

FCC EVALUATION REPORT FOR CERTIFICATION

Applicant : LG Electronics Inc.

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

Pyeongteak-si, Gyeonggi-do, Korea.

Attn: Mr. Myoung-Kyu Lee, Chief research engineer

Date of Issue : October 29, 2010

Order Number: GETEC-C1-10-203

Test Report Number: GETEC-E3-10-103

Test Site: Gumi College EMC Center

FCC Registration Number: (100749, 443957)

FCC ID.: BEJM2780DFM

Applicant: LG Electronics Inc.

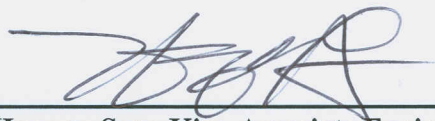
Rule Part(s)	: FCC Part 15 Subpart B
Equipment Class	: Class B computing device peripheral (JBP)
EUT Type	: LED LCD TV/Monitor
Type of Authority	: Certification
Model Name	: M2780DFM, M2780DM
Trade Name	: LG

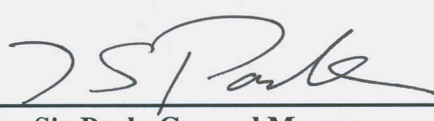
This equipment has been shown to be in compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.4-2003 / Canadian standard ICES-003

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,


Hyoung-Seop Kim, Associate Engineer
GUMI College EMC center


Tae-Sig Park, General Manager
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	23
6.1 OPERATING ENVIRONMENT	23
6.2 TEST SET-UP	23
6.3 MEASUREMENT UNCERTAINTY.....	23
6.4 LIMIT	24
6.5 TEST EQUIPMENT USED.....	24
6.6 TEST DATA FOR RADIATED EMISSION.....	24
7. SAMPLE CALCULATIONS.....	31
7.1 EXAMPLE 1 :	31
7.2 EXAMPLE 2 :	31
8. RECOMMENDATION & CONCLUSION.....	32
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. Myoung-Kyu Lee, Chief research engineer

Tel Number: +82-31-610-9623

- **FCC ID.** BEJM2780DFM
- **EUT Type** LED LCD TV/Monitor
- **Model Name** M2780DFM (Basic model), M2780DM (deleted with EUT stand woofer speaker)
"These model names are given in accordance with customer's requirement that are not effect on EMC performance. All the electrical and mechanical characteristics are the same as basic model except model name designation."
- **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** October 25, 2010
- **Place of Test** **Gumi College EMC Center** (FCC Registration Number: 100749, 443957)
407, Bugok-dong, Gumi-si, Gyeongbuk, Korea.
- **Test Report Number** GETEC-E3-10-103
- **Dates of Issue** October 29, 2010



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: M2780DFM, M2780DM)**

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: M2780DFM, M2780DM) FCC ID.: BEJM2780DFM**

LCD Panel	Screen Type	685.8 mm Wide (27 inch) TFT (Thin Film Transistor) LCD (Liquid Crystal Display) Panel Visible diagonal size: 685.8 mm
	Pixel Pitch	0.3114 mm (H)x0.3114 mm (V)
Video Signal	Max. Resolution	1920x1080 @ 60 Hz
	Recommended Resolution	1920x1080 @ 60 Hz
	Horizontal Frequency	30 kHz to 83 kHz
	Vertical Frequency	56 Hz to 75 Hz
	Synchronization Type	Separate Sync, Digital
Input Connector		TV, D-Sub Analog, PC Audio In, component, HDMI*2, CVBS
Power	Rated Voltage	19 V $\pm$ 2.8 A
	Power Consumption	On Mode 47 W (typ.) Off Mode $\leq$ 1 W
AC/DC Adapter		Manufacturer: LITE-ON, Model PA-1650-68 INPUT: AC 100-240 V 50/60 Hz 2.0 A OUTPUT: DC 19 V / 3.42 A
Tilt	Tilt Range	-5° to 10°
Dimensions (Width x Height x Depth) Weight	M2780D	
	644 mm x 480.8 mm x 222.8 mm (23.53 inch x 18.92 inch x 8.77 inch) 5.8 kg (12.79 lb)	
	M2780DF	
	644 mm x 493.6 mm x 221.7 mm (23.53 inch x 19.43 inch x 8.72 inch) 6.1 kg (13.45 lb)	
Environmental Conditions	Operating Temperature	10 °C to 35 °C
	Operating Humidity	20 % to 80 %
	Storage Temperature	-10 °C to 60 °C
	Storage Humidity	5 % to 90 %

-. Maximum Frequency Range : 400 MHz

EUT Type: LED LCD TV/Monitor

FCC ID.: BEJM2780DFM



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 Key board	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
Printer	Hewlett Packard	970CXI	S/N: MY9B01F1FG FCC ID.: DoC
DVD player	LG Electronics Inc.	LC-954	S/N: 3850R-Z674K FCC ID.: DoC
USB memory stick	LG Electronics Inc.	UM5 2GB	S/N: 003RLRZN37758 FCC ID.: DoC
Headset	PHILIPS	SBC HL140	S/N: N/A FCC ID.: N/A
TV signal generator	FLUKE	54200	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.
AC/DC adapter ^{*1)}	LITE ON Technology corporation	PA-1650-68	S/N: OA86D612314016155 FCC ID.: N/A

1) Input ratings: AC (100 – 240) V~, (50 – 60) Hz, 2.0 A / Output ratings: DC 19 V, 3.42 A



3.2.3 Used Cable(s)

Cable Name	Condition	Description
Power cable	Connected to the adapter	1.80 m unshielded
Adapter cable	Connected to the EUT	1.80 m shielded with a ferrite core
RGB (Analog) in cable	Connected to the EUT and PC	1.80 m shielded with two ferrite cores
HDMI/DVI (Digital) in cable	Connected to the EUT and PC	2.00 m shielded
Audio (RGB/DVI) in cable	Connected to the EUT and PC	1.80 m shielded with a ferrite core
Component in cable	Connected to the EUT and DVD player	2.00 m shielded
Component sound in cable	Connected to the EUT and DVD player	3.00 m shielded
AV in cable	Connected to the EUT and DVD player	3.00 m shielded
Headset cable	Connected to the EUT and headset	1.20 m shielded
RS-232C in cable	Connected to the EUT and PC	1.80 m shielded
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 play mode
 - ◆ Operating test pattern
 - . Continuous playback mode with video files

“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

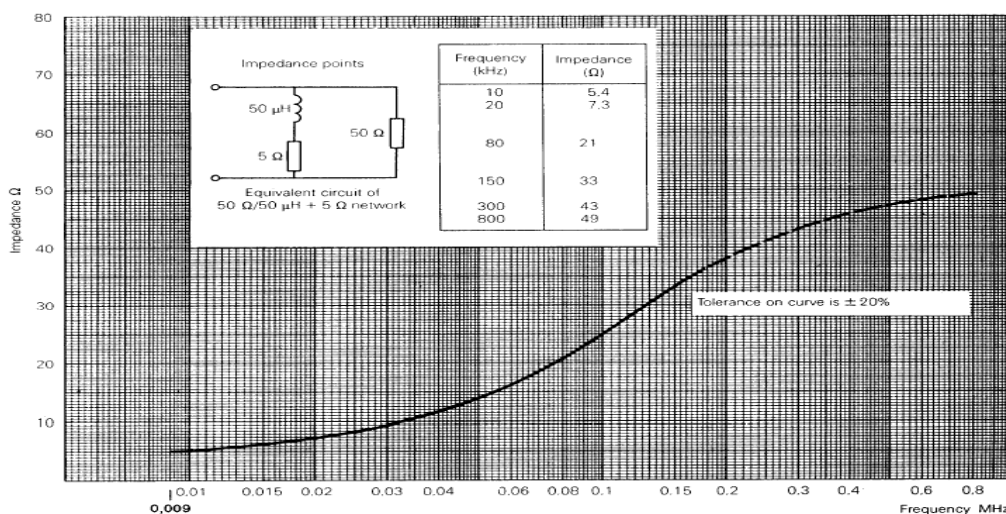


Fig 2. Impedance of LISN



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 : 25 °C
Relative Humidity : 48 % 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)	± 2.69 dB	Confidence levels of 95 % ($k = 2$)
Conducted emission (150 kHz ~ 30 MHz)	± 4.16 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. 2010
■ - ESH3-Z5	Rohde & Schwarz	LISN	838979/020	12. 10. 2010
■ - ESH2-Z5	Rohde & Schwarz	LISN	829991/009	12. 10. 2010
□ - ISN T8	TESEQ. GmbH	Impedance Network	24568	10. 16. 2010

