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: June 11, 2012

Order Number: GETEC-C1-12-160

Test Report Number: GETEC-E3-12-056

Test Site: GUMI COLLEGE EMC CENTER

FCC Registration Number: (100749, 443957)

FCC ID. : BEJ47VX30AF

Applicant : LG Electronics Inc.

Rule Part(s)	**: FCC Part 15 Subpart B**
Equipment Class	**: Class B computing device peripheral (JBP)**
EUT Type	**: MONITOR SIGNAGE**
Type of Authority	**: Certification**
Model Name	**: 47VX30AF**
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 vest 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,

Hyun Kim / Engineer
GUMI COLLEGE EMC CENTER

Reviewed by,

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

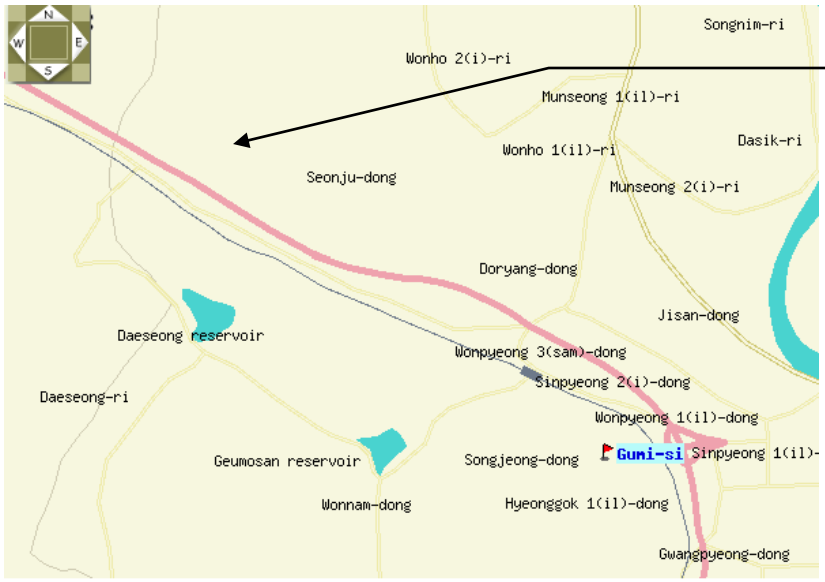
Applicant: LG Electronics Inc.
Applicant Address: 19-1, Cheongho-ri, Jinwi-myeon, Pyeongteak-si, Gyeonggi-do, Korea.
Manufacturer: LG Electronics Inc.
Manufacturer Address: 19-1, Cheongho-ri, Jinwi-myeon, Pyeongteak-si, Gyeonggi-do, Korea.
Contact Person: Mr. Sung-Wook Yoon, Chief research engineer
Tel Number: +82-31-610-9623

- **FCC ID.** BEJ47VX30AF
- **EUT Type** MONITOR SIGNAGE
- **Model Name** 47VX30AF
- **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 29 ~ June 5, 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-E3-12-056
- **Dates of Issue** June 11, 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.**
MONITOR SIGNAGE (Model Name: 47VX30AF)

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 (2009)



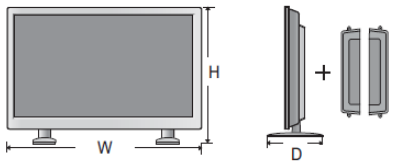
GUMI COLLEGE EMC CENTER
407, Bugok-Dong, Gumi-City,
Gyungbok, 730-711, Republic of Korea
Tel: +82-54-440-1195
Fax: +82-54-440-1199

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.**
MONITOR SIGNAGE (Model Name: 47VX30AF) FCC ID.: BEJ47VX30AF

LCD Panel	Screen Type	1192.87 mm Wide (47 inch) TFT (Thin Film Transistor) LCD (Liquid Crystal Display) Panel. Visible diagonal size : 1192.87 mm
	Pixel Pitch	0.5415 mm (H) x 0.5415 mm (V)
Video Signal	Max. Resolution	RGB : 1920 x 1080 @ 60 Hz HDMI/DVI/DP : 1920 x 1080 @ 60 Hz - It may not be supported depending on the OS or video card type.
	Recommended Resolution	RGB : 1920 x 1080 @ 60 Hz HDMI/DVI/DP : 1920 x 1080 @ 60 Hz - It may not be supported depending on the OS or video card type.
	Horizontal Frequency	RGB : 30 kHz to 83 kHz HDMI/DVI/DP : 30 kHz to 83 kHz
	Vertical Frequency	RGB : 56 Hz to 75 Hz HDMI/DVI/DP : 56 Hz to 60 Hz
	Synchronization Type	Separate Sync, Composite Sync, Digital
Input Connector		15-pin D-Sub type, HDMI (digital), RS-232C, LAN, DVI, Display port, USB
Power	Rated Voltage	AC 100-240 V~ 50/60 Hz 3.0 A
	Power Consumption	On Mode : 180 W Typ. Sleep Mode : ≤ 1 W Off Mode : ≤ 0.5 W
Environmental conditions	Operating Temperature Operating Humidity	0 °C to 40 °C 10 % to 80 %
	Storage Temperature Storage Humidity	-20 °C to 60 °C 5 % to 95 %
Dimensions (Width x Height x Depth) / Weight		
	1079.5 mm x 697.5 mm x 298.3 mm / 24.6 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)	ASROCK	770iCafe	S/N: 0AM0X3097310 FCC ID.: DoC
Video card	Rextechnology Co., Ltd.	HD4850	S/N: L5H041947 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
LCD monitor	Dell computer corporation	1800FP	S/N: KR-07R477-48324-33J-03WH FCC ID.: Verification
USB memory stick	SAMSUNG	SUM-LSM2	S/N: None. FCC ID.: DoC
Speaker	LG Electronics Inc.	SP-0000K	S/N: None. 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.
IR remote controller	LG Electronics Inc.	AKB72915219	S/N: None. FCC ID.: N/A

3.2.3 Used Cable(s)

Cable Name	**Condition**	**Description**
Power cable	Connected to the EUT	1.80 m unshielded
RGB(Analog) in cable	Connected to the EUT and PC	1.80 m shielded
RGB(Analog) out cable	Connected to the EUT and LCD monitor	1.80 m shielded with two ferrite cores
DVI(Digital) in cable	Connected to the EUT and PC	1.80 m shielded with two ferrite cores
DVI(Digital) out cable	Connected to the EUT and LCD monitor	1.80 m shielded with two ferrite cores
HDMI(Digital) in cable	Connected to the EUT and PC	2.00 m shielded
DP(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
RS-232C cable	Connected to the EUT(in port) and EUT(out port)	1.80 m shielded
Speaker out cable	Connected to the EUT and speaker	1.00 m shielded
LAN cable	Connected to the EUT and Network	10.00 m unshielded

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, DVI: Digital, HDMI: Digital, DP: Digital)
Conducted emission: 1 920 × 1 080 / 60 Hz (RGB: Analog, DVI: Digital, HDMI: Digital, DP: 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
-. Connected to internet via LAN interface
-. 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

