

FCC EVALUATION REPORT FOR CERTIFICATION

FCC Class B (Class II Permissive Change)

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 21, 2011

Order Number: GETEC-C1-11-215

Test Report Number: GETEC-E3-11-108

Test Site: Gumi College EMC Center

FCC Registration Number: (100749, 443957)

FCC ID. : BEJ42LW5600UA

Applicant : LG Electronics Inc.

Rule Part(s)	: FCC Part 15 Subpart B
Equipment Class	: Class B computing device peripheral (JBP)
EUT Type	: LED LCD TV/Monitor
Type of Authority	: Certification
Model Name	: 42LW5600-UA
Trade Name	: LG
Class II Change(s)	: With alternate power board and panel module

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.** BEJ42LW5600UA
- **EUT Type** LED LCD TV/Monitor
- **Model Name** 42LW5600-UA
- **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 7 ~ 15, 2011
- **Place of Test** **Gumi College EMC Center** (FCC Registration Number: 100749, 443957)
407, Bugok-dong, Gumi-si, Gyeongbuk, Korea.
- **Test Report Number** GETEC-E3-11-108
- **Dates of Issue** September 21, 2011
- **Class II Change(s)** With alternate power board and panel module



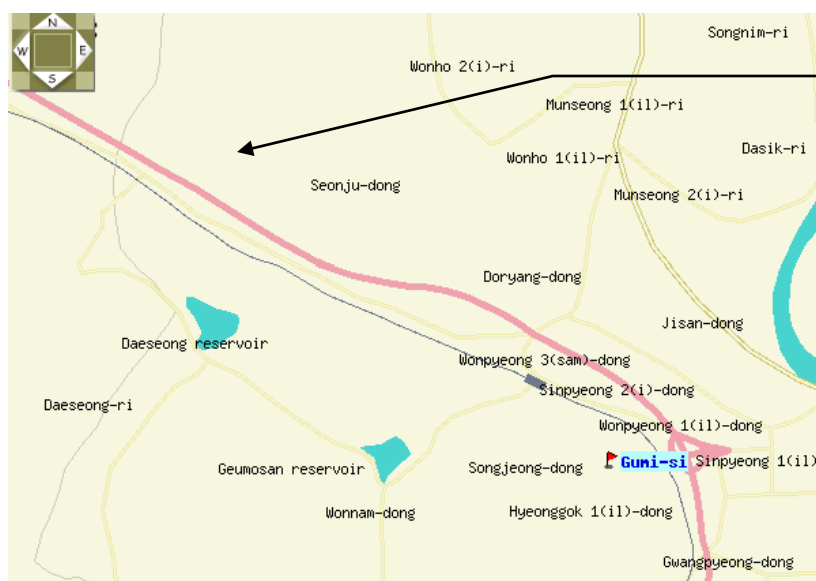
2. Introduction

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 TV/Monitor (Model Name: 42LW5600-UA)**

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 TV/Monitor (Model Name: 42LW5600-UA) FCC ID.: BEJ42LW5600UA**

MODELS		42LW5600 (42LW5600-UA)	47LW5600 (47LW5600-UA)	55LW5600 (55LW5600-UA)
Dimensions (W x H x D)	With stand	1005.0 mm x 688.0 mm x 256.3 mm	1115.0 mm x 750.0 mm x 256.3 mm	1293.0 mm x 851.0 mm x 338.0 mm
	Without stand	1005.0 mm x 621.0 mm x 29.9 mm	1115.0 mm x 683.0 mm x 29.9 mm	1293.0 mm x 785.0 mm x 29.9 mm
Weight	With stand	15.2 kg	20.7 kg	26.3 kg
	Without stand	13.0 kg	18.5 kg	22.0 kg
Power requirement		AC100-240V - 50/60Hz		
Television System		NTSC-M, ATSC, 64 & 256 QAM		
Program Coverage		VHF 2-13, UHF 14-69, CATV 1-135, DTV 2-69, CADTV 1-135		
External Antenna Impedance		75 Ω		
Environment condition	Operating Temperature	0 - 40°C		
	Operating Humidity	Less than 80%		
	Storage Temperature	-20 - 60°C		
	Storage Humidity	Less than 85%		

- Maximum Frequency Range : 796 MHz



3.2 Support Equipment / Cables used

3.2.1 Used Support Equipment

Description	Manufacturer	Model Name	S/N & FCC ID.
PC(Main board)	ASROCK	770iCafe	S/N: 0AM0X3097310 FCC ID.: DoC
Video card	Rextechnology Co., Ltd.	HD4850	S/N: L5H041947 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
USB memory stick	SAMSUNG	SUM-PSB4	S/N: TBBB202478F FCC ID.: DoC
Headset	PHILIPS	SBC HL140	S/N: None. FCC ID.: N/A
TV signal generator	FLUKE	54200M01	S/N: 831011 FCC ID.: DoC
Wireless ready dongle	LG Electronics Inc.	None.	S/N: None. FCC ID.: N/A

See “Appendix B– 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	OHNSUNG ELECTRONICS CO., LTD.	AKB72915238	S/N: None. FCC ID.: N/A
Motion remote controller	OHSUNG ELECTRONICS CO., LTD.	AKB73295502	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) cable	Connected to the EUT and PC	1.80 m shielded with two ferrite cores
HDMI/DVI(Digital) cable	Connected to the EUT and PC	2.00 m shielded
RS-232C (Control & service) cable	Connected to the EUT and PC	1.80 m shielded
Audio(RGB/DVI) in cable	Connected to the EUT and PC	1.50 m shielded
AV in cable	Connected to the EUT and DVD player	3.00 m shielded
AV 2 in cable	Connected to the EUT and DVD player	0.90 m shielded
Component in cable	Connected to the EUT and DVD player	3.00 m shielded
Component 2 in cable	Connected to the EUT and DVD player	2.00 m shielded
Headset cable	Connected to the EUT and headset	1.20 m shielded
Wireless control cable	Connected to the EUT and wireless ready dongle	0.40 m shielded with a ferrite core
LAN cable	Connected to the EUT and Network	10.00 m unshielded
Antenna cable	Connected to the EUT and TV signal generator	10.00 m shielded

3.3 Modification Item(s)

- None



4. Description of tests

4.1 Test Condition

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

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

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

- Test Mode(s)

- . Monitor mode

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

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

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

◆ Operating test pattern

- . "H" character scrolling mode (Font size: 10)
- . Black background white character
- . Brightness and contrast was adjusted as maximum level
- . Continuous playback of 1 kHz audio file with winamp player
- . USB memory stick was connected to the USB port
- . Connected to the Network via LAN

"The verification report for TV/AV mode would be issued by LG Electronics Inc."



4.2 Conducted Emission

The Line conducted emission test facility is inside a 4 m × 8 m × 2.5 m shielded enclosure. (FCC Registration No.: 100749)

The EUT was placed on a non-conducting 1.0 m by 1.5 m table, which is 0.8 m in height and 0.4 m away from the vertical wall of the shielded enclosure.

The EUT is powered from the Rohde & Schwarz LISN (ESH2-Z5) and the support equipment is powered from the Rohde & Schwarz LISN (ESH3-Z5). Powers to the LISN are filtered by high-current high insertion loss power line filter.

Sufficient time for EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition.

The RF output of the LISN was connected to the EMI test receiver (Rohde & Schwarz, ESCS30).

The EMI test receiver was scanned from 150 kHz to 30 MHz with 20 ms sweep time to determine the frequency producing the maximum EME from the EUT. The frequency producing the maximum level was re-examined using Quasi-Peak mode of the EMI test receiver.

The bandwidth of Quasi-peak mode was set to 9 kHz. Each emission was maximized consistent with typical applications by varying the configuration of the test sample. Interface cables were connected to the available interface ports of the test unit. The effect of varying the position of cables was investigated to find the configuration that produces maximum diagram emission. Excess cable lengths were bundled at center with 30 cm ~ 40 cm.

