



FCC EVALUATION REPORT FOR CERTIFICATION

Applicant : LG Electronics Inc.

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

Pyeongteak-si, Gyeonggi-do, Korea.

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

Date of Issue : April 15, 2010

Order Number: GETEC-C1-10-094

Test Report Number: GETEC-E3-10-045

Test Site: Gumi College EMC Center

FCC Registration Number: (100749, 443957)

FCC ID.: BEJ22LG3DDHUA

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	: 22LG3DDH-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



CONTENTS

1. GENERAL INFORMATION	3
2. INTRODUCTION	4
3. PRODUCT INFORMATION	5
3.1 DESCRIPTION OF EUT.....	5
3.2 SUPPORT EQUIPMENT / CABLES USED	6
3.3 MODIFICATION ITEM(S)	7
4. DESCRIPTION OF TESTS.....	8
4.1 TEST CONDITION.....	8
4.2 CONDUCTED EMISSION	9
4.3 RADIATED EMISSION.....	10
5. CONDUCTED EMISSION.....	11
5.1 OPERATING ENVIRONMENT	11
5.2 TEST SET-UP	11
5.3 MEASUREMENT UNCERTAINTY.....	11
5.4 LIMIT	12
5.5 TEST EQUIPMENT USED.....	12
5.6 TEST DATA FOR CONDUCTED EMISSION	12
6. RADIATED EMISSION	19
6.1 OPERATING ENVIRONMENT	19
6.2 TEST SET-UP	19
6.3 MEASUREMENT UNCERTAINTY.....	19
6.4 LIMIT	20
6.5 TEST EQUIPMENT USED.....	20
6.6 TEST DATA FOR RADIATED EMISSION.....	20
7. SAMPLE CALCULATIONS.....	23
7.1 EXAMPLE 1 :	23
7.2 EXAMPLE 2 :	23
8. RECOMMENDATION & CONCLUSION.....	24
 APPENDIX A – ATTESTATION STATEMENT	
APPENDIX B – ID SAMPLE LABEL & LOCATION	
APPENDIX C – BLOCK DIAGRAM	
APPENDIX D – TEST SET-UP PHOTOGRAPHS	
APPENDIX E – EXTERNAL PHOTOGRAPHS	
APPENDIX F – INTERNAL PHOTOGRAPHS	
APPENDIX G – USER’S MANUAL	



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

1. General Information

Applicant: LG Electronics Inc.

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

Manufacturer: LG Electronics Inc.

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

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

Tel Number: +82-31-610-9623

- **FCC ID.** BEJ22LG3DDHUA
- **EUT Type** LCD TV/Monitor
- **Model Name** 22LG3DDH-UA
- **Trade Name** LG
- **Serial Number** Prototype
- **Rule Part(s)** FCC Part 15 Subpart B
- **Type of Authority** Certification
- **Test Procedure(s)** ANSI C63.4 (2003) / Canadian standard ICES-003
- **Dates of Test** April 7 ~ 12, 2010
- **Place of Test** **Gumi College EMC Center** (FCC Registration Number: 100749, 443957)
407, Bugok-dong, Gumi-si, Gyeongbuk, Korea.
- **Test Report Number** GETEC-E3-10-045
- **Dates of Issue** April 15, 2010



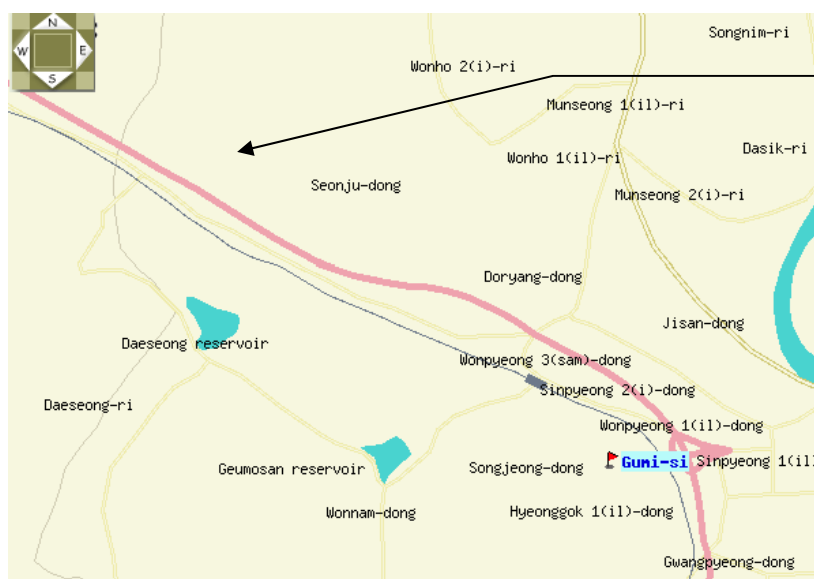
2. Introduction

The measurement procedure described in American National Standard for Methods of Measurement of Radio-Nose Emissions From Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (ASNI C63.4-2003) was used in determining radiated and conducted emissions emanating from **LG Electronics Inc. LCD TV/Monitor (Model Name: 22LG3DDH-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)



GUMI COLLEGE EMC CENTER
407, Bugok-dong, Gumi-si,
Gyeongbuk 730-711, Korea.
Tel: +82-54-440-1195
Fax: +82-54-440-1199

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: 22LG3DDH-UA)**
FCC ID.: BEJ22LG3DDHUA

MODEL		22LG3DDH (22LG3DDH-UA)	26LG3DDH (26LG3DDH-UA)	32LG3DDH (32LG3DDH-UA)
Dimensions (Width x Height x Depth)		20.7 x 15.2 x 3.2 inches 528 x 387.3 x 82.7 mm	26.1 x 17.6 x 3.1 inches 663.3 x 449.8 x 80.0 mm	31.5 x 21.4 x 4.2 inches 801.8 x 544.4 x 109 mm
Weight		13.6 pounds / 6.2kg	18.9 pounds / 8.6 kg	26.2 pounds / 11.9 kg
Power requirement Television System Program Coverage External Antenna Impedance		AC120V ~ 50/60Hz	AC120V ~ 50/60Hz NTSC-M, VSB, 64 & 256 QAM VHF 2-13, UHF 14-69, CATV 1-135, DTV 2-69, CADTV 1-135 75 ohm	AC120V ~ 50/60Hz
Environment condition	Operating Temperature Operating Humidity	32 ~ 104°F (0 ~ 40°C) Less than 80%		
	Storage Temperature Storage Humidity	-4 ~ 140°F (-20 ~ 60°C) Less than 85%		

