

FCC EVALUATION REPORT FOR CERTIFICATION

Manufacturer : LG Electronics Inc.

642, Jinpyeong-dong, Gumi-si,

Gyeongbuk, 730-360, Korea.

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

Date of Issue : June 30, 2009

Order Number: GETEC-C1-09-152

Test Report Number: GETEC-E3-09-082

Test Site: Gumi College EMC Center

FCC Registration Number: (100749)

FCC ID.: BEJM4213CG

Applicant: LG Electronics Inc.

Rule Part(s)	: FCC Part 15 Subpart B
Equipment Class	: Class B computing device peripheral (JBP)
EUT Type	: LCD Monitor
Type of Authority	: Certification
Model Name	: M4213CG
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


Tae-Sig Park, Technical Manager
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	21
6.1 OPERATING ENVIRONMENT	21
6.2 TEST SET-UP	21
6.3 MEASUREMENT UNCERTAINTY.....	21
6.4 LIMIT	22
6.5 TEST EQUIPMENT USED.....	22
6.6 TEST DATA FOR RADIATED EMISSION.....	23
7. SAMPLE CALCULATIONS.....	27
7.1 EXAMPLE 1 :	27
7.2 EXAMPLE 2 :	27
8. RECOMMENDATION & CONCLUSION.....	28
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: 642, Jinpyeong-dong, Gumi-si, Gyeongbuk, Korea.

Manufacturer: LG Electronics Inc.

Manufacturer Address: 642, Jinpyeong-dong, Gumi-si, Gyeongbuk, Korea.

Contact Person: Mr. Sang -Wook Lee, Chief research engineer

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- **FCC ID.** BEJM4213CG
- **EUT Type** LCD Monitor
- **Model Name** M4213CG
- **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** June 19 ~ 24, 2009
- **Place of Test** **Gumi College EMC Center** (FCC Registration Number: 100749)
407, Bugok-dong, Gumi-si, Gyeongbuk, Korea.
- **Test Report Number** GETEC-E3-09-082
- **Dates of Issue** June 30, 2009

EUT Type: LCD Monitor

FCC ID.: BEJM4213CG



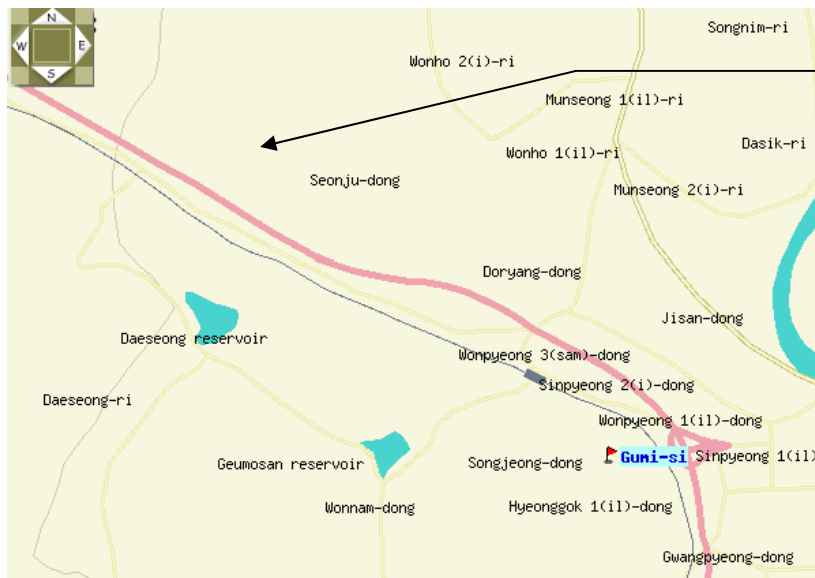
2. Introduction

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 Monitor (Model Name: M4213CG)**

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 on October 19, 1992



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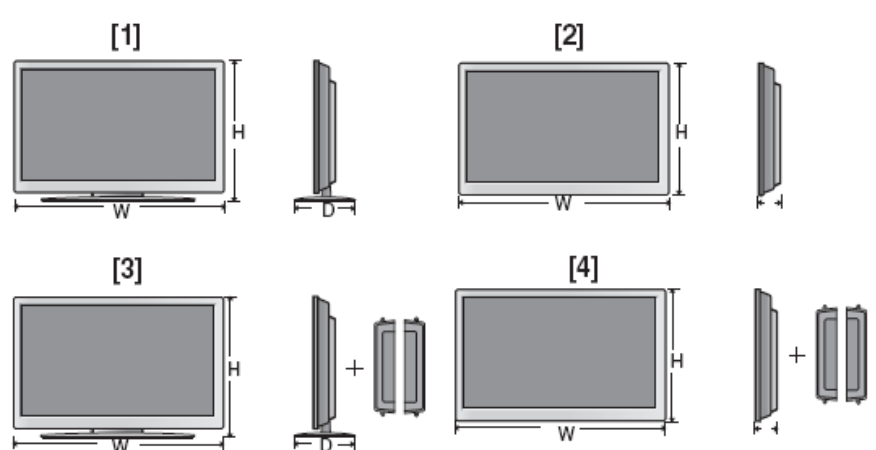
Fig 1. The map above shows the Gumi College in vicinity area.



3. Product Information

3.1 Description of EUT

The Equipment under Test (EUT) is the **LG Electronics Inc. LCD Monitor (Model Name: M4213CG) FCC ID.: BEJM4213CG**

LCD Panel	42.02 inches (106.73 cm) TFT (Thin Film Transistor) LCD (Liquid Crystal Display) Panel Visible diagonal size: 106.73 cm 0.227 mm X 0.681 mm (Pixel Pitch)	
Power	Rated Voltage Power Consumption	AC 100-240V~ 50/60Hz 2.2A On Mode : 220W Typ. Sleep Mode : ≤ 1W (RGB) / 3W(HDMI/DVI) (If LAN OFF is selected) Off Mode : ≤ 1W
Dimensions &Weight		
	Width x Height x Depth [1] 99.56 cm (39.19 inches) x 67.41 cm (26.54 inches) x 29.30 cm (11.54 inches) [2] 99.56 cm (39.19 inches) x 58.76 cm (23.13 inches) x 11.37 cm (4.47 inches) [3] 99.56 cm (39.19 inches) x 67.41 cm (26.54 inches) x 29.30 cm (11.54 inches) [4] 99.56 cm (39.19 inches) x 58.76 cm (23.13 inches) x 11.37 cm (4.47 inches)	
	Net [1] 24.5 kg (54.02 lbs) [3] 27.1 kg (59.75 lbs)	
	[2] 21.1 kg (46.54 lbs) [4] 23.7 kg (52.25 lbs)	

Maximum Frequency range:	210 MHz
Speaker	SP-0000K (LG Electronics Inc.)

