



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 : June 21, 2010

Order Number: GETEC-C1-10-138

Test Report Number: GETEC-E3-10-074

Test Site: Gumi College EMC Center

FCC Registration Number: (100749, 443957)

FCC ID.: BEJN194WAT

Applicant: LG Electronics Inc.

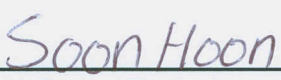
Rule Part(s)	: FCC Part 15 Subpart B
Equipment Class	: Class B computing device peripheral (JBP)
EUT Type	: LCD Monitor
Type of Authority	: Certification
Model Name	: N194WAT
Trade Name	: LG

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

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

Tested by,

Reviewed by,


Soon-Hoon Jeong, 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. Myoung-Kyu Lee, Chief research engineer

Tel Number: +82-31-610-9623

- **FCC ID.** BEJN194WAT
- **EUT Type** LCD Monitor
- **Model Name** N194WAT
- **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 11, 2010
- **Place of Test** **Gumi College EMC Center** (FCC Registration Number: 100749, 443957)
407, Bugok-dong, Gumi-si, Gyeongbuk, Korea.
- **Test Report Number** GETEC-E3-10-074
- **Dates of Issue** June 21, 2010

EUT Type: LCD Monitor

FCC ID.: BEJN194WAT



2. Introduction

The measurement procedure described in American National Standard for Methods of Measurement of Radio-Nose Emissions From Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (ASNI C63.4-2003) was used in determining radiated and conducted emissions emanating from **LG Electronics Inc. LCD Monitor (Model Name: N194WAT)**

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)



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



3. Product Information

3.1 Description of EUT

The Equipment under Test (EUT) is the **LG Electronics Inc. LCD Monitor (Model Name: N194WAT) FCC ID.: BEJN194WAT**

- . Equipment	: LCD Monitor
- . Model Name	: N194WAT
- . Trade Name	: LG
- . Serial Number	: Prototype
- . Rated Voltage	: AC (100 – 240) V~, (50/60) Hz, 0.8 A
- . Power Consumption	: 25 W
- . LCD Panel	: 48.133 cm (18.95 inch) TFT (Thin Film Transistor) LCD(Liquid Crystal Display) panel Anti-glare panel Viewable Image Size: 48.133 cm Pixel Pitch: 0.283 5 mm × 0.283 5 mm
- . Max. Resolution	: 1 440 × 900 @ 60 Hz
- . I/O Port	: LAN port, USB 1.1 port(Keyboard, mouse only), Headphone/Mike port USB 2.0 port(USB memory stick) only, D-Sub port
- . Vertical Frequency	: 57 Hz to 63 Hz
- . Horizontal Frequency	: 30 kHz to 66 kHz
- . Dimensions	: 448.4 mm(W) × 383.3 mm(H) × 198.4 mm(D)
- . Weight	: 3.9 kg
- . Maximum Frequency Range	: 333 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 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
USB memory stick	LG Electronics Inc.	UM5 2GB	S/N: 003RLRZN37758 FCC ID.: N/A
USB mouse	LIGITECH	M-UAE96	S/N: LZ7462708N1 FCC ID.: DoC
USB keyboard	YET FOUNDATE	SK-8115	S/N: CN-0DJ321-71616-725-03YK FCC ID.: DoC
Mike	-	Mike00	S/N: N/A FCC ID.: N/A
Headset	GOWOONSORI	GW-500M	S/N: N/A 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	1.80 m unshielded
D-sub(Analog) in cable	Connected to the EUT and PC	1.80 m shielded with two ferrite cores
LAN cable	Connected to the EUT and network	10.00 m shielded with a ferrite core
USB keyboard cable	Connected to the EUT and USB keyboard	2.00 m shielded
USB mouse cable	Connected to the EUT and USB mouse	1.80 m shielded
Headset cable	Connected to the EUT and headset	2.75 m shielded
Mike cable	Connected to the EUT and mike	1.30 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: 1 440 × 900 / 60 Hz (D-Sub: 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

 - . Network monitor mode: 1 440 × 900 / 60 Hz (LAN)
 - ◆ 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
 - . Read and write to USB memory stick
 - . Connected network (The EUT connected to the host PC on the network was the boot)



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

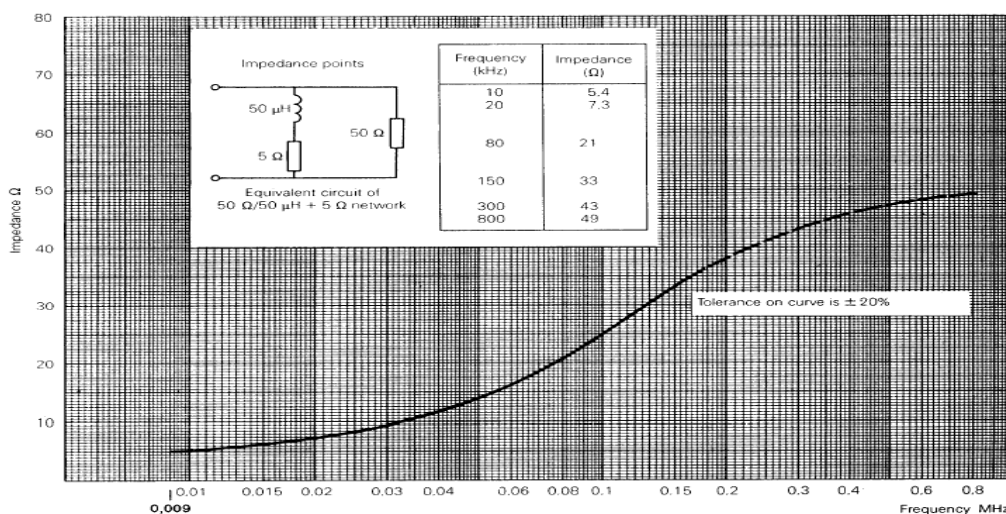


Fig 2. Impedance of LISN



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 : 40 % 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

