

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 28, 2011

Order Number: GETEC-C1-11-209

Test Report Number: GETEC-E3-11-103

Test Site: Gumi College EMC Center

FCC Registration Number: (100749, 443957)

FCC ID. : BEJ47VX30MF

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	: 47VX30MF
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.** BEJ47VX30MF
- **EUT Type** LCD Monitor
- **Model Name** 47VX30MF
- **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 1 ~ 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-E3-11-103
- **Dates of Issue** October 28, 2011



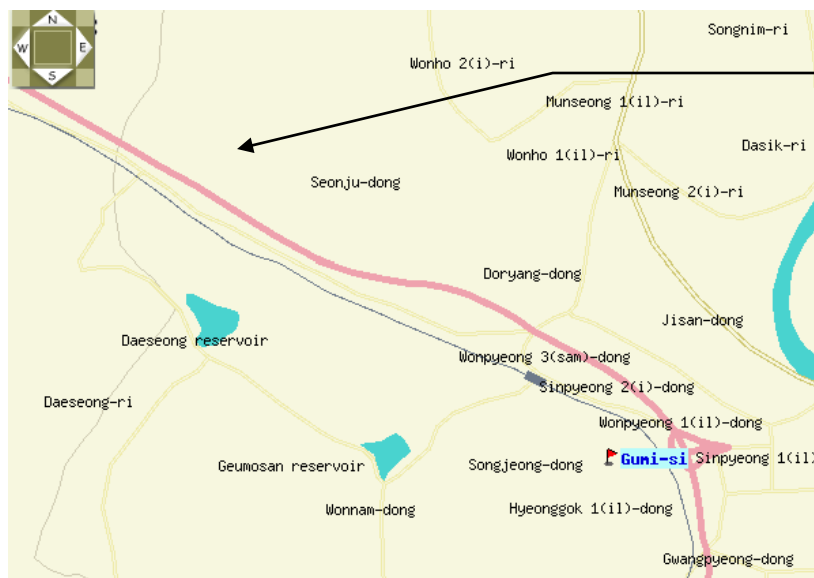
2. Introduction

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. LCD Monitor (Model Name: 47VX30MF)**

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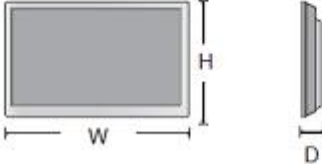
Fig 1. The map above shows the Gumi College in vicinity area.



3. Product Information

3.1 Description of EUT

The Equipment under Test (EUT) is the **LG Electronics Inc. LCD Monitor (Model Name: 47VX30MF) FCC ID.: BEJ47VX30MF**

LCD Panel	Screen Type	1192.8 mm Wide (46.96 inch) TFT (Thin Film Transistor) LCD (Liquid Crystal Display) Panel. Visible diagonal size : 1192.8 mm
	Pixel Pitch	0.5415 mm (H) x 0.5415 mm (V)
Video Signal	Max. Resolution	RGB : 1920 X 1080 @ 60 Hz HDMI/DVI : 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 : 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 : 30 kHz to 83 kHz
	Vertical Frequency	RGB : 56 Hz to 75 Hz HDMI/DVI : 56 Hz to 60 Hz
	Synchronization Type	Separate Sync, Composite Sync, Digital
Input Connector		15-pin D-Sub type, HDMI/DVI (digital), AV(CVBS), Composite Video, RS-232C, USB
Power	Rated Voltage	AC 100-240 V~ 50/60 Hz 3.0 A
	Power Consumption	On Mode : 260 W Typ. Sleep Mode : ≤ 1 W (RGB) / 2 W (HDMI/DVI) Off Mode : ≤ 0.5 W
Environmental conditions	Operating Temperature	0 °C to 40 °C
	Operating Humidity	10 % to 80 %
	Storage Temperature	-20 °C to 60 °C
	Storage Humidity	5 % to 95 %
/ Dimensions (Width x Height x Depth) / Weight		
	1079.5 mm x 624.6 mm x 116.3 mm / 21.5 kg	

-. Maximum Frequency Range : 400 MHz



3.2 Support Equipment / Cables used

3.2.1 Used Support Equipment

Description	Manufacturer	Model Name	S/N & FCC ID.
PC (Main board)	ASLOCK	770iCafe	S/N: 0AM0X3097310 FCC ID.: DoC
VGA 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
DVD player	LG Electronics Inc.	LC-954	S/N: 3850R-Z674K FCC ID.: Verification
Monitor	Dell computer corporation	1800FP	S/N: KR-07R477-48324-33J-03WH FCC ID.: DoC
USB memory stick	SAMSUNG	SUM-PSB4	S/N: TB33B202478F 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	AKB33871404	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	1.80 m shielded with two ferrite cores
RGB(Analog) out cable	Connected to the EUT and monitor	1.50 m shielded
HDMI/DVI(Digital) in cable	Connected to the EUT and PC	2.00 m shielded
RS-232C cable	Connected to the EUT(in port) and EUT(out port)	1.80 m shielded
Audio in cable	Connected to the EUT and PC	1.50 m shielded with a ferrite core
Component in cable	Connected to the EUT and DVD player	3.00 m shielded
AV in cable	Connected to the EUT and DVD player	3.00 m shielded
AV out cable	Connected to the EUT and DVD player	3.00 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, HDMI: Digital)

Conducted emission: 1 920 × 1 080 / 60 Hz (RGB: Analog, 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
- . 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

