

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 : February 16, 2010****Order Number: GETEC-C1-10-040****Test Report Number: GETEC-E3-10-017****Test Site: Gumi College EMC Center****FCC Registration Number: (100749, 443957)****FCC ID.: BEJM5203CG****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	: M5203CG
Trade Name	: LG

This equipment has been shown to be in compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.4-2003 / Canadian standard ICES-003

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

Tested by,**Reviewed by,**

Soon-Hoon Jeong, Engineer
GUMI College EMC center

Jae-Hoon Jeong, Senior Engineer
GUMI College EMC center



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

1. General Information

Applicant: LG Electronics Inc.

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

Manufacturer: LG Electronics Inc.

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

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

Tel Number: +82-31-610-9623

- **FCC ID.** BEJM5203CG
- **EUT Type** LCD Monitor
- **Model Name** M5203CG
- **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** February 5 ~ 8, 2010
- **Place of Test** **Gumi College EMC Center** (FCC Registration Number: 100749, 443957)
407, Bugok-dong, Gumi-si, Gyeongbuk, Korea.
- **Test Report Number** GETEC-E3-10-017
- **Dates of Issue** February 16, 2010



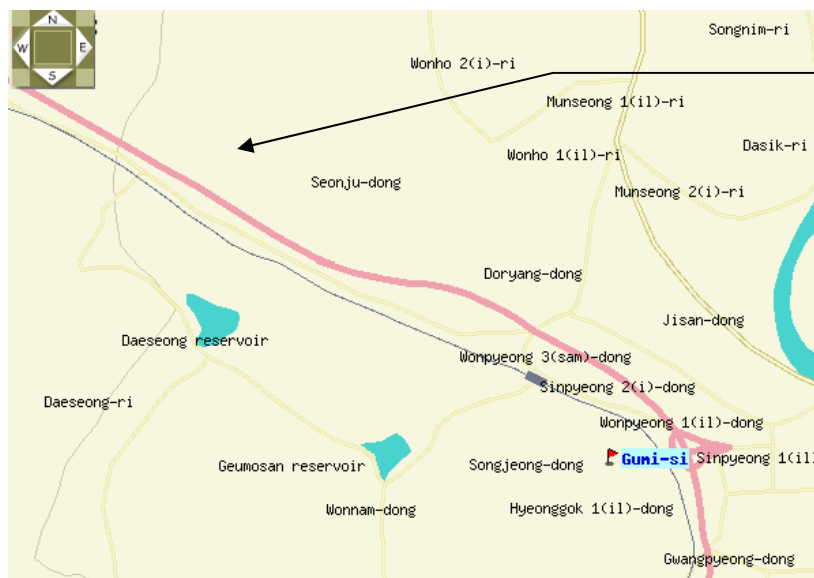
2. Introduction

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 Monitor (Model Name: M5203CG)**

These measurement tests were conducted at **Gumi College EMC Center**.

The site address is 407, Bugok-dong, Gumi-si, Gyeongbuk, Korea.

This test site is one of the highest point of Gumi 1 college at about 200 km away from Seoul city and 40 km away from Daegu city. It is located in the valley surrounded by mountains in all directions where ambient radio signal conditions are quiet and a favorable area to measure the radio frequency interference on open field test site for the computing and ISM devices manufactures. The detailed description of the measurement facility was found to be in compliance with the requirements of §2.948 according to ANSI C63.4 (2003)



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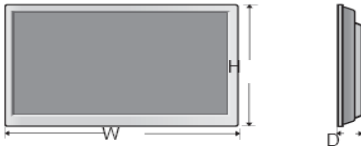
Fig 1. The map above shows the Gumi College in vicinity area.



3. Product Information

3.1 Description of EUT

The Equipment under Test (EUT) is the **LG Electronics Inc. LCD Monitor (Model Name: M5203CG) FCC ID.: BEJM5203CG**

LCD Panel	132.17 cm (52 inch) TFT (Thin Film Transistor) LCD (Liquid Crystal Display) Panel Visible diagonal size: 132.17 cm 0.600 mm x 0.600 mm (Pixel Pitch)	
Power	Rated Voltage	AC 100-240 V~ 50 / 60 Hz 4.0 A
	Power Consumption	On Mode : 350 W Typ. Sleep Mode : ≤ 1 W (RGB) / 2 W (HDMI / DVI) Off Mode : ≤ 1 W
Dimensions &Weight		
	Width x Height x Depth [1] 128.3 cm (50.51 inch) x 76.6 cm (30.17 inch) x 11.7 cm (4.62 inch)	
	Net [1] 36.3 kg (93.39 lb)	
Video Signal	Max. Resolution	RGB : 1920 x 1080 @ 60 Hz HDMI / DVI : 1920 x 1080 @ 60 Hz
	Recommended Resolution	RGB : 1920 x 1080 @ 60 Hz (Full HD) HDMI / DVI : 1920 x 1080 @ 60 Hz (Full HD)
	Horizontal Frequency	RGB : 30 kHz to 83 kHz HDMI / DVI : 30 kHz to 83 kHz
	Vertical Frequency	56 Hz to 85 Hz
	Synchronization Type	Separate / Composite / Digital
Input Connector	15 - pin D-Sub type, HDMI (digital), S - Video, Composite Video, Component, RS-232C	
Environmental Conditions	Operational Condition	Temperature: 0 °C to 40 °C, Humidity: 10 % to 80 %
	Storage Condition	Temperature: -20 °C to 60 °C , Humidity: 5 % to 95 %

-. Maximum Frequency range : 210 MHz

EUT Type: LCD Monitor

FCC ID.: BEJM5203CG



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
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
Printer	Hewlett Packard	970CXI	S/N: MY9B01F1FG FCC ID.: DoC
Monitor	DIBOSS	LT-15S5MF	S/N: D060403100019-C FCC ID.: DoC

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
RGB(Analog) in cable	Connected to the EUT and PC	1.80 m shielded with two ferrite cores
RGB(Analog) out cable	Connected to the EUT and monitor	1.80 m shielded with two ferrite cores
HDMI/DVI in cable	Connected to the EUT and PC	2.00 m shielded
Audio(RGB/DVI) in cable	Connected to the EUT and PC	1.50 m shielded with a ferrite core
RS-232C(Control) in cable	Connected to the EUT and PC	1.70 m shielded
RS-232C(Control) out cable	Connected to the EUT and PC	1.80 m shielded
Remote control in cable	Connected to the EUT and PC	1.80 m shielded
Component in cable	Connected to the EUT and DVD player	1.50 m shielded
Component sound in cable	Connected to the EUT and DVD player	3.00 m shielded
Video in cable	Connected to the EUT and DVD player	1.50 m shielded
Video out cable	Connected to the EUT and monitor	1.50 m shielded
Audio in cable	Connected to the EUT and DVD player	1.00 m shielded
Audio out cable	Connected to the EUT and monitor	2.00 m shielded
S-Video cable	Connected to the EUT and DVD player	1.80 m shielded
LAN cable	Connected to the EUT and network	10.00 m unshielded