-. Maximum Frequency range : 400 MHz



3.2 Support Equipment / Cables used

3.2.1 Used Support Equipment

Description	Manufacturer	Model Name	S/N & FCC ID.
PC	Hewlett Packard	D530	S/N: CNG34800PY FCC ID.: DoC
Video card	ATI	ATI RV360(9600)	S/N: SN0402017176 FCC ID.: DoC
Key board	COMPAQ	166516-AD6	S/N: B13BBOR391006D FCC ID.: AQ6-23K15
PS2 mouse	LOGITECH	M-S69	S/N: 334684-108 FCC ID.: JNZ211443
Joy stick	MICROSOFT	X05-92626	S/N: 9262600296169 FCC ID.: DoC
DVD player	LG Electronics Inc.	LC-954	S/N: 3850R-Z674K FCC ID.: DoC
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
Pillow speaker	Anacom MedTek	A4000-087.1D	S/N: 238805 FCC ID.: -

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

3.2.2 System configuration

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



3.2.3 Used Cable(s)

Cable Name	Condition	Description
Power cable	Connected to the EUT	1.80 m unshielded
HDMI/DVI in cable	Connected to the EUT and PC	2.00 m shielded
Remote control out 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
Pillow speaker cable	Connected to the EUT and pillow speaker	2.40 m shielded
Antenna cable	Connected to the EUT and TV signal generator	10.00 m shielded
Headset cable	Connected to the EUT and headset	2.75 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: 1 360 × 768 / 60 Hz (HDMI/DVI: Digital)

Conducted emission: 1 360 × 768 / 60 Hz (HDMI/DVI: Digital),

1 024 × 768 / 60 Hz (HDMI/DVI: Digital), 640 × 480 / 60 Hz (HDMI/DVI: Digital)

◆ 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

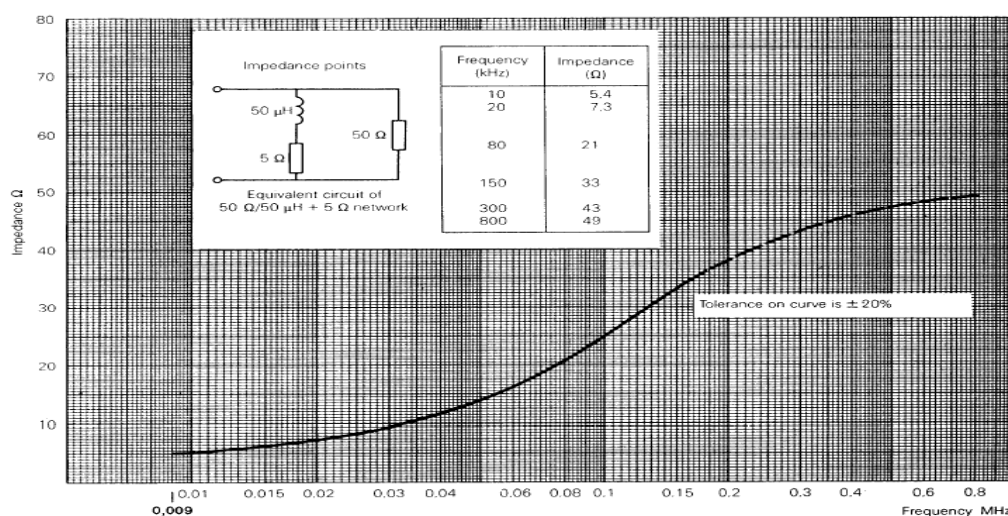


Fig 2. Impedance of LISN



4.3 Radiated Emission

Preliminary measurements were conducted 3 m semi anechoic chamber using broadband antennas to determine the frequency producing the maximum EME. Appropriate precaution was taken to ensure that all EME from the EUT were maximized and investigated. The technology configuration, mode of operation and turntable azimuth with respect to antenna was note for each frequency found.

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

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

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

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

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

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

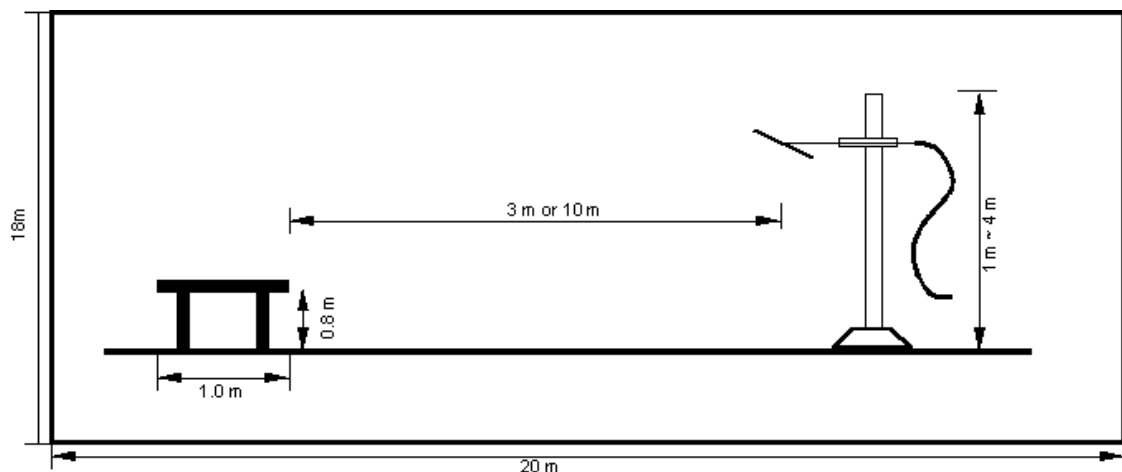


Fig 3. Dimensions of test site.



5. Conducted Emission

5.1 Operating Environment

Temperature : 25 °C
Relative Humidity : 38 % R.H.

5.2 Test Set-up

The conducted emission measurements were performed in the shielded room.

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

AMN is bonded on horizontal reference ground plane.

