

FCC EVALUATION REPORT FOR CERTIFICATION

Applicant: LG Electronics Inc.

19-1, Cheongho-ri, Jinwi-myeon,

Pyeongteak-si, Gyeonggi-do, Korea.

Attn: Mr. Do-Hyung Kim, Chief research engineer

Date of Issue: July 4, 2011

Order Number: GETEC-C1-11-141

Test Report Number: GETEC-E3-11-063

Test Site: Gumi College EMC Center

FCC Registration Number: (100749, 443957)

FCC ID. : BEJ42LV355CUA

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	: 42LV355C-UA
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,



Hyung-Seop Kim, Senior Engineer
GUMI College EMC center



Jae-Hoon Jeong, Senior Engineer
GUMI College EMC center



CONTENTS

1. GENERAL INFORMATION	3
2. INTRODUCTION	4
3. PRODUCT INFORMATION	5
3.1 DESCRIPTION OF EUT.....	5
3.2 SUPPORT EQUIPMENT / CABLES USED	6
3.3 MODIFICATION ITEM(S)	7
4. DESCRIPTION OF TESTS.....	8
4.1 TEST CONDITION.....	8
4.2 CONDUCTED EMISSION	9
4.3 RADIATED EMISSION.....	10
5. CONDUCTED EMISSION.....	11
5.1 OPERATING ENVIRONMENT	11
5.2 TEST SET-UP	11
5.3 MEASUREMENT UNCERTAINTY.....	11
5.4 LIMIT	12
5.5 TEST EQUIPMENT USED.....	12
5.6 TEST DATA FOR CONDUCTED EMISSION	12
6. RADIATED EMISSION	21
6.1 OPERATING ENVIRONMENT	21
6.2 TEST SET-UP	21
6.3 MEASUREMENT UNCERTAINTY.....	21
6.4 LIMIT	22
6.5 TEST EQUIPMENT USED.....	22
6.6 TEST DATA FOR RADIATED EMISSION	22
7. SAMPLE CALCULATIONS.....	27
7.1 EXAMPLE 1 :	27
7.2 EXAMPLE 2 :	27
8. RECOMMENDATION & CONCLUSION.....	28
APPENDIX A – ATTESTATION STATEMENT	
APPENDIX B – ID SAMPLE LABEL & LOCATION	
APPENDIX C – BLOCK DIAGRAM	
APPENDIX D – TEST SET-UP PHOTOGRAPHS	
APPENDIX E – EXTERNAL PHOTOGRAPHS	
APPENDIX F – INTERNAL PHOTOGRAPHS	
APPENDIX G – USER’S MANUAL	



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.** BEJ42LV355CUA
- **EUT Type** LED LCD TV/Monitor
- **Model Name** 42LV355C-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** June 30 ~ July 1, 2011
- **Place of Test** **Gumi College EMC Center** (FCC Registration Number: 100749, 443957)
407, Bugok-dong, Gumi-si, Gyeongbuk, Korea.
- **Test Report Number** GETEC-E3-11-063
- **Dates of Issue** July 4, 2011



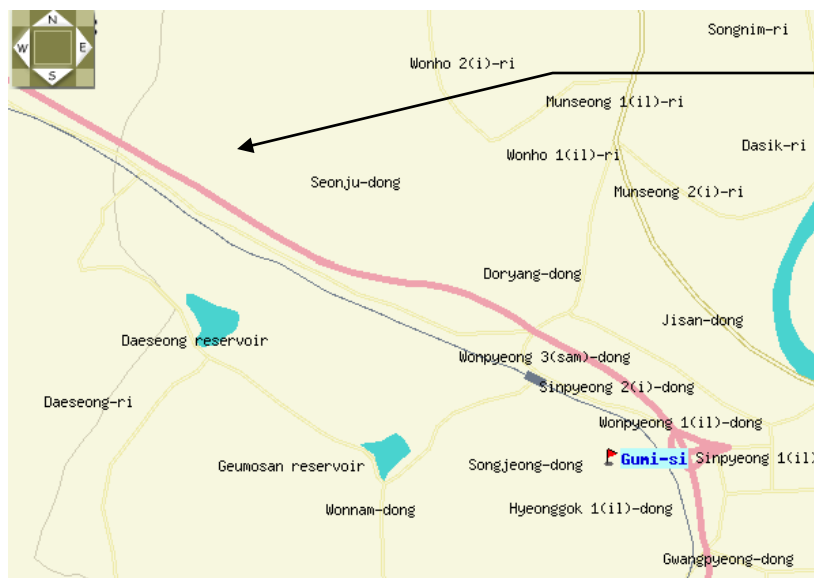
2. Introduction

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 TV/Monitor (Model Name: 42LV355C-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)



GUMI COLLEGE EMC CENTER
407, Bugok-dong, Gumi-si,
Gyeongbuk 730-711, Korea.
Tel: +82-54-440-1195
Fax: +82-54-440-1199

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: 42LV355C-UA) FCC ID.: BEJ42LV355CUA**

MODELS		42LV3500 (42LV3500-UA)	47LV3500 (47LV3500-UA)
		42LV3500 (42LV3500-UG)	47LV3500 (47LV3500-UG)
		42LV3520 (42LV3520-UC)	
		42LV3520 (42LV3520-UJ)	
		42LV355C (42LV355C-UA)	
Dimensions (W x H x D)	With stand	998.0 mm x 684.0 mm x 256.0 mm (39.2 inch x 26.9 inch x 10.0 inch)	1108.0 mm x 746.0 mm x 256.0 mm (43.6 inch x 29.3 inch x 10.0 inch)
	Without stand	998.0 mm x 615.0 mm x 30.4 mm (39.2 inch x 24.2 inch x 1.1 inch)	1108.0 mm x 677.0 mm x 30.4 mm (43.6 inch x 26.6 inch x 1.1 inch)
Weight	With stand	15.5 kg (34.1 lbs)	20.9 kg (46.0 lbs)
	Without stand	13.3 kg (29.3 lbs)	18.7 kg (41.2 lbs)
Current Value / Power consumption		1.1 A / 110 W	1.4 A / 140 W
Power requirement		USA, Canada, Mexico: AC 120 V ~ 50 / 60 Hz Other Country: AC 100 - 240 V ~ 50 / 60 Hz	
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 : 667 MHz



3.2 Support Equipment / Cables used

3.2.1 Used Support Equipment

Description	Manufacturer	Model Name	S/N & FCC ID.
PC	Hewlett Packard	D530	S/N: CNG34800PY FCC ID.: DoC
Video card	ATI	ATI RV360(9600)	S/N: SN0402017176 FCC ID.: DoC
PS2 keyboard	COMPAQ	166516-AD6	S/N: B13BBOR391006D FCC ID.: AQ6-23K15
PS2 mouse	LOGITECH	M-S69	S/N: 334684-108 FCC ID.: JNZ211443
Joy stick	MICROSOFT	X05-92626	S/N: 9262600296169 FCC ID.: DoC
DVD player	LG Electronics Inc.	LC-954	S/N: 3850R-Z674K FCC ID.: DoC
USB memory stick	SAMSUNG	SUM-PSB4	S/N: TBBB202478F FCC ID.: N/A
Headset	PHILIPS	SBC HL140	S/N: N/A FCC ID.: N/A
TV signal generator	FLUKE	54200M01	S/N: 831011 FCC ID.: DoC