3.3 Modification Item(s)

- None



4. Description of tests

4.1 Test Condition

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

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

- Test Voltage / Frequency : AC 120 V / 60 Hz

- Test Mode(s)

- . Monitor mode

Radiated emission: 1 920 × 1 080 / 60 Hz (RGB: Analog, HDMI/DVI: Digital)

Conducted emission: 1 920 × 1 080 / 60 Hz (RGB: Analog, HDMI/DVI: Digital)

1 024 × 768 / 60 Hz (RGB: Analog), 640 × 480 / 60 Hz (RGB: Analog)

◆ Operating test pattern

- . “H” character scrolling mode (Font size: 10)
- . Black background white character
- . Brightness and contrast was adjusted as maximum level
- . 1 kHz sound tone with winamp player
- . Connected network

“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. (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

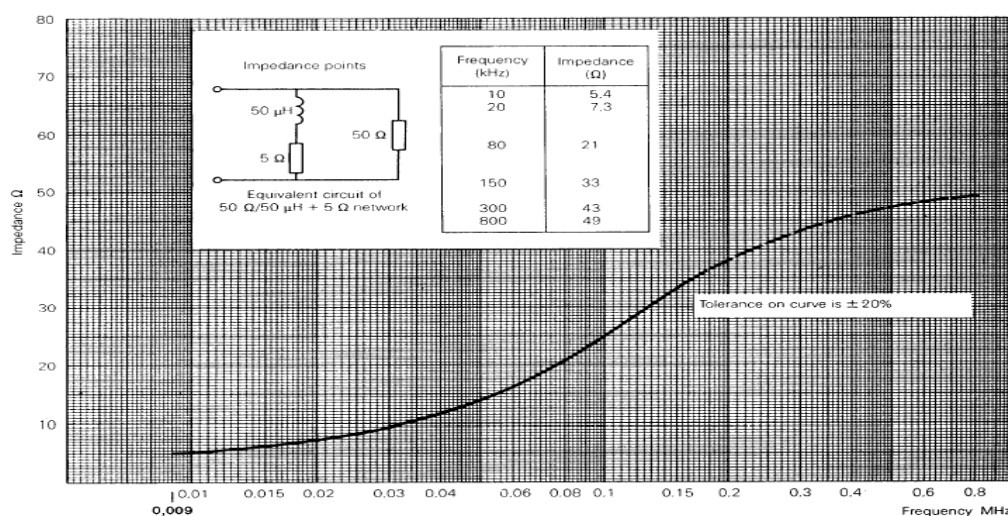


Fig 2. Impedance of LISN



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

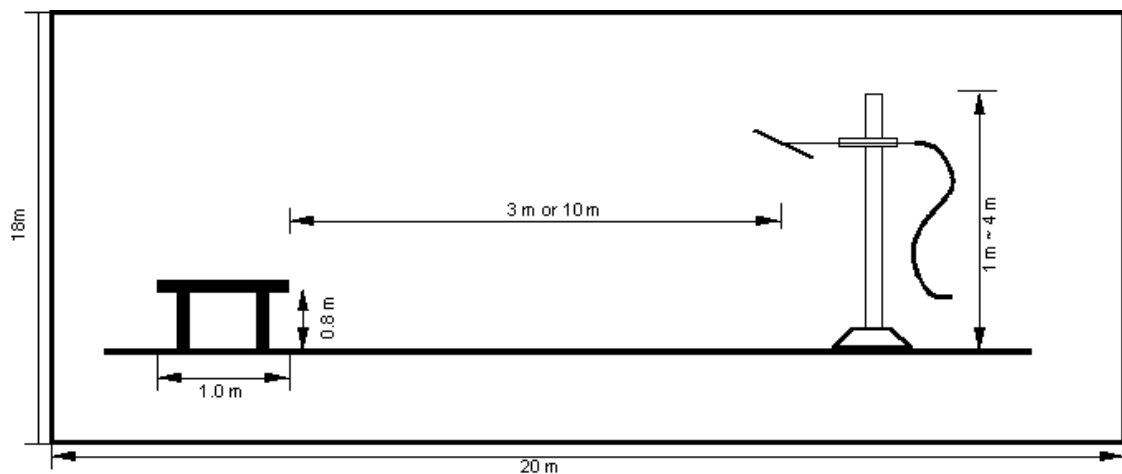


Fig 3. Dimensions of test site.



5. Conducted Emission

5.1 Operating Environment

Temperature : 25 °C
Relative Humidity : 44 % 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	ISN	24568	10. 16. 2010

