

FCC EVALUATION REPORT FOR CERTIFICATION

Applicant: LG Electronics Inc.

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

Pyeongteak-si, Gyeonggi-do, Korea.

Attn: Mr. Sung-Wook, Yoon, Chief research engineer

Date of Issue: May 14, 2012

Order Number: GETEC-C1-12-146

Test Report Number: GETEC-E3-12-052

Test Site: GUMI COLLEGE EMC CENTER

FCC Registration Number: (100749, 443957)

FCC ID. : BEJM2252D

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	: M2252D
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 C63.4-2009 / Canadian standard ICES-003

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

Tested by,

Reviewed by,



Hyun Kim / Engineer
GUMI COLLEGE EMC CENTER



Jae-Hoon Jeong / Senior Engineer
GUMI COLLEGE EMC CENTER



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Scope: Measurement and determination of electromagnetic emissions (EME) of radio frequency devices including intentional and / or unintentional radiators for compliance with technical rules and regulations of the Federal Communications Commission.

1. General Information

Applicant: LG Electronics Inc.

Applicant Address: 19-1, Cheongho-ri, Jinwi-myeon, Pyeongteak-si, Gyeonggi-do, Korea.

Manufacturer: LG Electronics Inc.

Manufacturer Address: 19-1, Cheongho-ri, Jinwi-myeon, Pyeongteak-si, Gyeonggi-do, Korea.

Contact Person: Mr. Sung-Wook Yoon, Chief research engineer

Tel Number: +82-31-610-9623

- **FCC ID.** BEJM2252D
- **EUT Type** LED LCD TV/Monitor
- **Model Name** M2252D
- **Trade Name** LG
- **Serial Number** Prototype
- **Rule Part(s)** FCC Part 15 Subpart B
- **Type of Authority** Certification
- **Test Procedure(s)** ANSI C63.4 (2009) / Canadian standard ICES-003
- **Dates of Test** May 4 ~ 9, 2012
- **Place of Test** **GUMI COLLEGE EMC CENTER** (FCC Registration Number: 100749, 443957)
407, Bugok-Dong, Gumi-City, Gyungbok, 730-711, Republic of Korea
- **Test Report Number** GETEC-E3-12-052
- **Dates of Issue** May 14, 2012



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: M2252D)

These measurement tests were conducted at **GUMI COLLEGE EMC CENTER**

The site address is 407, Bugok-Dong, Gumi-City, Gyungbok, 730-711, Republic of Korea.

This test site is one of the highest point of Gumi 1 college at about 200 km away from Seoul city and 40 km away from Daegu city. It is located in the valley surrounded by mountains in all directions where ambient radio signal conditions are quiet and a favorable area to measure the radio frequency interference on open field test site for the computing and ISM devices manufactures. The detailed description of the measurement facility was found to be in compliance with the requirements of §2.948 according to ANSI C63.4 (2003)



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



3. Product Information

3.1 Description of EUT

The Equipment under Test (EUT) is the **LG Electronics Inc.**

LED LCD TV/Monitor (Model Name: M2252D) FCC ID.: BEJM2252D

Panel	Screen Type	546.1 mm Wide (21.5 inch) Visible diagonal size : 546.1 mm
	Pixel Pitch	0.25 mm (H) x 0.25 mm (V)
Video Signal	Max. Resolution	1920 × 1080 @ 60 Hz
	Recommended Resolution	1920 × 1080 @ 60 Hz
	Horizontal Frequency	30 kHz to 83 kHz
	Vertical Frequency	56 Hz to 75 Hz
	Synchronization Type	Separate Sync, Digital
Input Connector		M2252D TV, D-Sub Analog, SCART, PC Audio In, Component, CVBS, HDMI*2, USB, PCMCIA
		M2252T TV, D-Sub Analog, SCART, PC Audio In, Component, CVBS, HDMI*2, USB, PCMCIA, LAN JACK (Only UK)
Power	Rated Voltage	19 V --- 1.6 A
	Power Consumption	On Mode : 30 W (typ.) Off Mode ≤ 0.4 W
AC/DC Adapter		Manufacturer: Lien Chang, Model LCAP25A Manufacturer: HONOR, Model ADS-40SG-19-2 19032G
Tilt	Tilt Range	-5 to 20°
Dimensions (Width x Depth x Height) Weight		With Stand
		508.6 mm x 182.8 mm x 386.5 mm 3.6 kg
		Without Stand
		508.6 mm x 62.9 mm x 314.8 mm 3.1 kg

- . Maximum Frequency Range : 667 MHz



3.2 Support Equipment / Cables used

3.2.1 Used Support Equipment

Description	Manufacturer	Model Name	S/N & FCC ID.
PC(Main board)	ASUSTEK COMPUTER INC.	P8H61	S/N: 0BG084-02014-MIBFE0-A05 FCC ID.: DoC
Video card	Digital Greentech Co., Ltd.	VX4850	S/N: LG1112056668 FCC ID.: DoC
PS2 keyboard	COMPAQ	166516-AD6	S/N: B13BBOR391006D FCC ID.: AQ6-23K15
USB mouse	Microsoft Corporation	1484	S/N: 0352700289761 FCC ID: DoC
DVD player	ILIKE ELECTRONICS CO., LTD.	CVX-3800 Full-HD	S/N: CVX380020110110493 FCC ID.: Verification
USB memory stick	SAMSUNG	SUM-PSB4	S/N: TBBB202478F FCC ID.: DoC
Headset	PHILIPS	SBC HL140	S/N: None. FCC ID.: N/A
Digital TV pattern generator	Teleview	TPG430B	S/N: 93.01.20.05.09.00.00.02 FCC ID.: Verification
8-VSB modulator	Ktech	VSB-ENC-150E	S/N: 2005-726 FCC ID.: Verification

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

3.2.2 System configuration

Description	Manufacturer	Model Name	S/N & FCC ID.
IR remote controller	LG Electronics Inc.	AKB73655824	S/N: None. FCC ID.: N/A
Adapter #1 ¹⁾	Lien Chang Electronic Enterprice Co., Ltd.	LCAP25A	S/N: EC3MN626488020063 FCC ID.: None.
Adapter #2 ¹⁾	ShenZhen Honor Electronic Co., Ltd.	ADS-40SG-19-2	S/N: EAY62549302 FCC ID.: None.

1) Input ratings: AC (100 – 240) V~, (50 – 60) Hz, 1.0 A / Output ratings: DC 19 V, 1.7 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
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	1.50 m shielded
Component 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
Antenna cable	Connected to the EUT and digital TV pattern generator	10.00 m shielded with two ferrite cores

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 with adapter #1 (model name: LCAP25A) or adapter #2 (model name: ADS-40SG-19-2)

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

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

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

◆ Operating test pattern

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

"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

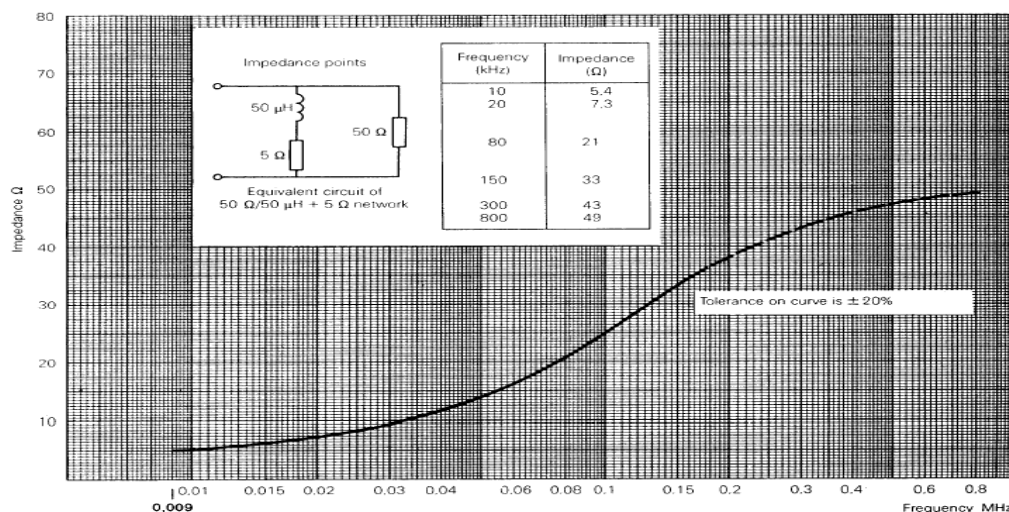


Fig 2. Impedance of LISN



4.3 Radiated Emission

Measurements (below 1 GHz) were made at Open area test site that complies to CISPR 16/ANSI C63.4. Preliminary (peak) measurements were performed at an antenna to EUT separation distance of 10 m. The EUT was rotated 360° about its azimuth with the receive antenna located at 1, 2, 3 and 4 meter heights in both horizontal and vertical polarities. Final measurements (quasi-peak or average as noted) were then performed by rotating the EUT 360° and adjusting the receive antenna height from 1.0 m to 4.0 m. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable.

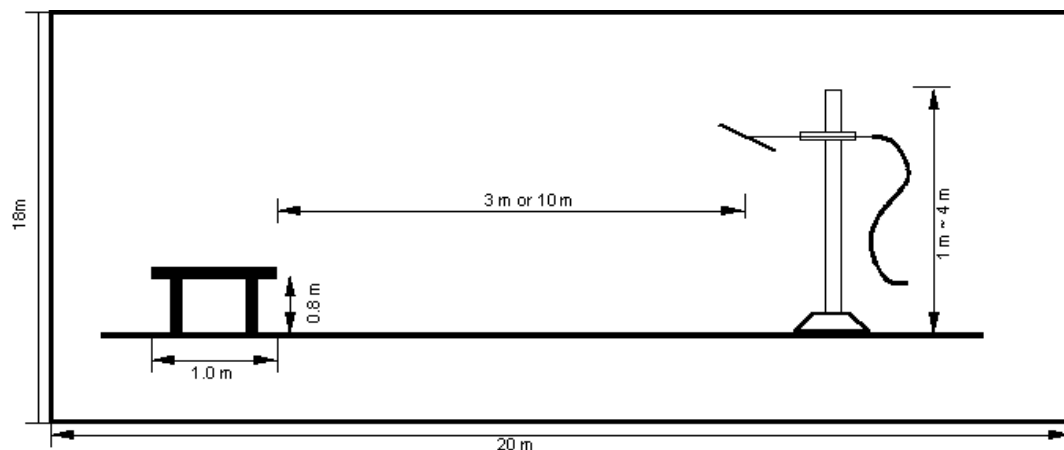


Fig 3. Dimensions of test site

The measurements (above 1 GHz) were made 3 m distance test site that complies to CISPR 16-1-4 (2007). In order to meet SVSWR Limit (Within 6 dB), the bottom side of test site was installed with absorbers. 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. The measurements were conducted with Average and Peak value.