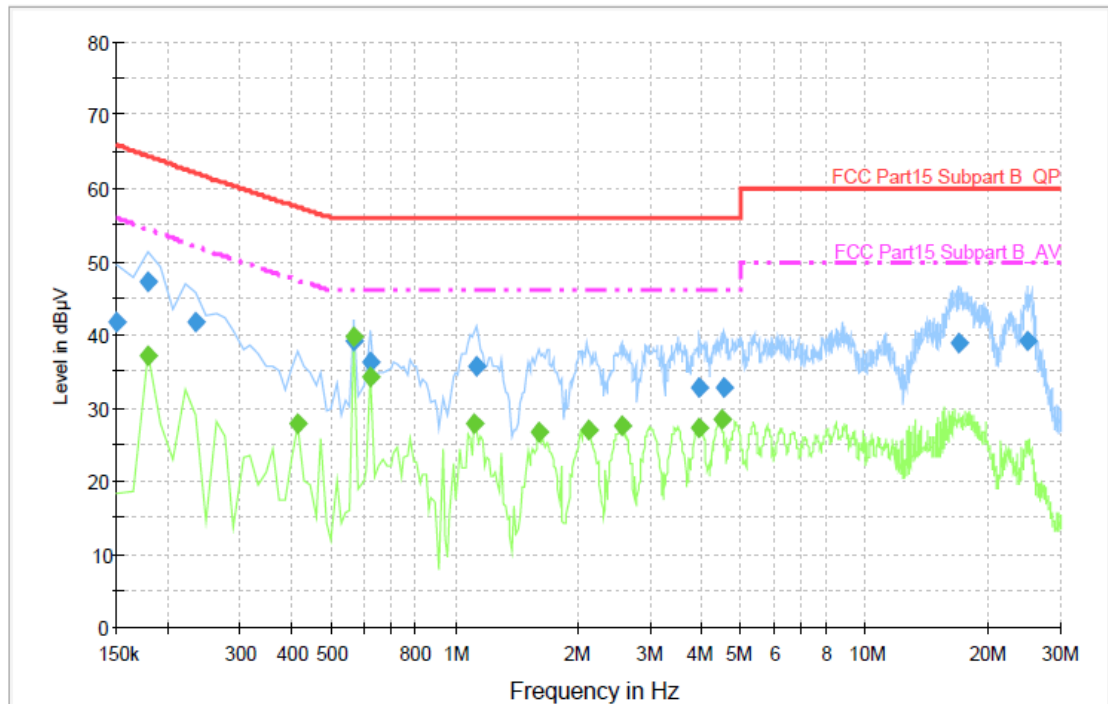
5.6 Test data for Conducted Emission

-. Test Date : June 11, 2010
-. Resolution Bandwidth : 9 kHz
-. Frequency Range : 0.15 MHz ~ 30 MHz



◆ Operating condition: 1 440 × 900 / 60 Hz (Monitor 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
0.150000	41.6	1000.000	9.000	GND	L1	10.0	24.4	66.0	
0.178000	47.1	1000.000	9.000	GND	L1	10.0	17.4	64.5	
0.234000	41.7	1000.000	9.000	GND	L1	10.0	20.4	62.1	
0.570000	39.0	1000.000	9.000	GND	L1	10.0	17.0	56.0	
0.626000	36.4	1000.000	9.000	GND	L1	10.0	19.6	56.0	
1.130000	35.7	1000.000	9.000	GND	L1	10.0	20.3	56.0	
3.958000	32.8	1000.000	9.000	GND	L1	10.2	23.2	56.0	
4.546000	32.8	1000.000	9.000	GND	L1	10.2	23.2	56.0	
16.838000	38.8	1000.000	9.000	GND	L1	10.8	21.2	60.0	
24.874000	39.0	1000.000	9.000	GND	L1	11.2	21.0	60.0	

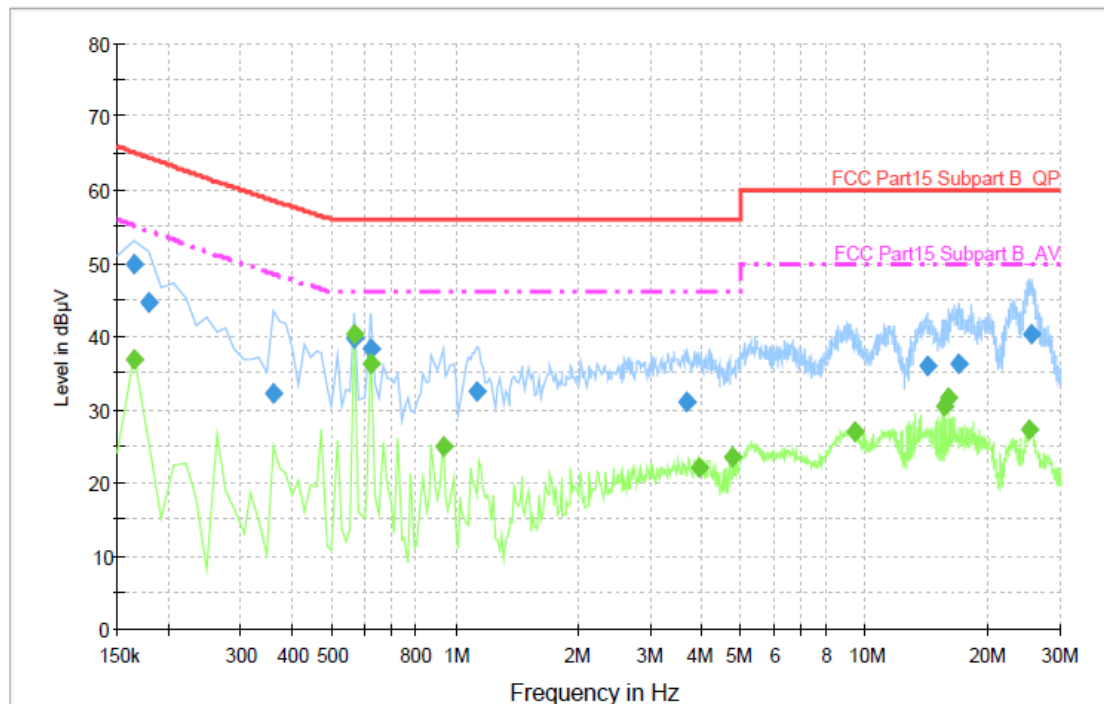
Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.178000	37.1	1000.000	9.000	GND	L1	10.0	17.5	54.5	
0.416000	27.7	1000.000	9.000	GND	L1	10.0	19.7	47.4	
0.570000	39.6	1000.000	9.000	GND	L1	10.0	6.4	46.0	
0.626000	34.2	1000.000	9.000	GND	L1	10.0	11.8	46.0	
1.116000	27.8	1000.000	9.000	GND	L1	10.0	18.2	46.0	
1.606000	26.7	1000.000	9.000	GND	L1	10.1	19.3	46.0	
2.124000	26.9	1000.000	9.000	GND	L1	10.1	19.1	46.0	
2.544000	27.4	1000.000	9.000	GND	L1	10.1	18.6	46.0	
3.958000	27.3	1000.000	9.000	GND	L1	10.2	18.7	46.0	
4.462000	28.4	1000.000	9.000	GND	L1	10.2	17.6	46.0	

< 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
0.164000	49.9	1000.000	9.000	GND	N	10.0	15.3	65.2	
0.178000	44.6	1000.000	9.000	GND	N	10.0	19.9	64.5	
0.360000	32.3	1000.000	9.000	GND	N	10.0	26.3	58.6	
0.570000	39.8	1000.000	9.000	GND	N	10.0	16.2	56.0	
0.626000	38.2	1000.000	9.000	GND	N	10.0	17.8	56.0	
1.130000	32.5	1000.000	9.000	GND	N	10.1	23.5	56.0	
3.692000	31.0	1000.000	9.000	GND	N	10.2	25.0	56.0	
14.136000	35.8	1000.000	9.000	GND	N	10.5	24.2	60.0	
17.020000	36.4	1000.000	9.000	GND	N	10.7	23.6	60.0	
25.546000	40.4	1000.000	9.000	GND	N	10.8	19.6	60.0	