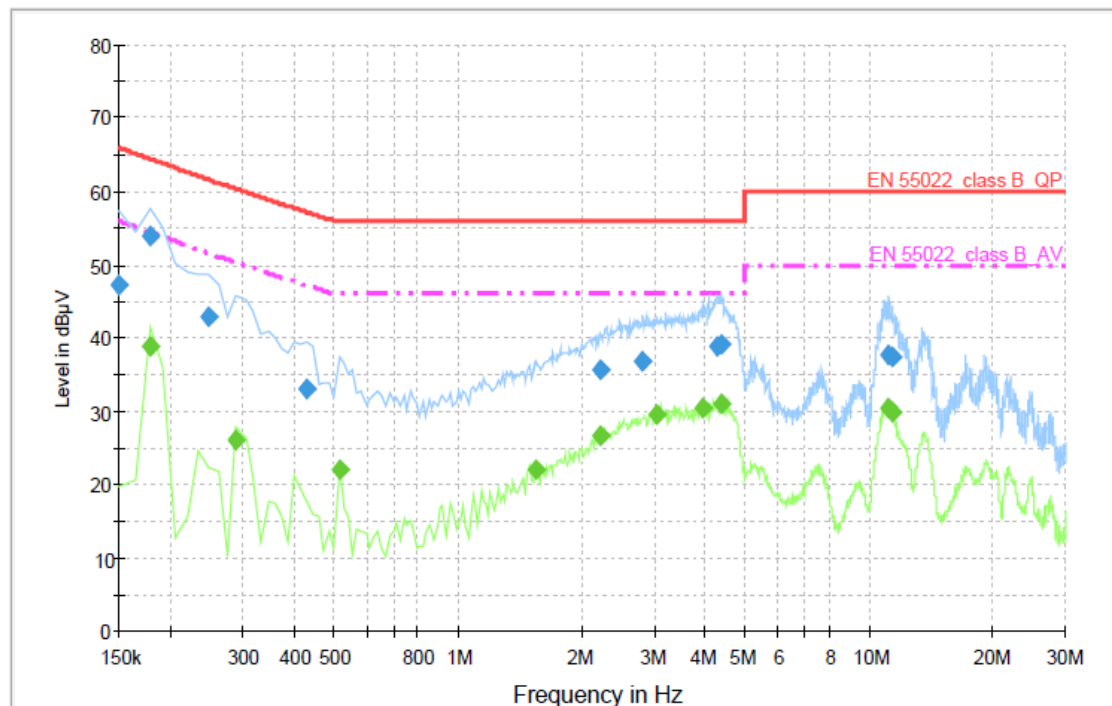
5.6 Test data for Conducted Emission

-. Test Date : October 25, 2010
-. 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
0.150000	47.3	1000.000	9.000	GND	L1	10.0	18.7	66.0	
0.178000	53.9	1000.000	9.000	GND	L1	10.0	10.6	64.5	
0.248000	42.9	1000.000	9.000	GND	L1	10.0	18.8	61.6	
0.430000	33.1	1000.000	9.000	GND	L1	10.0	24.1	57.2	
2.222000	35.5	1000.000	9.000	GND	L1	10.1	20.5	56.0	
2.810000	37.0	1000.000	9.000	GND	L1	10.1	19.0	56.0	
4.280000	38.7	1000.000	9.000	GND	L1	10.2	17.3	56.0	
4.364000	39.2	1000.000	9.000	GND	L1	10.2	16.8	56.0	
11.182000	37.6	1000.000	9.000	GND	L1	10.5	22.4	60.0	
11.350000	37.3	1000.000	9.000	GND	L1	10.5	22.7	60.0	

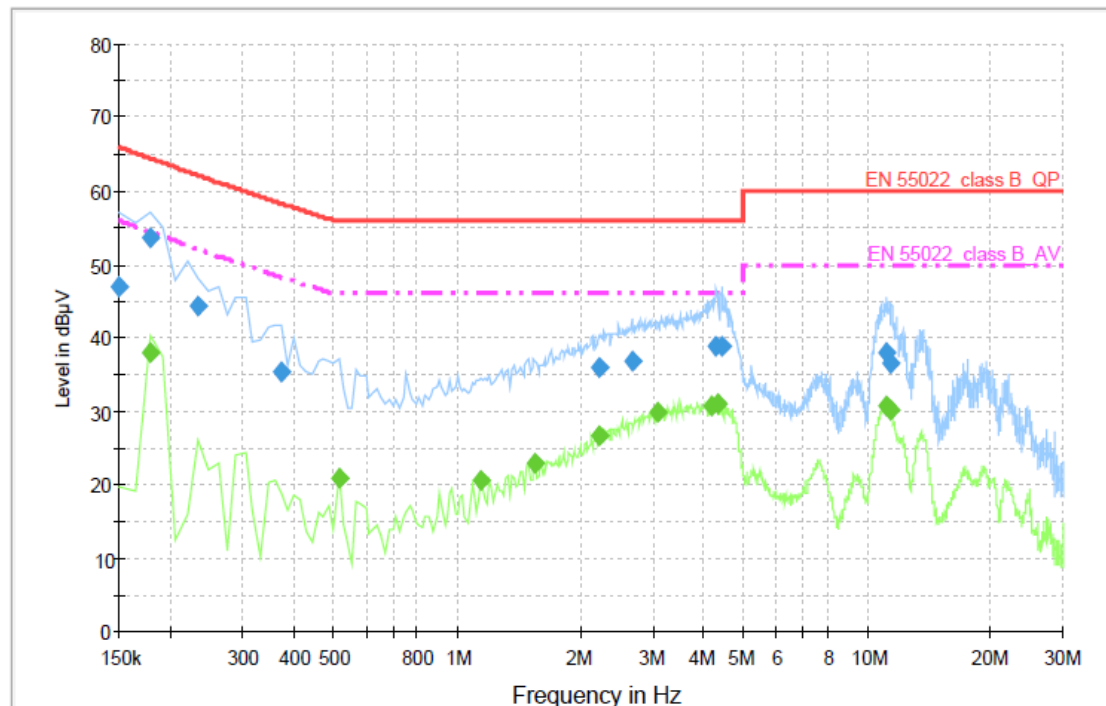
Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.178000	38.9	1000.000	9.000	GND	L1	10.0	15.6	54.5	
0.290000	26.2	1000.000	9.000	GND	L1	10.0	24.1	50.3	
0.514000	22.0	1000.000	9.000	GND	L1	10.0	24.0	46.0	
1.550000	22.0	1000.000	9.000	GND	L1	10.1	24.0	46.0	
2.222000	26.8	1000.000	9.000	GND	L1	10.1	19.2	46.0	
3.034000	29.6	1000.000	9.000	GND	L1	10.1	16.4	46.0	
3.916000	30.4	1000.000	9.000	GND	L1	10.2	15.6	46.0	
4.364000	31.1	1000.000	9.000	GND	L1	10.2	14.9	46.0	
11.084000	30.5	1000.000	9.000	GND	L1	10.5	19.5	50.0	
11.350000	30.0	1000.000	9.000	GND	L1	10.5	20.0	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	46.9	1000.000	9.000	GND	N	10.0	19.1	66.0	
0.178000	53.7	1000.000	9.000	GND	N	10.0	10.8	64.5	
0.234000	44.3	1000.000	9.000	GND	N	10.0	17.8	62.1	
0.374000	35.2	1000.000	9.000	GND	N	10.0	23.1	58.3	
2.222000	35.8	1000.000	9.000	GND	N	10.1	20.2	56.0	
2.670000	36.7	1000.000	9.000	GND	N	10.1	19.3	56.0	
4.280000	38.9	1000.000	9.000	GND	N	10.2	17.1	56.0	
4.434000	38.7	1000.000	9.000	GND	N	10.2	17.3	56.0	
11.126000	37.9	1000.000	9.000	GND	N	10.4	22.1	60.0	
11.448000	36.5	1000.000	9.000	GND	N	10.4	23.5	60.0	

Final Measurement Detector 2

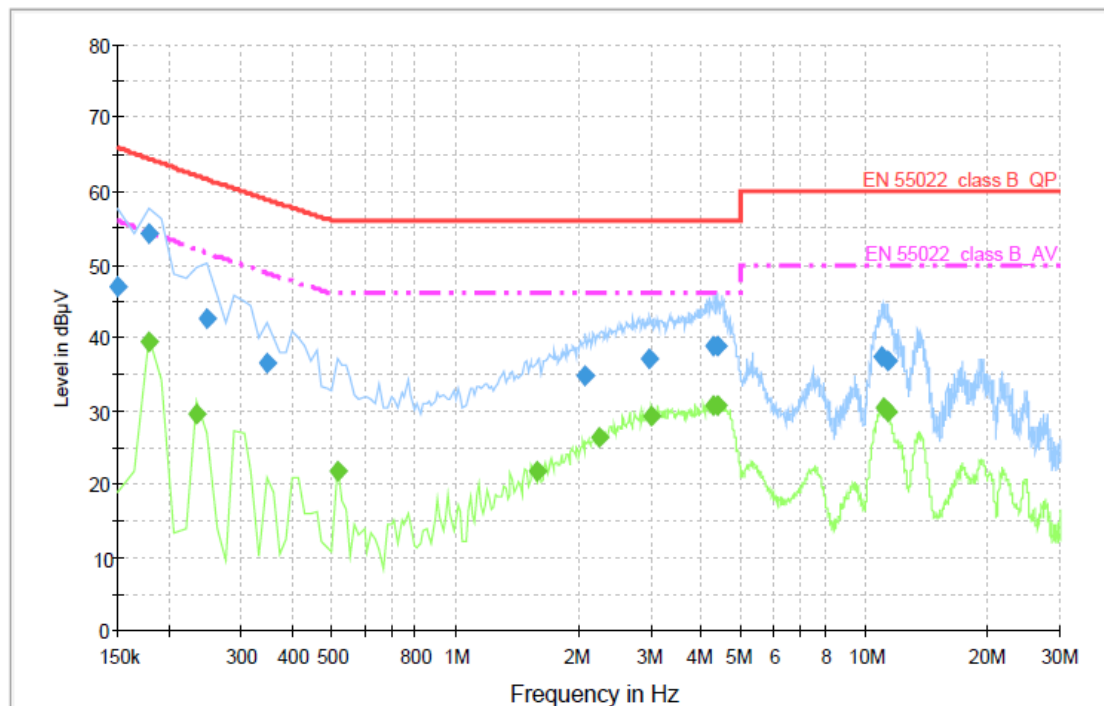
Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.178000	38.1	1000.000	9.000	GND	N	10.0	16.4	54.5	
0.514000	20.9	1000.000	9.000	GND	N	10.0	25.1	46.0	
1.144000	20.6	1000.000	9.000	GND	N	10.1	25.4	46.0	
1.550000	22.9	1000.000	9.000	GND	N	10.1	23.1	46.0	
2.222000	26.8	1000.000	9.000	GND	N	10.1	19.2	46.0	
3.090000	29.8	1000.000	9.000	GND	N	10.1	16.2	46.0	
4.196000	30.7	1000.000	9.000	GND	N	10.2	15.3	46.0	
4.308000	31.1	1000.000	9.000	GND	N	10.2	14.9	46.0	
11.126000	30.8	1000.000	9.000	GND	N	10.4	19.2	50.0	
11.336000	30.2	1000.000	9.000	GND	N	10.4	19.8	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
0.150000	47.1	1000.000	9.000	GND	L1	10.0	18.9	66.0	
0.178000	54.1	1000.000	9.000	GND	L1	10.0	10.4	64.5	
0.248000	42.6	1000.000	9.000	GND	L1	10.0	19.0	61.6	
0.346000	36.4	1000.000	9.000	GND	L1	10.0	22.5	58.9	
2.082000	34.9	1000.000	9.000	GND	L1	10.1	21.1	56.0	
2.992000	37.1	1000.000	9.000	GND	L1	10.1	18.9	56.0	
4.280000	38.8	1000.000	9.000	GND	L1	10.2	17.2	56.0	
4.364000	39.0	1000.000	9.000	GND	L1	10.2	17.0	56.0	
11.000000	37.5	1000.000	9.000	GND	L1	10.5	22.5	60.0	
11.378000	36.8	1000.000	9.000	GND	L1	10.5	23.2	60.0	