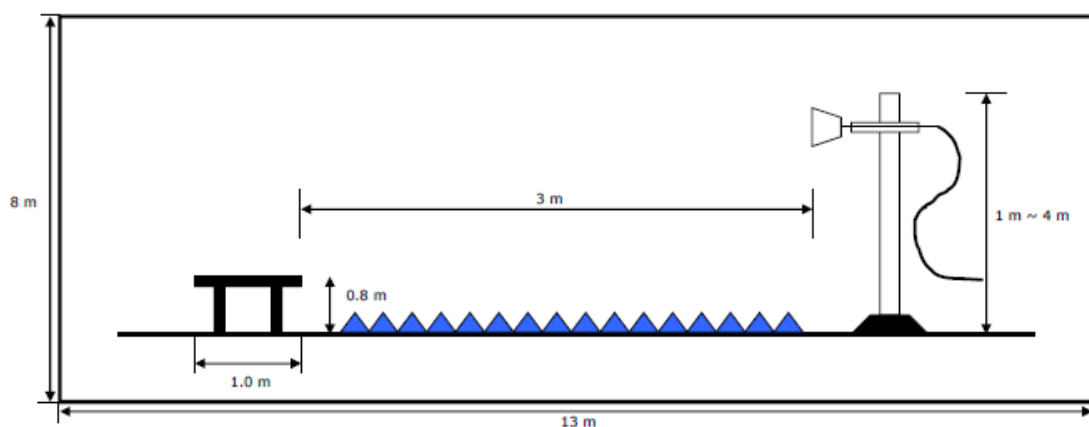


Fig 4. Dimensions of test site



5. Conducted Emission

5.1 Operating Environment

Temperature : 22.0 °C
Relative Humidity : 37.0 % R.H.

5.2 Test Set-up

The conducted emission measurements were performed in the shielded room.

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

AMN is bonded on horizontal reference ground plane.

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

5.3 Measurement Uncertainty

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

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

Test Items	Uncertainty	Remark
Conducted emission (9 kHz ~ 150 kHz)	± 2.74 dB	Confidence level of approximately 95 % ($k = 2$)
Conducted emission (150 kHz ~ 30 MHz)	± 4.25 dB	Confidence level of approximately 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

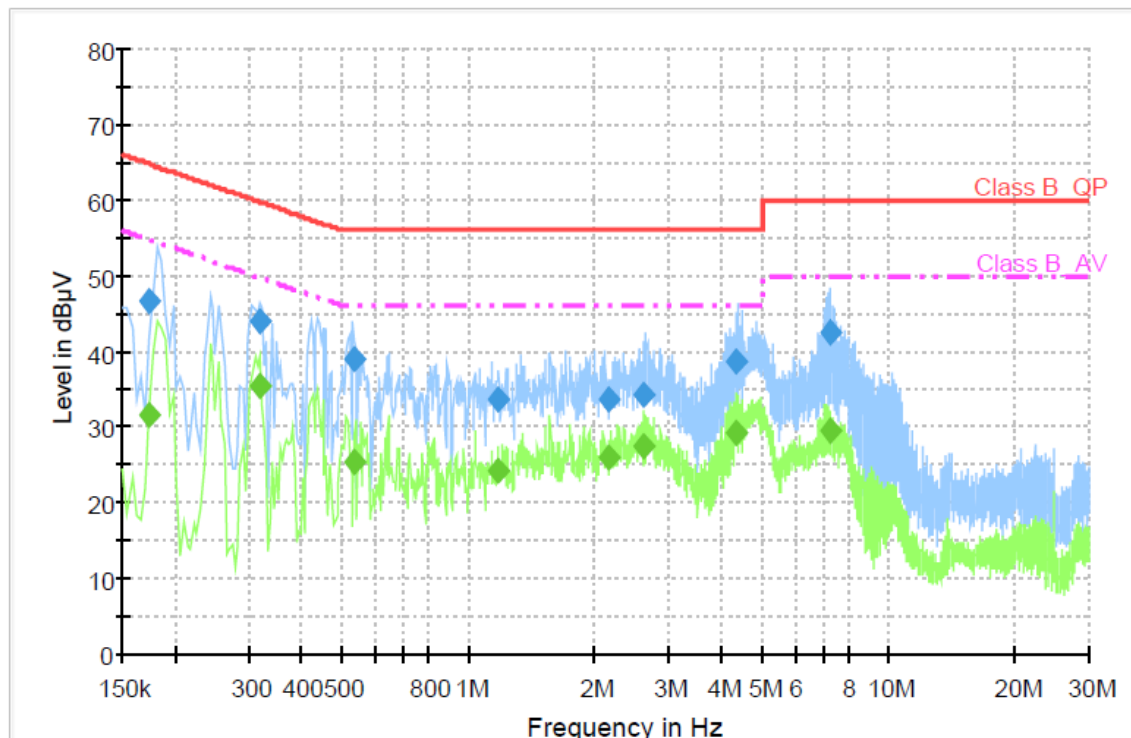
Model Name	Manufacturer	Description	Serial Number	Due to Calibration
■ - ESCS30	Rohde & Schwarz	EMI Test Receiver	839809/003	12. 05. 2012
■ - ESH3-Z5	Rohde & Schwarz	LISN	838979/020	12. 07. 2012
■ - ESH2-Z5	Rohde & Schwarz	LISN	829991/009	12. 07. 2012
□ - ENY81-CA6	Rohde & Schwarz	ISN	101573	10. 19. 2012

5.6 Test data for Conducted Emission

- . Test Date : May 9, 2012
- . Resolution Bandwidth : 9 kHz
- . Frequency Range : 0.15 MHz ~ 30 MHz
- . Line : L1: Live, N: Neutral



◆ Operating condition: Monitor with adapter #1, 1 920 × 1 080 / 60 Hz(RGB: Analog)



Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.174000	46.5	1000.0	9.000	GND	N	10.1	18.2	64.8	
0.320000	44.0	1000.0	9.000	GND	N	10.1	15.7	59.7	
0.532000	38.8	1000.0	9.000	GND	N	10.1	17.2	56.0	
1.172000	33.5	1000.0	9.000	GND	L1	10.2	22.5	56.0	
2.148000	33.8	1000.0	9.000	GND	N	10.2	22.2	56.0	
2.612000	34.3	1000.0	9.000	GND	L1	10.2	21.7	56.0	
4.356000	38.6	1000.0	9.000	GND	N	10.3	17.4	56.0	
7.308000	42.6	1000.0	9.000	GND	L1	10.3	17.4	60.0	

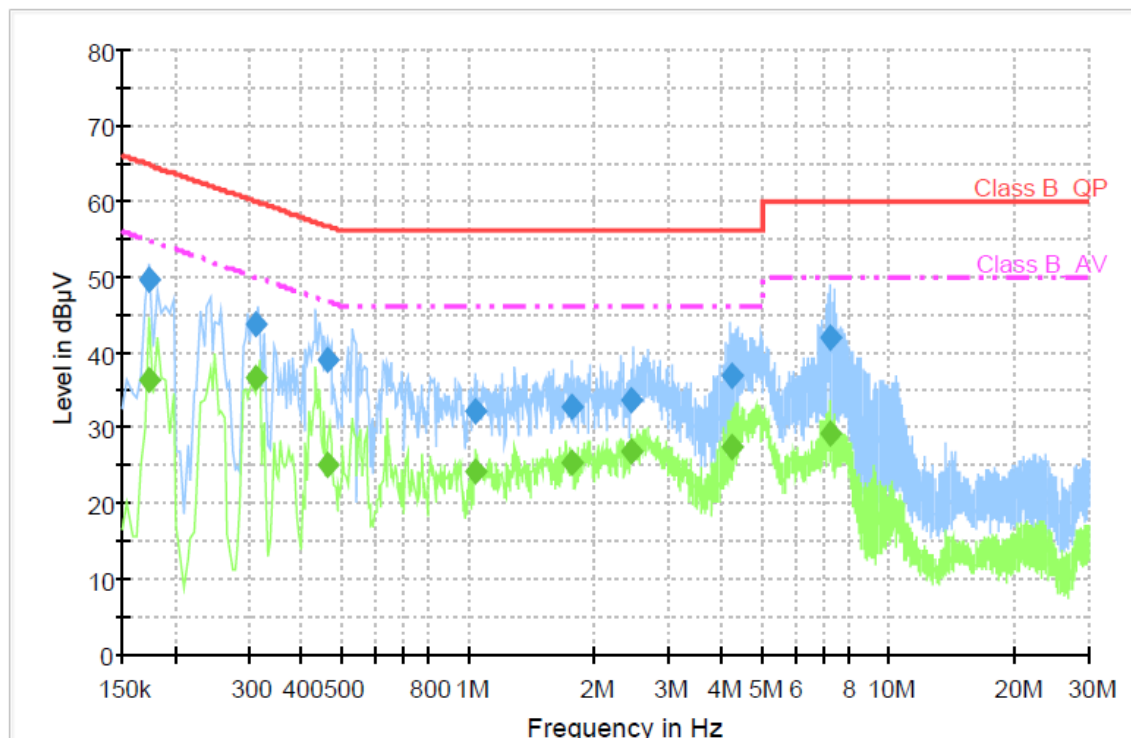
Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.174000	31.5	1000.0	9.000	GND	N	10.1	23.3	54.8	
0.320000	35.4	1000.0	9.000	GND	N	10.1	14.3	49.7	
0.532000	25.2	1000.0	9.000	GND	N	10.1	20.8	46.0	
1.172000	24.2	1000.0	9.000	GND	L1	10.2	21.8	46.0	
2.148000	26.1	1000.0	9.000	GND	N	10.2	19.9	46.0	
2.612000	27.5	1000.0	9.000	GND	L1	10.2	18.5	46.0	
4.356000	29.1	1000.0	9.000	GND	N	10.3	16.9	46.0	
7.308000	29.5	1000.0	9.000	GND	L1	10.3	20.5	50.0	