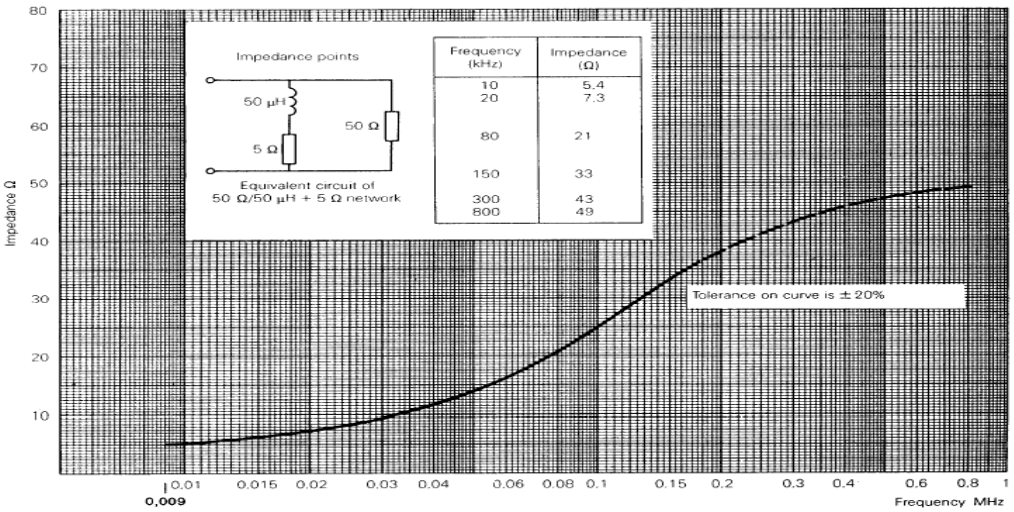


Fig 2. Impedance of LISN

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.

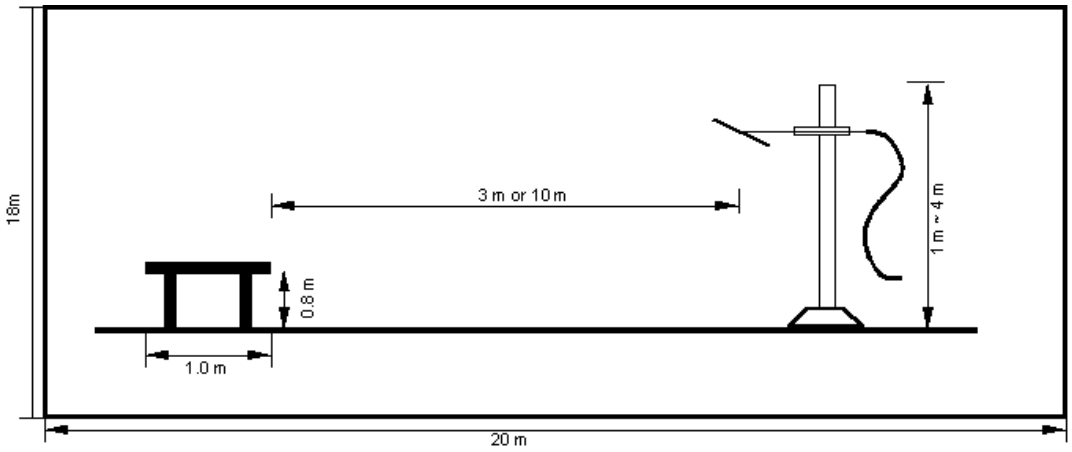


Fig 3. Dimensions of test site

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.

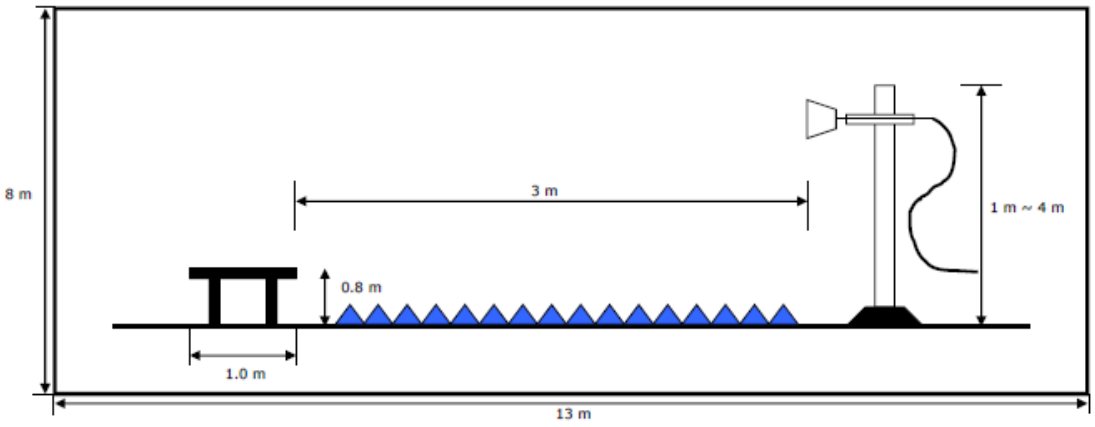


Fig 4. Dimensions of test site

5. Conducted Emission

5.1 Operating Environment

Temperature : 25.0 ℃
Relative Humidity : 41.0 % 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 μV/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.		

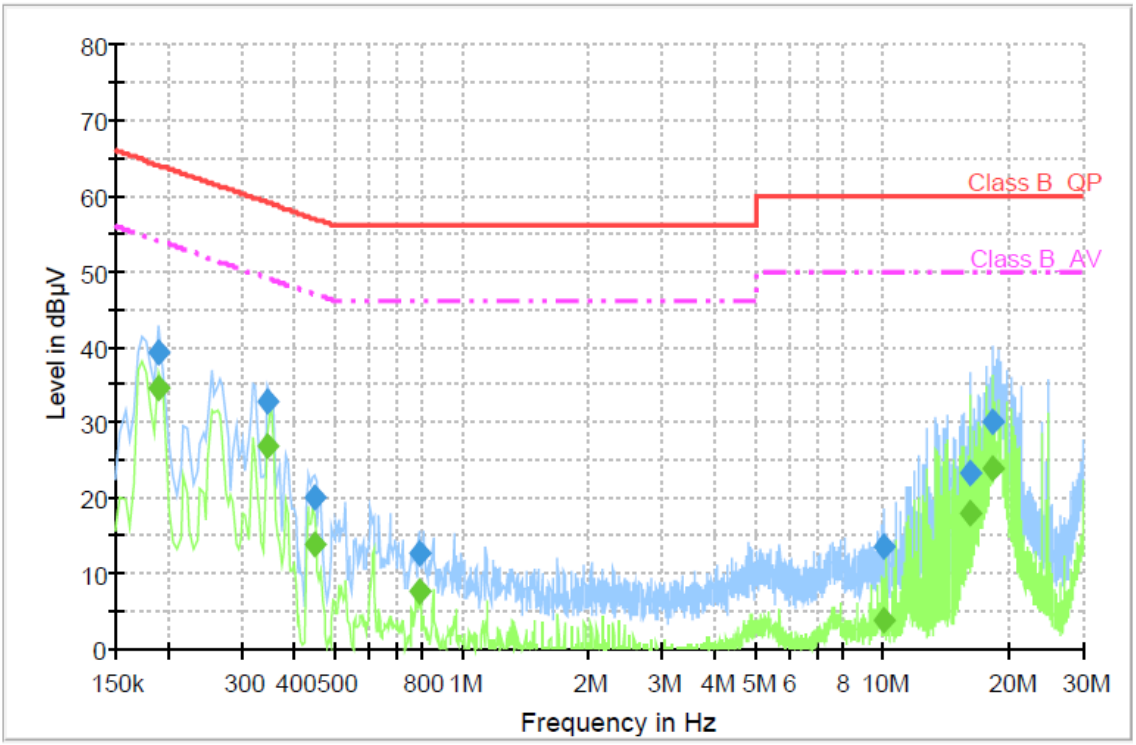
5.5 Test Equipment used

	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
■ -	ENY81-CA6	Rohde & Schwarz	ISN	101573	10. 19. 2012