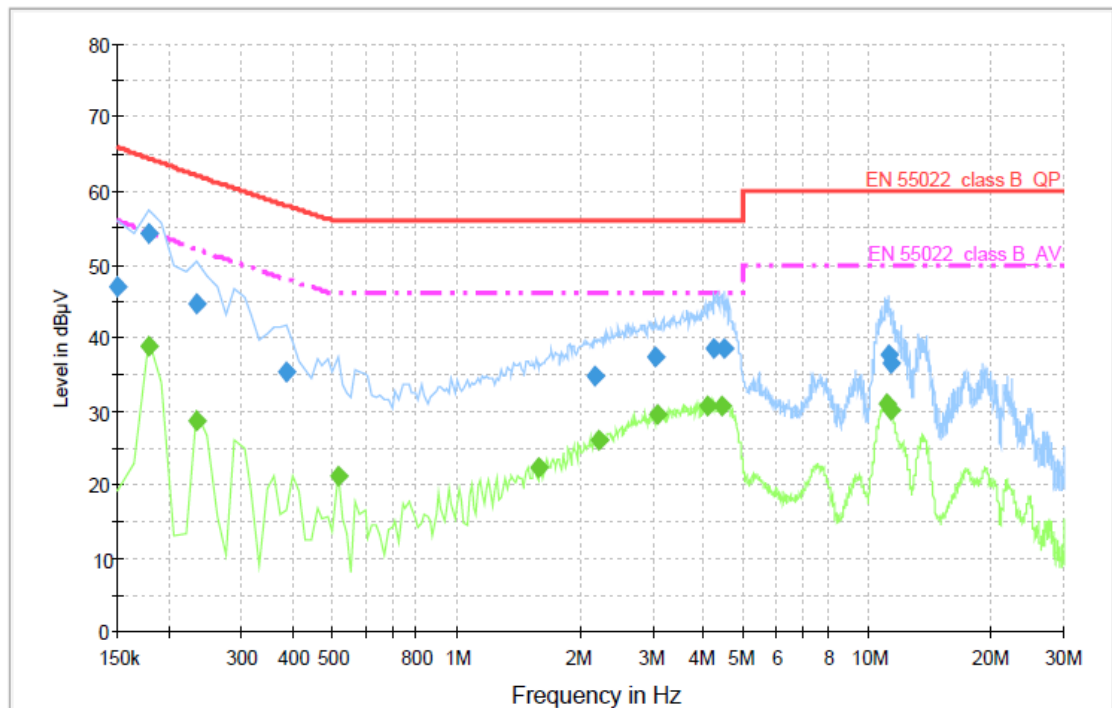
Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.178000	39.3	1000.000	9.000	GND	L1	10.0	15.2	54.5	
0.234000	29.5	1000.000	9.000	GND	L1	10.0	22.6	52.1	
0.514000	21.8	1000.000	9.000	GND	L1	10.0	24.2	46.0	
1.592000	21.7	1000.000	9.000	GND	L1	10.1	24.3	46.0	
2.236000	26.3	1000.000	9.000	GND	L1	10.1	19.7	46.0	
3.020000	29.4	1000.000	9.000	GND	L1	10.1	16.6	46.0	
4.280000	30.8	1000.000	9.000	GND	L1	10.2	15.2	46.0	
4.350000	30.8	1000.000	9.000	GND	L1	10.2	15.2	46.0	
11.182000	30.4	1000.000	9.000	GND	L1	10.5	19.6	50.0	
11.336000	29.8	1000.000	9.000	GND	L1	10.5	20.2	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	47.1	1000.000	9.000	GND	N	10.0	18.9	66.0	
0.178000	54.3	1000.000	9.000	GND	N	10.0	10.2	64.5	
0.234000	44.7	1000.000	9.000	GND	N	10.0	17.4	62.1	
0.388000	35.2	1000.000	9.000	GND	N	10.0	22.8	58.0	
2.166000	34.9	1000.000	9.000	GND	N	10.1	21.1	56.0	
3.062000	37.3	1000.000	9.000	GND	N	10.1	18.7	56.0	
4.238000	38.6	1000.000	9.000	GND	N	10.2	17.4	56.0	
4.476000	38.4	1000.000	9.000	GND	N	10.2	17.6	56.0	
11.252000	37.7	1000.000	9.000	GND	N	10.4	22.3	60.0	
11.434000	36.6	1000.000	9.000	GND	N	10.4	23.4	60.0	

Final Measurement Detector 2

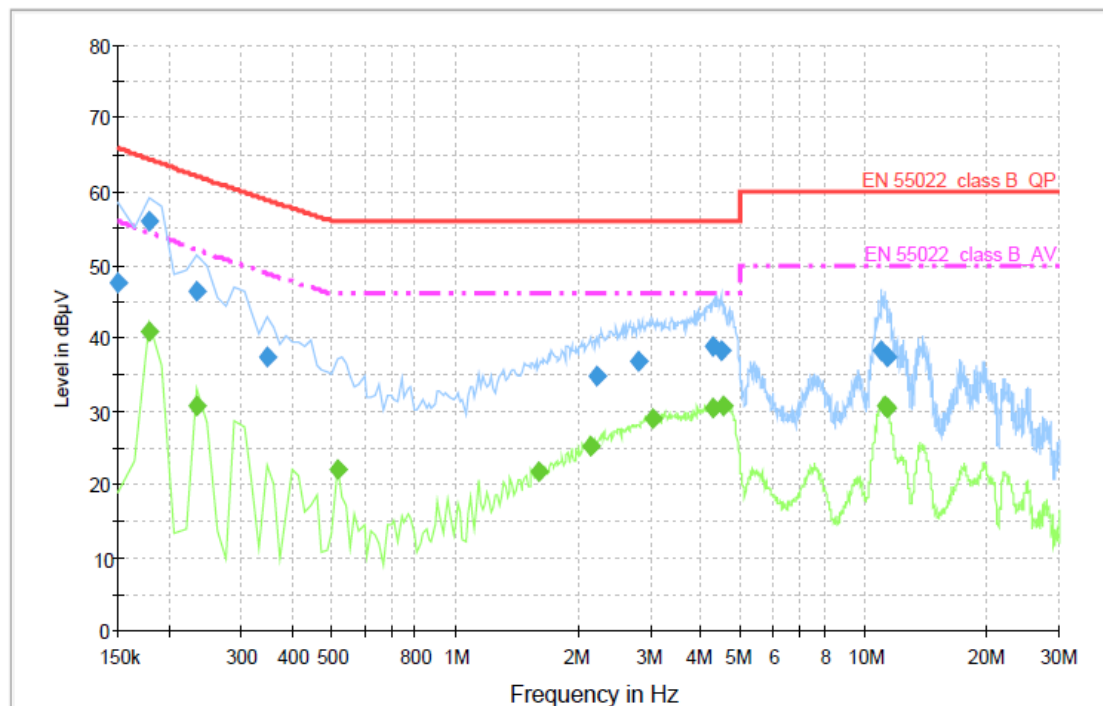
Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.178000	38.9	1000.000	9.000	GND	N	10.0	15.6	54.5	
0.234000	28.7	1000.000	9.000	GND	N	10.0	23.4	52.1	
0.514000	21.0	1000.000	9.000	GND	N	10.0	25.0	46.0	
1.592000	22.4	1000.000	9.000	GND	N	10.1	23.6	46.0	
2.222000	26.0	1000.000	9.000	GND	N	10.1	20.0	46.0	
3.076000	29.5	1000.000	9.000	GND	N	10.1	16.5	46.0	
4.098000	30.6	1000.000	9.000	GND	N	10.2	15.4	46.0	
4.420000	30.8	1000.000	9.000	GND	N	10.2	15.2	46.0	
11.126000	31.0	1000.000	9.000	GND	N	10.4	19.0	50.0	
11.350000	30.1	1000.000	9.000	GND	N	10.4	19.9	50.0	

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



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

Voltage with 4-Line-LISN_L1



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.150000	47.5	1000.000	9.000	GND	L1	10.0	18.5	66.0	
0.178000	56.0	1000.000	9.000	GND	L1	10.0	8.5	64.5	
0.234000	46.3	1000.000	9.000	GND	L1	10.0	15.8	62.1	
0.346000	37.4	1000.000	9.000	GND	L1	10.0	21.5	58.9	
2.222000	34.7	1000.000	9.000	GND	L1	10.1	21.3	56.0	
2.810000	36.7	1000.000	9.000	GND	L1	10.1	19.3	56.0	
4.266000	38.7	1000.000	9.000	GND	L1	10.2	17.3	56.0	
4.462000	38.1	1000.000	9.000	GND	L1	10.2	17.9	56.0	
11.042000	38.3	1000.000	9.000	GND	L1	10.5	21.7	60.0	
11.420000	37.3	1000.000	9.000	GND	L1	10.5	22.7	60.0	