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

5.3 Measurement Uncertainty

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

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

Test Items	Uncertainty	Remark
Conducted emission (9 kHz ~ 150 kHz)	± 2.69 dB	Confidence levels of 95 % ($k = 2$)
Conducted emission (150 kHz ~ 30 MHz)	± 4.16 dB	Confidence levels of 95 % ($k = 2$)



5.4 Limit

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

5.5 Test Equipment used

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

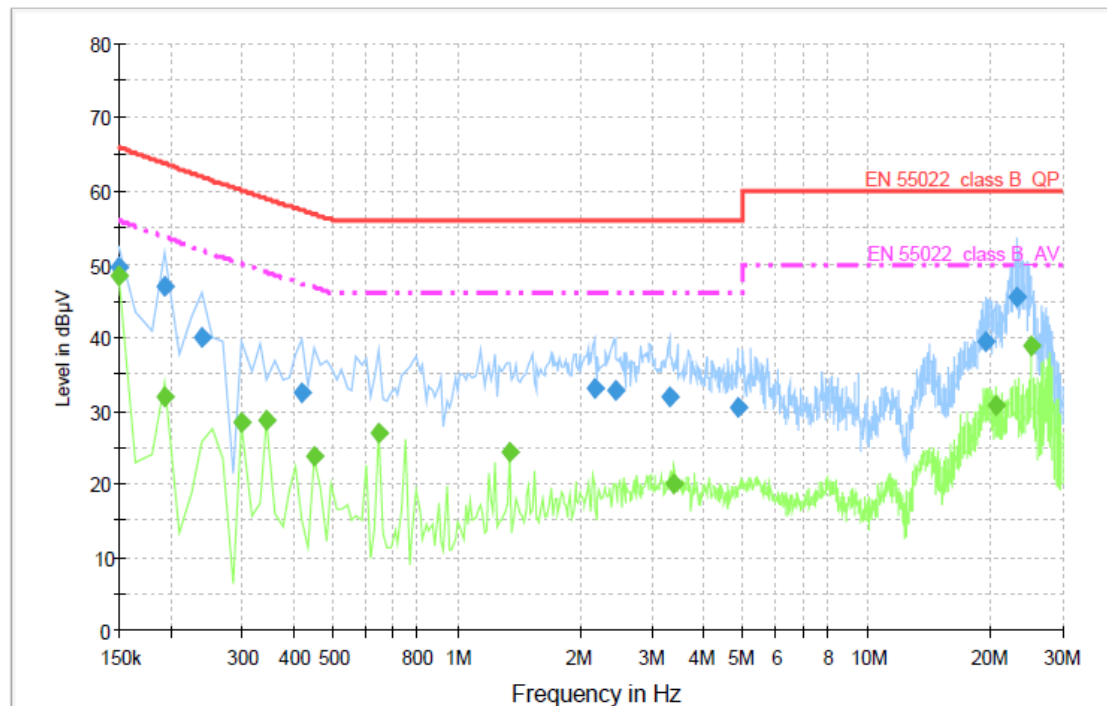
5.6 Test data for Conducted Emission

-. Test Date : April 12, 2010
-. Resolution Bandwidth : 9 kHz
-. Frequency Range : 0.15 MHz ~ 30 MHz



◆ Operating condition: 1 360 × 768 / 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
0.150000	49.5	1000.000	9.000	GND	L1	10.0	16.5	66.0	
0.195000	47.0	1000.000	9.000	GND	L1	10.0	16.7	63.7	
0.240000	40.0	1000.000	9.000	GND	L1	10.0	21.9	61.9	
0.420000	32.6	1000.000	9.000	GND	L1	10.0	24.7	57.3	
2.160000	32.9	1000.000	9.000	GND	L1	10.1	23.1	56.0	
2.430000	32.7	1000.000	9.000	GND	L1	10.1	23.3	56.0	
3.300000	31.9	1000.000	9.000	GND	L1	10.1	24.1	56.0	
4.860000	30.4	1000.000	9.000	GND	L1	10.2	25.6	56.0	
19.560000	39.4	1000.000	9.000	GND	L1	11.0	20.6	60.0	
23.145000	45.4	1000.000	9.000	GND	L1	11.2	14.6	60.0	

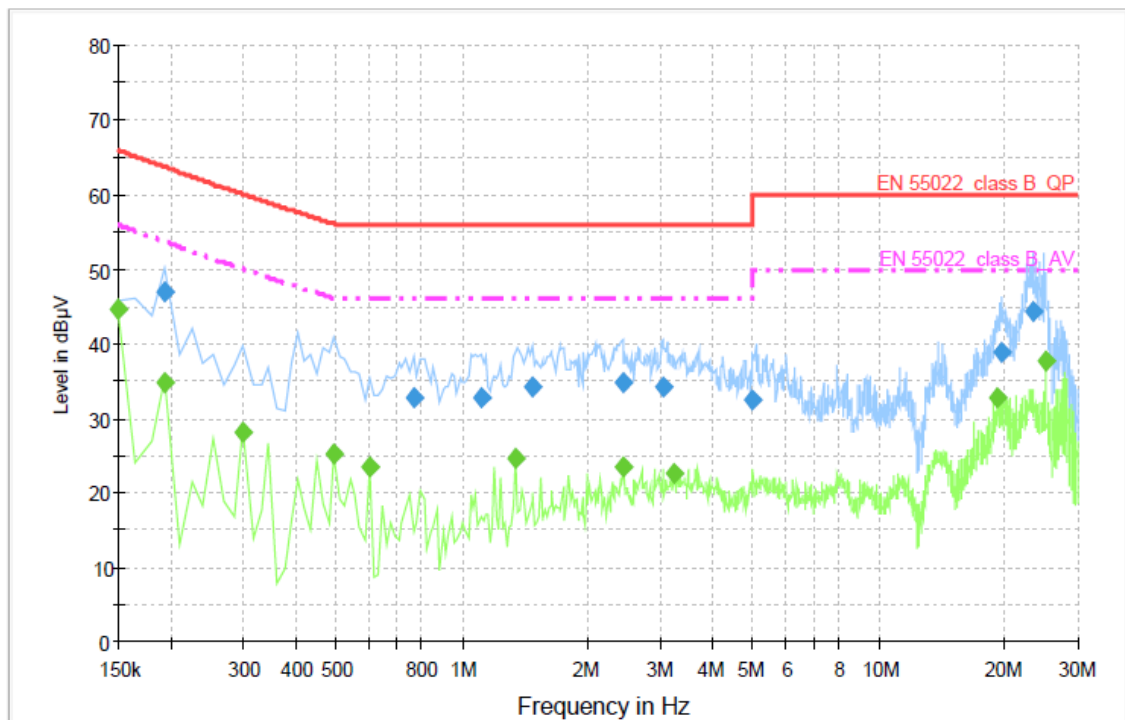
Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.150000	48.3	1000.000	9.000	GND	L1	10.0	7.7	56.0	
0.195000	32.0	1000.000	9.000	GND	L1	10.0	21.7	53.7	
0.300000	28.3	1000.000	9.000	GND	L1	10.0	21.7	50.0	
0.345000	28.7	1000.000	9.000	GND	L1	10.0	20.2	48.9	
0.450000	23.9	1000.000	9.000	GND	L1	10.0	22.9	46.8	
0.645000	27.1	1000.000	9.000	GND	L1	10.0	18.9	46.0	
1.350000	24.4	1000.000	9.000	GND	L1	10.1	21.6	46.0	
3.390000	20.1	1000.000	9.000	GND	L1	10.1	25.9	46.0	
20.565000	30.8	1000.000	9.000	GND	L1	11.1	19.2	50.0	
25.290000	38.9	1000.000	9.000	GND	L1	11.3	11.1	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
0.195000	46.8	1000.000	9.000	GND	N	10.0	16.9	63.7	
0.765000	32.7	1000.000	9.000	GND	N	10.0	23.3	56.0	
1.110000	32.7	1000.000	9.000	GND	N	10.1	23.3	56.0	
1.485000	34.3	1000.000	9.000	GND	N	10.1	21.7	56.0	
2.430000	34.7	1000.000	9.000	GND	N	10.1	21.3	56.0	
3.030000	34.1	1000.000	9.000	GND	N	10.1	21.9	56.0	
4.995000	32.5	1000.000	9.000	GND	N	10.2	23.6	56.0	
19.800000	38.9	1000.000	9.000	GND	N	10.8	21.1	60.0	
23.415000	44.4	1000.000	9.000	GND	N	10.8	15.6	60.0	