5.6 Test data for Conducted Emission

-. Test Date : May 29, 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

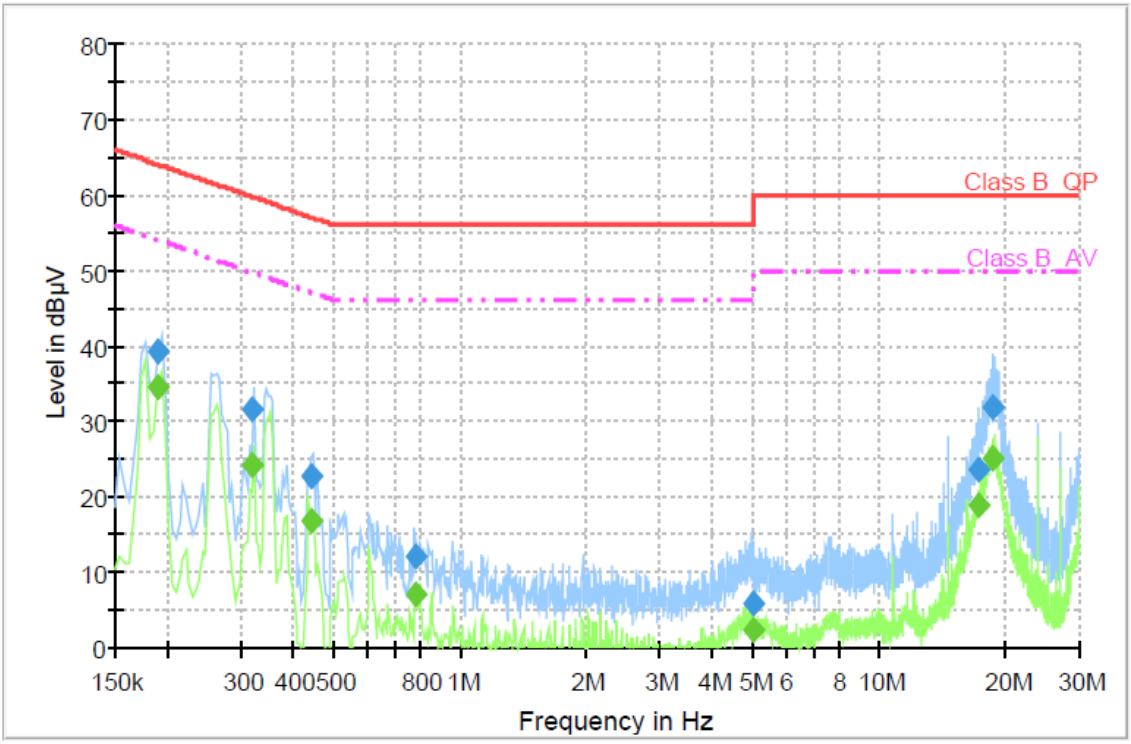
Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.190000	39.2	1000.0	9.000	GND	L1	10.1	24.9	64.0	
0.344000	32.8	1000.0	9.000	GND	N	10.1	26.3	59.1	
0.448000	20.2	1000.0	9.000	GND	L1	10.1	36.7	56.9	
0.792000	12.6	1000.0	9.000	GND	L1	10.1	43.4	56.0	
10.088000	13.7	1000.0	9.000	GND	N	10.3	46.3	60.0	
16.228000	23.3	1000.0	9.000	GND	L1	10.3	36.7	60.0	
18.292000	30.1	1000.0	9.000	GND	L1	10.3	29.9	60.0	

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.190000	34.6	1000.0	9.000	GND	L1	10.1	19.4	54.0	
0.344000	27.0	1000.0	9.000	GND	N	10.1	22.1	49.1	
0.448000	14.0	1000.0	9.000	GND	L1	10.1	32.9	46.9	
0.792000	7.8	1000.0	9.000	GND	L1	10.1	38.2	46.0	
10.088000	3.9	1000.0	9.000	GND	N	10.3	46.1	50.0	
16.228000	17.9	1000.0	9.000	GND	L1	10.3	32.1	50.0	
18.292000	23.8	1000.0	9.000	GND	L1	10.3	26.2	50.0	

< Fig 5. Conducted emission result >

♦ Operating condition: 1 024 × 768 / 60 Hz (RGB: Analog)



Final Result 1

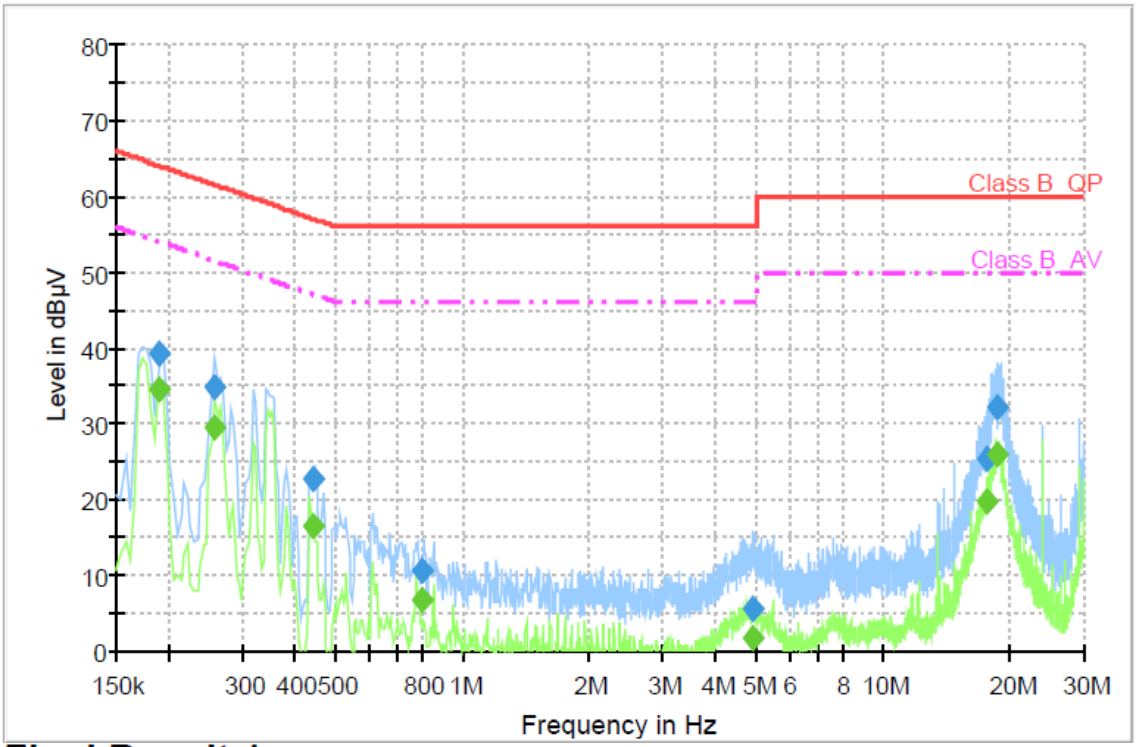
Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.190000	39.4	1000.0	9.000	GND	N	10.1	24.7	64.0	
0.320000	31.6	1000.0	9.000	GND	N	10.1	28.1	59.7	
0.444000	22.8	1000.0	9.000	GND	L1	10.1	34.2	57.0	
0.788000	12.2	1000.0	9.000	GND	L1	10.1	43.8	56.0	
4.988000	6.0	1000.0	9.000	GND	N	10.3	50.0	56.0	
17.204000	23.6	1000.0	9.000	GND	N	10.3	36.4	60.0	
18.672000	32.0	1000.0	9.000	GND	N	10.3	28.0	60.0	