See “Appendix D – Test Setup Photographs” for actual system test set-up

3.2.2 System configuration

Description	Manufacturer	Model Name	S/N & FCC ID.
None.	-	-	S/N: - FCC ID.: -



3.2.3 Used Cable(s)

Cable Name	Condition	Description
Power cable	Connected to the EUT	1.50 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
AV cable	Connected to the EUT and DVD player	3.00 m shielded
PC sound cable	Connected to the EUT and DVD player	1.80m shielded
Component cable	Connected to the EUT and DVD player	3.00 m shielded
Headset cable	Connected to the EUT and headset	1.20 m shielded
Antenna cable	Connected to the EUT and TV signal generator	10.00 m shielded
LAN cable	Connected to the EUT and Network	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
- . Settings and control the display via the Network from a PC
- . USB memory stick was connected to the USB port

"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

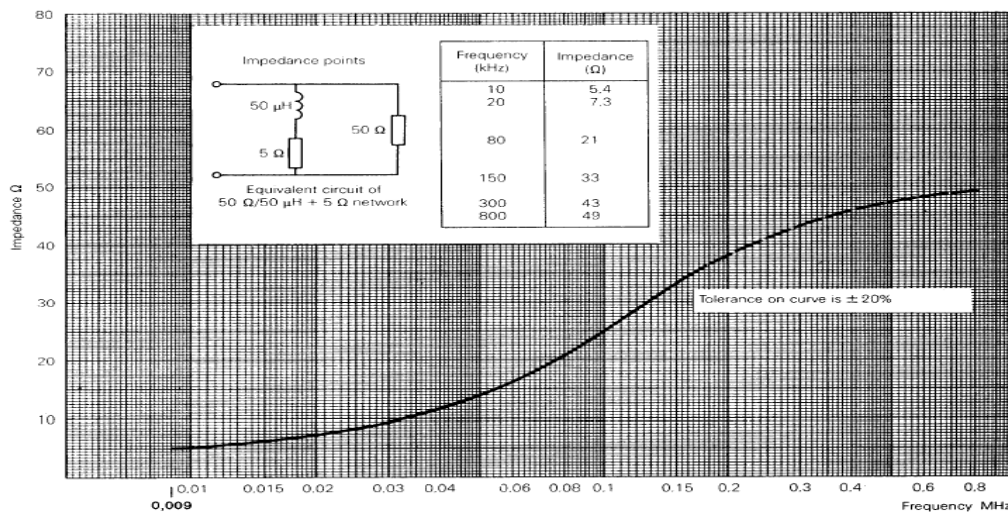


Fig 2. Impedance of LISN



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

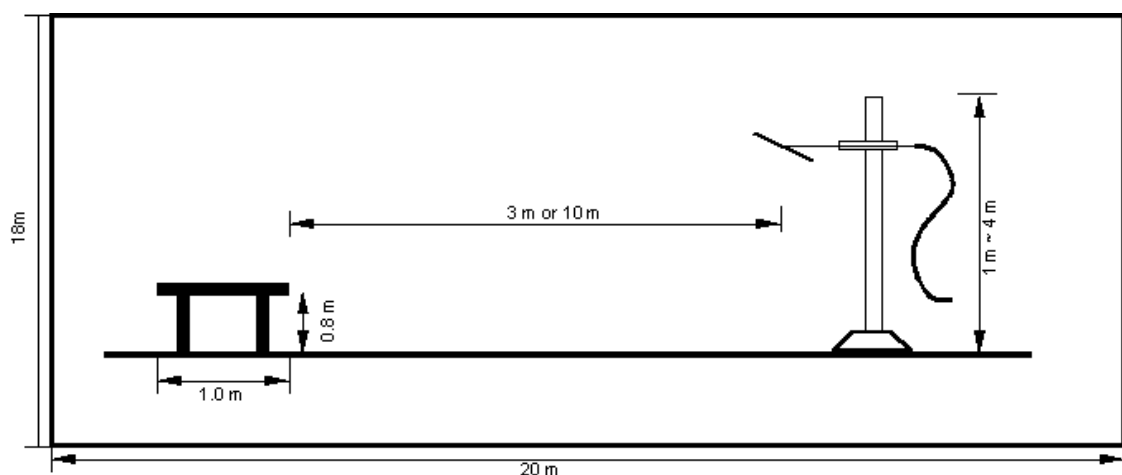


Fig 3. Dimensions of test site



5. Conducted Emission

5.1 Operating Environment

Temperature : 26 °C
Relative Humidity : 54 % R.H.

5.2 Test Set-up

The conducted emission measurements were performed in the shielded room.

The EUT was placed on wooden table, 0.8 m heights above the floor, 0.4 m from the reference ground plane (GRP) wall and 0.8 m from AMN & ISN.

AMN is bonded on horizontal reference ground plane.

The ground plane, which was electrically bonded to the shield room, ground system and all power lines entering the shield room, were filtered.

5.3 Measurement Uncertainty

The measurement uncertainty was calculated in accordance with ISO "Guide to the expression of uncertainty in measurement."

The measurement uncertainty was given with a confidence of 95 %.

Test Items	Uncertainty	Remark
Conducted emission (9 kHz ~ 150 kHz)	± 2.71 dB	Confidence levels of 95 % ($k = 2$)
Conducted emission (150 kHz ~ 30 MHz)	± 3.34 dB	Confidence levels of 95 % ($k = 2$)



5.4 Limit

RFI Conducted	FCC Limit(dB μ V/m) Class B	
Freq. Range	Quasi-Peak	Average
150 kHz ~ 0.5 MHz	66 ~ 56*	56 ~ 46*
0.5 MHz ~ 5 MHz	56	46
5 MHz ~ 30 MHz	60	50
*Limits decreases linearly with the logarithm of frequency.		

5.5 Test Equipment used

Model Name	Manufacturer	Description	Serial Number	Due to Calibration
■ - ESCS30	Rohde & Schwarz	EMI Test Receiver	839809/003	12. 10. 2011
■ - ESH3-Z5	Rohde & Schwarz	LISN	838979/020	12. 10. 2011
■ - ESH2-Z5	Rohde & Schwarz	LISN	829991/009	12. 10. 2011
■ - ISN T8	TESEQ. GmbH	ISN	24568	11. 09. 2011