Final Measurement Detector 2

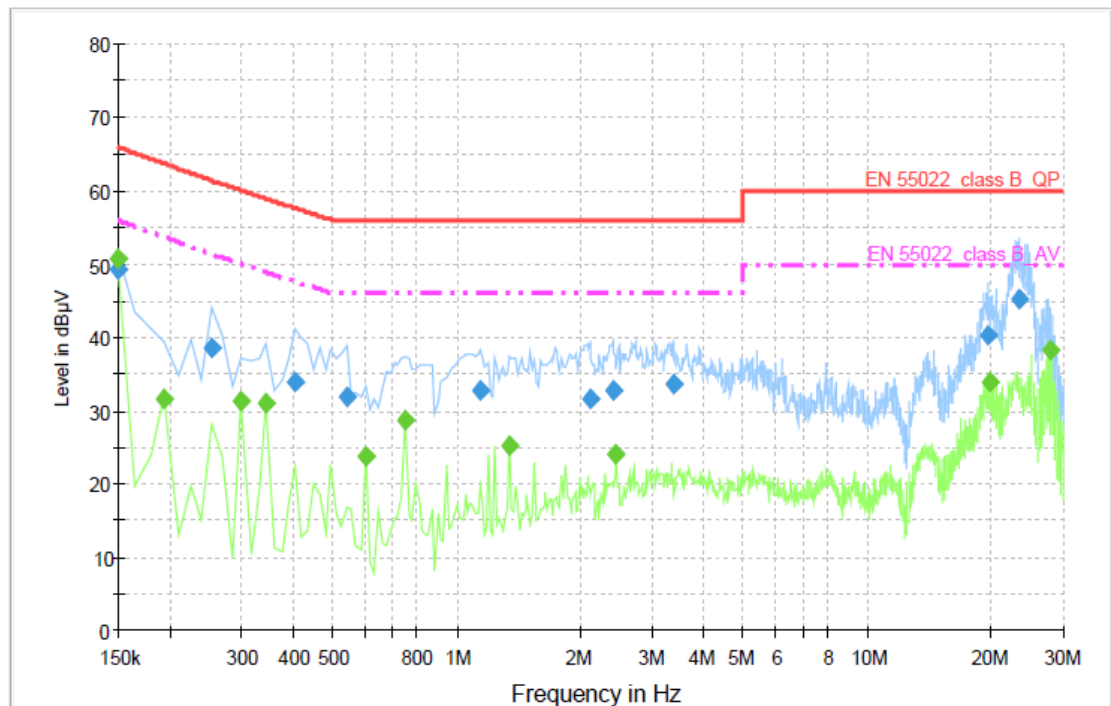
Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.150000	44.7	1000.000	9.000	GND	N	10.0	11.3	56.0	
0.195000	34.8	1000.000	9.000	GND	N	10.0	18.9	53.7	
0.300000	28.0	1000.000	9.000	GND	N	10.0	22.0	50.0	
0.495000	25.3	1000.000	9.000	GND	N	10.0	20.8	46.1	
0.600000	23.5	1000.000	9.000	GND	N	10.0	22.5	46.0	
1.350000	24.8	1000.000	9.000	GND	N	10.1	21.2	46.0	
2.445000	23.4	1000.000	9.000	GND	N	10.1	22.6	46.0	
3.240000	22.7	1000.000	9.000	GND	N	10.1	23.3	46.0	
19.365000	32.8	1000.000	9.000	GND	N	10.8	17.2	50.0	
25.290000	37.6	1000.000	9.000	GND	N	10.8	12.4	50.0	

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



◆ Operating condition: 1 024 × 768 / 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
0.150000	49.4	1000.000	9.000	GND	L1	10.0	16.6	66.0	
0.255000	38.7	1000.000	9.000	GND	L1	10.0	22.7	61.4	
0.405000	34.0	1000.000	9.000	GND	L1	10.0	23.6	57.6	
0.540000	32.0	1000.000	9.000	GND	L1	10.0	24.0	56.0	
1.140000	32.7	1000.000	9.000	GND	L1	10.0	23.3	56.0	
2.115000	31.7	1000.000	9.000	GND	L1	10.1	24.3	56.0	
2.400000	32.8	1000.000	9.000	GND	L1	10.1	23.2	56.0	
3.375000	33.5	1000.000	9.000	GND	L1	10.1	22.5	56.0	
19.785000	40.3	1000.000	9.000	GND	L1	11.0	19.7	60.0	
23.565000	45.1	1000.000	9.000	GND	L1	11.2	14.9	60.0	