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.190000	34.6	1000.0	9.000	GND	N	10.1	19.5	54.0	
0.320000	24.3	1000.0	9.000	GND	N	10.1	25.4	49.7	
0.444000	16.8	1000.0	9.000	GND	L1	10.1	30.2	47.0	
0.788000	7.2	1000.0	9.000	GND	L1	10.1	38.8	46.0	
4.988000	2.4	1000.0	9.000	GND	N	10.3	43.6	46.0	
17.204000	19.0	1000.0	9.000	GND	N	10.3	31.0	50.0	
18.672000	25.1	1000.0	9.000	GND	N	10.3	24.9	50.0	

< Fig 6. Conducted emission result >

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



Final Result 1

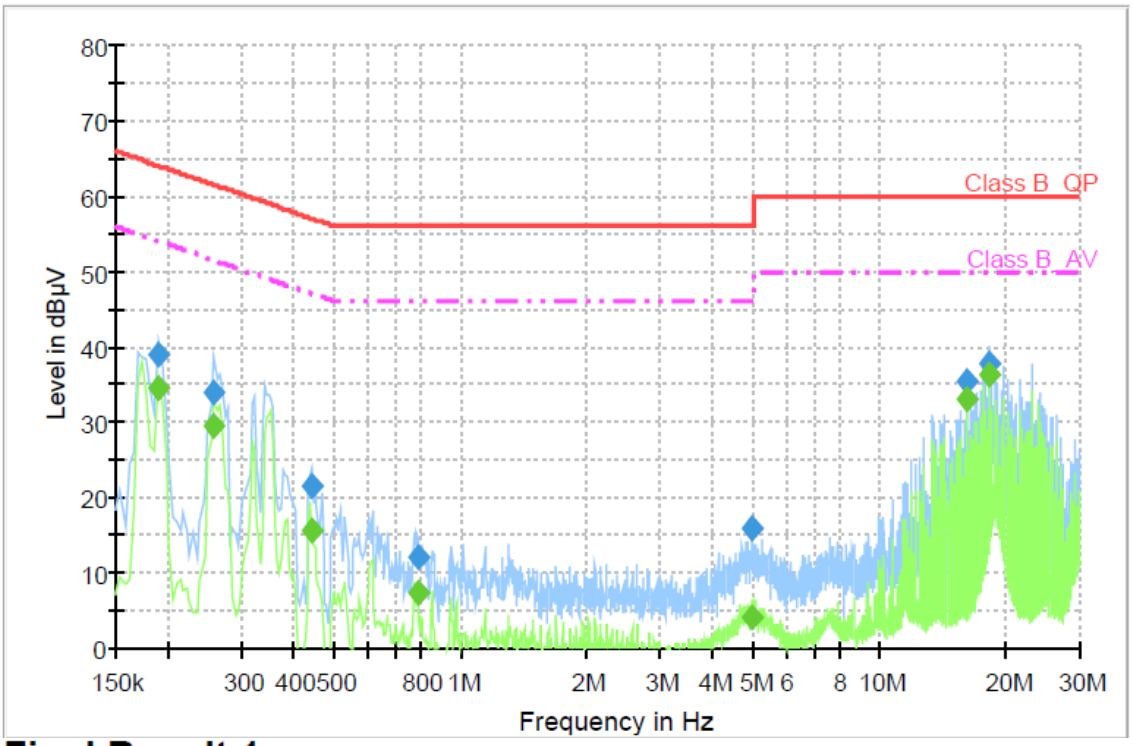
Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.190000	39.2	1000.0	9.000	GND	L1	10.1	24.9	64.0	
0.256000	34.8	1000.0	9.000	GND	N	10.1	26.8	61.6	
0.444000	22.6	1000.0	9.000	GND	L1	10.1	34.4	57.0	
0.800000	10.7	1000.0	9.000	GND	L1	10.1	45.3	56.0	
4.912000	5.6	1000.0	9.000	GND	L1	10.3	50.4	56.0	
17.632000	25.5	1000.0	9.000	GND	N	10.3	34.5	60.0	
18.720000	32.2	1000.0	9.000	GND	N	10.3	27.8	60.0	

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.190000	34.6	1000.0	9.000	GND	L1	10.1	19.4	54.0	
0.256000	29.5	1000.0	9.000	GND	N	10.1	22.0	51.6	
0.444000	16.5	1000.0	9.000	GND	L1	10.1	30.5	47.0	
0.800000	6.8	1000.0	9.000	GND	L1	10.1	39.2	46.0	
4.912000	1.8	1000.0	9.000	GND	L1	10.3	44.2	46.0	
17.632000	19.9	1000.0	9.000	GND	N	10.3	30.1	50.0	
18.720000	26.0	1000.0	9.000	GND	N	10.3	24.0	50.0	

< Fig 7. Conducted emission result >

♦ Operating condition: 1 920 × 1 080 / 60 Hz (DVI: Digital)