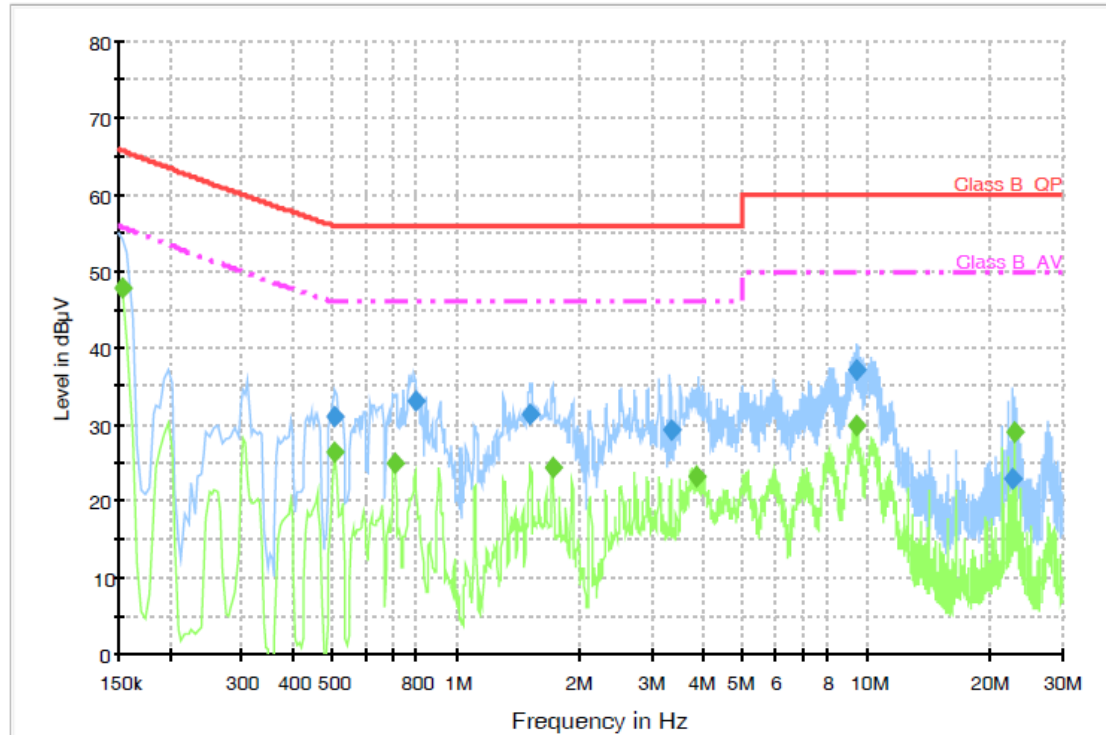
5.6 Test data for Conducted Emission

-. Test Date : July 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
0.504000	31.1	1000.000	9.000	GND	L1	10.1	24.9	56.0	
0.792000	33.2	1000.000	9.000	GND	L1	10.1	22.8	56.0	
1.520000	31.4	1000.000	9.000	GND	L1	10.1	24.6	56.0	
3.352000	29.2	1000.000	9.000	GND	L1	10.2	26.8	56.0	
9.468000	37.1	1000.000	9.000	GND	L1	10.5	22.9	60.0	
22.736000	22.8	1000.000	9.000	GND	L1	11.1	37.2	60.0	

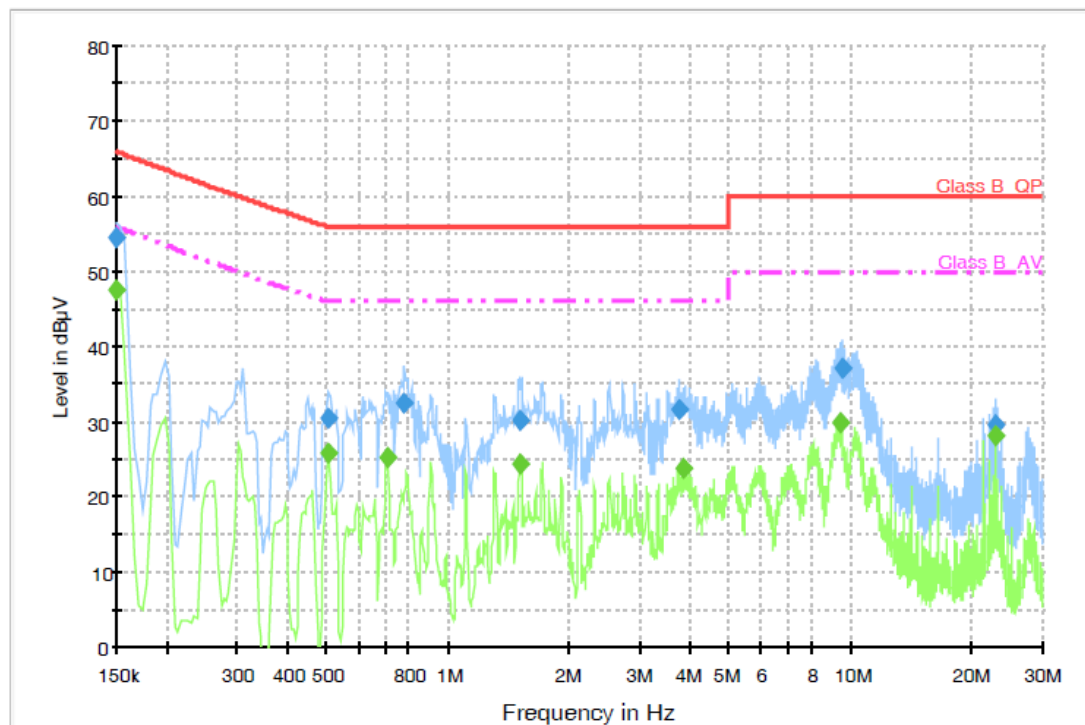
Final Measurement Detector 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.154000	47.8	1000.000	9.000	GND	L1	10.1	8.0	55.8	
0.504000	26.5	1000.000	9.000	GND	L1	10.1	19.5	46.0	
0.708000	25.0	1000.000	9.000	GND	L1	10.1	21.0	46.0	
1.720000	24.5	1000.000	9.000	GND	L1	10.1	21.5	46.0	
3.840000	23.3	1000.000	9.000	GND	L1	10.3	22.7	46.0	
9.400000	29.9	1000.000	9.000	GND	L1	10.5	20.1	50.0	
22.932000	28.9	1000.000	9.000	GND	L1	11.1	21.2	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
0.150000	54.6	1000.000	9.000	GND	N	10.1	11.4	66.0	
0.502000	30.5	1000.000	9.000	GND	N	10.1	25.5	56.0	
0.782000	32.4	1000.000	9.000	GND	N	10.1	23.6	56.0	
1.514000	30.2	1000.000	9.000	GND	N	10.1	25.8	56.0	
3.774000	31.5	1000.000	9.000	GND	N	10.3	24.5	56.0	
9.534000	37.2	1000.000	9.000	GND	N	10.5	22.8	60.0	
22.934000	29.7	1000.000	9.000	GND	N	10.8	30.3	60.0	

Final Measurement Detector 2

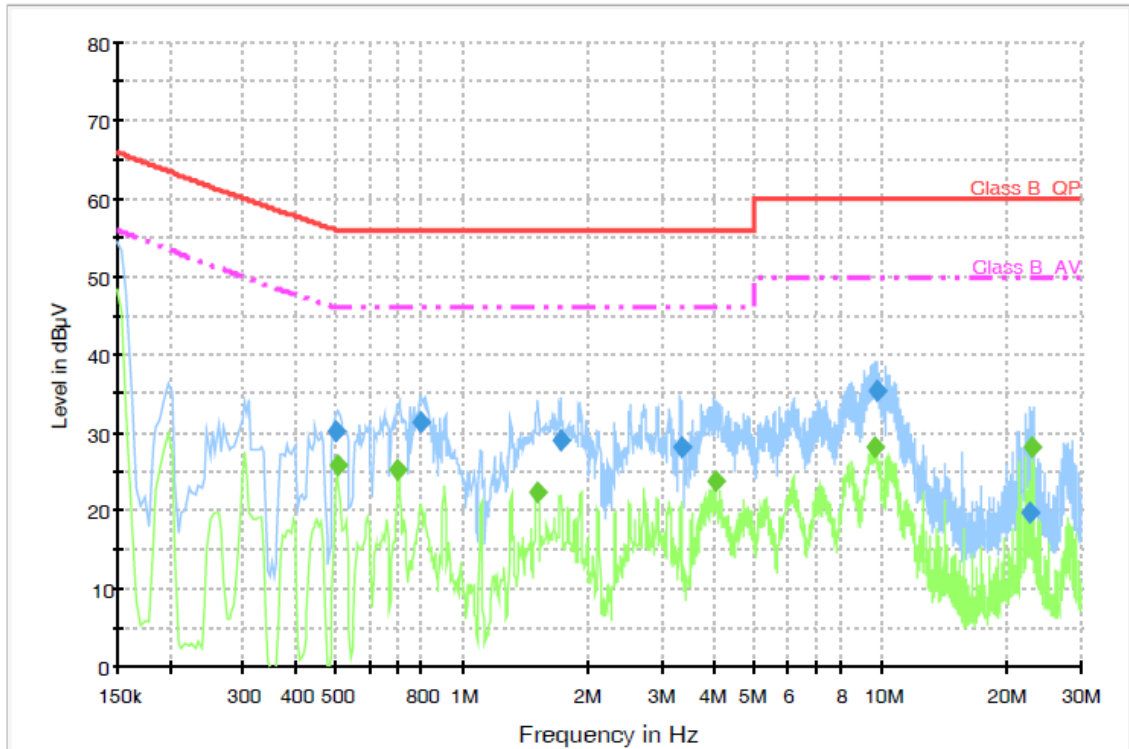
Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.150000	47.5	1000.000	9.000	GND	N	10.1	8.5	56.0	
0.506000	25.8	1000.000	9.000	GND	N	10.1	20.2	46.0	
0.706000	25.3	1000.000	9.000	GND	N	10.1	20.7	46.0	
1.518000	24.3	1000.000	9.000	GND	N	10.1	21.7	46.0	
3.838000	23.9	1000.000	9.000	GND	N	10.3	22.1	46.0	
9.398000	29.9	1000.000	9.000	GND	N	10.5	20.1	50.0	
22.934000	28.1	1000.000	9.000	GND	N	10.8	21.9	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
0.500000	30.2	1000.000	9.000	GND	L1	10.1	25.8	56.0	
0.792000	31.2	1000.000	9.000	GND	L1	10.1	24.8	56.0	
1.716000	29.1	1000.000	9.000	GND	L1	10.1	26.9	56.0	
3.336000	28.0	1000.000	9.000	GND	L1	10.2	28.0	56.0	
9.752000	35.5	1000.000	9.000	GND	L1	10.5	24.5	60.0	
22.604000	19.6	1000.000	9.000	GND	L1	11.1	40.4	60.0	