Each EME reported was calibrated using the R/S signal generator

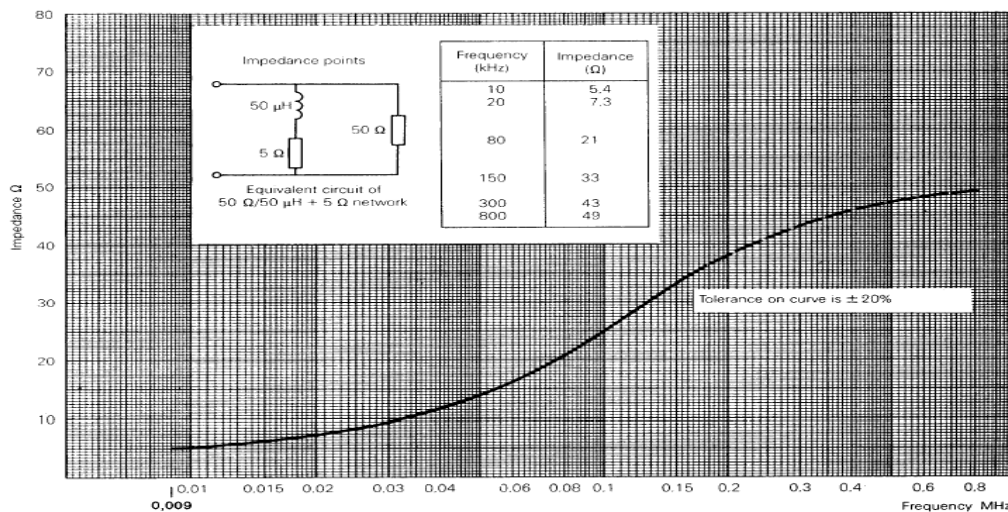


Fig 2. Impedance of LISN



4.3 Radiated Emission

Preliminary measurements were conducted 3 m semi anechoic chamber using broadband antennas to determine the frequency producing the maximum EME. Appropriate precaution was taken to ensure that all EME from the EUT were maximized and investigated. The technology configuration, mode of operation and turntable azimuth with respect to antenna was note for each frequency found.

Final measurements were made 3 m chamber (FCC registration No.: 443957) and/or 10 m OATS (FCC registration No.: 100749).

Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition.

Each frequency found during pre-scan measurements was re-examined and investigated using EMI test receiver. The detector function was set to CISPR quasi-peak mode average mode and the bandwidth of the receiver was set to 120 kHz or 1 MHz depending on the frequency or type of signal.

The EUT, support equipment and interconnecting cables were reconfigured to the setup producing the maximum emission for the frequency and were placed on top of a 0.8 m high non-metallic 1.0 m × 1.5 m table.

The turntable containing the test sample was rotated; the antenna height was varied 1 to 4 meter and stopped at the azimuth or height producing the maximum emission.

Each EME reported was calibrated using the R/S signal generator

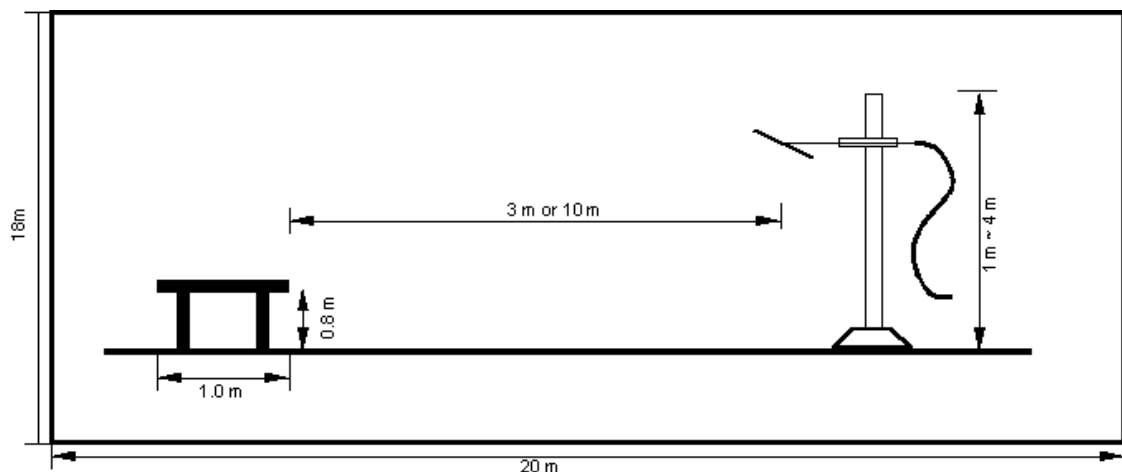


Fig 3. Dimensions of test site



5. Conducted Emission

5.1 Operating Environment

Temperature : 24.0 °C
Relative Humidity : 51.0 % 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

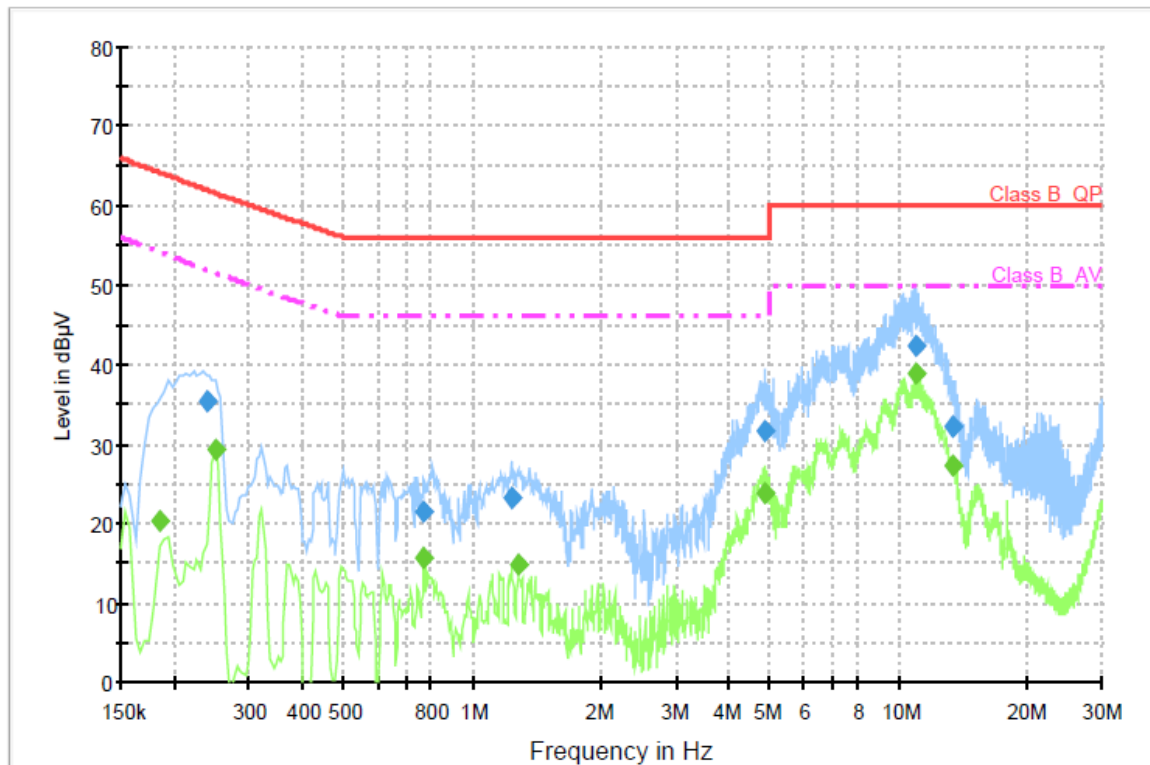
5.6 Test data for Conducted Emission

-. Test Date : September 7, 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
0.240000	35.3	1000.000	9.000	GND	L1	10.1	26.6	61.9	
0.772000	21.5	1000.000	9.000	GND	L1	10.1	34.5	56.0	
1.236000	23.2	1000.000	9.000	GND	L1	10.1	32.8	56.0	
4.856000	31.5	1000.000	9.000	GND	L1	10.3	24.5	56.0	
11.020000	42.4	1000.000	9.000	GND	L1	10.6	17.6	60.0	
13.448000	32.1	1000.000	9.000	GND	L1	10.8	27.9	60.0	

