

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: October 4, 2012

Order Number: GETEC-C1-12-281

Test Report Number: GETEC-E3-12-091

Test Site: GUMI COLLEGE EMC CENTER

FCC Registration Number: (100749, 443957)

FCC ID. : BEJIPS237WY

Applicant : LG Electronics Inc.

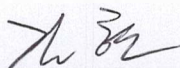
Rule Part(s)	: FCC Part 15 Subpart B
Equipment Class	: Class B computing device peripheral (JBP)
EUT Type	: LED LCD Monitor
Type of Authority	: Certification
Model Name	: IPS237WY
Trade Name	: LG

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

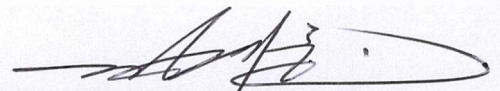
I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking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

Tested by,

Reviewed by,



Hyun Kim / Engineer
GUMI COLLEGE EMC CENTER



Jae-Hoon Jeong, Senior Engineer
GUMI COLLEGE EMC CENTER



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	17
6.1 OPERATING ENVIRONMENT	17
6.2 TEST SET-UP	17
6.3 MEASUREMENT UNCERTAINTY.....	17
6.4 LIMIT	18
6.5 TEST EQUIPMENT USED.....	18
6.6 TEST DATA FOR RADIATED EMISSION	18
7. SAMPLE CALCULATIONS.....	23
7.1 EXAMPLE 1 :	23
7.2 EXAMPLE 2 :	23
8. RECOMMENDATION & CONCLUSION.....	24
 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. Sung-Wook Yoon, Chief research engineer

Tel Number: +82-31-610-9623

- **FCC ID.** BEJIPS237WY
- **EUT Type** LED LCD Monitor
- **Model Name** IPS237WY
- **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** September 7 ~ 20, 2012
- **Place of Test** **GUMI COLLEGE EMC CENTER** (FCC Registration Number: 100749, 443957)
37, Yaeun-ro, Gumi-si, Gyeongsangbuk-do, 730-711, Republic of Korea
- **Test Report Number** GETEC-E3-12-096
- **Dates of Issue** October 4, 2012



2. Introduction

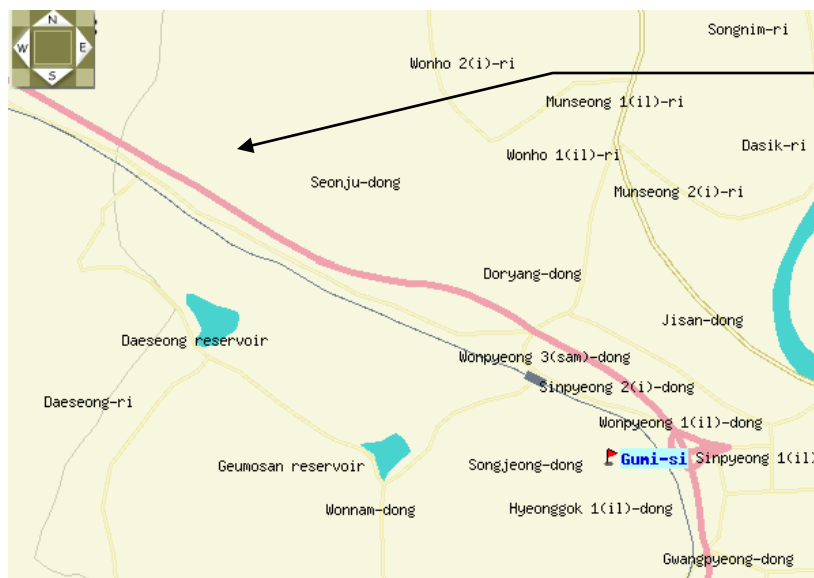
The measurement procedure described in American National Standard for Methods of Measurement of Radio-Nose Emissions From Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (ANSI C63.4-2009) was used in determining radiated and conducted emissions emanating from **LG Electronics Inc.**

LED LCD Monitor (Model Name: IPS237WY)

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

The site address is 37, Yaeun-ro, Gumi-si, Gyeongsangbuk-do, 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 (2009)



GUMI COLLEGE EMC CENTER
37, Yaeun-ro, Gumi-si,
Gyeongsangbuk-do, 730-711,
Republic of 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 Monitor (Model Name: IPS237WY) FCC ID.: BEJIPS237WY

Display	Screen Type	58.4 cm (23 inch) Flat Panel Active matrix-TFT LCD Anti-Glare coating Visible diagonal size: 58.4 cm
	Pixel Pitch	0.265 mm x 0.265 mm (Pixel Pitch)
Sync Input	Horizontal Frequency	30 kHz to 83 kHz (Automatic)
	Vertical Frequency	56Hz to 75Hz (D-SUB) 56Hz to 61Hz (HDMI)
	Input Form	Separate Sync. HDMI
Video Input	Signal Input	15 pin D-SUB Connector / HDMI Connector
	Input Form	RGB Analog (0.7 Vp-p/ 75 ohm), Digital
Resolution	Max	D-SUB (Analog) : 1920 x 1080 @ 60 Hz HDMI (Digital) : 1920 x 1080 @ 60 Hz
	Recommend	VESA 1920 x 1080 @ 60 Hz
Plug & Play	DDC 2B (Analog, HDMI)	
Power Consumption	On Mode : 40 W (Typ.) Sleep Mode ≤ 1 W (When the Wi-Fi option is off) Off Mode ≤ 0.5 W	
Power Input	19 V === 1.6 A	
AC-DC Adapter	Type PSAB-L101A, manufactured by LG Innotek	
	OUTPUT: 19 V === 2.53 A	
Dimensions (Width x Height x Depth)	With Stand	53.3 cm x 40.0 cm x 15.4 cm
	Without Stand	53.3 cm x 32.1 cm x 4.2 cm
Weight	3.7 kg	
Tilt Range	-5° to 20°	
Environmental conditions	Operating Temperature	10°C to 35 °C
	Operating Humidity	10 % to 80 %
	Storage Temperature	-20°C to 60 °C
	Storage Humidity	5 % to 90 % non-Condensing
Stand Base	Attached (), Detached (O)	
Power cord	Wall-outlet type	