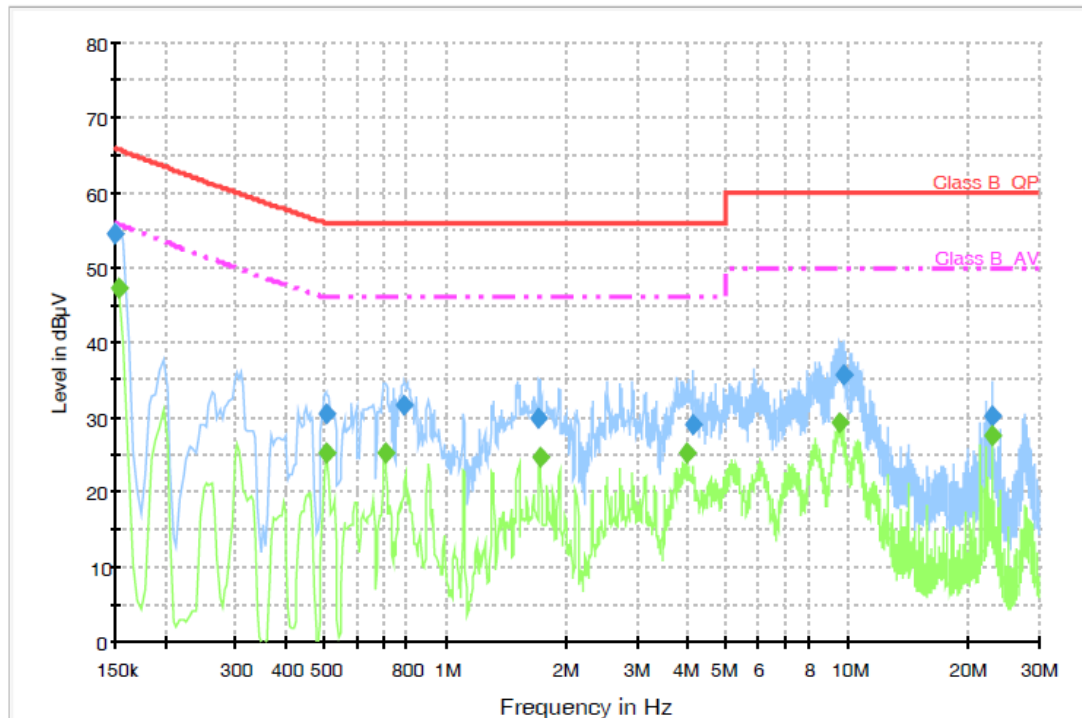
Final Measurement Detector 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.504000	25.8	1000.000	9.000	GND	L1	10.1	20.2	46.0	
0.704000	25.2	1000.000	9.000	GND	L1	10.1	20.8	46.0	
1.508000	22.2	1000.000	9.000	GND	L1	10.1	23.8	46.0	
4.044000	23.8	1000.000	9.000	GND	L1	10.3	22.2	46.0	
9.620000	28.1	1000.000	9.000	GND	L1	10.5	21.9	50.0	
22.928000	28.0	1000.000	9.000	GND	L1	11.1	22.0	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
0.150000	54.4	1000.000	9.000	GND	N	10.1	11.6	66.0	
0.502000	30.4	1000.000	9.000	GND	N	10.1	25.6	56.0	
0.790000	31.6	1000.000	9.000	GND	N	10.1	24.4	56.0	
1.706000	29.8	1000.000	9.000	GND	N	10.1	26.2	56.0	
4.114000	29.1	1000.000	9.000	GND	N	10.3	26.9	56.0	
9.746000	35.7	1000.000	9.000	GND	N	10.5	24.3	60.0	
22.926000	30.3	1000.000	9.000	GND	N	10.8	29.7	60.0	

Final Measurement Detector 2

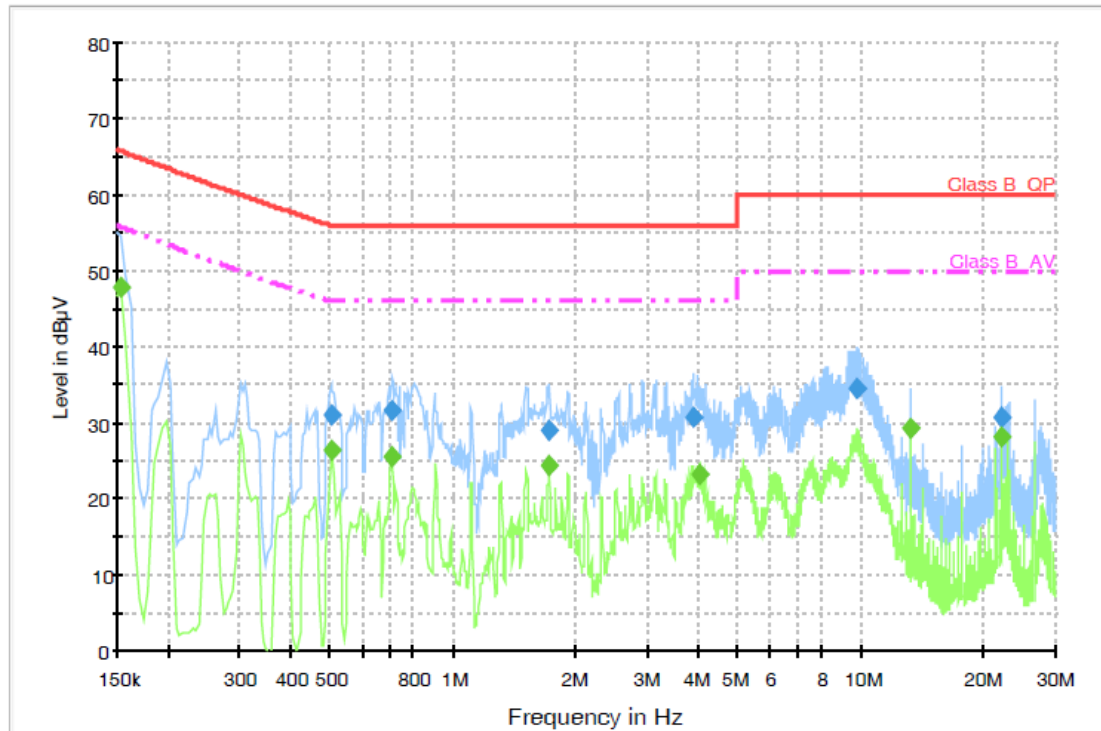
Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.154000	47.1	1000.000	9.000	GND	N	10.1	8.7	55.8	
0.506000	25.2	1000.000	9.000	GND	N	10.1	20.8	46.0	
0.706000	25.2	1000.000	9.000	GND	N	10.1	20.8	46.0	
1.722000	24.5	1000.000	9.000	GND	N	10.1	21.5	46.0	
3.978000	25.3	1000.000	9.000	GND	N	10.3	20.7	46.0	
9.610000	29.2	1000.000	9.000	GND	N	10.5	20.8	50.0	
22.930000	27.6	1000.000	9.000	GND	N	10.8	22.4	50.0	