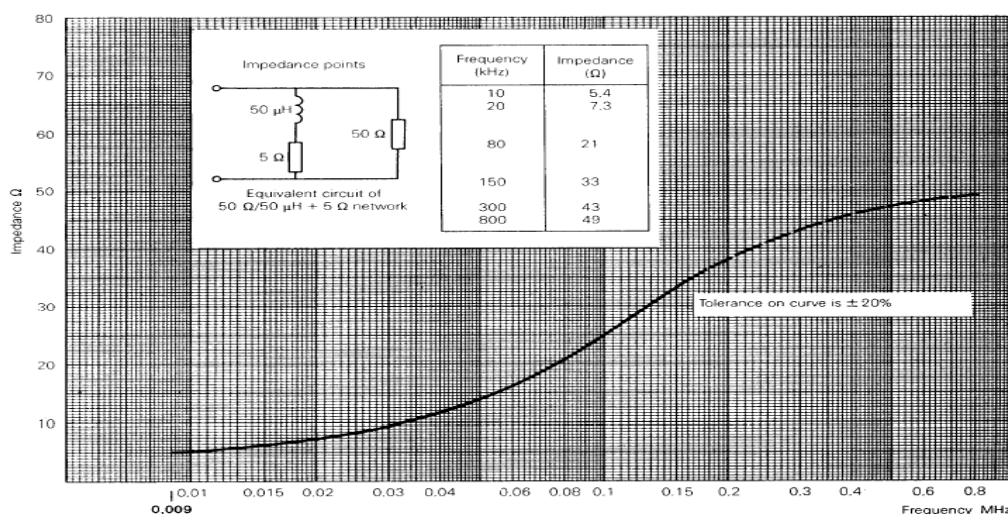


Fig 2. Impedance of LISN



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

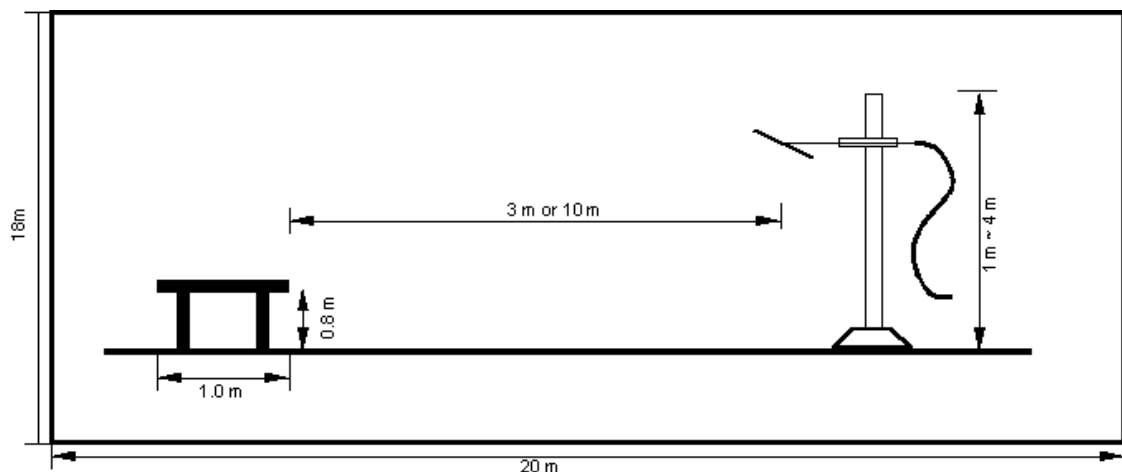


Fig 3. Dimensions of test site



5. Conducted Emission

5.1 Operating Environment

Temperature : 25.0 °C
Relative Humidity : 40.0 % 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

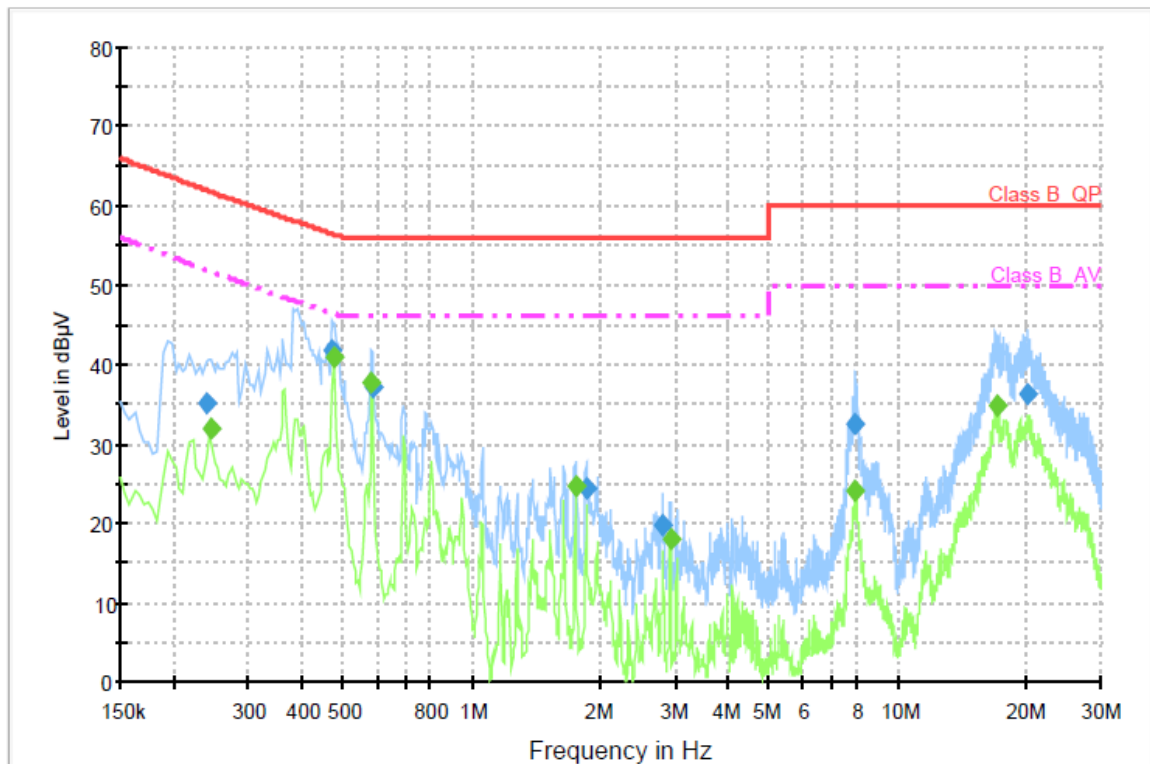
5.6 Test data for Conducted Emission

- Test Date : September 1, 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
0.238000	35.2	1000.000	9.000	GND	L1	10.1	26.8	62.0	
0.472000	41.7	1000.000	9.000	GND	L1	10.1	14.7	56.4	
0.588000	37.0	1000.000	9.000	GND	L1	10.1	19.0	56.0	
1.872000	24.3	1000.000	9.000	GND	L1	10.1	31.7	56.0	
2.812000	19.6	1000.000	9.000	GND	L1	10.2	36.4	56.0	
7.952000	32.4	1000.000	9.000	GND	L1	10.5	27.6	60.0	
20.132000	36.3	1000.000	9.000	GND	L1	11.2	23.7	60.0	