Final Measurement Detector 2

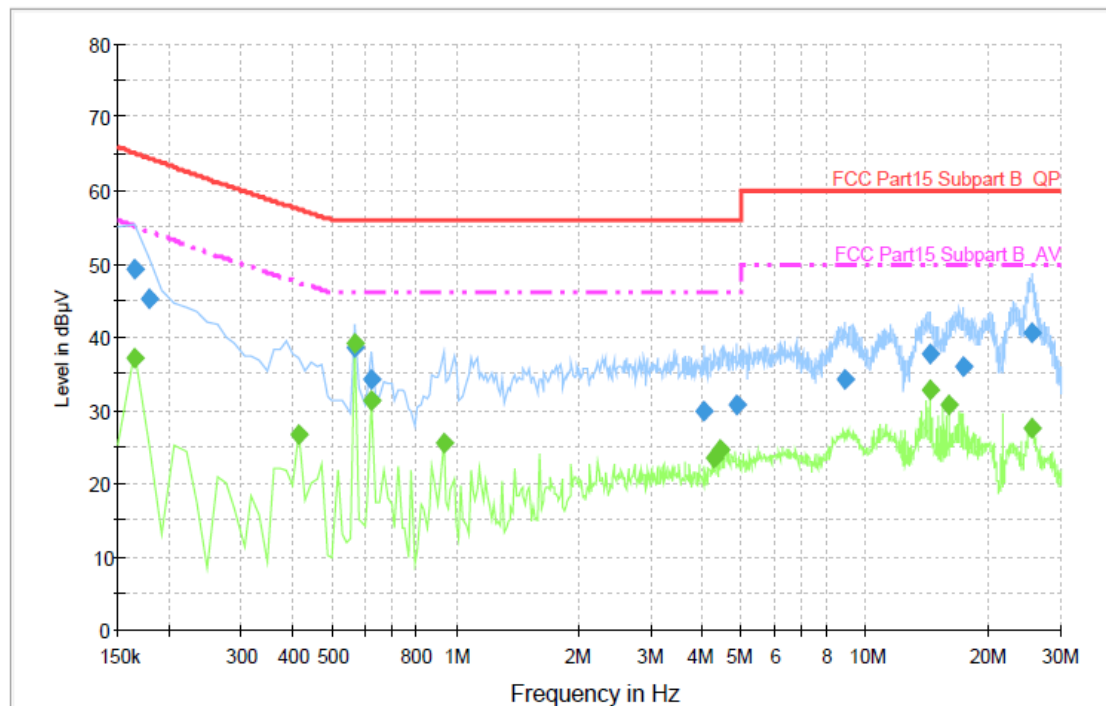
Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.164000	36.7	1000.000	9.000	GND	N	10.0	18.5	55.2	
0.570000	40.4	1000.000	9.000	GND	N	10.0	5.6	46.0	
0.626000	36.2	1000.000	9.000	GND	N	10.0	9.8	46.0	
0.934000	24.9	1000.000	9.000	GND	N	10.0	21.1	46.0	
3.944000	22.2	1000.000	9.000	GND	N	10.2	23.8	46.0	
4.756000	23.6	1000.000	9.000	GND	N	10.2	22.4	46.0	
9.488000	27.0	1000.000	9.000	GND	N	10.4	23.0	50.0	
15.592000	30.4	1000.000	9.000	GND	N	10.6	19.6	50.0	
16.012000	31.6	1000.000	9.000	GND	N	10.6	18.4	50.0	
25.196000	27.3	1000.000	9.000	GND	N	10.8	22.7	50.0	

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



◆ Operating condition: 1 024 × 768 / 60 Hz (Monitor 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	49.2	1000.000	9.000	GND	L1	10.0	16.0	65.2	
0.178000	45.3	1000.000	9.000	GND	L1	10.0	19.2	64.5	
0.570000	38.5	1000.000	9.000	GND	L1	10.0	17.5	56.0	
0.626000	34.1	1000.000	9.000	GND	L1	10.0	21.9	56.0	
4.028000	29.9	1000.000	9.000	GND	L1	10.2	26.1	56.0	
4.854000	30.7	1000.000	9.000	GND	L1	10.2	25.3	56.0	
8.928000	34.2	1000.000	9.000	GND	L1	10.4	25.8	60.0	
14.416000	37.7	1000.000	9.000	GND	L1	10.7	22.3	60.0	
17.384000	36.0	1000.000	9.000	GND	L1	10.9	24.0	60.0	
25.406000	40.5	1000.000	9.000	GND	L1	11.3	19.5	60.0	

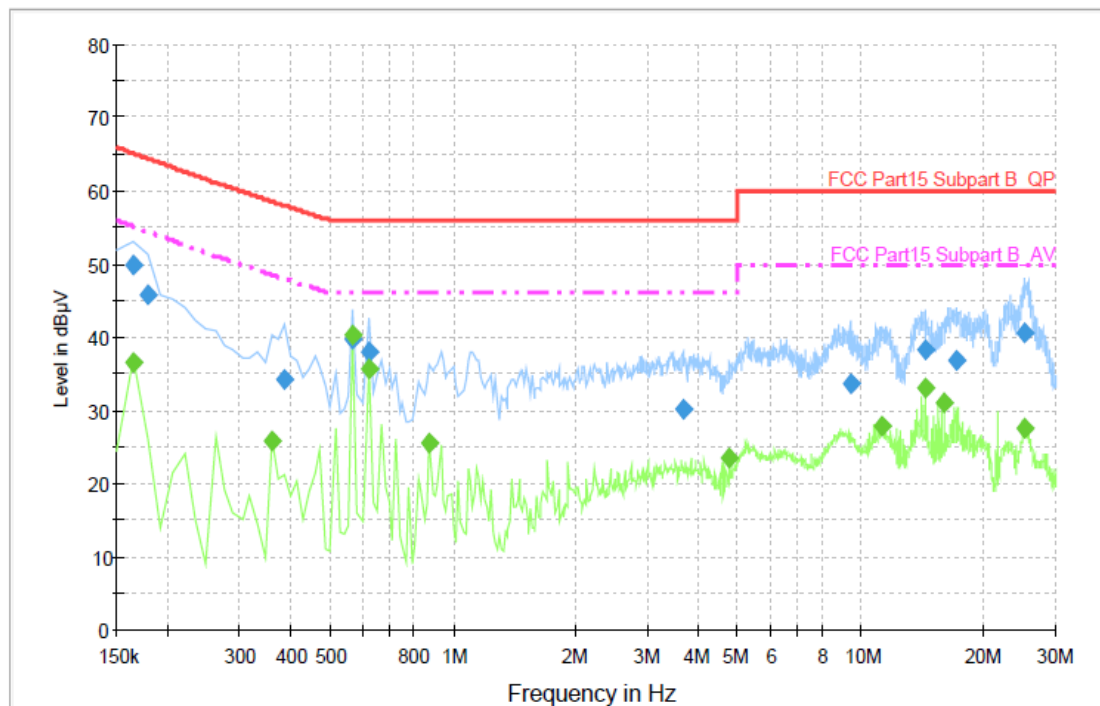
Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.164000	37.1	1000.000	9.000	GND	L1	10.0	18.1	55.2	
0.416000	26.8	1000.000	9.000	GND	L1	10.0	20.6	47.4	
0.570000	39.1	1000.000	9.000	GND	L1	10.0	6.9	46.0	
0.626000	31.2	1000.000	9.000	GND	L1	10.0	14.8	46.0	
0.934000	25.4	1000.000	9.000	GND	L1	10.0	20.6	46.0	
4.252000	23.5	1000.000	9.000	GND	L1	10.2	22.5	46.0	
4.448000	24.6	1000.000	9.000	GND	L1	10.2	21.4	46.0	
14.416000	32.7	1000.000	9.000	GND	L1	10.7	17.3	50.0	
16.012000	30.7	1000.000	9.000	GND	L1	10.8	19.3	50.0	
25.476000	27.5	1000.000	9.000	GND	L1	11.3	22.5	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
0.164000	49.9	1000.000	9.000	GND	N	10.0	15.3	65.2	
0.178000	45.7	1000.000	9.000	GND	N	10.0	18.8	64.5	
0.388000	34.3	1000.000	9.000	GND	N	10.0	23.7	58.0	
0.570000	39.8	1000.000	9.000	GND	N	10.0	16.2	56.0	
0.626000	38.1	1000.000	9.000	GND	N	10.0	17.9	56.0	
3.650000	30.2	1000.000	9.000	GND	N	10.2	25.8	56.0	
9.404000	33.6	1000.000	9.000	GND	N	10.4	26.4	60.0	
14.416000	38.2	1000.000	9.000	GND	N	10.5	21.8	60.0	
17.146000	36.7	1000.000	9.000	GND	N	10.7	23.3	60.0	
25.210000	40.5	1000.000	9.000	GND	N	10.8	19.5	60.0	