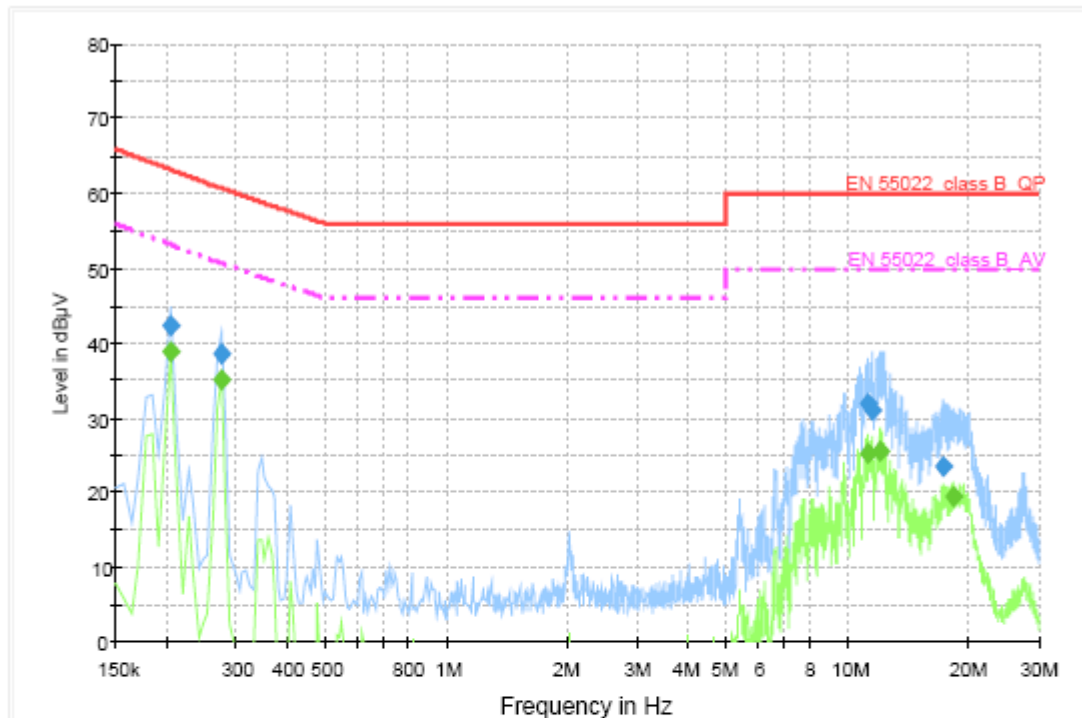
5.6 Test data for Conducted Emission

-. Test Date : February 8, 2010
-. Resolution Bandwidth : 9 kHz
-. Frequency Range : 0.15 MHz ~ 30 MHz



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

Voltage with 4-Line-LISN L1



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.206000	42.4	1000.000	9.000	GND	L1	10.0	20.8	63.2	
0.276000	38.4	1000.000	9.000	GND	L1	10.0	22.3	60.7	
11.196000	32.0	1000.000	9.000	GND	L1	10.5	28.0	60.0	
11.532000	31.0	1000.000	9.000	GND	L1	10.5	29.0	60.0	
17.237000	23.5	1000.000	9.000	GND	L1	10.9	36.5	60.0	

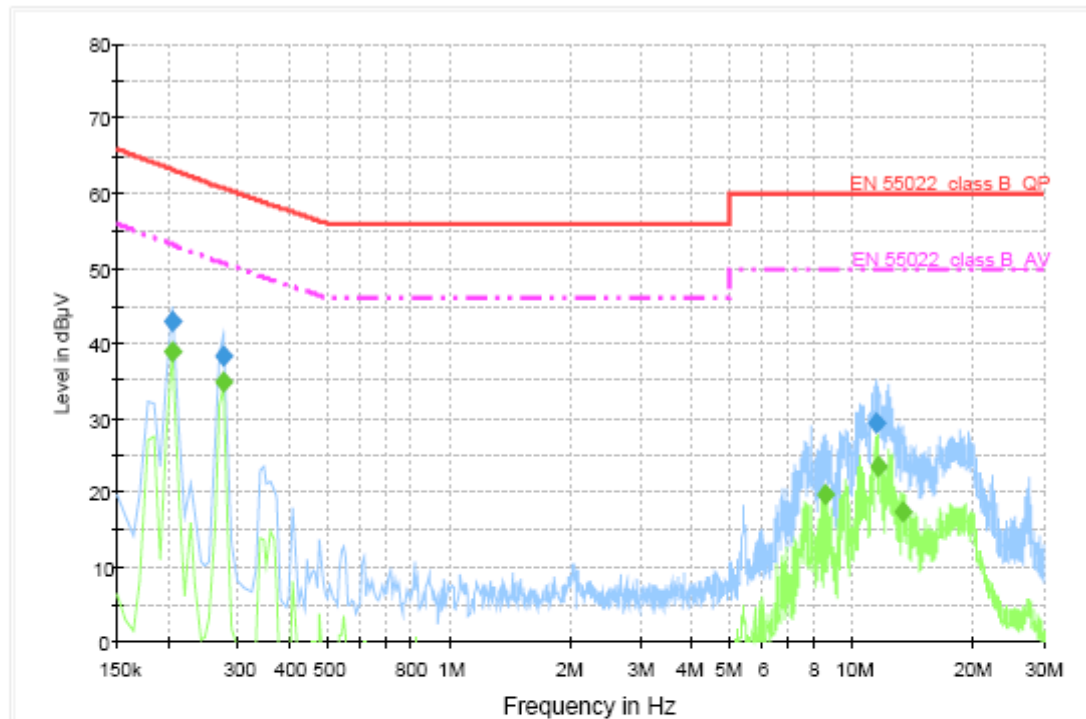
Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.206000	38.8	1000.000	9.000	GND	L1	10.0	14.4	53.2	
0.276000	35.1	1000.000	9.000	GND	L1	10.0	15.6	50.7	
11.245000	25.3	1000.000	9.000	GND	L1	10.5	24.7	50.0	
12.008000	25.4	1000.000	9.000	GND	L1	10.5	24.6	50.0	
18.308000	19.3	1000.000	9.000	GND	L1	10.9	30.7	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
0.206000	42.9	1000.000	9.000	GND	N	10.0	20.3	63.2	
0.276000	38.2	1000.000	9.000	GND	N	10.0	22.5	60.7	
11.532000	29.2	1000.000	9.000	GND	N	10.4	30.8	60.0	