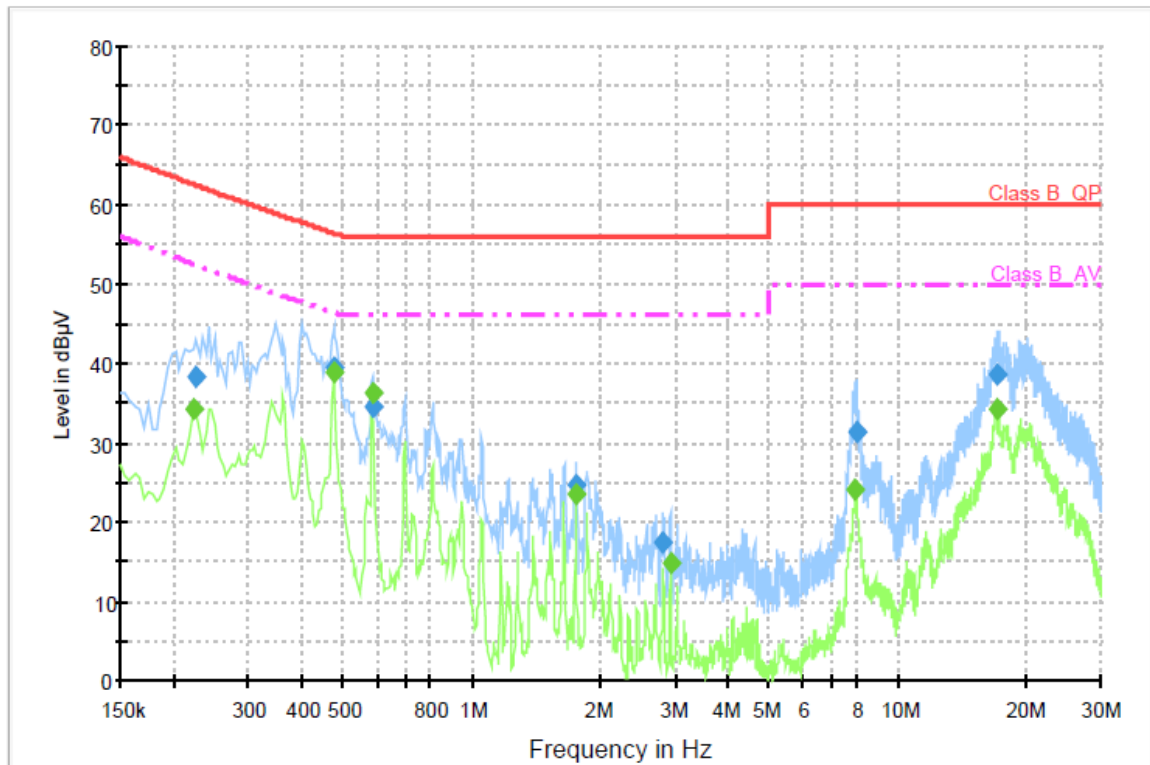
Final Measurement Detector 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.244000	32.0	1000.000	9.000	GND	L1	10.1	19.7	51.7	
0.476000	41.0	1000.000	9.000	GND	L1	10.1	5.4	46.4	
0.584000	37.6	1000.000	9.000	GND	L1	10.1	8.4	46.0	
1.756000	24.6	1000.000	9.000	GND	L1	10.1	21.4	46.0	
2.928000	18.0	1000.000	9.000	GND	L1	10.2	28.0	46.0	
7.944000	24.0	1000.000	9.000	GND	L1	10.5	26.0	50.0	
17.052000	34.7	1000.000	9.000	GND	L1	11.0	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
0.226000	38.2	1000.000	9.000	GND	N	10.1	24.2	62.4	
0.474000	39.4	1000.000	9.000	GND	N	10.1	17.0	56.4	
0.590000	34.5	1000.000	9.000	GND	N	10.1	21.5	56.0	
1.762000	24.6	1000.000	9.000	GND	N	10.1	31.4	56.0	
2.814000	17.3	1000.000	9.000	GND	N	10.2	38.7	56.0	
7.986000	31.4	1000.000	9.000	GND	N	10.4	28.6	60.0	
17.170000	38.4	1000.000	9.000	GND	N	10.8	21.6	60.0	

Final Measurement Detector 2

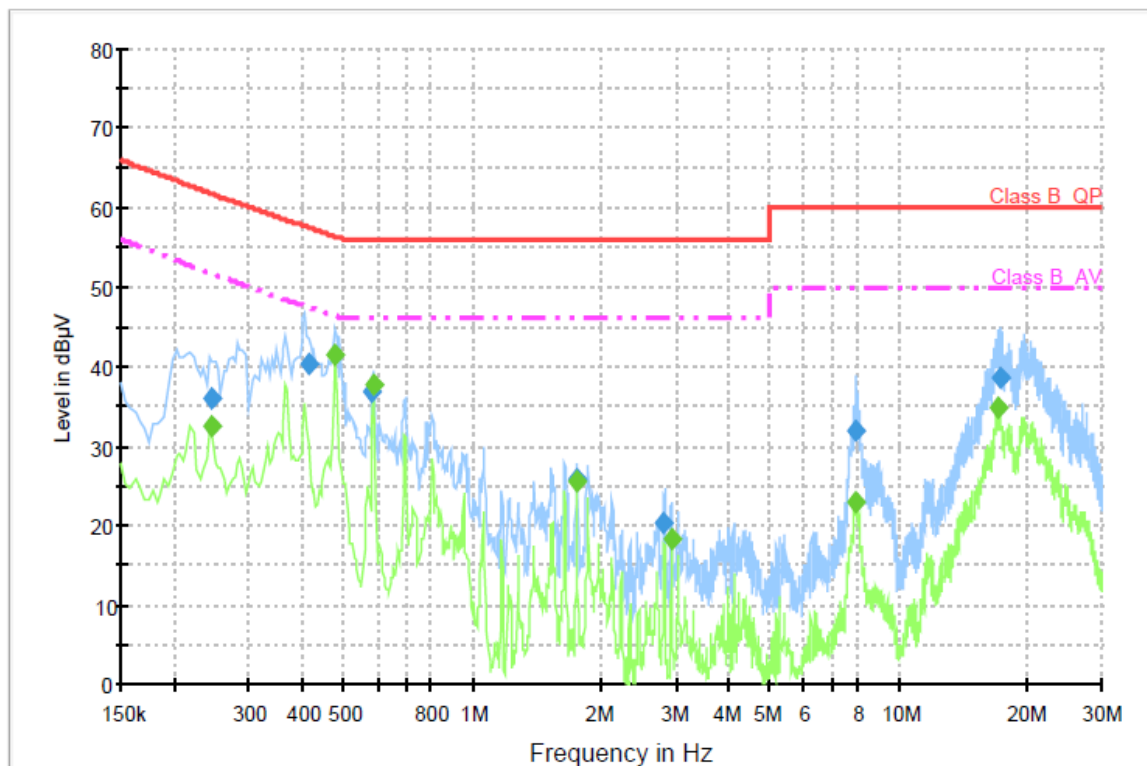
Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.222000	34.3	1000.000	9.000	GND	N	10.1	18.2	52.5	
0.474000	38.7	1000.000	9.000	GND	N	10.1	7.7	46.4	
0.586000	36.3	1000.000	9.000	GND	N	10.1	9.7	46.0	
1.758000	23.6	1000.000	9.000	GND	N	10.1	22.4	46.0	
2.930000	14.7	1000.000	9.000	GND	N	10.2	31.3	46.0	
7.950000	24.0	1000.000	9.000	GND	N	10.4	26.0	50.0	
17.170000	34.1	1000.000	9.000	GND	N	10.8	15.9	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
0.244000	36.0	1000.000	9.000	GND	L1	10.1	25.8	61.8	
0.412000	40.2	1000.000	9.000	GND	L1	10.1	17.3	57.5	
0.584000	36.7	1000.000	9.000	GND	L1	10.1	19.3	56.0	
1.760000	25.7	1000.000	9.000	GND	L1	10.1	30.3	56.0	
2.820000	20.3	1000.000	9.000	GND	L1	10.2	35.7	56.0	
7.932000	32.0	1000.000	9.000	GND	L1	10.5	28.0	60.0	
17.296000	38.6	1000.000	9.000	GND	L1	11.0	21.4	60.0	