-. Maximum Frequency Range : 533 MHz



3.2 Support Equipment / Cables used

3.2.1 Used Support Equipment

Description	Manufacturer	Model Name	S/N & FCC ID.
PC(Main board)	ASROCK	770iCafe	S/N: 0AM0X3097310 FCC ID.: DoC
Video card	Absolute Korea Co., Ltd.	HIS6770	S/N: H110838565 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
Headset	PHILIPS	SBC HL140	S/N: None. FCC ID.: N/A
USB memory stick	SAMSUNG	SUM-PSB4	S/N: TB BB202478F FCC ID.: DoC
Cell phone	LG Electronics Inc.	LG-LU6200	S/N: 201KPNY0587743 FCC ID.: N/A

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.
Wi-Fi module	LG Electronics Inc.	TWFM-B003D	S/N: None. FCC ID.: BEJTWFBM003D



3.2.3 Used Cable(s)

Cable Name	Condition	Description
Power cable	Connected to the adapter	1.00 m unshielded
Adapter cable	Connected to the EUT	1.20 m shielded with a ferrite core
RGB(Analog) in cable	Connected to the EUT and PC	1.50 m shielded
HDMI(Digital) in cable	Connected to the EUT and PC	2.00 m shielded
Upstream cable	Connected to the EUT and PC	1.80 m shielded with a ferrite core
Mobile high-definition link cable	Connected to the EUT and cell phone	1.80 m shielded with a ferrite core
Headset cable	Connected to the EUT and headset	1.20 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: Digital),

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

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

◆ 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



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

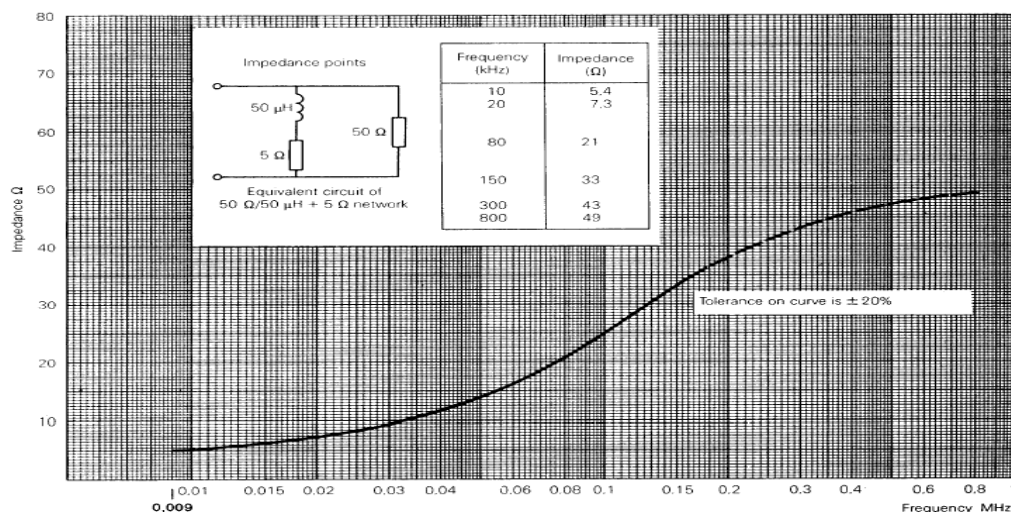


Fig 2. Impedance of LISN



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.

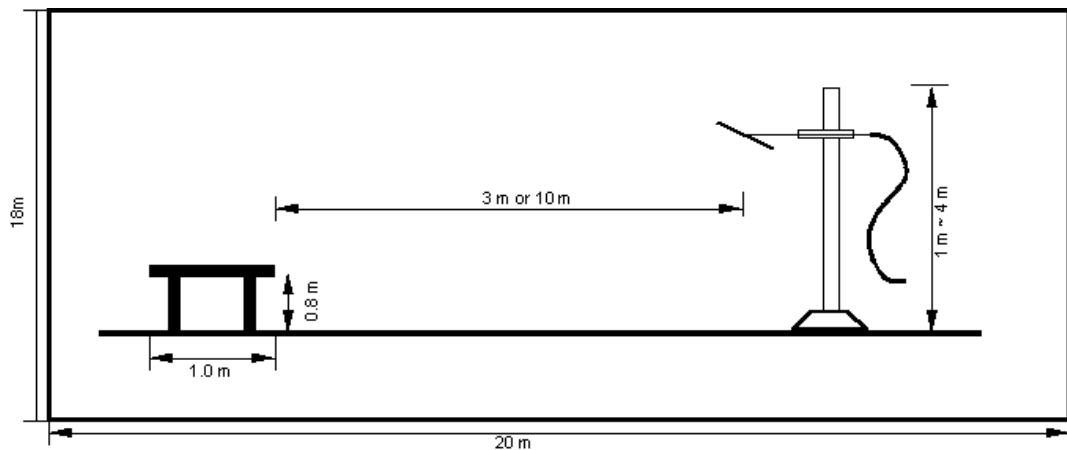


Fig 3. Dimensions of test site

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.

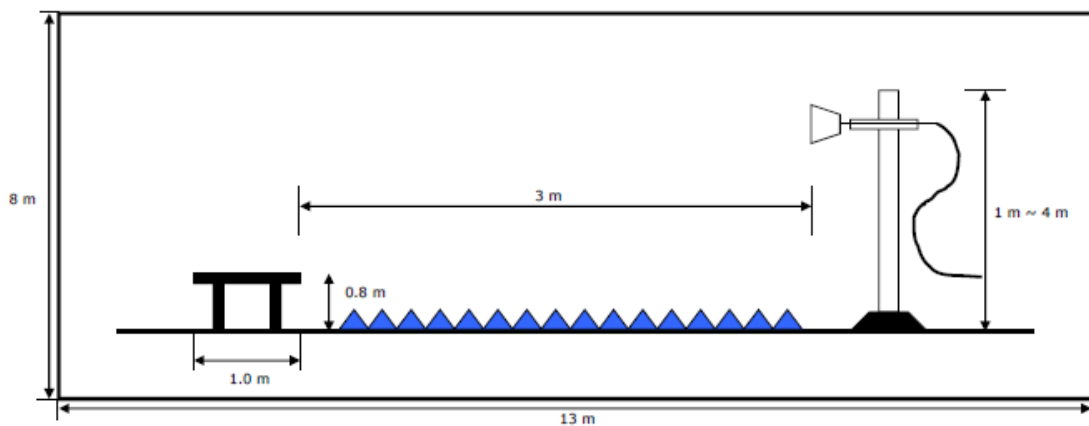


Fig 4. Dimensions of test site



5. Conducted Emission

5.1 Operating Environment

Temperature : 24.0 °C
Relative Humidity : 44.0 % 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