EUT Type: LCD Monitor

FCC ID.: BEJM4213CG



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
Joystick	Microsoft	X05-92626	S/N: 9262600296169 FCC ID: DoC
DVD player	LG Electronics Inc	LC-954	S/N: 3850R-Z674K FCC ID: DoC
Printer	Hewlett Packard	970CXI	S/N: MY9B01F1FG FCC ID: DoC
Monitor	MAJESTIC	TM154	S/N: D0703CP1003 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 EUT	1.8 m unshielded
Video(RGB)input cable	Connected to the EUT and PC	1.8 m shielded with two ferrite cores
Video(RGB)output cable	Connected to the EUT and Monitor	1.8 m shielded with two ferrite cores
Video(HDMI/DVI)cable	Connected to the EUT and PC	1.95 m shielded
PC sound cable	Connected to the EUT and PC	1.8 m shielded
Remote control in cable	Connected to the EUT and PC	1.8 m shielded
Component cable	Connected to the EUT and DVD player	3.0 m shielded
Component sound cable	Connected to the EUT and DVD player	3.0 m shielded
AV input cable	Connected to the EUT and DVD player	1.8 m shielded
AV output cable	Connected to the EUT and Monitor	1.8 m shielded
RS-232C input cable	Connected to the EUT	1.2 m shielded with two ferrite cores
S-video cable	Connected to the EUT and DVD player	1.8 m shielded
LAN cable	Connected to the EUT and Network	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 & Network Connecting 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

"The verification report for 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.

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

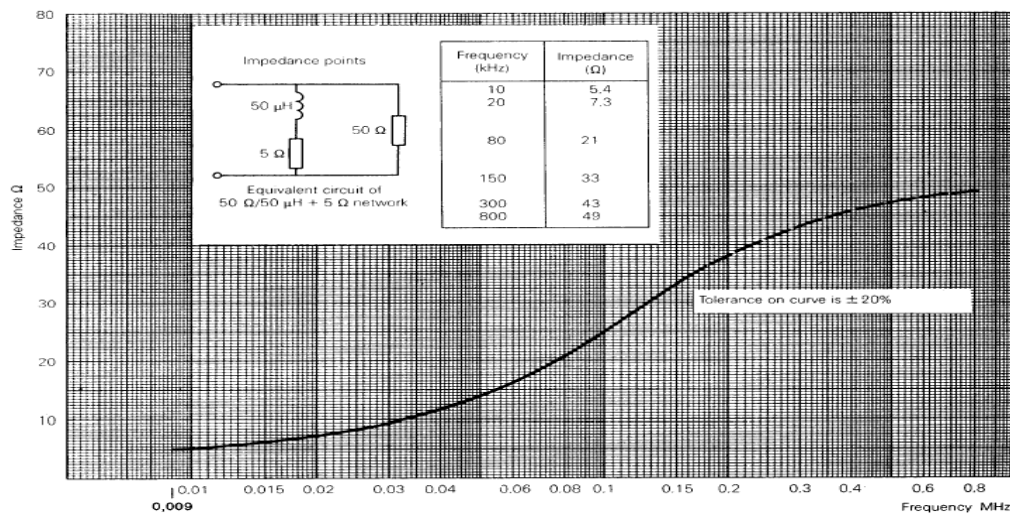


Fig 2. Impedance of LISN



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.

The spectrum was scanned from 30 MHz to 1 000 MHz using bicornical log antenna (Schwarzbeck, VULB9160). Above 1 GHz, horn antenna (Schwarzbeck, BBHA9120D) was used.

Final measurements were made outdoors at 3 m /10 m test range.

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

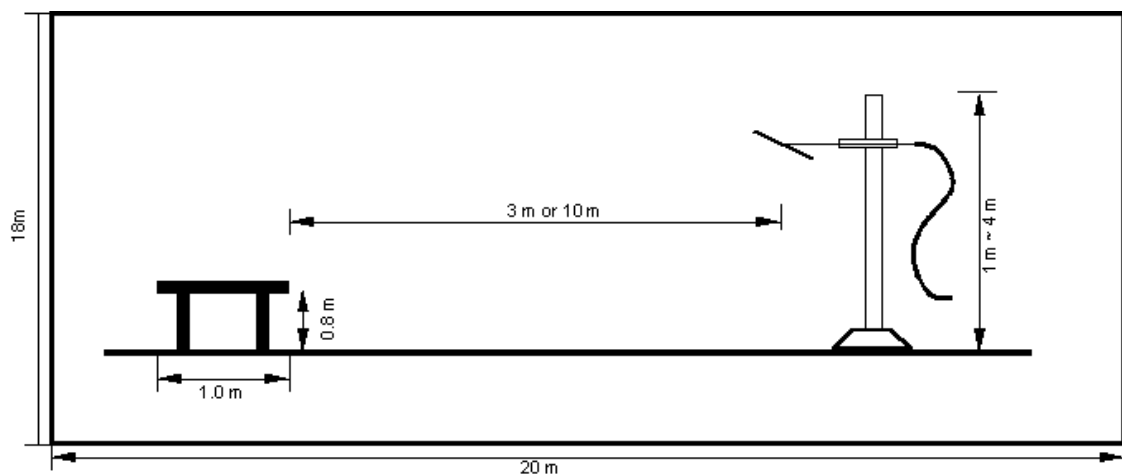


Fig 3. Dimensions of Open Site Test Area



5. Conducted Emission

5.1 Operating Environment

Temperature : 27 °C
Relative Humidity : 46 % 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)	± 2.97 dB	Confidence levels of 95 % (k=2)
Conducted emission (150 kHz ~ 30 MHz)	± 4.05 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. 2009

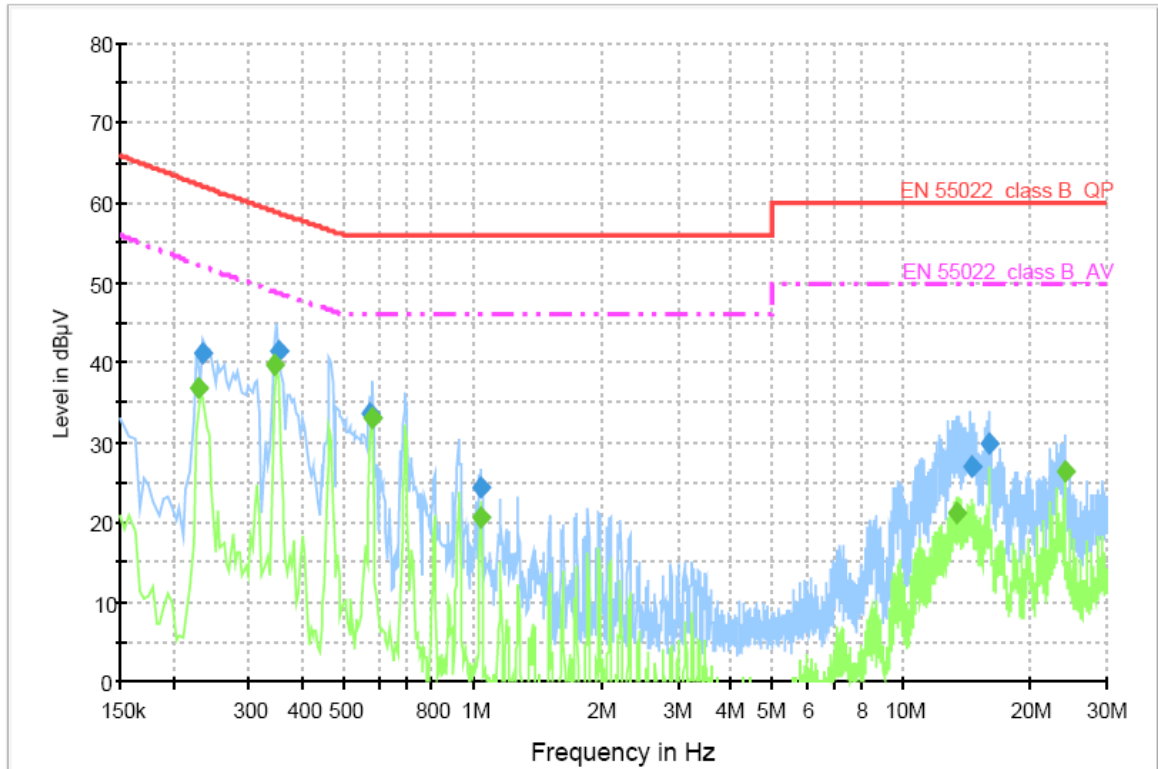
5.6 Test data for Conducted Emission

- . Test Date : June 19, 2009
- . Resolution Bandwidth : 9 kHz
- . Frequency Range : 0.15 MHz ~ 30 MHz