Final Measurement Detector 2

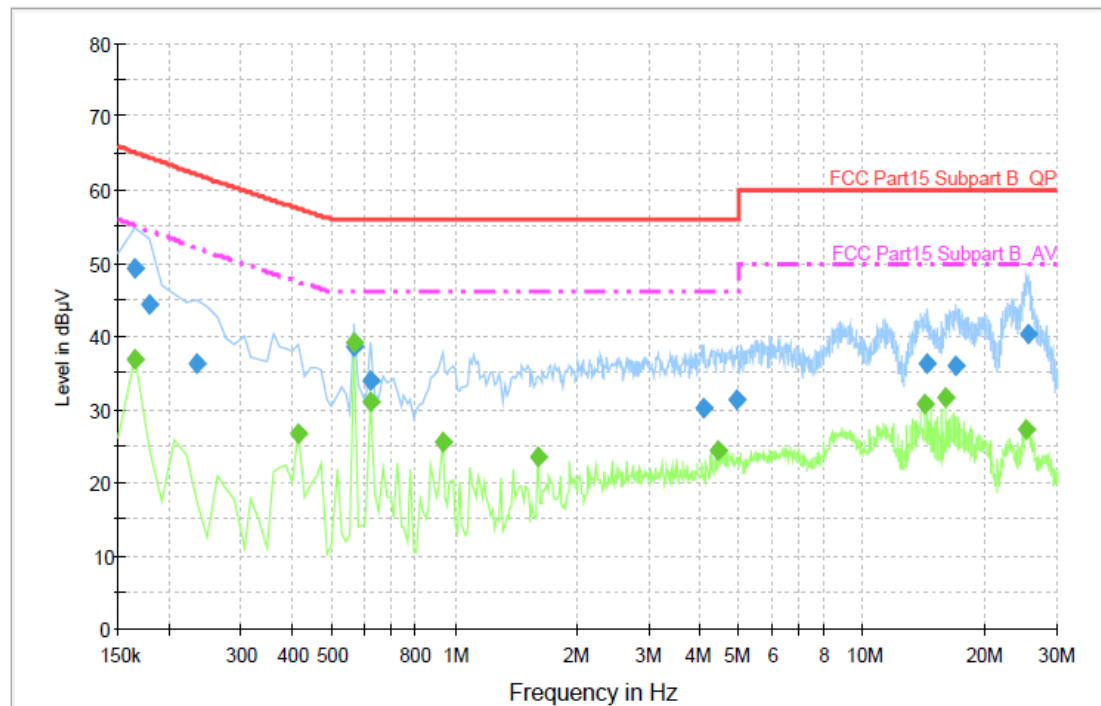
Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.164000	36.4	1000.000	9.000	GND	N	10.0	18.8	55.2	
0.360000	25.8	1000.000	9.000	GND	N	10.0	22.7	48.5	
0.570000	40.3	1000.000	9.000	GND	N	10.0	5.7	46.0	
0.626000	35.8	1000.000	9.000	GND	N	10.0	10.2	46.0	
0.878000	25.6	1000.000	9.000	GND	N	10.0	20.4	46.0	
4.756000	23.6	1000.000	9.000	GND	N	10.2	22.4	46.0	
11.196000	27.9	1000.000	9.000	GND	N	10.4	22.1	50.0	
14.416000	33.1	1000.000	9.000	GND	N	10.5	16.9	50.0	
16.012000	31.1	1000.000	9.000	GND	N	10.6	18.9	50.0	
25.112000	27.5	1000.000	9.000	GND	N	10.8	22.5	50.0	

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



◆ Operating condition: 640 × 480 / 60 Hz (Monitor 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	49.2	1000.000	9.000	GND	L1	10.0	16.0	65.2	
0.178000	44.5	1000.000	9.000	GND	L1	10.0	20.0	64.5	
0.234000	36.1	1000.000	9.000	GND	L1	10.0	26.0	62.1	
0.570000	38.5	1000.000	9.000	GND	L1	10.0	17.5	56.0	
0.626000	34.0	1000.000	9.000	GND	L1	10.0	22.0	56.0	
4.098000	30.2	1000.000	9.000	GND	L1	10.2	25.8	56.0	
4.910000	31.3	1000.000	9.000	GND	L1	10.2	24.7	56.0	
14.458000	36.2	1000.000	9.000	GND	L1	10.7	23.8	60.0	
16.950000	36.0	1000.000	9.000	GND	L1	10.8	24.0	60.0	
25.602000	40.3	1000.000	9.000	GND	L1	11.3	19.7	60.0	

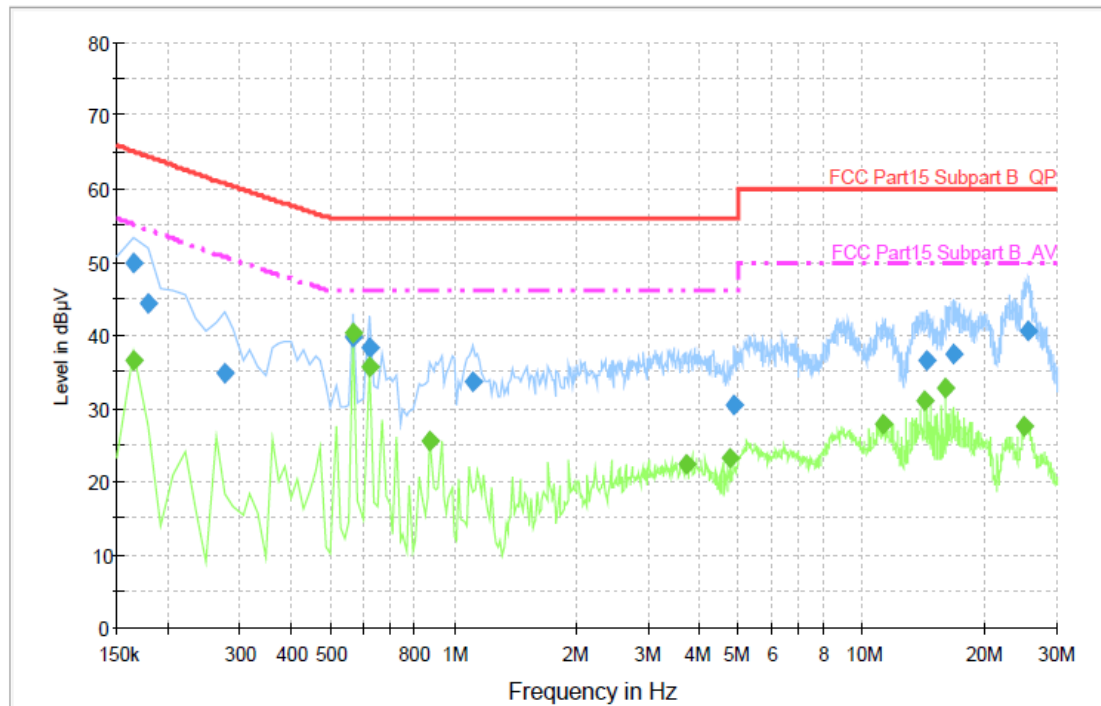
Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.164000	36.8	1000.000	9.000	GND	L1	10.0	18.4	55.2	
0.416000	26.8	1000.000	9.000	GND	L1	10.0	20.6	47.4	
0.570000	39.1	1000.000	9.000	GND	L1	10.0	6.9	46.0	
0.626000	31.0	1000.000	9.000	GND	L1	10.0	15.0	46.0	
0.934000	25.4	1000.000	9.000	GND	L1	10.0	20.6	46.0	
1.606000	23.5	1000.000	9.000	GND	L1	10.1	22.5	46.0	
4.448000	24.4	1000.000	9.000	GND	L1	10.2	21.6	46.0	
14.248000	30.8	1000.000	9.000	GND	L1	10.7	19.2	50.0	
16.012000	31.5	1000.000	9.000	GND	L1	10.8	18.5	50.0	
25.322000	27.4	1000.000	9.000	GND	L1	11.3	22.6	50.0	

