

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: September 15, 2011

Order Number: GETEC-C1-11-207

Test Report Number: GETEC-E3-11-102

Test Site: Gumi College EMC Center

FCC Registration Number: (100749, 443957)

FCC ID. : BEJ42WS10

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	: 42WS10
Trade Name	: LG

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

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

Tested by,

Reviewed by,


Soon-Hoon Jeong, Associate 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.** BEJ42WS10
- **EUT Type** LED LCD Monitor
- **Model Name** 42WS10
- **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** August 31 ~ September 5, 2011
- **Place of Test** **Gumi College EMC Center** (FCC Registration Number: 100749, 443957)
407, Bugok-dong, Gumi-si, Gyeongbuk, Korea.
- **Test Report Number** GETEC-E3-11-102
- **Dates of Issue** September 15, 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: 42WS10)**

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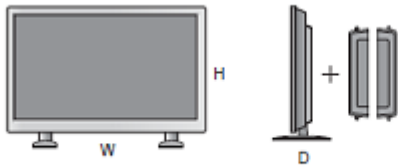
Fig 1. The map above shows the Gumi College in vicinity area.



3. Product Information

3.1 Description of EUT

The Equipment under Test (EUT) is the **LG Electronics Inc. LED LCD Monitor (Model Name: 42WS10) FCC ID.: BEJ42WS10**

LCD Panel	Screen Type	1067.31 mm Wide (42 inch) TFT (Thin Film Transistor) LCD (Liquid Crystal Display) Panel. Visible diagonal size : 1067.31 mm
	Pixel Pitch	0.4845 mm (H) x 0.4845 mm (V)
Video Signal	Max. Resolution	RGB : 1920 X 1080 @60Hz HDMI/DVI : 1920 X 1080 @60Hz - It may not be supported depending on the OS or video card type.
	Recommended Resolution	RGB : 1920 X 1080 @60Hz HDMI/DVI : 1920 X 1080 @60Hz - 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 (digital), Composite Video, RS-232C, LAN, USB
Power	Rated Voltage	100-240 V~ 50/60 Hz 1.6 A
	Power Consumption	On Mode : 110 W Typ. Sleep Mode : ≤ 3 W (RGB) / 3 W (HDMI/DVI) Off Mode : ≤ 0.5 W
Dimensions (Width x Height x Depth) / Weight		
	991.7 mm x 659.2 mm x 298.3 mm / 14.8 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
Monitor	Dell computer corporation	1800FP	S/N: KR-07R477-48324-33J-03WN 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 monitor	1.50 m shielded
DVI (Digital) in cable	Connected to the EUT and PC	1.50 m shielded
DVI (Digital) out cable	Connected to the EUT and monitor	1.50 m shielded
HDMI (Digital) cable	Connected to the EUT and PC	2.00 m shielded
DP (Digital) in cable	Connected to the EUT and PC	3.00 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 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) and HDMI(Digital) dual mode, DVI(Digital) and DP(Digital))

Conducted emission:

1 920 × 1 080 / 60 Hz (RGB(Analog) and HDMI(Digital) dual mode, DVI(Digital) and DP(Digital)),

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

◆ 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

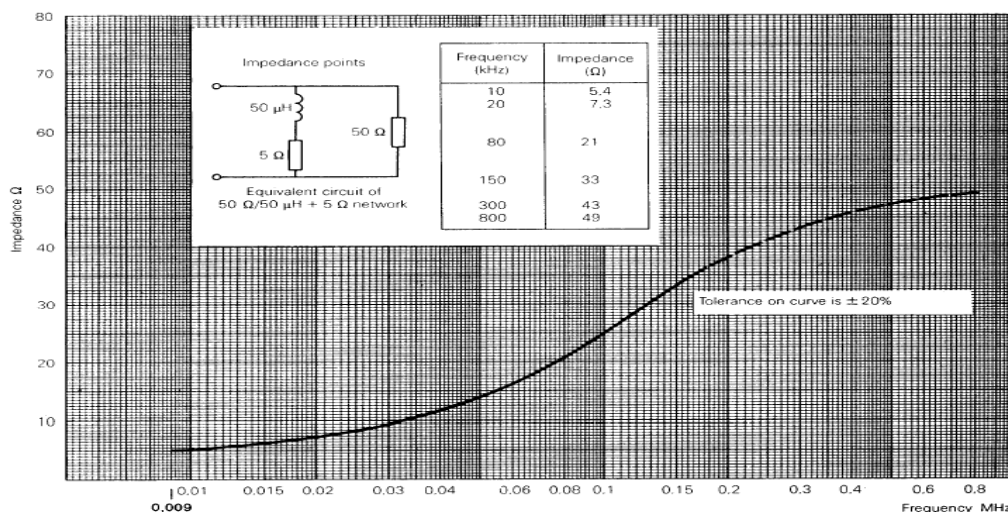


Fig 2. Impedance of LISN



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 : 50.0 % 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