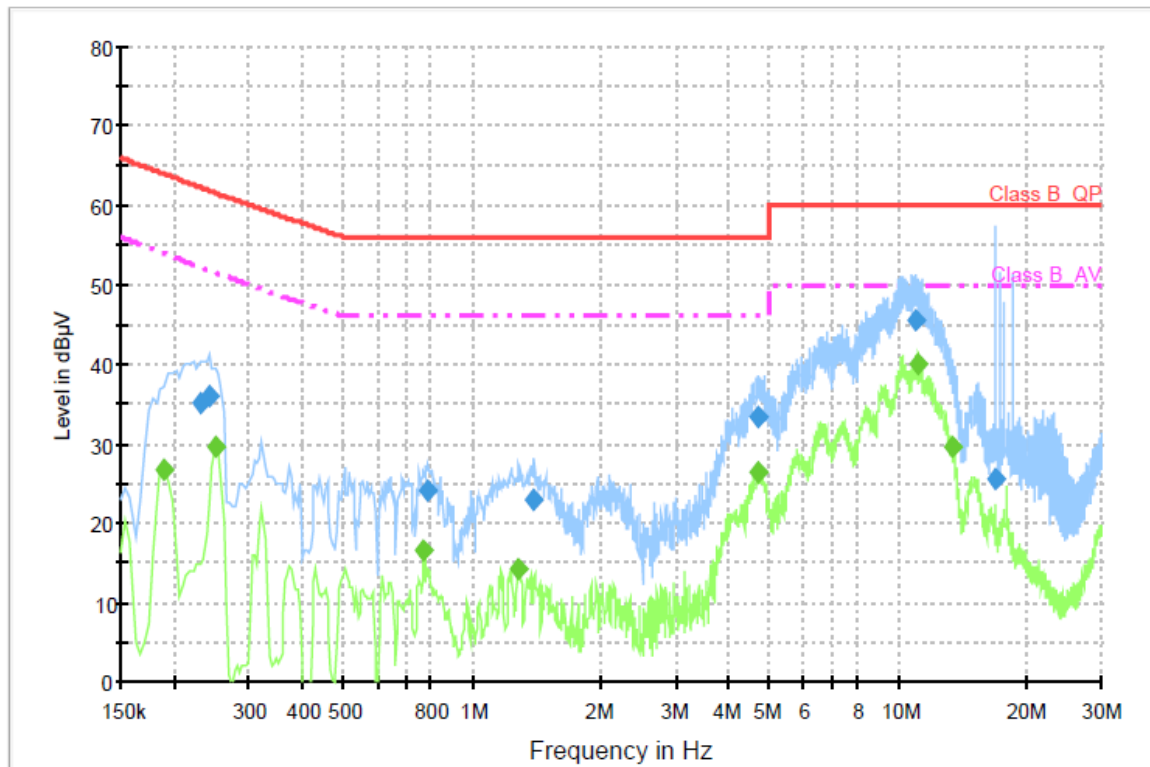
Final Measurement Detector 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.186000	20.2	1000.000	9.000	GND	L1	10.1	33.9	54.1	
0.252000	29.4	1000.000	9.000	GND	L1	10.1	22.0	51.4	
0.772000	15.7	1000.000	9.000	GND	L1	10.1	30.3	46.0	
1.280000	14.8	1000.000	9.000	GND	L1	10.1	31.2	46.0	
4.860000	23.7	1000.000	9.000	GND	L1	10.3	22.3	46.0	
11.012000	38.8	1000.000	9.000	GND	L1	10.6	11.2	50.0	
13.336000	27.3	1000.000	9.000	GND	L1	10.7	22.7	50.0	

< Fig 4. Conducted emission result (Live line) >



Voltage with 4-Line-LISN_N



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.230000	35.0	1000.000	9.000	GND	N	10.1	27.3	62.3	
0.242000	36.0	1000.000	9.000	GND	N	10.1	25.8	61.8	
0.790000	24.1	1000.000	9.000	GND	N	10.1	31.9	56.0	
1.398000	22.9	1000.000	9.000	GND	N	10.1	33.1	56.0	
4.718000	33.4	1000.000	9.000	GND	N	10.3	22.6	56.0	
11.006000	45.5	1000.000	9.000	GND	N	10.5	14.5	60.0	
16.846000	25.5	1000.000	9.000	GND	N	10.8	34.5	60.0	

Final Measurement Detector 2

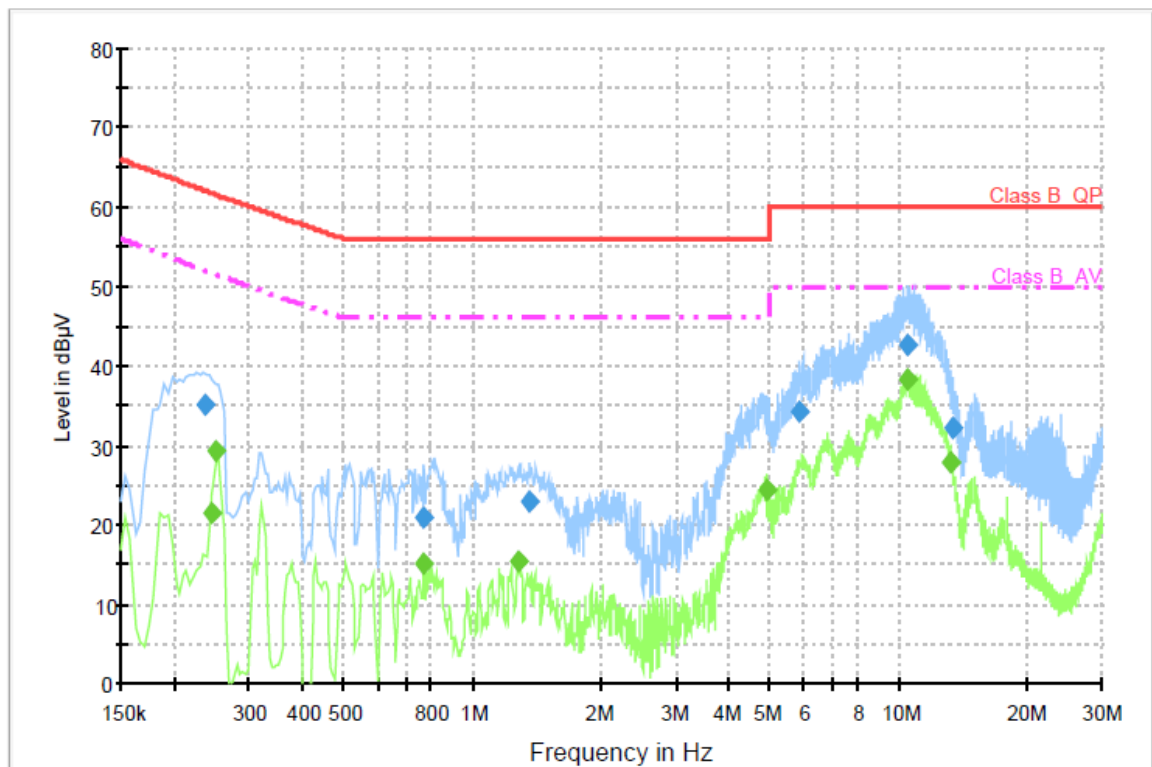
Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.190000	26.8	1000.000	9.000	GND	N	10.1	27.1	53.9	
0.250000	29.6	1000.000	9.000	GND	N	10.1	21.9	51.5	
0.770000	16.4	1000.000	9.000	GND	N	10.1	29.6	46.0	
1.282000	14.2	1000.000	9.000	GND	N	10.1	31.8	46.0	
4.714000	26.3	1000.000	9.000	GND	N	10.3	19.7	46.0	
11.094000	40.1	1000.000	9.000	GND	N	10.6	9.9	50.0	
13.374000	29.7	1000.000	9.000	GND	N	10.7	20.3	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
0.236000	35.0	1000.000	9.000	GND	L1	10.1	27.0	62.0	
0.768000	20.9	1000.000	9.000	GND	L1	10.1	35.1	56.0	
1.360000	22.9	1000.000	9.000	GND	L1	10.1	33.1	56.0	
5.828000	34.2	1000.000	9.000	GND	L1	10.4	25.8	60.0	
10.480000	42.6	1000.000	9.000	GND	L1	10.6	17.4	60.0	
13.372000	32.2	1000.000	9.000	GND	L1	10.7	27.8	60.0	

