

FCC EVALUATION REPORT FOR CERTIFICATION

Applicant: LG Electronics Inc.**19-1, Cheongho-ri, Jinwi-myeon,****Pyeongteak-si, Gyeonggi-do, Korea.****Attn: Mr. Do-Hyung Kim, Chief research engineer****Date of Issue: July 7, 2011****Order Number: GETEC-C1-11-136****Test Report Number: GETEC-E3-11-059****Test Site: Gumi College EMC Center****FCC Registration Number: (100749, 443957)****FCC ID. : BEJD237IPS****Applicant : LG Electronics Inc.**

Rule Part(s)	: FCC Part 15 Subpart B
Equipment Class	: Class B computing device peripheral (JBP)
EUT Type	: LED LCD Monitor
Type of Authority	: Certification
Model Name	: D237IPS
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,**

**Hyun Kim, 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. Do-Hyung Kim, Chief research engineer

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- **FCC ID.** BEJD237IPS
- **EUT Type** LED LCD Monitor
- **Model Name** D237IPS
- **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 30 ~ July 2, 2011
- **Place of Test** **Gumi College EMC Center** (FCC Registration Number: 100749, 443957)
407, Bugok-dong, Gumi-si, Gyeongbuk, Korea.
- **Test Report Number** GETEC-E3-11-059
- **Dates of Issue** July 7, 2011



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 Monitor (Model Name: D237IPS)**

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 Monitor (Model Name: D237IPS) FCC ID.: BEJD237IPS**

Display	Screen Type	58.42 cm (23 inch) Hard coating(3H) & Anti-Glare treatment of the front polarizer Visible diagonal size: 58.42 cm
	Pixel Pitch	0.2652 mm x 0.2652 mm (Pixel Pitch)
Sync Input	Horizontal Frequency	30 kHz to 83 kHz (Automatic)
	Vertical Frequency	56 Hz to 75 Hz (D-SUB, DVI-D) 56 Hz to 61 Hz (HDMI)
	Input Form	Separate Sync. Digital
Video Input	Signal Input	15 pin D-SUB Connector /DVI-D Connector (Digital) HDMI Connector
	Input Form	RGB Analog (0.7 Vp-p/ 75 ohm), Digital
Resolution	Max	D-SUB(Analog) : 1920 x 1080 @ 60 Hz DVI / HDMI (Digital) : 1920 x 1080 @ 60 Hz
	Recommend	VESA 1920 x 1080 @ 60 Hz
Plug & Play	DDC 2B(Analog,Digital,HDMI)	
Power Consumption	On Mode : 41 W(Typ.) Sleep Mode ≤ 1 W Off Mode ≤ 1 W	
Power Input	AC 100-240 V~ 50 / 60 Hz 0.7 A	
Dimensions (Width x Height x Depth)	With Stand	55.62 cm x 41.27 cm x 17.78 cm
	Without Stand	55.62 cm x 34.51 cm x 6.04 cm
Weight	4.86 kg	
Tilt Range	-5° to 18°	
Environmental conditions	Operating Temperature	10°C to 35 °C
	Operating Humidity	10 % to 80 %
	Storage Temperature	-20°C to 60 °C
	Storage Humidity	5 % to 90 % non-Condensing
Stand Base	Attached (), Detached (O)	
Power cord	Wall-outlet type	

- Maximum Frequency Range : 148.5 MHz



3.2 Support Equipment / Cables used

3.2.1 Used Support Equipment

Description	Manufacturer	Model Name	S/N & FCC ID.
PC	DNACOM	ASB-770iCafe	S/N: N/A FCC ID.: DoC
Video card	Rextechnology Co., Ltd.	HD4850	S/N: L5H041947 FCC ID.: DoC
PS2 keyboard	Hewlett Packard	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
Headset	PHILIPS	SBC HL140	S/N: 3850R-Z674K 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.	-	-	S/N: - FCC ID.: -

3.2.3 Used Cable(s)

Cable Name	Condition	Description
Power cable	Connected to the EUT	1.80 m unshielded
D-Sub(Analog) in cable	Connected to the EUT and PC	1.80 m shielded
DVI(Digital) in cable	Connected to the EUT and PC	1.80 m shielded
HDMI(Digital) in cable	Connected to the EUT and PC	1.80 m shielded
Headset cable	Connected to the EUT and headset	1.20 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, DVI: Digital, HDMI: Digital)

Conducted emission: 1 920 × 1 080 / 60 Hz (RGB: Analog, DVI: Digital, HDMI: 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
- . Continuous playback of 1 kHz audio file with winamp player



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

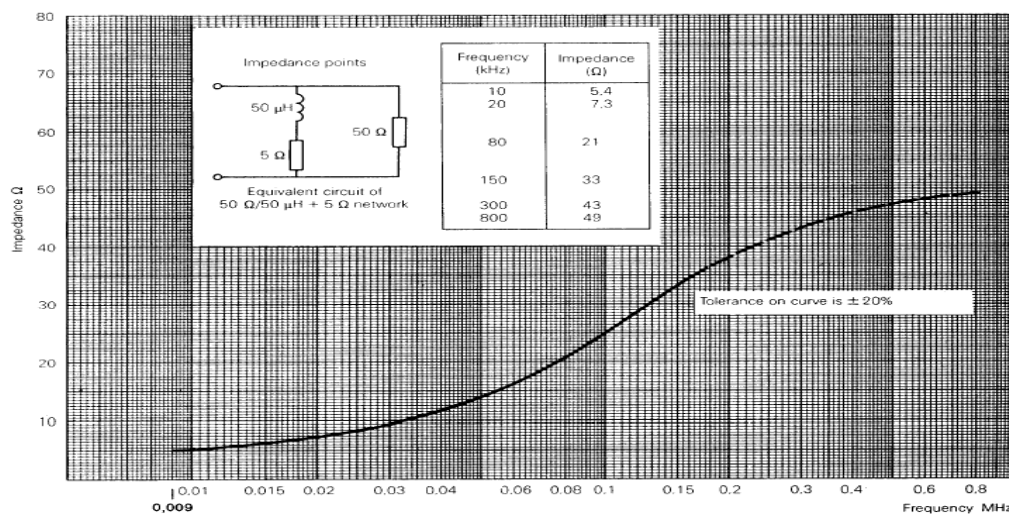


Fig 2. Impedance of LISN



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

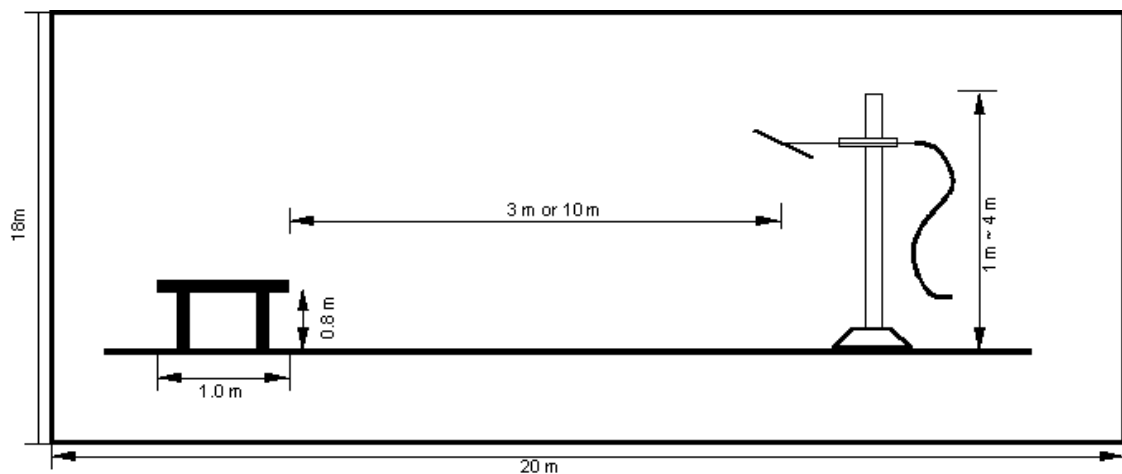


Fig 3. Dimensions of test site



5. Conducted Emission

5.1 Operating Environment

Temperature : 26 °C
Relative Humidity : 56 % 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 & ISN.