Final Result 1

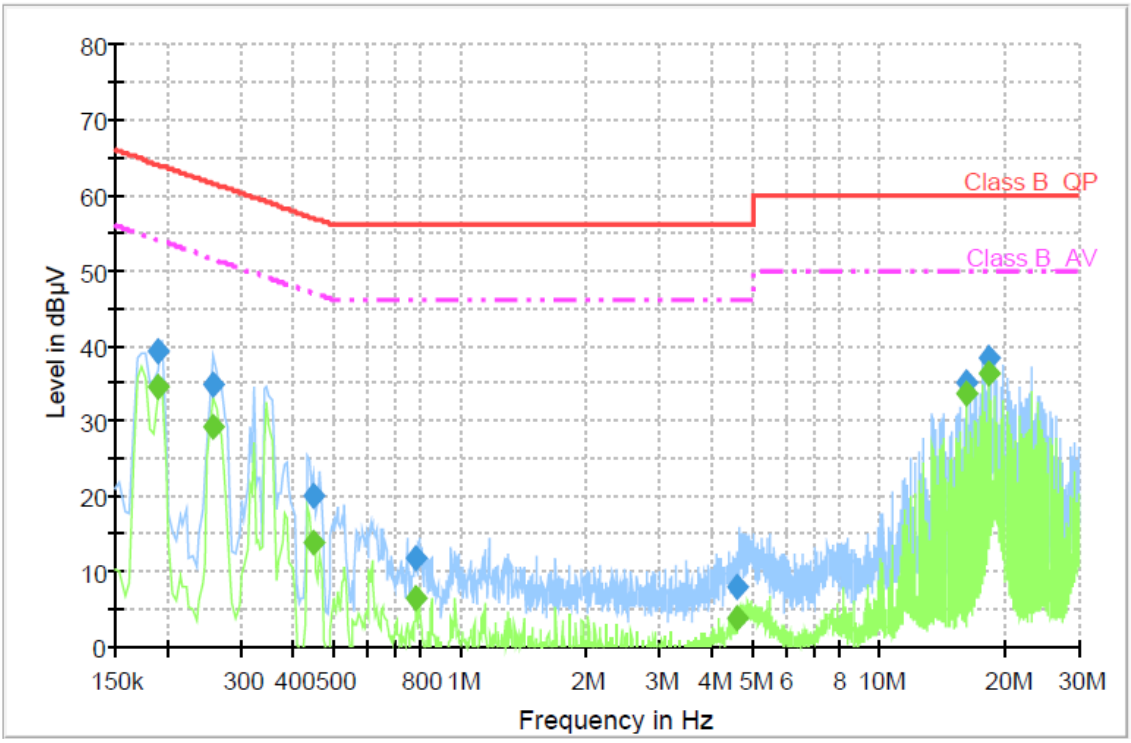
Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.190000	39.0	1000.0	9.000	GND	L1	10.1	25.0	64.0	
0.256000	34.1	1000.0	9.000	GND	L1	10.1	27.5	61.6	
0.444000	21.6	1000.0	9.000	GND	L1	10.1	35.4	57.0	
0.796000	12.0	1000.0	9.000	GND	L1	10.1	44.0	56.0	
4.932000	16.0	1000.0	9.000	GND	N	10.3	40.0	56.0	
16.228000	35.4	1000.0	9.000	GND	N	10.3	24.6	60.0	
18.244000	37.9	1000.0	9.000	GND	N	10.3	22.1	60.0	

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.190000	34.6	1000.0	9.000	GND	L1	10.1	19.4	54.0	
0.256000	29.7	1000.0	9.000	GND	L1	10.1	21.9	51.6	
0.444000	15.5	1000.0	9.000	GND	L1	10.1	31.5	47.0	
0.796000	7.3	1000.0	9.000	GND	L1	10.1	38.7	46.0	
4.932000	4.2	1000.0	9.000	GND	N	10.3	41.8	46.0	
16.228000	33.2	1000.0	9.000	GND	N	10.3	16.8	50.0	
18.244000	36.4	1000.0	9.000	GND	N	10.3	13.6	50.0	

< Fig 8. Conducted emission result >

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



Final Result 1

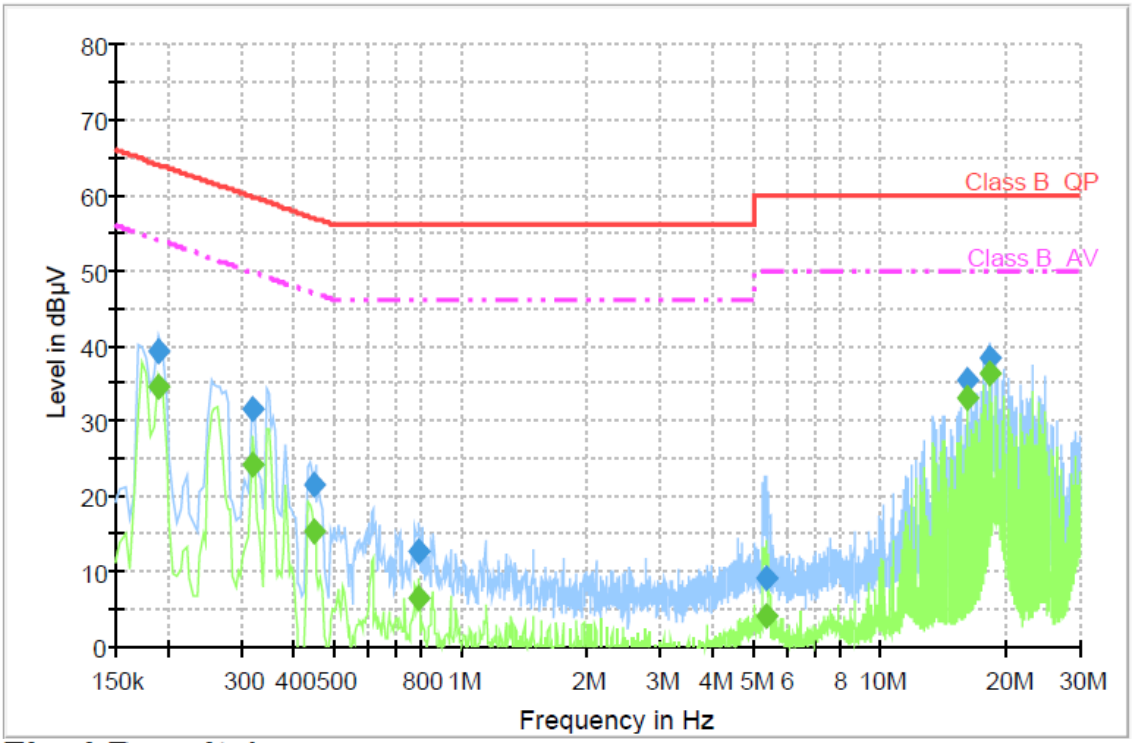
Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.190000	39.3	1000.0	9.000	GND	N	10.1	24.8	64.0	
0.256000	34.9	1000.0	9.000	GND	N	10.1	26.6	61.6	
0.448000	20.2	1000.0	9.000	GND	L1	10.1	36.7	56.9	
0.780000	11.9	1000.0	9.000	GND	L1	10.1	44.1	56.0	
4.592000	8.0	1000.0	9.000	GND	N	10.3	48.0	56.0	
16.228000	35.0	1000.0	9.000	GND	N	10.3	25.0	60.0	
18.244000	38.4	1000.0	9.000	GND	N	10.3	21.6	60.0	

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.190000	34.6	1000.0	9.000	GND	N	10.1	19.5	54.0	
0.256000	29.2	1000.0	9.000	GND	N	10.1	22.4	51.6	
0.448000	13.9	1000.0	9.000	GND	L1	10.1	33.0	46.9	
0.780000	6.6	1000.0	9.000	GND	L1	10.1	39.4	46.0	
4.592000	4.0	1000.0	9.000	GND	N	10.3	42.0	46.0	
16.228000	33.7	1000.0	9.000	GND	N	10.3	16.3	50.0	
18.244000	36.2	1000.0	9.000	GND	N	10.3	13.8	50.0	