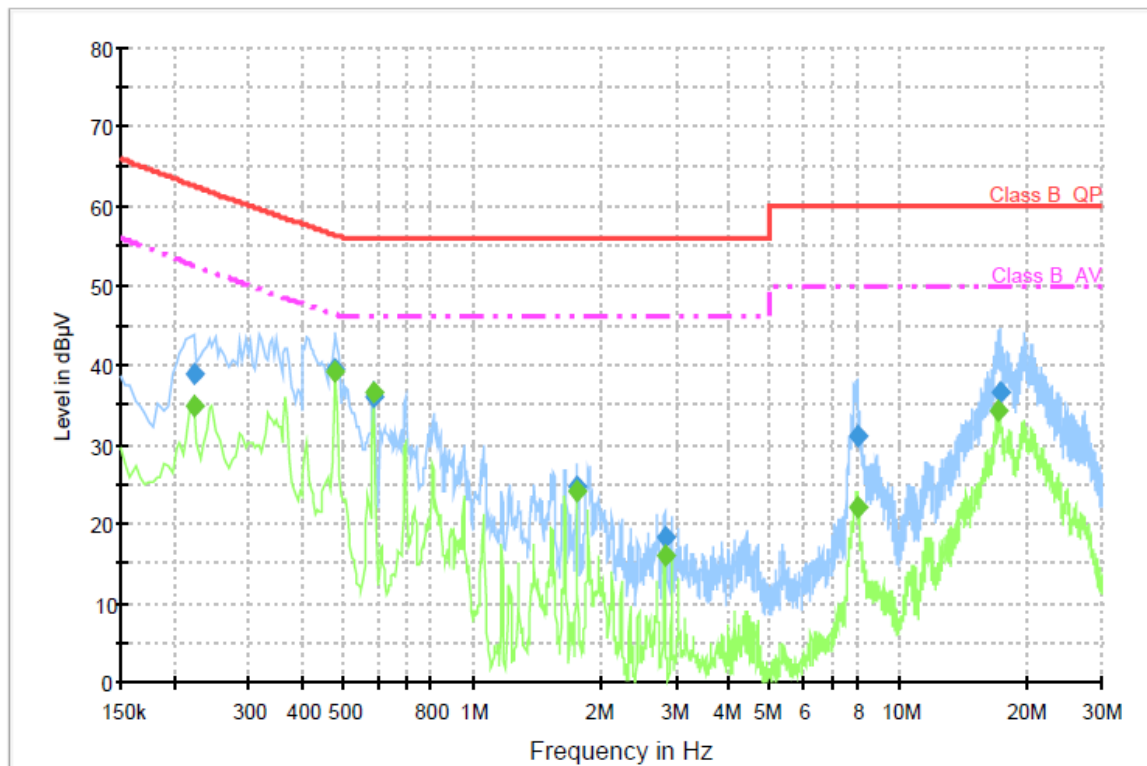
Final Measurement Detector 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.244000	32.4	1000.000	9.000	GND	L1	10.1	19.3	51.7	
0.476000	41.5	1000.000	9.000	GND	L1	10.1	4.9	46.4	
0.588000	37.7	1000.000	9.000	GND	L1	10.1	8.3	46.0	
1.760000	25.6	1000.000	9.000	GND	L1	10.1	20.4	46.0	
2.932000	18.1	1000.000	9.000	GND	L1	10.2	27.9	46.0	
7.956000	22.9	1000.000	9.000	GND	L1	10.5	27.1	50.0	
17.184000	34.9	1000.000	9.000	GND	L1	11.0	15.1	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
0.222000	38.8	1000.000	9.000	GND	N	10.1	23.8	62.6	
0.478000	39.5	1000.000	9.000	GND	N	10.1	16.8	56.3	
0.586000	35.8	1000.000	9.000	GND	N	10.1	20.2	56.0	
1.758000	24.7	1000.000	9.000	GND	N	10.1	31.3	56.0	
2.826000	18.4	1000.000	9.000	GND	N	10.2	37.6	56.0	
7.982000	31.1	1000.000	9.000	GND	N	10.4	28.9	60.0	
17.370000	36.6	1000.000	9.000	GND	N	10.8	23.4	60.0	

Final Measurement Detector 2

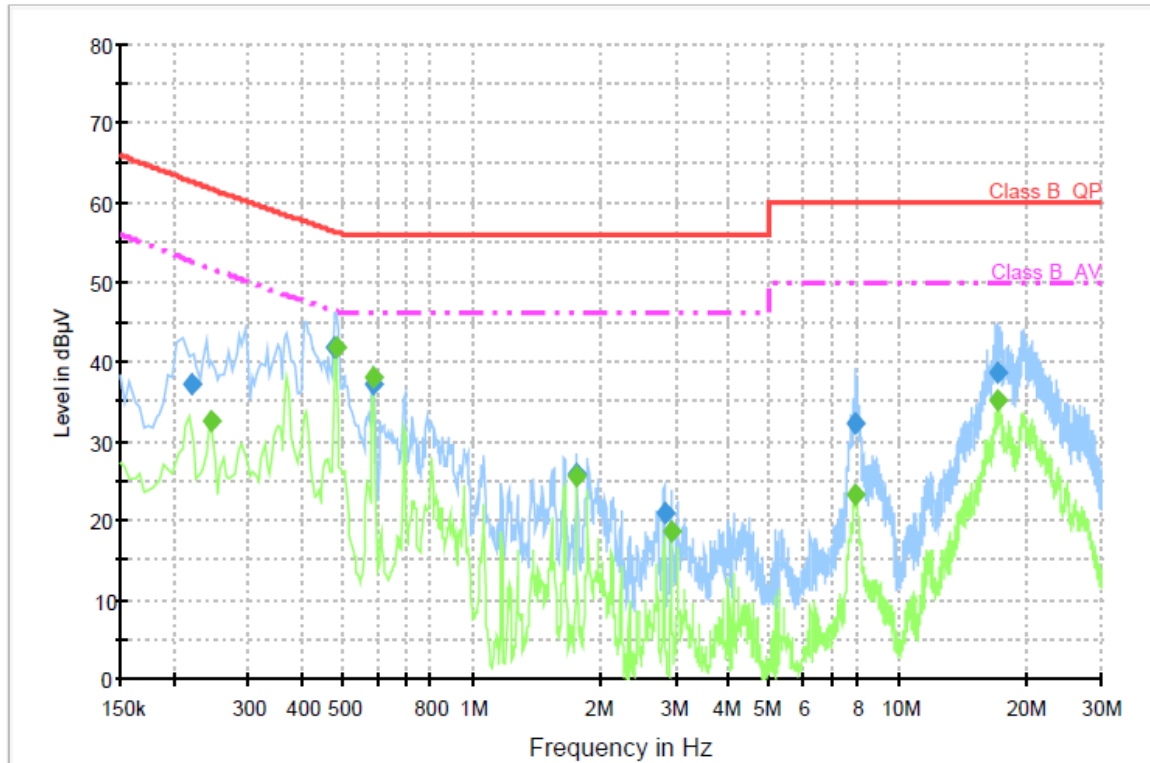
Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.222000	34.8	1000.000	9.000	GND	N	10.1	17.7	52.5	
0.478000	39.2	1000.000	9.000	GND	N	10.1	7.1	46.3	
0.586000	36.4	1000.000	9.000	GND	N	10.1	9.6	46.0	
1.762000	24.0	1000.000	9.000	GND	N	10.1	22.0	46.0	
2.826000	15.9	1000.000	9.000	GND	N	10.2	30.1	46.0	
7.998000	22.1	1000.000	9.000	GND	N	10.4	27.9	50.0	
17.070000	34.1	1000.000	9.000	GND	N	10.8	15.9	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
0.220000	37.2	1000.000	9.000	GND	L1	10.1	25.4	62.6	
0.476000	41.7	1000.000	9.000	GND	L1	10.1	14.7	56.4	
0.588000	37.2	1000.000	9.000	GND	L1	10.1	18.8	56.0	
1.760000	25.8	1000.000	9.000	GND	L1	10.1	30.2	56.0	
2.824000	20.8	1000.000	9.000	GND	L1	10.2	35.2	56.0	
7.960000	32.2	1000.000	9.000	GND	L1	10.5	27.8	60.0	
17.208000	38.6	1000.000	9.000	GND	L1	11.0	21.4	60.0	