< Fig 4. Conducted emission result >



◆ Operating condition: Monitor with adapter #1, 1 024 × 768 / 60 Hz(RGB: Analog)



Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.174000	49.7	1000.0	9.000	GND	N	10.1	15.0	64.8	
0.312000	43.8	1000.0	9.000	GND	N	10.1	16.1	59.9	
0.460000	38.8	1000.0	9.000	GND	N	10.1	17.9	56.7	
1.044000	32.2	1000.0	9.000	GND	L1	10.2	23.8	56.0	
1.760000	32.8	1000.0	9.000	GND	L1	10.2	23.2	56.0	
2.452000	33.6	1000.0	9.000	GND	N	10.2	22.4	56.0	
4.236000	36.9	1000.0	9.000	GND	N	10.3	19.1	56.0	
7.276000	41.9	1000.0	9.000	GND	N	10.3	18.1	60.0	

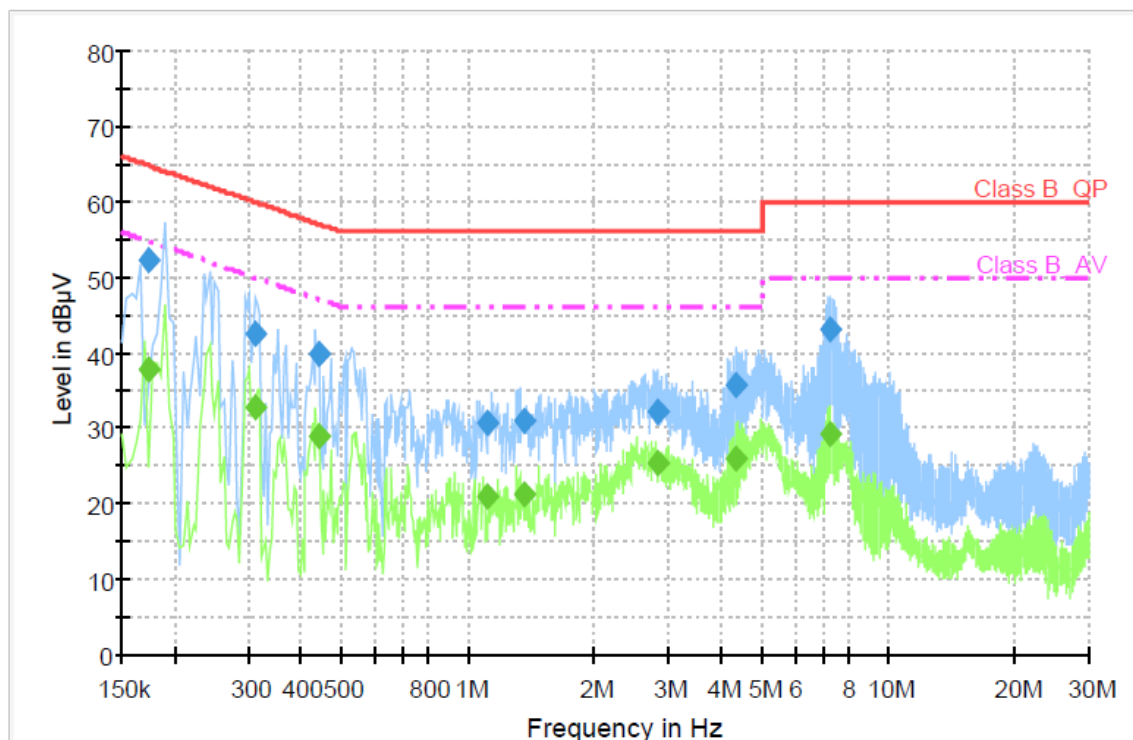
Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.174000	36.2	1000.0	9.000	GND	N	10.1	18.6	54.8	
0.312000	36.6	1000.0	9.000	GND	N	10.1	13.3	49.9	
0.460000	25.1	1000.0	9.000	GND	N	10.1	21.6	46.7	
1.044000	24.2	1000.0	9.000	GND	L1	10.2	21.8	46.0	
1.760000	25.5	1000.0	9.000	GND	L1	10.2	20.5	46.0	
2.452000	26.8	1000.0	9.000	GND	N	10.2	19.2	46.0	
4.236000	27.3	1000.0	9.000	GND	N	10.3	18.7	46.0	
7.276000	29.3	1000.0	9.000	GND	N	10.3	20.7	50.0	

< Fig 5. Conducted emission result >



◆ Operating condition: Monitor with adapter #1, 640 × 480 / 60 Hz(RGB: Analog)



Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.174000	52.2	1000.0	9.000	GND	L1	10.1	12.5	64.8	
0.312000	42.5	1000.0	9.000	GND	N	10.1	17.4	59.9	
0.444000	39.9	1000.0	9.000	GND	N	10.1	17.1	57.0	
1.116000	30.8	1000.0	9.000	GND	L1	10.2	25.2	56.0	
1.364000	31.0	1000.0	9.000	GND	L1	10.2	25.0	56.0	
2.840000	32.1	1000.0	9.000	GND	L1	10.2	23.9	56.0	
4.340000	35.7	1000.0	9.000	GND	L1	10.3	20.3	56.0	
7.308000	43.0	1000.0	9.000	GND	N	10.3	17.0	60.0	

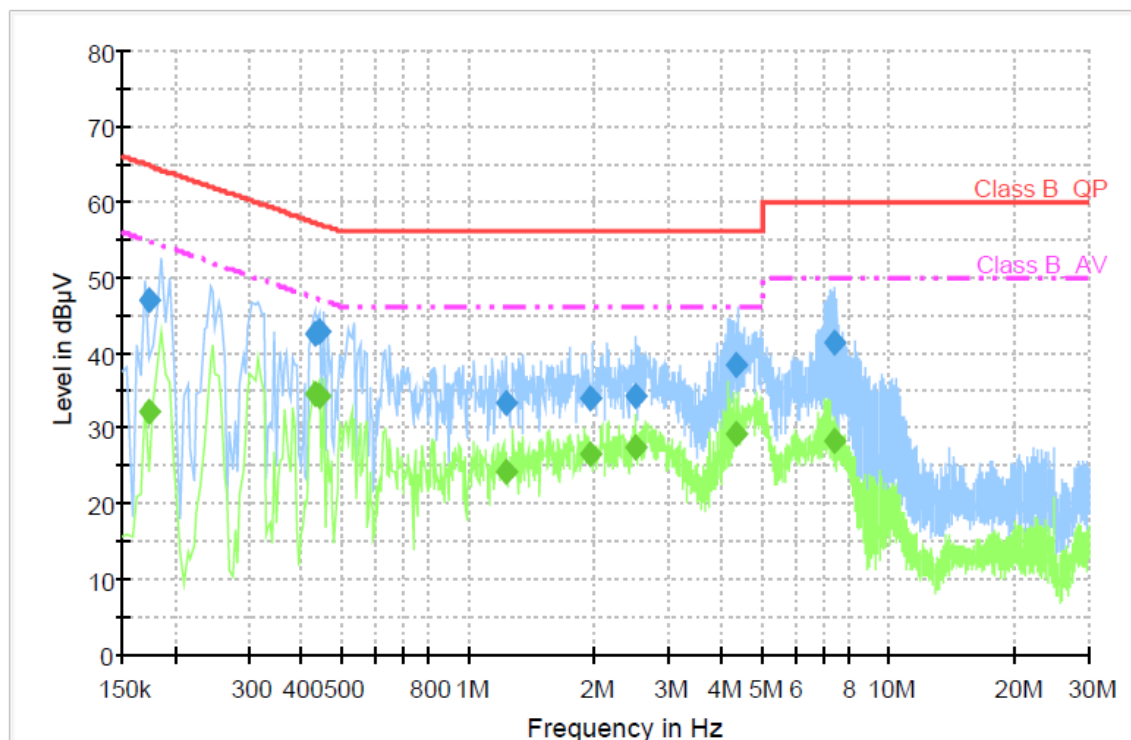
Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.174000	37.8	1000.0	9.000	GND	L1	10.1	17.0	54.8	
0.312000	32.8	1000.0	9.000	GND	N	10.1	17.1	49.9	
0.444000	29.0	1000.0	9.000	GND	N	10.1	18.0	47.0	
1.116000	21.0	1000.0	9.000	GND	L1	10.2	25.0	46.0	
1.364000	21.4	1000.0	9.000	GND	L1	10.2	24.6	46.0	
2.840000	25.5	1000.0	9.000	GND	L1	10.2	20.5	46.0	
4.340000	26.1	1000.0	9.000	GND	L1	10.3	19.9	46.0	
7.308000	29.1	1000.0	9.000	GND	N	10.3	20.9	50.0	

< Fig 6. Conducted emission result >



◆ Operating condition: Monitor with adapter #1, 1 920 × 1 080 / 60 Hz(HDMI/DVI: Digital)



Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.174000	46.9	1000.0	9.000	GND	N	10.1	17.8	64.8	
0.432000	42.4	1000.0	9.000	GND	N	10.1	14.8	57.2	
0.440000	42.8	1000.0	9.000	GND	N	10.1	14.3	57.1	
1.232000	33.4	1000.0	9.000	GND	L1	10.2	22.6	56.0	
1.960000	33.9	1000.0	9.000	GND	L1	10.2	22.1	56.0	
2.504000	34.1	1000.0	9.000	GND	N	10.2	21.9	56.0	
4.336000	38.5	1000.0	9.000	GND	N	10.3	17.5	56.0	
7.416000	41.2	1000.0	9.000	GND	N	10.3	18.8	60.0	