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



Voltage with 4-Line-LISN_N



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.164000	49.9	1000.000	9.000	GND	N	10.0	15.3	65.2	
0.178000	44.5	1000.000	9.000	GND	N	10.0	20.0	64.5	
0.276000	34.7	1000.000	9.000	GND	N	10.0	26.0	60.7	
0.570000	39.7	1000.000	9.000	GND	N	10.0	16.3	56.0	
0.626000	38.1	1000.000	9.000	GND	N	10.0	17.9	56.0	
1.116000	33.6	1000.000	9.000	GND	N	10.1	22.4	56.0	
4.882000	30.3	1000.000	9.000	GND	N	10.2	25.7	56.0	
14.458000	36.6	1000.000	9.000	GND	N	10.5	23.4	60.0	
16.740000	37.5	1000.000	9.000	GND	N	10.6	22.5	60.0	
25.392000	40.6	1000.000	9.000	GND	N	10.8	19.4	60.0	

Final Measurement Detector 2

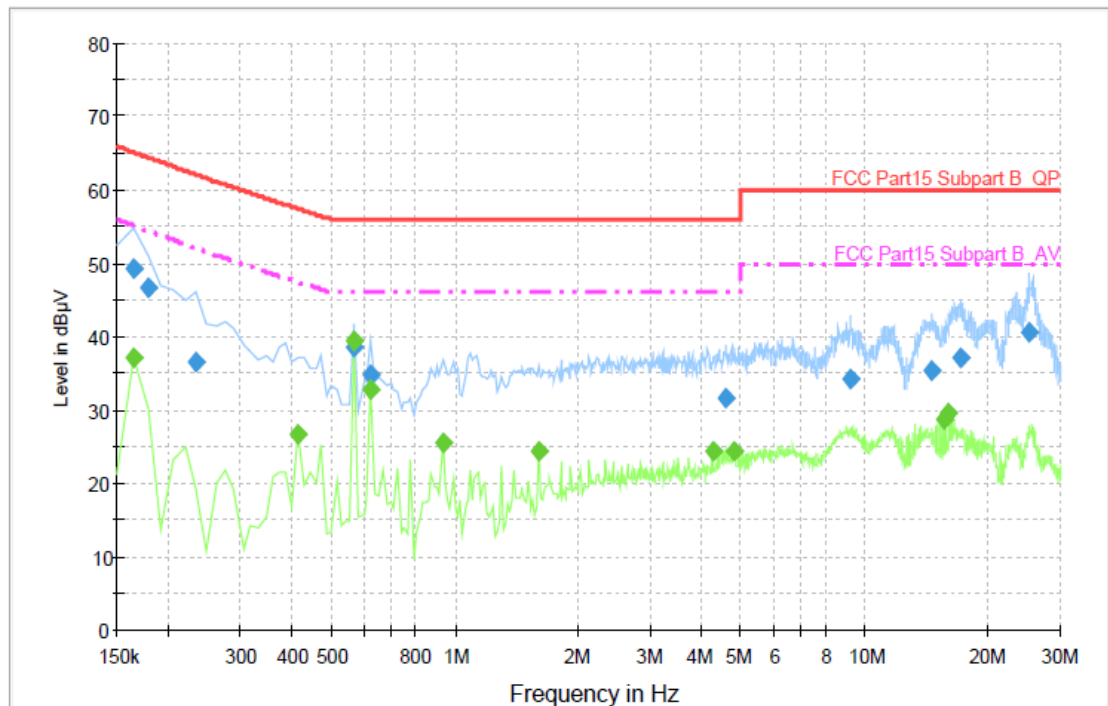
Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.164000	36.5	1000.000	9.000	GND	N	10.0	18.7	55.2	
0.570000	40.3	1000.000	9.000	GND	N	10.0	5.7	46.0	
0.626000	35.6	1000.000	9.000	GND	N	10.0	10.4	46.0	
0.878000	25.5	1000.000	9.000	GND	N	10.0	20.5	46.0	
3.734000	22.4	1000.000	9.000	GND	N	10.2	23.6	46.0	
4.756000	23.3	1000.000	9.000	GND	N	10.2	22.7	46.0	
11.252000	27.8	1000.000	9.000	GND	N	10.4	22.2	50.0	
14.248000	30.9	1000.000	9.000	GND	N	10.5	19.1	50.0	
16.012000	32.8	1000.000	9.000	GND	N	10.6	17.2	50.0	
25.000000	27.5	1000.000	9.000	GND	N	10.8	22.5	50.0	

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



◆ Operating condition: 1 440 × 900 / 60 Hz (Network monitor 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	49.4	1000.000	9.000	GND	L1	10.0	15.8	65.2	
0.178000	46.6	1000.000	9.000	GND	L1	10.0	17.9	64.5	
0.234000	36.5	1000.000	9.000	GND	L1	10.0	25.6	62.1	
0.570000	38.7	1000.000	9.000	GND	L1	10.0	17.3	56.0	
0.626000	34.8	1000.000	9.000	GND	L1	10.0	21.2	56.0	
4.574000	31.7	1000.000	9.000	GND	L1	10.2	24.3	56.0	
9.208000	34.2	1000.000	9.000	GND	L1	10.4	25.8	60.0	
14.500000	35.4	1000.000	9.000	GND	L1	10.7	24.6	60.0	
17.202000	37.2	1000.000	9.000	GND	L1	10.9	22.8	60.0	
25.308000	40.5	1000.000	9.000	GND	L1	11.3	19.5	60.0	