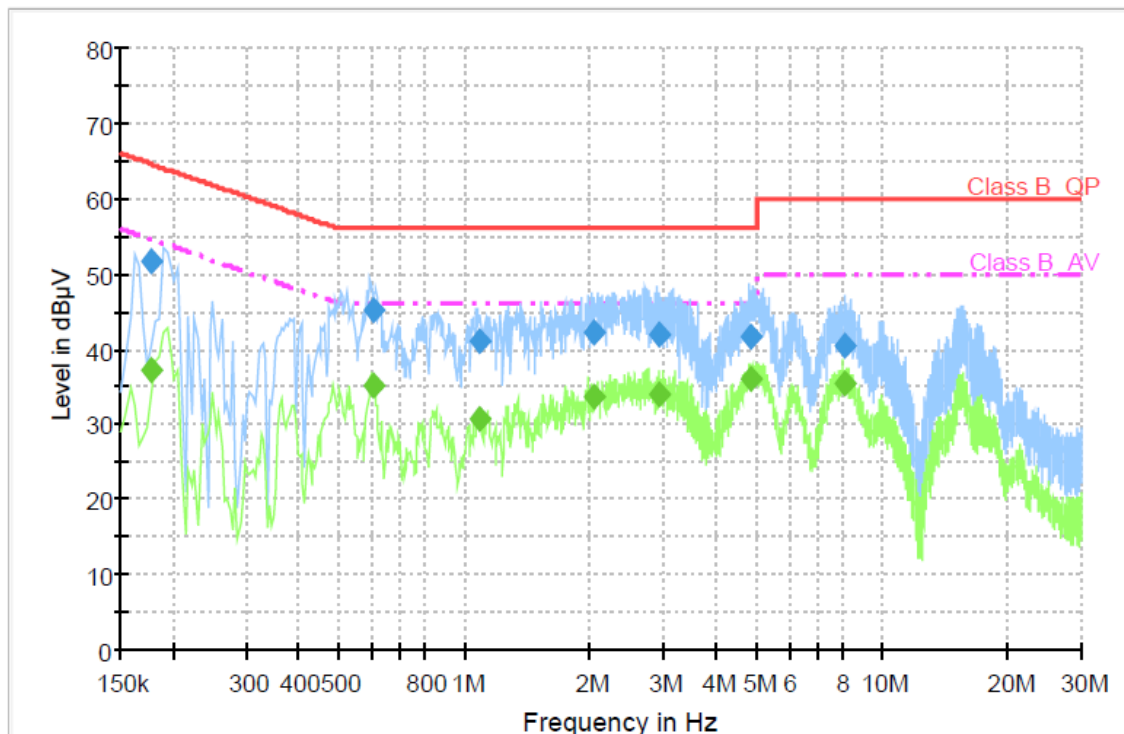
Model Name	Manufacturer	Description	Serial Number	Due to Calibration
■ - ESCS30	Rohde & Schwarz	EMI Test Receiver	839809/003	05. 22. 2013
■ - ESH3-Z5	Rohde & Schwarz	LISN	838979/020	05. 23. 2013
■ - ESH2-Z5	Rohde & Schwarz	LISN	829991/009	05. 23. 2013
□ - ISN T8	TESEQ.GmbH	ISN	24568	07. 04. 2013

5.6 Test data for Conducted Emission

- Test Date : September 7, 2012
- Resolution Bandwidth : 9 kHz
- Frequency Range : 0.15 MHz ~ 30 MHz
- Line : L1: Live, N: Neutral



◆ Operating condition: 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
0.178000	51.5	1000.0	9.000	GND	L1	10.1	13.1	64.6	
0.608000	45.1	1000.0	9.000	GND	N	10.1	10.9	56.0	
1.084000	41.0	1000.0	9.000	GND	N	10.2	15.0	56.0	
2.032000	42.2	1000.0	9.000	GND	N	10.2	13.8	56.0	
2.932000	41.8	1000.0	9.000	GND	N	10.2	14.2	56.0	
4.852000	41.8	1000.0	9.000	GND	L1	10.3	14.2	56.0	
8.160000	40.5	1000.0	9.000	GND	L1	10.3	19.5	60.0	