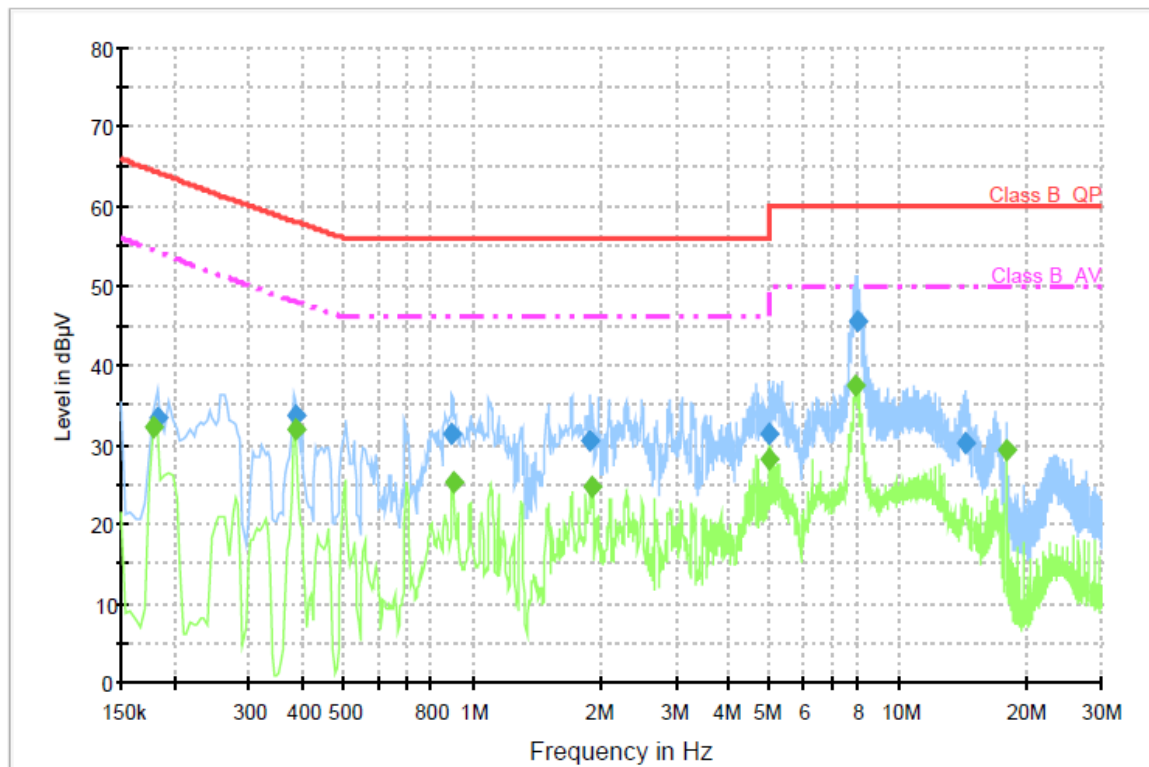
5.6 Test data for Conducted Emission

-. Test Date : August 31, 2011
-. Resolution Bandwidth : 9 kHz
-. Frequency Range : 0.15 MHz ~ 30 MHz



◆ Operating condition: 1 920 × 1 080 / 60 Hz (RGB(Analog) and HDMI(Digital) dual mode)

Voltage with 4-Line-LISN_L1



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.182000	33.4	1000.000	9.000	GND	L1	10.1	30.9	64.3	
0.384000	33.6	1000.000	9.000	GND	L1	10.1	24.5	58.1	
0.896000	31.3	1000.000	9.000	GND	L1	10.1	24.7	56.0	
1.892000	30.5	1000.000	9.000	GND	L1	10.1	25.5	56.0	
4.992000	31.3	1000.000	9.000	GND	L1	10.3	24.7	56.0	
7.984000	45.4	1000.000	9.000	GND	L1	10.5	14.6	60.0	
14.360000	30.2	1000.000	9.000	GND	L1	10.8	29.8	60.0	

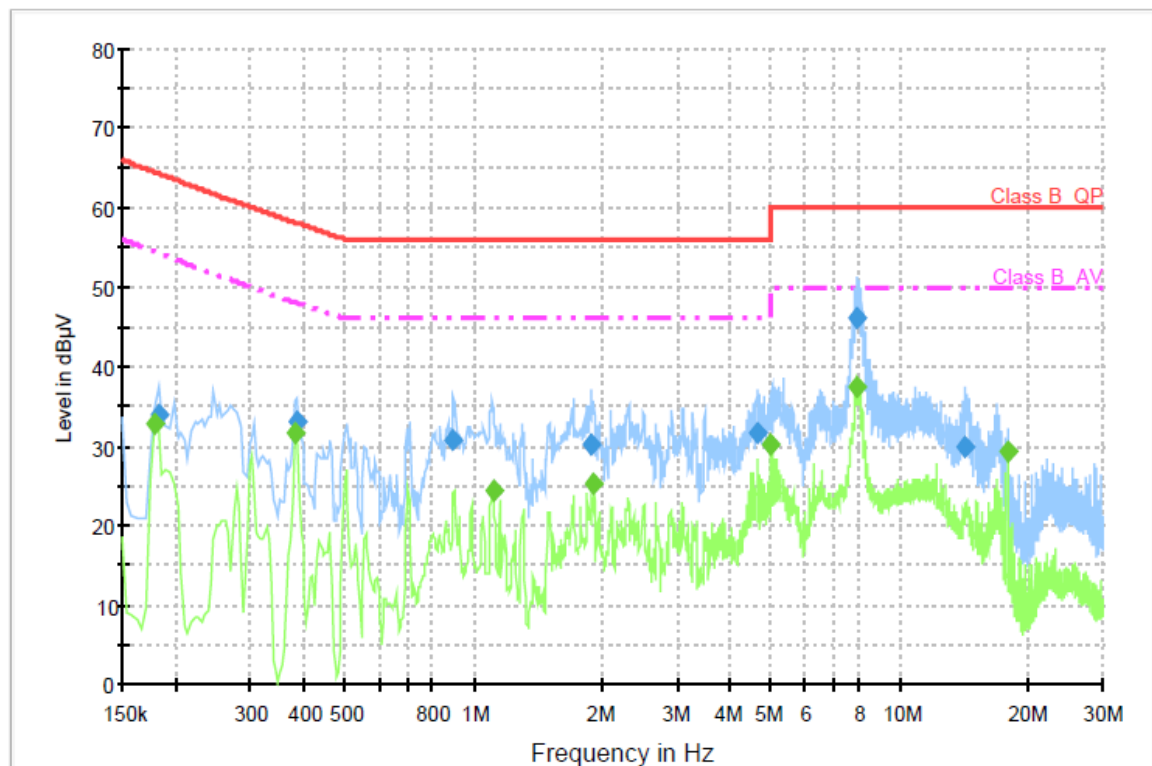
Final Measurement Detector 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.178000	32.1	1000.000	9.000	GND	L1	10.1	22.4	54.5	
0.384000	32.0	1000.000	9.000	GND	L1	10.1	16.0	48.0	
0.900000	25.2	1000.000	9.000	GND	L1	10.1	20.8	46.0	
1.916000	24.6	1000.000	9.000	GND	L1	10.1	21.4	46.0	
4.996000	28.1	1000.000	9.000	GND	L1	10.3	17.9	46.0	
7.960000	37.3	1000.000	9.000	GND	L1	10.5	12.7	50.0	
18.024000	29.2	1000.000	9.000	GND	L1	11.0	20.8	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
0.182000	34.0	1000.000	9.000	GND	N	10.1	30.3	64.3	
0.386000	33.1	1000.000	9.000	GND	N	10.1	24.9	58.0	
0.898000	30.8	1000.000	9.000	GND	N	10.1	25.2	56.0	
1.890000	30.1	1000.000	9.000	GND	N	10.2	25.9	56.0	
4.626000	31.6	1000.000	9.000	GND	N	10.3	24.4	56.0	
7.966000	46.0	1000.000	9.000	GND	N	10.4	14.0	60.0	
14.246000	29.9	1000.000	9.000	GND	N	10.7	30.1	60.0	

