

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: October 6, 2011****Order Number: GETEC-C1-11-227****Test Report Number: GETEC-E3-11-116****Test Site: Gumi College EMC Center****FCC Registration Number: (100749, 443957)****FCC ID. : BEJ47WS10****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	: 47WS10
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

Tel Number: +82-31-610-9623

- **FCC ID.** BEJ47WS10
- **EUT Type** LED LCD Monitor
- **Model Name** 47WS10
- **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** September 27 ~ 29, 2011
- **Place of Test** **Gumi College EMC Center** (FCC Registration Number: 100749, 443957)
407, Bugok-dong, Gumi-si, Gyeongbuk, Korea.
- **Test Report Number** GETEC-E3-11-116
- **Dates of Issue** October 6, 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: 47WS10)**

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: 47WS10) FCC ID.: BEJ47WS10**

LCD Panel	Screen Type	1192.78 mm Wide (47 inch) TFT (Thin Film Transistor) LCD (Liquid Crystal Display) Panel. Visible diagonal size : 1192.78 mm
	Pixel Pitch	0.5414 mm (H) x 0.5414 mm (V)
Video Signal	Max. Resolution	RGB : 1920 X 1080 @60 Hz HDMI,DVI-D, Display Port : 1920 X 1080 @60 Hz - It may not be supported depending on the OS or video card type.
	Recommended Resolution	RGB : 1920 X 1080 @60 Hz HDMI,DVI-D, Display Port : 1920 X 1080 @60 Hz - It may not be supported depending on the OS or video card type.
	Horizontal Frequency	RGB : 30 kHz to 83 kHz HDMI,DVI-D, Display Port : 30 kHz to 83 kHz
	Vertical Frequency	RGB : 56 Hz to 75 Hz HDMI,DVI-D, Display Port : 56 Hz to 60 Hz
	Synchronization Type	Separate Sync, Composite Sync, Digital
Input Connector		15-pin D-Sub, HDMI, DVI-D, Display Port, RS-232C, LAN, USB, Audio
Power	Rated Voltage	100-240 V~ 50/60 Hz 1.8 A
	Power Consumption	On Mode : 120 W Typ. Sleep Mode (RGB) : ≤ 1 W Sleep Mode (HDMI, DVI-D, Display Port) : ≤ 1 W (Set Only) / ≤ 2 W (With External Device) Off Mode : ≤ 0.5 W
Dimensions (Width x Height x Depth) / Weight		
	1102.0 mm x 720.9 mm x 298.3 mm / 19.7 kg	

-. Maximum Frequency Range : 667 MHz



3.2 Support Equipment / Cables used

3.2.1 Used Support Equipment

Description	Manufacturer	Model Name	S/N & FCC ID.
PC (Main board)	ASLOCK	770iCafe	S/N: 0AM0X3097310 FCC ID.: DoC
Video card	Absolute Korea Co., LTD.	HIS6770	S/N: H110838565 FCC ID.: DoC
PS2 keyboard	COMPAQ	166516-AD6	S/N: B13BBOR391006D FCC ID.: AQ6-23K15
USB mouse	Great Pleasure Electronics Co., Ltd.	GP-M3100UE	S/N: 14036766 FCC ID: DoC
LCD TV	LG Electronics Inc.	22LE5300-ZA	S/N: None. FCC ID.: DoC
USB memory stick	SAMSUNG	SUM-PSB4	S/N: TBBB202478F 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.
IR remote controller	HANSUNG ELECTRONICS	AKB72915219	S/N: None. FCC ID.: N/A



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	1.50 m shielded
RGB (Analog) out cable	Connected to the EUT and LCD TV	1.80 m shielded
DVI (Digital) in cable	Connected to the EUT and PC	1.50 m shielded
HDMI/DVI (Digital) out cable	Connected to the EUT and LCD TV	2.00 m shielded
HDMI (Digital) cable	Connected to the EUT and PC	1.80 m shielded
DP (Digital) in cable	Connected to the EUT and PC	2.00 m shielded
RS-232C cable	Connected to the EUT(RS-232C in) and EUT(RS-232C out)	1.80 m shielded
Audio in cable	Connected to the EUT and PC	1.50 m shielded
Speaker (Left) cable	Connected to the EUT and PC	1.50 m shielded
Speaker (Right) cable	Connected to the EUT and PC	1.50 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, DVI: Digital, HDMI: Digital, DP: Digital)

Conducted emission: 1 920 × 1 080 / 60 Hz (RGB: Analog, DVI: Digital, HDMI: Digital, DP: 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
- . Settings and control the display via the Network from a PC
- . USB memory stick was connected to the USB port



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

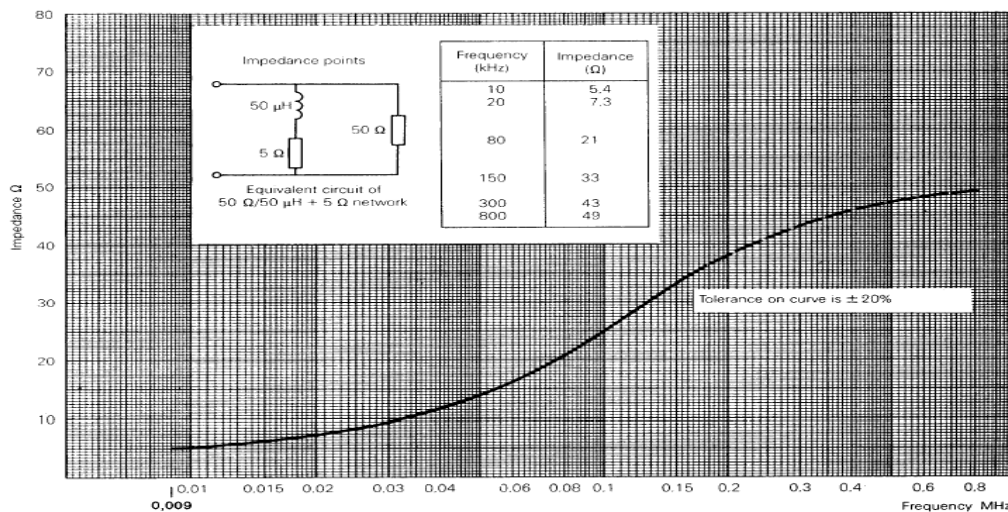


Fig 2. Impedance of LISN



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 : 21.0 °C
Relative Humidity : 45.0 % 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

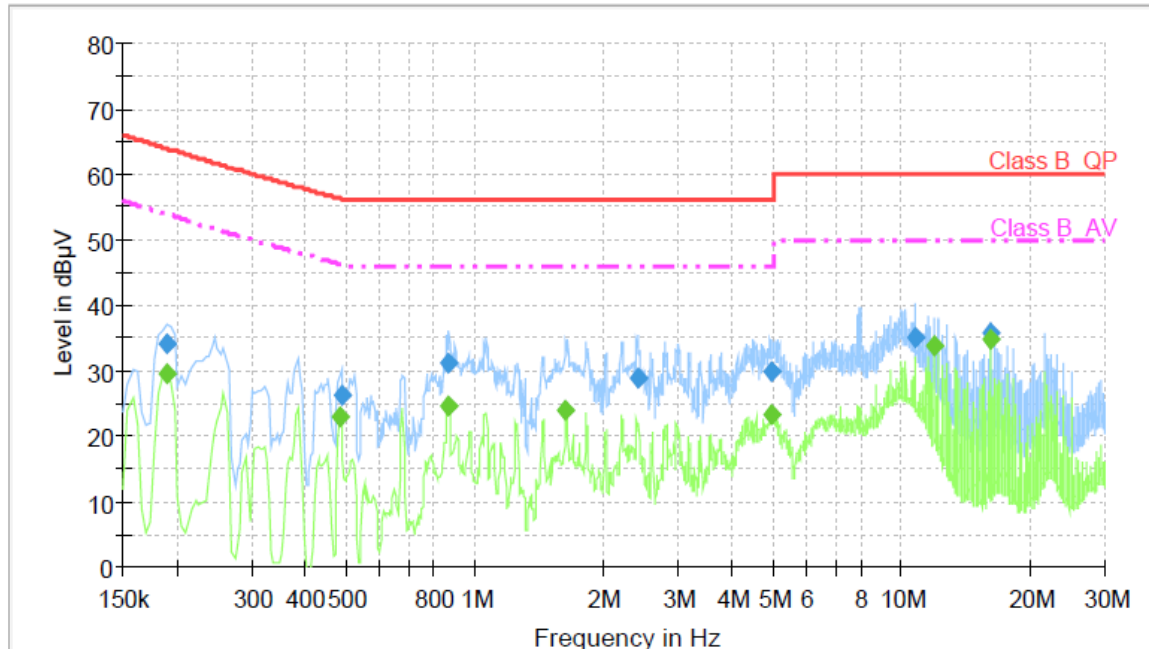
5.6 Test data for Conducted Emission

- . Test Date : September 27, 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	34.1	1000.000	9.000	GND	L1	10.1	29.8	63.9	
0.488000	26.3	1000.000	9.000	GND	L1	10.1	29.9	56.2	
0.864000	31.0	1000.000	9.000	GND	L1	10.1	25.0	56.0	
2.408000	28.8	1000.000	9.000	GND	L1	10.2	27.2	56.0	
4.952000	29.7	1000.000	9.000	GND	L1	10.3	26.3	56.0	
10.792000	35.1	1000.000	9.000	GND	L1	10.6	24.9	60.0	
16.228000	35.8	1000.000	9.000	GND	L1	10.9	24.2	60.0	