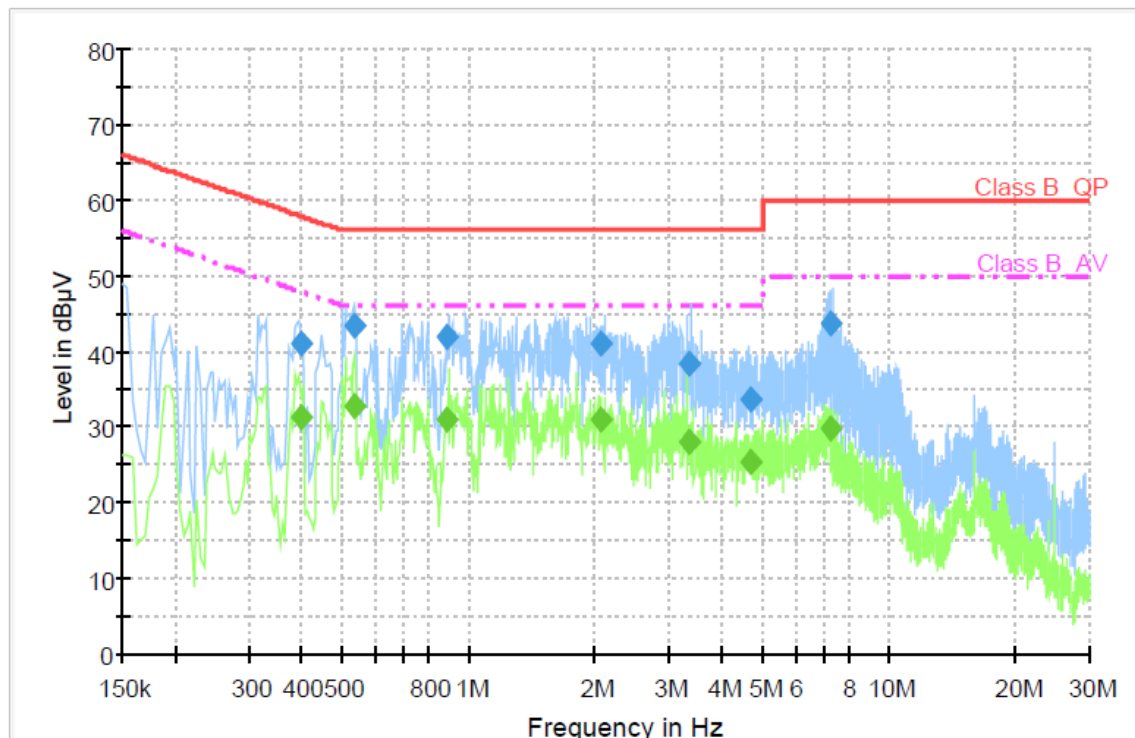
Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.174000	32.3	1000.0	9.000	GND	N	10.1	22.5	54.8	
0.432000	34.6	1000.0	9.000	GND	N	10.1	12.6	47.2	
0.440000	34.4	1000.0	9.000	GND	N	10.1	12.7	47.1	
1.232000	24.3	1000.0	9.000	GND	L1	10.2	21.7	46.0	
1.960000	26.6	1000.0	9.000	GND	L1	10.2	19.4	46.0	
2.504000	27.6	1000.0	9.000	GND	N	10.2	18.4	46.0	
4.336000	29.3	1000.0	9.000	GND	N	10.3	16.7	46.0	
7.416000	28.4	1000.0	9.000	GND	N	10.3	21.6	50.0	

< Fig 7. Conducted emission result >



◆ Operating condition: Monitor with adapter #2, 1 920 × 1 080 / 60 Hz(RGB: Analog)



Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.400000	41.2	1000.0	9.000	GND	N	10.1	16.7	57.9	
0.536000	43.4	1000.0	9.000	GND	N	10.1	12.6	56.0	
0.884000	42.0	1000.0	9.000	GND	N	10.1	14.0	56.0	
2.072000	41.1	1000.0	9.000	GND	N	10.2	14.9	56.0	
3.332000	38.4	1000.0	9.000	GND	N	10.2	17.6	56.0	
4.700000	33.6	1000.0	9.000	GND	L1	10.3	22.4	56.0	
7.300000	43.7	1000.0	9.000	GND	L1	10.3	16.3	60.0	

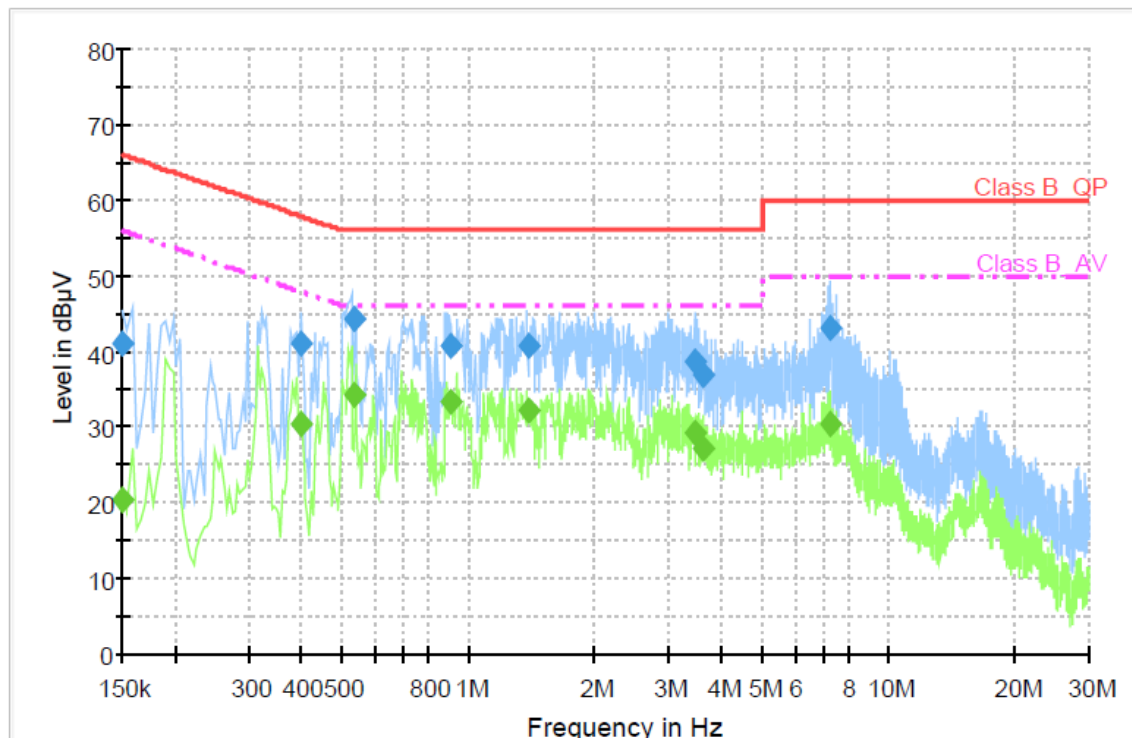
Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.400000	31.4	1000.0	9.000	GND	N	10.1	16.4	47.9	
0.536000	32.8	1000.0	9.000	GND	N	10.1	13.2	46.0	
0.884000	31.0	1000.0	9.000	GND	N	10.1	15.0	46.0	
2.072000	30.9	1000.0	9.000	GND	N	10.2	15.1	46.0	
3.332000	28.1	1000.0	9.000	GND	N	10.2	17.9	46.0	
4.700000	25.5	1000.0	9.000	GND	L1	10.3	20.5	46.0	
7.300000	29.9	1000.0	9.000	GND	L1	10.3	20.1	50.0	

< Fig 8. Conducted emission result >



◆ Operating condition: Monitor with adapter #2, 1 024 × 768 / 60 Hz(RGB: Analog)



Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.150000	40.9	1000.0	9.000	GND	N	10.1	25.1	66.0	
0.400000	41.1	1000.0	9.000	GND	N	10.1	16.8	57.9	
0.532000	44.3	1000.0	9.000	GND	N	10.1	11.7	56.0	
0.908000	40.7	1000.0	9.000	GND	N	10.2	15.3	56.0	
1.388000	40.6	1000.0	9.000	GND	N	10.2	15.4	56.0	
3.472000	38.8	1000.0	9.000	GND	N	10.2	17.2	56.0	
3.612000	36.9	1000.0	9.000	GND	N	10.2	19.1	56.0	
7.308000	43.1	1000.0	9.000	GND	N	10.3	16.9	60.0	

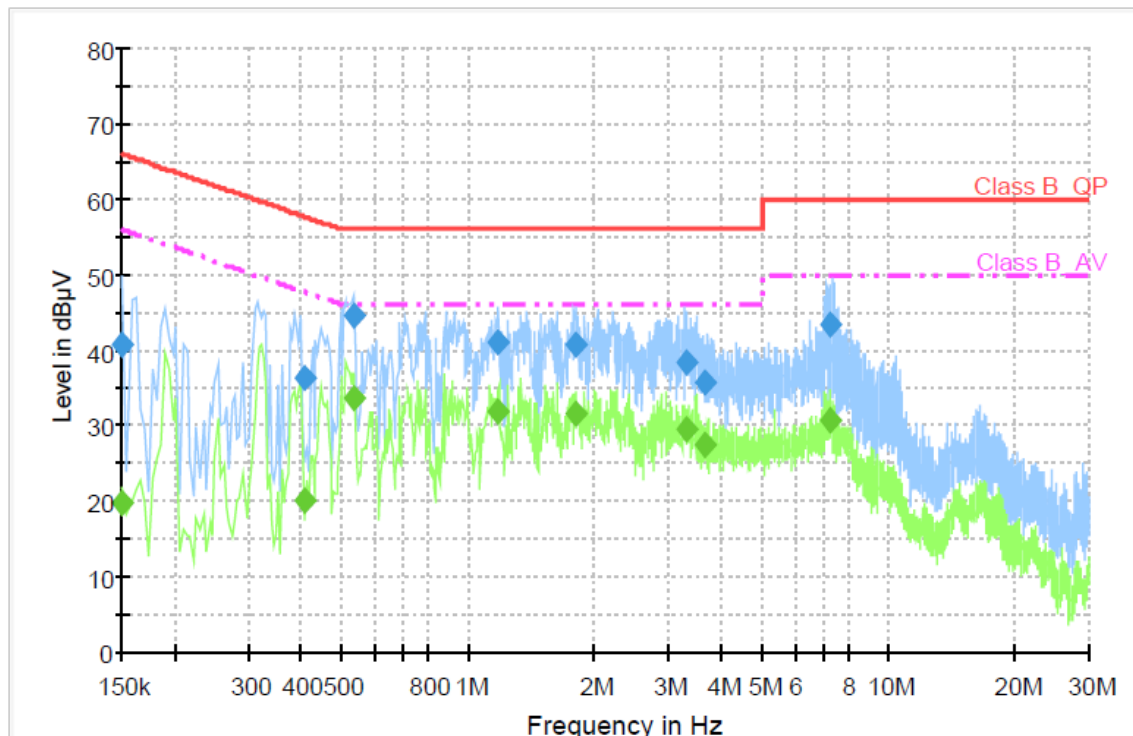
Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.150000	20.3	1000.0	9.000	GND	N	10.1	35.7	56.0	
0.400000	30.4	1000.0	9.000	GND	N	10.1	17.4	47.9	
0.532000	34.3	1000.0	9.000	GND	N	10.1	11.7	46.0	
0.908000	33.3	1000.0	9.000	GND	N	10.2	12.7	46.0	
1.388000	32.0	1000.0	9.000	GND	N	10.2	14.0	46.0	
3.472000	29.1	1000.0	9.000	GND	N	10.2	16.9	46.0	
3.612000	27.1	1000.0	9.000	GND	N	10.2	18.9	46.0	
7.308000	30.5	1000.0	9.000	GND	N	10.3	19.5	50.0	