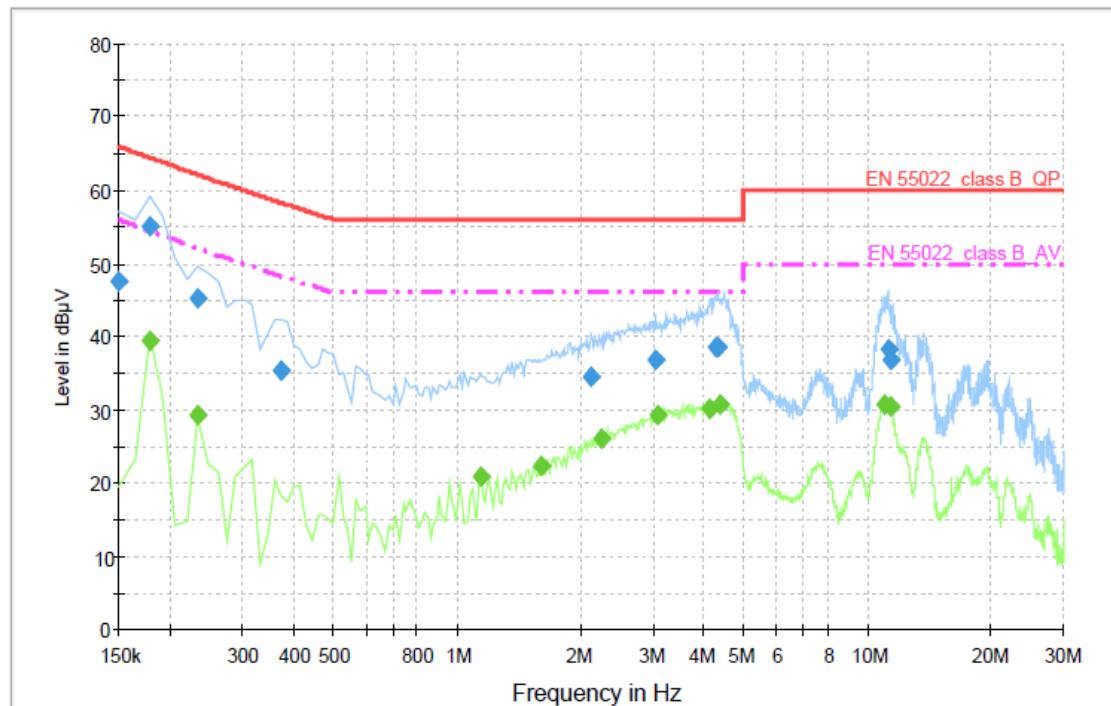
Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.178000	40.9	1000.000	9.000	GND	L1	10.0	13.6	54.5	
0.234000	30.7	1000.000	9.000	GND	L1	10.0	21.4	52.1	
0.514000	21.9	1000.000	9.000	GND	L1	10.0	24.1	46.0	
1.606000	21.8	1000.000	9.000	GND	L1	10.1	24.2	46.0	
2.152000	25.2	1000.000	9.000	GND	L1	10.1	20.8	46.0	
3.034000	29.0	1000.000	9.000	GND	L1	10.1	17.0	46.0	
4.252000	30.5	1000.000	9.000	GND	L1	10.2	15.5	46.0	
4.518000	30.7	1000.000	9.000	GND	L1	10.2	15.3	46.0	
11.252000	30.8	1000.000	9.000	GND	L1	10.5	19.2	50.0	
11.336000	30.5	1000.000	9.000	GND	L1	10.5	19.5	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	47.5	1000.000	9.000	GND	N	10.0	18.5	66.0	
0.178000	55.0	1000.000	9.000	GND	N	10.0	9.5	64.5	
0.234000	45.3	1000.000	9.000	GND	N	10.0	16.8	62.1	
0.374000	35.3	1000.000	9.000	GND	N	10.0	23.0	58.3	
2.124000	34.5	1000.000	9.000	GND	N	10.1	21.5	56.0	
3.034000	36.8	1000.000	9.000	GND	N	10.1	19.2	56.0	
4.280000	38.6	1000.000	9.000	GND	N	10.2	17.4	56.0	
4.322000	38.6	1000.000	9.000	GND	N	10.2	17.4	56.0	
11.196000	38.4	1000.000	9.000	GND	N	10.4	21.6	60.0	
11.434000	37.0	1000.000	9.000	GND	N	10.4	23.0	60.0	

Final Measurement Detector 2

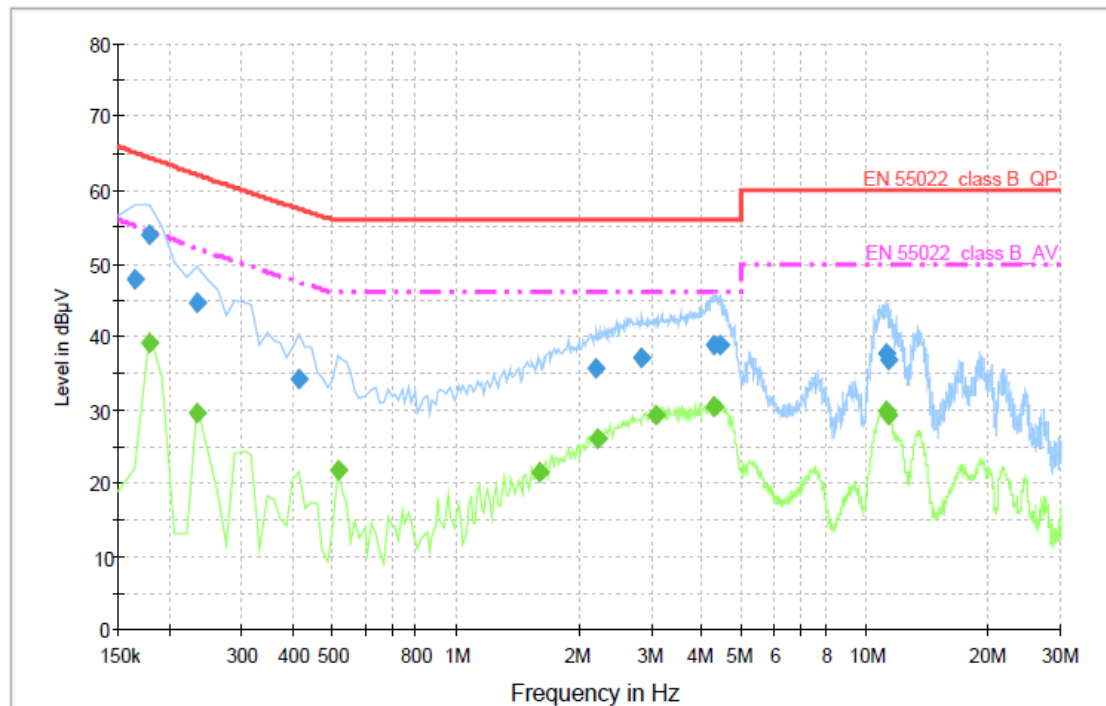
Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.178000	39.5	1000.000	9.000	GND	N	10.0	15.0	54.5	
0.234000	29.2	1000.000	9.000	GND	N	10.0	22.9	52.1	
1.144000	20.9	1000.000	9.000	GND	N	10.1	25.1	46.0	
1.606000	22.4	1000.000	9.000	GND	N	10.1	23.6	46.0	
2.236000	26.1	1000.000	9.000	GND	N	10.1	19.9	46.0	
3.090000	29.2	1000.000	9.000	GND	N	10.1	16.8	46.0	
4.112000	30.3	1000.000	9.000	GND	N	10.2	15.7	46.0	
4.364000	30.6	1000.000	9.000	GND	N	10.2	15.4	46.0	
11.028000	30.8	1000.000	9.000	GND	N	10.4	19.2	50.0	
11.336000	30.4	1000.000	9.000	GND	N	10.4	19.6	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
0.164000	47.8	1000.000	9.000	GND	L1	10.0	17.4	65.2	
0.178000	53.8	1000.000	9.000	GND	L1	10.0	10.7	64.5	
0.234000	44.7	1000.000	9.000	GND	L1	10.0	17.4	62.1	
0.416000	34.3	1000.000	9.000	GND	L1	10.0	23.1	57.4	
2.208000	35.7	1000.000	9.000	GND	L1	10.1	20.3	56.0	
2.852000	37.2	1000.000	9.000	GND	L1	10.1	18.8	56.0	
4.252000	38.8	1000.000	9.000	GND	L1	10.2	17.2	56.0	
4.420000	38.8	1000.000	9.000	GND	L1	10.2	17.2	56.0	
11.210000	37.7	1000.000	9.000	GND	L1	10.5	22.3	60.0	
11.406000	36.8	1000.000	9.000	GND	L1	10.5	23.2	60.0	