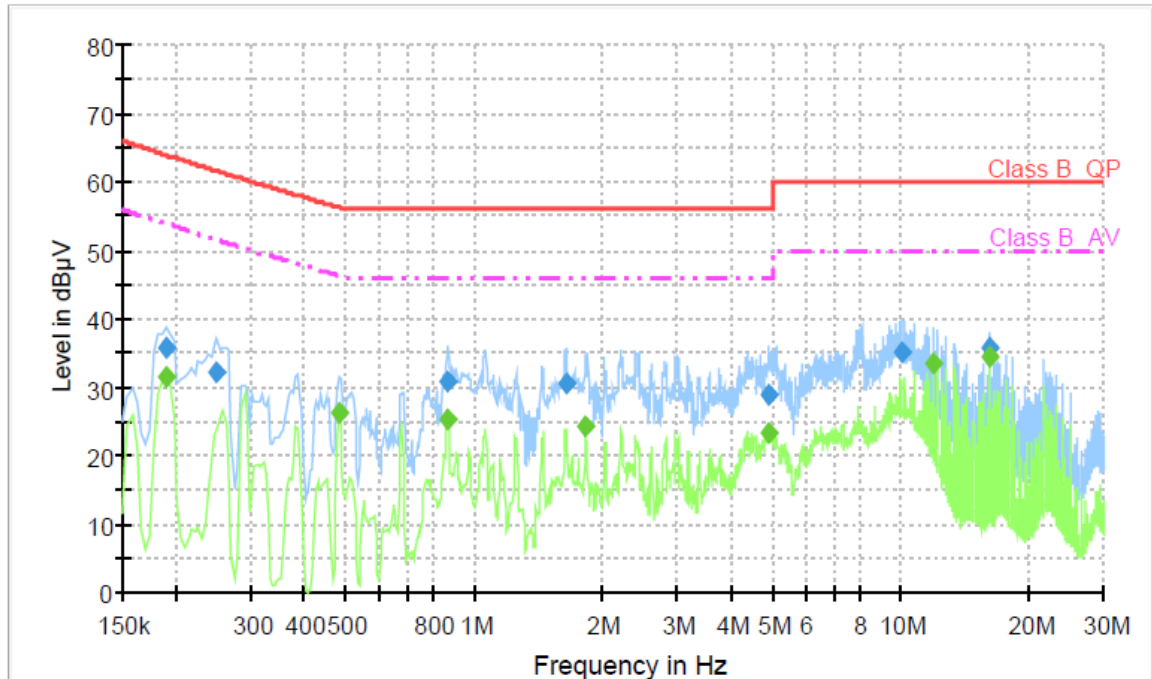
Final Measurement Detector 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.190000	29.5	1000.000	9.000	GND	L1	10.1	24.4	53.9	
0.484000	22.9	1000.000	9.000	GND	L1	10.1	23.3	46.2	
0.872000	24.5	1000.000	9.000	GND	L1	10.1	21.5	46.0	
1.632000	24.0	1000.000	9.000	GND	L1	10.1	22.0	46.0	
4.952000	23.4	1000.000	9.000	GND	L1	10.3	22.6	46.0	
11.892000	33.7	1000.000	9.000	GND	L1	10.6	16.3	50.0	
16.228000	34.7	1000.000	9.000	GND	L1	10.9	15.3	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
0.190000	35.7	1000.000	9.000	GND	N	10.1	28.2	63.9	
0.250000	32.2	1000.000	9.000	GND	N	10.1	29.4	61.6	
0.870000	30.8	1000.000	9.000	GND	N	10.1	25.2	56.0	
1.646000	30.4	1000.000	9.000	GND	N	10.1	25.6	56.0	
4.926000	28.9	1000.000	9.000	GND	N	10.3	27.1	56.0	
10.058000	35.2	1000.000	9.000	GND	N	10.5	24.8	60.0	
16.226000	35.7	1000.000	9.000	GND	N	10.8	24.3	60.0	

Final Measurement Detector 2

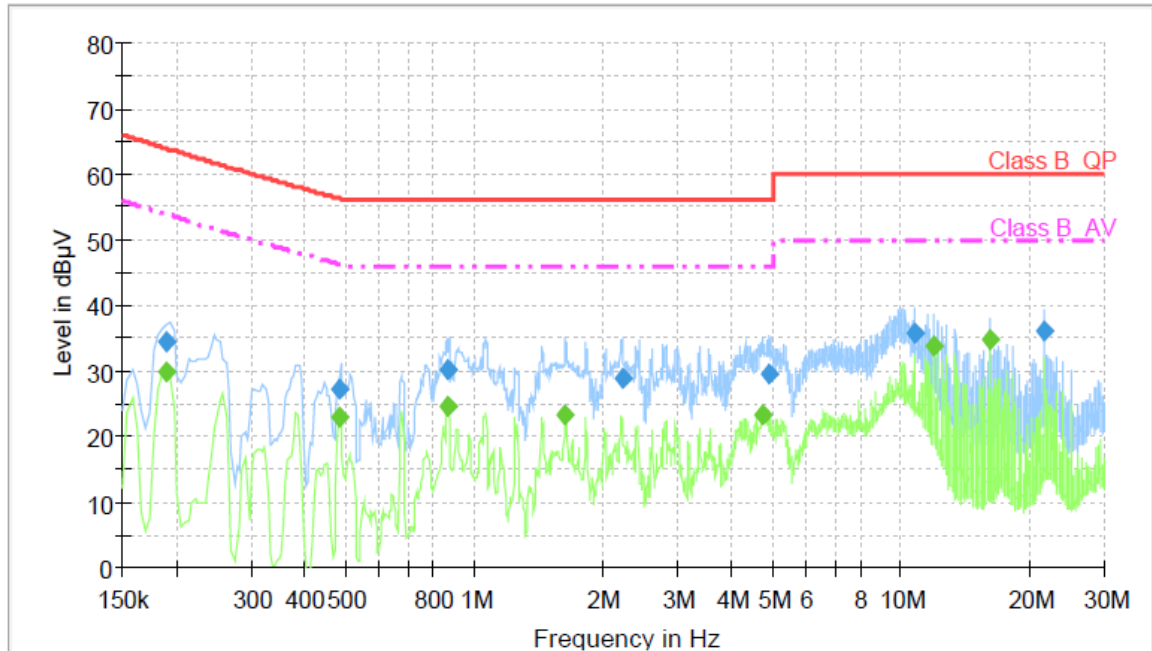
Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.190000	31.5	1000.000	9.000	GND	N	10.1	22.4	53.9	
0.482000	26.3	1000.000	9.000	GND	N	10.1	20.0	46.3	
0.870000	25.3	1000.000	9.000	GND	N	10.1	20.7	46.0	
1.822000	24.2	1000.000	9.000	GND	N	10.1	21.8	46.0	
4.906000	23.3	1000.000	9.000	GND	N	10.3	22.7	46.0	
11.894000	33.6	1000.000	9.000	GND	N	10.6	16.4	50.0	
16.226000	34.3	1000.000	9.000	GND	N	10.8	15.7	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	34.5	1000.000	9.000	GND	L1	10.1	29.4	63.9	
0.484000	27.2	1000.000	9.000	GND	L1	10.1	29.0	56.2	
0.872000	30.3	1000.000	9.000	GND	L1	10.1	25.7	56.0	
2.236000	28.7	1000.000	9.000	GND	L1	10.2	27.3	56.0	
4.888000	29.4	1000.000	9.000	GND	L1	10.3	26.6	56.0	
10.792000	35.6	1000.000	9.000	GND	L1	10.6	24.4	60.0	
21.664000	36.2	1000.000	9.000	GND	L1	11.1	23.8	60.0	

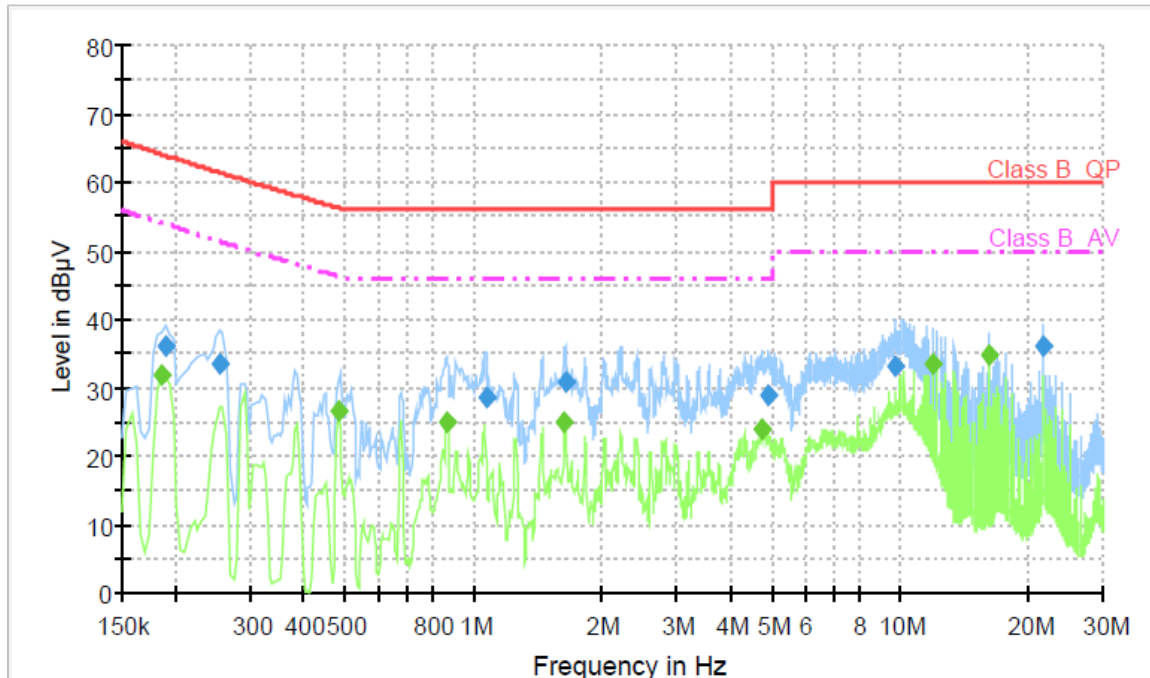
Final Measurement Detector 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.190000	29.9	1000.000	9.000	GND	L1	10.1	24.0	53.9	
0.484000	23.0	1000.000	9.000	GND	L1	10.1	23.2	46.2	
0.868000	24.7	1000.000	9.000	GND	L1	10.1	21.3	46.0	
1.636000	23.3	1000.000	9.000	GND	L1	10.1	22.7	46.0	
4.748000	23.4	1000.000	9.000	GND	L1	10.3	22.6	46.0	
11.892000	33.7	1000.000	9.000	GND	L1	10.6	16.3	50.0	
16.228000	34.7	1000.000	9.000	GND	L1	10.9	15.3	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
0.190000	35.9	1000.000	9.000	GND	N	10.1	28.0	63.9	
0.254000	33.6	1000.000	9.000	GND	N	10.1	27.8	61.4	
1.070000	28.6	1000.000	9.000	GND	N	10.1	27.4	56.0	
1.650000	30.7	1000.000	9.000	GND	N	10.1	25.3	56.0	
4.914000	28.8	1000.000	9.000	GND	N	10.3	27.2	56.0	
9.690000	33.3	1000.000	9.000	GND	N	10.5	26.7	60.0	
21.666000	36.1	1000.000	9.000	GND	N	10.8	23.9	60.0	