◆ Test resolution: 1 920 * 1 080 / 60 Hz (RGB: Analog mode) & Network Connecting 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
0.233500	41.0	1000.000	9.000	GND	L1	9.9	21.1	62.1	
0.350000	41.6	1000.000	9.000	GND	L1	10.0	17.2	58.8	
0.572500	33.7	1000.000	9.000	GND	L1	10.0	22.3	56.0	
1.041500	24.3	1000.000	9.000	GND	L1	10.0	31.7	56.0	
14.466500	26.9	1000.000	9.000	GND	L1	10.6	33.1	60.0	
16.005000	29.8	1000.000	9.000	GND	L1	10.7	30.2	60.0	

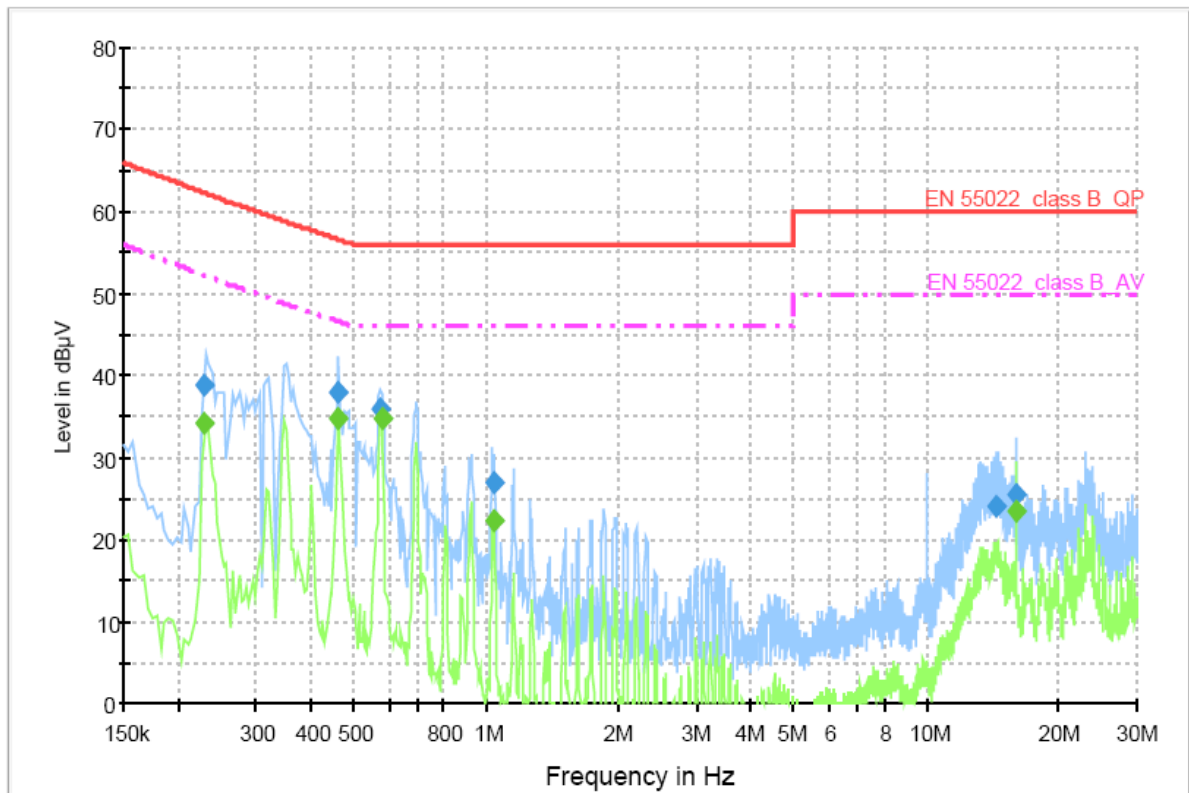
Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.229500	36.7	1000.000	9.000	GND	L1	9.9	15.5	52.2	
0.345500	39.7	1000.000	9.000	GND	L1	10.0	9.2	48.9	
0.577500	33.0	1000.000	9.000	GND	L1	10.0	13.0	46.0	
1.037000	20.6	1000.000	9.000	GND	L1	10.0	25.4	46.0	
13.455500	21.3	1000.000	9.000	GND	L1	10.5	28.7	50.0	
24.014000	26.3	1000.000	9.000	GND	L1	11.0	23.7	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
0.229500	38.8	1000.000	9.000	GND	N	10.0	23.5	62.3	
0.461500	38.1	1000.000	9.000	GND	N	10.0	18.5	56.6	
0.573500	36.0	1000.000	9.000	GND	N	10.0	20.0	56.0	
1.038500	26.9	1000.000	9.000	GND	N	10.0	29.1	56.0	
14.383500	24.0	1000.000	9.000	GND	N	10.5	36.0	60.0	
16.009500	25.5	1000.000	9.000	GND	N	10.6	34.5	60.0	