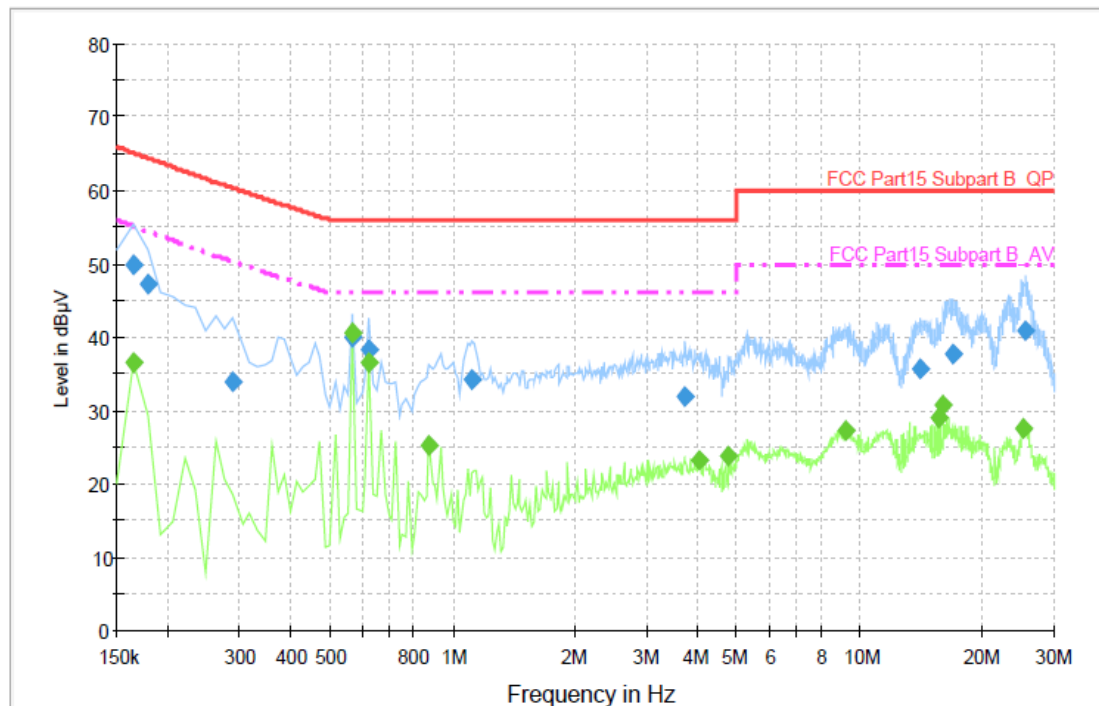
Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.164000	37.1	1000.000	9.000	GND	L1	10.0	18.1	55.2	
0.416000	26.5	1000.000	9.000	GND	L1	10.0	20.9	47.4	
0.570000	39.4	1000.000	9.000	GND	L1	10.0	6.6	46.0	
0.626000	32.6	1000.000	9.000	GND	L1	10.0	13.4	46.0	
0.934000	25.5	1000.000	9.000	GND	L1	10.0	20.5	46.0	
1.606000	24.3	1000.000	9.000	GND	L1	10.1	21.7	46.0	
4.252000	24.4	1000.000	9.000	GND	L1	10.2	21.6	46.0	
4.826000	24.2	1000.000	9.000	GND	L1	10.2	21.8	46.0	
15.592000	28.7	1000.000	9.000	GND	L1	10.7	21.3	50.0	
16.012000	29.7	1000.000	9.000	GND	L1	10.8	20.3	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
0.164000	49.8	1000.000	9.000	GND	N	10.0	15.4	65.2	
0.178000	47.1	1000.000	9.000	GND	N	10.0	17.4	64.5	
0.290000	33.8	1000.000	9.000	GND	N	10.0	26.5	60.3	
0.570000	39.9	1000.000	9.000	GND	N	10.0	16.1	56.0	
0.626000	38.2	1000.000	9.000	GND	N	10.0	17.8	56.0	
1.116000	34.2	1000.000	9.000	GND	N	10.1	21.8	56.0	
3.734000	31.8	1000.000	9.000	GND	N	10.2	24.2	56.0	
14.024000	35.6	1000.000	9.000	GND	N	10.5	24.4	60.0	
17.006000	37.8	1000.000	9.000	GND	N	10.7	22.2	60.0	
25.574000	40.8	1000.000	9.000	GND	N	10.8	19.2	60.0	

Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.164000	36.5	1000.000	9.000	GND	N	10.0	18.7	55.2	
0.570000	40.6	1000.000	9.000	GND	N	10.0	5.4	46.0	
0.626000	36.4	1000.000	9.000	GND	N	10.0	9.6	46.0	
0.878000	25.3	1000.000	9.000	GND	N	10.0	20.7	46.0	
4.042000	23.1	1000.000	9.000	GND	N	10.2	22.9	46.0	
4.756000	23.7	1000.000	9.000	GND	N	10.2	22.3	46.0	
9.180000	27.1	1000.000	9.000	GND	N	10.4	22.9	50.0	
15.592000	29.1	1000.000	9.000	GND	N	10.6	20.9	50.0	
16.012000	30.7	1000.000	9.000	GND	N	10.6	19.3	50.0	
25.308000	27.6	1000.000	9.000	GND	N	10.8	22.4	50.0	

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



6. Radiated Emission

6.1 Operating Environment

Temperature : 24 °C
Relative Humidity : 40 % 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

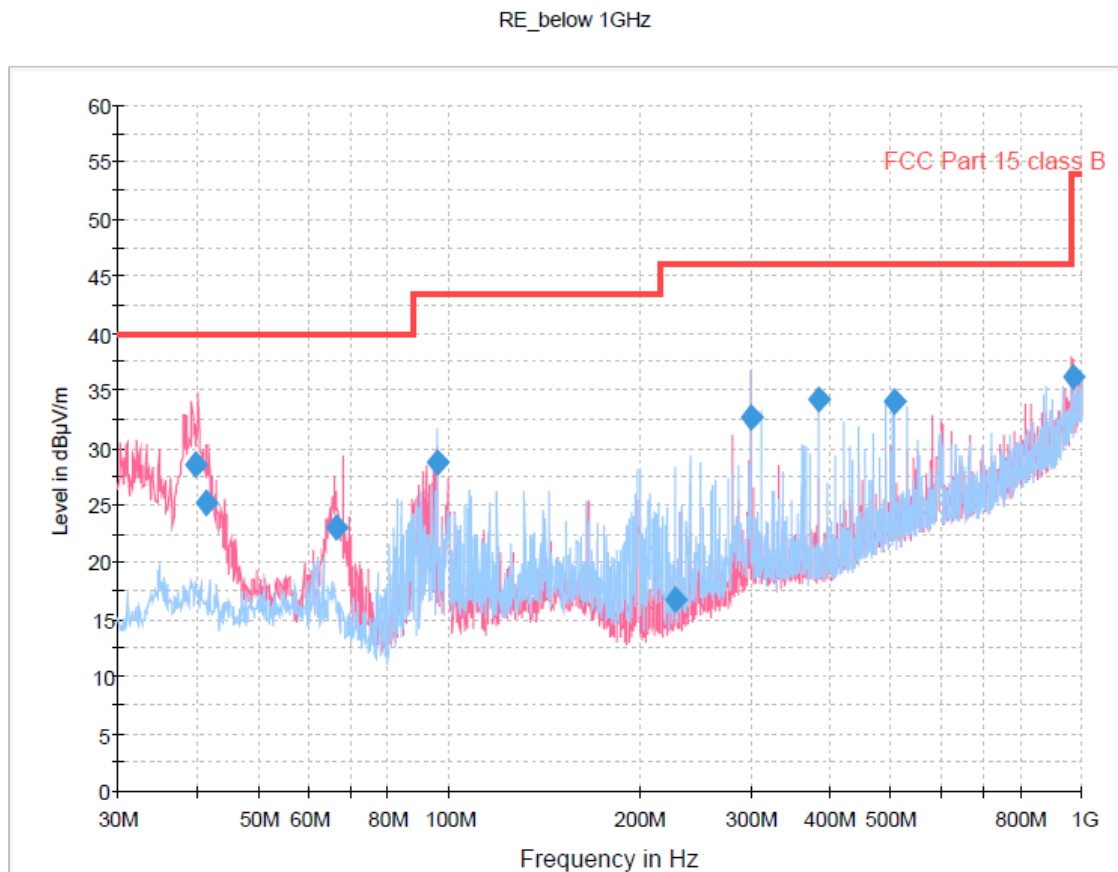
Model Name	Manufacturer	Description	Serial Number	Due to Calibration
■ - ESIB26	Rohde & Schwarz	EMI Test Receiver	830482/010	12. 11. 2010
■ - VULB9160	Schwarzbeck	Broadband Test Antenna	3193	03. 15. 2012
■ - BBHA9120D	Schwarzbeck	Horn ANT	207	12. 22. 2011
■ - MCU066	maturo GmbH	Position Controller	1390306	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 : June 11, 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 (333 MHz). The measurement was made up to 2 000 MHz