< Fig 9. Conducted emission result >

♦ Operating condition: 1 920 × 1 080 / 60 Hz (DP: Digital)



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.190000	39.4	1000.0	9.000	GND	N	10.1	24.7	64.0	
0.320000	31.7	1000.0	9.000	GND	N	10.1	28.0	59.7	
0.448000	21.4	1000.0	9.000	GND	L1	10.1	35.5	56.9	
0.796000	12.8	1000.0	9.000	GND	L1	10.1	43.2	56.0	
5.344000	9.1	1000.0	9.000	GND	N	10.3	50.9	60.0	
16.228000	35.4	1000.0	9.000	GND	N	10.3	24.6	60.0	
18.244000	38.4	1000.0	9.000	GND	N	10.3	21.6	60.0	

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.190000	34.7	1000.0	9.000	GND	N	10.1	19.4	54.0	
0.320000	24.3	1000.0	9.000	GND	N	10.1	25.4	49.7	
0.448000	15.4	1000.0	9.000	GND	L1	10.1	31.5	46.9	
0.796000	6.4	1000.0	9.000	GND	L1	10.1	39.6	46.0	
5.344000	4.0	1000.0	9.000	GND	N	10.3	46.0	50.0	
16.228000	33.0	1000.0	9.000	GND	N	10.3	17.0	50.0	
18.244000	36.4	1000.0	9.000	GND	N	10.3	13.6	50.0	

< Fig 10. Conducted emission result >

6. Radiated Emission

6.1 Operating Environment

Temperature : 34.0 ℃
Relative Humidity : 49.0 % R.H.

6.2 Test Set-up

A preliminary scan with peak mode was performed in the semi anechoic chamber and found frequency for test site.
The formal radiated emission was measured at 10 m distance open area test site and 3 m distance 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(Open Area Test Site)	Uncertainty	Remark
Radiated emission (30 MHz ~ 300 MHz, 10 m, Vertical)	± 4.96 dB	Confidence level of approximately 95 % (k = 2)
Radiated emission (30 MHz ~ 300 MHz, 10 m, Horizontal)	± 3.44 dB	Confidence level of approximately 95 % (k = 2)
Radiated emission (300 MHz ~ 1 000 MHz, 10 m, Vertical)	± 3.74 dB	Confidence level of approximately 95 % (k = 2)
Radiated emission (300 MHz ~ 1 000 MHz, 10 m, Horizontal)	± 3.88 dB	Confidence level of approximately 95 % (k = 2)

6.4 Limit

Frequency (MHz)	FCC Limit @ 3 m. dB μV/m	CISPR Limit @ 10 m. dB μV/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
■ -	ESCS30	Rohde & Schwarz	EMI Test Receiver	839809/003	05. 22. 2013
■ -	HK116	Rohde & Schwarz	Biconical Antenna	826861/018	01. 29. 2014
■ -	HL223	Rohde & Schwarz	Log Periodic Antenna	829228/011	01. 29. 2014
■ -	HD100	HD GmbH	Position Controller	100/692/01	N/A
■ -	DS415S	HD GmbH	Turntable	415/657/01	N/A
■ -	MA240	HD GmbH	Antenna Mast	240/565/01	N/A
■ -	ESIB26	Rohde & Schwarz	EMI Test Receiver	830482/010	05. 23. 2013
■ -	BBHA9120D	Schwarzbeck	Horn ANT	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

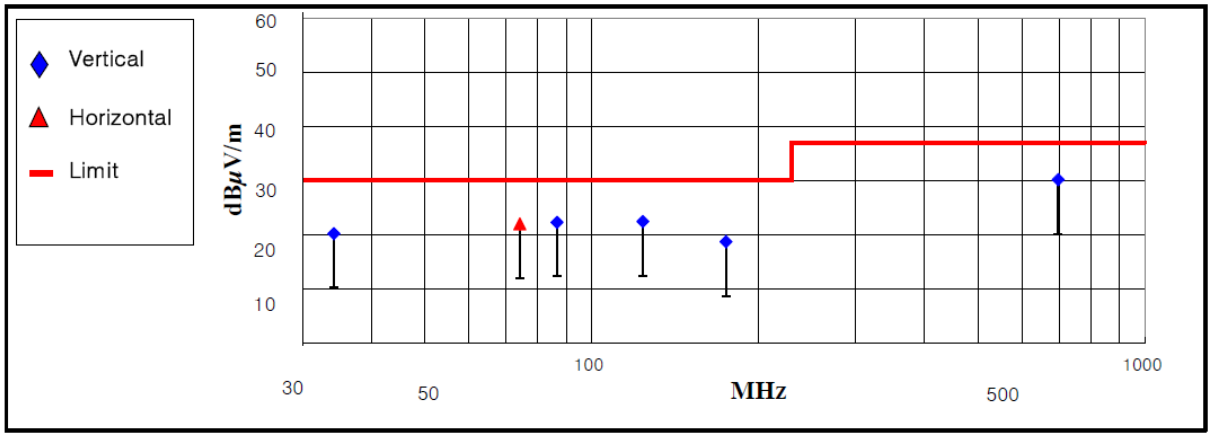
-. Test Date : June 5, 2012
-. Measurement Distance : 3 m
-. Note : The highest frequency of the internal source of the EUT is between 500 MHz and 1 000 MHz (667 MHz). The measurement was made up to 5 000 MHz

-. Measurement

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

♦ Operating Condition: 1 920 × 1 080 / 60 Hz (RGB: Analog)

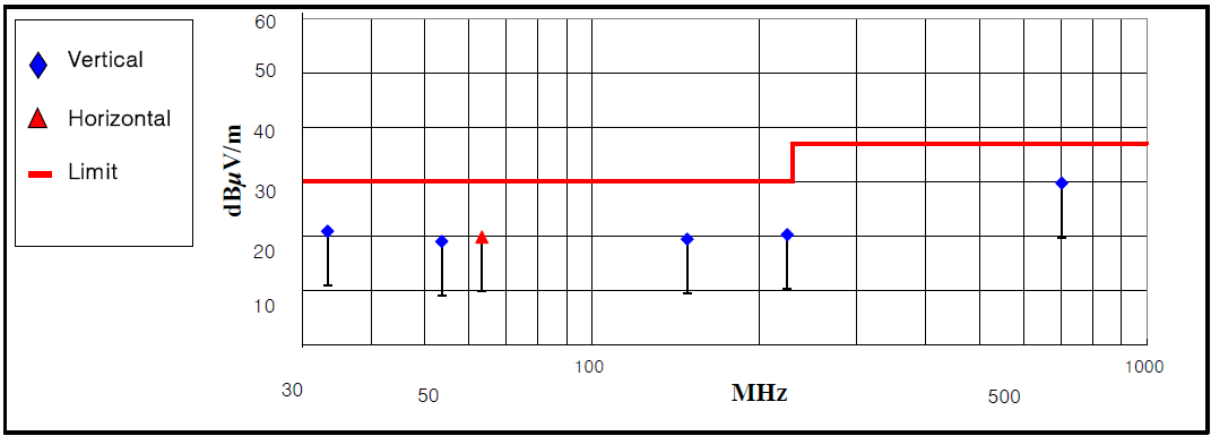
Frequency (MHz)	Measurement Level				Limit (dBμ V/m)	Margin (dB)	Positioning System		
	Reading Value(dBμ V)	Antenna Factor(dB/m)	Cable Loss(dB)	Test Result (dBμ V/m)			Pol. (H/V)	Height (cm)	Angle (°)
34.22	6.86	12.02	1.28	20.16	30.00	9.84	V	102	199
74.20	12.03	8.06	1.87	21.96	30.00	8.04	H	203	155
86.62	11.27	8.94	2.03	22.24	30.00	7.76	V	122	259
123.78	8.93	11.01	2.46	22.40	30.00	7.60	V	100	32
174.98	2.61	13.07	2.99	18.67	30.00	11.33	V	110	310
697.21	2.77	20.73	6.63	30.13	37.00	6.87	V	154	161