Final Measurement Detector 2

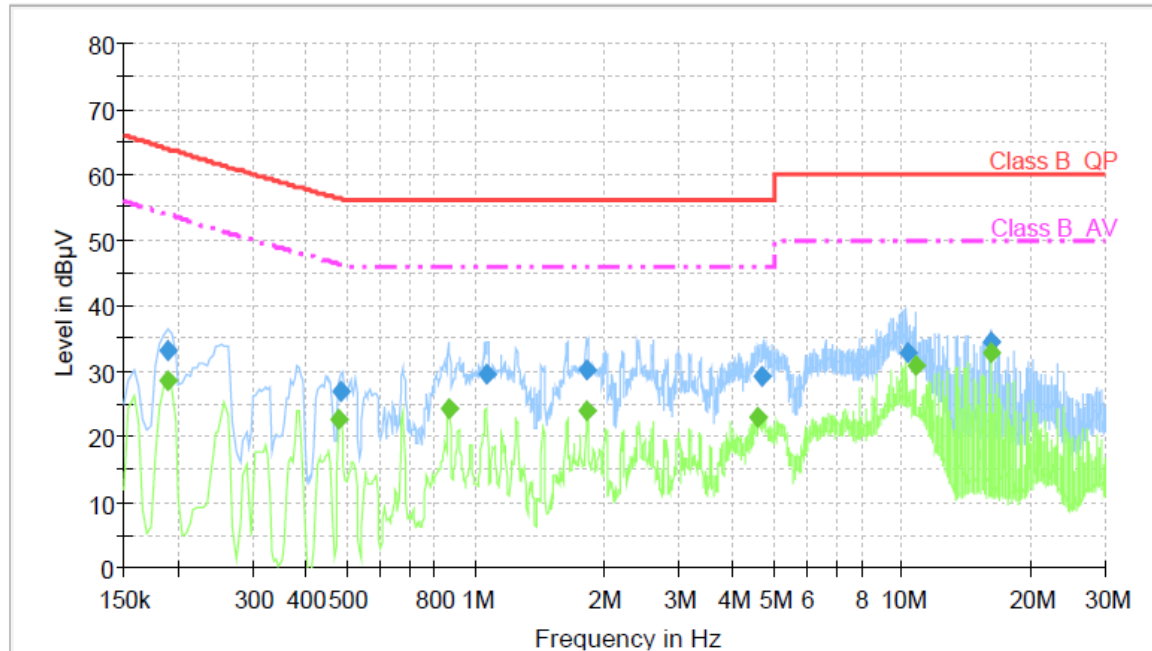
Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.186000	31.8	1000.000	9.000	GND	N	10.1	22.3	54.1	
0.482000	26.4	1000.000	9.000	GND	N	10.1	19.9	46.3	
0.870000	24.9	1000.000	9.000	GND	N	10.1	21.1	46.0	
1.630000	25.0	1000.000	9.000	GND	N	10.1	21.0	46.0	
4.758000	23.8	1000.000	9.000	GND	N	10.3	22.2	46.0	
11.894000	33.6	1000.000	9.000	GND	N	10.6	16.4	50.0	
16.226000	34.6	1000.000	9.000	GND	N	10.8	15.4	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
0.190000	33.1	1000.000	9.000	GND	L1	10.1	30.8	63.9	
0.484000	26.8	1000.000	9.000	GND	L1	10.1	29.4	56.2	
1.060000	29.5	1000.000	9.000	GND	L1	10.1	26.5	56.0	
1.824000	30.2	1000.000	9.000	GND	L1	10.1	25.8	56.0	
4.700000	29.2	1000.000	9.000	GND	L1	10.3	26.8	56.0	
10.248000	32.6	1000.000	9.000	GND	L1	10.5	27.4	60.0	
16.228000	34.4	1000.000	9.000	GND	L1	10.9	25.6	60.0	

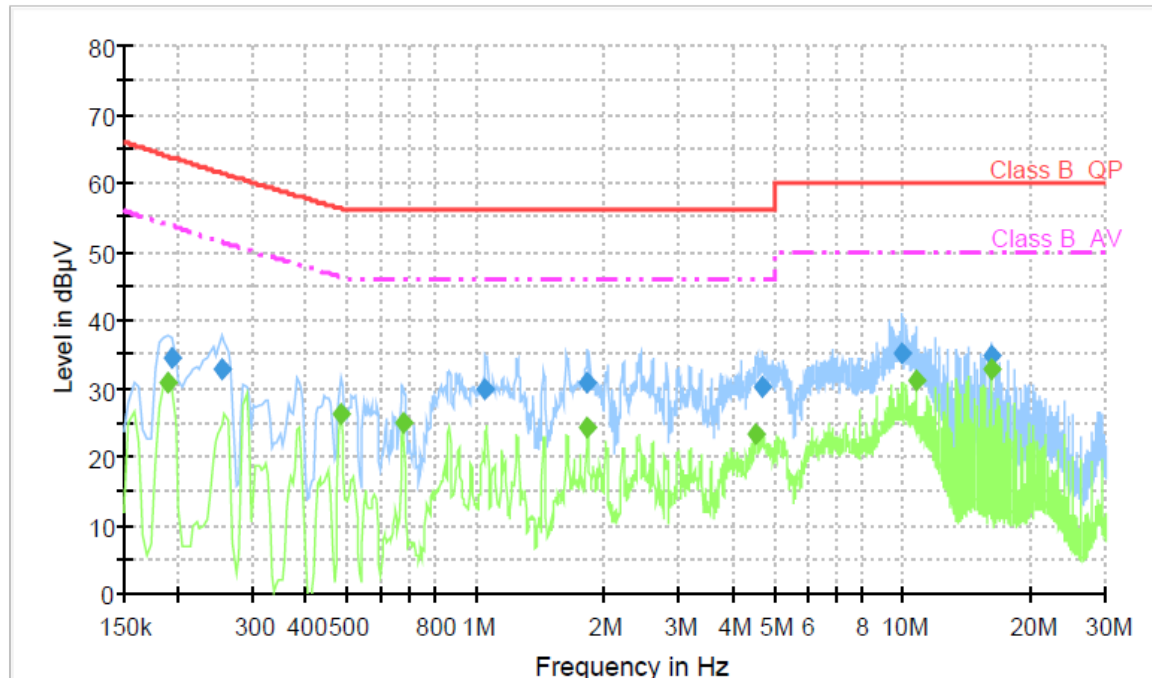
Final Measurement Detector 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.190000	28.6	1000.000	9.000	GND	L1	10.1	25.3	53.9	
0.480000	22.5	1000.000	9.000	GND	L1	10.1	23.8	46.3	
0.864000	24.2	1000.000	9.000	GND	L1	10.1	21.8	46.0	
1.820000	23.8	1000.000	9.000	GND	L1	10.1	22.2	46.0	
4.608000	22.8	1000.000	9.000	GND	L1	10.3	23.2	46.0	
10.792000	30.8	1000.000	9.000	GND	L1	10.6	19.2	50.0	
16.228000	32.7	1000.000	9.000	GND	L1	10.9	17.3	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	34.4	1000.000	9.000	GND	N	10.1	29.3	63.7	
0.254000	32.6	1000.000	9.000	GND	N	10.1	28.8	61.4	
1.054000	29.9	1000.000	9.000	GND	N	10.1	26.1	56.0	
1.826000	30.7	1000.000	9.000	GND	N	10.1	25.3	56.0	
4.702000	30.3	1000.000	9.000	GND	N	10.3	25.7	56.0	
9.938000	35.0	1000.000	9.000	GND	N	10.5	25.0	60.0	
16.230000	34.6	1000.000	9.000	GND	N	10.8	25.4	60.0	

Final Measurement Detector 2

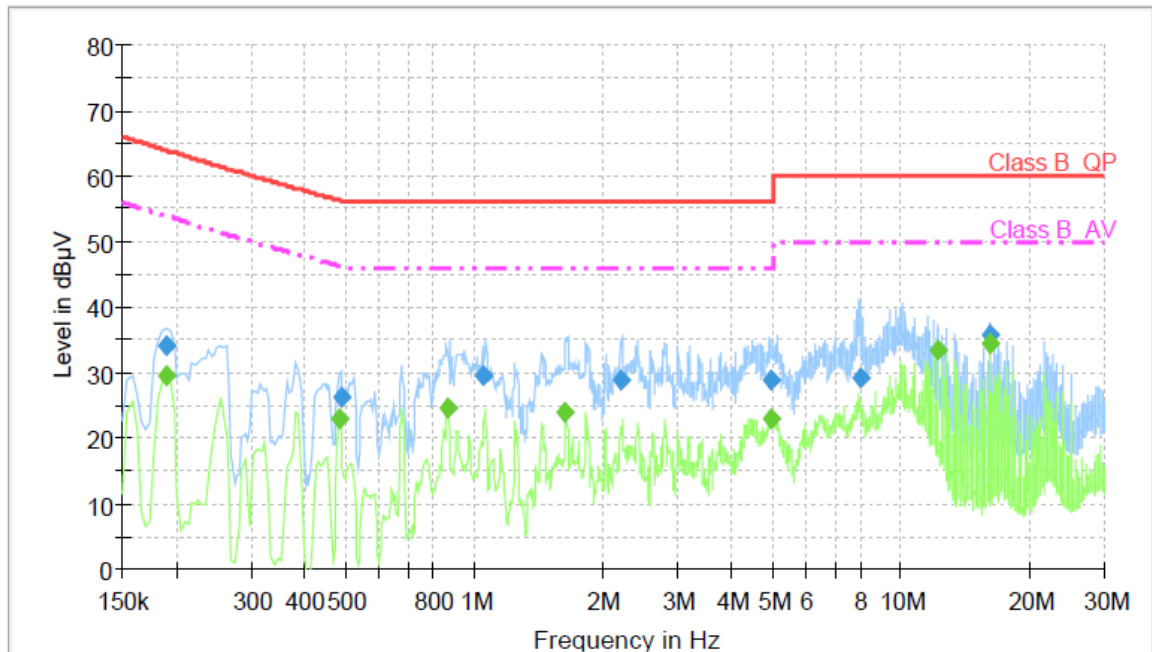
Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.190000	30.7	1000.000	9.000	GND	N	10.1	23.2	53.9	
0.482000	26.2	1000.000	9.000	GND	N	10.1	20.1	46.3	
0.674000	24.9	1000.000	9.000	GND	N	10.1	21.1	46.0	
1.822000	24.4	1000.000	9.000	GND	N	10.1	21.6	46.0	
4.558000	23.2	1000.000	9.000	GND	N	10.3	22.8	46.0	
10.794000	31.2	1000.000	9.000	GND	N	10.5	18.8	50.0	
16.226000	32.9	1000.000	9.000	GND	N	10.8	17.1	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
0.190000	34.1	1000.000	9.000	GND	L1	10.1	29.8	63.9	
0.488000	26.1	1000.000	9.000	GND	L1	10.1	30.1	56.2	
1.056000	29.5	1000.000	9.000	GND	L1	10.1	26.5	56.0	
2.200000	29.0	1000.000	9.000	GND	L1	10.2	27.0	56.0	
4.940000	28.7	1000.000	9.000	GND	L1	10.3	27.3	56.0	
8.028000	29.2	1000.000	9.000	GND	L1	10.5	30.8	60.0	
16.228000	35.8	1000.000	9.000	GND	L1	10.9	24.2	60.0	