- ◆ Operating Condition: 1 440 × 900 / 60 Hz (Monitor mode)
Red trace: Vertical polarization, Blue trace: Horizontal polarization



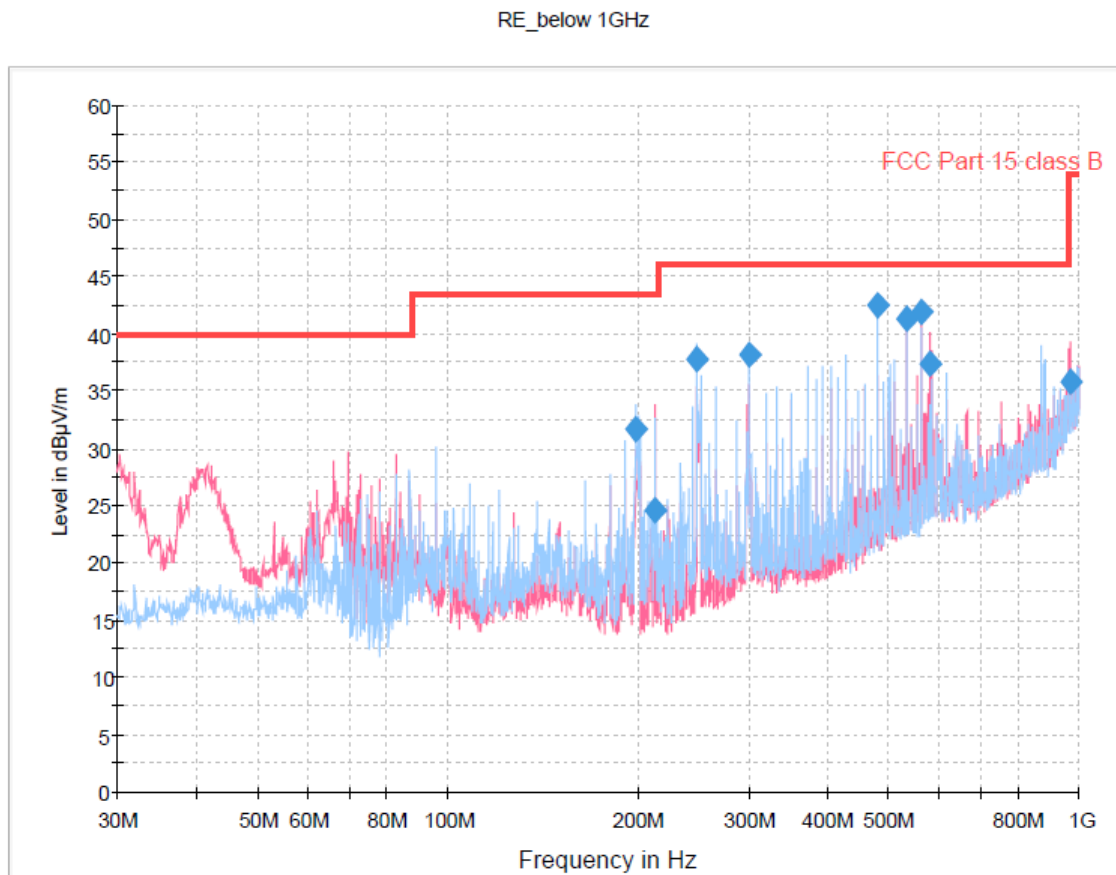
Final Result [1]

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
39.725000	28.5	1000.0	120.000	100.0	V	0.0	12.6	11.50	40.00
41.473750	25.1	1000.0	120.000	100.0	V	47.0	12.6	14.90	40.00
66.733750	23.0	1000.0	120.000	100.0	V	72.0	11.9	17.00	40.00
96.140000	28.7	1000.0	120.000	200.0	H	260.0	10.5	14.80	43.50
227.376250	16.7	1000.0	120.000	120.0	H	276.0	13.2	29.33	46.00
300.650000	32.7	1000.0	120.000	111.0	V	47.0	16.9	13.32	46.00
384.028750	34.3	1000.0	120.000	100.0	H	21.0	17.7	11.73	46.00
504.026250	34.0	1000.0	120.000	200.0	H	316.0	21.1	12.00	46.00
966.388750	36.1	1000.0	120.000	100.0	V	34.0	30.3	17.87	54.00

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



- ◆ Operating Condition: 1 440 × 900 / 60 Hz (Network monitor mode)
Red trace: Vertical polarization, Blue trace: Horizontal polarization



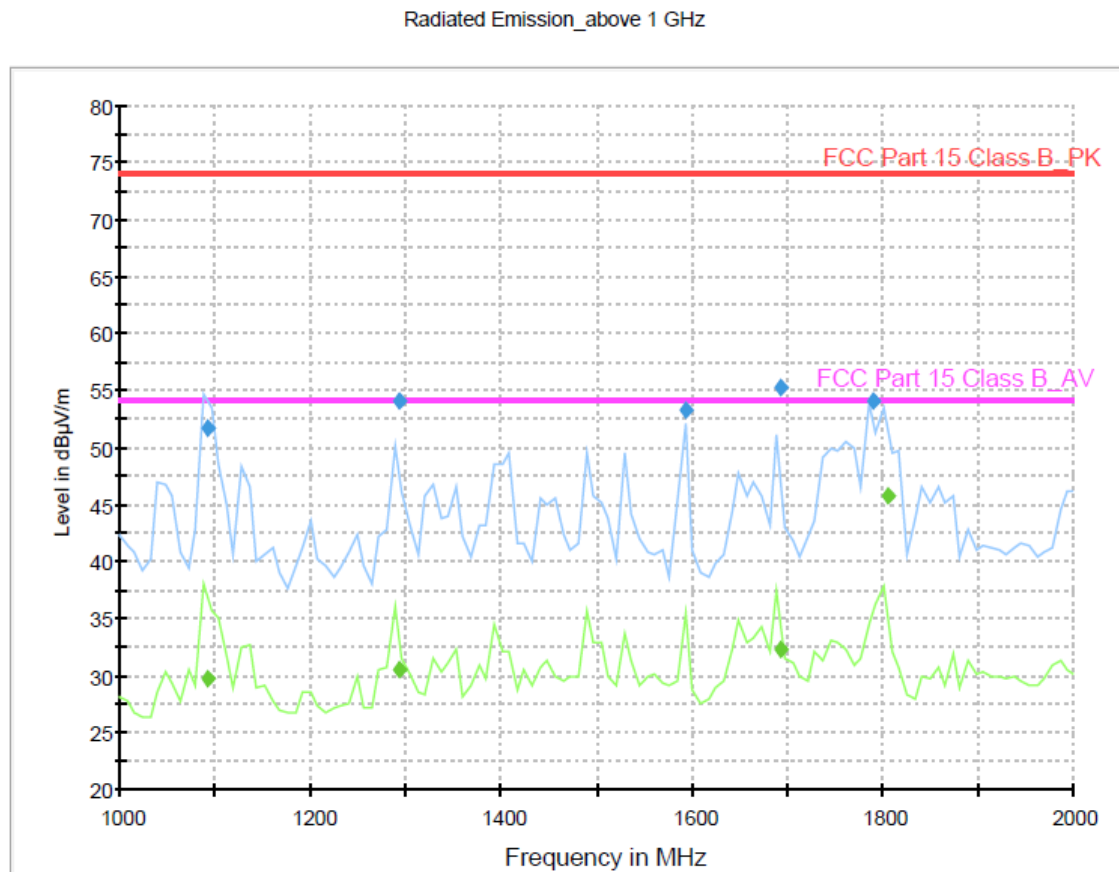
Final Result [1]