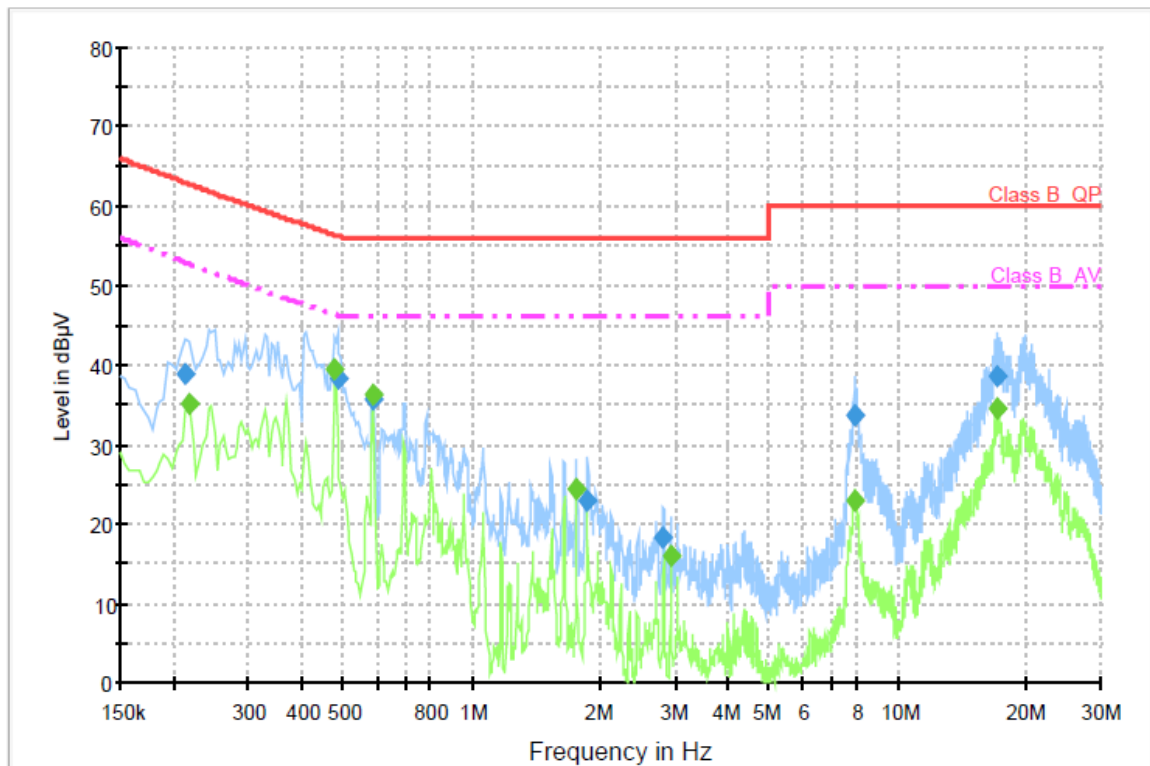
Final Measurement Detector 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.244000	32.6	1000.000	9.000	GND	L1	10.1	19.1	51.7	
0.480000	41.7	1000.000	9.000	GND	L1	10.1	4.6	46.3	
0.588000	37.9	1000.000	9.000	GND	L1	10.1	8.1	46.0	
1.760000	25.5	1000.000	9.000	GND	L1	10.1	20.6	46.0	
2.936000	18.7	1000.000	9.000	GND	L1	10.2	27.3	46.0	
7.952000	23.1	1000.000	9.000	GND	L1	10.5	26.9	50.0	
17.080000	35.0	1000.000	9.000	GND	L1	11.0	15.0	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
0.214000	39.0	1000.000	9.000	GND	N	10.1	23.9	62.9	
0.486000	38.2	1000.000	9.000	GND	N	10.1	18.0	56.2	
0.586000	35.8	1000.000	9.000	GND	N	10.1	20.2	56.0	
1.874000	22.9	1000.000	9.000	GND	N	10.2	33.1	56.0	
2.822000	18.3	1000.000	9.000	GND	N	10.2	37.7	56.0	
7.962000	33.8	1000.000	9.000	GND	N	10.4	26.2	60.0	
17.178000	38.4	1000.000	9.000	GND	N	10.8	21.6	60.0	