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)	± 2.71 dB	Confidence levels of 95 % ($k = 2$)
Conducted emission (150 kHz ~ 30 MHz)	± 3.34 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. 2011
■ - ESH3-Z5	Rohde & Schwarz	LISN	838979/020	12. 10. 2011
■ - ESH2-Z5	Rohde & Schwarz	LISN	829991/009	12. 10. 2011
□ - ISN T8	TESEQ. GmbH	ISN	24568	11. 09. 2011

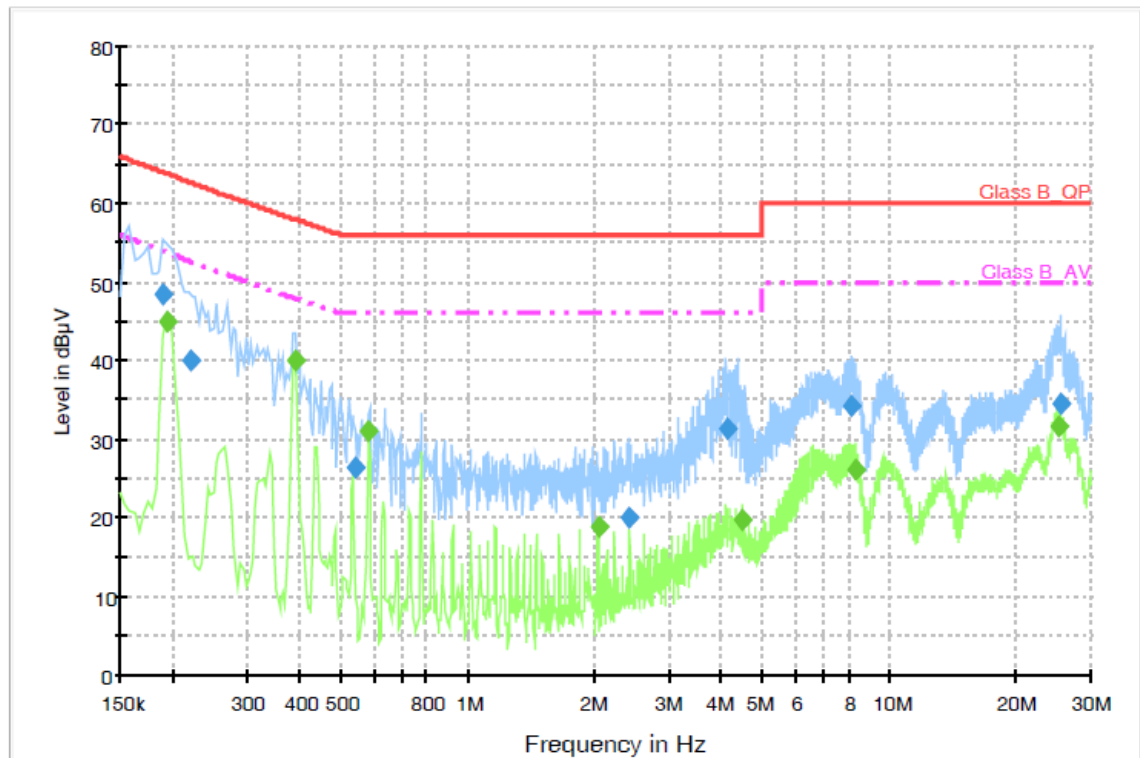
5.6 Test data for Conducted Emission

- Test Date : July 2, 2011
- 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
0.190000	48.3	1000.000	9.000	GND	L1	10.1	15.6	63.9	
0.220000	40.1	1000.000	9.000	GND	L1	10.1	22.5	62.6	
0.540000	26.3	1000.000	9.000	GND	L1	10.1	29.7	56.0	
2.420000	20.1	1000.000	9.000	GND	L1	10.2	35.9	56.0	
4.124000	31.3	1000.000	9.000	GND	L1	10.3	24.7	56.0	
8.108000	34.2	1000.000	9.000	GND	L1	10.5	25.8	60.0	
25.536000	34.6	1000.000	9.000	GND	L1	11.1	25.4	60.0	

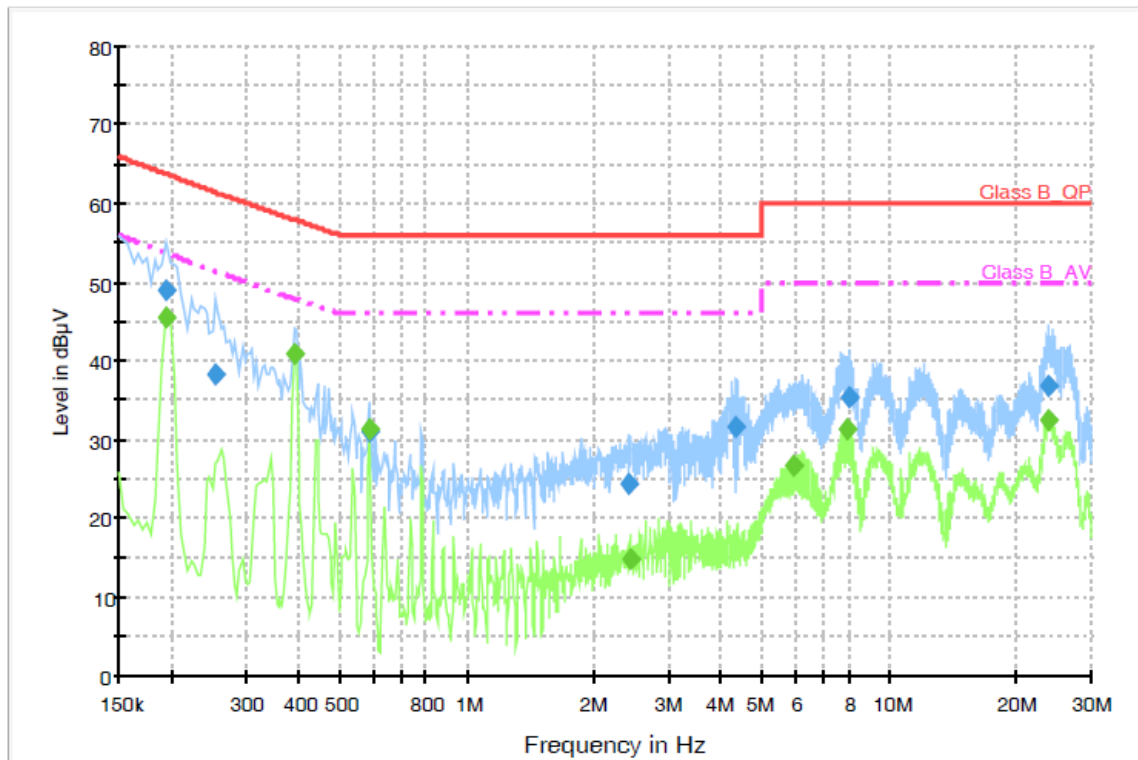
Final Measurement Detector 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.194000	44.9	1000.000	9.000	GND	L1	10.1	8.8	53.7	
0.392000	40.0	1000.000	9.000	GND	L1	10.1	7.9	47.9	
0.584000	30.9	1000.000	9.000	GND	L1	10.1	15.1	46.0	
2.048000	19.0	1000.000	9.000	GND	L1	10.2	27.0	46.0	
4.488000	19.8	1000.000	9.000	GND	L1	10.3	26.2	46.0	
8.316000	26.0	1000.000	9.000	GND	L1	10.5	24.0	50.0	
25.036000	31.5	1000.000	9.000	GND	L1	11.1	18.5	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
0.194000	48.9	1000.000	9.000	GND	N	10.1	14.8	63.7	
0.254000	38.3	1000.000	9.000	GND	N	10.1	23.1	61.4	
0.586000	31.0	1000.000	9.000	GND	N	10.1	25.0	56.0	
2.410000	24.4	1000.000	9.000	GND	N	10.2	31.6	56.0	
4.346000	31.6	1000.000	9.000	GND	N	10.3	24.4	56.0	
8.026000	35.3	1000.000	9.000	GND	N	10.4	24.7	60.0	
23.818000	36.8	1000.000	9.000	GND	N	10.7	23.2	60.0	