Final Measurement Detector 2

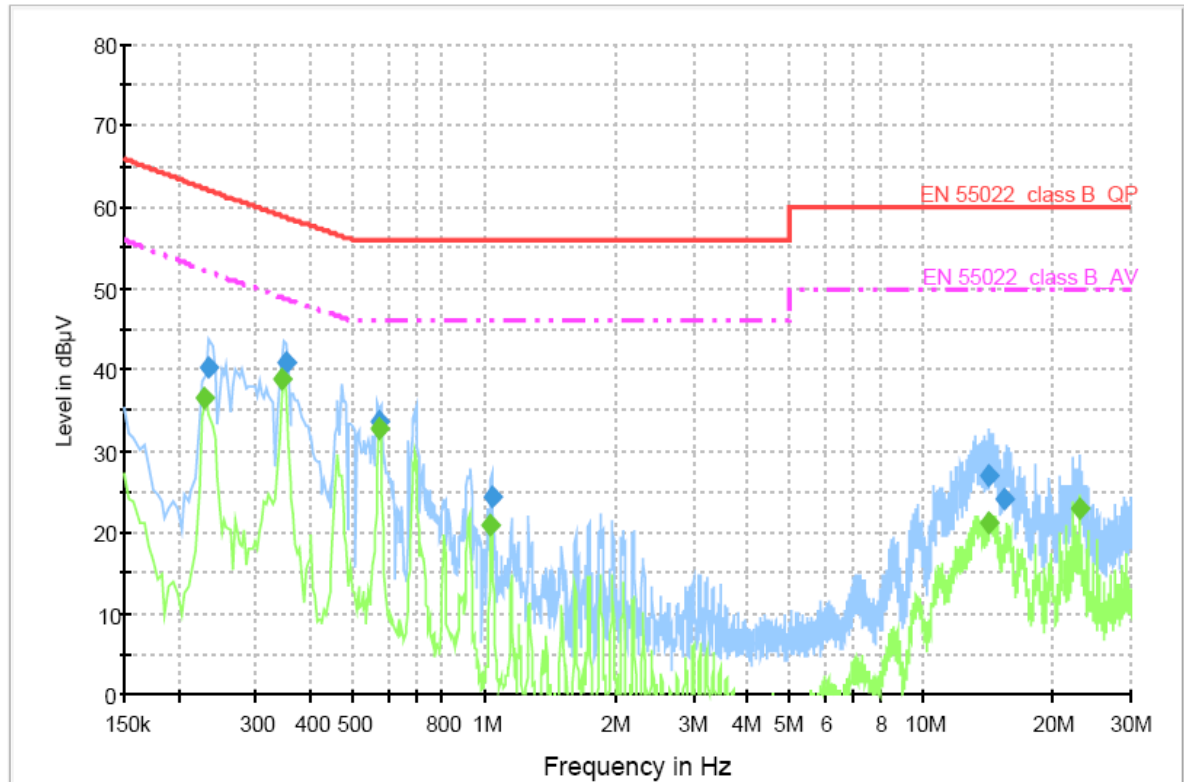
Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.229500	34.3	1000.000	9.000	GND	N	10.0	17.9	52.2	
0.461500	34.9	1000.000	9.000	GND	N	10.0	11.7	46.6	
0.578000	34.7	1000.000	9.000	GND	N	10.0	11.4	46.0	
1.037500	22.4	1000.000	9.000	GND	N	10.0	23.6	46.0	
16.009500	23.6	1000.000	9.000	GND	N	10.6	26.4	50.0	

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



◆ Test resolution: 1 920 * 1 080 / 60 Hz (HDMI/DVI: Digital mode) & Network Connecting 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
0.233500	40.2	1000.000	9.000	GND	L1	9.9	21.9	62.1	
0.350000	40.7	1000.000	9.000	GND	L1	10.0	18.1	58.8	
0.574000	33.7	1000.000	9.000	GND	L1	10.0	22.3	56.0	
1.037500	24.4	1000.000	9.000	GND	L1	10.0	31.6	56.0	
14.248500	27.0	1000.000	9.000	GND	L1	10.6	33.0	60.0	
15.512500	24.1	1000.000	9.000	GND	L1	10.6	35.9	60.0	

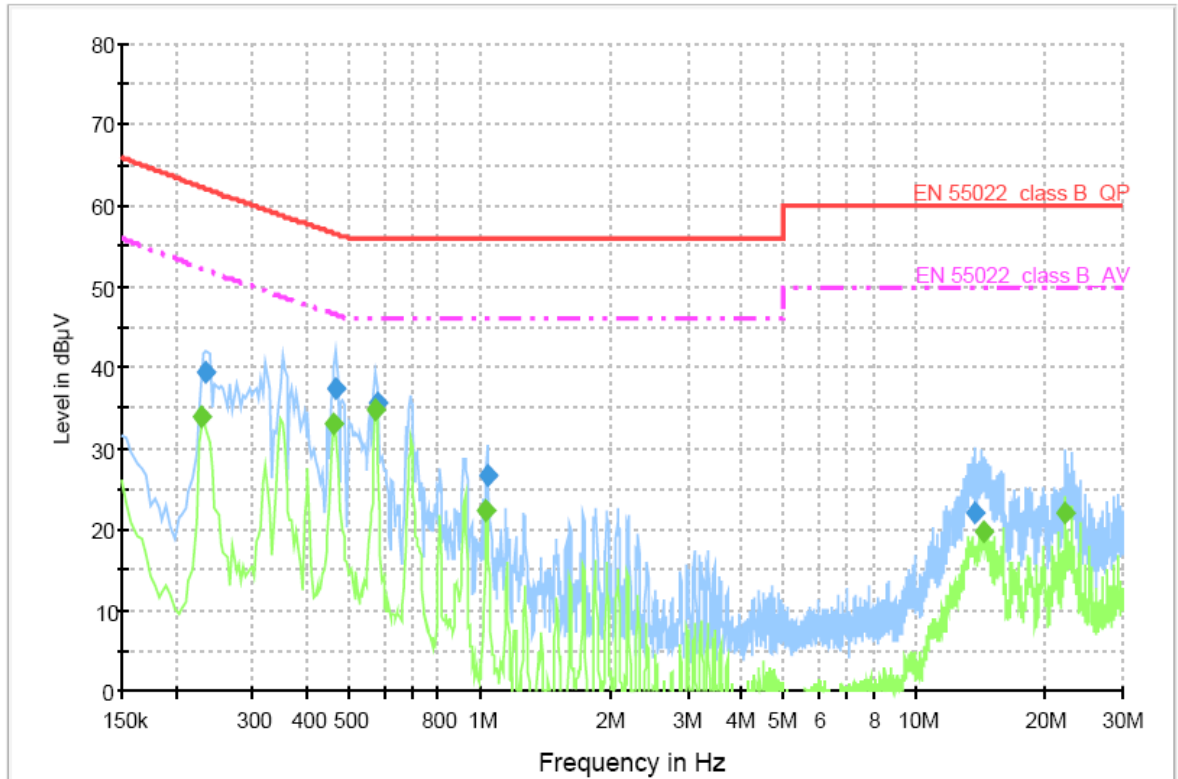
Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.229500	36.4	1000.000	9.000	GND	L1	9.9	15.8	52.2	
0.345500	38.8	1000.000	9.000	GND	L1	10.0	10.1	48.9	
0.573500	32.7	1000.000	9.000	GND	L1	10.0	13.3	46.0	
1.033500	20.9	1000.000	9.000	GND	L1	10.0	25.1	46.0	
14.245000	21.1	1000.000	9.000	GND	L1	10.6	28.9	50.0	
22.958000	22.9	1000.000	9.000	GND	L1	11.0	27.1	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
0.233500	39.5	1000.000	9.000	GND	N	10.0	22.6	62.1	
0.465500	37.4	1000.000	9.000	GND	N	10.0	19.1	56.5	
0.578000	35.7	1000.000	9.000	GND	N	10.0	20.3	56.0	
1.037500	26.6	1000.000	9.000	GND	N	10.0	29.4	56.0	
13.783500	22.1	1000.000	9.000	GND	N	10.5	37.9	60.0	