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



◆ Operating condition: 800 × 600 / 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
0.504000	31.1	1000.000	9.000	GND	L1	10.1	24.9	56.0	
0.708000	31.7	1000.000	9.000	GND	L1	10.1	24.3	56.0	
1.728000	29.0	1000.000	9.000	GND	L1	10.1	27.0	56.0	
3.908000	30.8	1000.000	9.000	GND	L1	10.3	25.2	56.0	
9.796000	34.4	1000.000	9.000	GND	L1	10.5	25.6	60.0	
22.136000	30.7	1000.000	9.000	GND	L1	11.1	29.3	60.0	

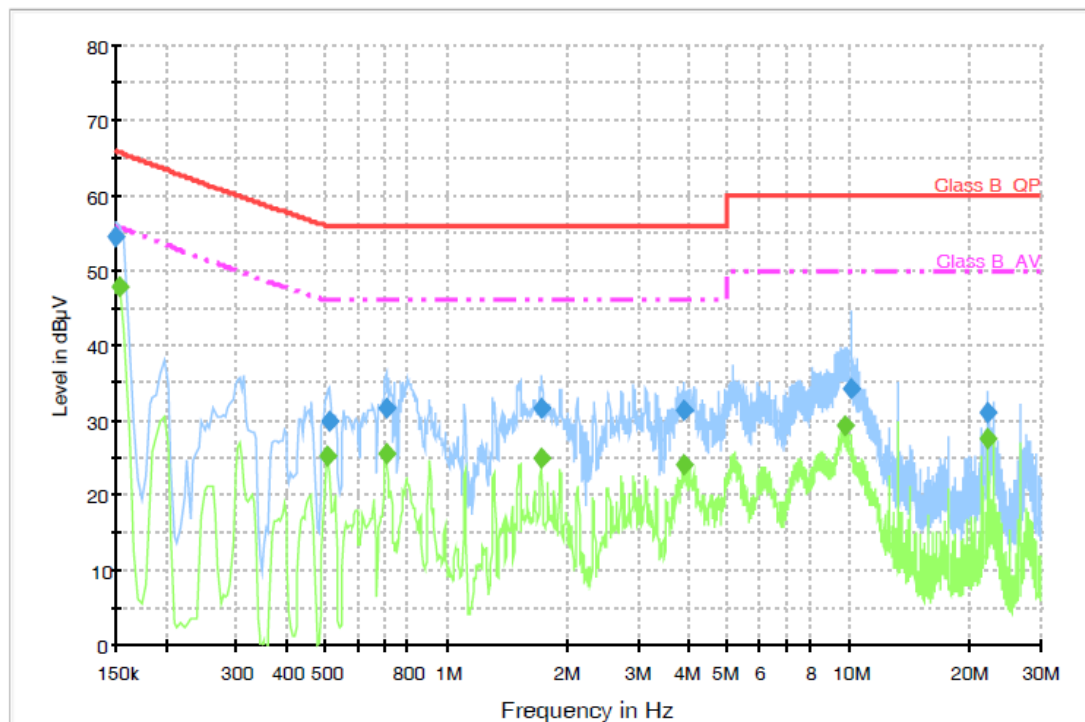
Final Measurement Detector 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.154000	48.0	1000.000	9.000	GND	L1	10.1	7.8	55.8	
0.504000	26.3	1000.000	9.000	GND	L1	10.1	19.7	46.0	
0.708000	25.5	1000.000	9.000	GND	L1	10.1	20.5	46.0	
1.720000	24.4	1000.000	9.000	GND	L1	10.1	21.6	46.0	
4.040000	23.3	1000.000	9.000	GND	L1	10.3	22.7	46.0	
13.276000	29.2	1000.000	9.000	GND	L1	10.7	20.8	50.0	
22.140000	28.2	1000.000	9.000	GND	L1	11.1	21.8	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
0.150000	54.5	1000.000	9.000	GND	N	10.1	11.5	66.0	
0.510000	29.9	1000.000	9.000	GND	N	10.1	26.2	56.0	
0.706000	31.7	1000.000	9.000	GND	N	10.1	24.3	56.0	
1.722000	31.6	1000.000	9.000	GND	N	10.1	24.4	56.0	
3.906000	31.3	1000.000	9.000	GND	N	10.3	24.7	56.0	
10.130000	34.2	1000.000	9.000	GND	N	10.5	25.8	60.0	
22.138000	30.9	1000.000	9.000	GND	N	10.8	29.1	60.0	

Final Measurement Detector 2

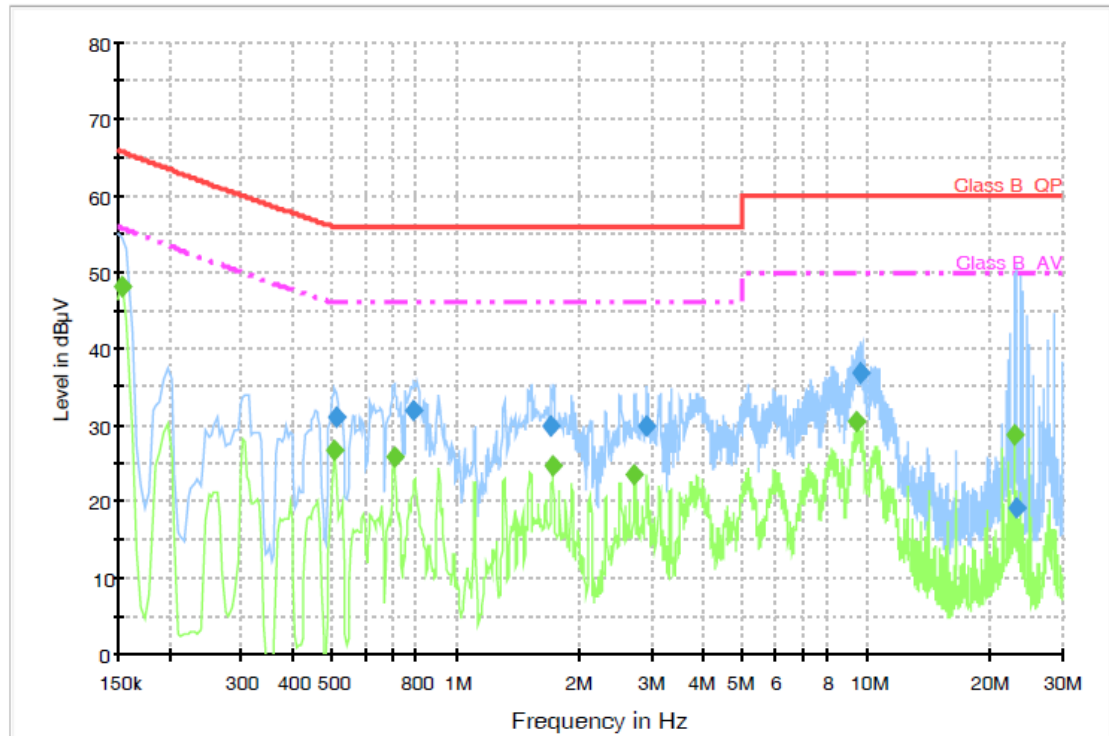
Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.154000	47.8	1000.000	9.000	GND	N	10.1	8.0	55.8	
0.502000	25.3	1000.000	9.000	GND	N	10.1	20.8	46.0	
0.706000	25.7	1000.000	9.000	GND	N	10.1	20.3	46.0	
1.722000	24.9	1000.000	9.000	GND	N	10.1	21.1	46.0	
3.906000	24.1	1000.000	9.000	GND	N	10.3	21.9	46.0	
9.798000	29.3	1000.000	9.000	GND	N	10.5	20.7	50.0	
22.138000	27.5	1000.000	9.000	GND	N	10.8	22.5	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
0.508000	31.0	1000.000	9.000	GND	L1	10.1	25.0	56.0	
0.784000	32.0	1000.000	9.000	GND	L1	10.1	24.0	56.0	
1.708000	29.9	1000.000	9.000	GND	L1	10.1	26.1	56.0	
2.912000	30.0	1000.000	9.000	GND	L1	10.2	26.0	56.0	
9.664000	36.9	1000.000	9.000	GND	L1	10.5	23.1	60.0	
23.256000	19.1	1000.000	9.000	GND	L1	11.1	40.9	60.0	