Final Measurement Detector 2

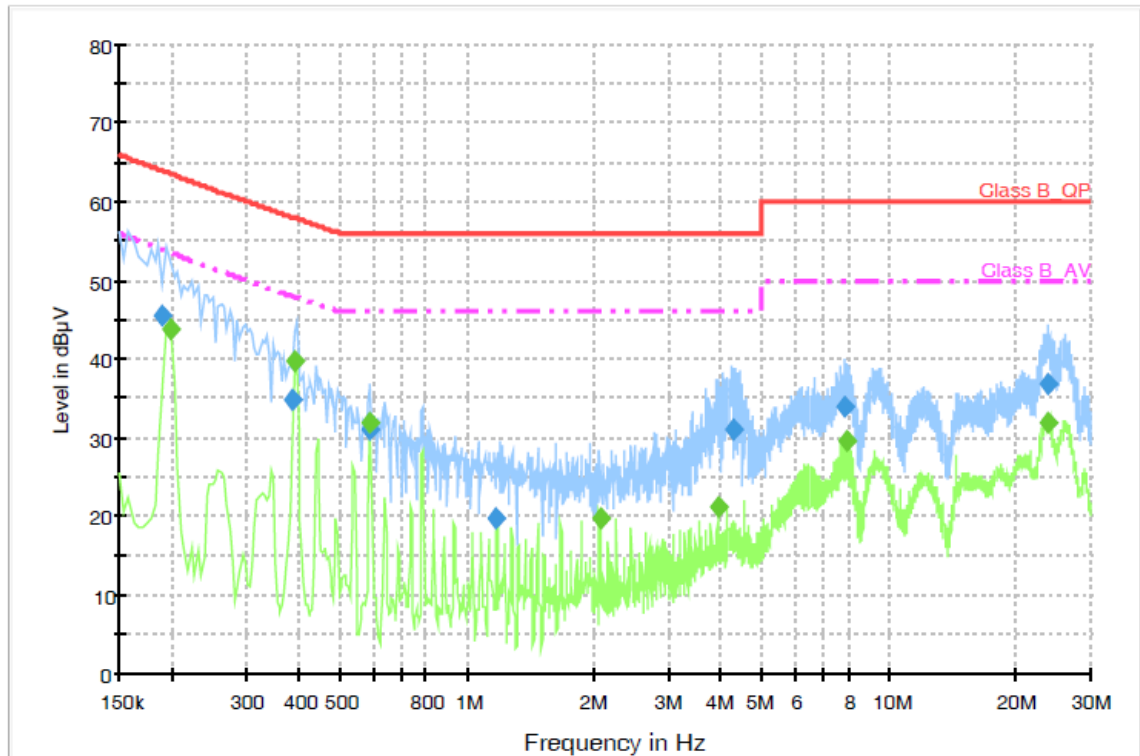
Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.194000	45.6	1000.000	9.000	GND	N	10.1	8.1	53.7	
0.390000	40.7	1000.000	9.000	GND	N	10.1	7.2	47.9	
0.586000	31.3	1000.000	9.000	GND	N	10.1	14.7	46.0	
2.442000	14.8	1000.000	9.000	GND	N	10.2	31.2	46.0	
5.922000	26.5	1000.000	9.000	GND	N	10.4	23.5	50.0	
7.966000	31.3	1000.000	9.000	GND	N	10.4	18.7	50.0	
23.778000	32.4	1000.000	9.000	GND	N	10.7	17.6	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
0.190000	45.6	1000.000	9.000	GND	L1	10.1	18.3	63.9	
0.388000	34.8	1000.000	9.000	GND	L1	10.1	23.2	58.0	
0.588000	31.1	1000.000	9.000	GND	L1	10.1	24.9	56.0	
1.164000	19.7	1000.000	9.000	GND	L1	10.1	36.4	56.0	
4.248000	31.1	1000.000	9.000	GND	L1	10.3	24.9	56.0	
7.824000	33.8	1000.000	9.000	GND	L1	10.4	26.2	60.0	
23.752000	36.8	1000.000	9.000	GND	L1	11.1	23.2	60.0	

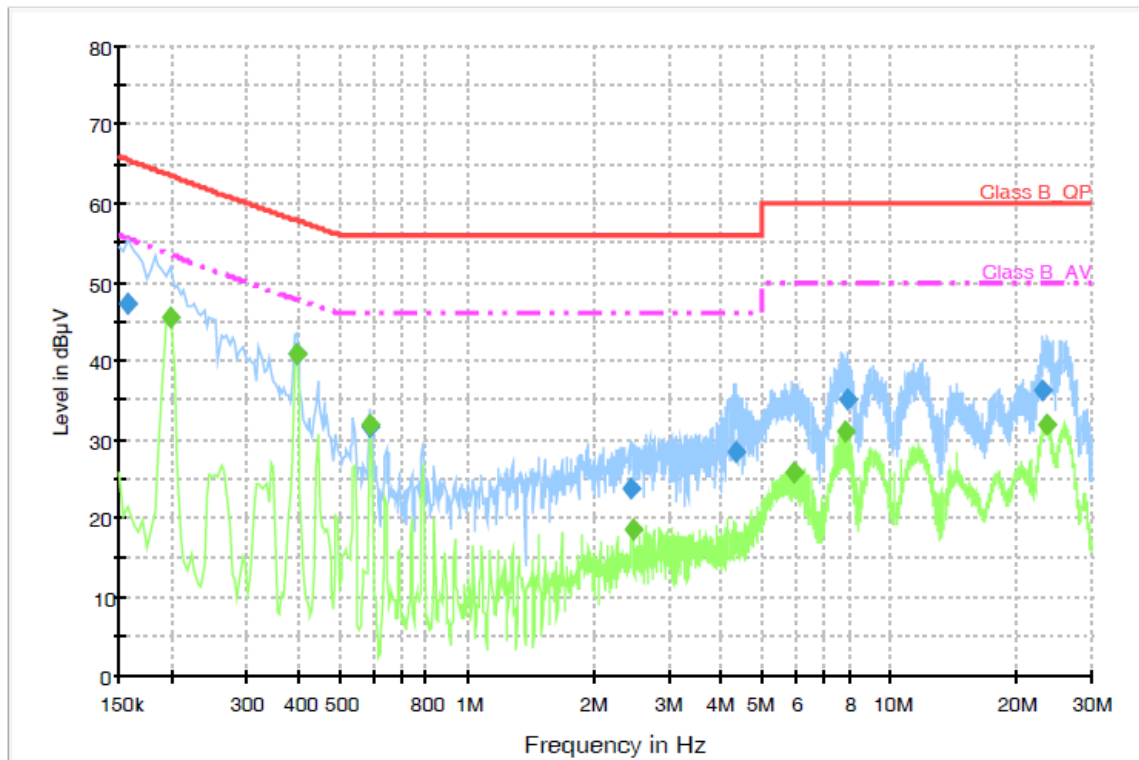
Final Measurement Detector 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.198000	43.8	1000.000	9.000	GND	L1	10.1	9.7	53.5	
0.392000	39.8	1000.000	9.000	GND	L1	10.1	8.1	47.9	
0.588000	31.8	1000.000	9.000	GND	L1	10.1	14.2	46.0	
2.064000	19.7	1000.000	9.000	GND	L1	10.2	26.3	46.0	
3.928000	21.2	1000.000	9.000	GND	L1	10.3	24.8	46.0	
7.956000	29.7	1000.000	9.000	GND	L1	10.5	20.3	50.0	
23.724000	31.9	1000.000	9.000	GND	L1	11.1	18.1	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
0.158000	47.2	1000.000	9.000	GND	N	10.1	18.3	65.5	
0.394000	40.9	1000.000	9.000	GND	N	10.1	17.0	57.9	
0.590000	31.5	1000.000	9.000	GND	N	10.1	24.5	56.0	
2.454000	23.8	1000.000	9.000	GND	N	10.2	32.2	56.0	
4.314000	28.3	1000.000	9.000	GND	N	10.3	27.7	56.0	
7.890000	35.0	1000.000	9.000	GND	N	10.4	25.0	60.0	
23.038000	36.2	1000.000	9.000	GND	N	10.8	23.8	60.0	

Final Measurement Detector 2

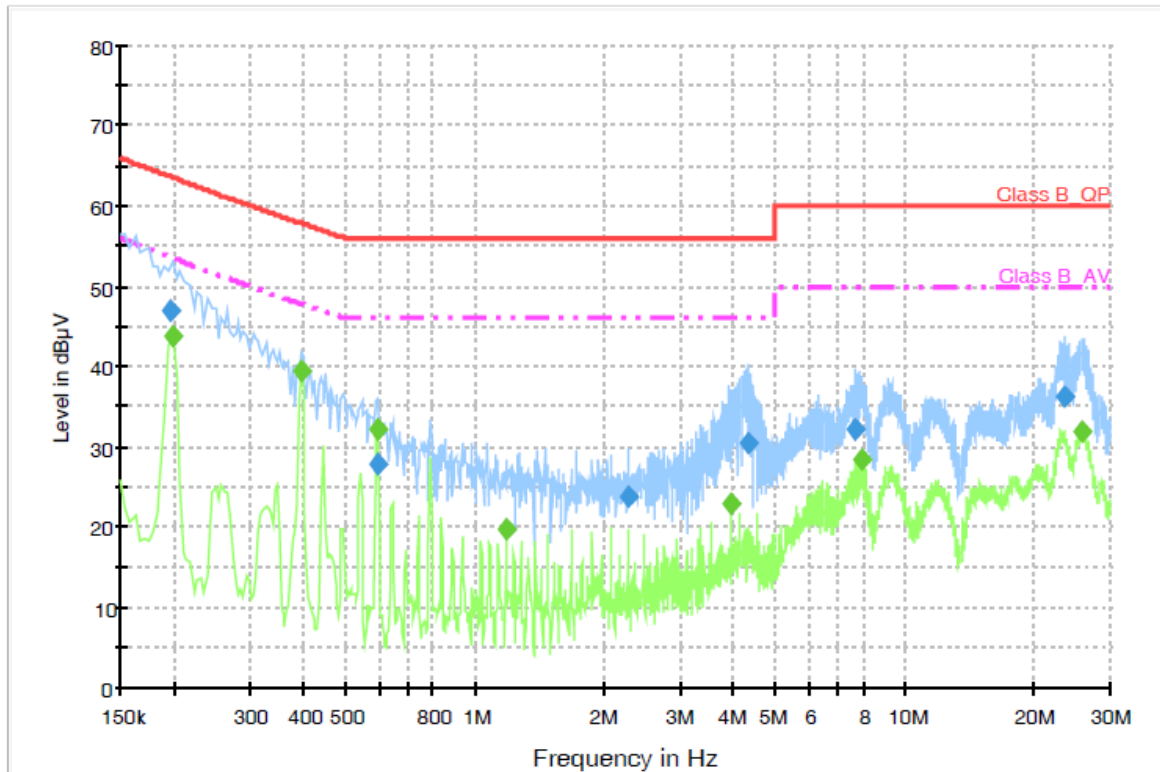
Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.198000	45.5	1000.000	9.000	GND	N	10.1	8.0	53.5	
0.394000	40.9	1000.000	9.000	GND	N	10.1	6.9	47.8	
0.590000	31.9	1000.000	9.000	GND	N	10.1	14.1	46.0	
2.458000	18.6	1000.000	9.000	GND	N	10.2	27.4	46.0	
5.898000	25.8	1000.000	9.000	GND	N	10.4	24.2	50.0	
7.822000	31.0	1000.000	9.000	GND	N	10.4	19.0	50.0	
23.350000	32.0	1000.000	9.000	GND	N	10.7	18.0	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
0.196000	47.0	1000.000	9.000	GND	L1	10.1	16.6	63.6	
0.596000	27.9	1000.000	9.000	GND	L1	10.1	28.1	56.0	
2.268000	23.9	1000.000	9.000	GND	L1	10.2	32.1	56.0	
4.316000	30.3	1000.000	9.000	GND	L1	10.3	25.7	56.0	
7.700000	32.1	1000.000	9.000	GND	L1	10.4	27.9	60.0	
23.608000	36.1	1000.000	9.000	GND	L1	11.1	23.9	60.0	