Final Measurement Detector 2

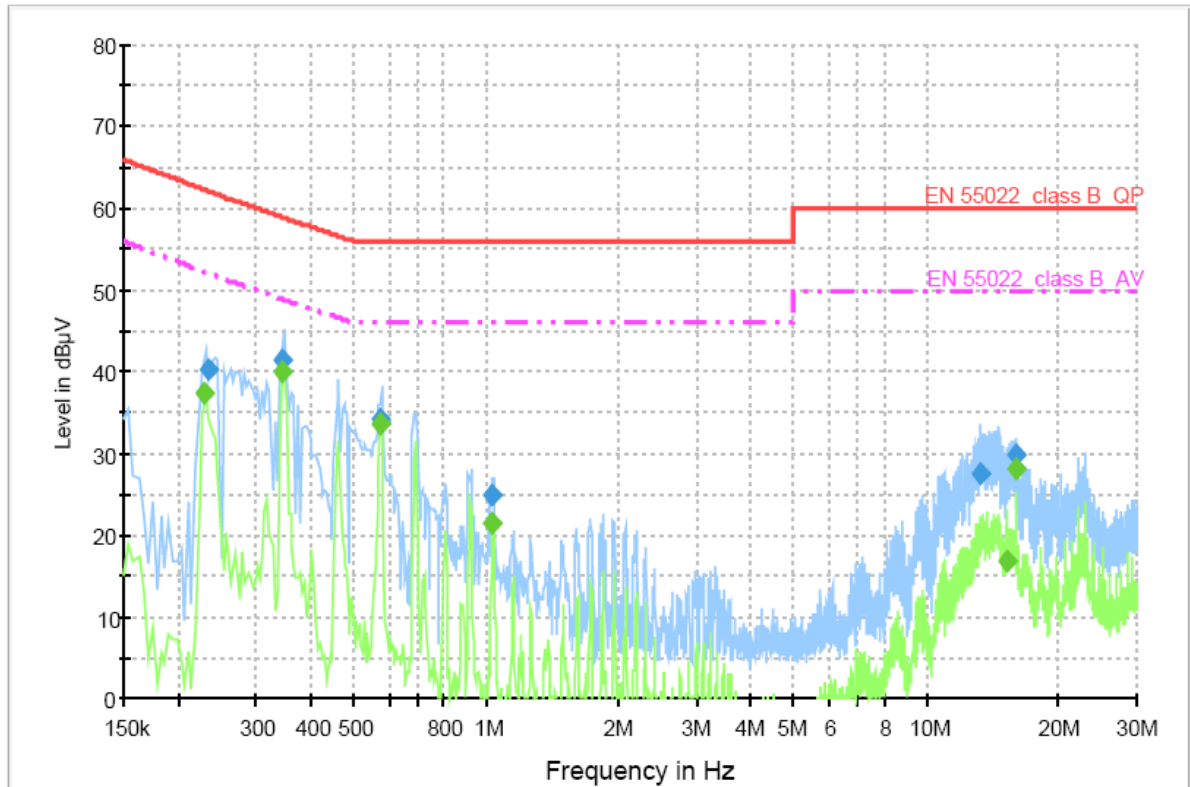
Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.229500	33.8	1000.000	9.000	GND	N	10.0	18.4	52.2	
0.461500	32.9	1000.000	9.000	GND	N	10.0	13.7	46.6	
0.573500	34.9	1000.000	9.000	GND	N	10.0	11.1	46.0	
1.033500	22.3	1000.000	9.000	GND	N	10.0	23.7	46.0	
14.445500	19.6	1000.000	9.000	GND	N	10.5	30.4	50.0	
22.165500	22.1	1000.000	9.000	GND	N	10.8	27.9	50.0	

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



◆ Test resolution: 1 024 * 768 / 60 Hz (RGB: Analog mode) & Network Connecting 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
0.234000	40.4	1000.000	9.000	GND	L1	9.9	21.7	62.1	
0.345500	41.6	1000.000	9.000	GND	L1	10.0	17.3	58.9	
0.573000	34.3	1000.000	9.000	GND	L1	10.0	21.7	56.0	
1.033500	24.9	1000.000	9.000	GND	L1	10.0	31.1	56.0	
13.238000	27.6	1000.000	9.000	GND	L1	10.5	32.4	60.0	
16.010000	29.9	1000.000	9.000	GND	L1	10.7	30.1	60.0	

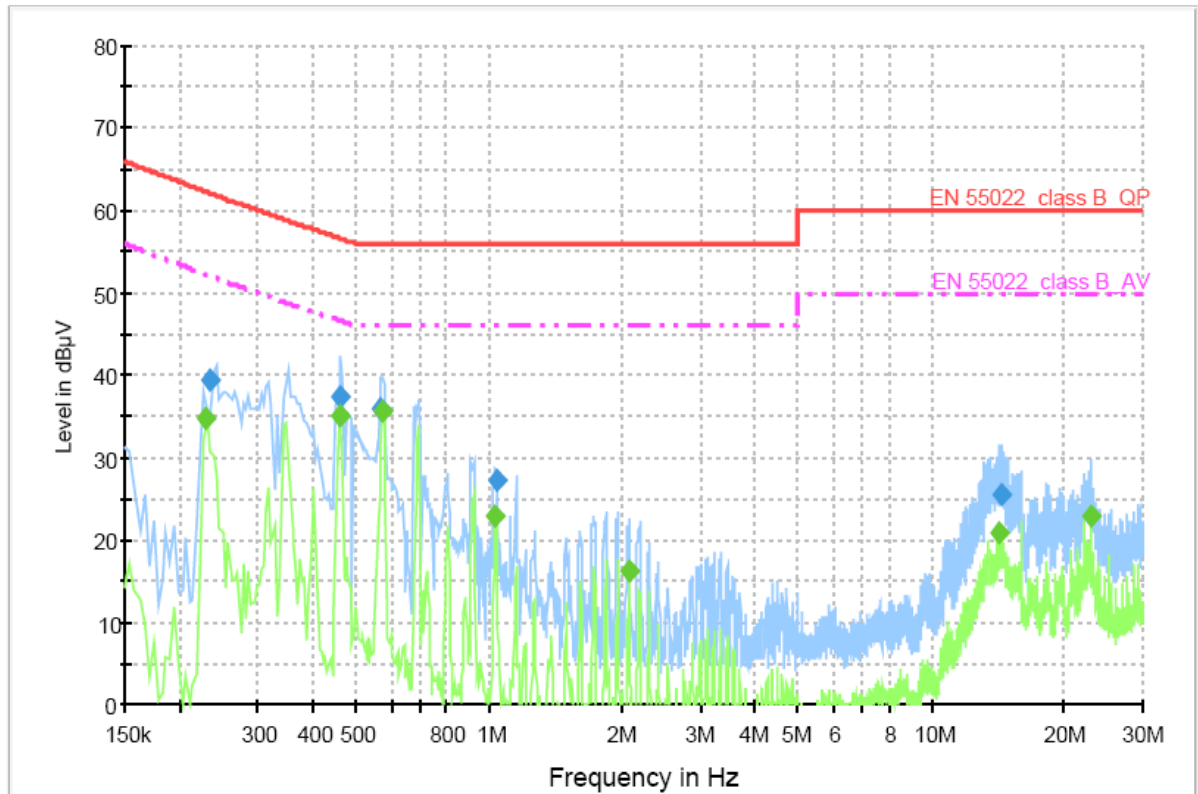
Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.229500	37.4	1000.000	9.000	GND	L1	9.9	14.8	52.2	
0.345500	40.1	1000.000	9.000	GND	L1	10.0	8.8	48.9	
0.573500	33.6	1000.000	9.000	GND	L1	10.0	12.4	46.0	
1.033000	21.4	1000.000	9.000	GND	L1	10.0	24.6	46.0	
15.175000	16.9	1000.000	9.000	GND	L1	10.6	33.1	50.0	
16.009500	28.1	1000.000	9.000	GND	L1	10.7	21.9	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
0.232500	39.5	1000.000	9.000	GND	N	10.0	22.7	62.2	
0.461500	37.4	1000.000	9.000	GND	N	10.0	19.2	56.6	
0.569000	35.9	1000.000	9.000	GND	N	10.0	20.1	56.0	
1.038000	27.2	1000.000	9.000	GND	N	10.0	28.8	56.0	
14.373500	25.5	1000.000	9.000	GND	N	10.5	34.5	60.0	