Final Measurement Detector 2

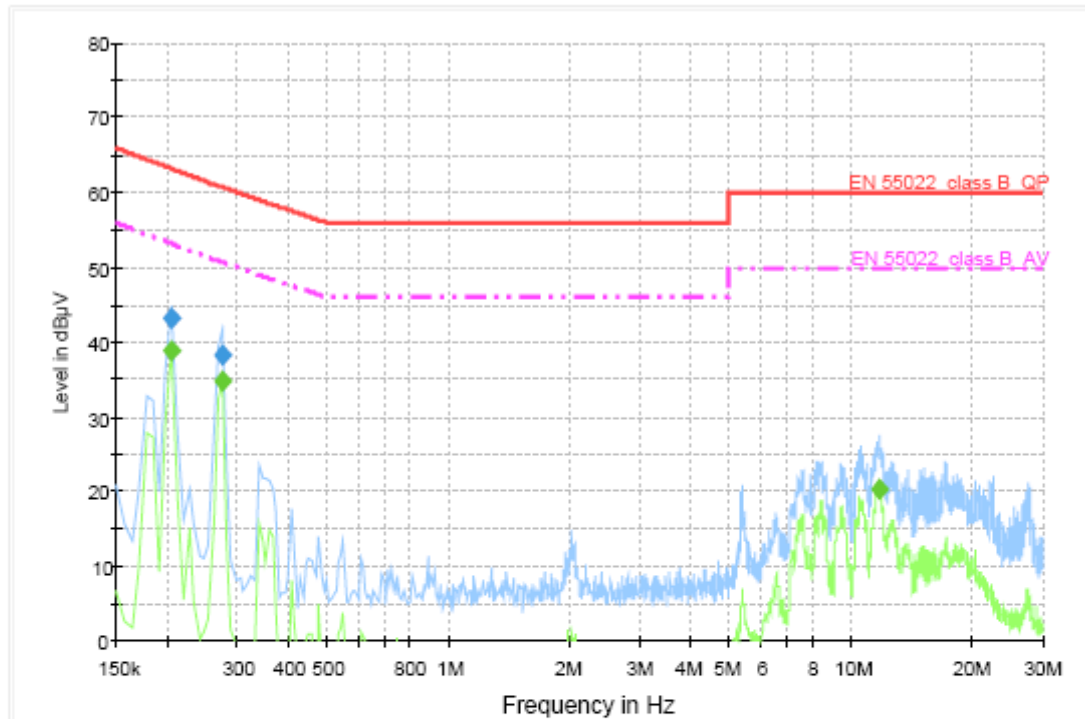
Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.206000	38.7	1000.000	9.000	GND	N	10.0	14.5	53.2	
0.276000	34.9	1000.000	9.000	GND	N	10.0	15.8	50.7	
8.634000	19.7	1000.000	9.000	GND	N	10.3	30.3	50.0	
11.665000	23.3	1000.000	9.000	GND	N	10.4	26.7	50.0	
13.408000	17.5	1000.000	9.000	GND	N	10.5	32.5	50.0	

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



◆ Operating condition: 1 024 × 768 / 60 Hz (RGB: Analog)

Voltage with 4-Line-LISN L1



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.206000	43.1	1000.000	9.000	GND	L1	10.0	20.1	63.2	
0.276000	38.1	1000.000	9.000	GND	L1	10.0	22.6	60.7	

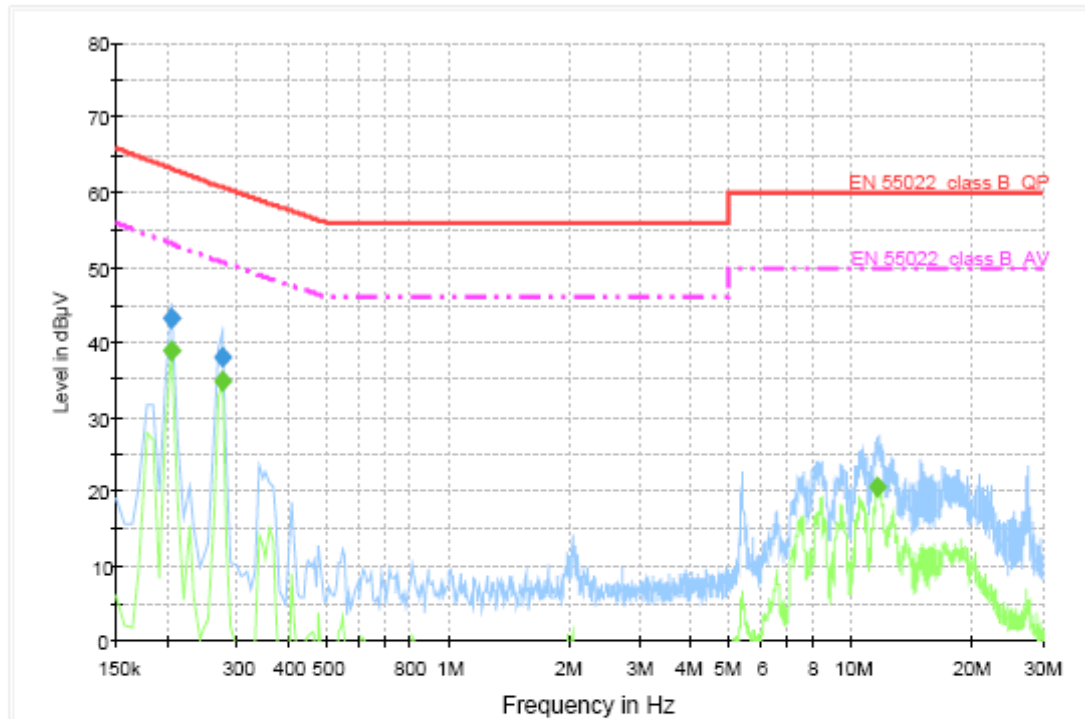
Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.206000	38.9	1000.000	9.000	GND	L1	10.0	14.3	53.2	
0.276000	34.9	1000.000	9.000	GND	L1	10.0	15.8	50.7	
11.805000	20.4	1000.000	9.000	GND	L1	10.5	29.6	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
0.206000	43.1	1000.000	9.000	GND	N	10.0	20.1	63.2	
0.276000	38.1	1000.000	9.000	GND	N	10.0	22.6	60.7	

Final Measurement Detector 2

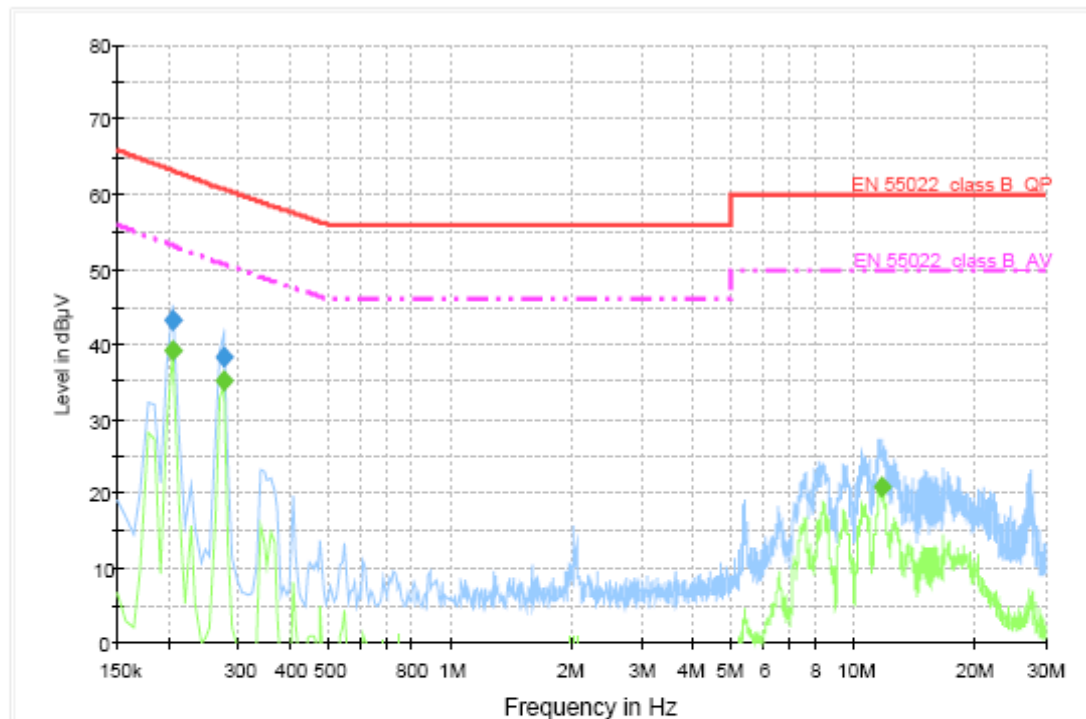
Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.206000	38.9	1000.000	9.000	GND	N	10.0	14.3	53.2	
0.276000	34.9	1000.000	9.000	GND	N	10.0	15.8	50.7	
11.679000	20.4	1000.000	9.000	GND	N	10.4	29.6	50.0	