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

♦ Operating Condition: 1 920 × 1 080 / 60 Hz (DVI: Digital)

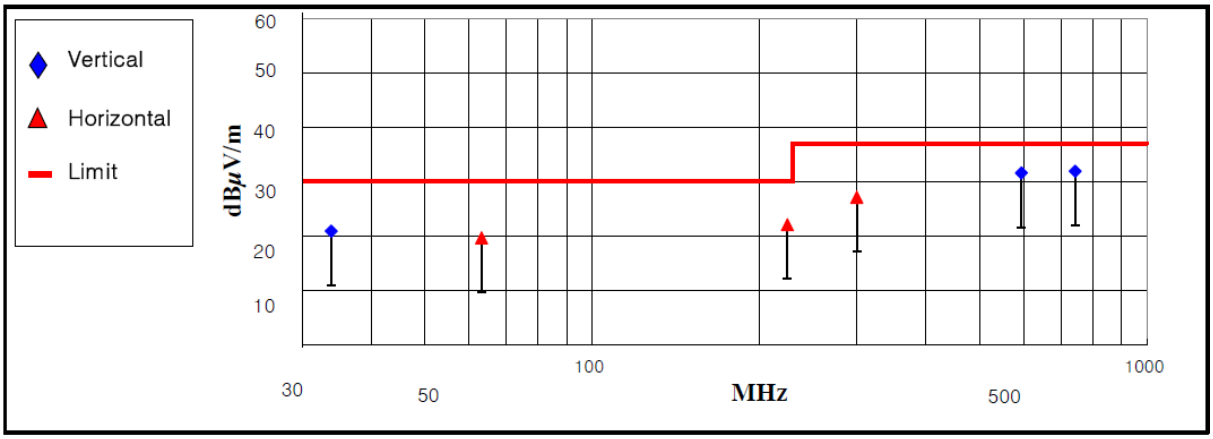
Frequency (MHz)	Measurement Level				Limit (dBμ V/m)	Margin (dB)	Positioning System		
	Reading Value(dBμ V)	Antenna Factor(dB/m)	Cable Loss(dB)	Test Result (dBμ V/m)			Pol. (H/V)	Height (cm)	Angle (°)
33.38	7.31	12.27	1.26	20.84	30.00	9.16	V	102	279
53.61	8.76	8.61	1.59	18.96	30.00	11.04	V	100	155
63.34	10.25	7.81	1.73	19.79	30.00	10.21	H	201	162
148.50	4.50	12.16	2.72	19.38	30.00	10.62	V	100	331
224.96	2.18	14.61	3.41	20.20	30.00	9.80	V	195	342
702.78	2.24	20.79	6.66	29.69	37.00	7.31	V	148	157



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

♦ Operating Condition: 1 920 × 1 080 / 60 Hz (HDMI: Digital)

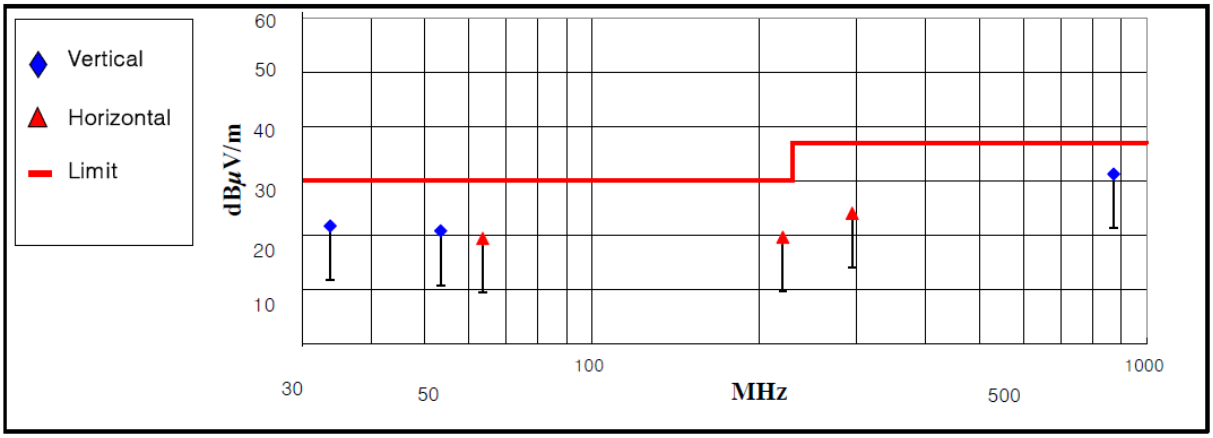
Frequency (MHz)	Measurement Level				Limit (dBμ V/m)	Margin (dB)	Positioning System		
	Reading Value(dBμ V)	Antenna Factor(dB/m)	Cable Loss(dB)	Test Result (dBμ V/m)			Pol. (H/V)	Height (cm)	Angle (°)
33.89	7.46	12.12	1.27	20.85	30.00	9.15	V	103	280
63.24	10.08	7.81	1.73	19.62	30.00	10.38	H	201	341
224.98	4.02	14.61	3.41	22.04	30.00	7.96	H	148	312
300.02	3.34	19.72	4.02	27.08	37.00	9.92	H	100	226
594.00	7.01	18.49	6.05	31.55	37.00	5.45	V	103	219
742.52	4.20	20.81	6.86	31.87	37.00	5.13	V	100	140