Final Measurement Detector 2

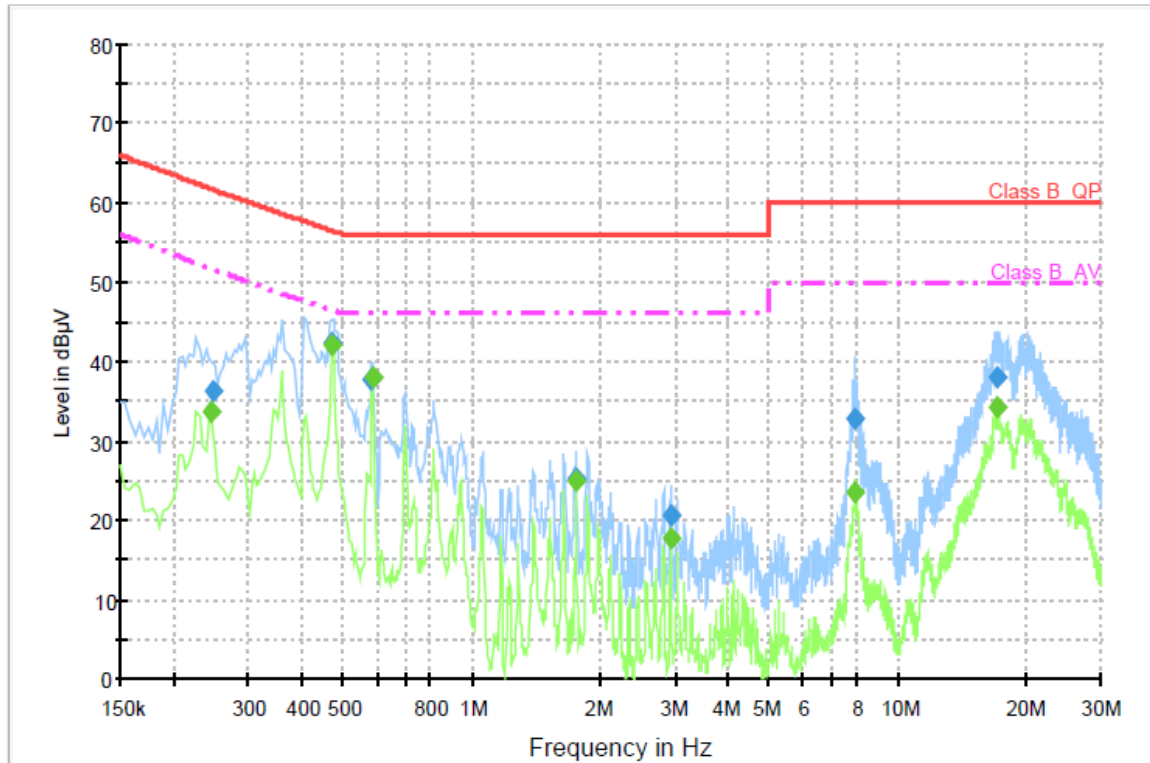
Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.218000	35.1	1000.000	9.000	GND	N	10.1	17.6	52.7	
0.478000	39.3	1000.000	9.000	GND	N	10.1	7.0	46.3	
0.586000	36.3	1000.000	9.000	GND	N	10.1	9.7	46.0	
1.762000	24.2	1000.000	9.000	GND	N	10.1	21.8	46.0	
2.934000	16.0	1000.000	9.000	GND	N	10.2	30.0	46.0	
7.942000	22.8	1000.000	9.000	GND	N	10.4	27.2	50.0	
17.190000	34.5	1000.000	9.000	GND	N	10.8	15.5	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
0.248000	36.2	1000.000	9.000	GND	L1	10.1	25.4	61.6	
0.472000	42.3	1000.000	9.000	GND	L1	10.1	14.1	56.4	
0.584000	37.8	1000.000	9.000	GND	L1	10.1	18.2	56.0	
1.764000	25.2	1000.000	9.000	GND	L1	10.1	30.8	56.0	
2.932000	20.6	1000.000	9.000	GND	L1	10.2	35.4	56.0	
7.964000	32.9	1000.000	9.000	GND	L1	10.5	27.1	60.0	
17.208000	37.9	1000.000	9.000	GND	L1	11.0	22.1	60.0	

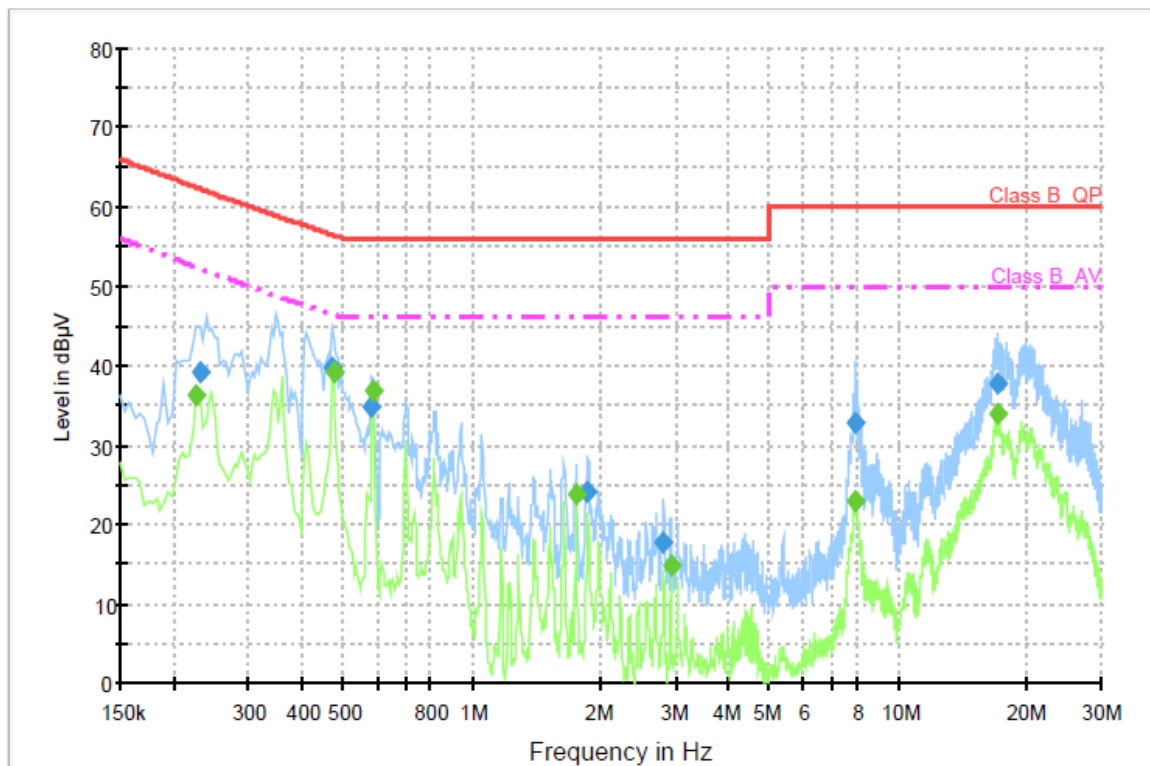
Final Measurement Detector 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.244000	33.5	1000.000	9.000	GND	L1	10.1	18.2	51.7	
0.472000	42.0	1000.000	9.000	GND	L1	10.1	4.4	46.4	
0.588000	37.8	1000.000	9.000	GND	L1	10.1	8.2	46.0	
1.760000	25.1	1000.000	9.000	GND	L1	10.1	20.9	46.0	
2.932000	17.7	1000.000	9.000	GND	L1	10.2	28.3	46.0	
7.952000	23.6	1000.000	9.000	GND	L1	10.5	26.4	50.0	
17.172000	34.2	1000.000	9.000	GND	L1	11.0	15.8	50.0	

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



Voltage with 4-Line-LISN_N



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.230000	39.0	1000.000	9.000	GND	N	10.1	23.3	62.3	
0.470000	39.7	1000.000	9.000	GND	N	10.1	16.8	56.5	
0.582000	34.9	1000.000	9.000	GND	N	10.1	21.1	56.0	
1.874000	24.2	1000.000	9.000	GND	N	10.2	31.8	56.0	
2.822000	17.8	1000.000	9.000	GND	N	10.2	38.2	56.0	
7.958000	32.8	1000.000	9.000	GND	N	10.4	27.2	60.0	
17.086000	37.8	1000.000	9.000	GND	N	10.8	22.2	60.0	