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



◆ Operating condition: 640 × 480 / 60 Hz (RGB: Analog)

Voltage with 4-Line-LISN L1



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.206000	43.1	1000.000	9.000	GND	L1	10.0	20.1	63.2	
0.276000	38.2	1000.000	9.000	GND	L1	10.0	22.5	60.7	

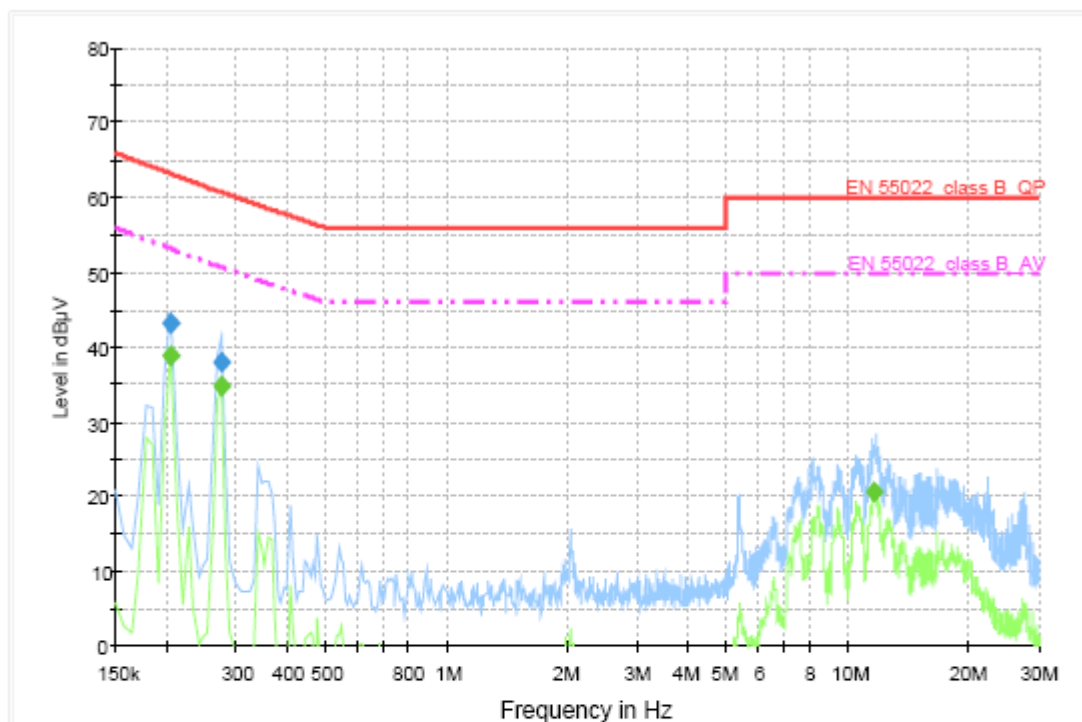
Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.206000	39.0	1000.000	9.000	GND	L1	10.0	14.2	53.2	
0.276000	35.0	1000.000	9.000	GND	L1	10.0	15.7	50.7	
11.805000	20.8	1000.000	9.000	GND	L1	10.5	29.2	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
0.206000	43.1	1000.000	9.000	GND	N	10.0	20.1	63.2	
0.276000	38.0	1000.000	9.000	GND	N	10.0	22.7	60.7	

Final Measurement Detector 2

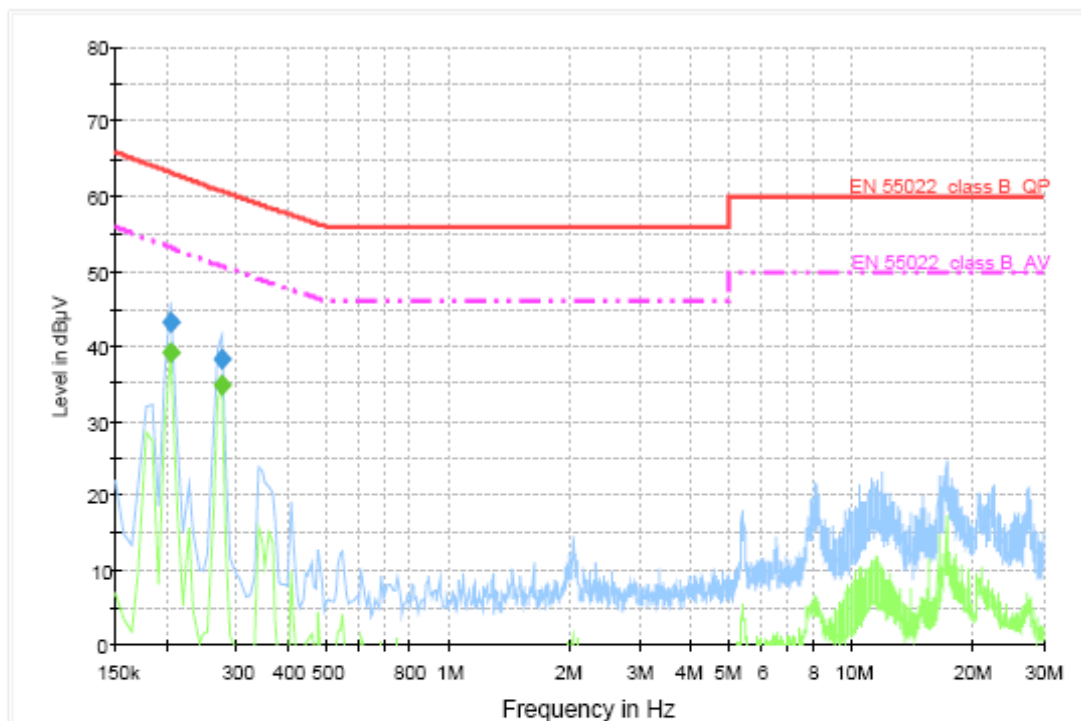
Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.206000	38.9	1000.000	9.000	GND	N	10.0	14.3	53.2	
0.276000	34.8	1000.000	9.000	GND	N	10.0	15.9	50.7	
11.679000	20.4	1000.000	9.000	GND	N	10.4	29.6	50.0	