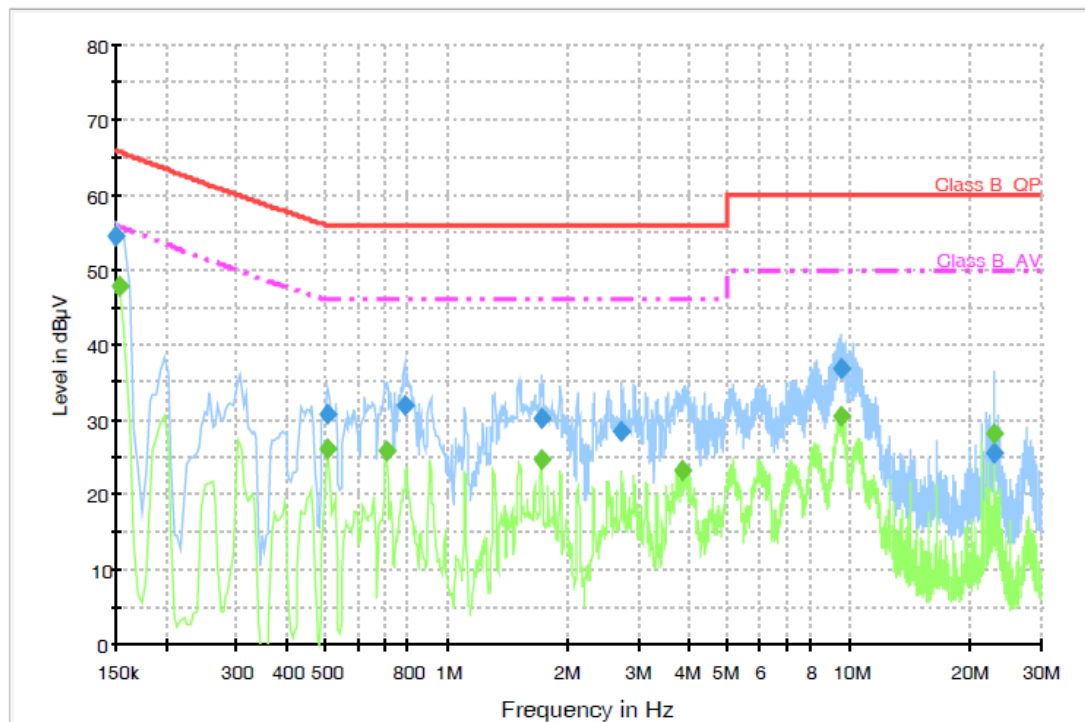
Final Measurement Detector 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.154000	48.1	1000.000	9.000	GND	L1	10.1	7.7	55.8	
0.504000	26.6	1000.000	9.000	GND	L1	10.1	19.4	46.0	
0.708000	25.7	1000.000	9.000	GND	L1	10.1	20.3	46.0	
1.720000	24.6	1000.000	9.000	GND	L1	10.1	21.4	46.0	
2.712000	23.5	1000.000	9.000	GND	L1	10.2	22.5	46.0	
9.464000	30.4	1000.000	9.000	GND	L1	10.5	19.6	50.0	
22.932000	28.8	1000.000	9.000	GND	L1	11.1	21.2	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
0.150000	54.5	1000.000	9.000	GND	N	10.1	11.5	66.0	
0.506000	30.8	1000.000	9.000	GND	N	10.1	25.2	56.0	
0.786000	31.9	1000.000	9.000	GND	N	10.1	24.1	56.0	
1.714000	30.1	1000.000	9.000	GND	N	10.1	25.9	56.0	
2.718000	28.4	1000.000	9.000	GND	N	10.2	27.6	56.0	
9.598000	36.9	1000.000	9.000	GND	N	10.5	23.1	60.0	
22.918000	25.4	1000.000	9.000	GND	N	10.8	34.6	60.0	

Final Measurement Detector 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.154000	48.0	1000.000	9.000	GND	N	10.1	7.8	55.8	
0.506000	26.1	1000.000	9.000	GND	N	10.1	19.9	46.0	
0.706000	25.9	1000.000	9.000	GND	N	10.1	20.1	46.0	
1.722000	24.7	1000.000	9.000	GND	N	10.1	21.3	46.0	
3.838000	23.3	1000.000	9.000	GND	N	10.3	22.7	46.0	
9.530000	30.5	1000.000	9.000	GND	N	10.5	19.5	50.0	
22.930000	28.2	1000.000	9.000	GND	N	10.8	21.8	50.0	

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



6. Radiated Emission

6.1 Operating Environment

Temperature : 22 °C
Relative Humidity : 42 % 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