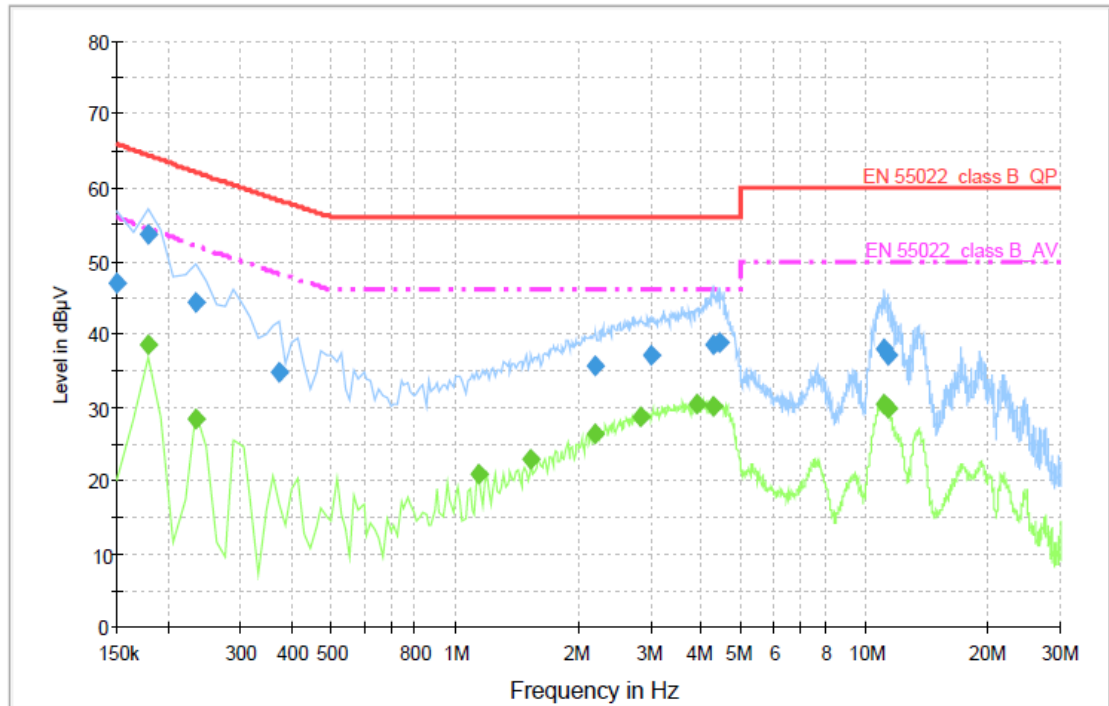
Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.178000	39.1	1000.000	9.000	GND	L1	10.0	15.4	54.5	
0.234000	29.5	1000.000	9.000	GND	L1	10.0	22.6	52.1	
0.514000	21.7	1000.000	9.000	GND	L1	10.0	24.3	46.0	
1.606000	21.4	1000.000	9.000	GND	L1	10.1	24.6	46.0	
2.222000	26.1	1000.000	9.000	GND	L1	10.1	19.9	46.0	
3.090000	29.3	1000.000	9.000	GND	L1	10.1	16.7	46.0	
4.252000	30.3	1000.000	9.000	GND	L1	10.2	15.7	46.0	
4.294000	30.4	1000.000	9.000	GND	L1	10.2	15.6	46.0	
11.238000	29.9	1000.000	9.000	GND	L1	10.5	20.1	50.0	
11.336000	29.4	1000.000	9.000	GND	L1	10.5	20.6	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	47.0	1000.000	9.000	GND	N	10.0	19.0	66.0	
0.178000	53.8	1000.000	9.000	GND	N	10.0	10.7	64.5	
0.234000	44.3	1000.000	9.000	GND	N	10.0	17.9	62.1	
0.374000	34.7	1000.000	9.000	GND	N	10.0	23.6	58.3	
2.208000	35.7	1000.000	9.000	GND	N	10.1	20.3	56.0	
3.006000	37.0	1000.000	9.000	GND	N	10.1	19.0	56.0	
4.280000	38.5	1000.000	9.000	GND	N	10.2	17.5	56.0	
4.420000	38.9	1000.000	9.000	GND	N	10.2	17.1	56.0	
11.182000	37.9	1000.000	9.000	GND	N	10.4	22.1	60.0	
11.336000	37.2	1000.000	9.000	GND	N	10.4	22.8	60.0	

Final Measurement Detector 2

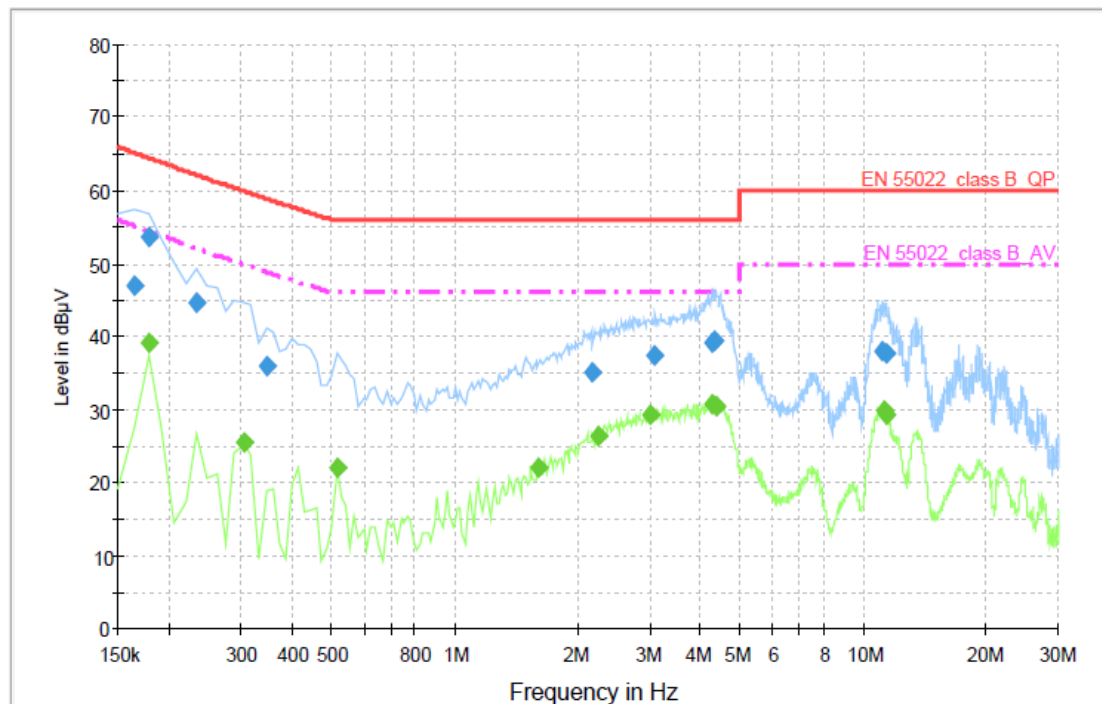
Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.178000	38.5	1000.000	9.000	GND	N	10.0	16.0	54.5	
0.234000	28.4	1000.000	9.000	GND	N	10.0	23.7	52.1	
1.144000	20.8	1000.000	9.000	GND	N	10.1	25.2	46.0	
1.536000	22.8	1000.000	9.000	GND	N	10.1	23.2	46.0	
2.208000	26.3	1000.000	9.000	GND	N	10.1	19.7	46.0	
2.824000	28.7	1000.000	9.000	GND	N	10.1	17.3	46.0	
3.888000	30.5	1000.000	9.000	GND	N	10.2	15.5	46.0	
4.294000	30.1	1000.000	9.000	GND	N	10.2	15.9	46.0	
11.126000	30.3	1000.000	9.000	GND	N	10.4	19.7	50.0	
11.336000	29.8	1000.000	9.000	GND	N	10.4	20.2	50.0	

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



◆ Operating condition: USB memory stick play 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
0.164000	47.1	1000.000	9.000	GND	L1	10.0	18.1	65.2	
0.178000	53.7	1000.000	9.000	GND	L1	10.0	10.8	64.5	
0.234000	44.6	1000.000	9.000	GND	L1	10.0	17.5	62.1	
0.346000	36.1	1000.000	9.000	GND	L1	10.0	22.8	58.9	
2.166000	35.1	1000.000	9.000	GND	L1	10.1	20.9	56.0	
3.090000	37.4	1000.000	9.000	GND	L1	10.1	18.6	56.0	
4.280000	39.0	1000.000	9.000	GND	L1	10.2	17.0	56.0	
4.308000	39.4	1000.000	9.000	GND	L1	10.2	16.6	56.0	
11.154000	38.0	1000.000	9.000	GND	L1	10.5	22.0	60.0	
11.336000	37.6	1000.000	9.000	GND	L1	10.5	22.4	60.0	

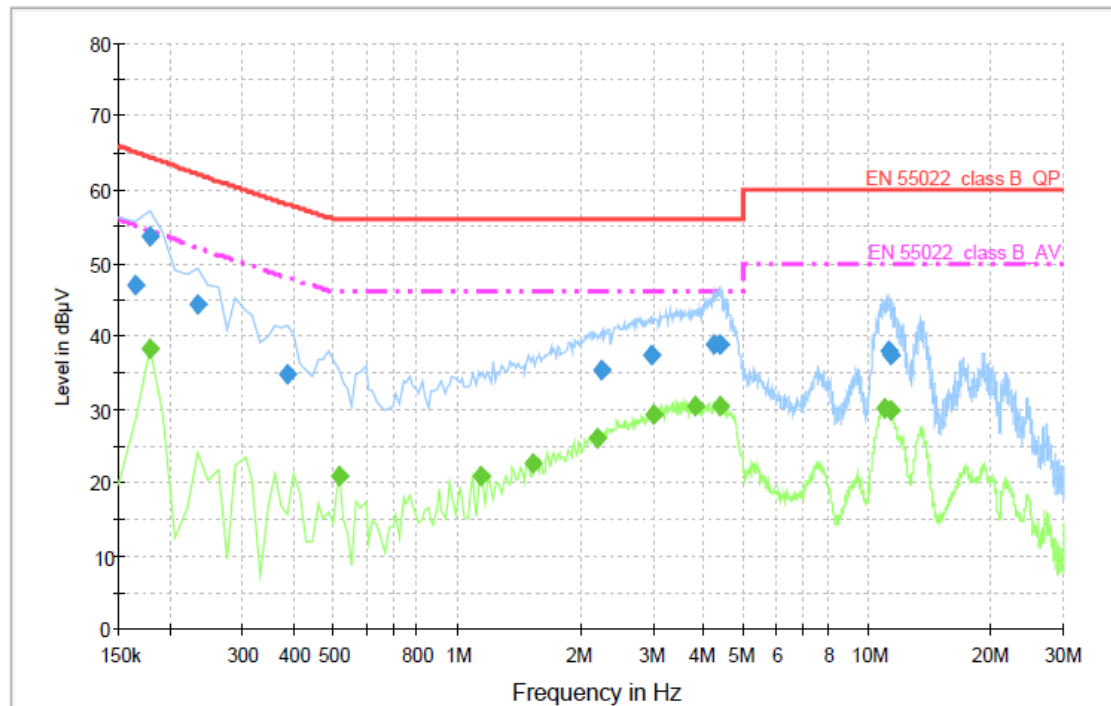
Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.178000	39.0	1000.000	9.000	GND	L1	10.0	15.5	54.5	
0.304000	25.6	1000.000	9.000	GND	L1	10.0	24.3	49.9	
0.514000	22.1	1000.000	9.000	GND	L1	10.0	23.9	46.0	
1.606000	21.9	1000.000	9.000	GND	L1	10.1	24.1	46.0	
2.236000	26.3	1000.000	9.000	GND	L1	10.1	19.7	46.0	
3.020000	29.3	1000.000	9.000	GND	L1	10.1	16.7	46.0	
4.280000	30.8	1000.000	9.000	GND	L1	10.2	15.2	46.0	
4.364000	30.5	1000.000	9.000	GND	L1	10.2	15.5	46.0	
11.280000	29.7	1000.000	9.000	GND	L1	10.5	20.3	50.0	
11.364000	29.3	1000.000	9.000	GND	L1	10.5	20.7	50.0	