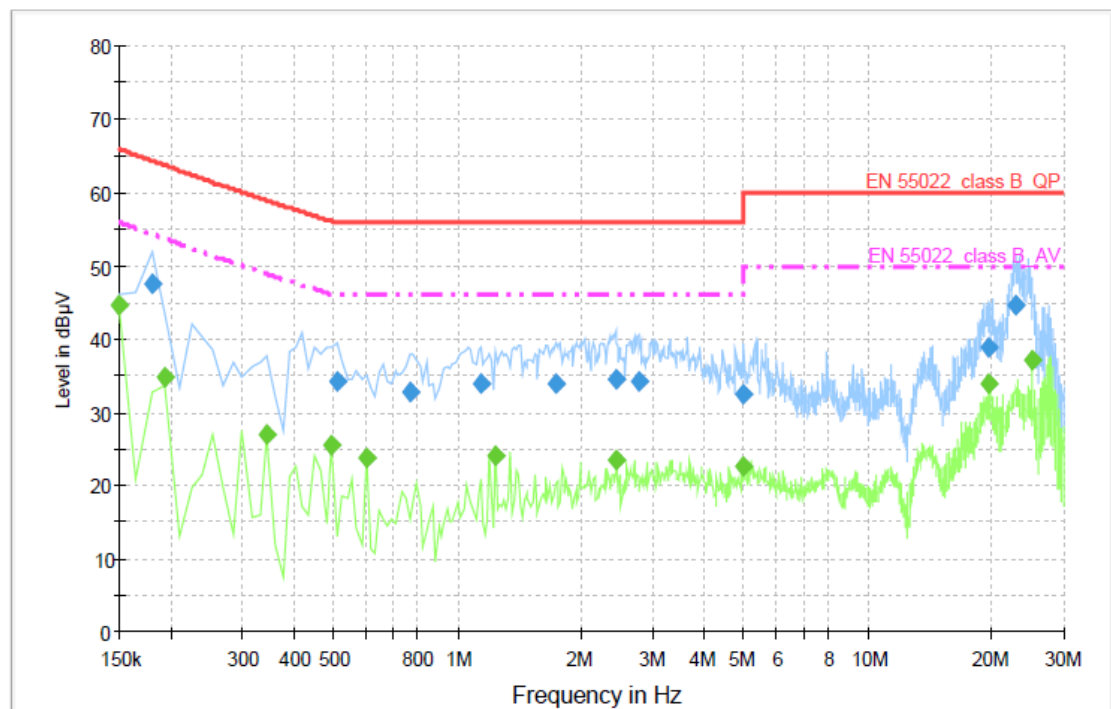
Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.150000	50.6	1000.000	9.000	GND	L1	10.0	5.4	56.0	
0.195000	31.5	1000.000	9.000	GND	L1	10.0	22.2	53.7	
0.300000	31.4	1000.000	9.000	GND	L1	10.0	18.6	50.0	
0.345000	30.9	1000.000	9.000	GND	L1	10.0	18.0	48.9	
0.600000	23.8	1000.000	9.000	GND	L1	10.0	22.2	46.0	
0.750000	28.6	1000.000	9.000	GND	L1	10.0	17.4	46.0	
1.350000	25.3	1000.000	9.000	GND	L1	10.1	20.7	46.0	
2.445000	24.1	1000.000	9.000	GND	L1	10.1	21.9	46.0	
19.920000	33.9	1000.000	9.000	GND	L1	11.0	16.1	50.0	
28.035000	38.2	1000.000	9.000	GND	L1	11.4	11.8	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
0.180000	47.6	1000.000	9.000	GND	N	10.0	16.8	64.4	
0.510000	34.2	1000.000	9.000	GND	N	10.0	21.8	56.0	
0.765000	32.8	1000.000	9.000	GND	N	10.0	23.2	56.0	
1.140000	33.9	1000.000	9.000	GND	N	10.1	22.1	56.0	
1.740000	33.9	1000.000	9.000	GND	N	10.1	22.1	56.0	
2.430000	34.4	1000.000	9.000	GND	N	10.1	21.6	56.0	
2.760000	34.1	1000.000	9.000	GND	N	10.1	21.9	56.0	
4.995000	32.5	1000.000	9.000	GND	N	10.2	23.6	56.0	
19.635000	38.9	1000.000	9.000	GND	N	10.8	21.1	60.0	
22.950000	44.7	1000.000	9.000	GND	N	10.8	15.3	60.0	

Final Measurement Detector 2

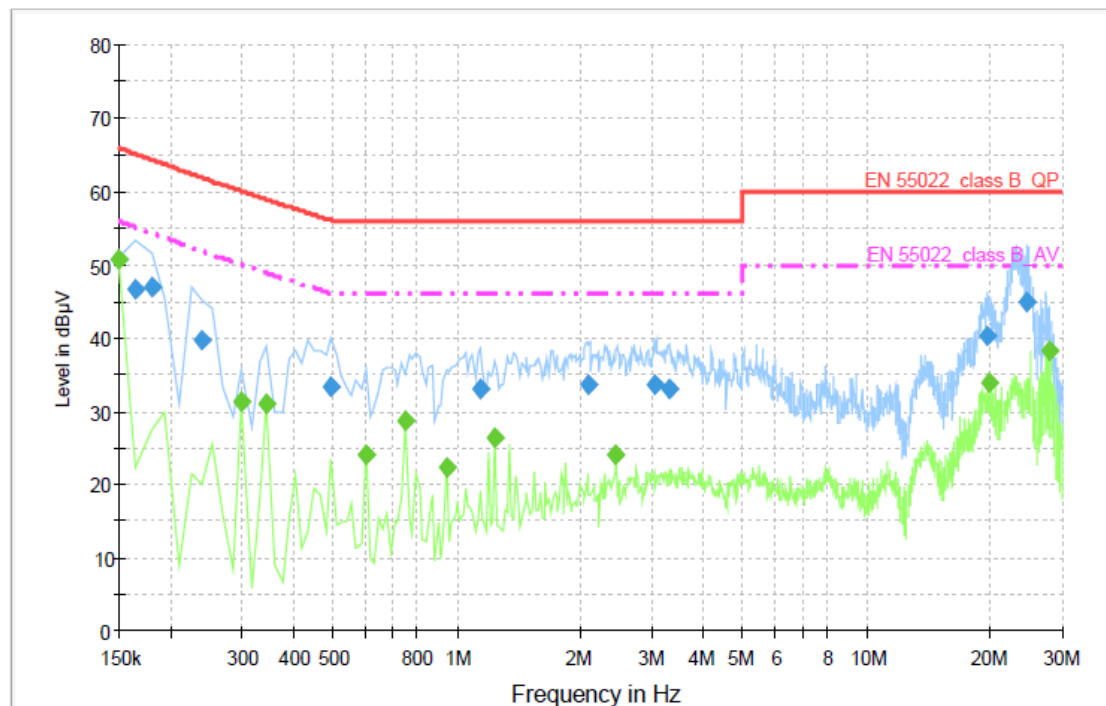
Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.150000	44.8	1000.000	9.000	GND	N	10.0	11.2	56.0	
0.195000	34.9	1000.000	9.000	GND	N	10.0	18.8	53.7	
0.345000	26.9	1000.000	9.000	GND	N	10.0	22.0	48.9	
0.495000	25.4	1000.000	9.000	GND	N	10.0	20.7	46.1	
0.600000	23.7	1000.000	9.000	GND	N	10.0	22.3	46.0	
1.245000	24.2	1000.000	9.000	GND	N	10.1	21.8	46.0	
2.445000	23.5	1000.000	9.000	GND	N	10.1	22.5	46.0	
4.995000	22.7	1000.000	9.000	GND	N	10.2	23.3	46.0	
19.755000	33.8	1000.000	9.000	GND	N	10.8	16.2	50.0	
25.290000	37.2	1000.000	9.000	GND	N	10.8	12.8	50.0	