Final Measurement Detector 2

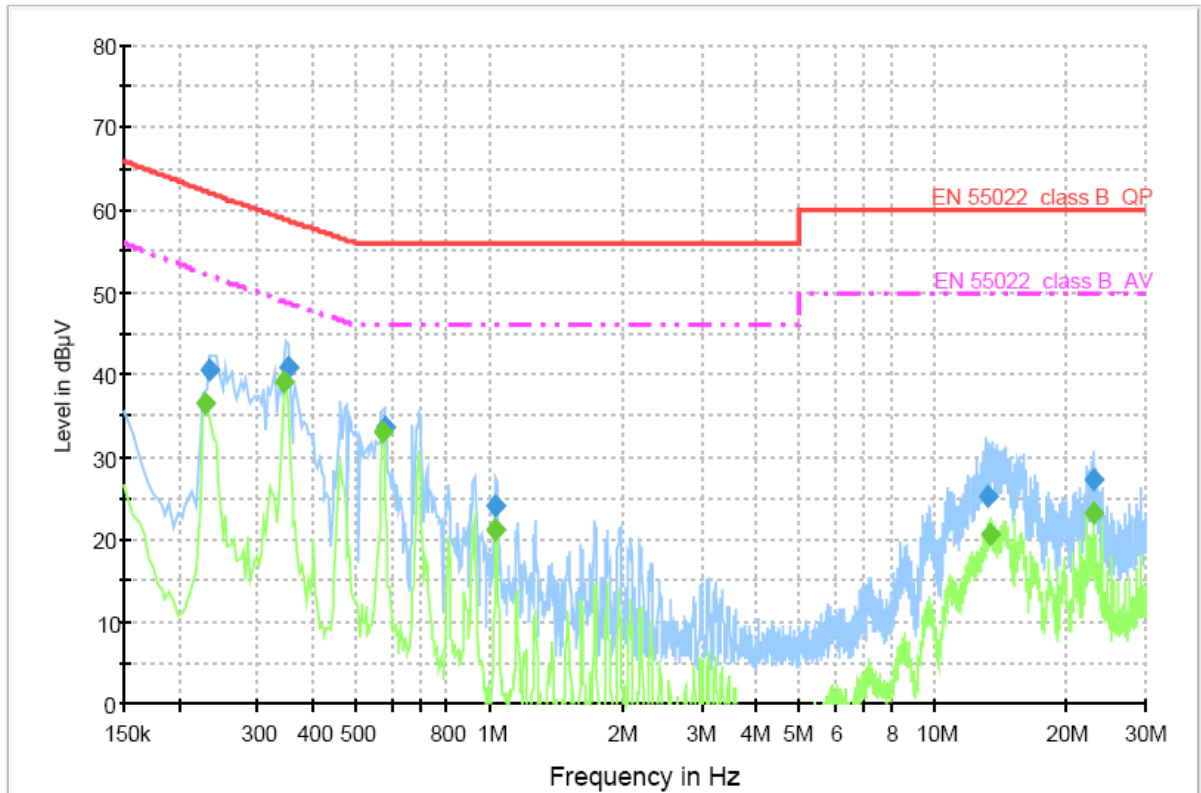
Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.229500	34.7	1000.000	9.000	GND	N	10.0	17.5	52.2	
0.457500	35.0	1000.000	9.000	GND	N	10.0	11.7	46.7	
0.573500	35.5	1000.000	9.000	GND	N	10.0	10.5	46.0	
1.033500	23.0	1000.000	9.000	GND	N	10.0	23.0	46.0	
2.069500	16.2	1000.000	9.000	GND	N	10.1	29.8	46.0	
14.249500	21.0	1000.000	9.000	GND	N	10.5	29.0	50.0	
22.957500	22.9	1000.000	9.000	GND	N	10.8	27.1	50.0	

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



◆ Test resolution: 640 * 480 / 60 Hz (RGB: Analog mode) & Network Connecting 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
0.233000	40.7	1000.000	9.000	GND	L1	9.9	21.5	62.2	
0.350000	40.7	1000.000	9.000	GND	L1	10.0	18.1	58.8	
0.577500	33.8	1000.000	9.000	GND	L1	10.0	22.2	56.0	
1.033500	24.0	1000.000	9.000	GND	L1	10.0	32.0	56.0	
13.220000	25.3	1000.000	9.000	GND	L1	10.5	34.7	60.0	
22.958000	27.1	1000.000	9.000	GND	L1	11.0	32.9	60.0	

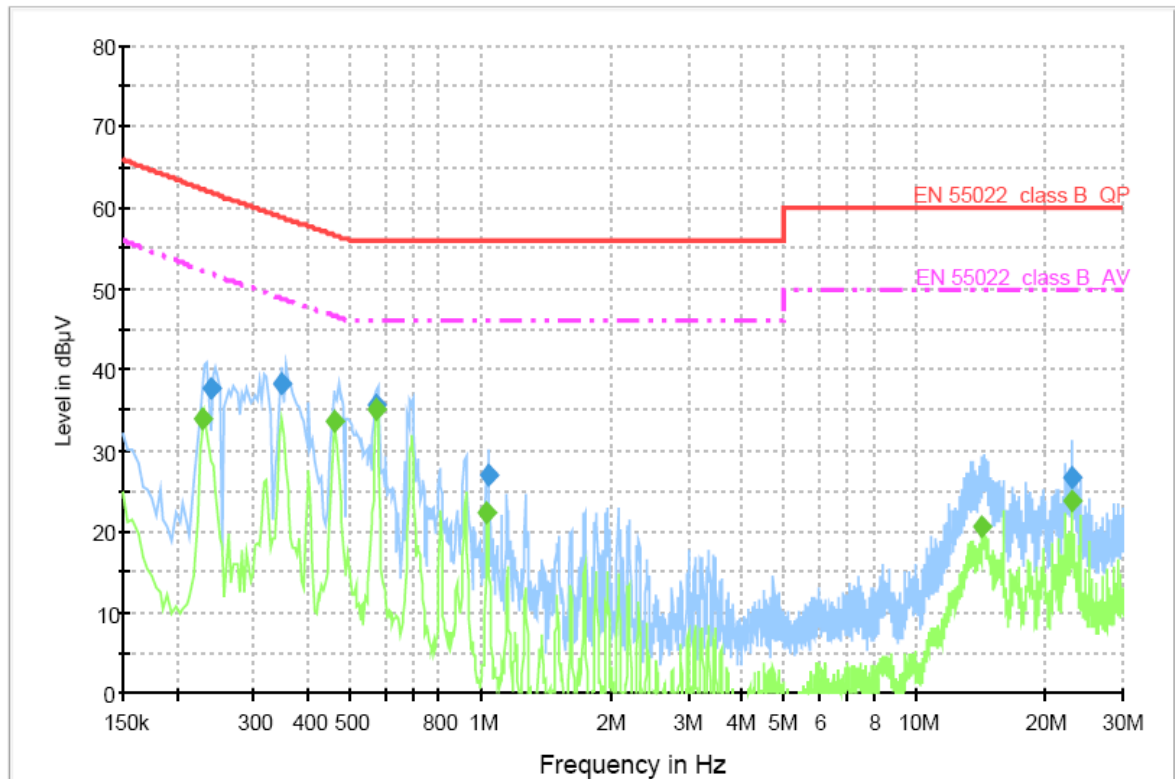
Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.229500	36.6	1000.000	9.000	GND	L1	9.9	15.6	52.2	
0.345500	39.1	1000.000	9.000	GND	L1	10.0	9.8	48.9	
0.573500	32.9	1000.000	9.000	GND	L1	10.0	13.1	46.0	
1.033500	21.0	1000.000	9.000	GND	L1	10.0	25.0	46.0	
13.362000	20.6	1000.000	9.000	GND	L1	10.5	29.4	50.0	
22.953500	23.2	1000.000	9.000	GND	L1	11.0	26.8	50.0	