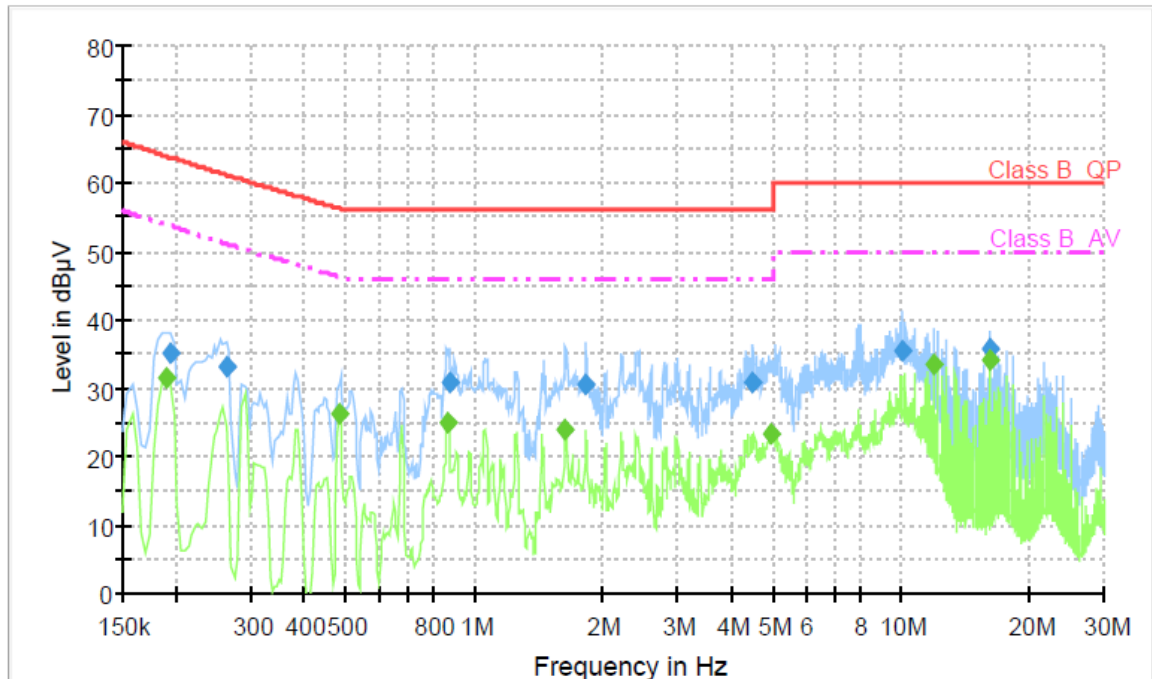
Final Measurement Detector 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.190000	29.6	1000.000	9.000	GND	L1	10.1	24.3	53.9	
0.484000	22.9	1000.000	9.000	GND	L1	10.1	23.3	46.2	
0.872000	24.5	1000.000	9.000	GND	L1	10.1	21.5	46.0	
1.632000	23.9	1000.000	9.000	GND	L1	10.1	22.1	46.0	
4.952000	23.1	1000.000	9.000	GND	L1	10.3	22.9	46.0	
12.196000	33.3	1000.000	9.000	GND	L1	10.7	16.7	50.0	
16.228000	34.6	1000.000	9.000	GND	L1	10.9	15.4	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
0.194000	35.2	1000.000	9.000	GND	N	10.1	28.5	63.7	
0.262000	33.0	1000.000	9.000	GND	N	10.1	28.2	61.2	
0.874000	30.8	1000.000	9.000	GND	N	10.1	25.2	56.0	
1.818000	30.6	1000.000	9.000	GND	N	10.1	25.4	56.0	
4.506000	30.9	1000.000	9.000	GND	N	10.3	25.1	56.0	
10.058000	35.5	1000.000	9.000	GND	N	10.5	24.5	60.0	
16.230000	35.6	1000.000	9.000	GND	N	10.8	24.4	60.0	

Final Measurement Detector 2

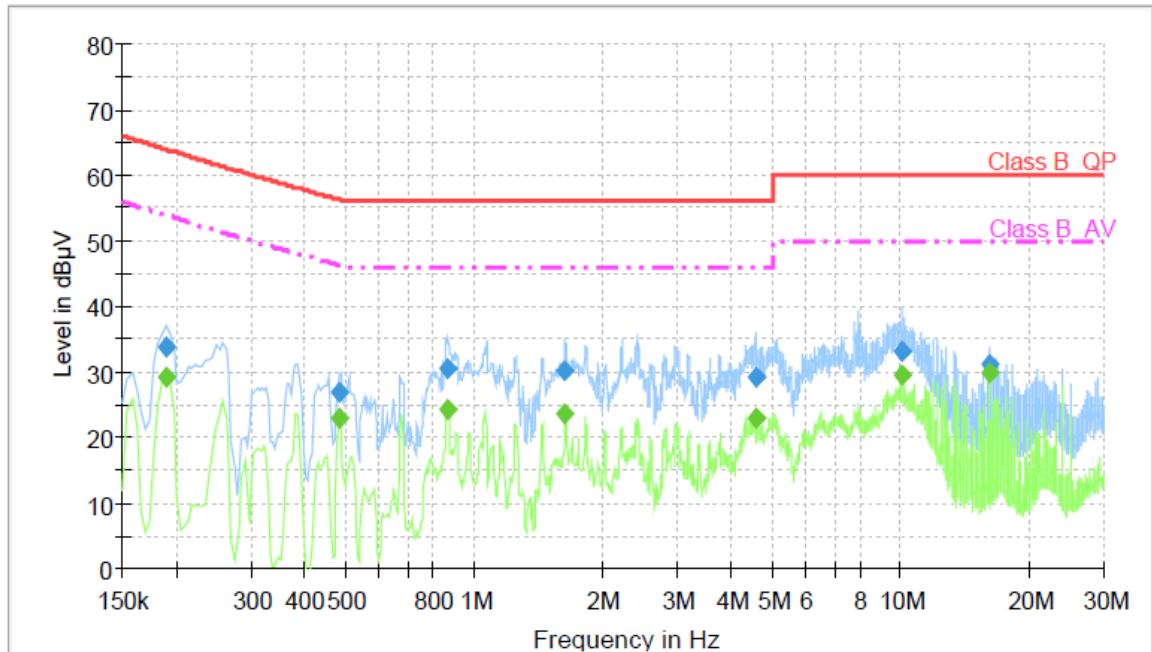
Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.190000	31.5	1000.000	9.000	GND	N	10.1	22.4	53.9	
0.482000	26.3	1000.000	9.000	GND	N	10.1	20.0	46.3	
0.866000	25.0	1000.000	9.000	GND	N	10.1	21.0	46.0	
1.634000	23.9	1000.000	9.000	GND	N	10.1	22.1	46.0	
4.946000	23.3	1000.000	9.000	GND	N	10.3	22.7	46.0	
11.894000	33.4	1000.000	9.000	GND	N	10.6	16.6	50.0	
16.230000	34.2	1000.000	9.000	GND	N	10.8	15.8	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	33.8	1000.000	9.000	GND	L1	10.1	30.1	63.9	
0.484000	27.0	1000.000	9.000	GND	L1	10.1	29.2	56.2	
0.864000	30.5	1000.000	9.000	GND	L1	10.1	25.5	56.0	
1.628000	30.2	1000.000	9.000	GND	L1	10.1	25.8	56.0	
4.576000	29.2	1000.000	9.000	GND	L1	10.3	26.8	56.0	
10.064000	33.2	1000.000	9.000	GND	L1	10.5	26.8	60.0	
16.228000	31.3	1000.000	9.000	GND	L1	10.9	28.7	60.0	