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



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

Voltage with 4-Line-LISN L1



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.206000	43.2	1000.000	9.000	GND	L1	10.0	20.0	63.2	
0.276000	38.2	1000.000	9.000	GND	L1	10.0	22.5	60.7	

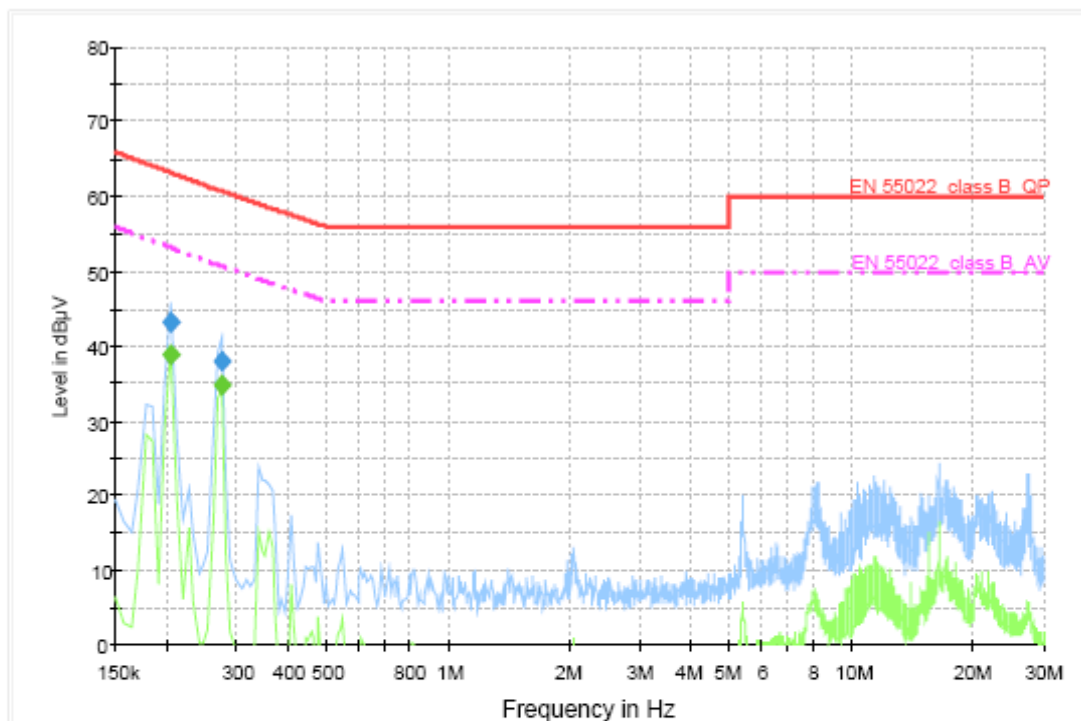
Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.206000	39.0	1000.000	9.000	GND	L1	10.0	14.2	53.2	
0.276000	34.9	1000.000	9.000	GND	L1	10.0	15.8	50.7	

< 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
0.206000	43.2	1000.000	9.000	GND	N	10.0	20.0	63.2	
0.276000	38.0	1000.000	9.000	GND	N	10.0	22.7	60.7	

Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.206000	38.9	1000.000	9.000	GND	N	10.0	14.3	53.2	
0.276000	34.9	1000.000	9.000	GND	N	10.0	15.8	50.7	

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



6. Radiated Emission

6.1 Operating Environment

Temperature : 0 °C
Relative Humidity : 39 % R.H.

6.2 Test Set-up

A preliminary scan with peak mode was performed in the semi anechoic chamber and found frequency for test site. The formal radiated emission was measured at 10 m distance open area test site and 3 m distance 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
■ - ESCS30	EMI test receiver	Rohde & Schwarz	839809/003	2010. 12. 10
■ - HK116	Biconical antenna	Rohde & Schwarz	826861/018	2010. 11. 20
■ - HL223	Log-periodic antenna	Rohde & Schwarz	829228/011	2010. 11. 20
■ - HD100	Position Controller	HD GmbH	100/692/01	N/A
■ - DS415S	Turntable	HD GmbH	415/657/01	N/A
■ - MA240	Antenna Mast	HD GmbH	240/565/01	N/A
■ - ESI	EMI test receiver	Rohde & Schwarz	830482/010	2010. 12. 11
■ - BBHA9120D	Horn antenna	Schwarzbeck	597	2010. 12. 18
■ - AFS44-00101800-25-10P-44	Preamplifier	MITEQ	1258943	2010. 11. 12
■ - MCU066	Position Controller	maturo GmbH	1390306	N/A
■ - TT2.5SI	Turntable	maturo GmbH	1390307	N/A
■ - AM 4.0	Antenna Mast	maturo GmbH	1390308	N/A