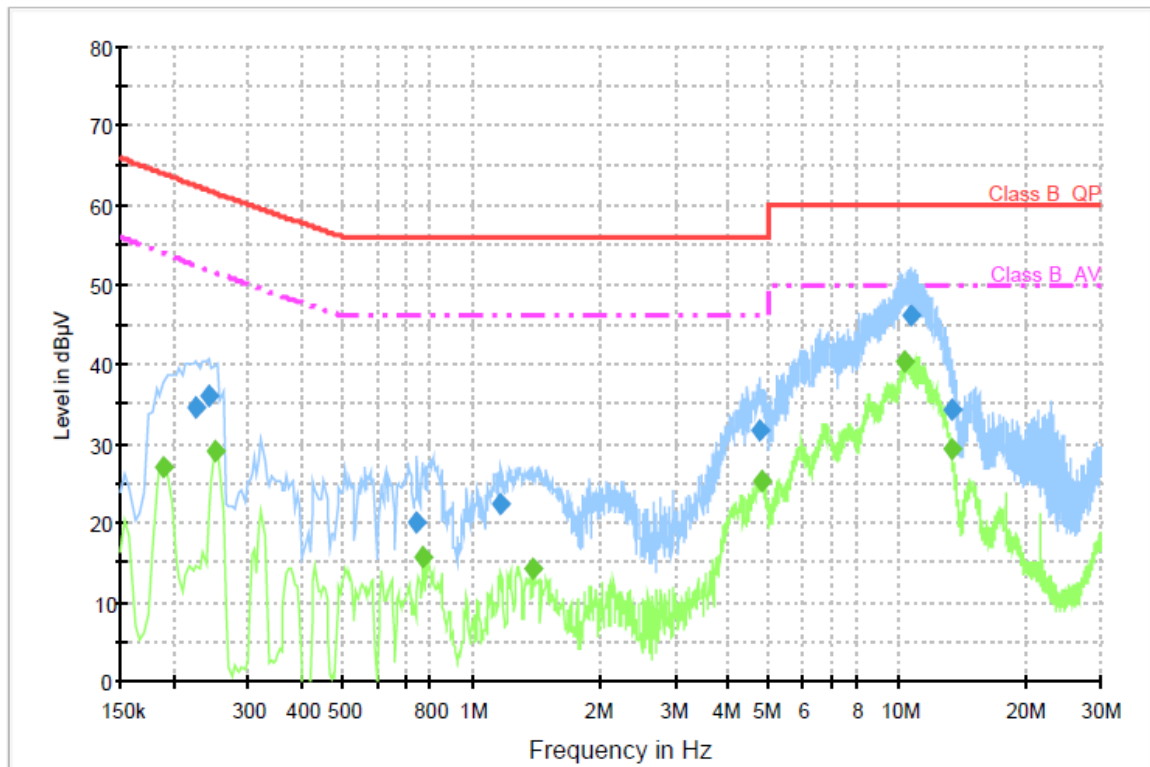
Final Measurement Detector 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.244000	21.4	1000.000	9.000	GND	L1	10.1	30.3	51.7	
0.252000	29.2	1000.000	9.000	GND	L1	10.1	22.2	51.4	
0.772000	15.1	1000.000	9.000	GND	L1	10.1	30.9	46.0	
1.280000	15.3	1000.000	9.000	GND	L1	10.1	30.7	46.0	
4.920000	24.5	1000.000	9.000	GND	L1	10.3	21.5	46.0	
10.456000	38.4	1000.000	9.000	GND	L1	10.6	11.6	50.0	
13.296000	27.7	1000.000	9.000	GND	L1	10.7	22.3	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
0.226000	34.6	1000.000	9.000	GND	N	10.1	27.8	62.4	
0.242000	35.9	1000.000	9.000	GND	N	10.1	25.9	61.8	
0.746000	19.9	1000.000	9.000	GND	N	10.1	36.1	56.0	
1.174000	22.3	1000.000	9.000	GND	N	10.1	33.7	56.0	
4.758000	31.6	1000.000	9.000	GND	N	10.3	24.4	56.0	
10.738000	46.0	1000.000	9.000	GND	N	10.5	14.0	60.0	
13.426000	34.2	1000.000	9.000	GND	N	10.7	25.8	60.0	

Final Measurement Detector 2

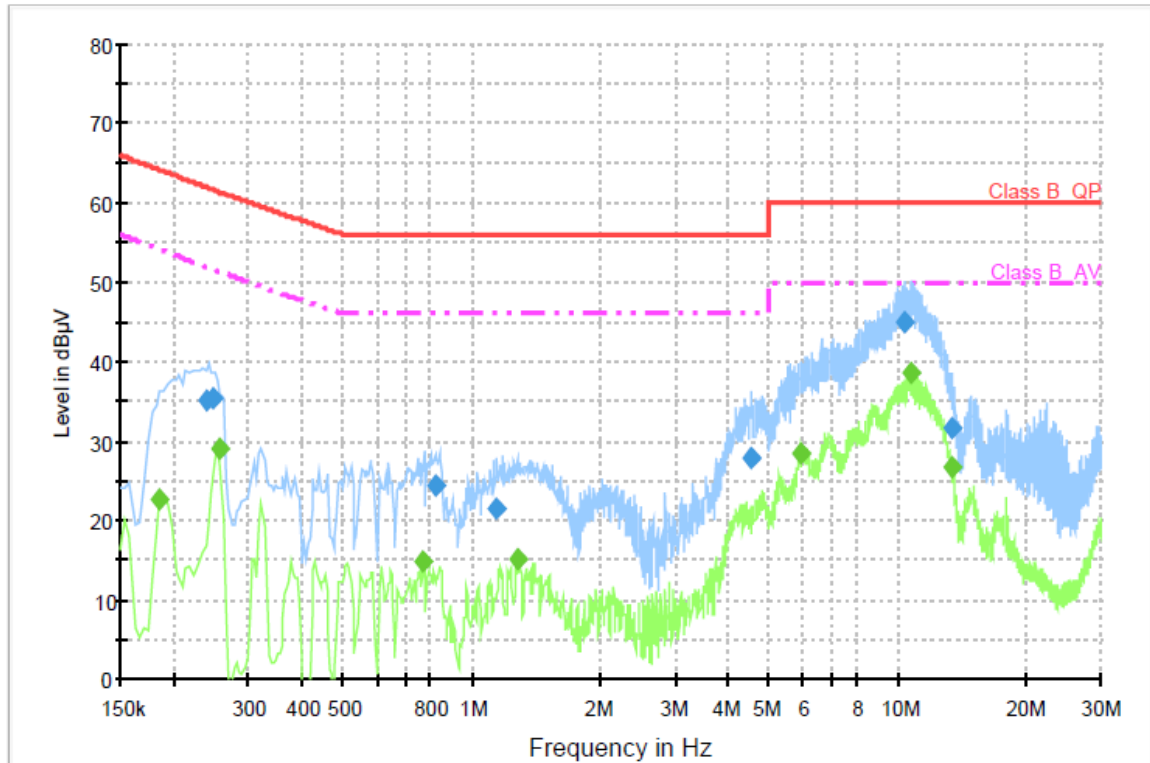
Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.190000	27.0	1000.000	9.000	GND	N	10.1	26.9	53.9	
0.250000	28.9	1000.000	9.000	GND	N	10.1	22.6	51.5	
0.770000	15.7	1000.000	9.000	GND	N	10.1	30.3	46.0	
1.398000	14.3	1000.000	9.000	GND	N	10.1	31.7	46.0	
4.798000	25.1	1000.000	9.000	GND	N	10.3	20.9	46.0	
10.394000	40.2	1000.000	9.000	GND	N	10.5	9.8	50.0	
13.342000	29.2	1000.000	9.000	GND	N	10.7	20.8	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
0.240000	35.0	1000.000	9.000	GND	L1	10.1	26.9	61.9	
0.248000	35.3	1000.000	9.000	GND	L1	10.1	26.3	61.6	
0.820000	24.5	1000.000	9.000	GND	L1	10.1	31.5	56.0	
1.140000	21.3	1000.000	9.000	GND	L1	10.1	34.7	56.0	
4.508000	27.9	1000.000	9.000	GND	L1	10.3	28.1	56.0	
10.328000	44.9	1000.000	9.000	GND	L1	10.5	15.1	60.0	
13.376000	31.5	1000.000	9.000	GND	L1	10.7	28.5	60.0	