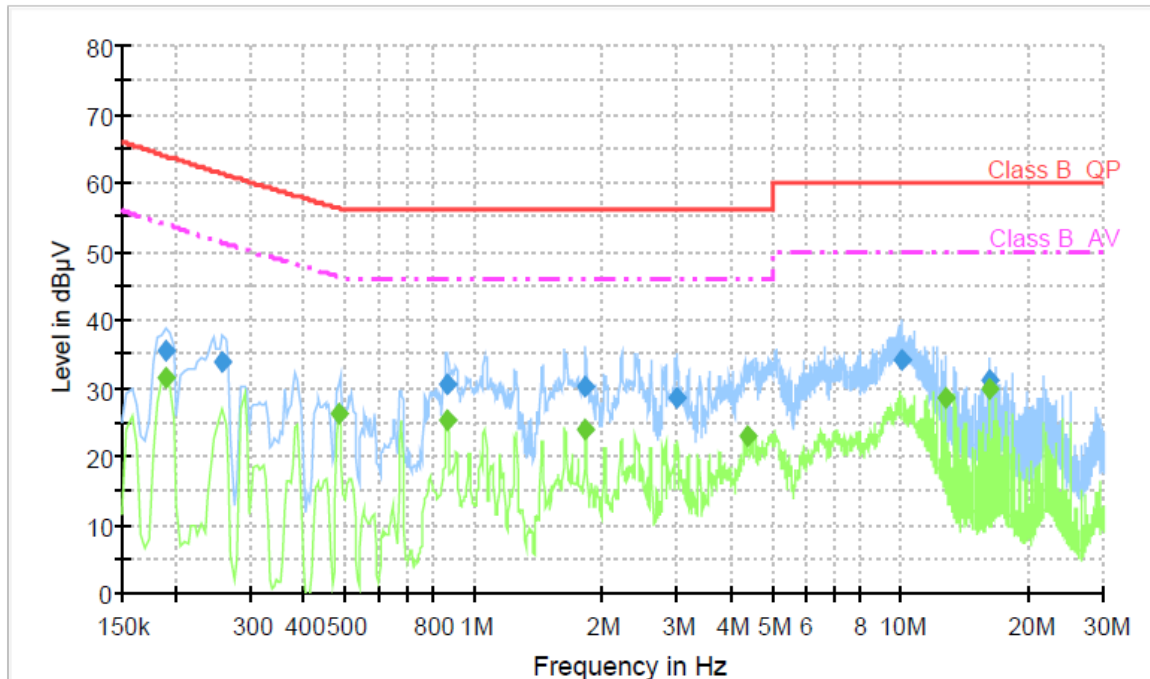
Final Measurement Detector 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.190000	29.3	1000.000	9.000	GND	L1	10.1	24.6	53.9	
0.484000	22.9	1000.000	9.000	GND	L1	10.1	23.3	46.2	
0.864000	24.4	1000.000	9.000	GND	L1	10.1	21.6	46.0	
1.632000	23.7	1000.000	9.000	GND	L1	10.1	22.3	46.0	
4.564000	22.8	1000.000	9.000	GND	L1	10.3	23.2	46.0	
10.060000	29.4	1000.000	9.000	GND	L1	10.5	20.6	50.0	
16.228000	29.9	1000.000	9.000	GND	L1	10.9	20.1	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
0.190000	35.6	1000.000	9.000	GND	N	10.1	28.3	63.9	
0.258000	33.7	1000.000	9.000	GND	N	10.1	27.6	61.3	
0.866000	30.7	1000.000	9.000	GND	N	10.1	25.3	56.0	
1.818000	30.2	1000.000	9.000	GND	N	10.1	25.8	56.0	
2.990000	28.4	1000.000	9.000	GND	N	10.2	27.6	56.0	
10.062000	34.2	1000.000	9.000	GND	N	10.5	25.8	60.0	
16.226000	31.0	1000.000	9.000	GND	N	10.8	29.0	60.0	

Final Measurement Detector 2

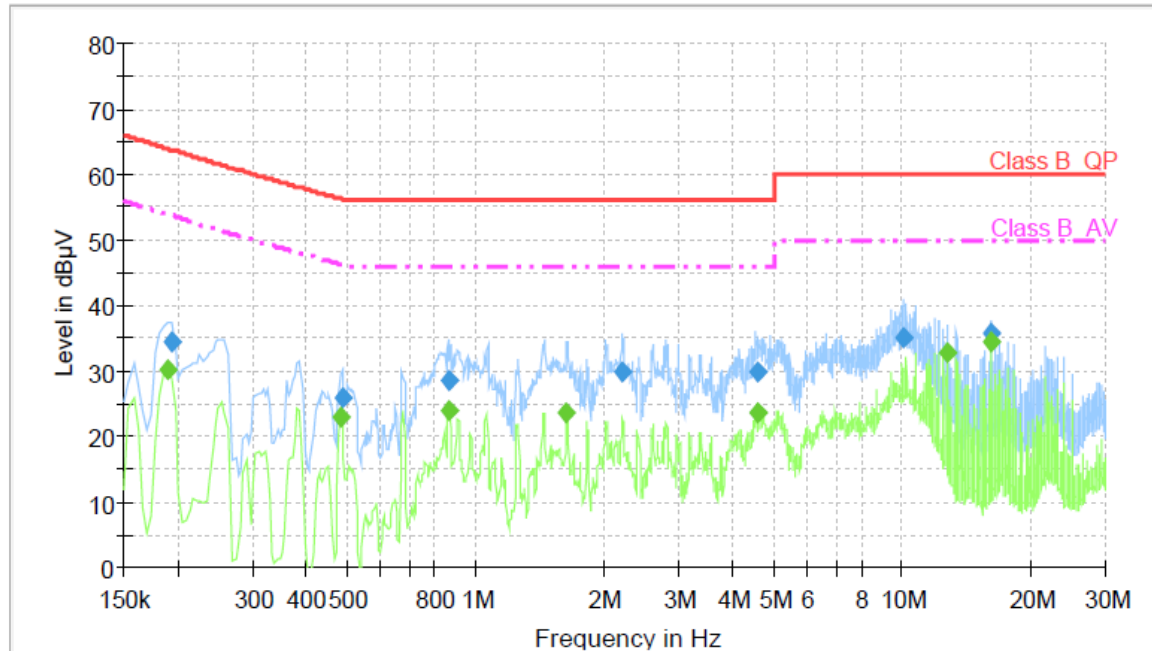
Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.190000	31.4	1000.000	9.000	GND	N	10.1	22.5	53.9	
0.482000	26.2	1000.000	9.000	GND	N	10.1	20.1	46.3	
0.866000	25.2	1000.000	9.000	GND	N	10.1	20.8	46.0	
1.822000	24.1	1000.000	9.000	GND	N	10.1	21.9	46.0	
4.370000	23.1	1000.000	9.000	GND	N	10.3	22.9	46.0	
12.746000	28.5	1000.000	9.000	GND	N	10.6	21.5	50.0	
16.226000	30.0	1000.000	9.000	GND	N	10.8	20.0	50.0	

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



◆ Operating condition: 1 920 × 1 080 / 60 Hz (DP: 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
0.194000	34.3	1000.000	9.000	GND	L1	10.1	29.4	63.7	
0.488000	25.7	1000.000	9.000	GND	L1	10.1	30.5	56.2	
0.868000	28.5	1000.000	9.000	GND	L1	10.1	27.5	56.0	
2.216000	29.8	1000.000	9.000	GND	L1	10.2	26.2	56.0	
4.564000	29.9	1000.000	9.000	GND	L1	10.3	26.1	56.0	
10.060000	35.2	1000.000	9.000	GND	L1	10.5	24.8	60.0	
16.228000	35.9	1000.000	9.000	GND	L1	10.9	24.1	60.0	

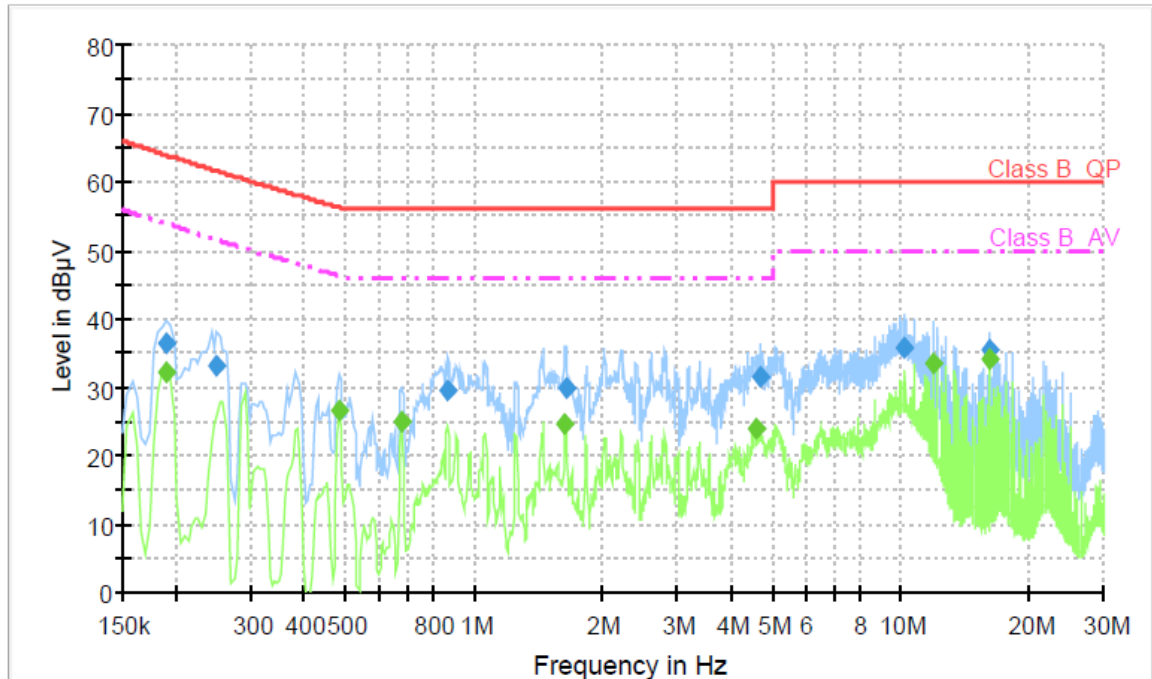
Final Measurement Detector 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.190000	30.1	1000.000	9.000	GND	L1	10.1	23.8	53.9	
0.484000	22.9	1000.000	9.000	GND	L1	10.1	23.3	46.2	
0.864000	24.0	1000.000	9.000	GND	L1	10.1	22.0	46.0	
1.632000	23.7	1000.000	9.000	GND	L1	10.1	22.3	46.0	
4.564000	23.7	1000.000	9.000	GND	L1	10.3	22.3	46.0	
12.748000	32.6	1000.000	9.000	GND	L1	10.7	17.4	50.0	
16.228000	34.5	1000.000	9.000	GND	L1	10.9	15.5	50.0	

< Fig 14. 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
0.190000	36.3	1000.000	9.000	GND	N	10.1	27.6	63.9	
0.250000	33.3	1000.000	9.000	GND	N	10.1	28.3	61.6	
0.870000	29.5	1000.000	9.000	GND	N	10.1	26.5	56.0	
1.642000	30.0	1000.000	9.000	GND	N	10.1	26.0	56.0	
4.702000	31.5	1000.000	9.000	GND	N	10.3	24.5	56.0	
10.242000	35.8	1000.000	9.000	GND	N	10.5	24.2	60.0	
16.226000	35.5	1000.000	9.000	GND	N	10.8	24.5	60.0	

Final Measurement Detector 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.190000	32.1	1000.000	9.000	GND	N	10.1	21.8	53.9	
0.482000	26.4	1000.000	9.000	GND	N	10.1	19.9	46.3	
0.674000	24.8	1000.000	9.000	GND	N	10.1	21.2	46.0	
1.630000	24.7	1000.000	9.000	GND	N	10.1	21.3	46.0	
4.562000	23.9	1000.000	9.000	GND	N	10.3	22.1	46.0	
11.894000	33.4	1000.000	9.000	GND	N	10.6	16.6	50.0	
16.226000	34.0	1000.000	9.000	GND	N	10.8	16.0	50.0	