< Fig 10. Conducted emission result (Live line)>



Voltage with 4-Line-LISN_N



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.238000	37.7	1000.000	9.000	GND	N	10.0	24.3	62.0	
0.349000	38.4	1000.000	9.000	GND	N	10.0	20.4	58.8	
0.573000	35.7	1000.000	9.000	GND	N	10.0	20.3	56.0	
1.037000	26.8	1000.000	9.000	GND	N	10.0	29.2	56.0	
22.957500	26.6	1000.000	9.000	GND	N	10.8	33.4	60.0	

Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.229500	34.0	1000.000	9.000	GND	N	10.0	18.2	52.2	
0.461500	33.7	1000.000	9.000	GND	N	10.0	12.9	46.6	
0.573500	35.0	1000.000	9.000	GND	N	10.0	11.0	46.0	
1.033500	22.3	1000.000	9.000	GND	N	10.0	23.7	46.0	
14.249000	20.5	1000.000	9.000	GND	N	10.5	29.5	50.0	
22.957500	23.8	1000.000	9.000	GND	N	10.8	26.2	50.0	

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



6. Radiated Emission

6.1 Operating Environment

Temperature : 26 °C
Relative Humidity : 59 % R.H.

6.2 Test Set-up

A preliminary scan with peak mode was performed in the semi anechoic chamber and found frequency for open area test site.

The formal radiated emission was measured at 3 m / 10 m distance open area test site.

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
■ - ESCS30	Rohde & Schwarz	EMI test receiver	839809/003	12. 13. 2009
■ - HK116	Rohde & Schwarz	Biconical ANT	832639/007	12. 28. 2009
■ - HL223	Rohde & Schwarz	Log-periodic antenna	835998/004	12. 28. 2009
■ - BBHA9120D	Schwarzbeck	Horn ANT	207	12. 26. 2009
■ - HD100	HD GmbH	Position Controller	100/692/01	N/A
■ - DS415S	HD GmbH	Turntable	415/657/01	N/A
■ - MA240	HD GmbH	Antenna Mast	240/565/01	N/A
■ - AFS 44 00101800- 25-10P-44	MITEQ	Preamplifier	1258943	11. 11. 2009

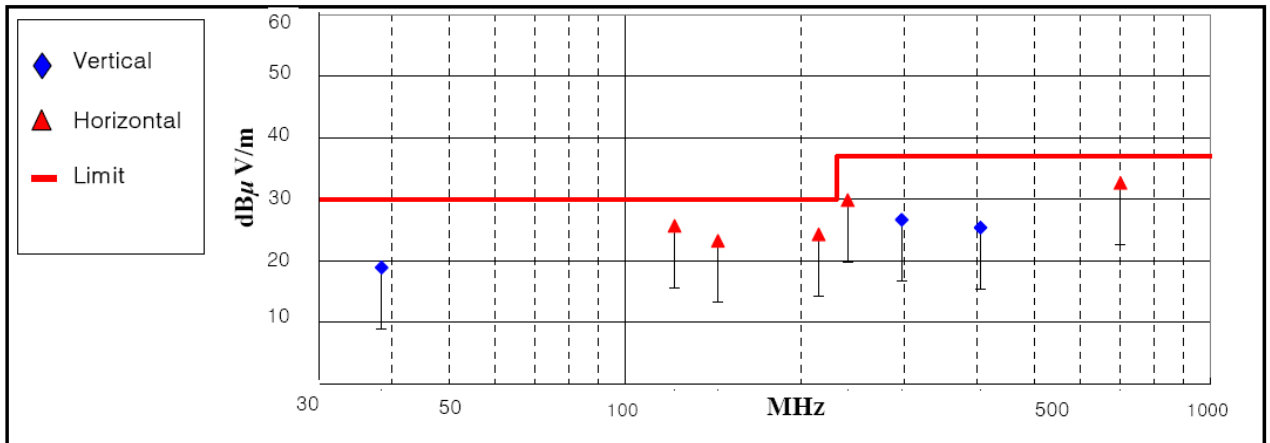


6.6 Test data for Radiated Emission

- Test Date : June 22, 2009
- Resolution Bandwidth : 120 kHz/ 1 MHz
- Frequency Range : 30 MHz ~ 2 000 MHz
- Measurement Distance : 10 m/ 3 m

- ◆ Operating Condition: 1 920 * 1 080 / 60 Hz (RGB: Analog mode) & Network Connecting 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)	(°)
38.33	6.22	10.85	1.84	18.91	30.00	11.09	V	105	146
121.52	11.69	10.77	3.20	25.66	30.00	4.34	H	163	201
143.99	8.36	11.37	3.52	23.25	30.00	6.75	H	157	145
214.23	5.74	14.09	4.45	24.28	30.00	5.72	H	102	213
240.03	10.40	14.72	4.74	29.86	37.00	7.14	H	149	123
297.00	2.44	18.61	5.60	26.65	37.00	10.35	V	226	180
405.03	2.14	15.68	7.55	25.37	37.00	11.63	V	128	196
702.06	3.87	20.45	8.33	32.65	37.00	4.35	H	150	33

