000	40.7	200.0	V	180.0	-12.2	13.3	54.0	
2227.200000	41.7	200.0	H	180.0	-11.5	12.3	54.0	
4212.000000	43.0	100.0	H	270.0	-3.3	11.0	54.0	
4914.000000	42.6	100.0	H	270.0	-2.7	11.4	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_Preamplifier_RE with Scans



Final Result 1

Frequency (MHz)	Peak-MaxHold (dBμV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
3262.800000	49.7	100.0	H	90.0	-7.4	24.3	74.0	
4059.600000	50.2	200.0	V	0.0	-3.2	23.8	74.0	

Final Result 2

Frequency (MHz)	Average-MaxHold (dBμV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
3609.200000	34.0	100.0	H	270.0	-5.9	20.0	54.0	
3924.800000	35.8	100.0	H	0.0	-3.7	18.2	54.0	
4059.600000	37.0	200.0	H	270.0	-3.2	17.0	54.0	
4608.000000	37.8	100.0	H	90.0	-3.2	16.2	54.0	
4717.600000	37.1	100.0	H	0.0	-3.0	16.9	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 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: 22LE5300-UE)** was complies with §15.107 and 15.109 of the FCC Rules.