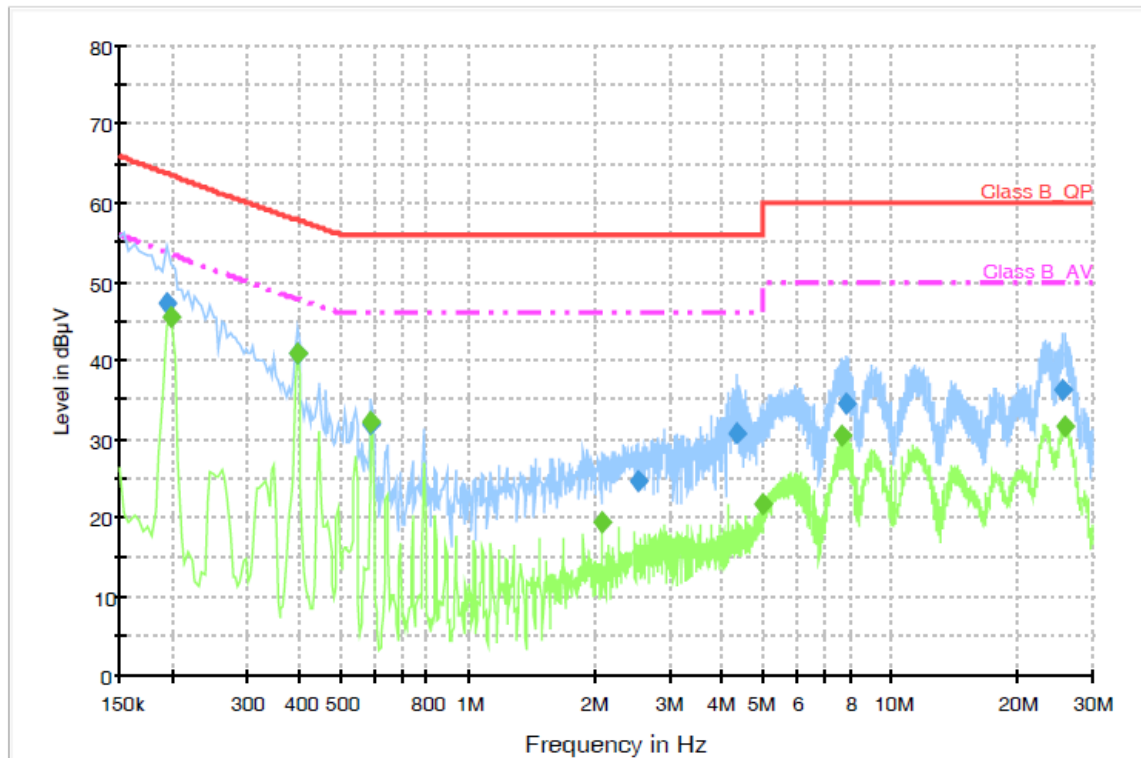
Final Measurement Detector 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.198000	43.8	1000.000	9.000	GND	L1	10.1	9.7	53.5	
0.396000	39.3	1000.000	9.000	GND	L1	10.1	8.5	47.8	
0.592000	32.2	1000.000	9.000	GND	L1	10.1	13.8	46.0	
1.184000	19.6	1000.000	9.000	GND	L1	10.1	26.4	46.0	
3.940000	22.9	1000.000	9.000	GND	L1	10.3	23.1	46.0	
7.948000	28.3	1000.000	9.000	GND	L1	10.5	21.7	50.0	
25.708000	32.0	1000.000	9.000	GND	L1	11.1	18.0	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
0.194000	47.2	1000.000	9.000	GND	N	10.1	16.5	63.7	
0.394000	41.0	1000.000	9.000	GND	N	10.1	16.9	57.9	
0.590000	31.9	1000.000	9.000	GND	N	10.1	24.1	56.0	
2.514000	24.5	1000.000	9.000	GND	N	10.2	31.5	56.0	
4.334000	30.6	1000.000	9.000	GND	N	10.3	25.4	56.0	
7.874000	34.4	1000.000	9.000	GND	N	10.4	25.6	60.0	
25.546000	36.3	1000.000	9.000	GND	N	10.7	23.7	60.0	

Final Measurement Detector 2

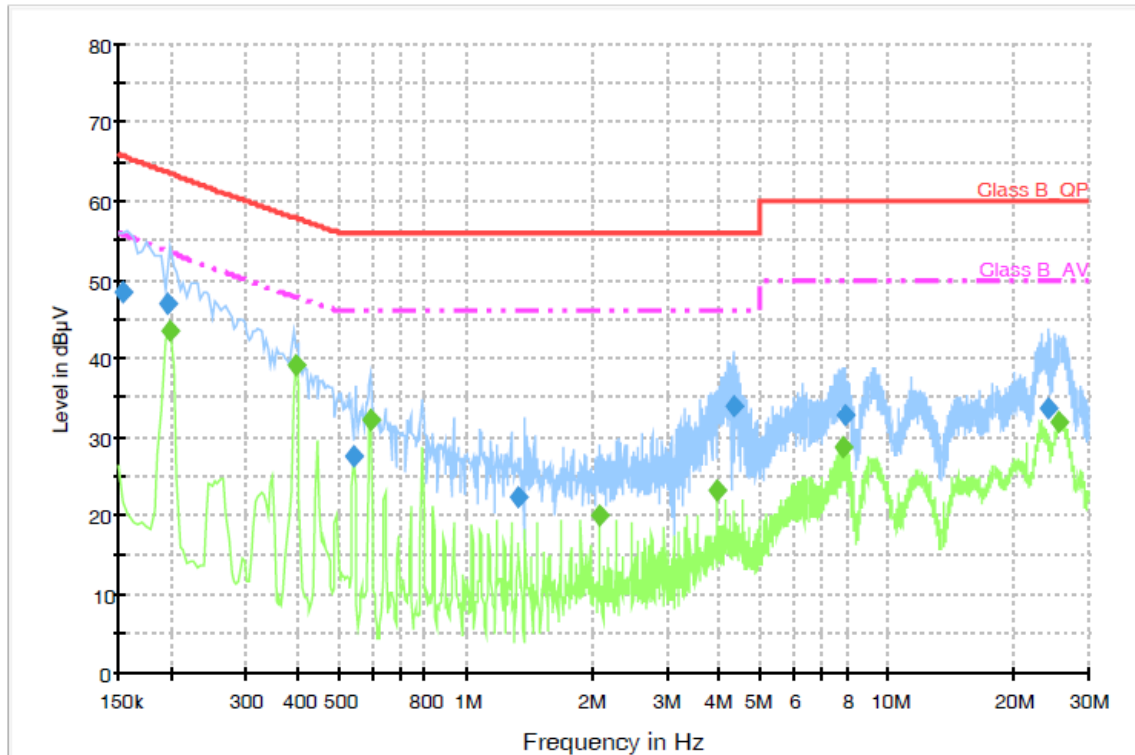
Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.198000	45.5	1000.000	9.000	GND	N	10.1	8.0	53.5	
0.394000	41.0	1000.000	9.000	GND	N	10.1	6.8	47.8	
0.590000	32.2	1000.000	9.000	GND	N	10.1	13.8	46.0	
2.070000	19.4	1000.000	9.000	GND	N	10.2	26.6	46.0	
4.986000	21.7	1000.000	9.000	GND	N	10.3	24.3	46.0	
7.682000	30.4	1000.000	9.000	GND	N	10.4	19.6	50.0	
25.650000	31.7	1000.000	9.000	GND	N	10.7	18.3	50.0	