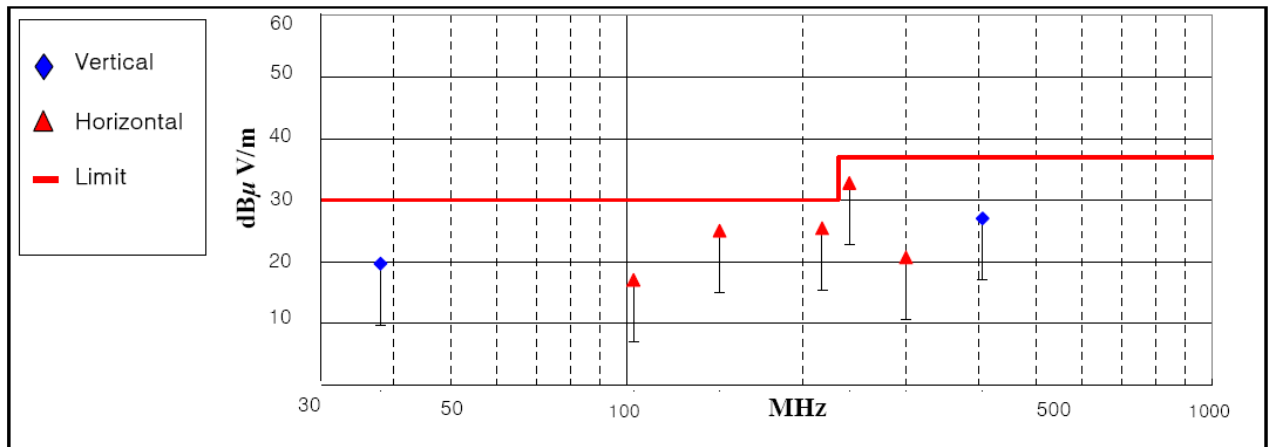


< Fig 12. Radiated emission result (30 MHz ~ 1 000 MHz)>



- ◆ Operating Condition: 1 920 * 1 080 / 60 Hz (HDMI/DVI: Digital mode) & Network Connecting 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.	Height	Angle
	Value(dBμ V)	Factor(dB/m)	Loss(dB)	(dBμ V/m)			(H/V)	(cm)	(°)
37.92	6.86	10.97	1.83	19.66	30.00	10.34	V	102	155
102.66	4.50	9.64	2.88	17.02	30.00	12.98	H	222	23
144.02	10.12	11.37	3.52	25.01	30.00	4.99	H	202	162
215.59	6.81	14.14	4.47	25.42	30.00	4.58	H	100	226
239.98	13.31	14.72	4.74	32.77	37.00	4.23	H	156	110
300.01	2.27	12.74	5.68	20.69	37.00	16.31	H	117	202
405.55	3.80	15.69	7.54	27.03	37.00	9.97	V	126	186

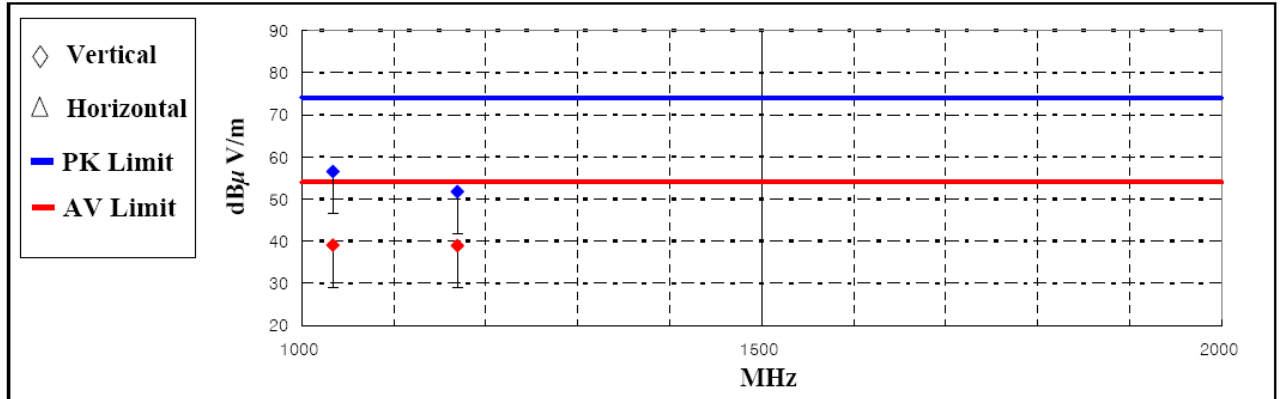


< Fig 13. Radiated emission result (30 MHz ~ 1 000 MHz)>



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

Frequency (MHz)	Measurement Level						Limit (dB μ V/m)		Margin (dB)		Positioning System		
	Reading Value (dB μ V/m)		AF	AMP / CL	Test Result (dB μ V/m)						Pol.	Height	Angle
	Peak	Average	(dB/m)	(dB)	Peak	Average	Peak	Average	(H/V)	(cm)	(°)		
	1033.60	72.55	55.15	24.92	-40.97	56.50	39.10	74.00	54.00	17.50	14.90	V	195
1169.20	67.20	54.40	25.17	-40.67	51.70	38.90	74.00	54.00	22.30	15.10	V	170	76



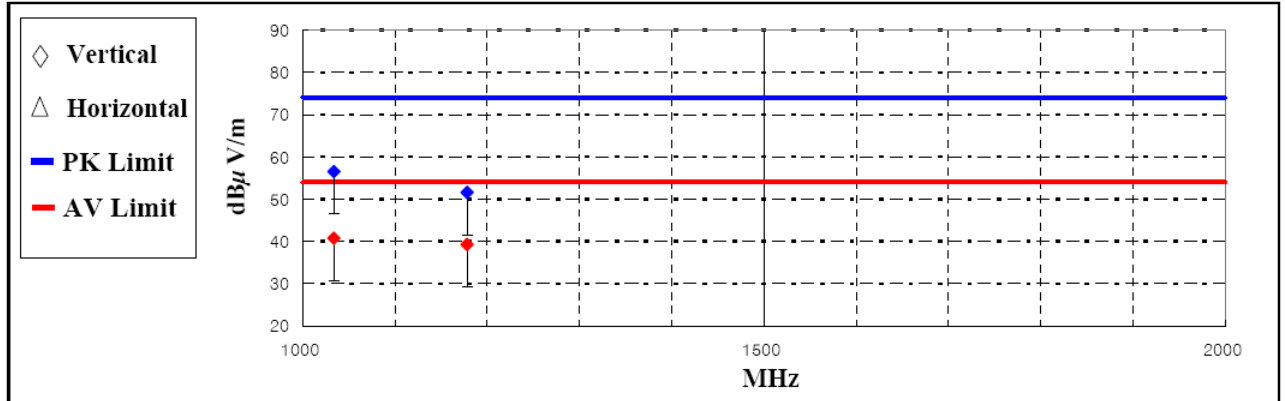
*Comment : AMP/CL_Cable loss value + AMP gain value
AF : Antenna factor value
Pol. : H(Horizontal), V(Vertical)

< Fig 14. Radiated emission result (1 000 MHz ~ 2 000 MHz)>



- ◆ Operating Condition: 1 920 * 1 080 / 60 Hz (HDMI/DVI: Digital mode) & Network Connecting mode
Detector mode: Peak detector mode / Average detector mode

Frequency (MHz)	Measurement Level						Limit (dB μ V/m)		Margin (dB)		Positioning System		
	Reading Value (dB μ V/m)		AF	AMP / CL	Test Result (dB μ V/m)						Pol.	Height	Angle
	Peak	Average	(dB/m)	(dB)	Peak	Average	Peak	Average	(H/V)	(cm)	(°)		
	1033.60	72.55	56.85	24.92	-40.97	56.50	40.80	74.00	54.00	17.50	13.20	V	202
1178.00	67.07	54.77	25.18	-40.65	51.60	39.30	74.00	54.00	22.40	14.70	V	190	160



*Comment : AMP/CL_Cable loss value + AMP gain value
AF : Antenna factor value
Pol. : H(Horizontal), V(Vertical)

< Fig 15. 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 Monitor (Model Name: M4213CG)** was complies with §15.107 and 15.109 of the FCC Rules.