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



◆ Operating condition: 640 × 480 / 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
0.165000	46.8	1000.000	9.000	GND	L1	10.0	18.3	65.1	
0.180000	46.9	1000.000	9.000	GND	L1	10.0	17.5	64.4	
0.240000	39.7	1000.000	9.000	GND	L1	10.0	22.2	61.9	
0.495000	33.5	1000.000	9.000	GND	L1	10.0	22.7	56.1	
1.140000	33.0	1000.000	9.000	GND	L1	10.0	23.0	56.0	
2.085000	33.7	1000.000	9.000	GND	L1	10.1	22.3	56.0	
3.030000	33.7	1000.000	9.000	GND	L1	10.1	22.3	56.0	
3.300000	33.0	1000.000	9.000	GND	L1	10.1	23.0	56.0	
19.755000	40.4	1000.000	9.000	GND	L1	11.0	19.6	60.0	
24.630000	44.8	1000.000	9.000	GND	L1	11.2	15.2	60.0	

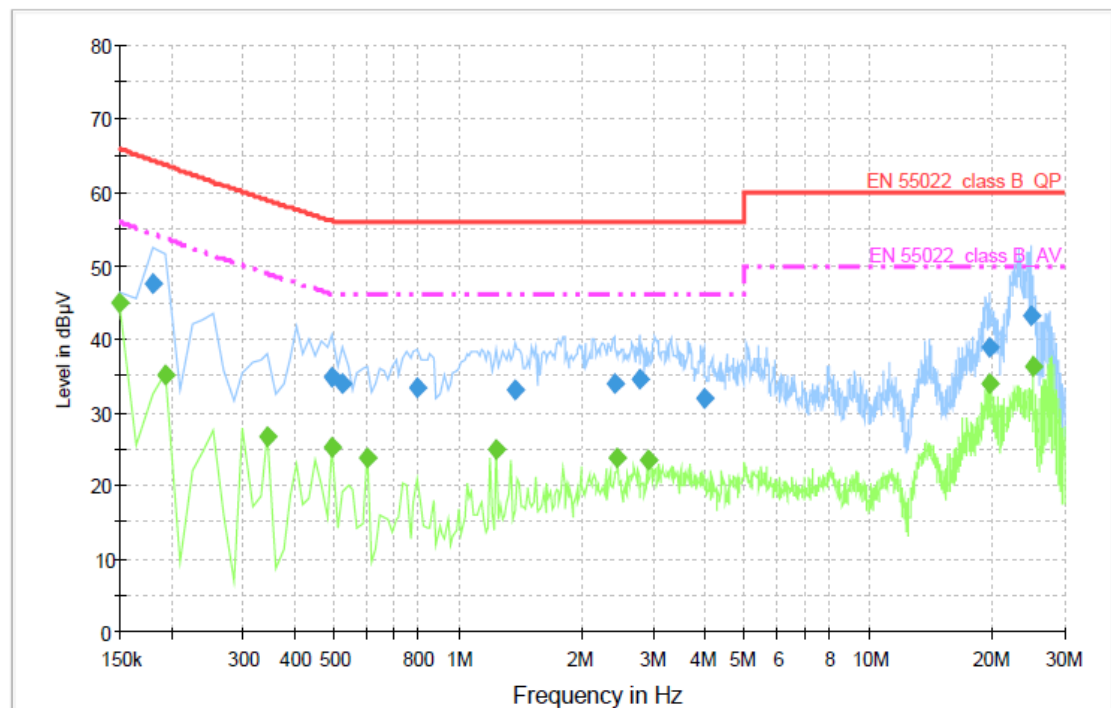
Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.150000	50.7	1000.000	9.000	GND	L1	10.0	5.3	56.0	
0.300000	31.4	1000.000	9.000	GND	L1	10.0	18.6	50.0	
0.345000	31.0	1000.000	9.000	GND	L1	10.0	17.9	48.9	
0.600000	24.0	1000.000	9.000	GND	L1	10.0	22.0	46.0	
0.750000	28.7	1000.000	9.000	GND	L1	10.0	17.3	46.0	
0.945000	22.2	1000.000	9.000	GND	L1	10.0	23.8	46.0	
1.245000	26.3	1000.000	9.000	GND	L1	10.1	19.7	46.0	
2.445000	24.1	1000.000	9.000	GND	L1	10.1	21.9	46.0	
19.920000	34.0	1000.000	9.000	GND	L1	11.0	16.0	50.0	
28.035000	38.3	1000.000	9.000	GND	L1	11.4	11.7	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
0.180000	47.6	1000.000	9.000	GND	N	10.0	16.8	64.4	
0.495000	34.9	1000.000	9.000	GND	N	10.0	21.2	56.1	
0.525000	33.9	1000.000	9.000	GND	N	10.0	22.1	56.0	
0.795000	33.4	1000.000	9.000	GND	N	10.0	22.6	56.0	
1.380000	33.0	1000.000	9.000	GND	N	10.1	23.0	56.0	
2.400000	33.9	1000.000	9.000	GND	N	10.1	22.1	56.0	
2.760000	34.4	1000.000	9.000	GND	N	10.1	21.6	56.0	
3.975000	31.9	1000.000	9.000	GND	N	10.2	24.1	56.0	
19.665000	38.7	1000.000	9.000	GND	N	10.8	21.3	60.0	
24.870000	43.1	1000.000	9.000	GND	N	10.8	16.9	60.0	

Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.150000	44.9	1000.000	9.000	GND	N	10.0	11.1	56.0	
0.195000	34.9	1000.000	9.000	GND	N	10.0	18.8	53.7	
0.345000	26.7	1000.000	9.000	GND	N	10.0	22.2	48.9	
0.495000	25.3	1000.000	9.000	GND	N	10.0	20.8	46.1	
0.600000	23.9	1000.000	9.000	GND	N	10.0	22.1	46.0	
1.245000	24.9	1000.000	9.000	GND	N	10.1	21.1	46.0	
2.445000	23.6	1000.000	9.000	GND	N	10.1	22.4	46.0	
2.895000	23.5	1000.000	9.000	GND	N	10.1	22.5	46.0	
19.755000	33.9	1000.000	9.000	GND	N	10.8	16.1	50.0	
25.290000	36.3	1000.000	9.000	GND	N	10.8	13.7	50.0	

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



6. Radiated Emission

6.1 Operating Environment

Temperature : 23 °C
Relative Humidity : 43 % R.H.

6.2 Test Set-up

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

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

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

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

6.3 Measurement Uncertainty

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

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

Test Items(Chamber)	Uncertainty	Remark
Radiated emission (30 MHz ~ 300 MHz, 3 m, Vertical)	± 4.32 dB	Confidence levels of 95 % ($k = 2$)
Radiated emission (30 MHz ~ 300 MHz, 3 m, Horizontal)	± 4.21 dB	Confidence levels of 95 % ($k = 2$)
Radiated emission (300 MHz ~ 1 000 MHz, 3 m, Vertical)	± 3.96 dB	Confidence levels of 95 % ($k = 2$)
Radiated emission (300 MHz ~ 1 000 MHz, 3 m, Horizontal)	± 3.97 dB	Confidence levels of 95 % ($k = 2$)



6.4 Limit

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

6.5 Test Equipment used

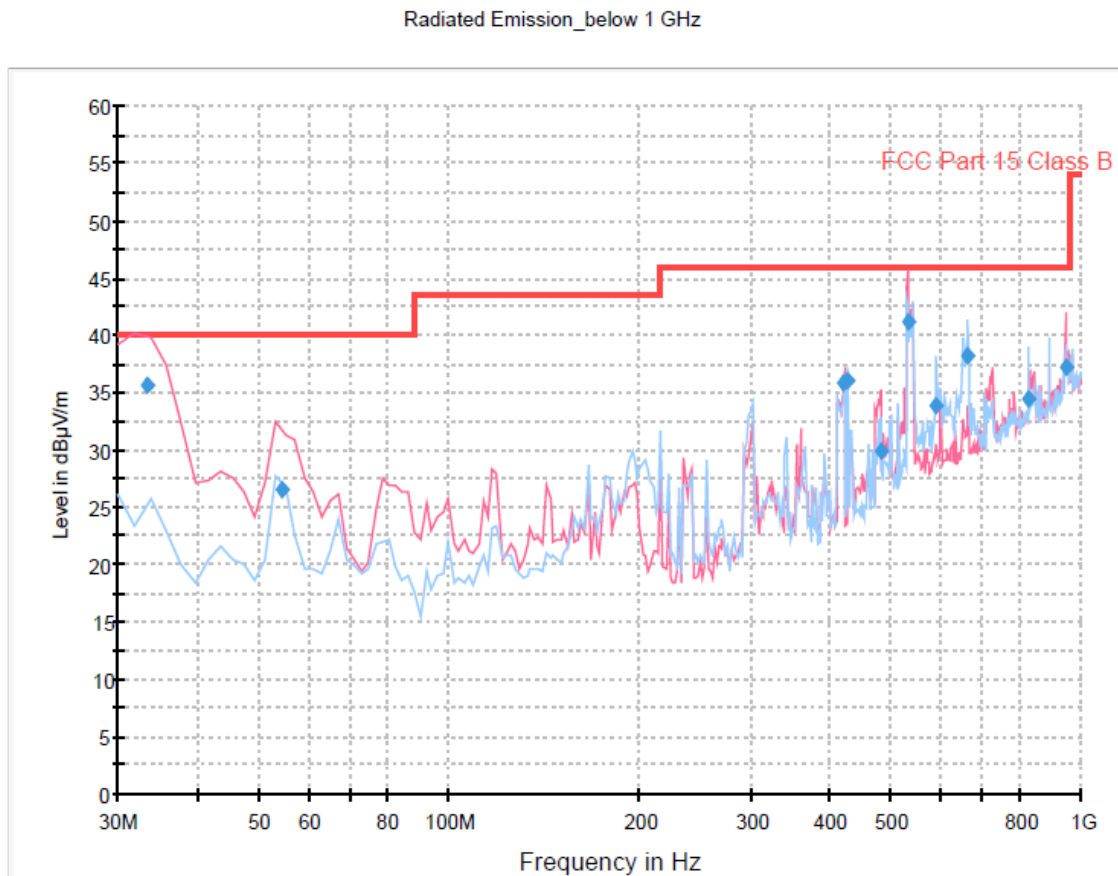
Model Name	Manufacturer	Description	Serial Number	Due to Calibration
■ - ESIB26	Rohde & Schwarz	EMI Test Receiver	830482/010	12. 11. 2010
■ - VULB9160	Schwarzbeck	Broadband Test Antenna	3193	03. 11. 2012
■ - BBHA9120D	Schwarzbeck	Horn ANT	207	12. 22. 2011
■ - MCU066	maturo GmbH	Position Controller	1390306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