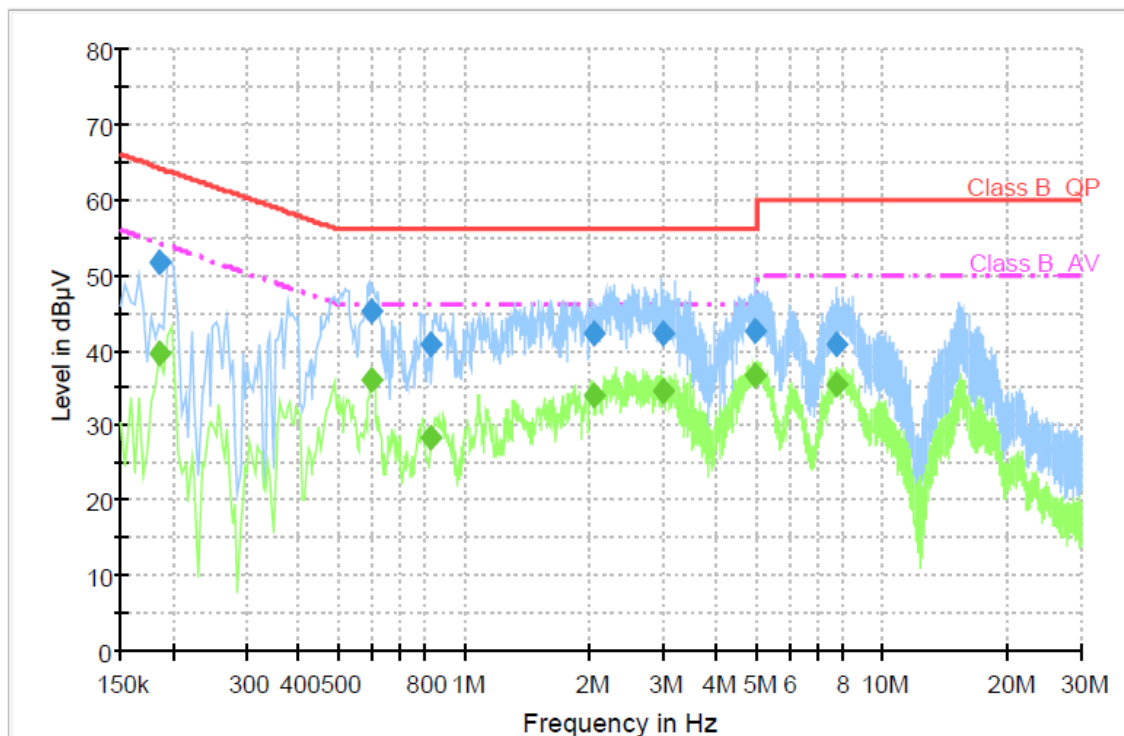
Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.178000	37.2	1000.0	9.000	GND	L1	10.1	17.4	54.6	
0.608000	35.1	1000.0	9.000	GND	N	10.1	10.9	46.0	
1.084000	30.7	1000.0	9.000	GND	N	10.2	15.3	46.0	
2.032000	33.7	1000.0	9.000	GND	N	10.2	12.3	46.0	
2.932000	34.0	1000.0	9.000	GND	N	10.2	12.0	46.0	
4.852000	36.0	1000.0	9.000	GND	L1	10.3	10.0	46.0	
8.160000	35.5	1000.0	9.000	GND	L1	10.3	14.5	50.0	

< Fig 6. Conducted emission result >



◆ Operating condition: 1 920 × 1 080 / 60 Hz (HDMI: Digital)



Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.186000	51.6	1000.0	9.000	GND	L1	10.1	12.6	64.2	
0.596000	45.2	1000.0	9.000	GND	N	10.1	10.8	56.0	
0.832000	40.6	1000.0	9.000	GND	N	10.1	15.4	56.0	
2.032000	42.1	1000.0	9.000	GND	N	10.2	13.9	56.0	
2.980000	42.1	1000.0	9.000	GND	N	10.2	13.9	56.0	
4.944000	42.5	1000.0	9.000	GND	N	10.3	13.5	56.0	
7.800000	40.6	1000.0	9.000	GND	N	10.3	19.4	60.0	

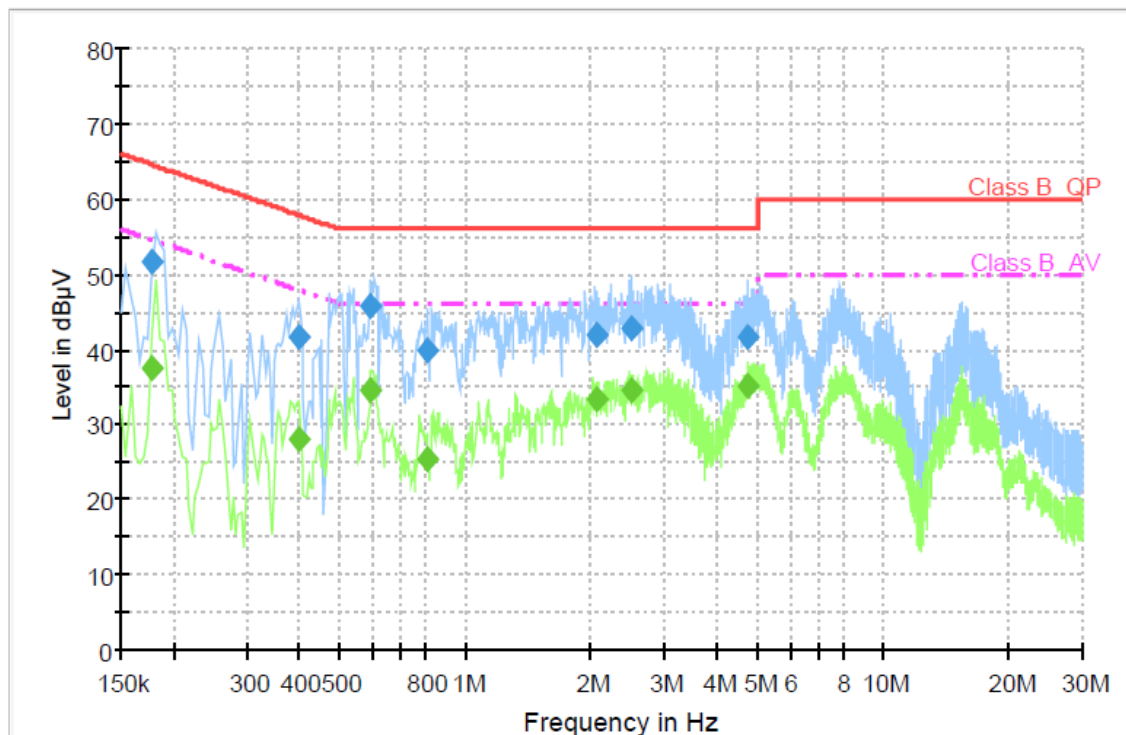
Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.186000	39.6	1000.0	9.000	GND	L1	10.1	14.6	54.2	
0.596000	36.0	1000.0	9.000	GND	N	10.1	10.0	46.0	
0.832000	28.2	1000.0	9.000	GND	N	10.1	17.8	46.0	
2.032000	33.8	1000.0	9.000	GND	N	10.2	12.2	46.0	
2.980000	34.4	1000.0	9.000	GND	N	10.2	11.6	46.0	
4.944000	36.7	1000.0	9.000	GND	N	10.3	9.3	46.0	
7.800000	35.3	1000.0	9.000	GND	N	10.3	14.7	50.0	