Final Measurement Detector 2

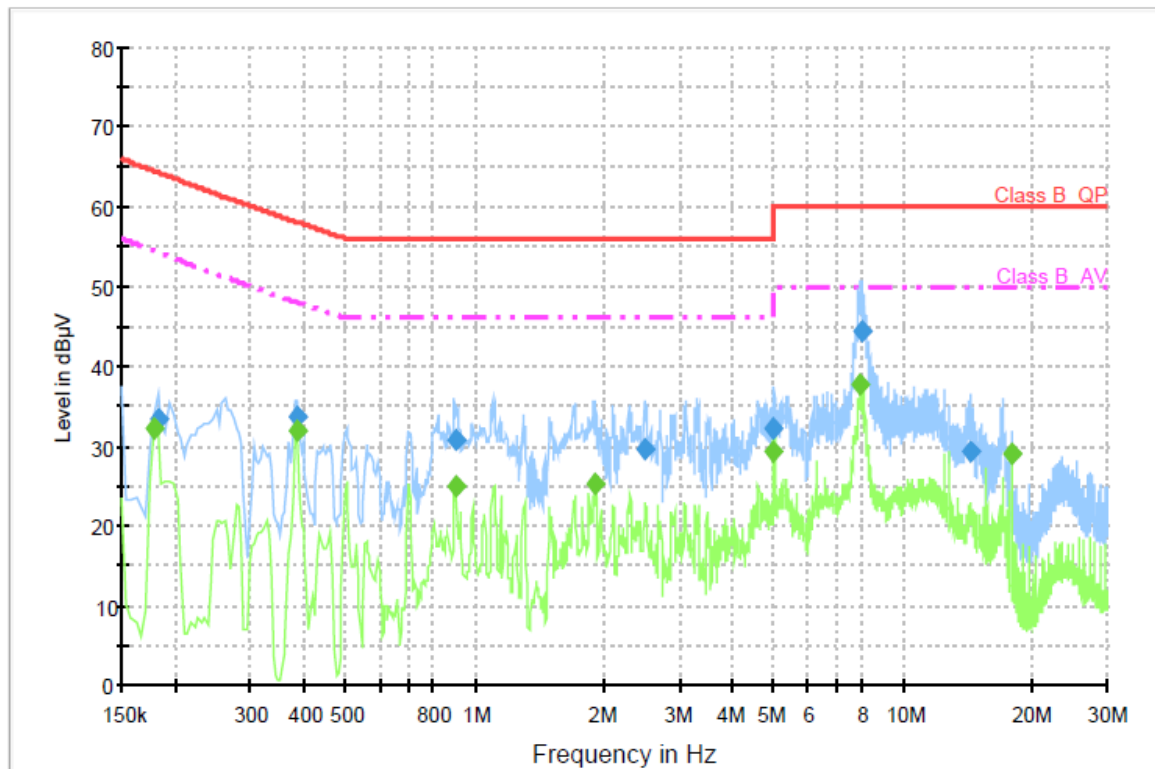
Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.178000	32.6	1000.000	9.000	GND	N	10.1	21.9	54.5	
0.382000	31.6	1000.000	9.000	GND	N	10.1	16.5	48.1	
1.110000	24.5	1000.000	9.000	GND	N	10.1	21.5	46.0	
1.918000	25.1	1000.000	9.000	GND	N	10.2	20.9	46.0	
4.998000	30.3	1000.000	9.000	GND	N	10.3	15.7	46.0	
7.974000	37.5	1000.000	9.000	GND	N	10.4	12.5	50.0	
18.022000	29.2	1000.000	9.000	GND	N	10.9	20.8	50.0	

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



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

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
0.182000	33.2	1000.000	9.000	GND	L1	10.1	31.1	64.3	
0.384000	33.5	1000.000	9.000	GND	L1	10.1	24.6	58.1	
0.904000	30.8	1000.000	9.000	GND	L1	10.1	25.2	56.0	
2.508000	29.7	1000.000	9.000	GND	L1	10.2	26.3	56.0	
4.996000	32.2	1000.000	9.000	GND	L1	10.3	23.8	56.0	
8.000000	44.5	1000.000	9.000	GND	L1	10.5	15.5	60.0	
14.408000	29.2	1000.000	9.000	GND	L1	10.8	30.8	60.0	

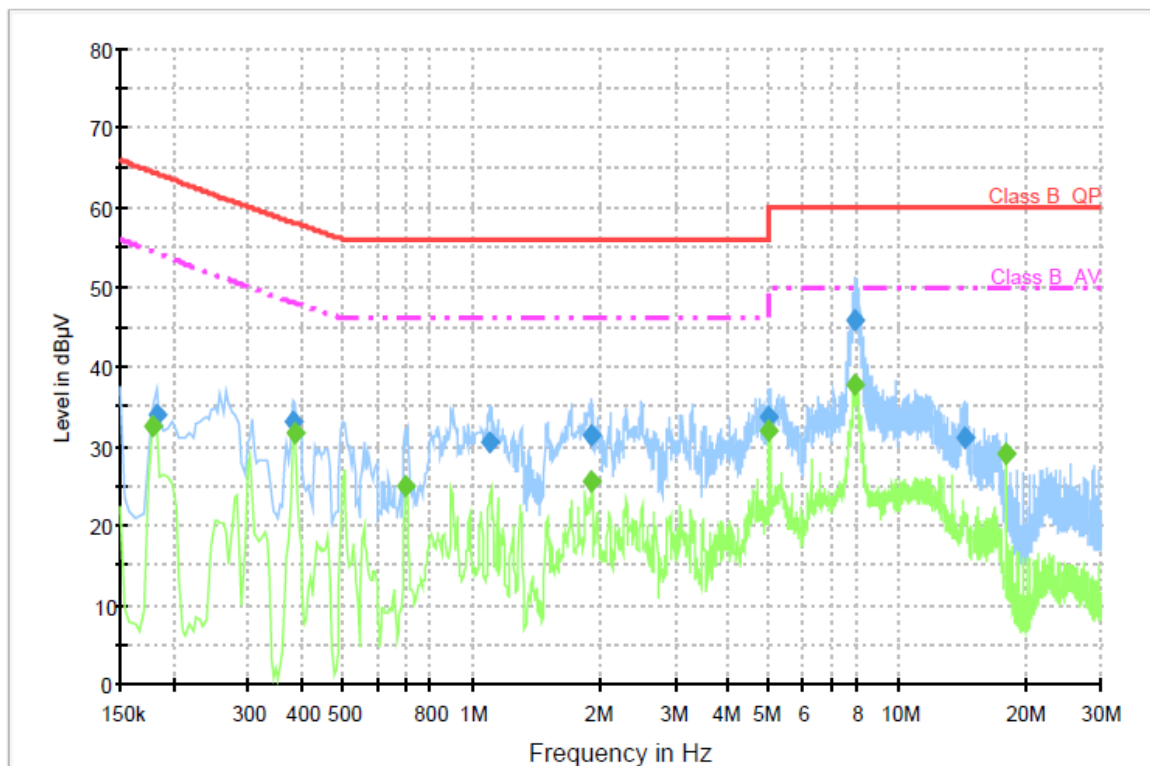
Final Measurement Detector 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.178000	32.1	1000.000	9.000	GND	L1	10.1	22.4	54.5	
0.384000	32.0	1000.000	9.000	GND	L1	10.1	16.0	48.0	
0.900000	24.9	1000.000	9.000	GND	L1	10.1	21.1	46.0	
1.916000	25.2	1000.000	9.000	GND	L1	10.1	20.8	46.0	
4.996000	29.3	1000.000	9.000	GND	L1	10.3	16.7	46.0	
7.968000	37.6	1000.000	9.000	GND	L1	10.5	12.4	50.0	
18.024000	28.9	1000.000	9.000	GND	L1	11.0	21.1	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
0.182000	33.8	1000.000	9.000	GND	N	10.1	30.5	64.3	
0.382000	33.0	1000.000	9.000	GND	N	10.1	25.1	58.1	
1.106000	30.5	1000.000	9.000	GND	N	10.1	25.5	56.0	
1.918000	31.4	1000.000	9.000	GND	N	10.2	24.6	56.0	
4.998000	33.7	1000.000	9.000	GND	N	10.3	22.3	56.0	
7.962000	45.8	1000.000	9.000	GND	N	10.4	14.2	60.0	
14.406000	31.2	1000.000	9.000	GND	N	10.7	28.8	60.0	