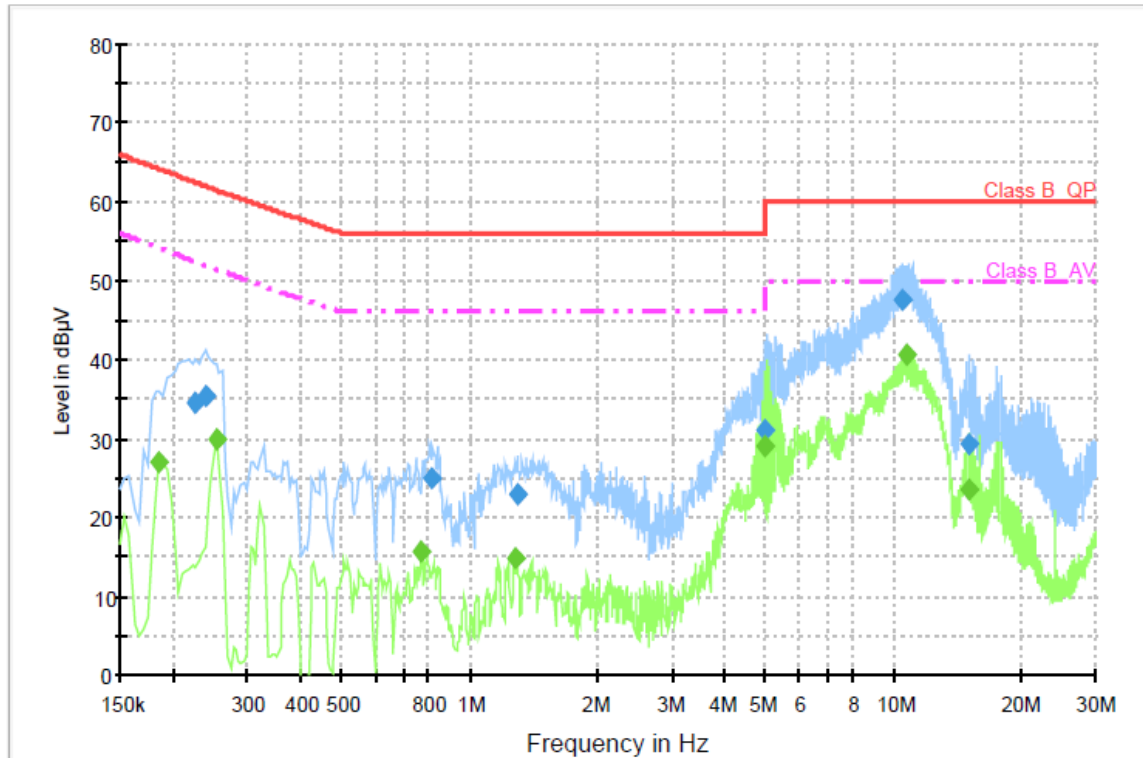
Final Measurement Detector 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.186000	22.7	1000.000	9.000	GND	L1	10.1	31.4	54.1	
0.256000	28.9	1000.000	9.000	GND	L1	10.1	22.4	51.3	
0.768000	14.9	1000.000	9.000	GND	L1	10.1	31.1	46.0	
1.280000	15.2	1000.000	9.000	GND	L1	10.1	30.8	46.0	
5.892000	28.4	1000.000	9.000	GND	L1	10.4	21.6	50.0	
10.796000	38.6	1000.000	9.000	GND	L1	10.6	11.4	50.0	
13.332000	26.8	1000.000	9.000	GND	L1	10.7	23.2	50.0	

< Fig 8. Conducted emission result (Live line) >



Voltage with 4-Line-LISN_N



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.226000	34.4	1000.000	9.000	GND	N	10.1	28.0	62.4	
0.238000	35.3	1000.000	9.000	GND	N	10.1	26.7	62.0	
0.818000	24.8	1000.000	9.000	GND	N	10.1	31.2	56.0	
1.302000	23.0	1000.000	9.000	GND	N	10.1	33.0	56.0	
4.990000	31.0	1000.000	9.000	GND	N	10.3	25.0	56.0	
10.446000	47.4	1000.000	9.000	GND	N	10.5	12.6	60.0	
15.070000	29.4	1000.000	9.000	GND	N	10.7	30.6	60.0	

Final Measurement Detector 2

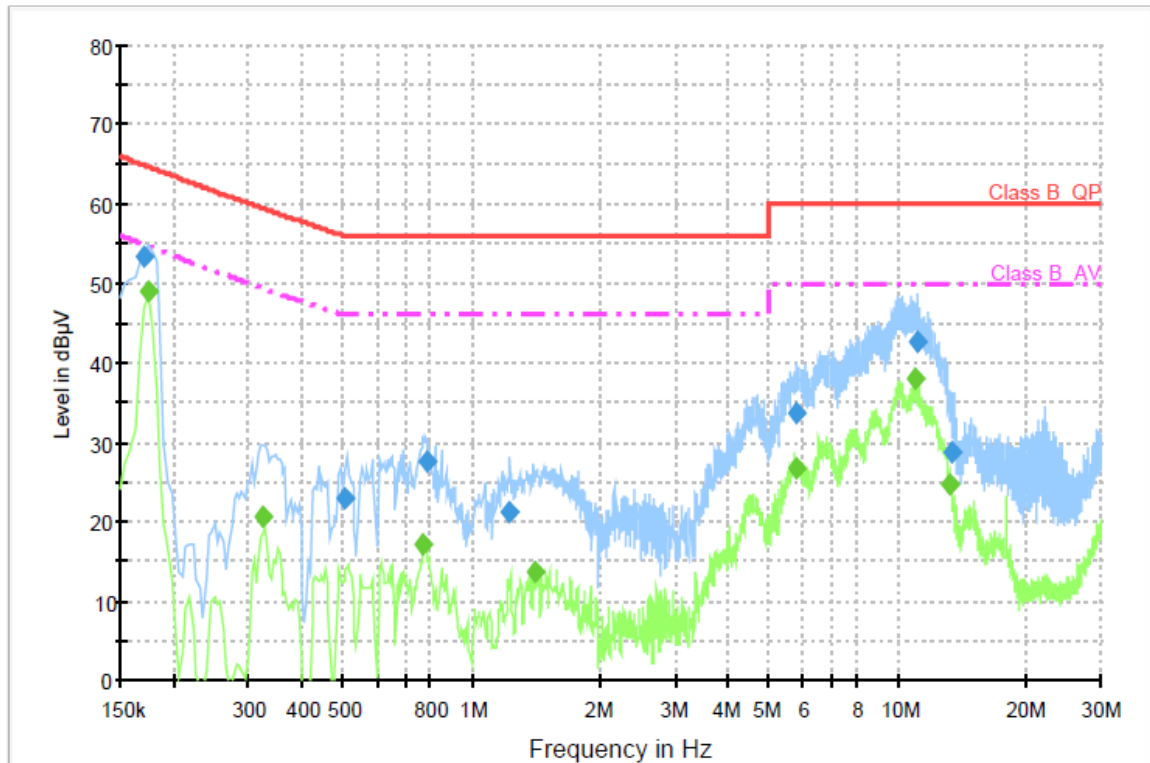
Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.186000	26.9	1000.000	9.000	GND	N	10.1	27.2	54.1	
0.254000	29.7	1000.000	9.000	GND	N	10.1	21.7	51.4	
0.770000	15.6	1000.000	9.000	GND	N	10.1	30.4	46.0	
1.278000	14.6	1000.000	9.000	GND	N	10.1	31.4	46.0	
4.986000	29.1	1000.000	9.000	GND	N	10.3	16.9	46.0	
10.706000	40.7	1000.000	9.000	GND	N	10.5	9.3	50.0	
15.014000	23.5	1000.000	9.000	GND	N	10.7	26.5	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
0.170000	53.5	1000.000	9.000	GND	L1	10.1	11.4	64.9	
0.504000	22.9	1000.000	9.000	GND	L1	10.1	33.2	56.0	
0.784000	27.4	1000.000	9.000	GND	L1	10.1	28.6	56.0	
1.224000	21.2	1000.000	9.000	GND	L1	10.1	34.8	56.0	
5.780000	33.6	1000.000	9.000	GND	L1	10.4	26.4	60.0	
11.068000	42.5	1000.000	9.000	GND	L1	10.6	17.5	60.0	
13.440000	28.7	1000.000	9.000	GND	L1	10.8	31.3	60.0	