< Fig 7. Conducted emission result >



◆ Operating condition: 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
0.178000	51.6	1000.0	9.000	GND	L1	10.1	13.0	64.6	
0.400000	41.5	1000.0	9.000	GND	N	10.1	16.3	57.9	
0.592000	45.6	1000.0	9.000	GND	N	10.1	10.4	56.0	
0.812000	39.8	1000.0	9.000	GND	L1	10.1	16.2	56.0	
2.064000	42.0	1000.0	9.000	GND	N	10.2	14.0	56.0	
2.496000	42.7	1000.0	9.000	GND	N	10.2	13.3	56.0	
4.752000	41.7	1000.0	9.000	GND	L1	10.3	14.3	56.0	

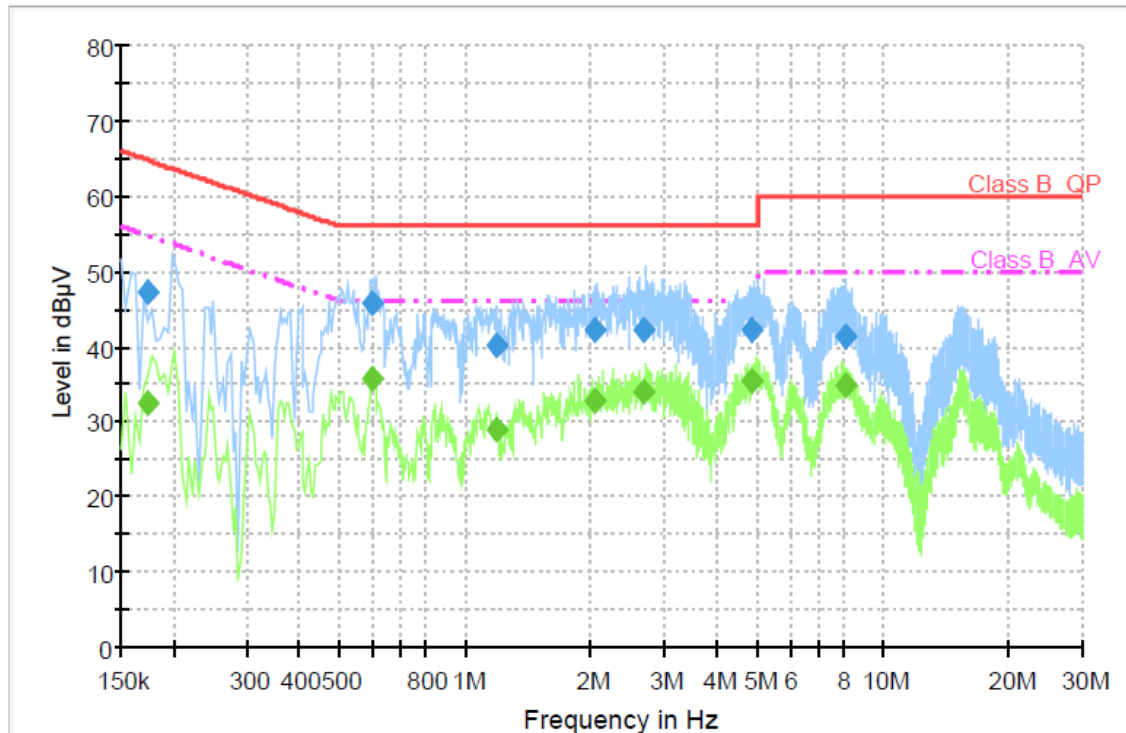
Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.178000	37.6	1000.0	9.000	GND	L1	10.1	17.0	54.6	
0.400000	28.2	1000.0	9.000	GND	N	10.1	19.7	47.9	
0.592000	34.4	1000.0	9.000	GND	N	10.1	11.6	46.0	
0.812000	25.3	1000.0	9.000	GND	L1	10.1	20.7	46.0	
2.064000	33.5	1000.0	9.000	GND	N	10.2	12.5	46.0	
2.496000	34.6	1000.0	9.000	GND	N	10.2	11.4	46.0	
4.752000	35.2	1000.0	9.000	GND	L1	10.3	10.8	46.0	

< Fig 8. Conducted emission result >



◆ Operating condition: 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	47.3	1000.0	9.000	GND	L1	10.1	17.5	64.8	
0.596000	45.7	1000.0	9.000	GND	L1	10.1	10.3	56.0	
1.184000	40.3	1000.0	9.000	GND	L1	10.2	15.7	56.0	
2.032000	42.3	1000.0	9.000	GND	N	10.2	13.7	56.0	
2.684000	42.3	1000.0	9.000	GND	L1	10.2	13.7	56.0	
4.872000	42.1	1000.0	9.000	GND	L1	10.3	13.9	56.0	
8.108000	41.3	1000.0	9.000	GND	L1	10.3	18.7	60.0	

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.174000	32.5	1000.0	9.000	GND	L1	10.1	22.2	54.8	
0.596000	35.7	1000.0	9.000	GND	L1	10.1	10.3	46.0	
1.184000	29.0	1000.0	9.000	GND	L1	10.2	17.0	46.0	
2.032000	32.6	1000.0	9.000	GND	N	10.2	13.4	46.0	
2.684000	34.0	1000.0	9.000	GND	L1	10.2	12.0	46.0	
4.872000	35.5	1000.0	9.000	GND	L1	10.3	10.5	46.0	
8.108000	34.8	1000.0	9.000	GND	L1	10.3	15.2	50.0	