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



◆ Operating condition: 1 920 × 1 080 / 60 Hz (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
0.154000	48.5	1000.000	9.000	GND	L1	10.1	17.3	65.8	
0.196000	46.9	1000.000	9.000	GND	L1	10.1	16.7	63.6	
0.544000	27.4	1000.000	9.000	GND	L1	10.1	28.6	56.0	
1.332000	22.2	1000.000	9.000	GND	L1	10.1	33.8	56.0	
4.336000	33.9	1000.000	9.000	GND	L1	10.3	22.1	56.0	
7.952000	32.9	1000.000	9.000	GND	L1	10.5	27.1	60.0	
24.164000	33.7	1000.000	9.000	GND	L1	11.1	26.3	60.0	

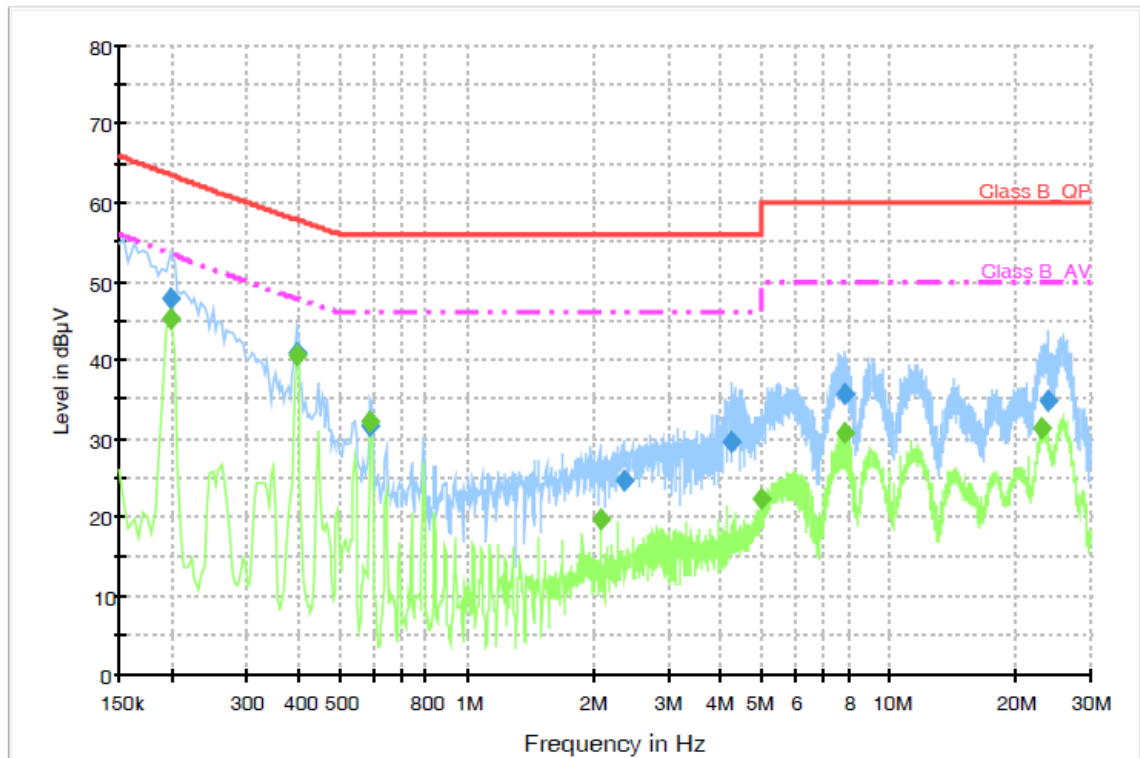
Final Measurement Detector 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.198000	43.5	1000.000	9.000	GND	L1	10.1	10.0	53.5	
0.396000	39.0	1000.000	9.000	GND	L1	10.1	8.8	47.8	
0.592000	32.2	1000.000	9.000	GND	L1	10.1	13.8	46.0	
2.072000	20.1	1000.000	9.000	GND	L1	10.2	25.9	46.0	
3.944000	23.1	1000.000	9.000	GND	L1	10.3	22.9	46.0	
7.812000	28.7	1000.000	9.000	GND	L1	10.4	21.3	50.0	
25.456000	32.0	1000.000	9.000	GND	L1	11.1	18.0	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
0.198000	47.7	1000.000	9.000	GND	N	10.1	15.8	63.5	
0.394000	40.8	1000.000	9.000	GND	N	10.1	17.1	57.9	
0.590000	31.7	1000.000	9.000	GND	N	10.1	24.3	56.0	
2.362000	24.6	1000.000	9.000	GND	N	10.2	31.4	56.0	
4.234000	29.7	1000.000	9.000	GND	N	10.3	26.3	56.0	
7.810000	35.7	1000.000	9.000	GND	N	10.4	24.3	60.0	
23.782000	34.9	1000.000	9.000	GND	N	10.7	25.1	60.0	

Final Measurement Detector 2

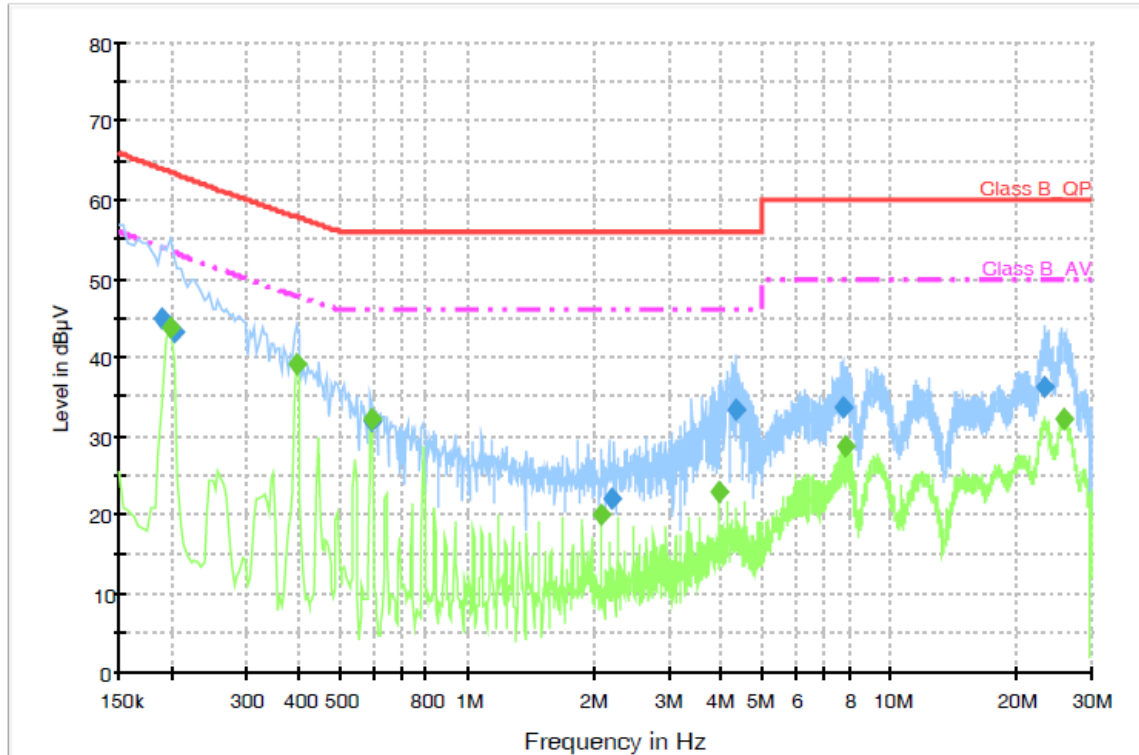
Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.198000	45.4	1000.000	9.000	GND	N	10.1	8.1	53.5	
0.394000	40.6	1000.000	9.000	GND	N	10.1	7.2	47.8	
0.590000	32.3	1000.000	9.000	GND	N	10.1	13.7	46.0	
2.070000	19.6	1000.000	9.000	GND	N	10.2	26.4	46.0	
4.982000	22.3	1000.000	9.000	GND	N	10.3	23.7	46.0	
7.878000	30.7	1000.000	9.000	GND	N	10.4	19.3	50.0	
22.926000	31.2	1000.000	9.000	GND	N	10.8	18.8	50.0	

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



◆ Operating condition: 1 920 × 1 080 / 60 Hz (HDMI: 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
0.190000	44.9	1000.000	9.000	GND	L1	10.1	19.0	63.9	
0.204000	43.3	1000.000	9.000	GND	L1	10.1	20.0	63.3	
0.592000	31.9	1000.000	9.000	GND	L1	10.1	24.1	56.0	
2.204000	22.0	1000.000	9.000	GND	L1	10.2	34.0	56.0	
4.300000	33.4	1000.000	9.000	GND	L1	10.3	22.6	56.0	
7.748000	33.6	1000.000	9.000	GND	L1	10.4	26.4	60.0	
23.204000	36.4	1000.000	9.000	GND	L1	11.1	23.6	60.0	