6.6 Test data for Radiated Emission

- . Test Date : April 7, 2010
- . Resolution Bandwidth : 120 kHz/1 MHz
- . Frequency Range : 30 MHz ~ 2 000 MHz
- . Measurement Distance : 3 m
- . Note : The highest frequency of the internal source of the EUT is between 108 MHz and 500 MHz (400 MHz). The measurement was made up to 2 000 MHz



- ◆ Operating Condition: 1 360 × 768 / 60 Hz (HDMI/DVI: Digital)
Red trace: Vertical polarization, Blue trace: Horizontal polarization



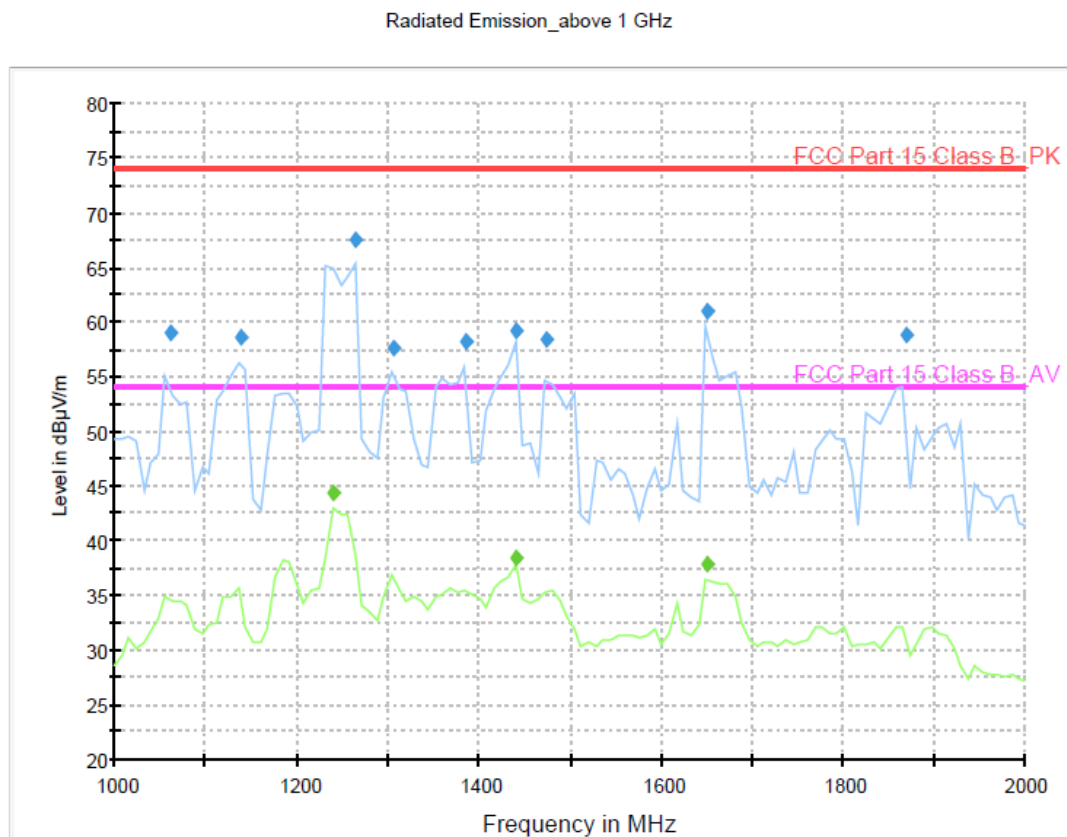
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
33.403888	35.6	1000.0	120.000	100.0	V	25.0	12.9	4.4	40.0
54.466653	26.5	1000.0	120.000	100.0	V	297.0	13.5	13.5	40.0
422.245331	35.8	1000.0	120.000	122.0	V	280.0	19.8	10.2	46.0
427.476994	36.1	1000.0	120.000	122.0	H	195.0	20.0	9.9	46.0
482.785852	29.8	1000.0	120.000	100.0	V	315.0	21.2	16.2	46.0
532.046934	41.3	1000.0	120.000	100.0	V	192.0	22.2	4.7	46.0
590.563567	33.9	1000.0	120.000	131.0	H	177.0	24.2	12.1	46.0
662.663527	38.2	1000.0	120.000	113.0	H	151.0	25.6	7.8	46.0
826.693988	34.5	1000.0	120.000	113.0	H	151.0	28.4	11.5	46.0
944.631142	37.3	1000.0	120.000	130.0	V	194.0	30.8	8.7	46.0

< Fig 10. Radiated emission result (30 MHz ~ 1 000 MHz)>



- ◆ Operating Condition: 1 360 × 768 / 60 Hz (HDMI/DVI: Digital)
Green trace: Average detector, Blue trace: Peak detector



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)
1061.112225	59.0	100.0	1000.000	146.0	V	172.0	-15.6	15.0	74.0
1139.672545	58.5	100.0	1000.000	311.0	V	172.0	-15.2	15.5	74.0
1265.929058	67.6	100.0	1000.000	100.0	V	152.0	-14.6	6.4	74.0
1306.409219	57.6	100.0	1000.000	100.0	V	180.0	-14.3	16.4	74.0
1386.169539	58.3	100.0	1000.000	100.0	V	193.0	-14.4	15.7	74.0
1441.881764	59.2	100.0	1000.000	200.0	V	166.0	-14.4	14.8	74.0
1473.945892	58.5	100.0	1000.000	163.0	V	172.0	-14.3	15.6	74.0
1650.698597	61.0	100.0	1000.000	100.0	V	186.0	-13.6	13.0	74.0
1868.731463	58.8	100.0	1000.000	171.0	V	160.0	-13.1	15.2	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)
1139.272545	6.9	100.0	1000.000	297.0	V	172.0	-15.2	47.1	54.0
1241.480962	44.4	100.0	1000.000	192.0	V	146.0	-14.7	9.6	54.0
1440.681764	38.4	100.0	1000.000	200.0	V	166.0	-14.4	15.6	54.0
1651.898597	37.7	100.0	1000.000	100.0	V	186.0	-13.6	16.3	54.0

< Fig 11. Radiated emission result (1 000 MHz ~ 2 000 MHz)>



7. Sample Calculations

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

7.1 Example 1 :

■ 20.3 MHz

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

7.2 Example 2 :

■ 66.7 MHz

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



8. Recommendation & Conclusion

The data collected shows that the **LG Electronics Inc. LCD TV/Monitor (Model Name: 22LG3DDH-UA)** was complies with §15.107 and 15.109 of the FCC Rules.