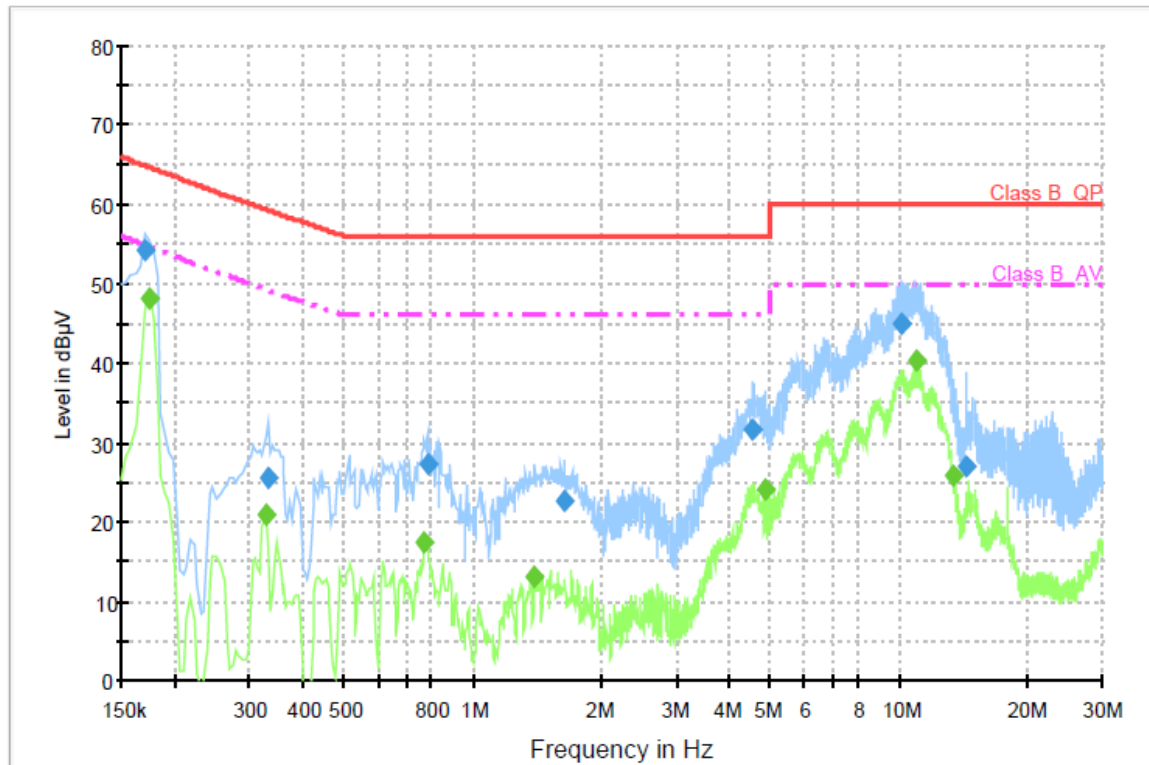
Final Measurement Detector 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.174000	49.1	1000.000	9.000	GND	L1	10.1	5.6	54.7	
0.324000	20.6	1000.000	9.000	GND	L1	10.1	28.8	49.4	
0.772000	17.2	1000.000	9.000	GND	L1	10.1	28.8	46.0	
1.404000	13.6	1000.000	9.000	GND	L1	10.1	32.4	46.0	
5.764000	26.8	1000.000	9.000	GND	L1	10.4	23.2	50.0	
10.996000	38.0	1000.000	9.000	GND	L1	10.6	12.0	50.0	
13.308000	24.5	1000.000	9.000	GND	L1	10.7	25.5	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
0.170000	54.3	1000.000	9.000	GND	N	10.1	10.6	64.9	
0.330000	25.6	1000.000	9.000	GND	N	10.1	33.7	59.3	
0.786000	27.4	1000.000	9.000	GND	N	10.1	28.6	56.0	
1.638000	22.7	1000.000	9.000	GND	N	10.1	33.3	56.0	
4.518000	31.6	1000.000	9.000	GND	N	10.3	24.4	56.0	
10.154000	45.0	1000.000	9.000	GND	N	10.5	15.0	60.0	
14.306000	26.9	1000.000	9.000	GND	N	10.7	33.1	60.0	

Final Measurement Detector 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.174000	48.0	1000.000	9.000	GND	N	10.1	6.7	54.7	
0.326000	21.0	1000.000	9.000	GND	N	10.1	28.3	49.3	
0.770000	17.4	1000.000	9.000	GND	N	10.1	28.6	46.0	
1.398000	12.9	1000.000	9.000	GND	N	10.1	33.1	46.0	
4.858000	24.1	1000.000	9.000	GND	N	10.3	21.9	46.0	
10.998000	40.2	1000.000	9.000	GND	N	10.5	9.8	50.0	
13.362000	25.7	1000.000	9.000	GND	N	10.7	24.3	50.0	

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



6. Radiated Emission

6.1 Operating Environment

Temperature : 24.0 °C
Relative Humidity : 45.0 % R.H.

6.2 Test Set-up

A preliminary and final measurement was at 3 m 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(Anechoic Chamber)	Uncertainty	Remark
Radiated emission (30 MHz ~ 300 MHz, 3 m, Vertical)	± 4.38 dB	Confidence levels of 95 % ($k = 2$)
Radiated emission (30 MHz ~ 300 MHz, 3 m, Horizontal)	± 3.50 dB	Confidence levels of 95 % ($k = 2$)
Radiated emission (300 MHz ~ 1 000 MHz, 3 m, Vertical)	± 3.75 dB	Confidence levels of 95 % ($k = 2$)
Radiated emission (300 MHz ~ 1 000 MHz, 3 m, Horizontal)	± 3.59 dB	Confidence levels of 95 % ($k = 2$)



6.4 Limit

Frequency (MHz)	FCC Limit @ 3 m. dB μ V/m	CISPR Limit @ 10 m. dB μ V/m
30 ~ 88	40.0	30.0
88 ~ 216	43.5	30.0
216 ~ 230	46.0	30.0
230 ~ 960	46.0	37.0
960 ~ 1 000	54.0	37.0
> 1 000	54.0	No Specified limit

6.5 Test Equipment used

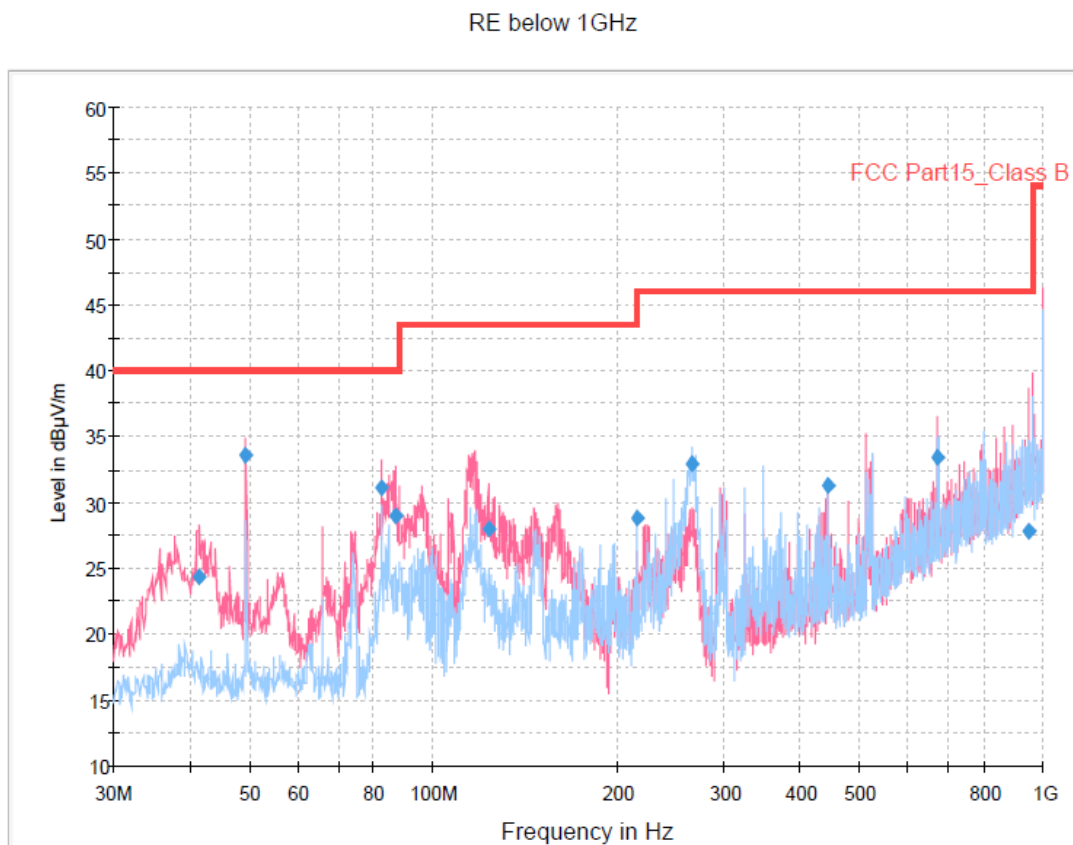
Model Name	Manufacturer	Description	Serial Number	Due to Calibration
■ - ESIB26	Rohde & Schwarz	EMI Test Receiver	830482/010	12. 11. 2011
■ - VULB9160	Schwarzbeck	Broadband Test Antenna	3193	03. 15. 2012
■ - BBHA9120D	Schwarzbeck	Horn ANT	207	12. 22. 2011
■ - MCU066	maturo GmbH	Position Controller	1390306	N/A
■ - TT2.5SI	maturo GmbH	Turntable	1390307	N/A
■ - AM 4.0	maturo GmbH	Antenna Mast	1390308	N/A
■ - AFS 44 00101800-25-10P-44	MITEQ	Preamplifier	1258943	11. 12. 2011