Final Measurement Detector 2

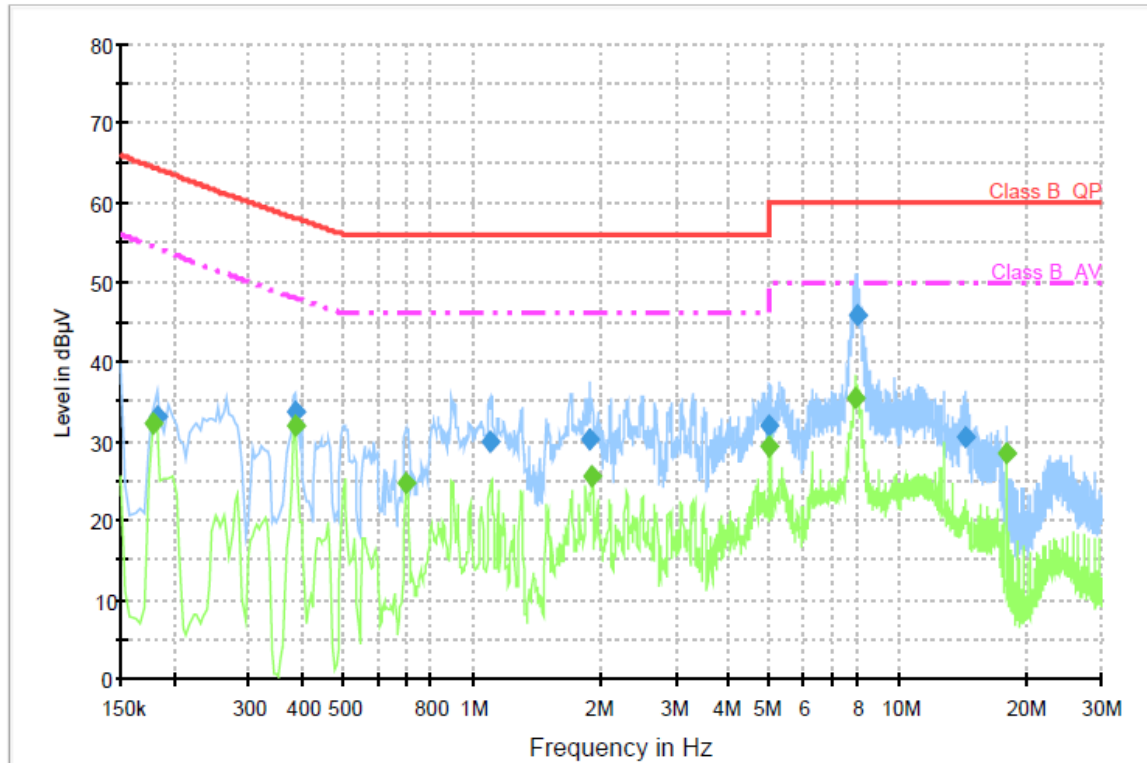
Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.178000	32.6	1000.000	9.000	GND	N	10.1	21.9	54.5	
0.386000	31.5	1000.000	9.000	GND	N	10.1	16.5	48.0	
0.702000	25.0	1000.000	9.000	GND	N	10.1	21.0	46.0	
1.918000	25.5	1000.000	9.000	GND	N	10.2	20.5	46.0	
4.998000	32.0	1000.000	9.000	GND	N	10.3	14.0	46.0	
7.962000	37.7	1000.000	9.000	GND	N	10.4	12.3	50.0	
18.022000	29.1	1000.000	9.000	GND	N	10.9	20.9	50.0	

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



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

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
0.182000	33.0	1000.000	9.000	GND	L1	10.1	31.3	64.3	
0.384000	33.5	1000.000	9.000	GND	L1	10.1	24.6	58.1	
1.104000	30.0	1000.000	9.000	GND	L1	10.1	26.0	56.0	
1.888000	30.2	1000.000	9.000	GND	L1	10.1	25.8	56.0	
4.996000	32.0	1000.000	9.000	GND	L1	10.3	24.0	56.0	
7.988000	45.7	1000.000	9.000	GND	L1	10.5	14.3	60.0	
14.400000	30.5	1000.000	9.000	GND	L1	10.8	29.5	60.0	