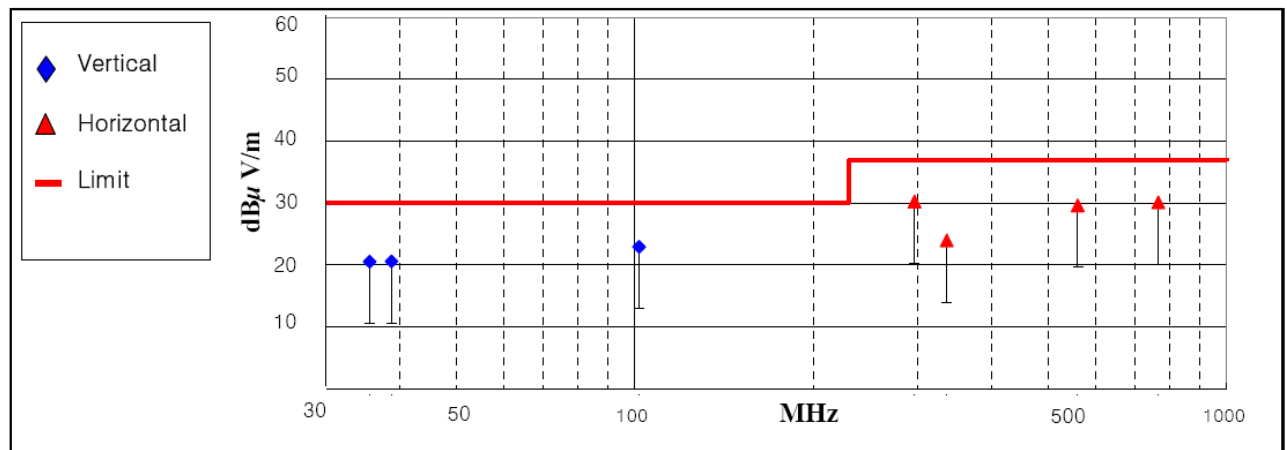
6.6 Test data for Radiated Emission

- Test Date : February 5, 2010
- Resolution Bandwidth : 120 kHz / 1 MHz
- Frequency Range : 30 MHz ~ 2 000 MHz
- Measurement Distance : 10 m / 3 m
- Note : The highest frequency of the internal source of the EUT is between 108 MHz and 500 MHz (210 MHz). The measurement was made up to 2 000 MHz.

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

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)	(°)
35.66	6.80	11.75	2.00	20.55	30.00	9.45	V	100	180
38.81	7.58	10.94	2.06	20.58	30.00	9.42	V	100	160
101.66	10.27	9.58	3.09	22.94	30.00	7.06	V	132	0
297.01	3.24	21.46	5.58	30.28	37.00	6.72	H	198	270
336.39	2.49	14.89	6.63	24.01	37.00	12.99	H	240	90
560.10	4.37	18.09	7.19	29.65	37.00	7.35	H	225	190
766.34	2.04	19.68	8.40	30.12	37.00	6.88	H	260	220

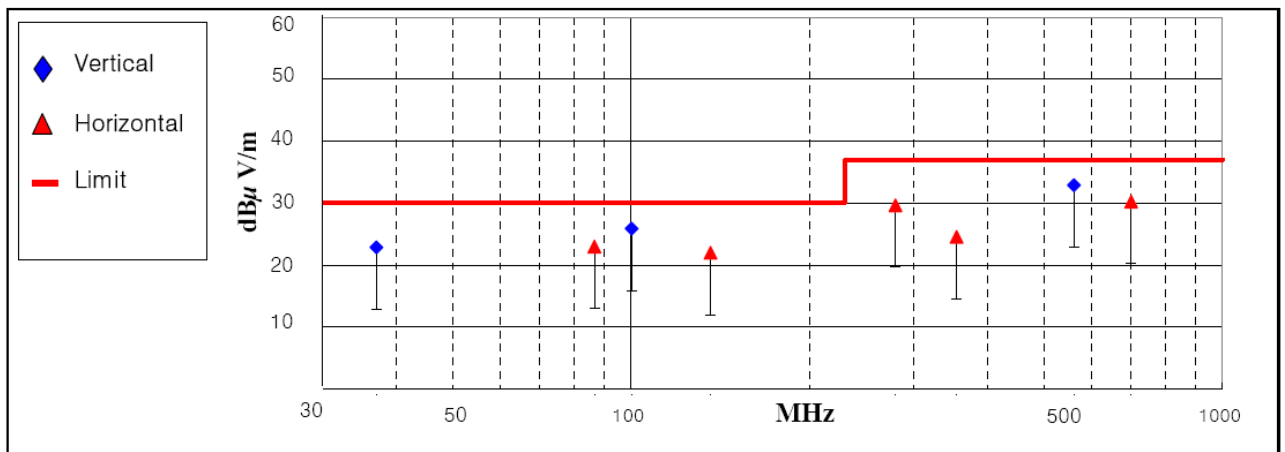


< Fig 12. Radiated emission result (30 MHz ~ 1 000 MHz)>



- ◆ Operating Condition: 1 920 × 1 080 / 60 Hz (HDMI/DVI: Digital)
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)	(°)
37.11	9.44	11.38	2.03	22.85	30.00	7.15	V	101	90
86.69	11.42	8.66	2.90	22.98	30.00	7.02	H	250	164
100.25	13.28	9.50	3.07	25.85	30.00	4.15	V	100	80
136.17	6.97	11.47	3.53	21.97	30.00	8.03	H	295	215
280.00	4.25	20.05	5.35	29.65	37.00	7.35	H	200	100
355.09	2.14	15.35	7.04	24.53	37.00	12.47	H	198	125
560.59	7.58	18.10	7.20	32.88	37.00	4.12	V	160	90
700.69	2.83	19.41	7.97	30.21	37.00	6.79	H	300	100