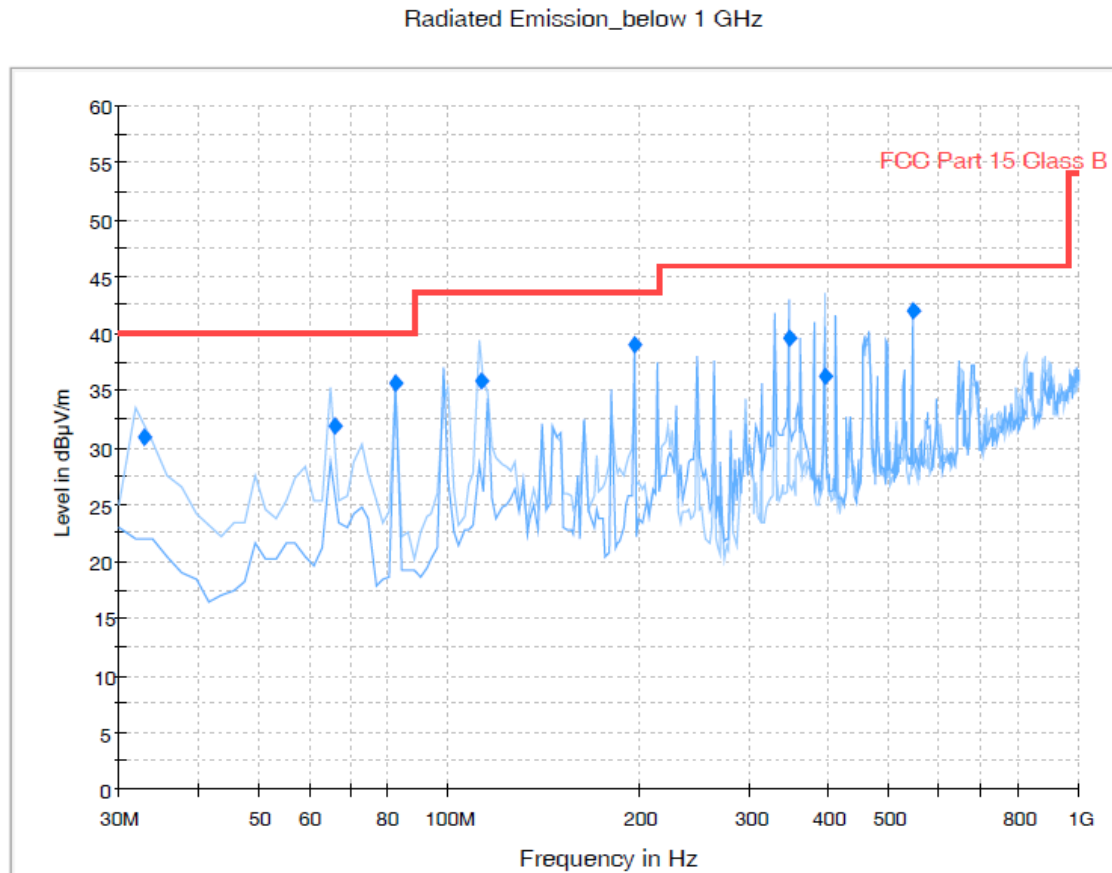
Model Name	Manufacturer	Description	Serial Number	Due to Calibration
■ - ESIB26	Rohde & Schwarz	EMI Test Receiver	830482/010	12. 11. 2011
■ - VULB9160	Schwarzbeck	Broadband Test Antenna	3193	03. 15. 2012
■ - BBHA9120D	Schwarzbeck	Horn ANT	207	12. 22. 2011
■ - MCU066	maturo GmbH	Position Controller	1390306	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	1258942	11. 12. 2011

6.6 Test data for Radiated Emission

- Test Date : June 30, 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 (667 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



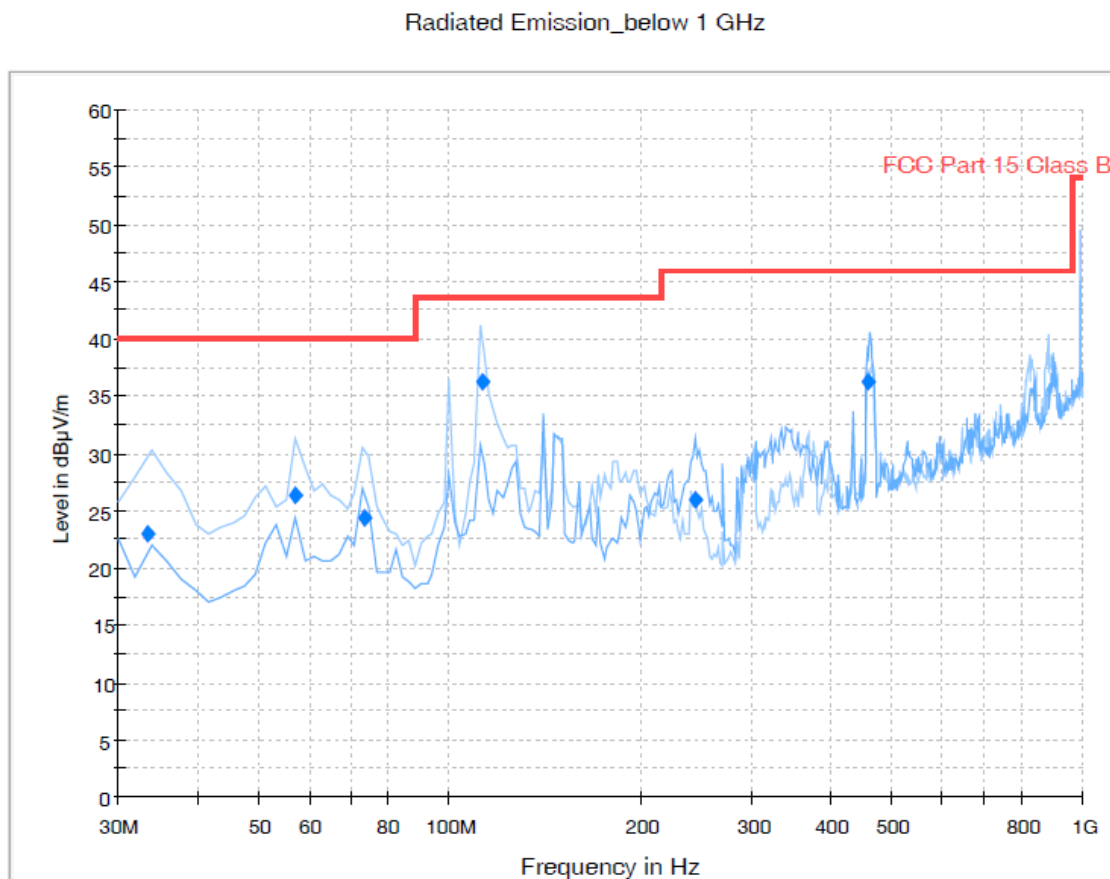
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
33.003888	30.9	1000.0	120.000	100.0	V	229.0	11.6	9.1	40.0
66.009980	31.9	1000.0	120.000	100.0	V	292.0	12.0	8.1	40.0
82.504970	35.7	1000.0	120.000	226.0	H	238.0	9.1	4.3	40.0
112.523287	35.8	1000.0	120.000	100.0	V	73.0	12.7	7.7	43.5
198.034349	39.0	1000.0	120.000	115.0	H	272.0	11.6	4.5	43.5
346.593707	39.5	1000.0	120.000	109.0	H	160.0	18.2	6.5	46.0
396.110902	36.1	1000.0	120.000	100.0	H	212.0	19.6	9.9	46.0
544.630261	42.0	1000.0	120.000	114.0	H	193.0	22.6	4.0	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