6.6 Test data for Radiated Emission

- Test Date : September 7 ~ 15, 2011
- Resolution Bandwidth : 120 kHz/1 MHz
- Frequency Range : 30 MHz ~ 5 000 MHz
- Measurement Distance : 3 m
- Note : The highest frequency of the internal source of the EUT is between 500 MHz and 1 000 MHz (796 MHz). The measurement was made up to 5 000 MHz



- ◆ Operating Condition: 1 920 × 1 080 / 60 Hz (RGB: Analog)
Red trace: Vertical polarization, Blue trace: Horizontal polarization



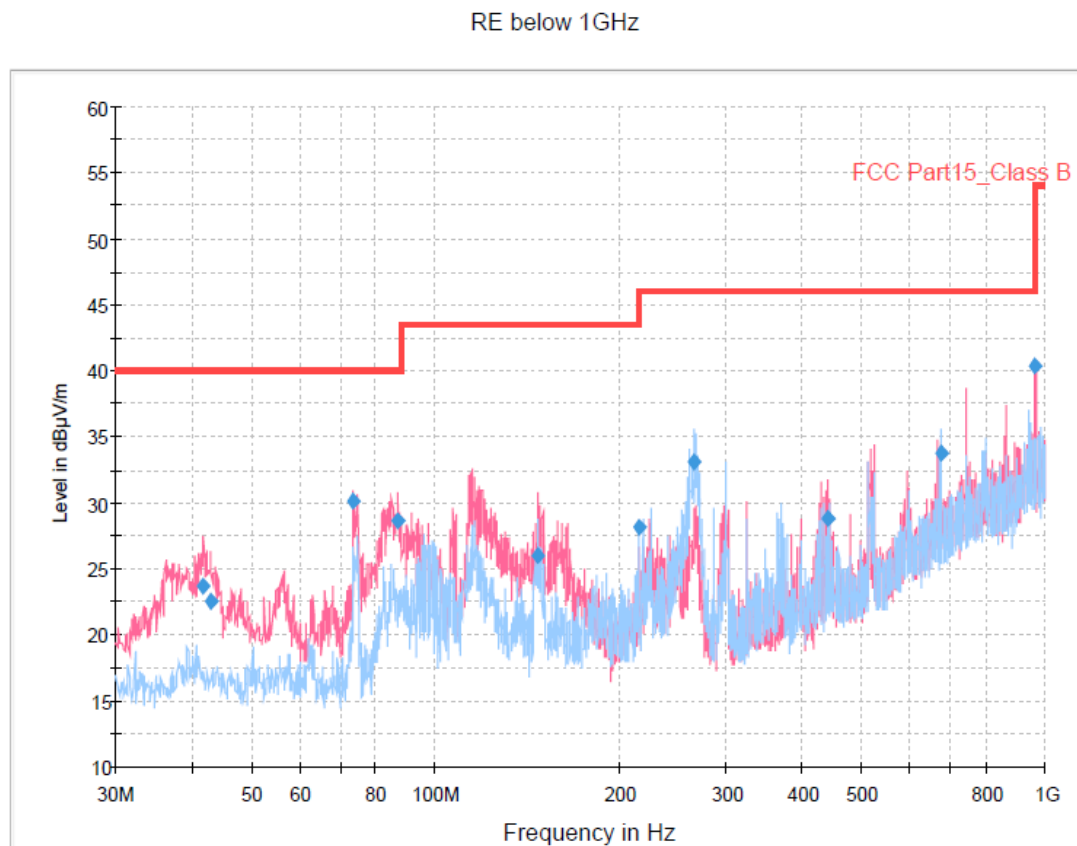
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
41.478750	24.3	1000.0	120.000	100.0	V	166.0	12.6	15.7	40.0
49.481250	33.6	1000.0	120.000	100.0	V	99.0	13.1	6.4	40.0
82.501250	31.2	1000.0	120.000	150.0	V	296.0	9.0	8.8	40.0
86.988750	29.0	1000.0	120.000	126.0	V	86.0	9.1	11.0	40.0
123.241250	27.9	1000.0	120.000	100.0	V	62.0	12.7	15.6	43.5
215.997500	28.8	1000.0	120.000	100.0	H	130.0	11.5	14.7	43.5
266.478750	33.0	1000.0	120.000	100.0	H	-4.0	13.9	13.0	46.0
445.483750	31.4	1000.0	120.000	199.0	V	13.0	19.3	14.6	46.0
673.838750	33.4	1000.0	120.000	100.0	V	224.0	24.2	12.6	46.0
944.468750	27.9	1000.0	120.000	114.0	V	40.0	29.0	18.1	46.0

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



- ◆ Operating Condition: 1 920 × 1 080 / 60 Hz (HDMI/DVI: Digital)
Red trace: Vertical polarization, Blue trace: Horizontal polarization



Final Result 1

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
41.721250	23.8	1000.0	120.000	100.0	V	154.0	12.7	16.2	40.0
43.053750	22.6	1000.0	120.000	100.0	V	162.0	12.7	17.4	40.0
73.690000	30.2	1000.0	120.000	100.0	V	173.0	10.2	9.8	40.0
86.988750	28.7	1000.0	120.000	150.0	V	102.0	9.1	11.3	40.0
147.288750	26.0	1000.0	120.000	100.0	V	17.0	14.0	17.5	43.5
215.997500	28.1	1000.0	120.000	100.0	H	120.0	11.5	15.4	43.5
266.720000	33.1	1000.0	120.000	100.0	H	-4.0	13.9	12.9	46.0
439.987500	28.8	1000.0	120.000	200.0	V	0.0	19.1	17.2	46.0
676.748750	33.7	1000.0	120.000	100.0	H	86.0	24.3	12.3	46.0
960.027500	40.3	1000.0	120.000	150.0	V	216.0	29.2	13.7	54.0