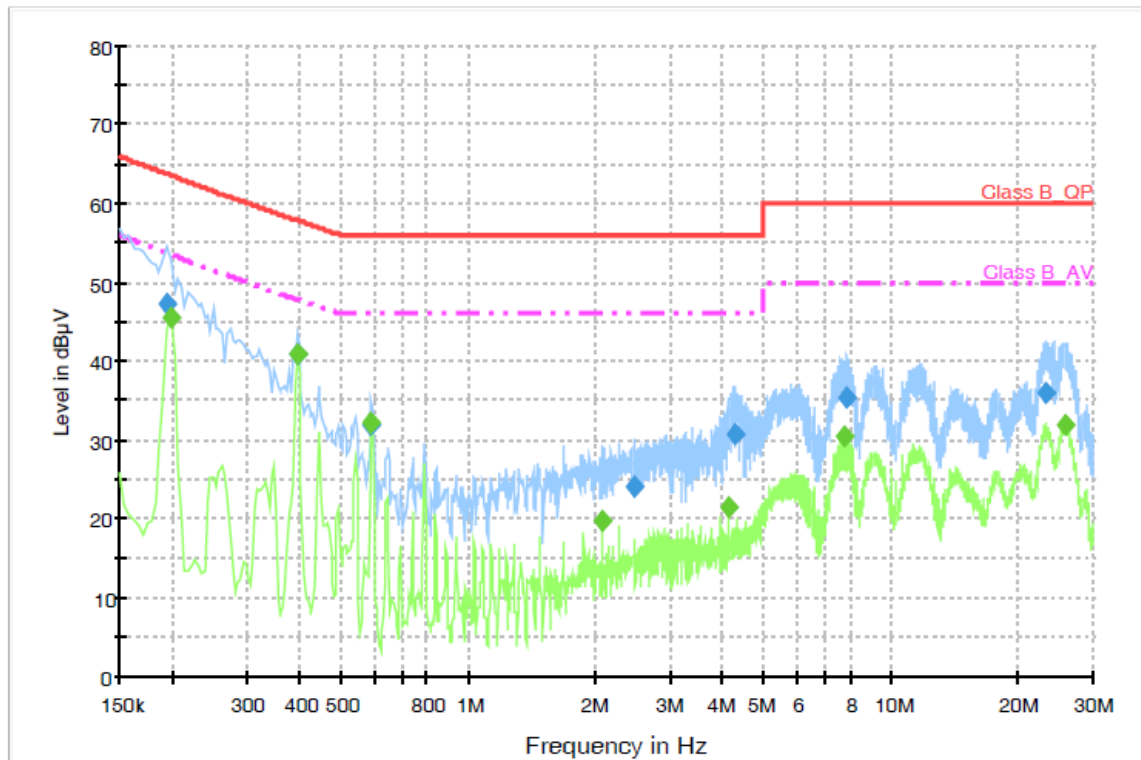
Final Measurement Detector 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.198000	43.7	1000.000	9.000	GND	L1	10.1	9.8	53.5	
0.396000	39.0	1000.000	9.000	GND	L1	10.1	8.8	47.8	
0.592000	32.3	1000.000	9.000	GND	L1	10.1	13.7	46.0	
2.072000	20.1	1000.000	9.000	GND	L1	10.2	25.9	46.0	
3.944000	22.9	1000.000	9.000	GND	L1	10.3	23.1	46.0	
7.884000	28.8	1000.000	9.000	GND	L1	10.5	21.2	50.0	
25.724000	32.1	1000.000	9.000	GND	L1	11.1	17.9	50.0	

< 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
0.194000	47.2	1000.000	9.000	GND	N	10.1	16.5	63.7	
0.394000	40.9	1000.000	9.000	GND	N	10.1	17.0	57.9	
0.590000	31.8	1000.000	9.000	GND	N	10.1	24.2	56.0	
2.462000	24.1	1000.000	9.000	GND	N	10.2	31.9	56.0	
4.270000	30.8	1000.000	9.000	GND	N	10.3	25.2	56.0	
7.818000	35.5	1000.000	9.000	GND	N	10.4	24.5	60.0	
23.162000	35.8	1000.000	9.000	GND	N	10.8	24.2	60.0	

Final Measurement Detector 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.198000	45.5	1000.000	9.000	GND	N	10.1	8.0	53.5	
0.394000	40.9	1000.000	9.000	GND	N	10.1	6.9	47.8	
0.590000	32.2	1000.000	9.000	GND	N	10.1	13.8	46.0	
2.070000	19.7	1000.000	9.000	GND	N	10.2	26.3	46.0	
4.138000	21.4	1000.000	9.000	GND	N	10.3	24.6	46.0	
7.754000	30.4	1000.000	9.000	GND	N	10.4	19.6	50.0	
25.762000	31.9	1000.000	9.000	GND	N	10.7	18.1	50.0	

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



6. Radiated Emission

6.1 Operating Environment

Temperature : 27 °C
Relative Humidity : 55 % 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(Open area test site)	Uncertainty	Remark
Radiated emission (30 MHz ~ 300 MHz, 10 m, Vertical)	± 4.03 dB	Confidence levels of 95 % ($k = 2$)
Radiated emission (30 MHz ~ 300 MHz, 10 m, Horizontal)	± 3.96 dB	Confidence levels of 95 % ($k = 2$)
Radiated emission (300 MHz ~ 1 000 MHz, 10 m, Vertical)	± 4.01 dB	Confidence levels of 95 % ($k = 2$)
Radiated emission (300 MHz ~ 1 000 MHz, 10 m, Horizontal)	± 3.88 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. 2011
■ - VULB9160	Schwarzbeck	Broadband Test Antenna	3193	03. 15. 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	1258942	11. 12. 2011
■ - ESCS30	Rohde & Schwarz	EMI Test Receiver	839809/003	12. 10. 2011
■ - HK116	Rohde & Schwarz	Biconical Antenna	832639/007	03. 15. 2012
■ - HL223	Rohde & Schwarz	Log Periodic Antenna	835998/004	03. 15. 2012
■ - 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

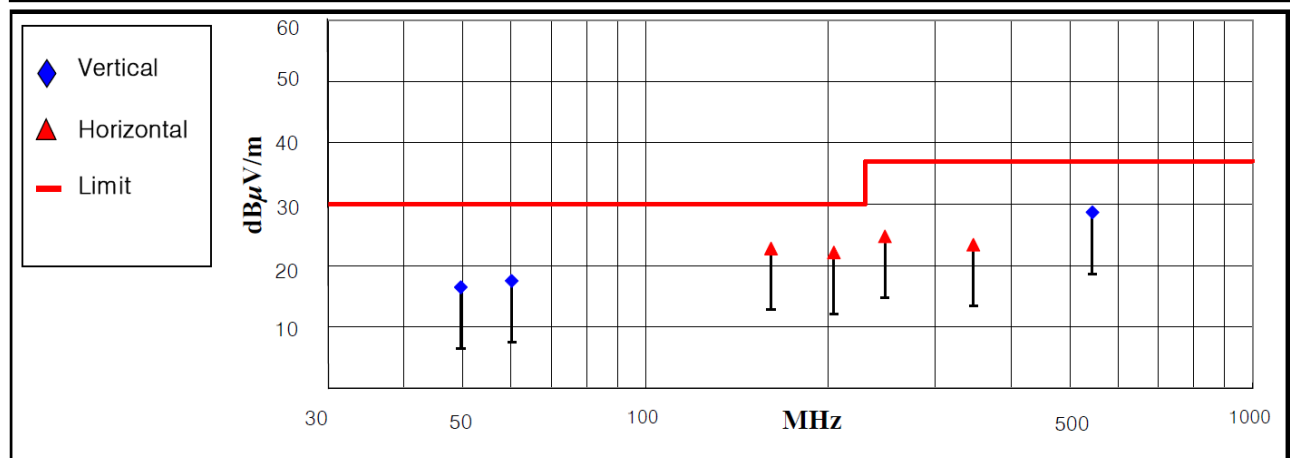


6.6 Test data for Radiated Emission

- Test Date : June 30, 2011
- Resolution Bandwidth : 120 kHz/1 MHz
- Measurement Distance : 10 m / 3 m
- Frequency Range (Detector mode) : 30 MHz ~ 1 GHz (Quasi-peak detector mode)
1 GHz ~ 2 GHz (Average detector mode, Peak detector mode)
- Note : The highest frequency of the internal source of the EUT is between 108 MHz and 500 MHz (148.5 MHz). The measurement was made up to 2 000 MHz

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

Frequency (MHz)	Measurement Level				Limit (dBμ V/m)	Margin (dB)	Positioning System		
	Reading Value(dBμ V)	Antenna Factor(dB/m)	Cable Loss(dB)	Test Result (dBμ V/m)			Pol. (H/V)	Height (cm)	Angle (°)
49.62	5.38	9.39	1.71	16.48	30.00	13.52	V	108	212
60.18	7.56	8.05	1.91	17.52	30.00	12.48	V	107	230
160.89	7.33	12.15	3.31	22.79	30.00	7.21	H	200	181
204.20	3.92	14.41	3.81	22.14	30.00	7.86	H	102	199
247.87	7.15	13.38	4.24	24.77	37.00	12.23	H	107	87
346.67	3.83	14.46	5.12	23.41	37.00	13.59	H	110	114
544.54	3.85	18.19	6.63	28.67	37.00	8.33	V	104	210