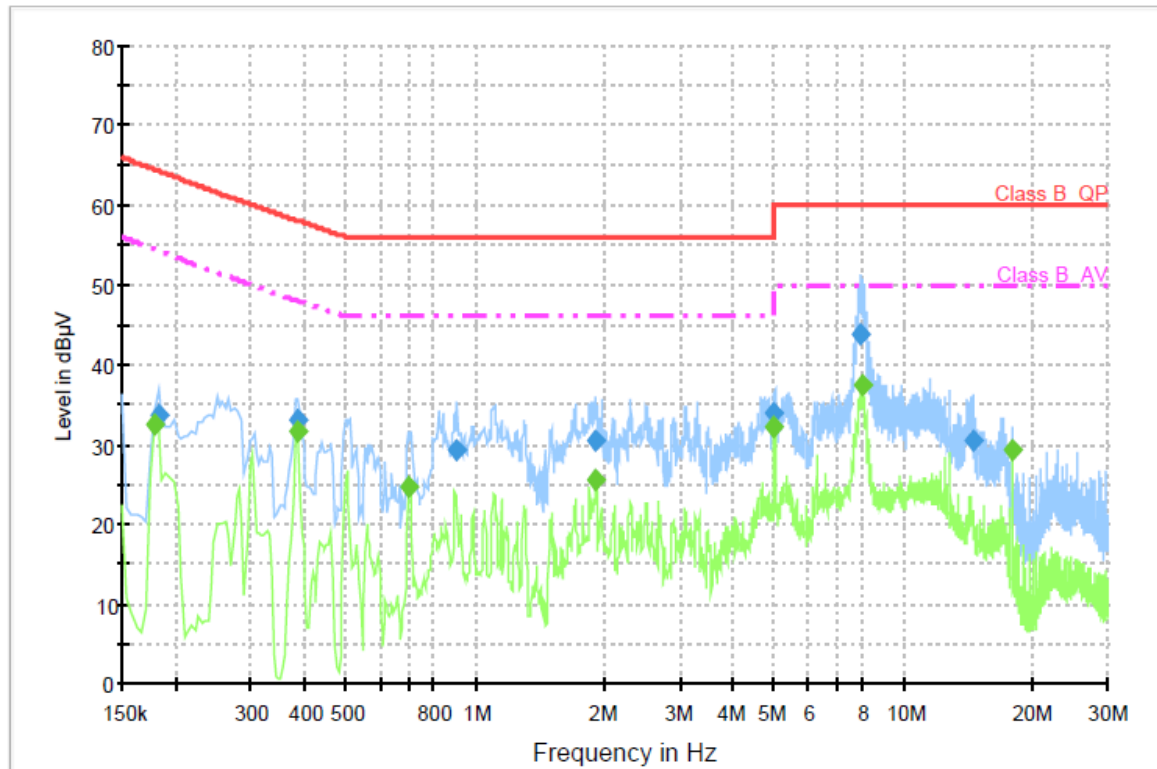
Final Measurement Detector 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.178000	32.1	1000.000	9.000	GND	L1	10.1	22.4	54.5	
0.384000	31.9	1000.000	9.000	GND	L1	10.1	16.1	48.0	
0.704000	24.5	1000.000	9.000	GND	L1	10.1	21.5	46.0	
1.916000	25.5	1000.000	9.000	GND	L1	10.1	20.5	46.0	
4.996000	29.3	1000.000	9.000	GND	L1	10.3	16.7	46.0	
7.956000	35.5	1000.000	9.000	GND	L1	10.5	14.5	50.0	
18.024000	28.4	1000.000	9.000	GND	L1	11.0	21.6	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
0.182000	33.7	1000.000	9.000	GND	N	10.1	30.6	64.3	
0.386000	33.0	1000.000	9.000	GND	N	10.1	25.0	58.0	
0.910000	29.4	1000.000	9.000	GND	N	10.1	26.6	56.0	
1.910000	30.4	1000.000	9.000	GND	N	10.2	25.6	56.0	
4.998000	33.8	1000.000	9.000	GND	N	10.3	22.2	56.0	
7.910000	43.8	1000.000	9.000	GND	N	10.4	16.2	60.0	
14.502000	30.5	1000.000	9.000	GND	N	10.7	29.5	60.0	

Final Measurement Detector 2

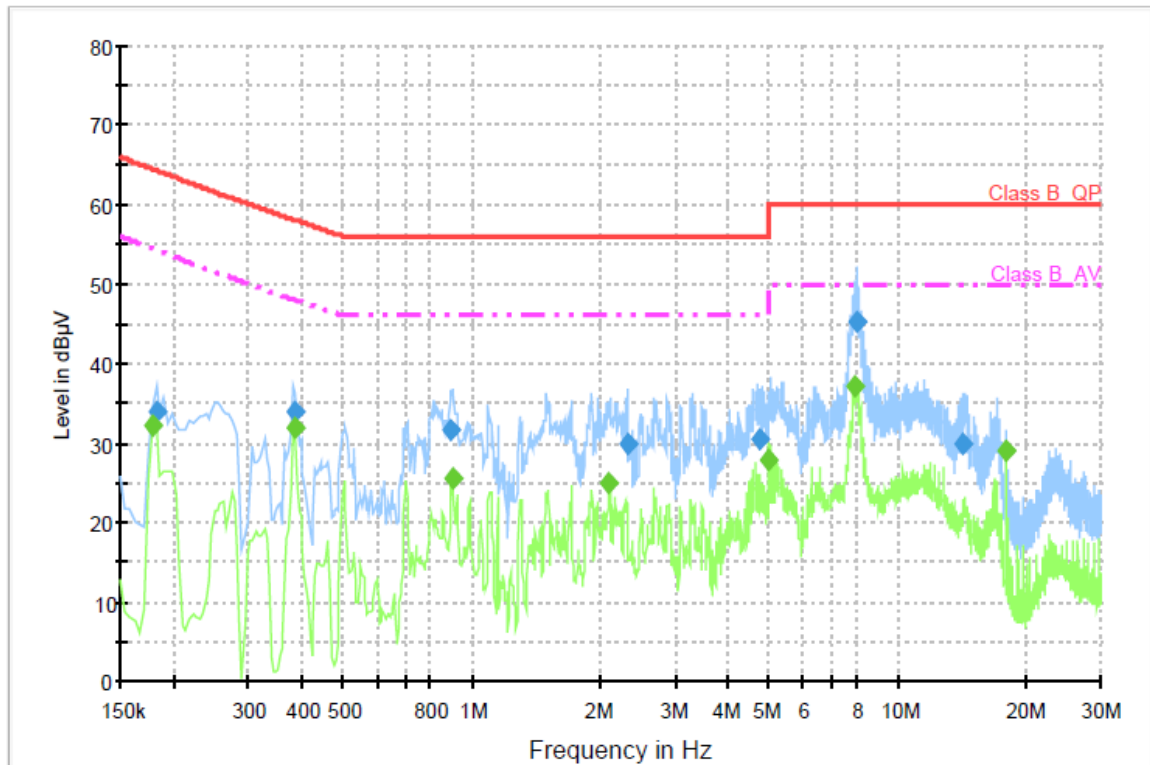
Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.178000	32.6	1000.000	9.000	GND	N	10.1	21.9	54.5	
0.386000	31.5	1000.000	9.000	GND	N	10.1	16.5	48.0	
0.702000	24.7	1000.000	9.000	GND	N	10.1	21.3	46.0	
1.918000	25.5	1000.000	9.000	GND	N	10.2	20.5	46.0	
4.998000	32.2	1000.000	9.000	GND	N	10.3	13.8	46.0	
7.986000	37.3	1000.000	9.000	GND	N	10.4	12.7	50.0	
18.022000	29.3	1000.000	9.000	GND	N	10.9	20.7	50.0	

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



◆ Operating condition: 1 920 × 1 080 / 60 Hz (DVI(Digital) and DP(Digital) dual mode)