< Fig 8. Conducted emission result >



6. Radiated Emission

6.1 Operating Environment

Temperature : 24.0 °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)	± 4.35 dB	Confidence level of approximately 95 % ($k = 2$)
Radiated emission (30 MHz ~ 300 MHz, 3 m, Horizontal)	± 4.29 dB	Confidence level of approximately 95 % ($k = 2$)
Radiated emission (300 MHz ~ 1 000 MHz, 3 m, Vertical)	± 4.43 dB	Confidence level of approximately 95 % ($k = 2$)
Radiated emission (300 MHz ~ 1 000 MHz, 3 m, Horizontal)	± 4.21 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	05. 23. 2013
■ - VULB9160	Schwarzbeck	Broadband Test Antenna	3193	03. 14. 2014
■ - 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

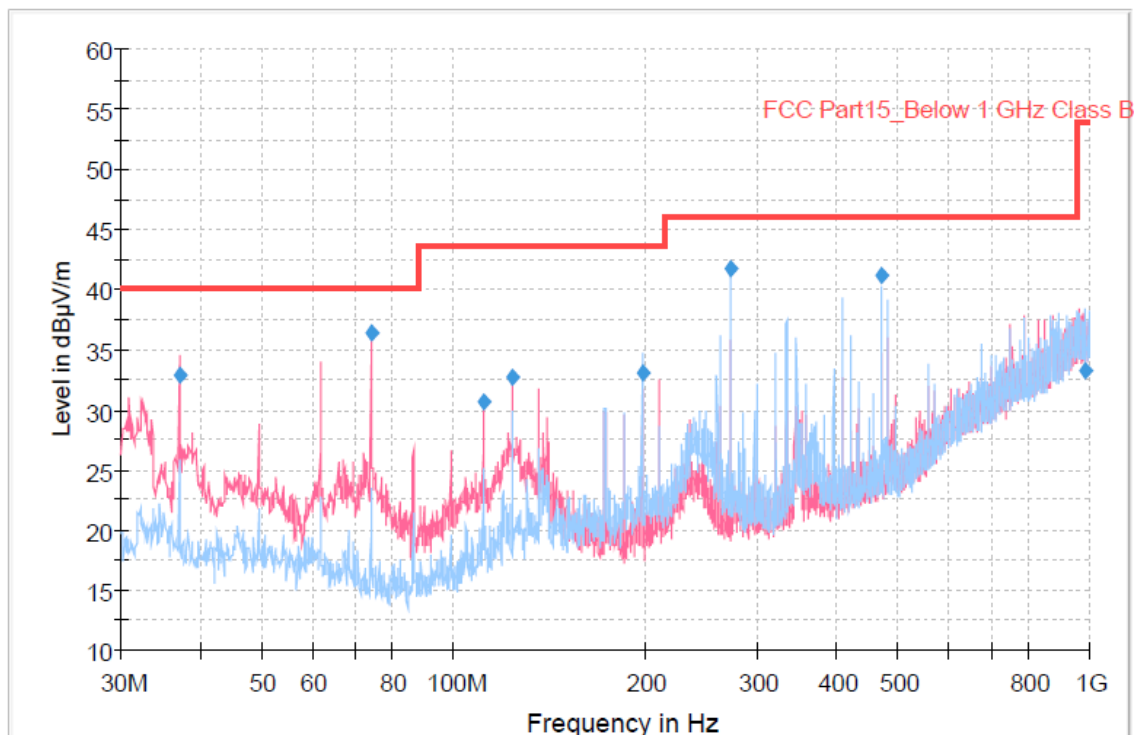
- . Test Date : September 10 ~ 20, 2012
-. Measurement Distance : 3 m
-. Note : The highest frequency of the internal source of the EUT is between 500 MHz and 1 000 MHz (533 MHz). The measurement was made up to 5 000 MHz

-. Measurement

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



◆ Operating condition: 1 920 × 1 080 / 60 Hz (RGB: Analog)



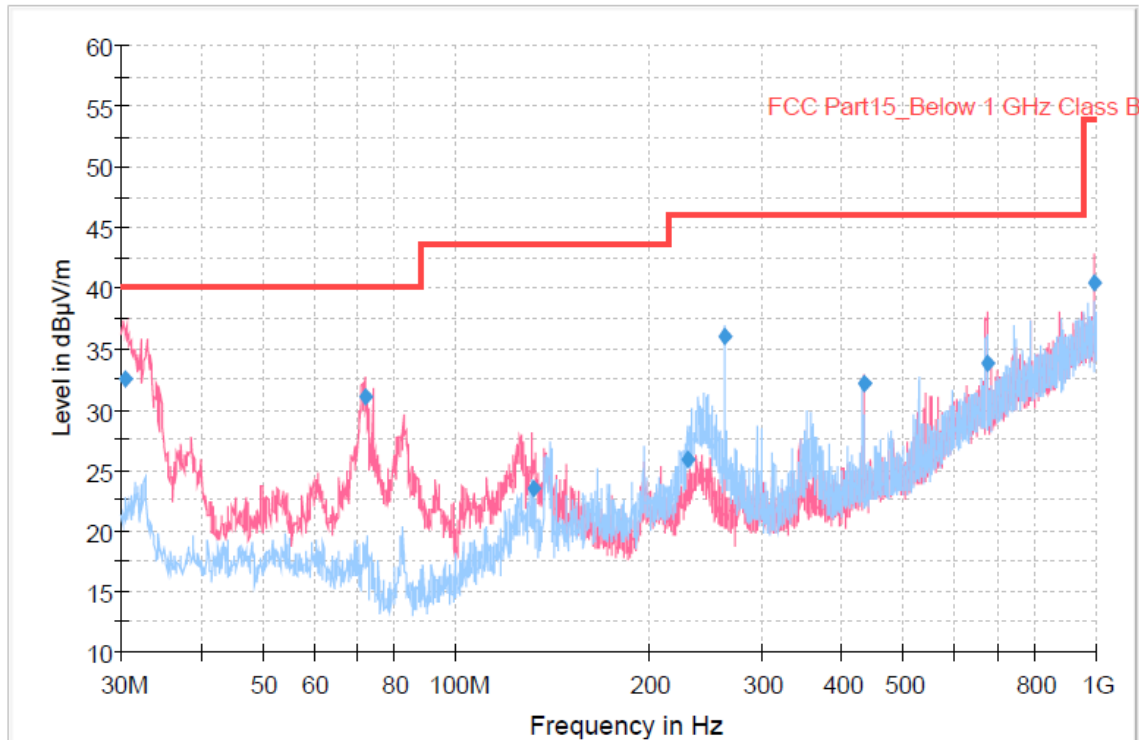
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
37.132500	32.8	1000.0	120.000	100.0	V	252.0	12.4	7.2	40.0
74.276250	36.3	1000.0	120.000	100.0	V	223.0	10.1	3.7	40.0
111.418750	30.6	1000.0	120.000	100.0	V	-25.0	11.5	12.9	43.5
123.786250	32.7	1000.0	120.000	100.0	V	357.0	12.7	10.8	43.5
198.032500	33.1	1000.0	120.000	150.0	H	202.0	10.8	10.4	43.5
272.317500	41.8	1000.0	120.000	139.0	H	50.0	13.9	5.2	47.0
470.360000	41.1	1000.0	120.000	100.0	H	171.0	19.3	5.9	47.0
987.287500	33.2	1000.0	120.000	150.0	H	86.0	28.5	13.8	47.0