< Fig 9. Conducted emission result >



◆ Operating condition: Monitor with adapter #2, 640 × 480 / 60 Hz(RGB: Analog)



Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.150000	40.8	1000.0	9.000	GND	N	10.1	25.2	66.0	
0.408000	36.2	1000.0	9.000	GND	N	10.1	21.5	57.7	
0.532000	44.4	1000.0	9.000	GND	N	10.1	11.6	56.0	
1.180000	41.1	1000.0	9.000	GND	N	10.2	14.9	56.0	
1.812000	40.6	1000.0	9.000	GND	N	10.2	15.4	56.0	
3.308000	38.4	1000.0	9.000	GND	N	10.2	17.6	56.0	
3.672000	35.8	1000.0	9.000	GND	N	10.3	20.2	56.0	
7.308000	43.3	1000.0	9.000	GND	N	10.3	16.7	60.0	

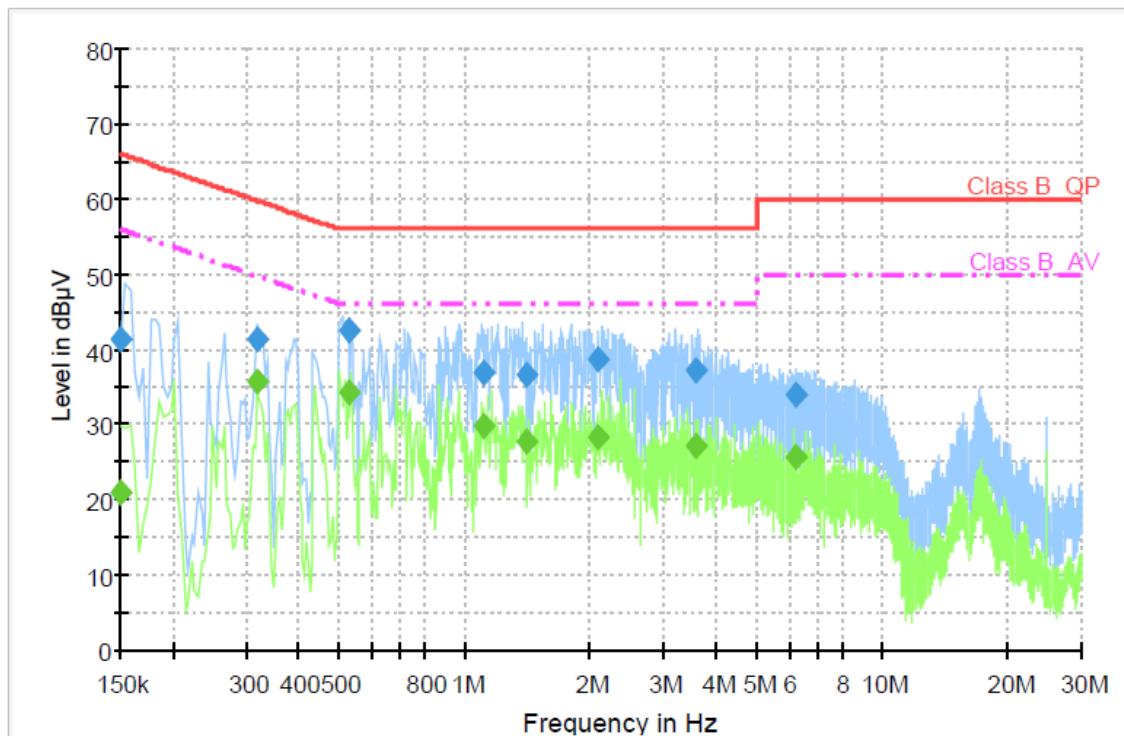
Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.150000	19.7	1000.0	9.000	GND	N	10.1	36.3	56.0	
0.408000	20.1	1000.0	9.000	GND	N	10.1	27.6	47.7	
0.532000	33.6	1000.0	9.000	GND	N	10.1	12.4	46.0	
1.180000	31.8	1000.0	9.000	GND	N	10.2	14.2	46.0	
1.812000	31.6	1000.0	9.000	GND	N	10.2	14.4	46.0	
3.308000	29.5	1000.0	9.000	GND	N	10.2	16.5	46.0	
3.672000	27.4	1000.0	9.000	GND	N	10.3	18.6	46.0	
7.308000	30.7	1000.0	9.000	GND	N	10.3	19.3	50.0	

< Fig 10. Conducted emission result >



◆ Operating condition: Monitor with adapter #2, 1 920 × 1 080 / 60 Hz(HDMI/DVI: Digital)



Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.150000	41.2	1000.0	9.000	GND	N	10.1	24.8	66.0	
0.320000	41.4	1000.0	9.000	GND	N	10.1	18.3	59.7	
0.528000	42.6	1000.0	9.000	GND	N	10.1	13.4	56.0	
1.116000	36.9	1000.0	9.000	GND	N	10.2	19.1	56.0	
1.412000	36.5	1000.0	9.000	GND	N	10.2	19.5	56.0	
2.096000	38.5	1000.0	9.000	GND	N	10.2	17.5	56.0	
3.576000	37.3	1000.0	9.000	GND	N	10.2	18.7	56.0	
6.240000	34.0	1000.0	9.000	GND	N	10.3	26.0	60.0	

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.150000	20.9	1000.0	9.000	GND	N	10.1	35.1	56.0	
0.320000	35.9	1000.0	9.000	GND	N	10.1	13.8	49.7	
0.528000	34.2	1000.0	9.000	GND	N	10.1	11.8	46.0	
1.116000	30.0	1000.0	9.000	GND	N	10.2	16.0	46.0	
1.412000	27.7	1000.0	9.000	GND	N	10.2	18.3	46.0	
2.096000	28.2	1000.0	9.000	GND	N	10.2	17.8	46.0	
3.576000	27.2	1000.0	9.000	GND	N	10.2	18.8	46.0	
6.240000	25.7	1000.0	9.000	GND	N	10.3	24.3	50.0	

< Fig 11. Conducted emission result >



6. Radiated Emission

6.1 Operating Environment

Temperature : 23.0 °C
Relative Humidity : 42.0 % R.H.

6.2 Test Set-up

A preliminary and final measurement was at 3 m anechoic chamber.

The EUT was placed on a non-conductive turntable approximately 0.8 m above the ground plane.

The turntable with EUT was rotated 360°, and the antenna was varied in height between 1.0 m and 4.0 m in order to determine the maximum emission levels.

This procedure was performed for both horizontal and vertical polarization of the receiving antenna.

6.3 Measurement Uncertainty

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

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

Test Items(Anechoic Chamber)	Uncertainty	Remark
Radiated emission (30 MHz ~ 300 MHz, 3 m, Vertical)	± 4.38 dB	Confidence level of approximately 95 % ($k = 2$)
Radiated emission (30 MHz ~ 300 MHz, 3 m, Horizontal)	± 3.50 dB	Confidence level of approximately 95 % ($k = 2$)
Radiated emission (300 MHz ~ 1 000 MHz, 3 m, Vertical)	± 3.75 dB	Confidence level of approximately 95 % ($k = 2$)
Radiated emission (300 MHz ~ 1 000 MHz, 3 m, Horizontal)	± 3.59 dB	Confidence level of approximately 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. 05. 2012
■ - VULB9160	Schwarzbeck	Broadband Test Antenna	3193	03. 14. 2013
■ - BBHA9120D	Schwarzbeck	Horn Antenna	597	01. 23. 2013
■ - 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. 2012

6.6 Test data for Radiated Emission

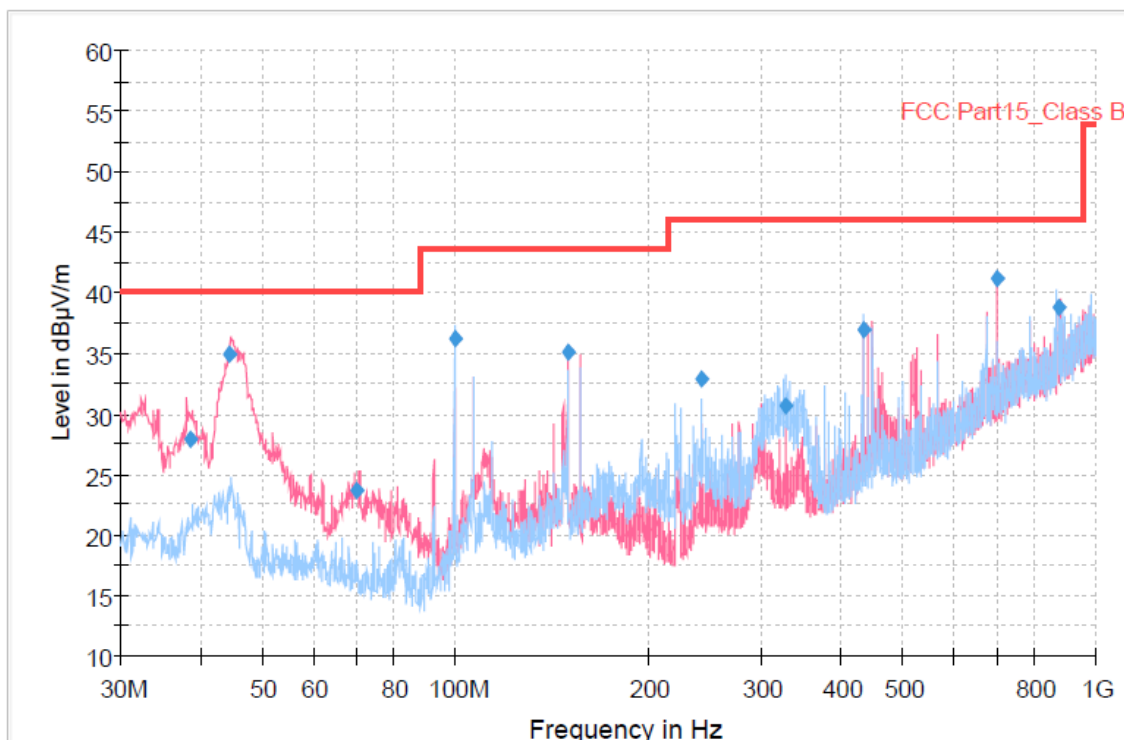
- Test Date : May 4 ~ 8, 2012
- Measurement Distance : 3 m
- Note : The highest frequency of the internal source of the EUT is between 500 MHz and 1 000 MHz (667 MHz). The measurement was made up to 5 000 MHz