Voltage with 4-Line-LISN_L1



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.182000	33.9	1000.000	9.000	GND	L1	10.1	30.4	64.3	
0.384000	33.8	1000.000	9.000	GND	L1	10.1	24.3	58.1	
0.896000	31.5	1000.000	9.000	GND	L1	10.1	24.5	56.0	
2.316000	30.0	1000.000	9.000	GND	L1	10.2	26.0	56.0	
4.736000	30.4	1000.000	9.000	GND	L1	10.3	25.6	56.0	
7.980000	45.3	1000.000	9.000	GND	L1	10.5	14.7	60.0	
14.184000	29.8	1000.000	9.000	GND	L1	10.8	30.2	60.0	

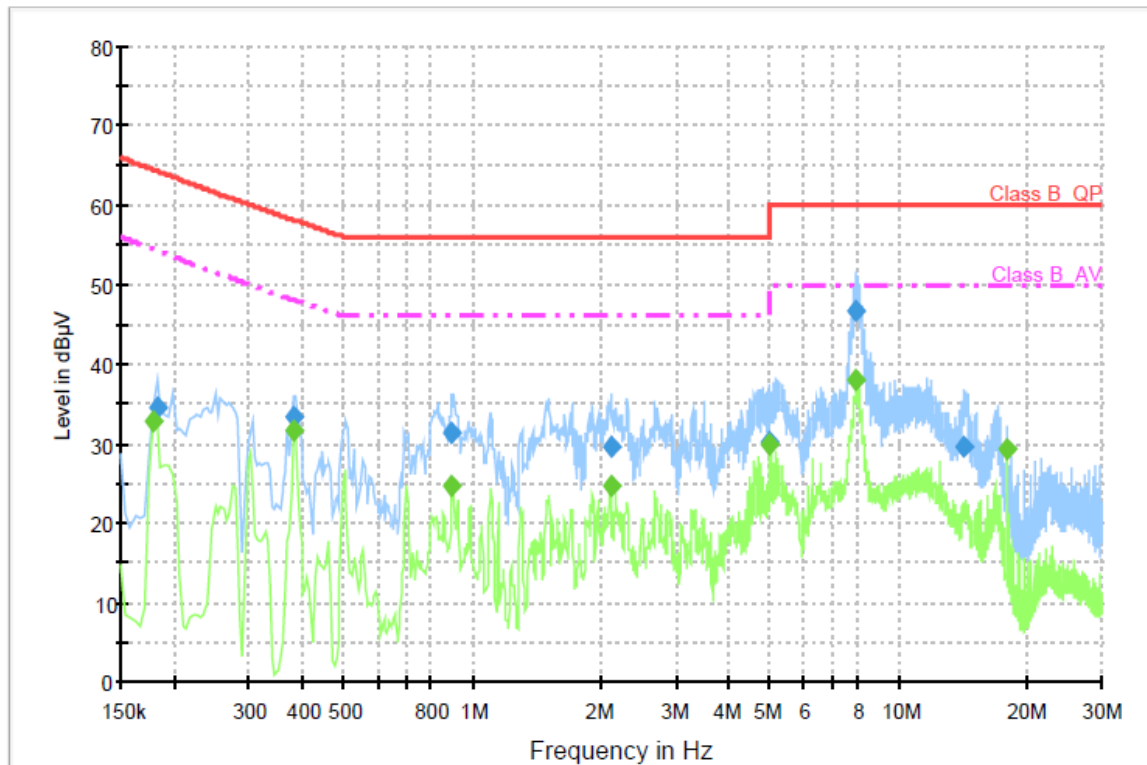
Final Measurement Detector 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.178000	32.2	1000.000	9.000	GND	L1	10.1	22.3	54.5	
0.384000	32.0	1000.000	9.000	GND	L1	10.1	16.0	48.0	
0.900000	25.4	1000.000	9.000	GND	L1	10.1	20.6	46.0	
2.092000	24.9	1000.000	9.000	GND	L1	10.2	21.1	46.0	
4.996000	27.9	1000.000	9.000	GND	L1	10.3	18.1	46.0	
7.960000	37.0	1000.000	9.000	GND	L1	10.5	13.0	50.0	
18.024000	29.1	1000.000	9.000	GND	L1	11.0	20.9	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
0.182000	34.5	1000.000	9.000	GND	N	10.1	29.8	64.3	
0.382000	33.4	1000.000	9.000	GND	N	10.1	24.7	58.1	
0.898000	31.4	1000.000	9.000	GND	N	10.1	24.6	56.0	
2.122000	29.7	1000.000	9.000	GND	N	10.2	26.3	56.0	
4.954000	30.0	1000.000	9.000	GND	N	10.3	26.0	56.0	
7.954000	46.6	1000.000	9.000	GND	N	10.4	13.4	60.0	
14.266000	29.5	1000.000	9.000	GND	N	10.7	30.5	60.0	

Final Measurement Detector 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.178000	32.6	1000.000	9.000	GND	N	10.1	21.9	54.5	
0.382000	31.6	1000.000	9.000	GND	N	10.1	16.5	48.1	
0.898000	24.6	1000.000	9.000	GND	N	10.1	21.4	46.0	
2.114000	24.6	1000.000	9.000	GND	N	10.2	21.4	46.0	
4.998000	29.9	1000.000	9.000	GND	N	10.3	16.1	46.0	
7.966000	37.8	1000.000	9.000	GND	N	10.4	12.2	50.0	
18.022000	29.3	1000.000	9.000	GND	N	10.9	20.7	50.0	

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



6. Radiated Emission

6.1 Operating Environment

Temperature : 29.0 °C
Relative Humidity : 48.0 % 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

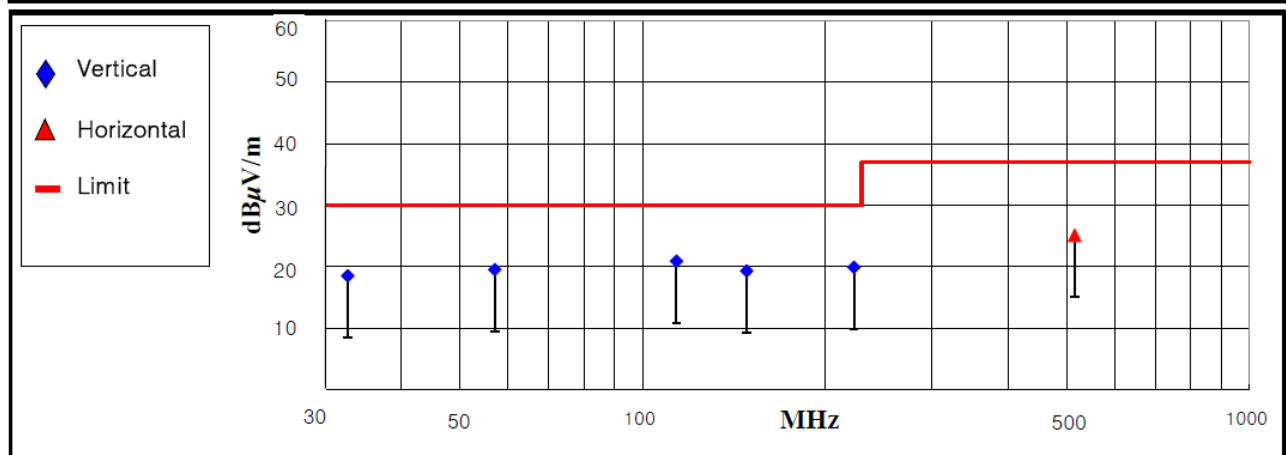


6.6 Test data for Radiated Emission

- Test Date : September 5, 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) and HDMI(Digital) dual mode)