< Fig 15. Conducted emission result (Neutral line) >



6. Radiated Emission

6.1 Operating Environment

Temperature : 24.0 °C
Relative Humidity : 37.0 % 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
■ - 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
■ - ESIB26	Rohde & Schwarz	EMI Test Receiver	830482/010	12. 11. 2011
■ - BBHA9120D	Schwarzbeck	Horn Antenna	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

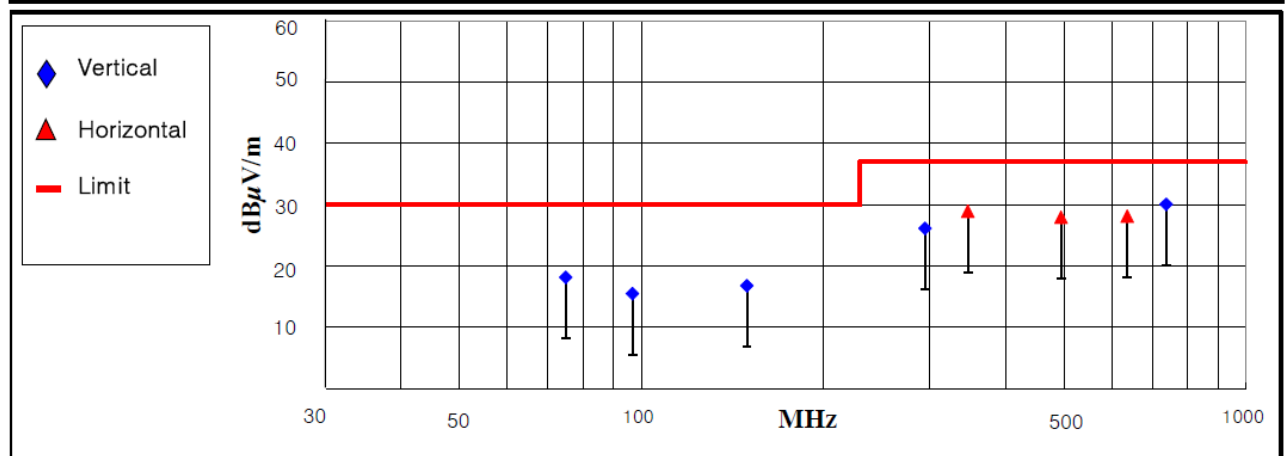


6.6 Test data for Radiated Emission

- Test Date : September 28 ~ 29, 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 ~ 5 GHz (Average detector mode, Peak detector mode)
- Note : The highest frequency of the internal source of the EUT is between 500 MHz and 1 000 MHz (667 MHz). The measurement was made up to 5 000 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 (°)
75.04	7.41	8.57	2.16	18.14	30.00	11.86	V	104	140
96.71	3.79	9.20	2.49	15.48	30.00	14.52	V	104	174
149.54	1.67	11.95	3.16	16.78	30.00	13.22	V	100	38
294.80	4.25	17.22	4.67	26.14	37.00	10.86	V	147	354
346.87	9.37	14.46	5.12	28.95	37.00	8.05	H	100	134
494.82	4.23	17.46	6.27	27.96	37.00	9.04	H	200	240
636.72	1.41	19.45	7.28	28.14	37.00	8.86	H	114	138
738.32	1.48	20.63	7.97	30.08	37.00	6.92	V	103	337

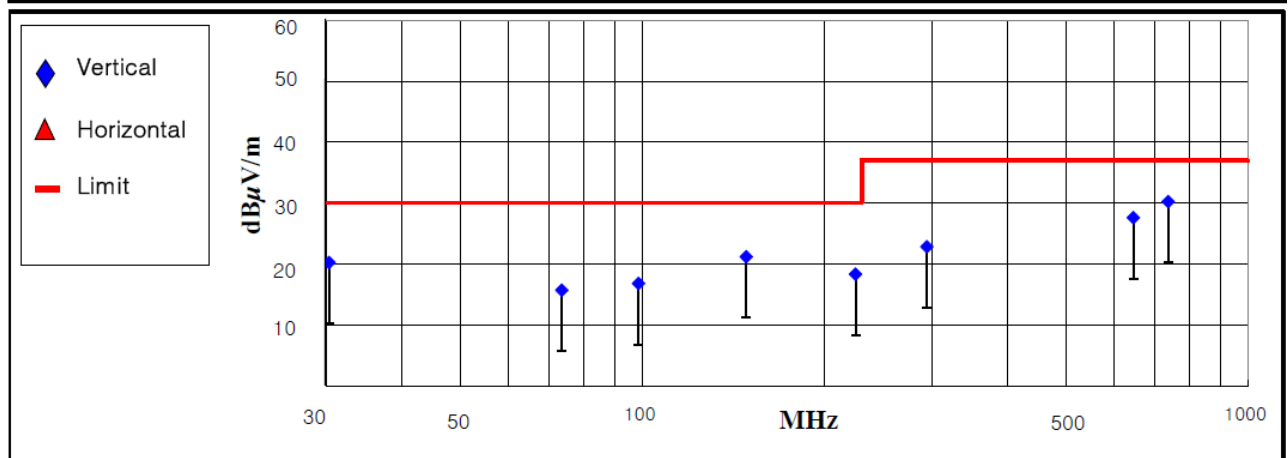


< Fig 16. Radiated emission result (30 MHz ~ 1 000 MHz) >



◆ Operating Condition: 1 920 × 1 080 / 60 Hz (DVI: 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)	(°)
30.34	5.27	13.64	1.33	20.24	30.00	9.76	V	104	175
73.54	4.98	8.61	2.13	15.72	30.00	14.28	V	104	153
98.50	4.95	9.35	2.51	16.81	30.00	13.19	V	132	135
148.36	6.10	11.94	3.15	21.19	30.00	8.81	V	100	351
224.71	0.38	13.93	4.01	18.32	30.00	11.68	V	101	324
294.85	0.93	17.23	4.67	22.83	37.00	14.17	V	154	4
646.51	0.70	19.56	7.35	27.61	37.00	9.39	V	105	138
738.22	1.63	20.63	7.97	30.23	37.00	6.77	V	104	349

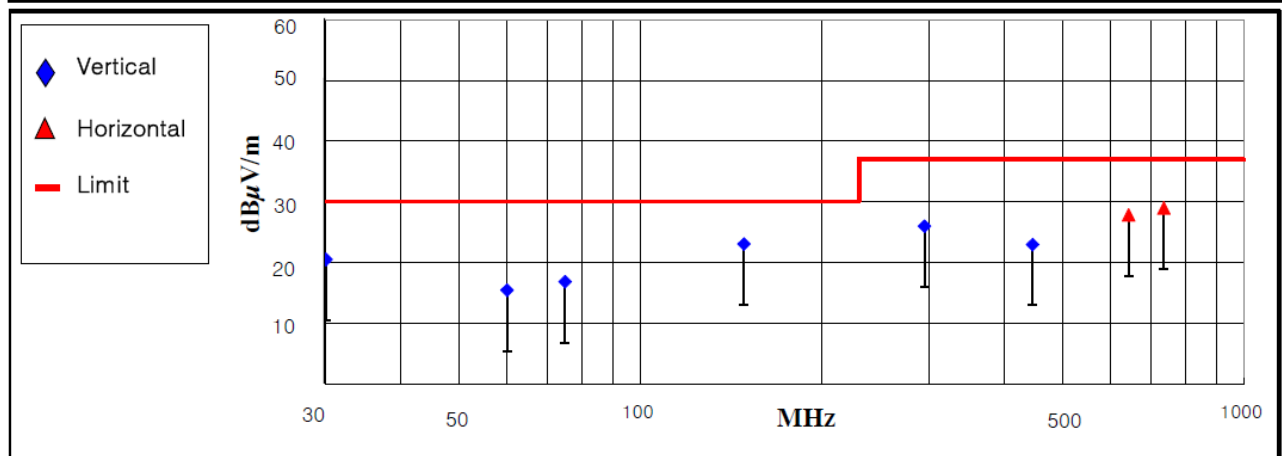


< Fig 17. Radiated emission result (30 MHz ~ 1 000 MHz) >



◆ 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)	(°)
30.11	5.42	13.73	1.32	20.47	30.00	9.53	V	104	115
60.04	5.47	8.04	1.91	15.42	30.00	14.58	V	103	111
74.95	6.08	8.58	2.16	16.82	30.00	13.18	V	103	305
148.31	7.95	11.94	3.15	23.04	30.00	6.96	V	100	355
295.28	4.03	17.27	4.68	25.98	37.00	11.02	V	145	352
446.16	0.21	16.82	5.91	22.94	37.00	14.06	V	100	171
643.76	0.96	19.53	7.33	27.82	37.00	9.18	H	194	156
736.17	0.38	20.61	7.96	28.95	37.00	8.05	H	100	130