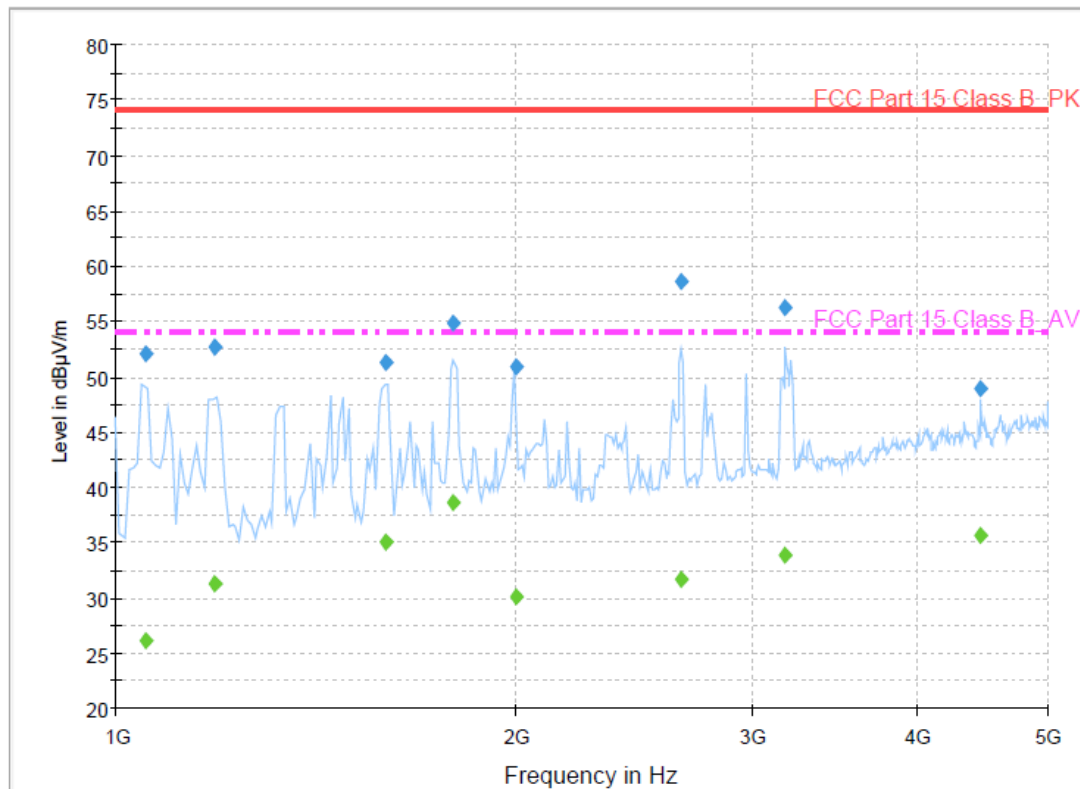
< Fig 13. Radiated emission result (30 MHz ~ 1 000 MHz) >



◆ 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)
1055.096192	52.0	1000.0	1000.000	100.0	V	355.0	-14.4	22.0	74.0
1187.384770	52.7	1000.0	1000.000	100.0	V	351.0	-14.1	21.3	74.0
1593.002405	51.3	1000.0	1000.000	150.0	V	189.0	-12.7	22.7	74.0
1792.187174	54.8	1000.0	1000.000	100.0	V	194.0	-12.0	19.2	74.0
1996.987976	51.0	1000.0	1000.000	100.0	V	324.0	-11.5	23.0	74.0
2655.118637	58.6	1000.0	1000.000	176.0	H	138.0	-8.2	15.4	74.0
3172.960721	56.1	1000.0	1000.000	188.0	V	355.0	-6.1	17.9	74.0
4454.709820	48.8	1000.0	1000.000	198.0	H	243.0	-2.0	25.2	74.0

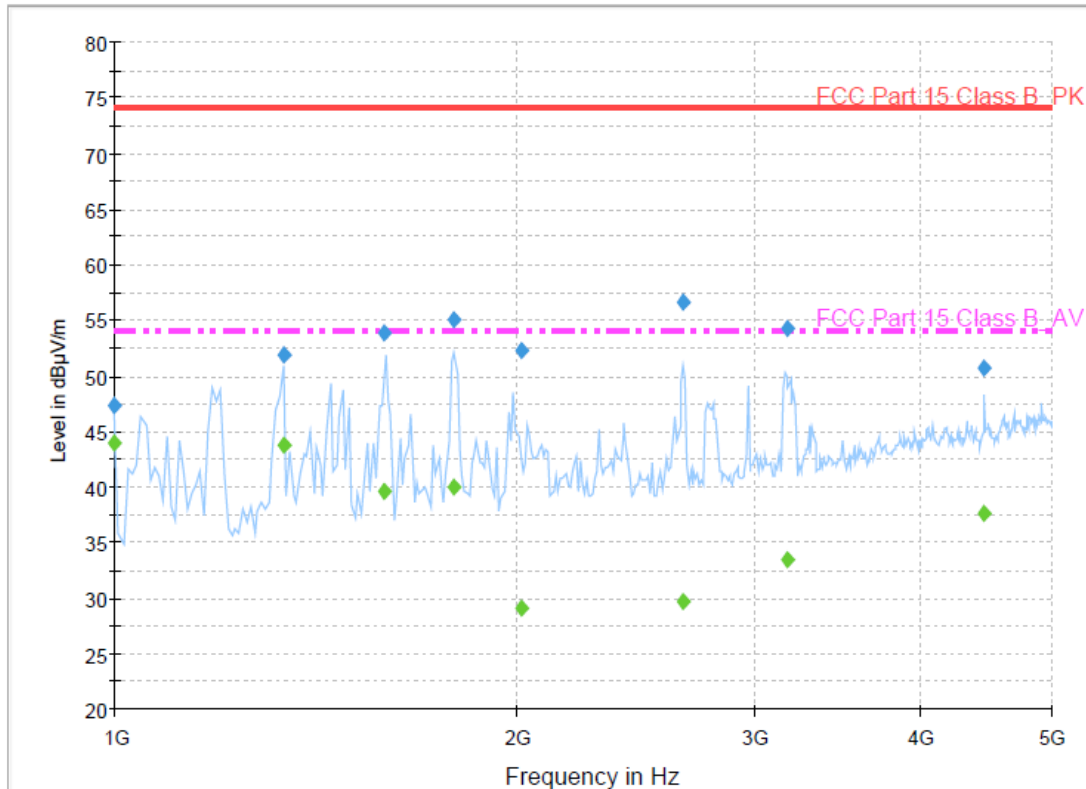
Final Result 2

Frequency (MHz)	CAverage (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1055.096192	26.1	1000.0	1000.000	100.0	V	355.0	-14.4	27.9	54.0
1187.384770	31.2	1000.0	1000.000	100.0	V	351.0	-14.1	22.8	54.0
1593.002405	35.1	1000.0	1000.000	150.0	V	189.0	-12.7	18.9	54.0
1792.187174	38.6	1000.0	1000.000	100.0	V	194.0	-12.0	15.4	54.0
1996.987976	30.2	1000.0	1000.000	100.0	V	324.0	-11.5	23.8	54.0
2655.118637	31.7	1000.0	1000.000	176.0	H	138.0	-8.2	22.3	54.0
3172.960721	33.8	1000.0	1000.000	188.0	V	355.0	-6.1	20.2	54.0
4454.709820	35.7	1000.0	1000.000	198.0	H	243.0	-2.0	18.3	54.0

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



- ◆ Operating Condition: 1 920 × 1 080 / 60 Hz (HDMI/DVI: 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)
1000.000000	47.3	1000.0	1000.000	115.0	H	23.0	-14.5	26.7	74.0
1336.473347	51.8	1000.0	1000.000	100.0	H	188.0	-13.4	22.2	74.0
1592.986373	53.8	1000.0	1000.000	100.0	V	157.0	-12.7	20.2	74.0
1792.187174	55.0	1000.0	1000.000	100.0	V	189.0	-12.0	19.0	74.0
2010.571944	52.3	1000.0	1000.000	100.0	V	324.0	-11.4	21.7	74.0
2656.318637	56.7	1000.0	1000.000	199.0	H	129.0	-8.2	17.3	74.0
3175.728657	54.2	1000.0	1000.000	150.0	V	354.0	-6.1	19.8	74.0
4455.109820	50.7	1000.0	1000.000	198.0	H	256.0	-2.0	23.3	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	43.9	1000.0	1000.000	115.0	H	23.0	-14.5	10.1	54.0
1336.473347	43.9	1000.0	1000.000	100.0	H	188.0	-13.4	10.1	54.0
1592.986373	39.6	1000.0	1000.000	100.0	V	157.0	-12.7	14.5	54.0
1792.187174	40.1	1000.0	1000.000	100.0	V	189.0	-12.0	13.9	54.0
2010.571944	29.1	1000.0	1000.000	100.0	V	324.0	-11.4	24.9	54.0
2656.318637	29.7	1000.0	1000.000	199.0	H	129.0	-8.2	24.3	54.0
3175.728657	33.4	1000.0	1000.000	150.0	V	354.0	-6.1	20.6	54.0
4455.109820	37.7	1000.0	1000.000	198.0	H	256.0	-2.0	16.3	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 TV/Monitor (Model Name: 42LW5600-UA)** was complies with §15.107 and 15.109 of the FCC Rules.