Final Measurement Detector 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.226000	36.2	1000.000	9.000	GND	N	10.1	16.2	52.4	
0.474000	39.2	1000.000	9.000	GND	N	10.1	7.2	46.4	
0.586000	36.7	1000.000	9.000	GND	N	10.1	9.3	46.0	
1.758000	23.8	1000.000	9.000	GND	N	10.1	22.2	46.0	
2.934000	14.8	1000.000	9.000	GND	N	10.2	31.2	46.0	
7.922000	23.0	1000.000	9.000	GND	N	10.4	27.0	50.0	
17.178000	33.8	1000.000	9.000	GND	N	10.8	16.2	50.0	

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



6. Radiated Emission

6.1 Operating Environment

Temperature : 23.0 °C
Relative Humidity : 40.0 % 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	1258943	11. 12. 2011

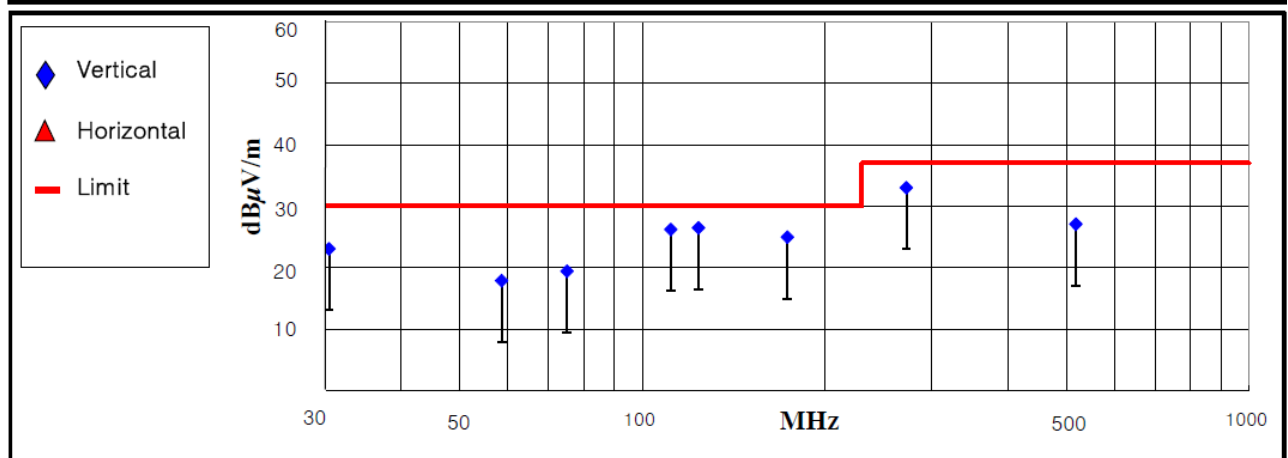


6.6 Test data for Radiated Emission

- Test Date : September 1 ~ 2, 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 (400 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 (dBμV/m)	Margin (dB)	Positioning System		
	Reading Value(dBμV)	Antenna Factor(dB/m)	Cable Loss(dB)	Test Result (dBμV/m)			Pol. (H/V)	Height (cm)	Angle (°)
30.45	8.12	13.59	1.33	23.04	30.00	6.96	V	104	201
58.61	7.78	8.22	1.88	17.88	30.00	12.12	V	104	154
75.12	8.69	8.57	2.16	19.42	30.00	10.58	V	102	170
111.40	13.02	10.48	2.68	26.18	30.00	3.82	V	100	302
123.78	12.28	11.35	2.84	26.47	30.00	3.53	V	100	161
173.36	8.41	13.08	3.46	24.95	30.00	5.05	V	102	175
272.31	13.24	15.27	4.47	32.98	37.00	4.02	V	194	197
518.12	2.82	17.80	6.44	27.06	37.00	9.94	V	100	183

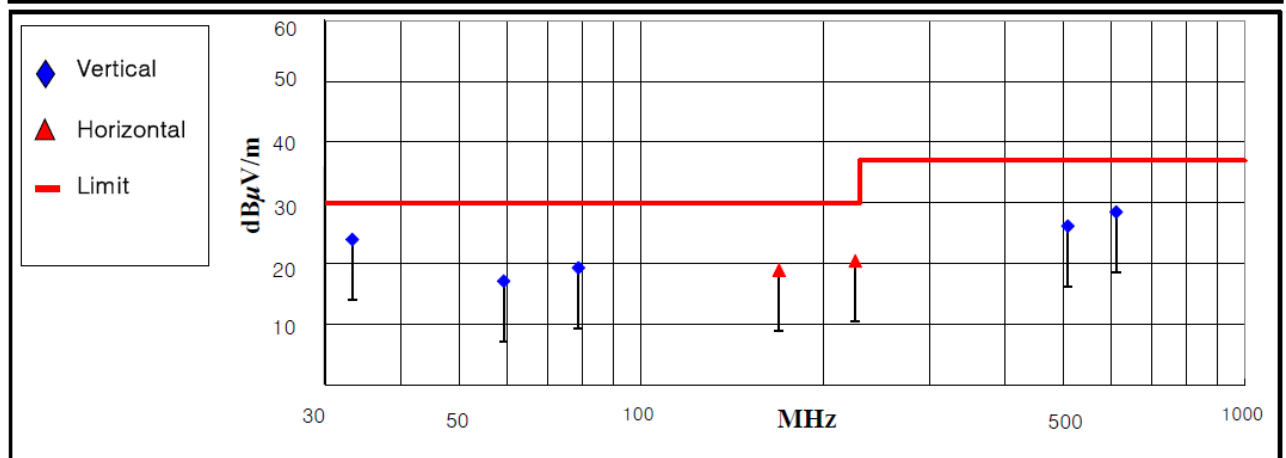


< Fig 12. Radiated emission result (30 MHz ~ 1 000 MHz) >



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

Frequency (MHz)	Measurement Level				Limit (dBμV/m)	Margin (dB)	Positioning System		
	Reading	Antenna	Cable	Test Result			Pol.	Height	Angle
	Value(dBμV)	Factor(dB/m)	Loss(dB)	(dBμV/m)			(H/V)	(cm)	(°)
33.21	10.18	12.41	1.38	23.97	30.00	6.03	V	100	230
59.17	7.07	8.15	1.89	17.11	30.00	12.89	V	100	134
78.68	8.57	8.48	2.23	19.28	30.00	10.72	V	105	165
169.14	2.77	12.76	3.41	18.94	30.00	11.06	H	143	267
226.30	2.53	13.89	4.03	20.45	30.00	9.55	H	100	15
508.44	2.15	17.65	6.37	26.17	37.00	10.83	V	102	166
611.59	2.23	19.15	7.10	28.48	37.00	8.52	V	196	355