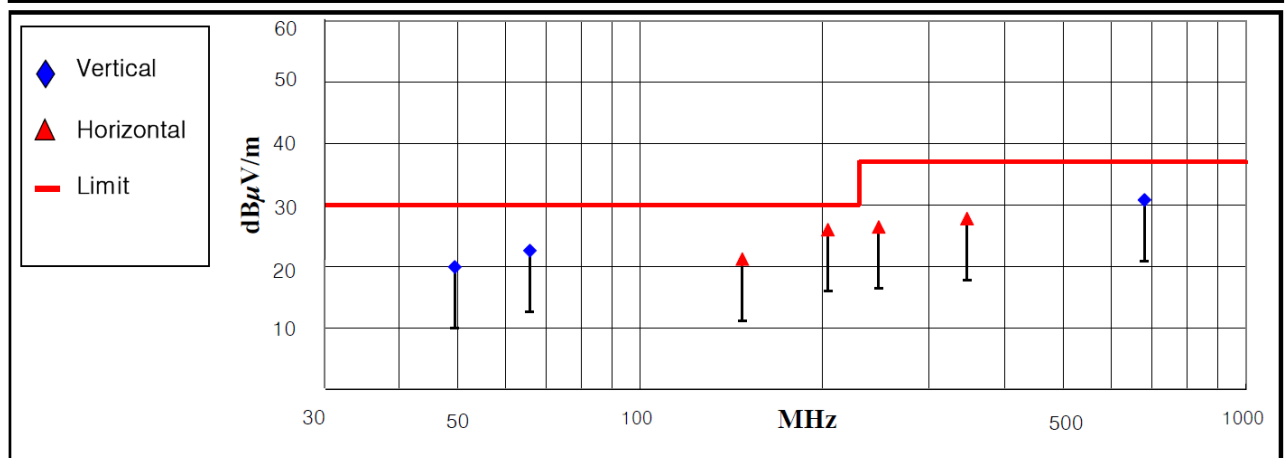


< Fig 14. Radiated emission result (30 MHz ~ 1 000 MHz) >



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

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)	(°)
49.47	8.79	9.42	1.71	19.92	30.00	10.08	V	106	254
65.80	12.15	8.43	2.00	22.58	30.00	7.42	V	107	80
147.56	6.13	11.93	3.14	21.20	30.00	8.80	H	200	178
204.25	7.77	14.41	3.81	25.99	30.00	4.01	H	105	221
247.81	8.82	13.38	4.24	26.44	37.00	10.56	H	106	101
346.61	8.23	14.45	5.12	27.80	37.00	9.20	H	108	140
680.34	3.26	19.97	7.59	30.82	37.00	6.18	V	103	35

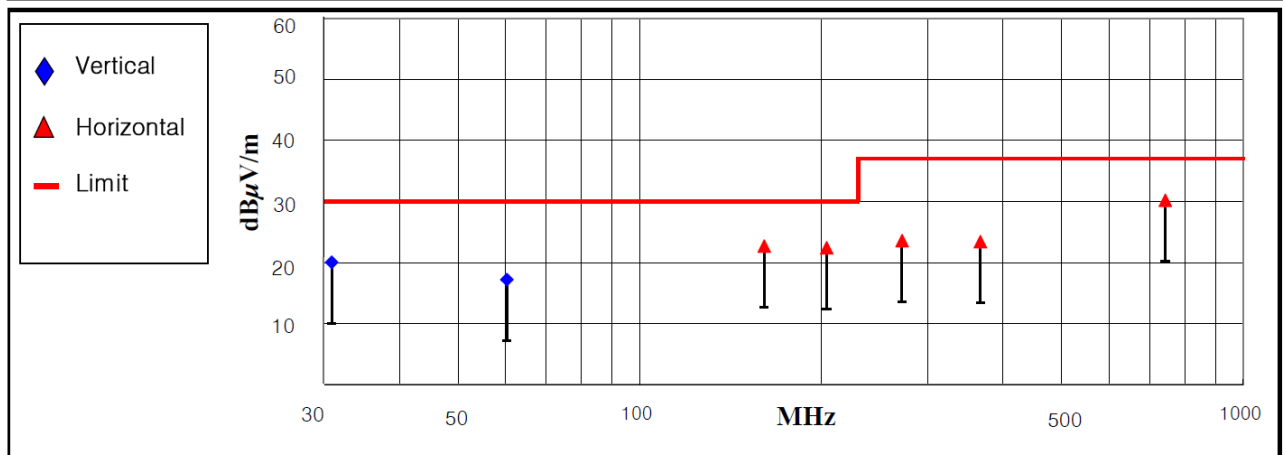


< Fig 15. Radiated emission result (30 MHz ~ 1 000 MHz) >



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

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)	(°)
30.87	5.29	13.41	1.34	20.04	30.00	9.96	V	101	210
60.21	7.22	8.05	1.91	17.18	30.00	12.82	V	108	128
160.84	7.26	12.14	3.31	22.71	30.00	7.29	H	200	189
204.08	4.20	14.41	3.81	22.42	30.00	7.58	H	104	207
272.10	3.88	15.25	4.46	23.59	37.00	13.41	H	104	5
366.79	3.02	15.12	5.28	23.42	37.00	13.58	H	108	161
742.62	1.52	20.68	8.00	30.20	37.00	6.80	H	102	305

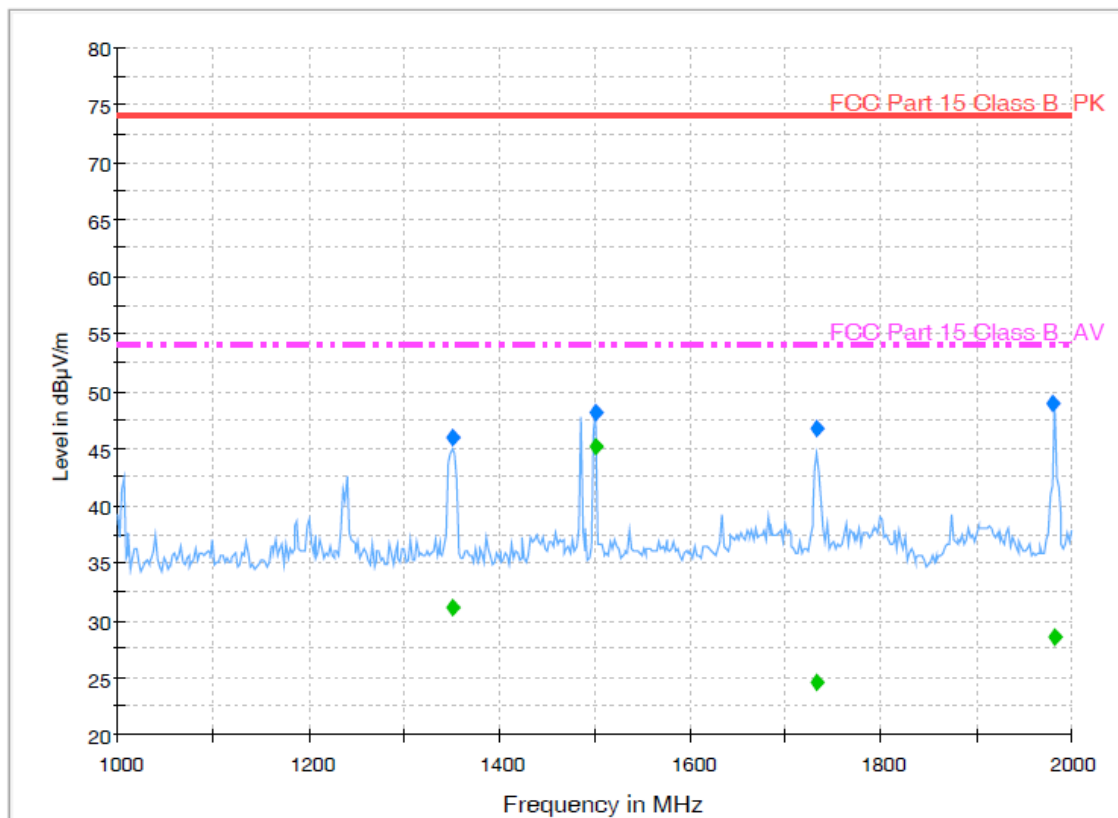


< Fig 16. Radiated emission result (30 MHz ~ 1 000 MHz) >



- ◆ Operating Condition: 1 920 × 1 080 / 60 Hz (RGB: Analog)
Green market: Average detector, Blue market: Peak detector

Radiated Emission_above 1 GHz



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)
1350.101403	46.0	1000.0	1000.000	100.0	V	343.0	-13.3	28.0	74.0
1500.402004	48.2	1000.0	1000.000	131.0	V	0.0	-13.0	25.8	74.0
1733.666934	46.7	1000.0	1000.000	200.0	V	343.0	-12.4	27.3	74.0
1980.963928	49.0	1000.0	1000.000	112.0	H	350.0	-11.7	25.0	74.0