< Fig 12. Conducted emission result (Live line) >



Voltage with 4-Line-LISN_N



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.164000	46.9	1000.000	9.000	GND	N	10.0	18.3	65.2	
0.178000	53.6	1000.000	9.000	GND	N	10.0	10.9	64.5	
0.234000	44.2	1000.000	9.000	GND	N	10.0	17.9	62.1	
0.388000	34.9	1000.000	9.000	GND	N	10.0	23.1	58.0	
2.236000	35.4	1000.000	9.000	GND	N	10.1	20.6	56.0	
2.992000	37.5	1000.000	9.000	GND	N	10.1	18.5	56.0	
4.210000	38.9	1000.000	9.000	GND	N	10.2	17.1	56.0	
4.350000	38.9	1000.000	9.000	GND	N	10.2	17.1	56.0	
11.224000	38.1	1000.000	9.000	GND	N	10.4	21.9	60.0	
11.364000	37.3	1000.000	9.000	GND	N	10.4	22.7	60.0	

Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.178000	38.2	1000.000	9.000	GND	N	10.0	16.3	54.5	
0.514000	21.0	1000.000	9.000	GND	N	10.0	25.0	46.0	
1.144000	21.0	1000.000	9.000	GND	N	10.1	25.0	46.0	
1.536000	22.7	1000.000	9.000	GND	N	10.1	23.3	46.0	
2.208000	26.1	1000.000	9.000	GND	N	10.1	19.9	46.0	
3.020000	29.4	1000.000	9.000	GND	N	10.1	16.6	46.0	
3.790000	30.3	1000.000	9.000	GND	N	10.2	15.7	46.0	
4.350000	30.4	1000.000	9.000	GND	N	10.2	15.6	46.0	
11.042000	30.2	1000.000	9.000	GND	N	10.4	19.8	50.0	
11.336000	29.9	1000.000	9.000	GND	N	10.4	20.1	50.0	

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



6. Radiated Emission

6.1 Operating Environment

Temperature : 24 °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)	± 4.32 dB	Confidence levels of 95 % ($k = 2$)
Radiated emission (30 MHz ~ 300 MHz, 3 m, Horizontal)	± 4.21 dB	Confidence levels of 95 % ($k = 2$)
Radiated emission (300 MHz ~ 1 000 MHz, 3 m, Vertical)	± 3.96 dB	Confidence levels of 95 % ($k = 2$)
Radiated emission (300 MHz ~ 1 000 MHz, 3 m, Horizontal)	± 3.97 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

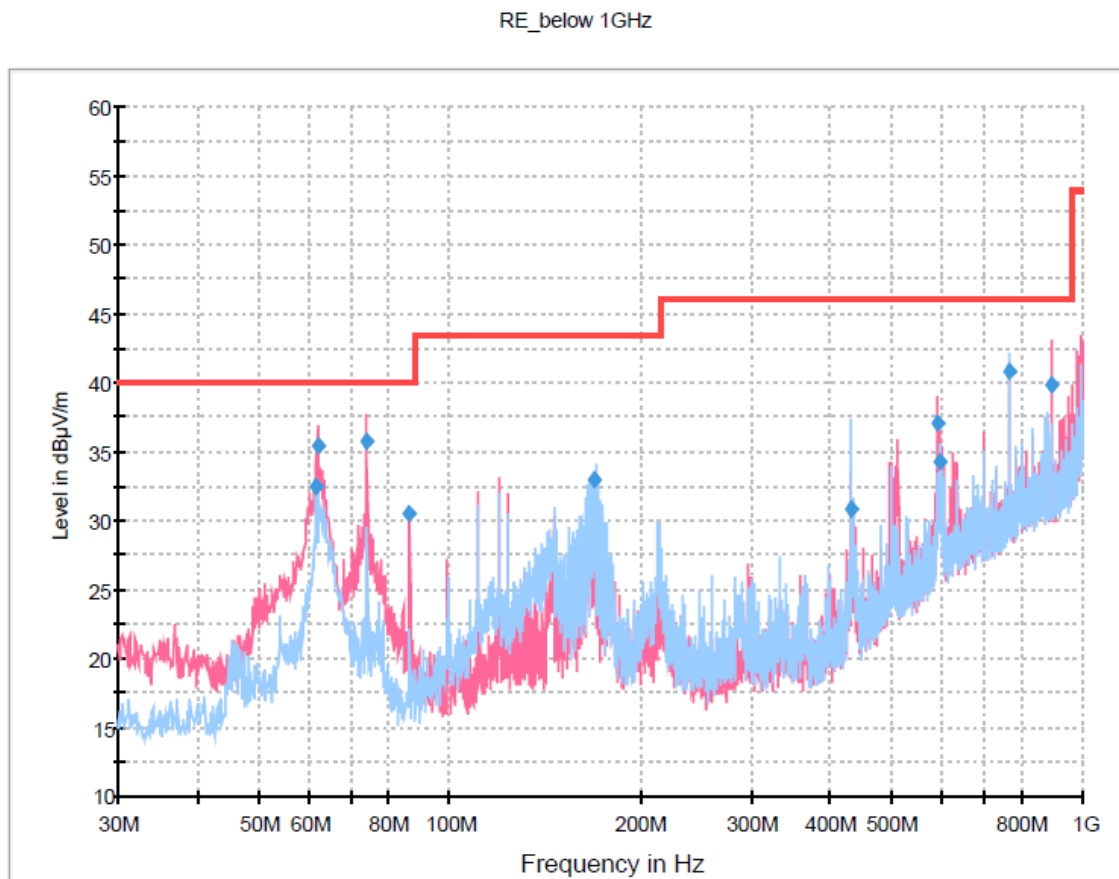
Model Name	Manufacturer	Description	Serial Number	Due to Calibration
■ - ESIB26	Rohde & Schwarz	EMI Test Receiver	830482/010	12. 11. 2010
■ - VULB9160	Schwarzbeck	Broadband Test Antenna	3193	03. 15. 2012
■ - BBHA9120D	Schwarzbeck	Horn ANT	207	12. 22. 2011
■ - MCU066	maturo GmbH	Position Controller	1390306	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. 2010

6.6 Test data for Radiated Emission

- Test Date : October 25, 2010
- Resolution Bandwidth : 120 kHz/1 MHz
- Frequency Range : 30 MHz ~ 2 000 MHz
- Measurement Distance : 3 m
- Note : The highest frequency of the internal source of the EUT is between 108 MHz and 500 MHz (400 MHz). The measurement was made up to 2 000 MHz



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



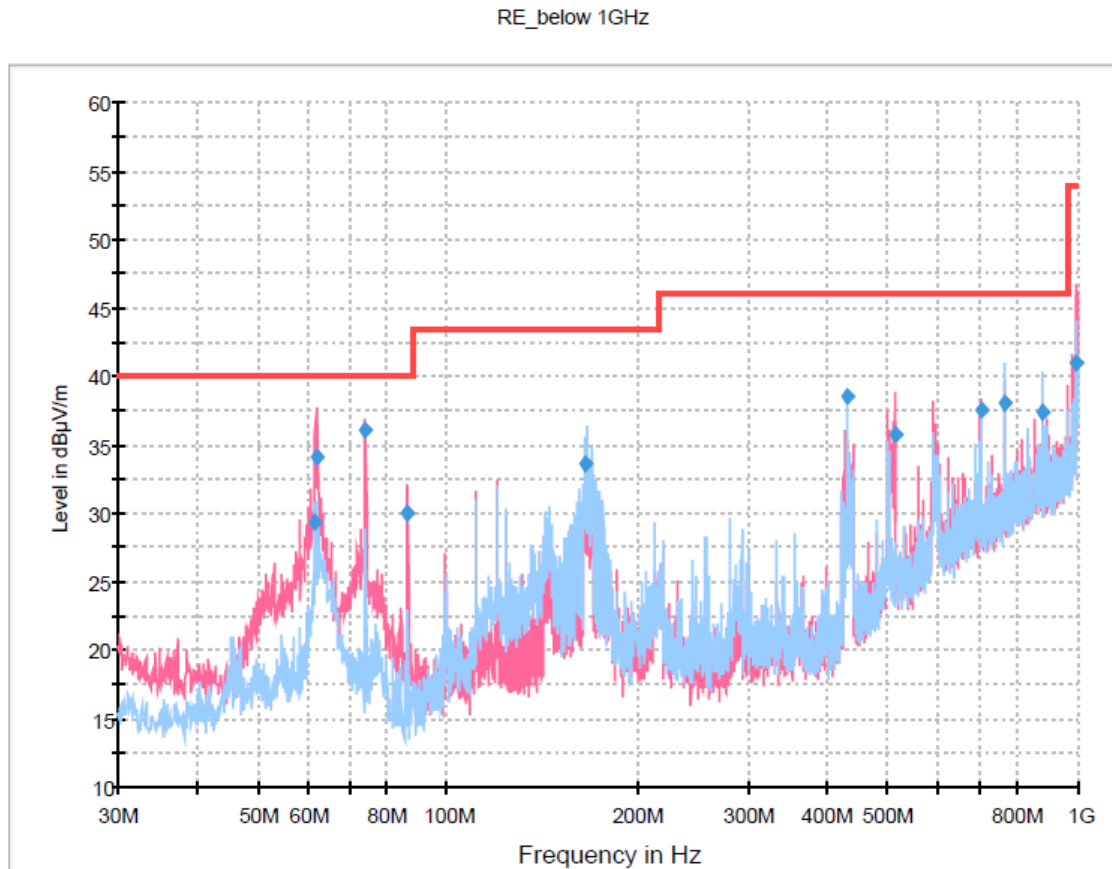
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
61.812500	32.5	1000.0	120.000	100.0	V	102.0	12.5	7.50	40.00
61.908750	35.4	1000.0	120.000	100.0	V	102.0	12.5	4.60	40.00
74.275000	35.8	1000.0	120.000	200.0	V	0.0	10.5	4.20	40.00
86.603750	30.5	1000.0	120.000	200.0	V	40.0	9.2	9.50	40.00
169.785000	33.0	1000.0	120.000	200.0	H	186.0	14.4	10.50	43.50
431.325000	30.8	1000.0	120.000	100.0	H	186.0	19.1	15.20	46.00
588.696250	37.1	1000.0	120.000	100.0	V	170.0	24.7	8.90	46.00
594.025000	34.3	1000.0	120.000	100.0	V	170.0	24.9	11.70	46.00
766.331250	40.8	1000.0	120.000	100.0	H	220.0	28.1	5.20	46.00
890.977500	39.8	1000.0	120.000	100.0	V	0.0	29.6	6.20	46.00