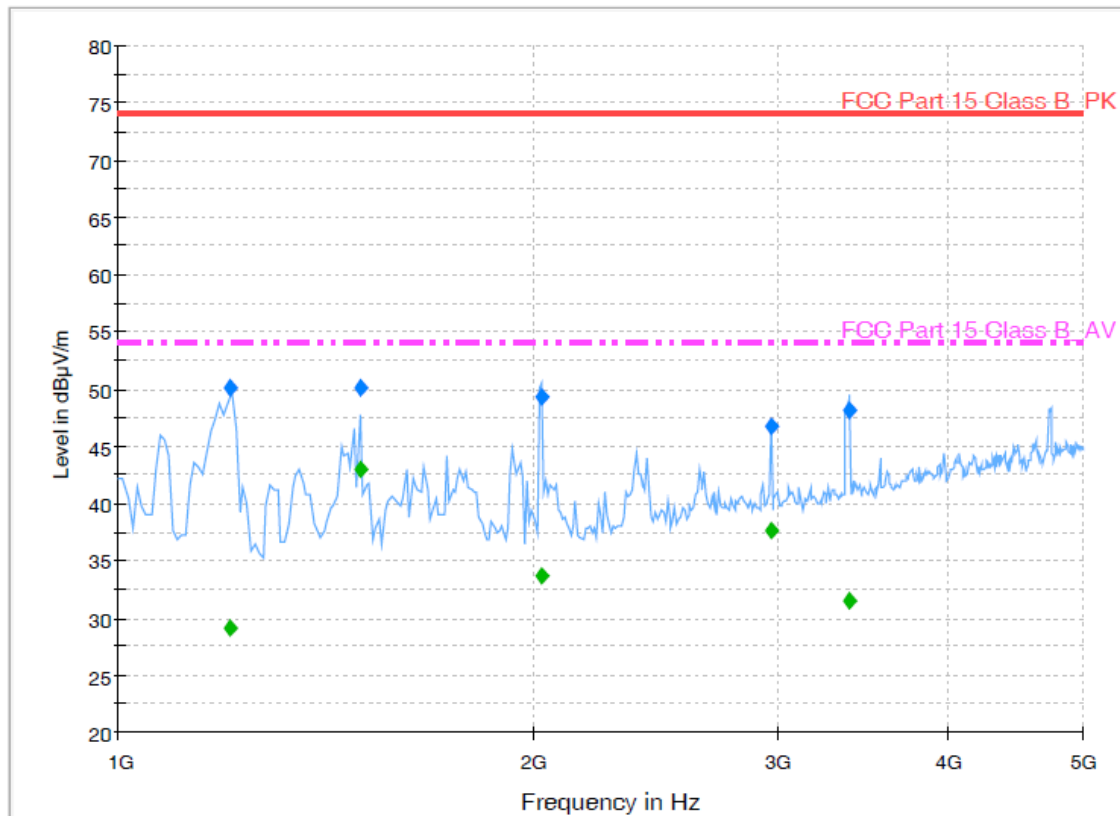
Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
33.447776	22.9	1000.0	120.000	100.0	V	199.0	11.6	17.1	40.0
57.274429	26.4	1000.0	120.000	100.0	V	33.0	12.9	13.6	40.0
73.245531	24.4	1000.0	120.000	100.0	V	268.0	10.8	15.6	40.0
112.543287	36.3	1000.0	120.000	125.0	V	121.0	12.7	7.2	43.5
244.487655	26.0	1000.0	120.000	100.0	H	48.0	13.8	20.0	46.0
458.683086	36.3	1000.0	120.000	100.0	H	196.0	20.8	9.7	46.0

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



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

Radiated Emission_above 1 GHz



Final Result 1

Frequency (MHz)	MaxPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1204.616834	50.2	1000.0	1000.000	121.0	V	2.0	-13.7	23.8	74.0
1500.393988	50.2	1000.0	1000.000	138.0	V	10.0	-13.0	23.8	74.0
2029.452104	49.4	1000.0	1000.000	113.0	V	212.0	-11.5	24.6	74.0
2969.743888	46.7	1000.0	1000.000	150.0	V	205.0	-7.5	27.3	74.0
3384.577555	48.1	1000.0	1000.000	100.0	H	79.0	-5.9	25.9	74.0

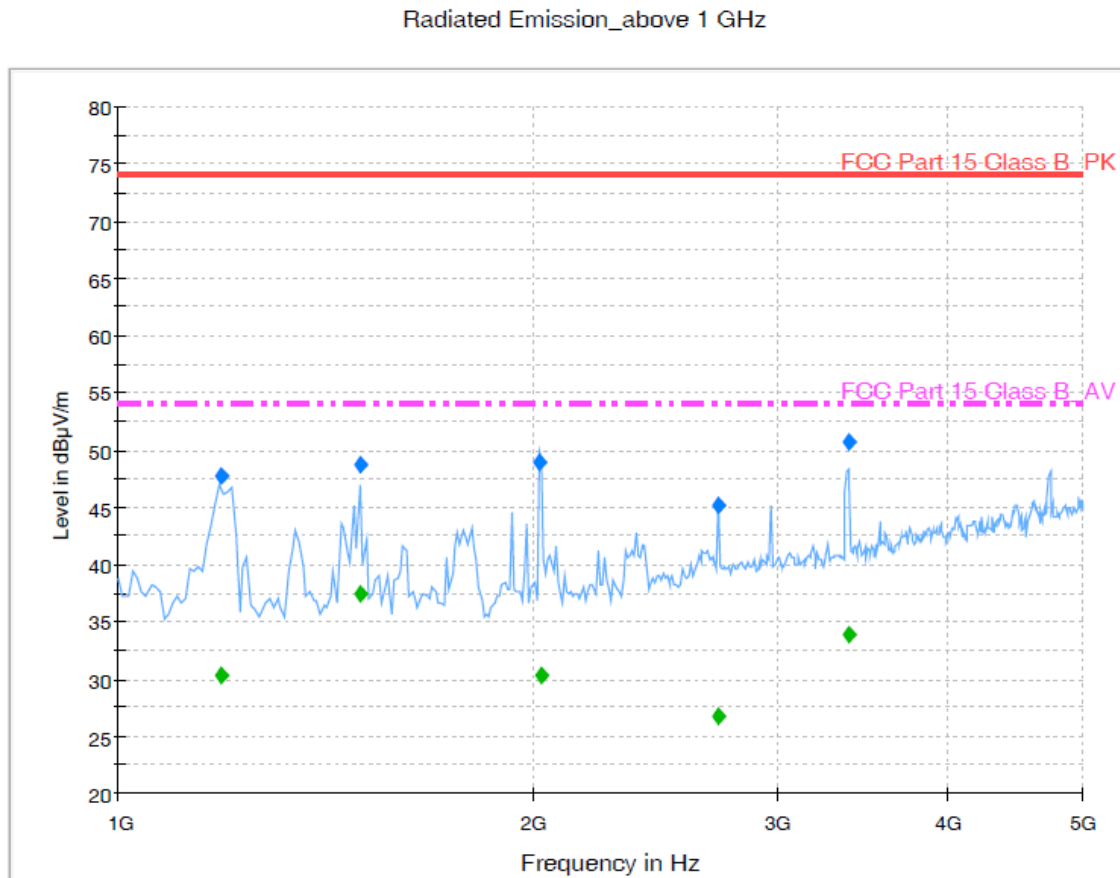
Final Result 2

Frequency (MHz)	CAverage (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1203.416834	29.1	1000.0	1000.000	113.0	V	6.0	-13.7	24.9	54.0
1500.393988	42.9	1000.0	1000.000	100.0	V	-2.0	-13.0	11.1	54.0
2029.452104	33.7	1000.0	1000.000	112.0	V	210.0	-11.5	20.3	54.0
2969.743888	37.6	1000.0	1000.000	150.0	V	208.0	-7.5	16.4	54.0
3383.777555	31.4	1000.0	1000.000	100.0	H	82.0	-5.9	22.6	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



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)
1188.168738	47.8	1000.0	1000.000	113.0	V	10.0	-13.7	26.2	74.0
1500.393988	48.6	1000.0	1000.000	150.0	V	10.0	-13.0	25.4	74.0
2021.036072	49.0	1000.0	1000.000	100.0	H	243.0	-11.6	25.0	74.0
2724.046894	45.2	1000.0	1000.000	100.0	V	200.0	-8.4	28.8	74.0
3381.361523	50.7	1000.0	1000.000	100.0	H	72.0	-5.9	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)
1187.768738	30.3	1000.0	1000.000	121.0	V	6.0	-13.7	23.7	54.0
1500.393988	37.4	1000.0	1000.000	113.0	V	-2.0	-13.0	16.6	54.0
2023.036072	30.3	1000.0	1000.000	150.0	H	246.0	-11.5	23.7	54.0
2725.246894	26.8	1000.0	1000.000	100.0	V	200.0	-8.4	27.2	54.0
3382.161523	33.9	1000.0	1000.000	100.0	H	72.0	-5.9	20.1	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: 42LV355C-UA)** was complies with §15.107 and 15.109 of the FCC Rules.