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 (°)
32.67	4.49	12.64	1.37	18.50	30.00	11.50	V	125	211
57.08	9.23	8.42	1.85	19.50	30.00	10.50	V	100	336
113.74	7.51	10.68	2.71	20.90	30.00	9.10	V	100	26
148.42	4.21	11.94	3.15	19.30	30.00	10.70	V	102	226
222.95	1.94	13.97	3.99	19.90	30.00	10.10	V	100	274
515.28	0.92	17.76	6.42	25.10	37.00	11.90	H	219	248

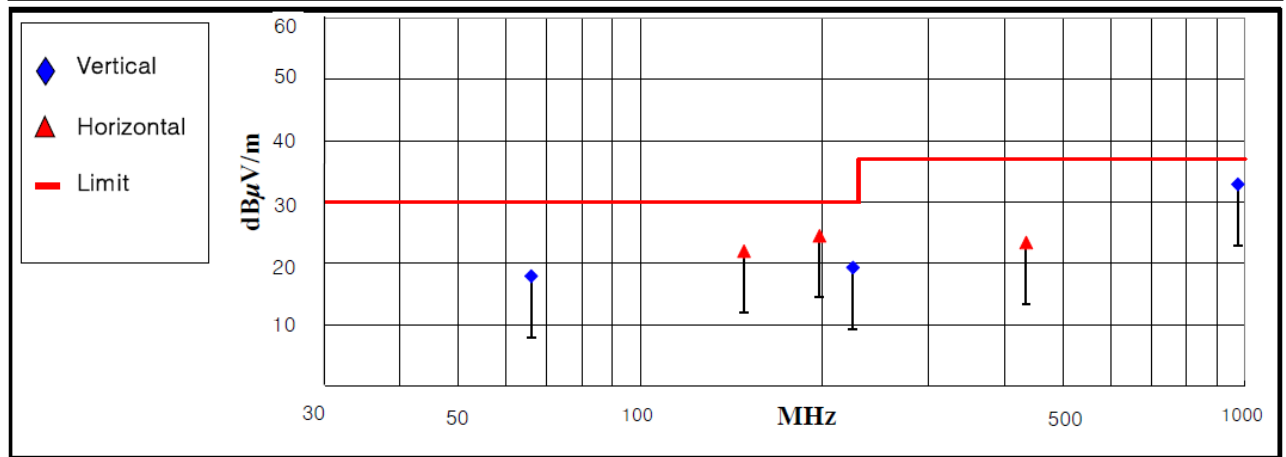


< Fig 12. Radiated emission result (30 MHz ~ 1 000 MHz) >



◆ Operating Condition: 1 920 × 1 080 / 60 Hz (DVI(Digital) and DP(Digital) dual mode)

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)	(°)
66.02	7.45	8.44	2.01	17.90	30.00	12.10	V	100	256
148.50	6.91	11.94	3.15	22.00	30.00	8.00	H	237	52
197.97	6.35	14.41	3.74	24.50	30.00	5.50	H	120	96
224.85	1.37	13.92	4.01	19.30	30.00	10.70	V	109	186
434.81	0.91	16.67	5.82	23.40	37.00	13.60	H	100	93
974.43	0.13	23.29	9.48	32.90	37.00	4.10	V	145	0



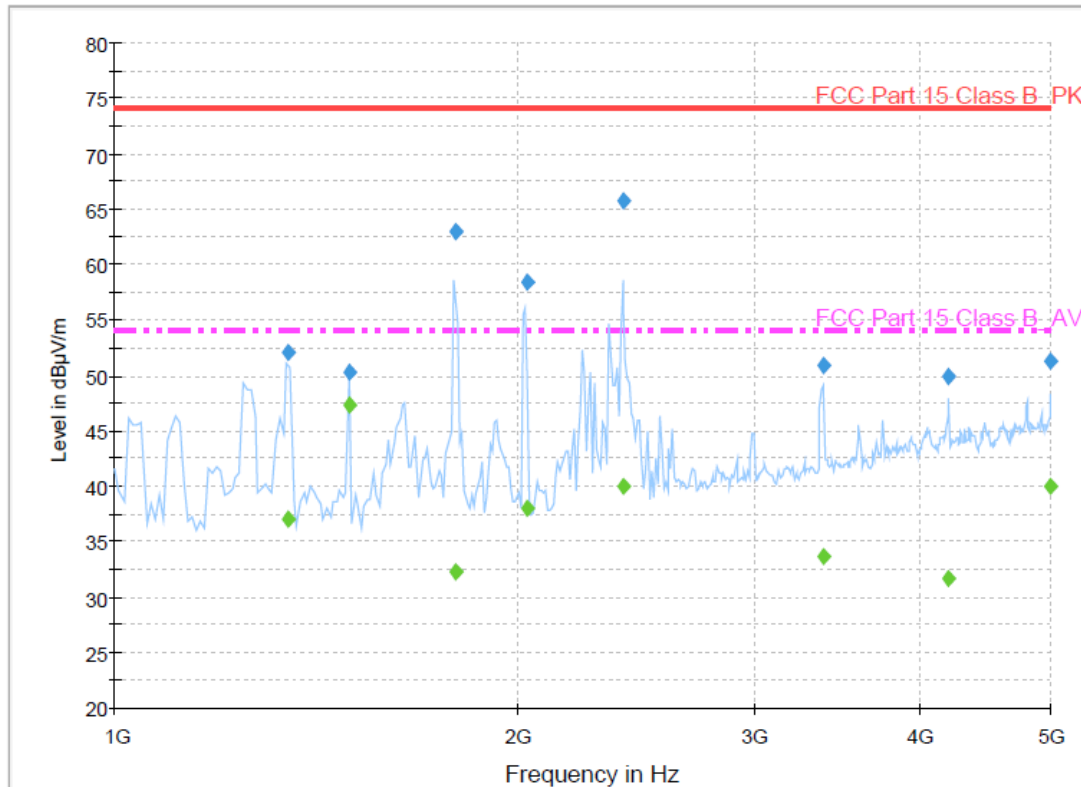
< Fig 13. Radiated emission result (30 MHz ~ 1 000 MHz) >