< Fig 14. 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



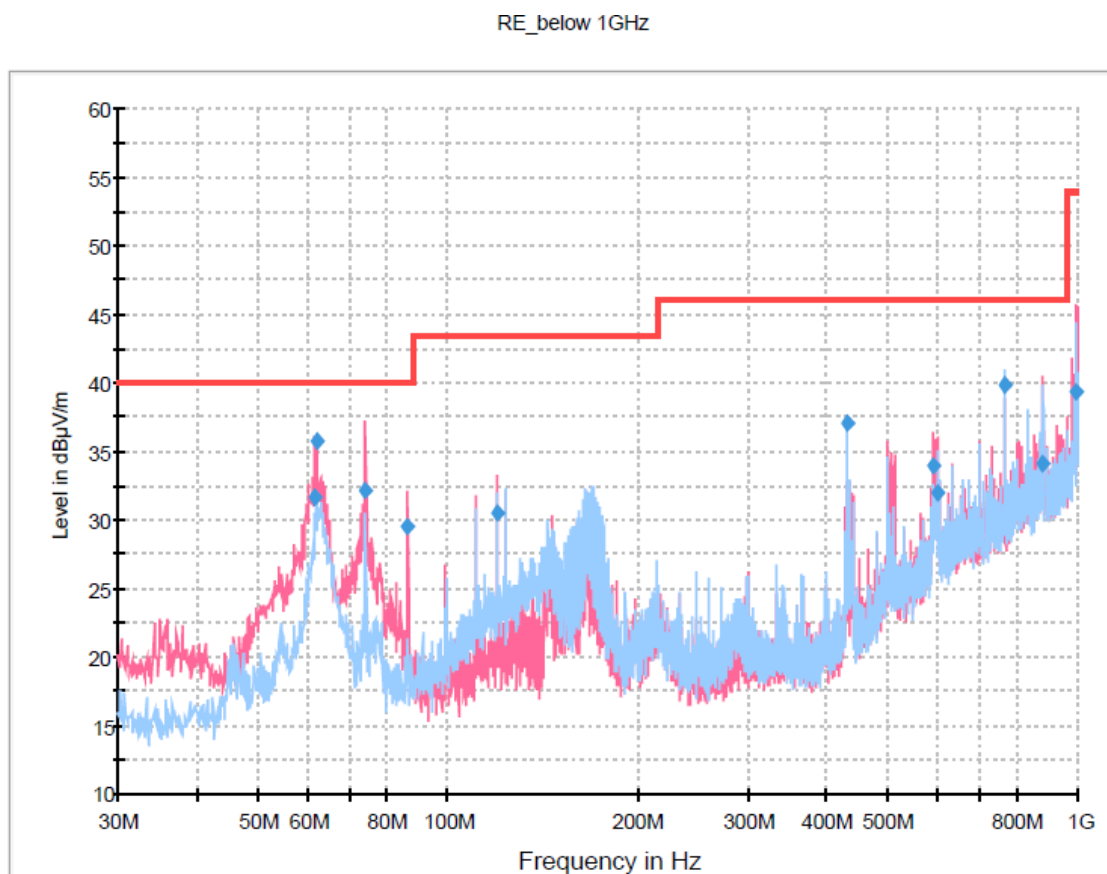
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
61.812500	29.4	1000.0	120.000	100.0	V	158.0	12.5	10.60	40.00
61.868750	34.1	1000.0	120.000	100.0	V	90.0	12.5	5.90	40.00
74.236250	36.0	1000.0	120.000	200.0	V	341.0	10.5	4.00	40.00
86.603750	30.1	1000.0	120.000	200.0	V	0.0	9.2	9.90	40.00
165.911250	33.7	1000.0	120.000	200.0	H	195.0	14.9	9.80	43.50
432.045000	38.5	1000.0	120.000	100.0	H	195.0	19.1	7.50	46.00
512.427500	35.8	1000.0	120.000	100.0	V	180.0	22.5	10.20	46.00
700.695000	37.5	1000.0	120.000	200.0	V	130.0	26.6	8.50	46.00
763.098750	38.1	1000.0	120.000	100.0	H	314.0	28.1	7.90	46.00
880.427500	37.3	1000.0	120.000	100.0	H	244.0	29.6	8.70	46.00
993.710000	41.0	1000.0	120.000	200.0	V	210.0	31.6	13.00	54.00

< Fig 15. Radiated emission result (30 MHz ~ 1 000 MHz) >



- ◆ Operating Condition: USB memory stick play mode
Red trace: Vertical polarization, Blue trace: Horizontal polarization



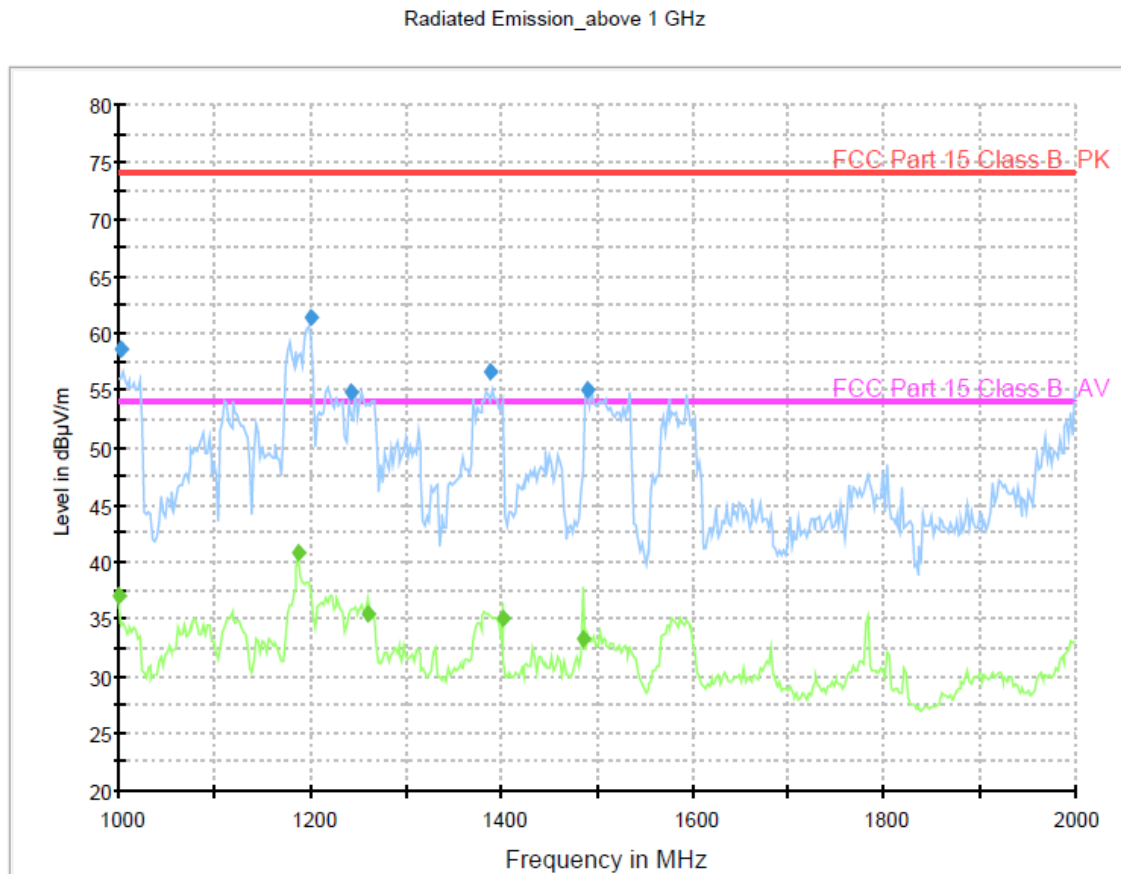
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
61.691250	31.7	1000.0	120.000	100.0	V	102.0	12.5	8.30	40.00
61.907500	35.7	1000.0	120.000	100.0	V	91.0	12.5	4.30	40.00
74.236250	32.1	1000.0	120.000	100.0	V	79.0	10.5	7.90	40.00
86.603750	29.4	1000.0	120.000	200.0	V	335.0	9.2	10.60	40.00
119.987500	30.5	1000.0	120.000	100.0	V	307.0	13.7	13.00	43.50
432.085000	37.1	1000.0	120.000	100.0	H	180.0	19.1	8.90	46.00
589.456250	34.0	1000.0	120.000	100.0	V	186.0	24.7	12.00	46.00
600.526250	31.9	1000.0	120.000	100.0	V	186.0	25.1	14.10	46.00
766.291250	39.8	1000.0	120.000	100.0	H	124.0	28.1	6.20	46.00
880.393750	34.1	1000.0	120.000	100.0	V	32.0	29.6	11.90	46.00
994.800000	39.3	1000.0	120.000	100.0	V	199.0	31.6	14.70	54.00

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



- ◆ Operating Condition: 1 920 × 1 080 / 60 Hz (RGB: Analog)
Green trace: Average detector, Blue trace: 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)
1001.600000	58.6	100.0	1000.000	150.0	V	188.0	-15.9	15.4	74.0
1201.796794	61.4	100.0	1000.000	150.0	V	188.0	-15.0	12.6	74.0
1241.892986	54.9	100.0	1000.000	150.0	V	181.0	-14.7	19.1	74.0
1388.981563	56.6	100.0	1000.000	139.0	H	145.0	-14.4	17.4	74.0
1490.389980	55.1	100.0	1000.000	100.0	V	199.0	-14.3	18.9	74.0