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
198.277500	31.7	1000.0	120.000	110.0	H	32.0	11.9	11.79	43.50
213.026250	24.5	1000.0	120.000	100.0	V	200.0	12.4	18.99	43.50
248.997500	37.7	1000.0	120.000	100.0	H	340.0	14.4	8.28	46.00
300.690000	38.2	1000.0	120.000	100.0	H	79.0	16.9	7.78	46.00
479.251250	42.6	1000.0	120.000	100.0	H	124.0	20.3	3.43	46.00
532.521250	41.2	1000.0	120.000	100.0	V	200.0	21.5	4.78	46.00
564.450000	41.9	1000.0	120.000	111.0	V	200.0	22.0	4.11	46.00
581.021250	37.4	1000.0	120.000	100.0	V	291.0	22.4	8.57	46.00
966.475000	35.7	1000.0	120.000	100.0	V	33.0	30.3	18.25	54.00

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



- ◆ Operating Condition: 1 440 × 900 / 60 Hz (Monitor mode)
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)
1093.176353	51.6	100.0	1000.000	100.0	V	127.0	-15.4	22.4	74.0
1293.577154	54.0	100.0	1000.000	100.0	H	138.0	-14.4	20.0	74.0
1592.986373	53.3	100.0	1000.000	100.0	V	193.0	-13.7	20.7	74.0
1692.378758	55.2	100.0	1000.000	100.0	V	200.0	-13.6	18.8	74.0
1790.571142	54.0	100.0	1000.000	236.0	V	172.0	-13.1	20.0	74.0

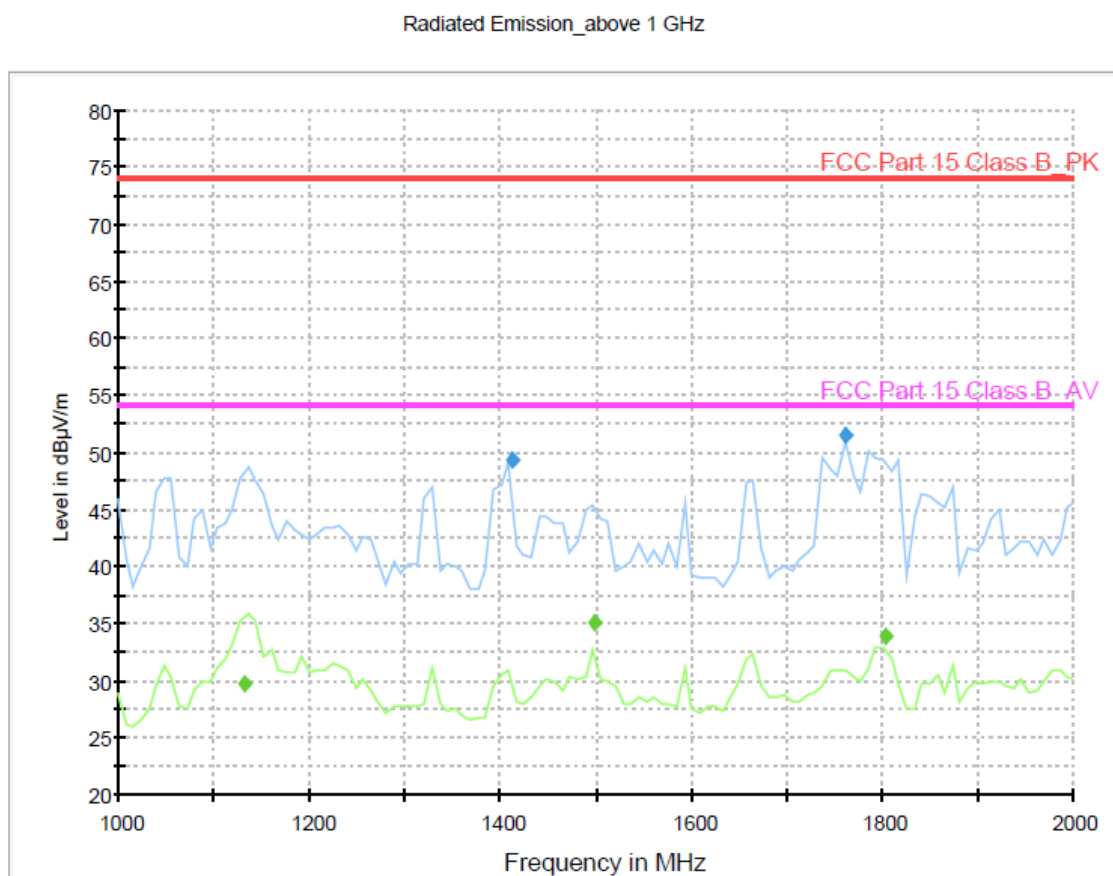
Final Result 2

Frequency (MHz)	Average (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1093.176353	29.7	100.0	1000.000	100.0	V	127.0	-15.4	24.3	54.0
1293.177154	30.5	100.0	1000.000	100.0	H	138.0	-14.4	23.5	54.0
1692.378758	32.3	100.0	1000.000	100.0	V	200.0	-13.6	21.7	54.0
1805.003206	45.7	100.0	1000.000	122.0	V	179.0	-13.1	8.3	54.0

< Fig 14. Radiated emission result (1 000 MHz ~ 2 000 MHz) >



- ◆ Operating Condition: 1 440 × 900 / 60 Hz (Network monitor mode)
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)
1413.817635	49.3	100.0	1000.000	100.0	V	212.0	-14.4	24.7	74.0
1760.523046	51.5	100.0	1000.000	100.0	V	192.0	-13.3	22.5	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)
1133.272545	29.7	100.0	1000.000	138.0	V	344.0	-15.3	24.3	54.0
1499.993988	35.0	100.0	1000.000	113.0	V	179.0	-14.3	19.0	54.0
1804.203206	33.8	100.0	1000.000	100.0	V	199.0	-13.1	20.2	54.0

< Fig 15. Radiated emission result (1 000 MHz ~ 2 000 MHz) >



7. Sample Calculations

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

7.1 Example 1 :

■ 20.3 MHz

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

7.2 Example 2 :

■ 66.7 MHz

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



8. Recommendation & Conclusion

The data collected shows that the **LG Electronics Inc. LCD Monitor (Model Name: N194WAT)** was complies with §15.107 and 15.109 of the FCC Rules.