Final Result 2

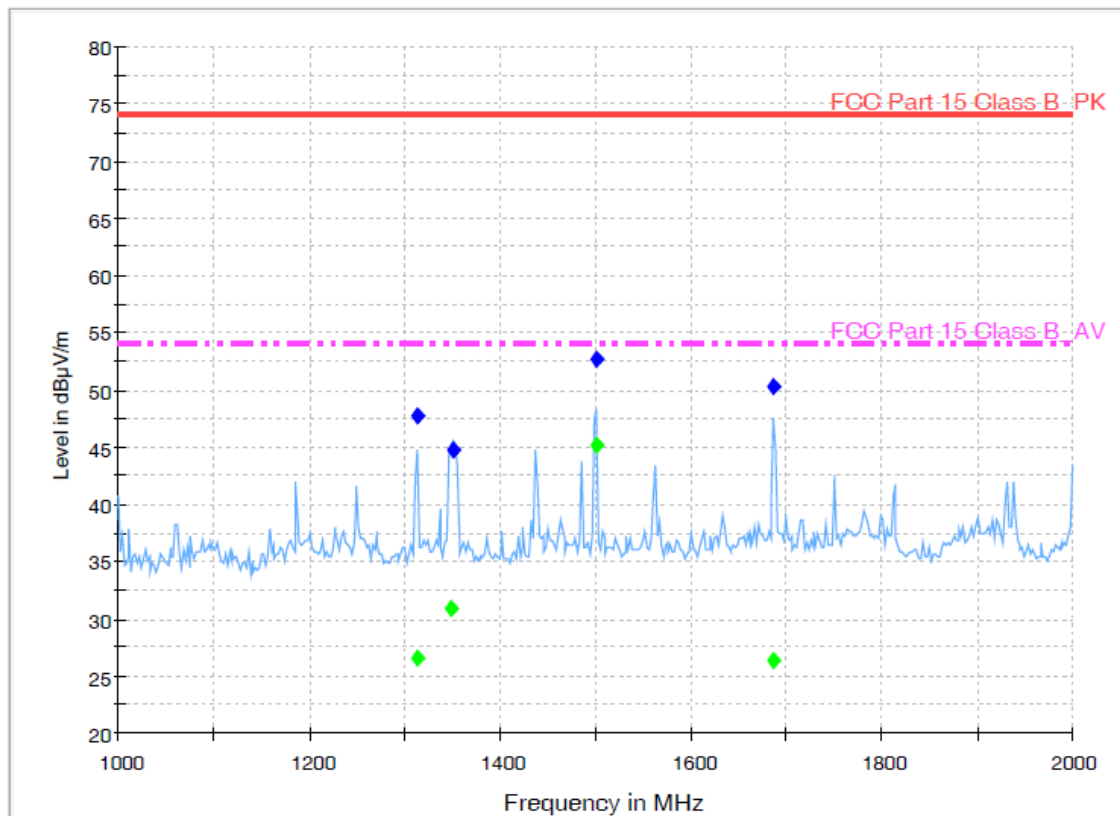
Frequency (MHz)	CAverage (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1350.101403	31.1	1000.0	1000.000	100.0	V	348.0	-13.3	22.9	54.0
1500.402004	45.1	1000.0	1000.000	137.0	V	6.0	-13.0	8.9	54.0
1733.666934	24.5	1000.0	1000.000	200.0	V	348.0	-12.4	29.5	54.0
1981.363928	28.5	1000.0	1000.000	113.0	H	355.0	-11.7	25.5	54.0

< Fig 17. Radiated emission result (1 000 MHz ~ 2 000 MHz) >



- ◆ Operating Condition: 1 920 × 1 080 / 60 Hz (DVI: Digital)
Green marker: Average detector, Blue marker: Peak detector

Radiated Emission_above 1 GHz



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)
1312.425251	47.8	1000.0	1000.000	163.0	V	15.0	-13.4	26.2	74.0
1350.901403	44.7	1000.0	1000.000	113.0	V	358.0	-13.3	29.3	74.0
1500.002004	52.6	1000.0	1000.000	129.0	V	2.0	-13.0	21.4	74.0
1687.574750	50.3	1000.0	1000.000	204.0	V	343.0	-12.6	23.7	74.0

Final Result 2

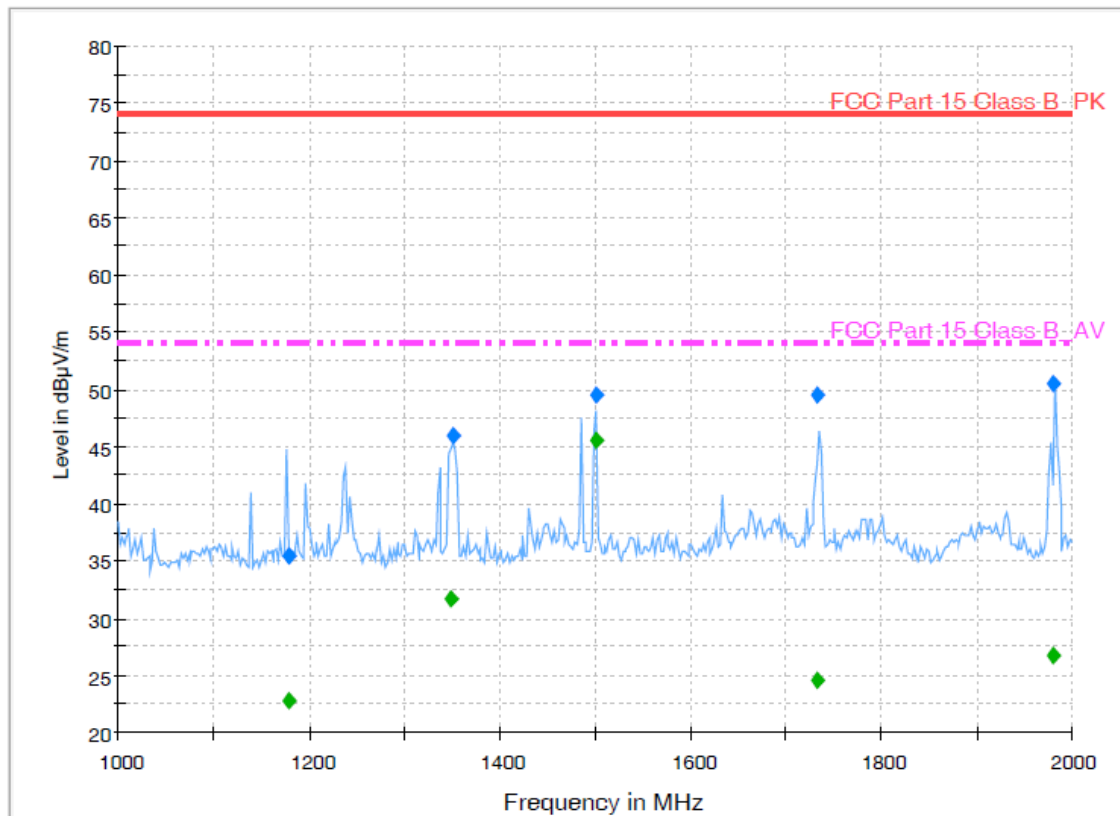
Frequency (MHz)	CAverage (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1312.825251	26.5	1000.0	1000.000	200.0	V	15.0	-13.4	27.5	54.0
1348.901403	30.9	1000.0	1000.000	113.0	V	355.0	-13.3	23.1	54.0
1500.402004	45.1	1000.0	1000.000	138.0	V	2.0	-13.0	8.9	54.0
1687.574750	26.3	1000.0	1000.000	150.0	V	346.0	-12.6	27.7	54.0

< Fig 18. Radiated emission result (1 000 MHz ~ 2 000 MHz) >



- ◆ Operating Condition: 1 920 × 1 080 / 60 Hz (HDMI: Digital)
Green marker: Average detector, Blue marker: Peak detector

Radiated Emission_above 1 GHz



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)
1179.752705	35.5	1000.0	1000.000	100.0	H	278.0	-13.8	38.5	74.0
1350.501403	46.0	1000.0	1000.000	100.0	V	341.0	-13.3	28.0	74.0
1500.002004	49.6	1000.0	1000.000	129.0	V	3.0	-13.0	24.4	74.0
1732.870942	49.5	1000.0	1000.000	100.0	V	333.0	-12.4	24.5	74.0
1980.963928	50.5	1000.0	1000.000	100.0	H	310.0	-11.7	23.5	74.0

Final Result 2

Frequency (MHz)	CAverage (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1178.552705	22.7	1000.0	1000.000	121.0	H	288.0	-13.8	31.3	54.0
1348.901403	31.6	1000.0	1000.000	100.0	V	341.0	-13.3	22.4	54.0
1500.402004	45.6	1000.0	1000.000	137.0	V	7.0	-13.0	8.4	54.0
1733.670942	24.6	1000.0	1000.000	113.0	V	333.0	-12.4	29.4	54.0
1980.963928	26.8	1000.0	1000.000	100.0	H	313.0	-11.7	27.2	54.0

< Fig 19. 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. LED LCD Monitor (Model Name: D237IPS)** was complies with §15.107 and 15.109 of the FCC Rules.