< Fig 10. Radiated emission result (30 MHz ~ 1 000 MHz) >



◆ Operating condition: 1 920 × 1 080 / 60 Hz (HDMI: Digital)



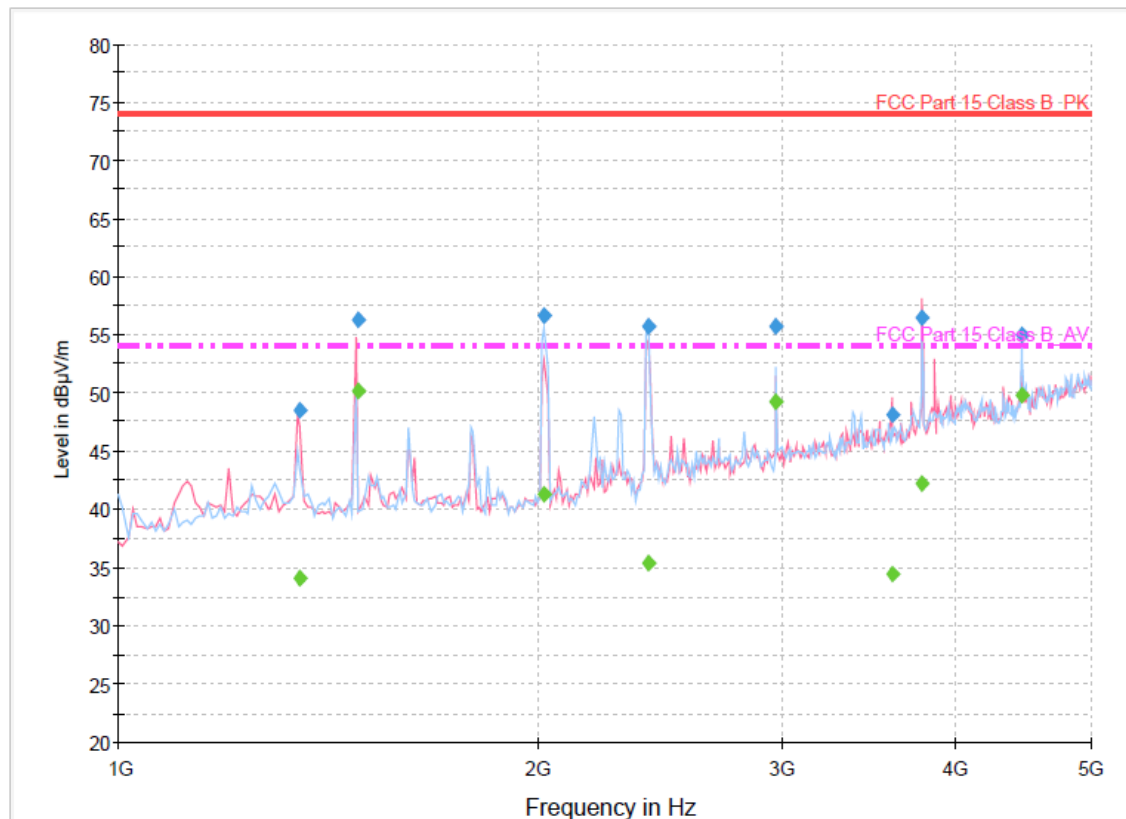
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
30.360000	32.6	1000.0	120.000	100.0	V	-25.0	12.4	7.4	40.0
72.132500	31.0	1000.0	120.000	100.0	V	11.0	10.5	9.0	40.0
132.422500	23.4	1000.0	120.000	100.0	V	299.0	13.3	20.1	43.5
230.835000	25.9	1000.0	120.000	100.0	H	198.0	12.1	21.1	47.0
262.537500	36.1	1000.0	120.000	100.0	H	274.0	13.5	10.9	47.0
433.377500	32.1	1000.0	120.000	130.0	V	242.0	18.5	14.9	47.0
674.466250	33.9	1000.0	120.000	200.0	V	204.0	23.7	13.1	47.0
990.563750	40.4	1000.0	120.000	200.0	V	269.0	28.5	6.6	47.0

< Fig 11. Radiated emission result (30 MHz ~ 1 000 MHz) >



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



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)
1350.489379	48.5	1000.0	1000.000	100.0	V	222.0	-12.9	25.5	74.0
1485.161924	56.3	1000.0	1000.000	100.0	V	191.0	-12.6	17.7	74.0
2023.852104	56.7	1000.0	1000.000	135.0	H	37.0	-11.1	17.3	74.0
2400.589579	55.8	1000.0	1000.000	100.0	H	317.0	-9.1	18.2	74.0
2970.143888	55.8	1000.0	1000.000	115.0	H	206.0	-6.5	18.2	74.0
3595.794389	48.2	1000.0	1000.000	100.0	V	257.0	-4.2	25.8	74.0
3780.163126	56.6	1000.0	1000.000	145.0	V	188.0	-3.4	17.4	74.0
4455.109820	55.1	1000.0	1000.000	100.0	H	184.0	-1.6	18.9	74.0