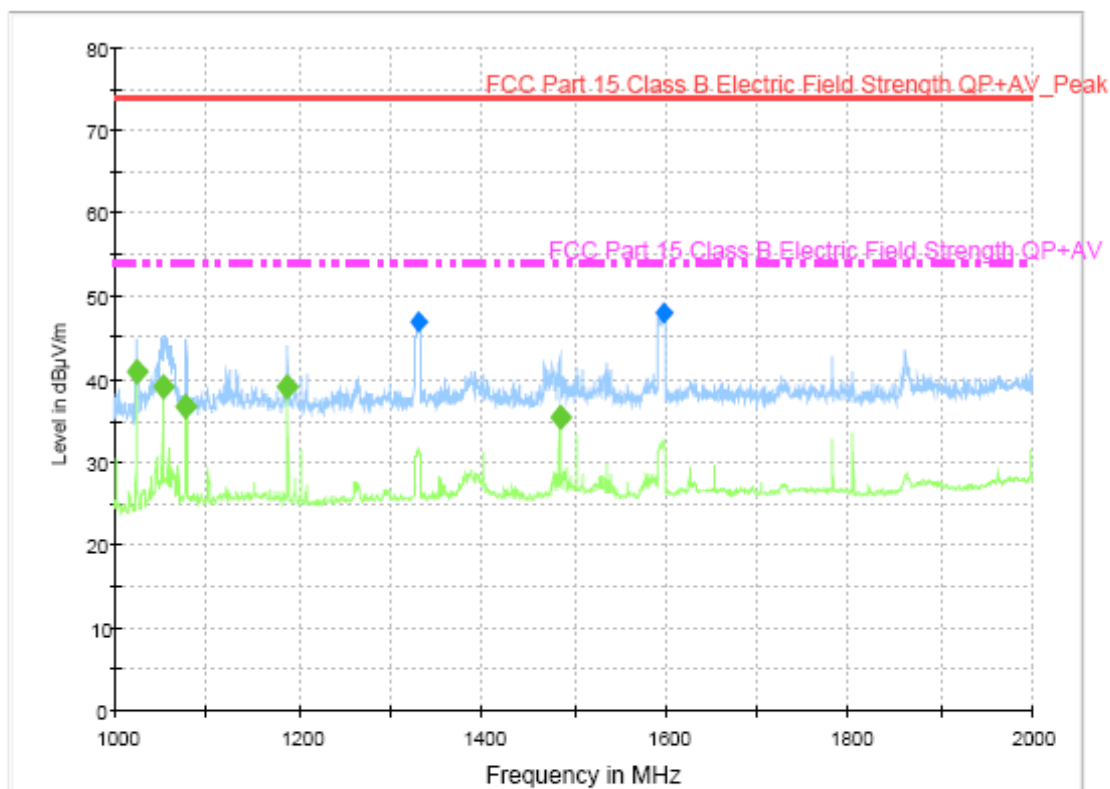


< Fig 13. Radiated emission result (30 MHz ~ 1 000 MHz)>



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

FCC_ESIB_Preamplifier_RE with Scans



Final Result 1

Frequency (MHz)	Maxpeak-MaxHold (dBμV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
1330.400000	46.9	100.0	H	90.0	-14.9	27.1	74.0	
1597.600000	48.1	100.0	V	0.0	-14.4	25.9	74.0	

Final Result 2

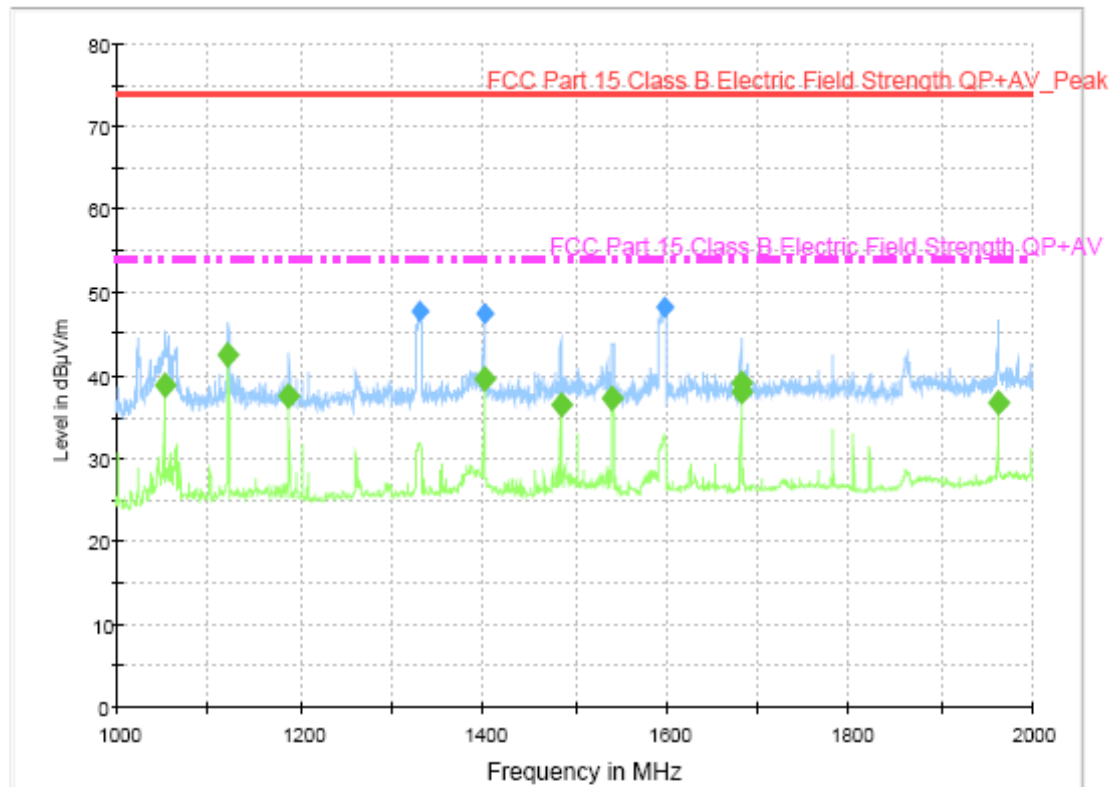
Frequency (MHz)	Average-MaxHold (dBμV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
1024.000000	40.9	100.0	H	270.0	-16.5	13.1	54.0	
1052.400000	39.1	100.0	H	90.0	-16.4	14.9	54.0	
1078.000000	36.9	200.0	H	90.0	-16.2	17.1	54.0	
1188.000000	39.2	100.0	H	90.0	-15.9	14.8	54.0	
1484.800000	35.4	100.0	H	0.0	-14.8	18.6	54.0	

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



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

FCC_ESIB_Preamplifier_RE with Scans



Final Result 1

Frequency (MHz)	Maxpeak-MaxHold (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Comment
1330.800000	47.6	100.0	H	90.0	-14.9	26.4	74.0	
1401.600000	47.4	200.0	V	180.0	-14.8	26.6	74.0	
1598.800000	48.3	100.0	V	0.0	-14.4	25.7	74.0	

Final Result 2

Frequency (MHz)	Average-MaxHold (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Comment
1052.400000	38.9	100.0	H	90.0	-16.4	15.1	54.0	
1122.400000	42.4	200.0	H	180.0	-16.1	11.6	54.0	
1188.000000	37.4	100.0	H	90.0	-15.9	16.6	54.0	
1401.600000	39.6	200.0	V	180.0	-14.8	14.4	54.0	
1484.800000	36.6	200.0	H	180.0	-14.8	17.4	54.0	
1541.600000	37.1	100.0	H	90.0	-14.6	16.9	54.0	
1681.600000	39.1	200.0	H	180.0	-14.4	14.9	54.0	
1682.000000	38.0	200.0	H	180.0	-14.4	16.0	54.0	
1962.000000	36.8	100.0	V	180.0	-13.0	17.2	54.0	

< 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: M5203CG)** was complies with §15.107 and 15.109 of the FCC Rules.