- Measurement

Frequency range	30 MHz ~ 1 GHz	Above 1 GHz
Detector mode	Quasi peak	Peak / Average
Resolution bandwidth	120 kHz	1 MHz



- ◆ Operating condition: Monitor with adapter #1, 1 920 × 1 080 / 60 Hz(RGB: Analog)



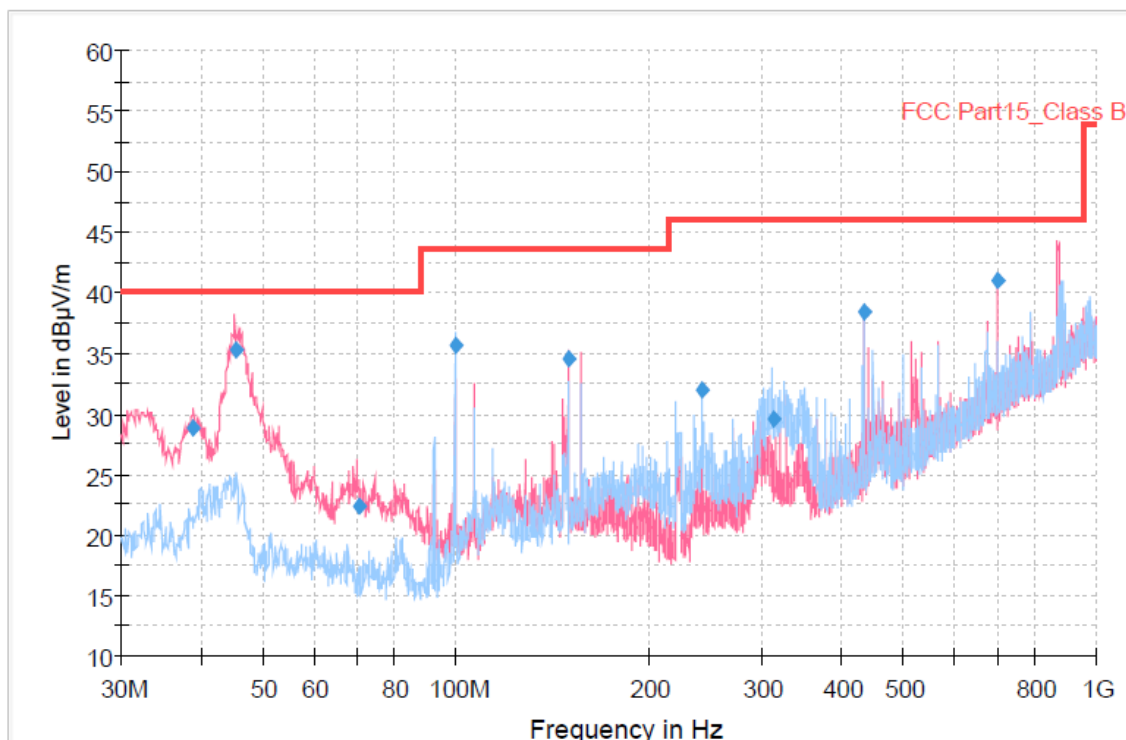
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
38.583750	27.9	1000.0	120.000	100.0	V	20.0	12.5	12.1	40.0
44.490000	35.0	1000.0	120.000	100.0	V	143.0	12.8	5.0	40.0
70.361250	23.7	1000.0	120.000	100.0	V	272.0	10.9	16.3	40.0
99.738750	36.2	1000.0	120.000	200.0	H	257.0	10.3	7.3	43.5
149.572500	35.1	1000.0	120.000	100.0	V	-25.0	13.9	8.4	43.5
242.167500	32.8	1000.0	120.000	150.0	H	286.0	12.6	13.2	46.0
327.660000	30.7	1000.0	120.000	100.0	H	210.0	15.6	15.3	46.0
433.338750	36.9	1000.0	120.000	100.0	H	54.0	18.5	9.1	46.0
700.007500	41.2	1000.0	120.000	100.0	V	136.0	24.0	4.8	46.0
873.341250	38.8	1000.0	120.000	141.0	H	110.0	26.7	7.2	46.0

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



- ◆ Operating condition: Monitor with adapter #1, 1 920 × 1 080 / 60 Hz(HDMI/DVI: Digital)



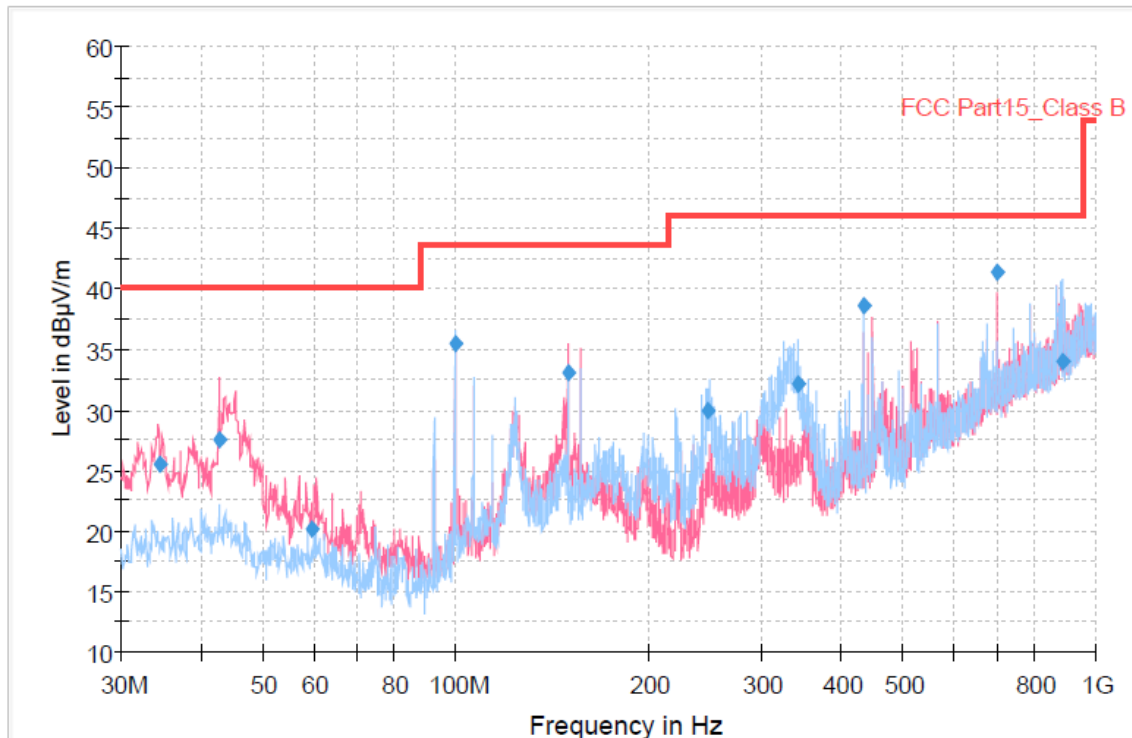
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
38.792500	28.9	1000.0	120.000	110.0	V	276.0	12.5	11.1	40.0
45.256250	35.2	1000.0	120.000	100.0	V	120.0	12.8	4.8	40.0
70.632500	22.4	1000.0	120.000	100.0	V	217.0	10.9	17.6	40.0
99.738750	35.6	1000.0	120.000	200.0	H	258.0	10.3	7.9	43.5
149.572500	34.5	1000.0	120.000	100.0	V	330.0	13.9	9.0	43.5
242.167500	32.0	1000.0	120.000	100.0	H	282.0	12.6	14.0	46.0
312.970000	29.6	1000.0	120.000	100.0	H	173.0	15.2	16.4	46.0
433.377500	38.5	1000.0	120.000	100.0	H	39.0	18.5	7.5	46.0
700.007500	41.1	1000.0	120.000	100.0	V	135.0	24.0	4.9	46.0

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



- ◆ Operating condition: Monitor with adapter #2, 1 920 × 1 080 / 60 Hz(RGB: Analog)



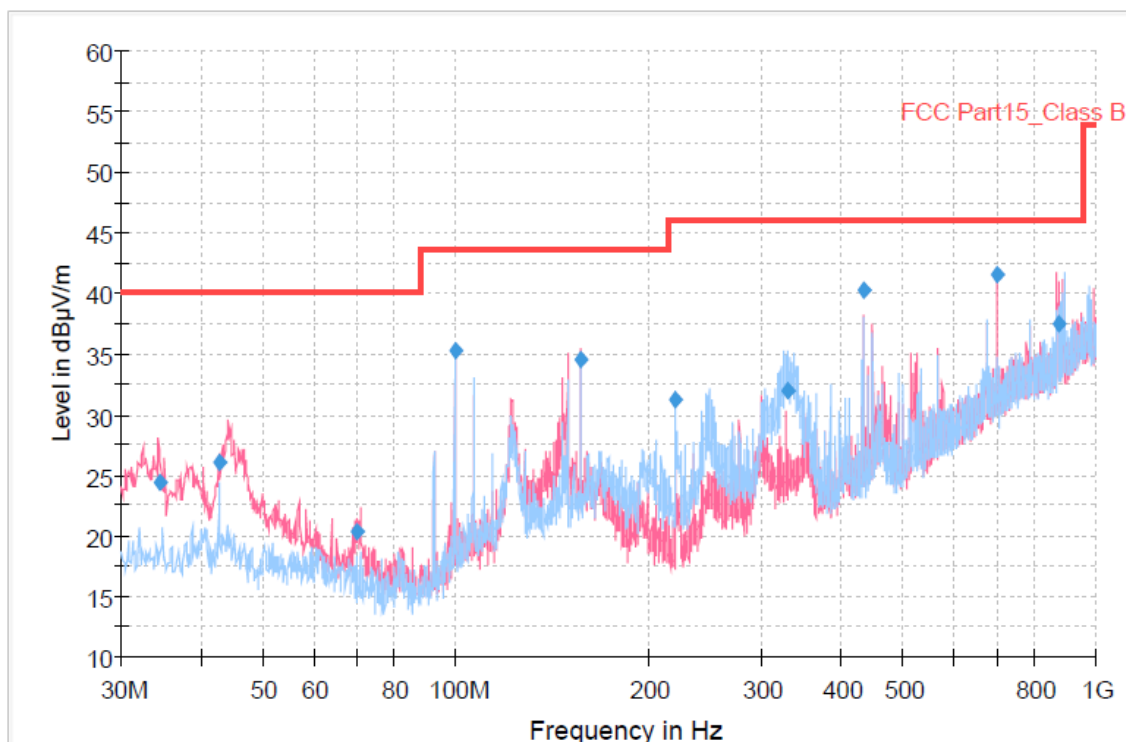
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
34.545000	25.6	1000.0	120.000	100.0	V	269.0	12.4	14.4	40.0
42.751250	27.5	1000.0	120.000	100.0	V	179.0	12.7	12.5	40.0
59.496250	20.2	1000.0	120.000	100.0	V	99.0	12.8	19.8	40.0
99.698750	35.5	1000.0	120.000	200.0	H	261.0	10.3	8.0	43.5
149.572500	33.0	1000.0	120.000	100.0	V	198.0	13.9	10.5	43.5
247.042500	29.9	1000.0	120.000	140.0	H	179.0	12.9	16.1	46.0
341.875000	32.1	1000.0	120.000	100.0	H	216.0	16.0	13.9	46.0
433.378750	38.6	1000.0	120.000	100.0	H	290.0	18.5	7.4	46.0
699.968750	41.3	1000.0	120.000	100.0	V	136.0	24.0	4.7	46.0
888.096250	34.0	1000.0	120.000	150.0	H	142.0	26.8	12.0	46.0