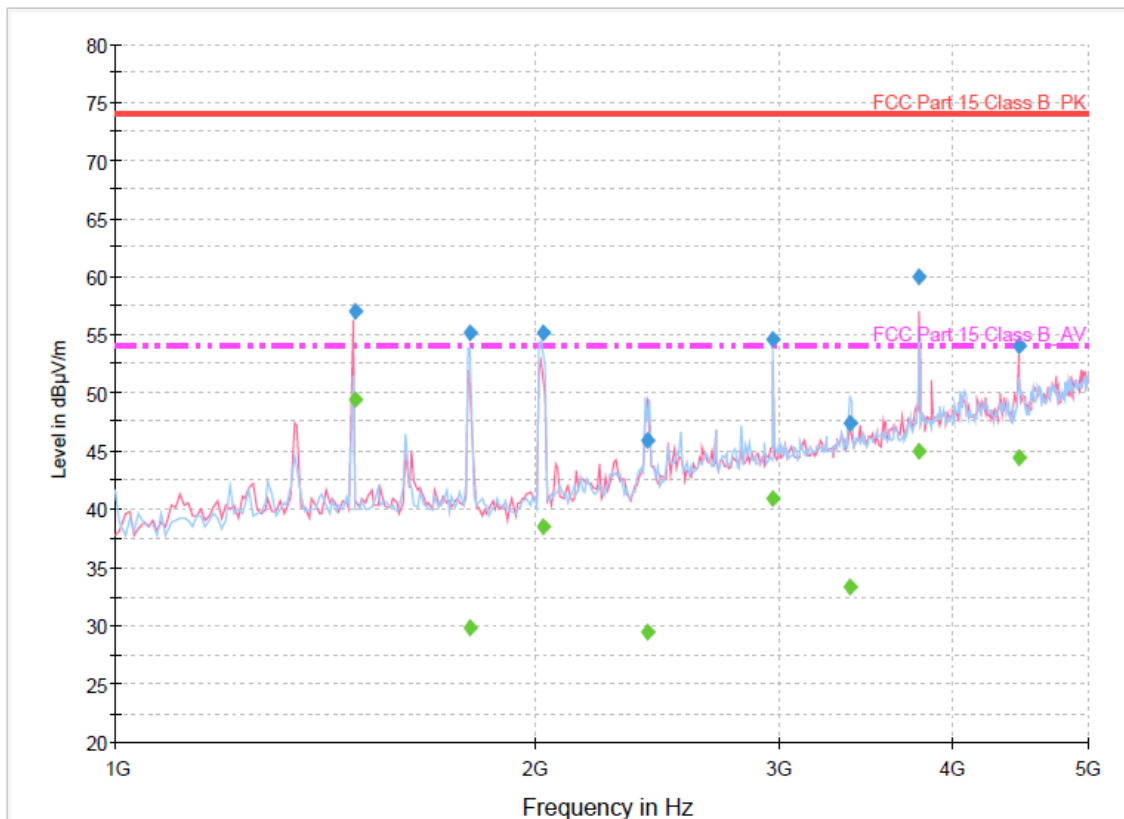
Final Result 2

Frequency (MHz)	CAverage (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1350.489379	34.1	1000.0	1000.000	100.0	V	222.0	-12.9	19.9	54.0
1485.161924	50.2	1000.0	1000.000	100.0	V	191.0	-12.6	3.8	54.0
2023.852104	41.3	1000.0	1000.000	135.0	H	37.0	-11.1	12.7	54.0
2400.589579	35.3	1000.0	1000.000	100.0	H	317.0	-9.1	18.7	54.0
2970.143888	49.3	1000.0	1000.000	115.0	H	206.0	-6.5	4.7	54.0
3595.794389	34.4	1000.0	1000.000	100.0	V	257.0	-4.2	19.6	54.0
3780.163126	42.2	1000.0	1000.000	145.0	V	188.0	-3.4	11.8	54.0
4455.109820	49.8	1000.0	1000.000	100.0	H	184.0	-1.6	4.2	54.0

< Fig 13. Radiated emission result (1 000 MHz ~ 5 000 MHz) >



- ◆ Operating condition: 1 920 × 1 080 / 60 Hz (HDMI: 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)
1485.161924	57.0	1000.0	1000.000	100.0	V	185.0	-12.6	17.0	74.0
1798.203206	55.2	1000.0	1000.000	215.0	H	334.0	-11.6	18.8	74.0
2026.636072	55.1	1000.0	1000.000	100.0	H	300.0	-11.1	18.9	74.0
2409.405611	46.0	1000.0	1000.000	166.0	H	63.0	-9.0	28.0	74.0
2970.143888	54.6	1000.0	1000.000	100.0	H	114.0	-6.5	19.4	74.0
3375.345491	47.4	1000.0	1000.000	100.0	H	200.0	-5.1	26.6	74.0
3780.163126	60.0	1000.0	1000.000	166.0	V	165.0	-3.4	14.0	74.0
4455.109820	54.1	1000.0	1000.000	150.0	V	200.0	-1.6	19.9	74.0

Final Result 2

Frequency (MHz)	CAverage (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1485.161924	49.5	1000.0	1000.000	100.0	V	185.0	-12.6	4.5	54.0
1798.203206	29.8	1000.0	1000.000	215.0	H	334.0	-11.6	24.2	54.0
2026.636072	38.5	1000.0	1000.000	100.0	H	300.0	-11.1	15.5	54.0
2409.405611	29.5	1000.0	1000.000	166.0	H	63.0	-9.0	24.5	54.0
2970.143888	41.0	1000.0	1000.000	100.0	H	114.0	-6.5	13.0	54.0
3375.345491	33.4	1000.0	1000.000	100.0	H	200.0	-5.1	20.6	54.0
3780.163126	45.1	1000.0	1000.000	166.0	V	165.0	-3.4	8.9	54.0
4455.109820	44.5	1000.0	1000.000	150.0	V	200.0	-1.6	9.5	54.0

< Fig 14. 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 Monitor (Model Name: IPS237WY)** was complies with §15.107 and 15.109 of the FCC Rules.

- The end -