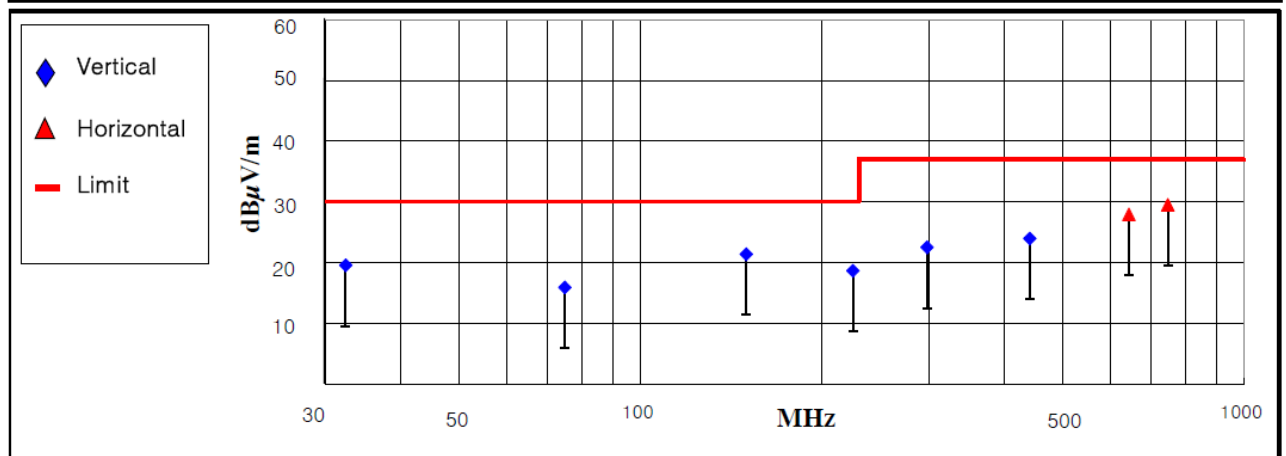


< Fig 18. Radiated emission result (30 MHz ~ 1 000 MHz) >



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

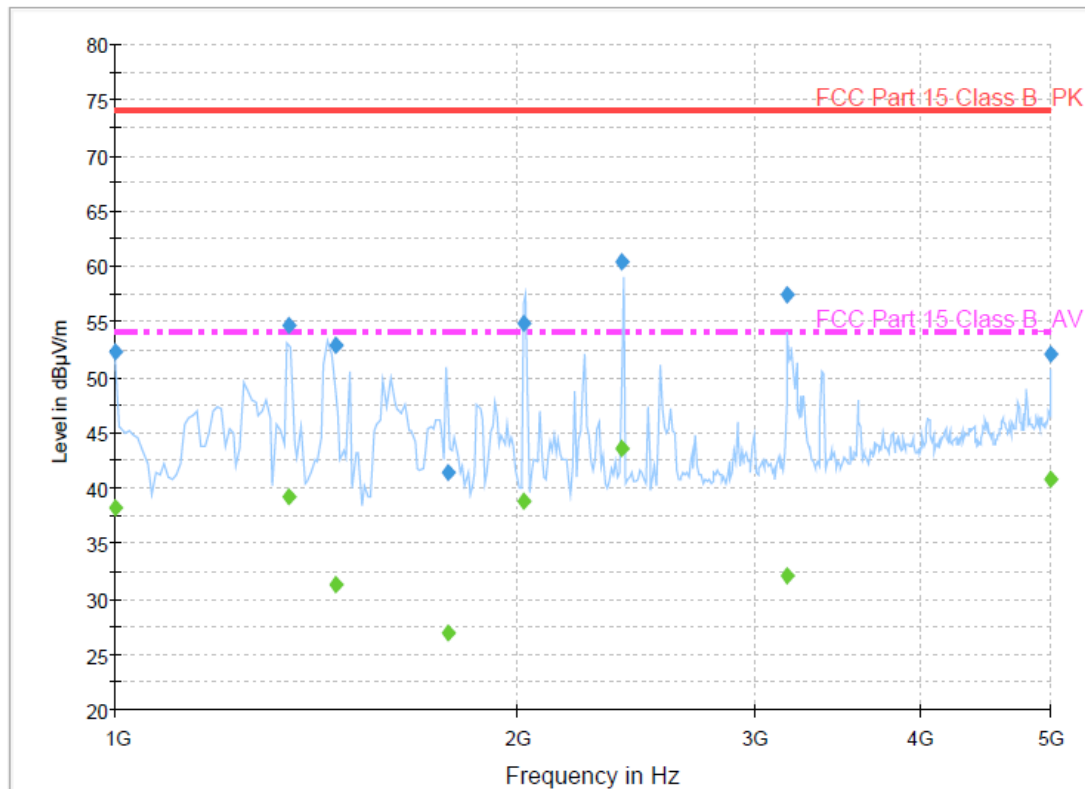
Frequency (MHz)	Measurement Level				Limit (dBμ V/m)	Margin (dB)	Positioning System		
	Reading	Antenna	Cable	Test Result			Pol.	Height	Angle
	Value(dBμ V)	Factor(dB/m)	Loss(dB)	(dBμ V/m)			(H/V)	(cm)	(°)
32.42	5.44	12.75	1.37	19.56	30.00	10.44	V	101	195
74.85	5.18	8.58	2.16	15.92	30.00	14.08	V	102	154
149.62	6.25	11.96	3.17	21.38	30.00	8.62	V	100	11
224.78	0.70	13.93	4.01	18.64	30.00	11.36	V	101	332
298.31	0.28	17.53	4.70	22.51	37.00	14.49	V	152	339
441.58	1.31	16.76	5.87	23.94	37.00	13.06	V	104	168
644.63	1.07	19.54	7.34	27.95	37.00	9.05	H	123	134
747.49	0.78	20.73	8.03	29.54	37.00	7.46	H	185	130



< Fig 19. Radiated emission result (30 MHz ~ 1 000 MHz) >



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



Final Result 1

Frequency (MHz)	MaxPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1000.000000	52.3	1000.0	1000.000	100.0	H	191.0	-14.5	21.7	74.0
1350.089379	54.6	1000.0	1000.000	100.0	V	17.0	-13.4	19.4	74.0
1461.481764	52.9	1000.0	1000.000	100.0	V	18.0	-13.3	21.2	74.0
1772.139078	41.4	1000.0	1000.000	208.0	V	133.0	-12.1	32.6	74.0
2022.652104	54.9	1000.0	1000.000	150.0	V	337.0	-11.4	19.1	74.0
2393.789579	60.3	1000.0	1000.000	100.0	H	150.0	-9.4	13.7	74.0
3182.960721	57.3	1000.0	1000.000	100.0	H	125.0	-6.1	16.7	74.0
4999.800000	52.0	1000.0	1000.000	100.0	H	53.0	-0.8	22.0	74.0

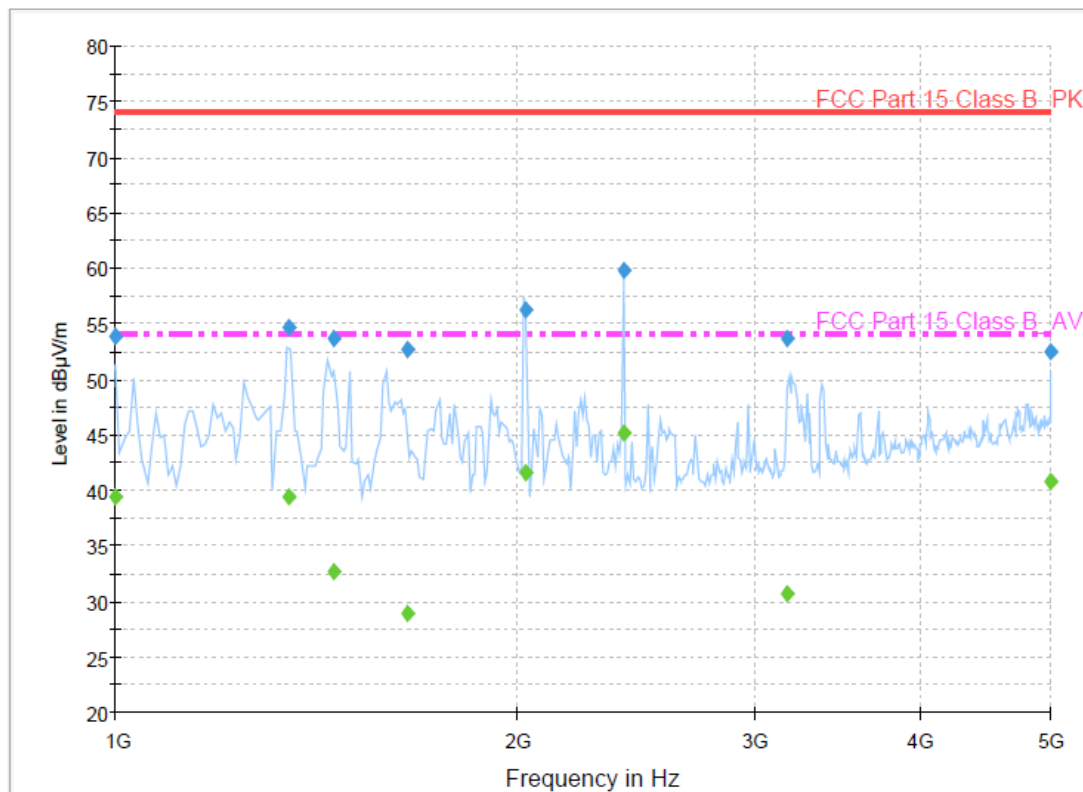
Final Result 2

Frequency (MHz)	CAverage (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1000.000000	38.3	1000.0	1000.000	100.0	H	191.0	-14.5	15.7	54.0
1350.089379	39.3	1000.0	1000.000	100.0	V	17.0	-13.4	14.7	54.0
1461.481764	31.3	1000.0	1000.000	100.0	V	18.0	-13.3	22.7	54.0
1772.139078	26.9	1000.0	1000.000	208.0	V	133.0	-12.1	27.1	54.0
2022.652104	38.8	1000.0	1000.000	150.0	V	337.0	-11.4	15.2	54.0
2393.789579	43.5	1000.0	1000.000	100.0	H	150.0	-9.4	10.5	54.0
3182.960721	32.0	1000.0	1000.000	100.0	H	125.0	-6.1	22.0	54.0
4999.800000	40.7	1000.0	1000.000	100.0	H	53.0	-0.8	13.3	54.0

< Fig 20. Radiated emission result (1 000 MHz ~ 5 000 MHz) >



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



Final Result 1

Frequency (MHz)	MaxPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1000.000000	53.8	1000.0	1000.000	100.0	V	130.0	-14.5	20.2	74.0
1350.089379	54.6	1000.0	1000.000	100.0	V	12.0	-13.4	19.4	74.0
1456.281764	53.7	1000.0	1000.000	100.0	V	23.0	-13.3	20.3	74.0
1650.266533	52.7	1000.0	1000.000	116.0	H	128.0	-12.6	21.3	74.0
2023.836072	56.2	1000.0	1000.000	100.0	V	339.0	-11.4	17.8	74.0
2395.389579	59.9	1000.0	1000.000	100.0	H	143.0	-9.4	14.1	74.0
3179.808818	53.7	1000.0	1000.000	137.0	H	215.0	-6.1	20.3	74.0
4999.800000	52.4	1000.0	1000.000	100.0	H	52.0	-0.8	21.6	74.0