< Fig 14. Radiated emission result (30 MHz ~ 1 000 MHz) >



- ◆ Operating condition: Monitor with adapter #2, 1 920 × 1 080 / 60 Hz(HDMI/DVI: Digital)



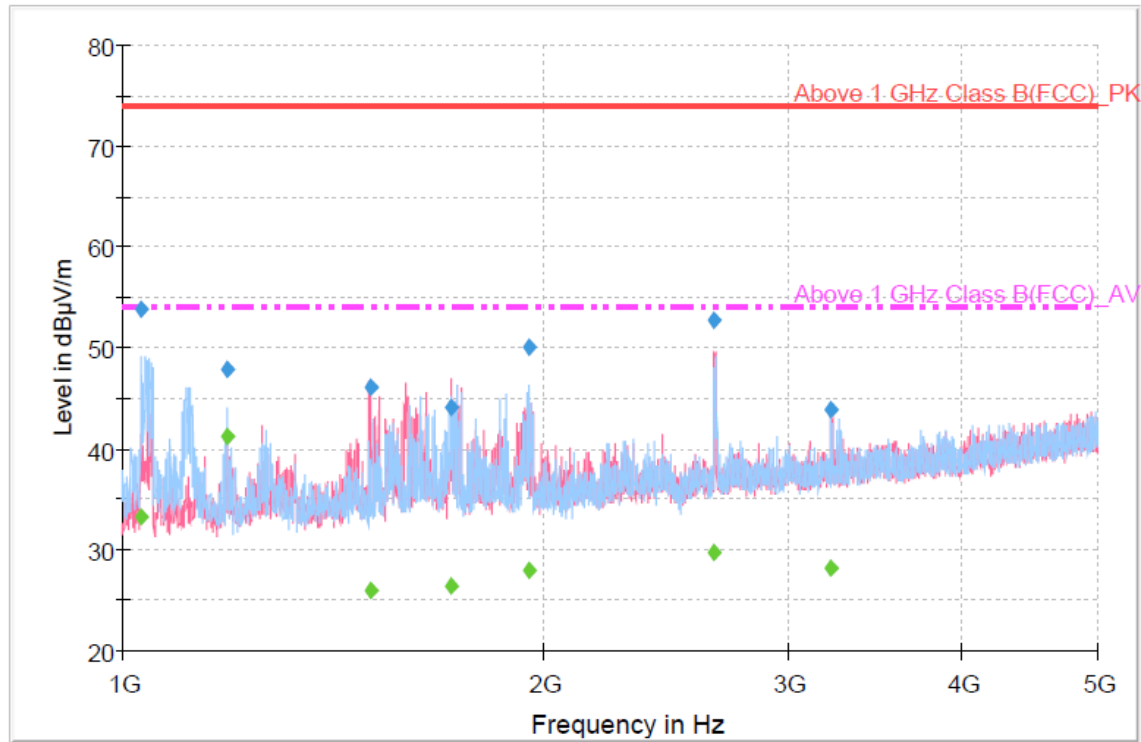
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
34.505000	24.4	1000.0	120.000	100.0	V	234.0	12.4	15.6	40.0
42.726250	26.1	1000.0	120.000	100.0	V	180.0	12.7	13.9	40.0
70.325000	20.2	1000.0	120.000	100.0	V	173.0	10.9	19.8	40.0
99.738750	35.4	1000.0	120.000	200.0	H	241.0	10.3	8.1	43.5
156.686250	34.5	1000.0	120.000	110.0	V	354.0	14.0	9.0	43.5
220.786250	31.3	1000.0	120.000	150.0	H	174.0	11.6	14.7	46.0
331.157500	32.0	1000.0	120.000	100.0	H	25.0	15.7	14.0	46.0
433.377500	40.2	1000.0	120.000	130.0	V	230.0	18.5	5.8	46.0
700.007500	41.6	1000.0	120.000	100.0	V	135.0	24.0	4.4	46.0
872.540000	37.6	1000.0	120.000	100.0	V	192.0	26.7	8.4	46.0

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



- ◆ Operating condition: Monitor with adapter #1, 1 920 × 1 080 / 60 Hz(RGB: Analog)
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)
1030.800000	53.8	1000.0	1000.000	110.0	H	187.0	-11.2	20.2	74.0
1188.100000	47.8	1000.0	1000.000	100.0	H	297.0	-10.1	26.2	74.0
1507.840000	46.2	1000.0	1000.000	100.0	V	180.0	-8.7	27.8	74.0
1720.220000	44.1	1000.0	1000.000	150.0	V	206.0	-8.0	29.9	74.0
1956.600000	50.1	1000.0	1000.000	113.0	H	156.0	-7.6	23.9	74.0
2657.040000	52.8	1000.0	1000.000	107.0	V	179.0	-5.0	21.2	74.0
3218.340000	43.9	1000.0	1000.000	120.0	V	201.0	-3.7	30.1	74.0

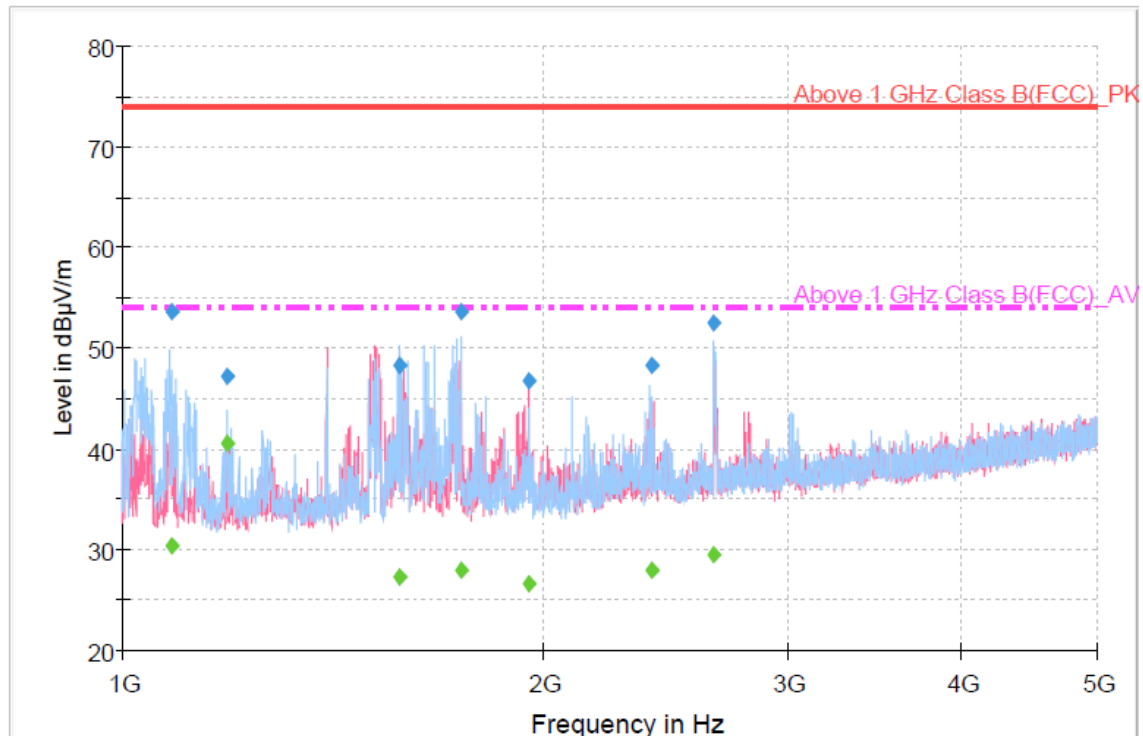
Final Result 2

Frequency (MHz)	CAverage (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1030.800000	33.2	1000.0	1000.000	110.0	H	187.0	-11.2	20.8	54.0
1188.100000	41.3	1000.0	1000.000	100.0	H	297.0	-10.1	12.7	54.0
1507.840000	26.0	1000.0	1000.000	100.0	V	180.0	-8.7	28.0	54.0
1720.220000	26.5	1000.0	1000.000	150.0	V	206.0	-8.0	27.5	54.0
1956.600000	28.1	1000.0	1000.000	113.0	H	156.0	-7.6	25.9	54.0
2657.040000	29.8	1000.0	1000.000	107.0	V	179.0	-5.0	24.2	54.0
3218.340000	28.2	1000.0	1000.000	120.0	V	201.0	-3.7	25.8	54.0