Final Result 2

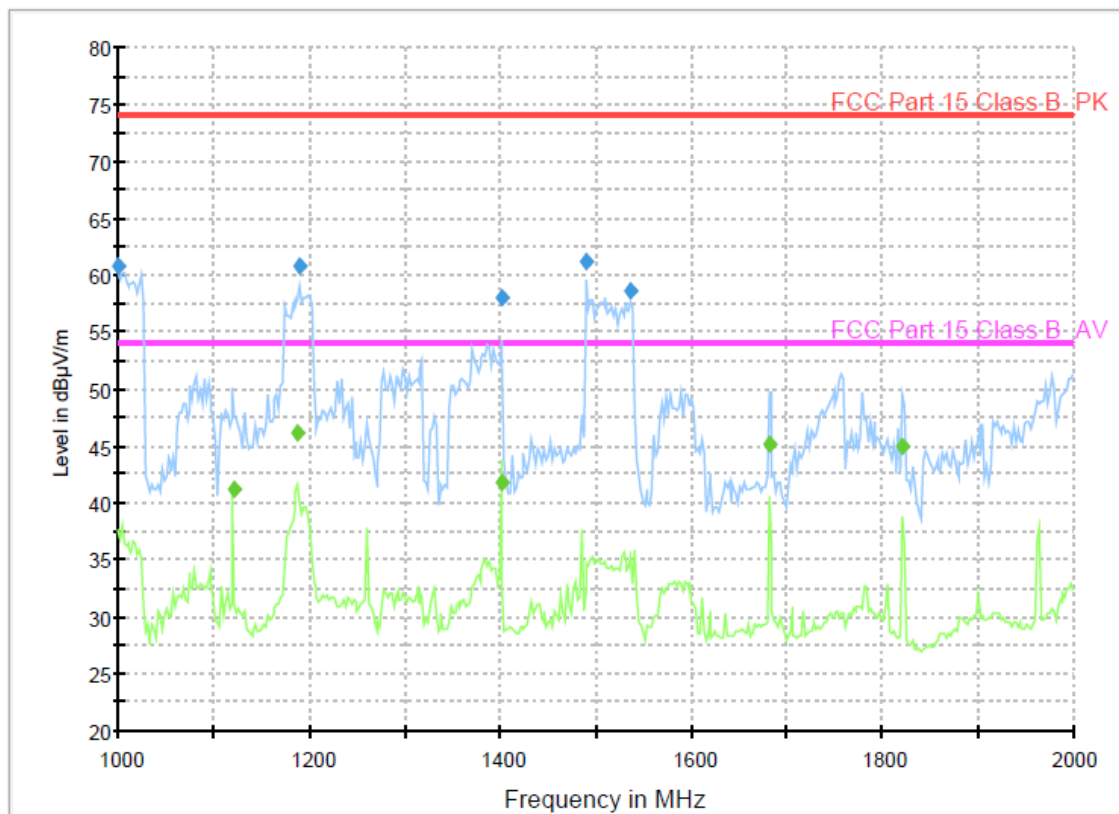
Frequency (MHz)	Average (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1000.000000	37.1	100.0	1000.000	150.0	V	181.0	-15.9	16.9	54.0
1188.176754	40.8	100.0	1000.000	194.0	V	167.0	-15.1	13.2	54.0
1261.121042	35.4	100.0	1000.000	150.0	V	195.0	-14.6	18.6	54.0
1401.401603	35.0	100.0	1000.000	100.0	V	178.0	-14.5	19.0	54.0
1485.169940	33.2	100.0	1000.000	150.0	V	160.0	-14.3	20.8	54.0

< Fig 17. Radiated emission result (1 000 MHz ~ 2 000 MHz) >



- ◆ Operating Condition: 1 920 × 1 080 / 60 Hz (HDMI/DVI: Digital)
Green trace: Average detector, Blue trace: 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)
1000.000000	60.8	100.0	1000.000	150.0	V	182.0	-15.9	13.2	74.0
1189.780762	60.8	100.0	1000.000	163.0	V	197.0	-15.1	13.2	74.0
1401.401603	58.1	100.0	1000.000	100.0	H	222.0	-14.5	15.9	74.0
1490.381964	61.1	100.0	1000.000	100.0	V	200.0	-14.3	12.9	74.0
1535.662124	58.6	100.0	1000.000	100.0	V	127.0	-14.0	15.4	74.0

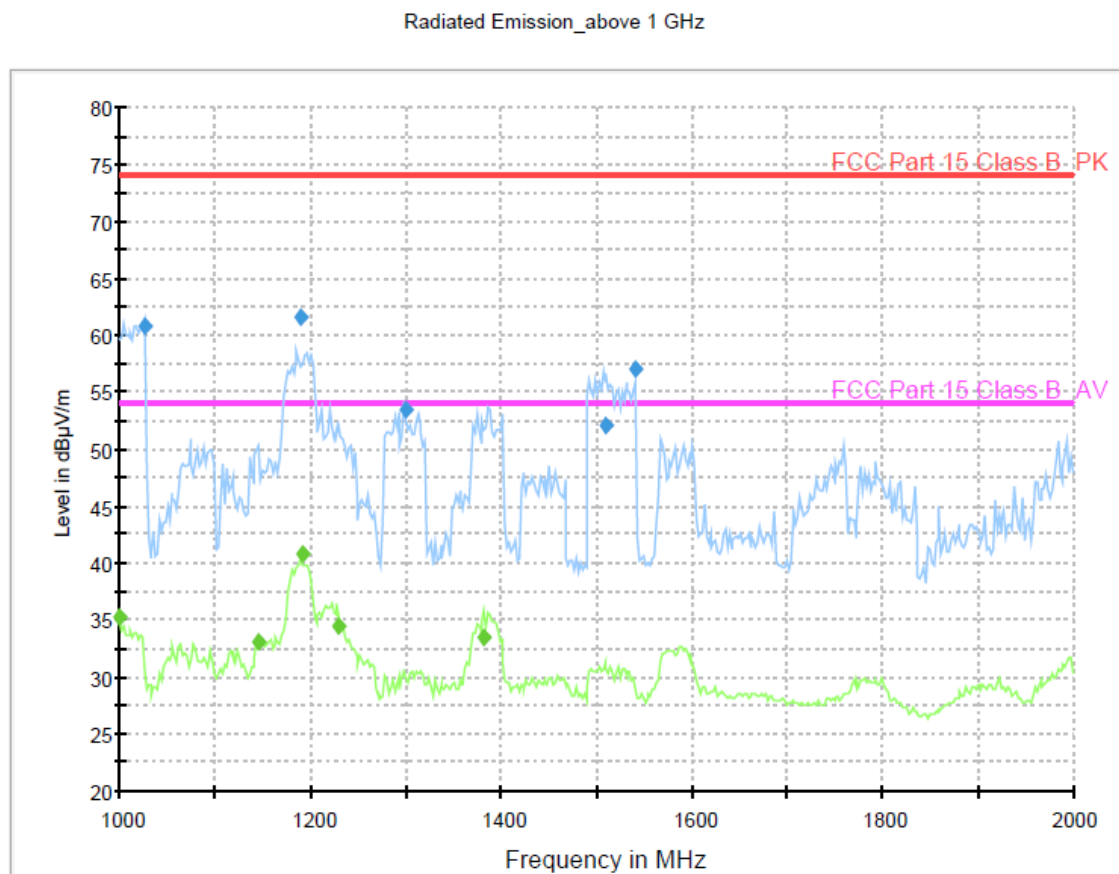
Final Result 2

Frequency (MHz)	Average (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1121.240481	41.2	100.0	1000.000	122.0	V	221.0	-15.3	12.8	54.0
1188.176754	46.1	100.0	1000.000	150.0	V	197.0	-15.1	8.0	54.0
1401.401603	41.9	100.0	1000.000	150.0	H	173.0	-14.5	12.1	54.0
1681.562725	45.1	100.0	1000.000	100.0	H	142.0	-13.6	8.9	54.0
1821.843287	44.9	100.0	1000.000	100.0	V	234.0	-13.1	9.1	54.0

< Fig 18. Radiated emission result (1 000 MHz ~ 2 000 MHz) >



- ◆ Operating Condition: USB memory stick play mode
Green trace: Average detector, Blue trace: Peak detector



Final Result 1

Frequency (MHz)	MaxPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)
1026.252104	60.8	100.0	1000.000	143.0	V	183.0	-15.8	13.2	74.0
1190.172746	61.7	100.0	1000.000	164.0	V	211.0	-15.1	12.3	74.0
1299.197194	53.5	100.0	1000.000	100.0	V	190.0	-14.3	20.5	74.0
1509.614028	52.2	100.0	1000.000	100.0	V	132.0	-14.2	21.8	74.0
1540.082164	56.9	100.0	1000.000	100.0	V	132.0	-14.0	17.1	74.0

Final Result 2

Frequency (MHz)	Average (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)
1000.400000	35.2	100.0	1000.000	150.0	V	182.0	-15.9	18.8	54.0
1145.692585	33.0	100.0	1000.000	179.0	V	144.0	-15.2	21.0	54.0
1190.980762	40.8	100.0	1000.000	163.0	V	197.0	-15.1	13.2	54.0
1229.468938	34.4	100.0	1000.000	150.0	V	197.0	-14.8	19.6	54.0
1382.165531	33.5	100.0	1000.000	100.0	H	139.0	-14.4	20.5	54.0

< Fig 19. Radiated emission result (1 000 MHz ~ 2 000 MHz) >



7. Sample Calculations

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

7.1 Example 1 :

■ 20.3 MHz

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

7.2 Example 2 :

■ 66.7 MHz

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



8. Recommendation & Conclusion

The data collected shows that the **LG Electronics Inc. LED LCD TV/Monitor (Model Name: M2780DFM, M2780DM)** complies with §15.107 and 15.109 of the FCC Rules.