- ◆ Operating Condition: 1 920 × 1 080 / 60 Hz (RGB(Analog) and HDMI(Digital) dual mode)

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)
1349.689379	52.1	1000.0	1000.000	100.0	V	43.0	-13.4	21.9	74.0
1500.393988	50.2	1000.0	1000.000	100.0	V	13.0	-13.2	23.8	74.0
1796.987174	62.9	1000.0	1000.000	100.0	H	202.0	-12.0	11.1	74.0
2031.052104	58.3	1000.0	1000.000	100.0	V	130.0	-11.3	15.7	74.0
2399.789579	65.8	1000.0	1000.000	100.0	H	123.0	-9.4	8.2	74.0
3383.761523	51.0	1000.0	1000.000	100.0	H	53.0	-5.4	23.0	74.0
4196.196794	50.0	1000.0	1000.000	100.0	V	184.0	-2.5	24.0	74.0
4999.800000	51.3	1000.0	1000.000	100.0	H	56.0	-0.8	22.7	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)
1349.689379	37.1	1000.0	1000.000	100.0	V	43.0	-13.4	16.9	54.0
1500.393988	47.3	1000.0	1000.000	100.0	V	13.0	-13.2	6.7	54.0
1796.987174	32.3	1000.0	1000.000	100.0	H	202.0	-12.0	21.7	54.0
2031.052104	37.9	1000.0	1000.000	100.0	V	130.0	-11.3	16.1	54.0
2399.789579	40.1	1000.0	1000.000	100.0	H	123.0	-9.4	13.9	54.0
3383.761523	33.7	1000.0	1000.000	100.0	H	53.0	-5.4	20.3	54.0
4196.196794	31.7	1000.0	1000.000	100.0	V	184.0	-2.5	22.3	54.0
4999.800000	40.0	1000.0	1000.000	100.0	H	56.0	-0.8	14.0	54.0

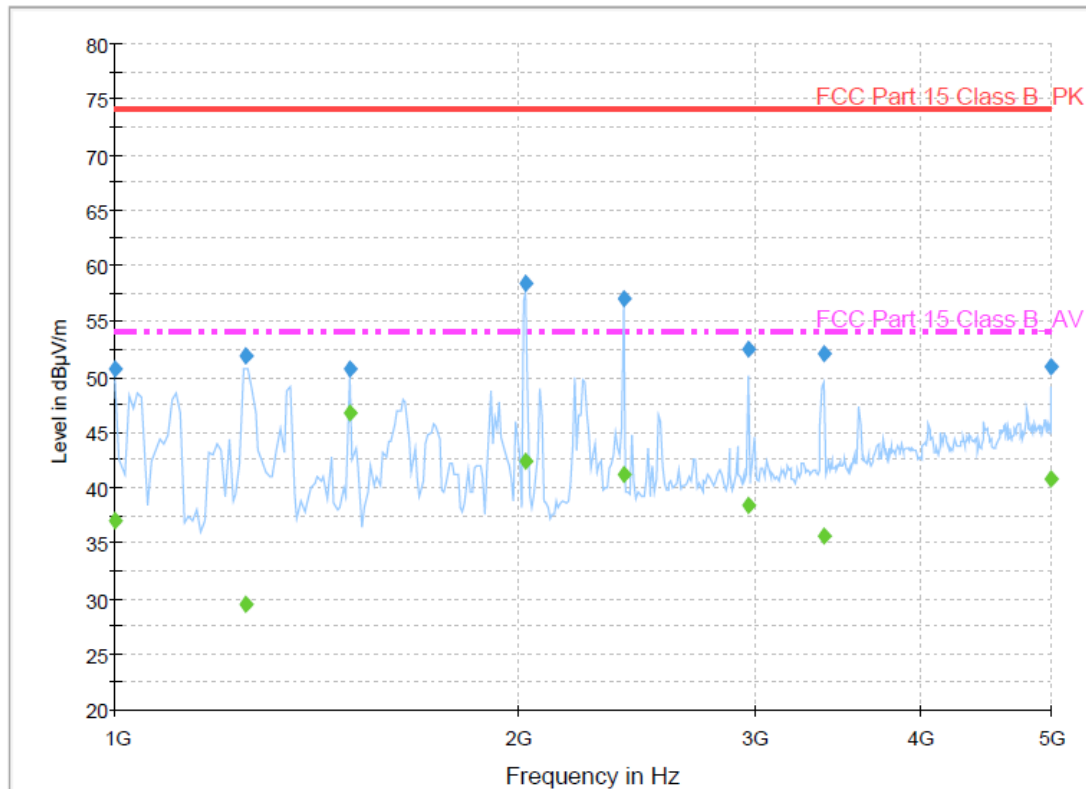
< Fig 14. Radiated emission result (1 000 MHz ~ 5 000 MHz) >



◆ Operating Condition: 1 920 × 1 080 / 60 Hz (DVI(Digital) and DP(Digital) dual mode)

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)
1000.000000	50.7	1000.0	1000.000	100.0	V	112.0	-14.5	23.3	74.0
1252.296994	51.9	1000.0	1000.000	100.0	H	192.0	-13.8	22.1	74.0
1499.993988	50.8	1000.0	1000.000	100.0	V	-2.0	-13.2	23.2	74.0
2024.252104	58.4	1000.0	1000.000	100.0	V	136.0	-11.4	15.6	74.0
2399.789579	57.1	1000.0	1000.000	100.0	H	134.0	-9.4	16.9	74.0
2970.143888	52.5	1000.0	1000.000	100.0	H	207.0	-6.8	21.5	74.0
3382.961523	52.1	1000.0	1000.000	115.0	H	54.0	-5.4	21.9	74.0
5000.000000	50.9	1000.0	1000.000	100.0	H	53.0	-0.8	23.1	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	37.0	1000.0	1000.000	100.0	V	112.0	-14.5	17.0	54.0
1252.296994	29.5	1000.0	1000.000	100.0	H	192.0	-13.8	24.5	54.0
1499.993988	46.7	1000.0	1000.000	100.0	V	-2.0	-13.2	7.3	54.0
2024.252104	42.3	1000.0	1000.000	100.0	V	136.0	-11.4	11.7	54.0
2399.789579	41.2	1000.0	1000.000	100.0	H	134.0	-9.4	12.8	54.0
2970.143888	38.5	1000.0	1000.000	100.0	H	207.0	-6.8	15.5	54.0
3382.961523	35.7	1000.0	1000.000	115.0	H	54.0	-5.4	18.3	54.0
5000.000000	40.7	1000.0	1000.000	100.0	H	53.0	-0.8	13.3	54.0

< Fig 15. 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: 42WS10)** was complies with §15.107 and 15.109 of the FCC Rules.