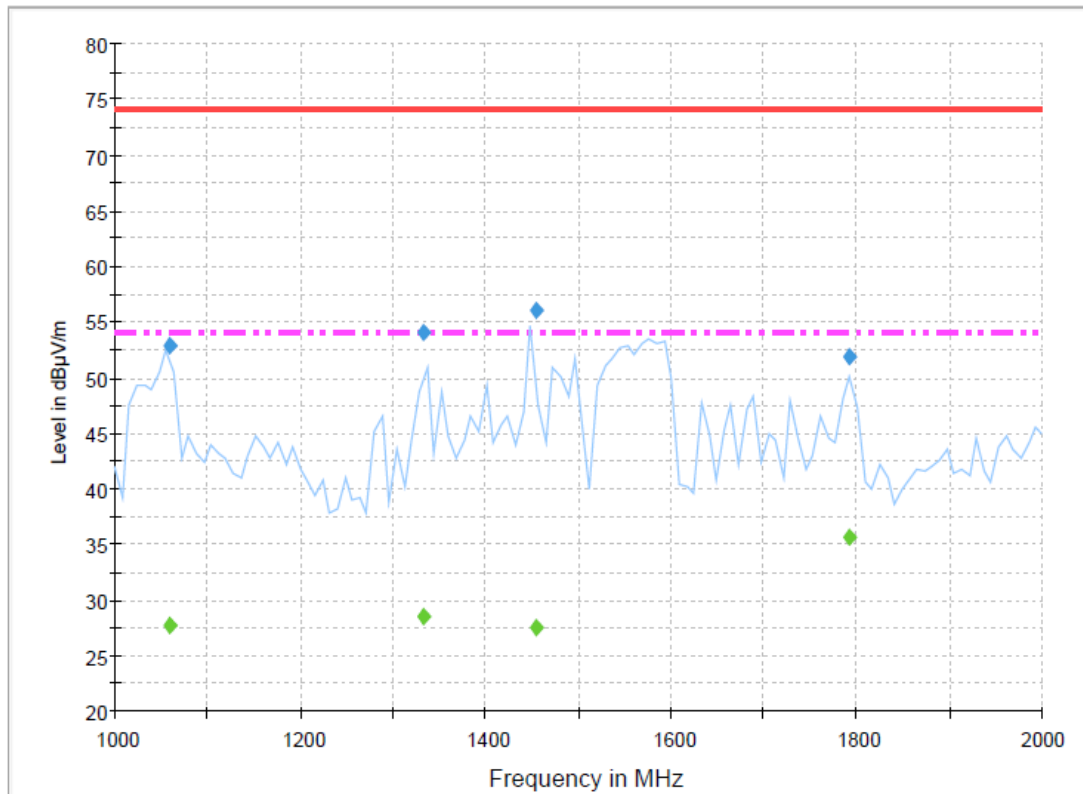


< Fig 13. Radiated emission result (30 MHz ~ 1 000 MHz) >



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

Radiated emission_above 1GHz-6GHz



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)
1059.912225	52.9	1000.0	1000.000	100.0	V	149.0	-14.4	21.1	74.0
1334.073347	54.1	1000.0	1000.000	150.0	V	232.0	-13.4	19.9	74.0
1453.897796	56.1	1000.0	1000.000	115.0	V	210.0	-13.3	17.9	74.0
1792.187174	52.0	1000.0	1000.000	100.0	V	174.0	-12.0	22.0	74.0

Final Result 2

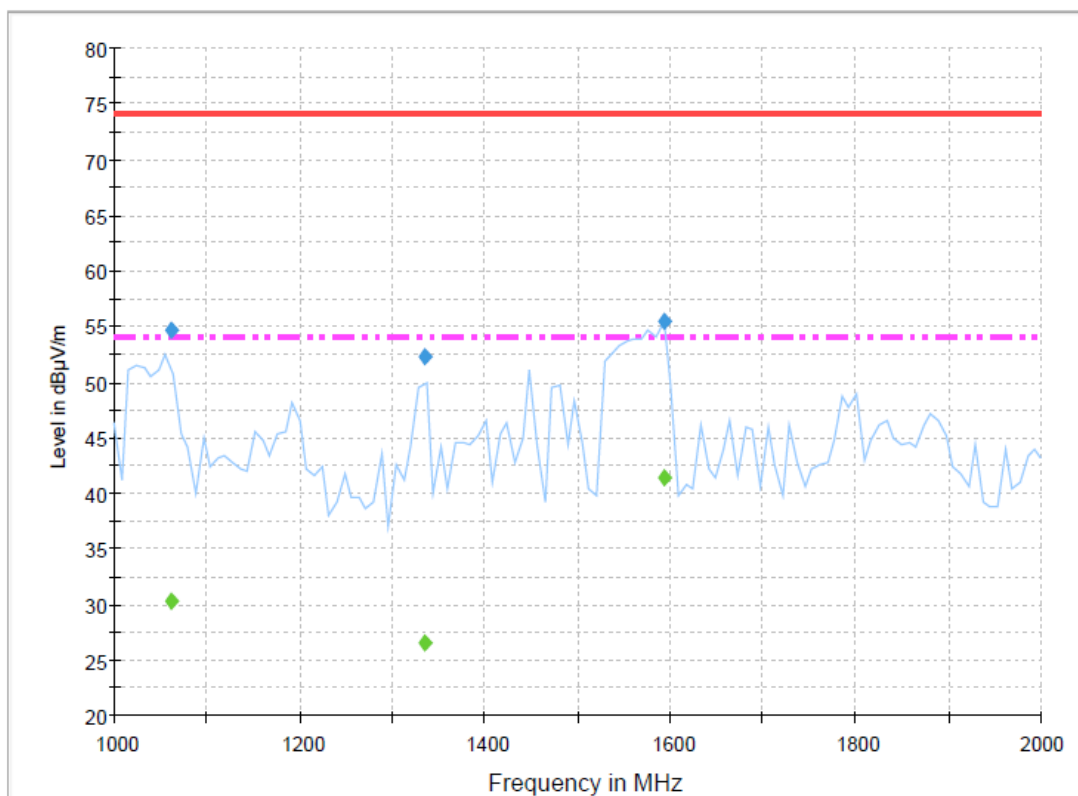
Frequency (MHz)	CAverage (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1059.912225	27.7	1000.0	1000.000	100.0	V	149.0	-14.4	26.3	54.0
1334.073347	28.4	1000.0	1000.000	150.0	V	232.0	-13.4	25.6	54.0
1453.897796	27.6	1000.0	1000.000	115.0	V	210.0	-13.3	26.4	54.0
1792.187174	35.7	1000.0	1000.000	100.0	V	174.0	-12.0	18.3	54.0

< Fig 14. 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 1GHz-6GHz



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)
1060.712225	54.8	1000.0	1000.000	100.0	V	180.0	-14.4	19.2	74.0
1334.473347	52.2	1000.0	1000.000	100.0	H	234.0	-13.4	21.8	74.0
1592.986373	55.4	1000.0	1000.000	100.0	V	240.0	-12.7	18.6	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)
1060.712225	30.2	1000.0	1000.000	100.0	V	180.0	-14.4	23.8	54.0
1334.473347	26.6	1000.0	1000.000	100.0	H	234.0	-13.4	27.4	54.0
1592.986373	41.3	1000.0	1000.000	100.0	V	240.0	-12.7	12.7	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: 47VX30MF)** was complies with §15.107 and 15.109 of the FCC Rules.