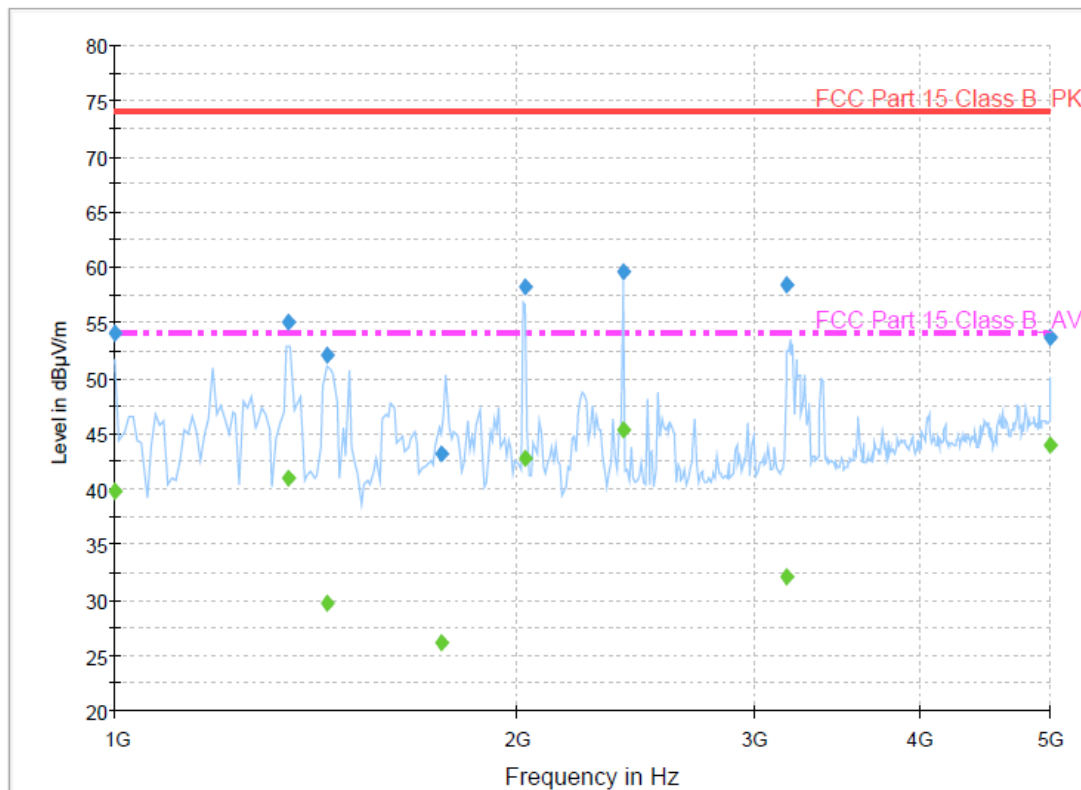
Final Result 2

Frequency (MHz)	CAverage (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1000.000000	39.4	1000.0	1000.000	100.0	V	130.0	-14.5	14.6	54.0
1350.089379	39.4	1000.0	1000.000	100.0	V	12.0	-13.4	14.6	54.0
1456.281764	32.7	1000.0	1000.000	100.0	V	23.0	-13.3	21.3	54.0
1650.266533	29.0	1000.0	1000.000	116.0	H	128.0	-12.6	25.0	54.0
2023.836072	41.6	1000.0	1000.000	100.0	V	339.0	-11.4	12.4	54.0
2395.389579	45.1	1000.0	1000.000	100.0	H	143.0	-9.4	8.9	54.0
3179.808818	30.8	1000.0	1000.000	137.0	H	215.0	-6.1	23.2	54.0
4999.800000	40.7	1000.0	1000.000	100.0	H	52.0	-0.8	13.3	54.0

< Fig 21. Radiated emission result (1 000 MHz ~ 5 000 MHz) >



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



Final Result 1

Frequency (MHz)	MaxPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1000.000000	54.1	1000.0	1000.000	100.0	V	127.0	-14.5	19.9	74.0
1350.089379	55.1	1000.0	1000.000	100.0	V	6.0	-13.4	18.9	74.0
1439.081764	52.1	1000.0	1000.000	146.0	V	16.0	-13.3	21.9	74.0
1752.939078	43.2	1000.0	1000.000	100.0	V	108.0	-12.2	30.8	74.0
2025.436072	58.2	1000.0	1000.000	137.0	V	344.0	-11.3	15.8	74.0
2397.389579	59.6	1000.0	1000.000	221.0	H	322.0	-9.4	14.4	74.0
3179.792786	58.3	1000.0	1000.000	116.0	H	124.0	-6.1	15.7	74.0
5000.000000	53.6	1000.0	1000.000	100.0	H	55.0	-0.8	20.4	74.0

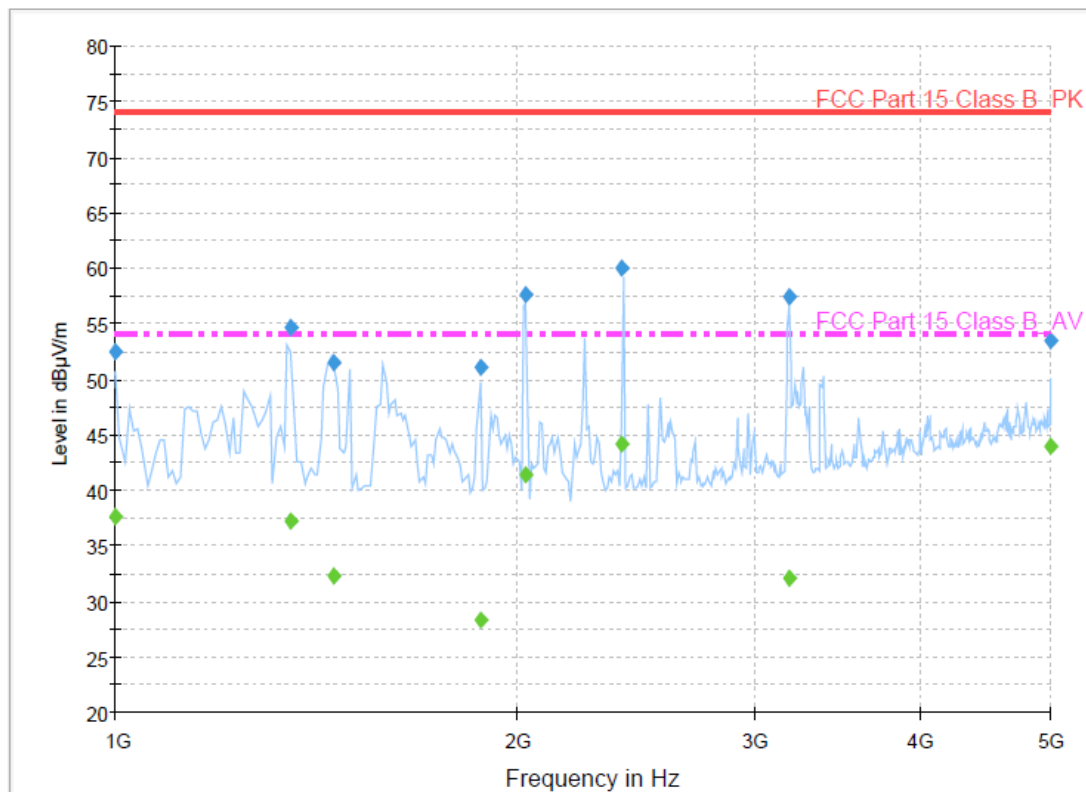
Final Result 2

Frequency (MHz)	CAverage (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1000.000000	39.7	1000.0	1000.000	100.0	V	127.0	-14.5	14.3	54.0
1350.089379	40.9	1000.0	1000.000	100.0	V	6.0	-13.4	13.1	54.0
1439.081764	29.7	1000.0	1000.000	146.0	V	16.0	-13.3	24.3	54.0
1752.939078	26.1	1000.0	1000.000	100.0	V	108.0	-12.2	27.9	54.0
2025.436072	42.7	1000.0	1000.000	137.0	V	344.0	-11.3	11.3	54.0
2397.389579	45.4	1000.0	1000.000	221.0	H	322.0	-9.4	8.6	54.0
3179.792786	32.0	1000.0	1000.000	116.0	H	124.0	-6.1	22.0	54.0
5000.000000	44.0	1000.0	1000.000	100.0	H	55.0	-0.8	10.0	54.0

< Fig 22. Radiated emission result (1 000 MHz ~ 5 000 MHz) >



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



Final Result 1

Frequency (MHz)	MaxPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1000.000000	52.5	1000.0	1000.000	100.0	V	157.0	-14.5	21.5	74.0
1353.689379	54.6	1000.0	1000.000	100.0	V	23.0	-13.4	19.4	74.0
1457.097796	51.5	1000.0	1000.000	150.0	V	17.0	-13.3	22.5	74.0
1876.747495	51.2	1000.0	1000.000	150.0	V	26.0	-11.9	22.8	74.0
2024.252104	57.7	1000.0	1000.000	100.0	V	340.0	-11.4	16.3	74.0
2394.189579	60.0	1000.0	1000.000	100.0	H	145.0	-9.4	14.0	74.0
3184.176754	57.4	1000.0	1000.000	115.0	H	121.0	-6.1	16.6	74.0
5000.000000	53.5	1000.0	1000.000	100.0	H	55.0	-0.8	20.5	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)
1000.000000	37.6	1000.0	1000.000	100.0	V	157.0	-14.5	16.4	54.0
1353.689379	37.2	1000.0	1000.000	100.0	V	23.0	-13.4	16.8	54.0
1457.097796	32.3	1000.0	1000.000	150.0	V	17.0	-13.3	21.7	54.0
1876.747495	28.4	1000.0	1000.000	150.0	V	26.0	-11.9	25.6	54.0
2024.252104	41.4	1000.0	1000.000	100.0	V	340.0	-11.4	12.6	54.0
2394.189579	44.3	1000.0	1000.000	100.0	H	145.0	-9.4	9.7	54.0
3184.176754	32.0	1000.0	1000.000	115.0	H	121.0	-6.1	22.0	54.0
5000.000000	43.9	1000.0	1000.000	100.0	H	55.0	-0.8	10.1	54.0

< Fig 23. Radiated emission result (1 000 MHz ~ 5 000 MHz) >



7. Sample Calculations

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

7.1 Example 1 :

■ 20.3 MHz

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

7.2 Example 2 :

■ 66.7 MHz

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



8. Recommendation & Conclusion

The data collected shows that the **LG Electronics Inc. LED LCD Monitor (Model Name: 47WS10)** was complies with §15.107 and 15.109 of the FCC Rules.