< Fig 16. Radiated emission result (1 000 MHz ~ 5 000 MHz) >



- ◆ Operating condition: Monitor with adapter #1, 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)
1083.540000	53.6	1000.0	1000.000	114.0	H	153.0	-10.9	20.4	74.0
1188.100000	47.3	1000.0	1000.000	100.0	H	297.0	-10.1	26.7	74.0
1579.740000	48.4	1000.0	1000.000	141.0	H	111.0	-8.3	25.6	74.0
1748.700000	53.6	1000.0	1000.000	110.0	H	153.0	-7.9	20.4	74.0
1958.620000	46.8	1000.0	1000.000	148.0	V	211.0	-7.6	27.2	74.0
2393.540000	48.4	1000.0	1000.000	150.0	H	146.0	-5.5	25.6	74.0
2657.240000	52.5	1000.0	1000.000	100.0	H	194.0	-5.0	21.5	74.0

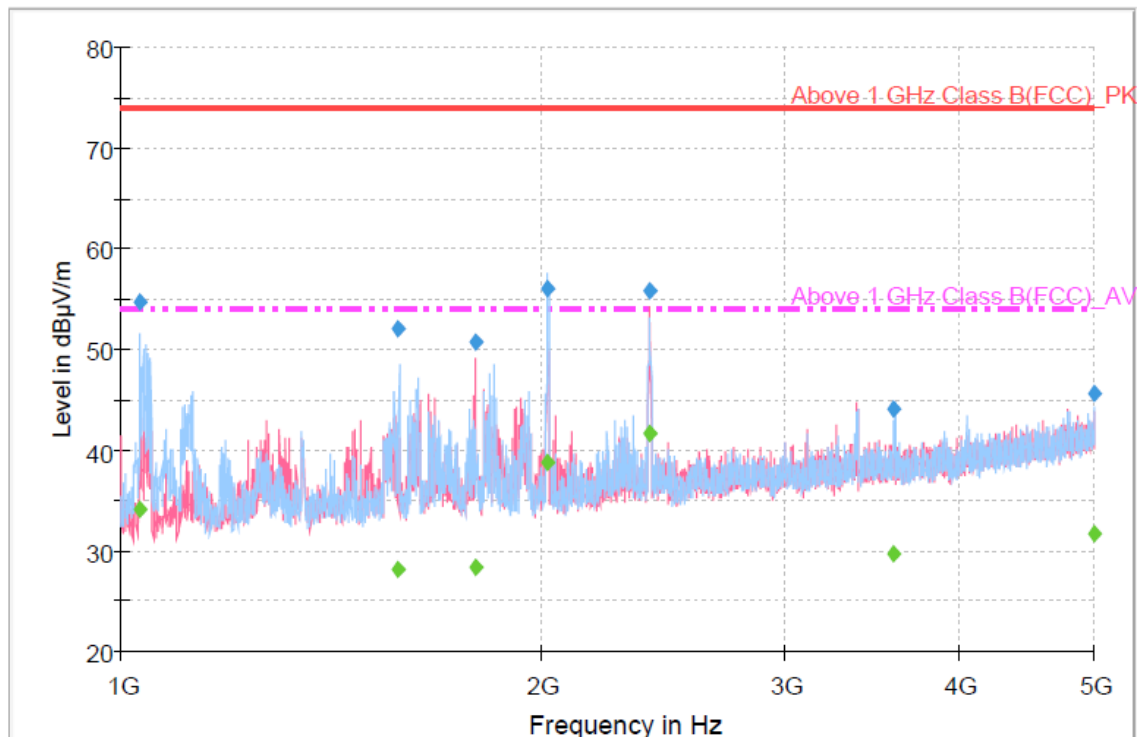
Final Result 2

Frequency (MHz)	CAverage (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1083.540000	30.5	1000.0	1000.000	114.0	H	153.0	-10.9	23.5	54.0
1188.100000	40.7	1000.0	1000.000	100.0	H	297.0	-10.1	13.3	54.0
1579.740000	27.4	1000.0	1000.000	141.0	H	111.0	-8.3	26.6	54.0
1748.700000	27.9	1000.0	1000.000	110.0	H	153.0	-7.9	26.1	54.0
1958.620000	26.7	1000.0	1000.000	148.0	V	211.0	-7.6	27.3	54.0
2393.540000	27.9	1000.0	1000.000	150.0	H	146.0	-5.5	26.1	54.0
2657.240000	29.6	1000.0	1000.000	100.0	H	194.0	-5.0	24.4	54.0

< Fig 17. Radiated emission result (1 000 MHz ~ 5 000 MHz) >



- ◆ Operating condition: Monitor with adapter #2, 1 920 × 1 080 / 60 Hz(RGB: Analog)
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)
1030.280000	54.8	1000.0	1000.000	120.0	H	187.0	-11.2	19.2	74.0
1579.320000	52.0	1000.0	1000.000	110.0	H	154.0	-8.3	22.0	74.0
1796.600000	50.8	1000.0	1000.000	150.0	V	215.0	-7.8	23.2	74.0
2021.620000	56.1	1000.0	1000.000	100.0	H	277.0	-7.5	17.9	74.0
2398.360000	55.8	1000.0	1000.000	130.0	V	279.0	-5.5	18.2	74.0
3590.780000	44.2	1000.0	1000.000	100.0	H	257.0	-2.9	29.8	74.0
4999.640000	45.6	1000.0	1000.000	150.0	H	302.0	1.0	28.4	74.0

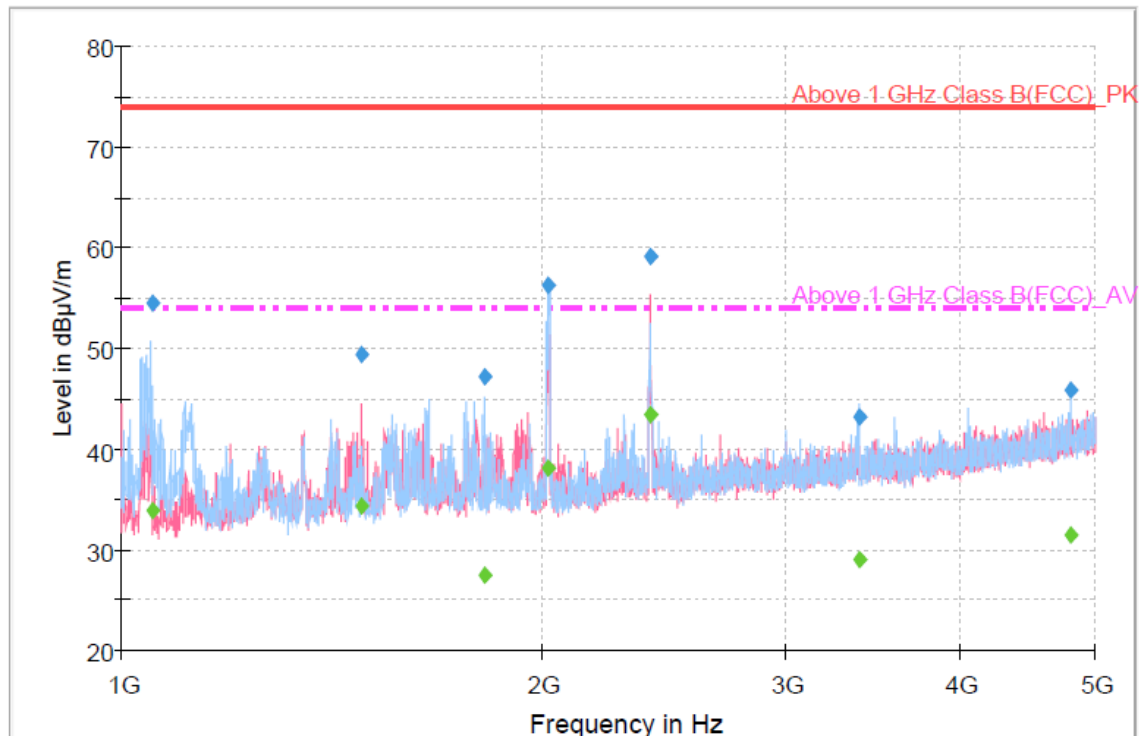
Final Result 2

Frequency (MHz)	CAverage (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1030.280000	34.2	1000.0	1000.000	120.0	H	187.0	-11.2	19.8	54.0
1579.320000	28.2	1000.0	1000.000	110.0	H	154.0	-8.3	25.8	54.0
1796.600000	28.5	1000.0	1000.000	150.0	V	215.0	-7.8	25.6	54.0
2021.620000	38.9	1000.0	1000.000	100.0	H	277.0	-7.5	15.1	54.0
2398.360000	41.8	1000.0	1000.000	130.0	V	279.0	-5.5	12.2	54.0
3590.780000	29.7	1000.0	1000.000	100.0	H	257.0	-2.9	24.3	54.0
4999.640000	31.6	1000.0	1000.000	150.0	H	302.0	1.0	22.4	54.0

< Fig 18. Radiated emission result (1 000 MHz ~ 5 000 MHz) >



- ◆ Operating condition: Monitor with adapter #2, 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)
1051.020000	54.5	1000.0	1000.000	110.0	H	189.0	-11.1	19.5	74.0
1485.080000	49.4	1000.0	1000.000	100.0	V	174.0	-8.8	24.6	74.0
1818.720000	47.3	1000.0	1000.000	100.0	H	155.0	-7.7	26.7	74.0
2021.060000	56.2	1000.0	1000.000	100.0	H	277.0	-7.5	17.8	74.0
2394.320000	59.2	1000.0	1000.000	110.0	V	215.0	-5.5	14.8	74.0
3382.720000	43.3	1000.0	1000.000	129.0	H	77.0	-3.3	30.7	74.0
4799.640000	45.8	1000.0	1000.000	130.0	H	299.0	0.4	28.2	74.0

Final Result 2

Frequency (MHz)	CAverage (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1051.020000	33.9	1000.0	1000.000	110.0	H	189.0	-11.1	20.1	54.0
1485.080000	34.4	1000.0	1000.000	100.0	V	174.0	-8.8	19.6	54.0
1818.720000	27.5	1000.0	1000.000	100.0	H	155.0	-7.7	26.5	54.0
2021.060000	38.1	1000.0	1000.000	100.0	H	277.0	-7.5	15.9	54.0
2394.320000	43.5	1000.0	1000.000	110.0	V	215.0	-5.5	10.5	54.0
3382.720000	29.0	1000.0	1000.000	129.0	H	77.0	-3.3	25.0	54.0
4799.640000	31.5	1000.0	1000.000	130.0	H	299.0	0.4	22.5	54.0

< Fig 19. 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: M2252D)** was complies with §15.107 and 15.109 of the FCC Rules.

- The end -