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

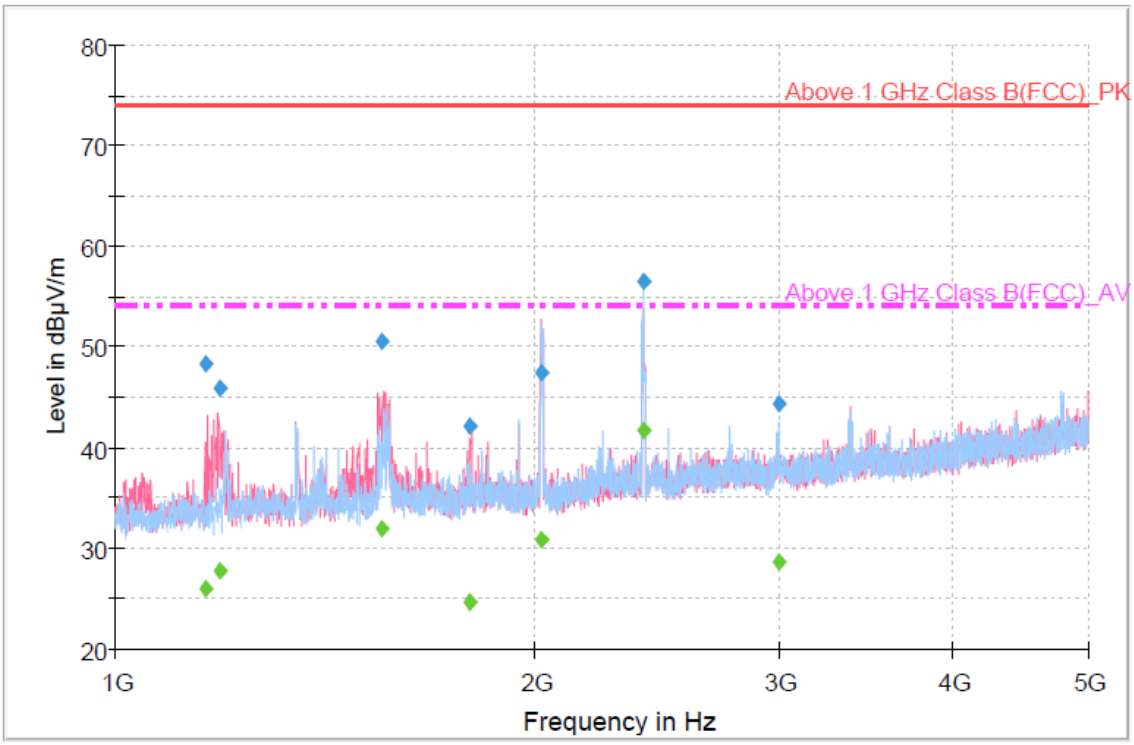
♦ Operating Condition: 1 920 × 1 080 / 60 Hz (DP: Digital)

Frequency (MHz)	Measurement Level				Limit (dBμ V/m)	Margin (dB)	Positioning System		
	Reading Value(dBμ V)	Antenna Factor(dB/m)	Cable Loss(dB)	Test Result (dBμ V/m)			Pol. (H/V)	Height (cm)	Angle (°)
33.75	8.21	12.16	1.27	21.64	30.00	8.36	V	100	277
53.40	10.51	8.64	1.59	20.74	30.00	9.26	V	102	146
63.57	9.82	7.80	1.73	19.35	30.00	10.65	H	197	0
220.95	1.64	14.54	3.38	19.56	30.00	10.44	H	199	125
294.61	0.77	19.23	3.98	23.98	37.00	13.02	H	106	271
872.10	1.96	21.68	7.56	31.20	37.00	5.80	V	104	47



< Fig 14. 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

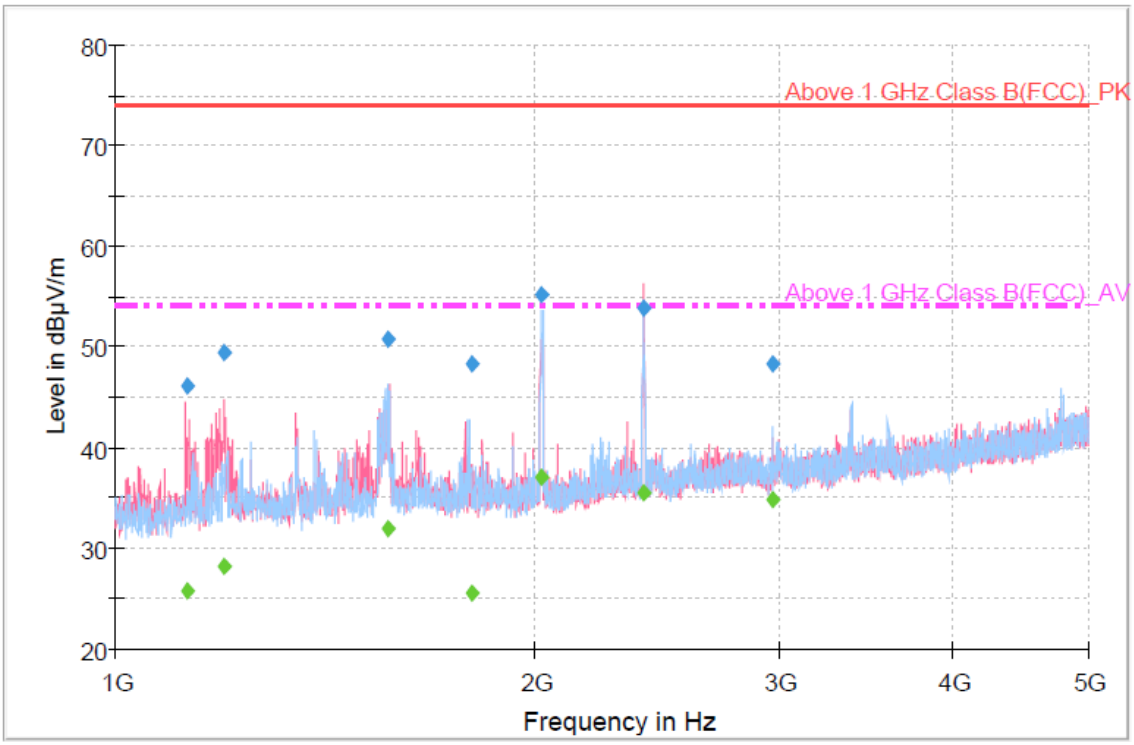
Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1162.440000	48.3	1000.0	1000.000	100.0	V	165.0	-10.3	25.7	74.0
1188.460000	45.8	1000.0	1000.000	100.0	V	148.0	-10.1	28.2	74.0
1554.640000	50.6	1000.0	1000.000	100.0	V	219.0	-8.5	23.4	74.0
1797.080000	42.1	1000.0	1000.000	150.0	V	304.0	-7.8	31.9	74.0
2021.320000	47.5	1000.0	1000.000	100.0	V	247.0	-7.5	26.5	74.0
2395.340000	56.6	1000.0	1000.000	100.0	H	206.0	-5.5	17.4	74.0
2996.320000	44.3	1000.0	1000.000	130.0	H	319.0	-4.2	29.7	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)
1162.440000	26.1	1000.0	1000.000	100.0	V	165.0	-10.3	27.9	54.0
1188.460000	27.7	1000.0	1000.000	100.0	V	148.0	-10.1	26.3	54.0
1554.640000	32.0	1000.0	1000.000	100.0	V	219.0	-8.5	22.0	54.0
1797.080000	24.7	1000.0	1000.000	150.0	V	304.0	-7.8	29.3	54.0
2021.320000	30.8	1000.0	1000.000	100.0	V	247.0	-7.5	23.2	54.0
2395.340000	41.6	1000.0	1000.000	100.0	H	206.0	-5.5	12.4	54.0
2996.320000	28.6	1000.0	1000.000	130.0	H	319.0	-4.2	25.4	54.0

< Fig 15. Radiated emission result (1 000 MHz ~ 5 000 MHz) >

♦ Operating Condition: 1 920 × 1 080 / 60 Hz (DVI: Digital)
Green marker: Average detector, Blue marker: Peak detector



Final Result 1

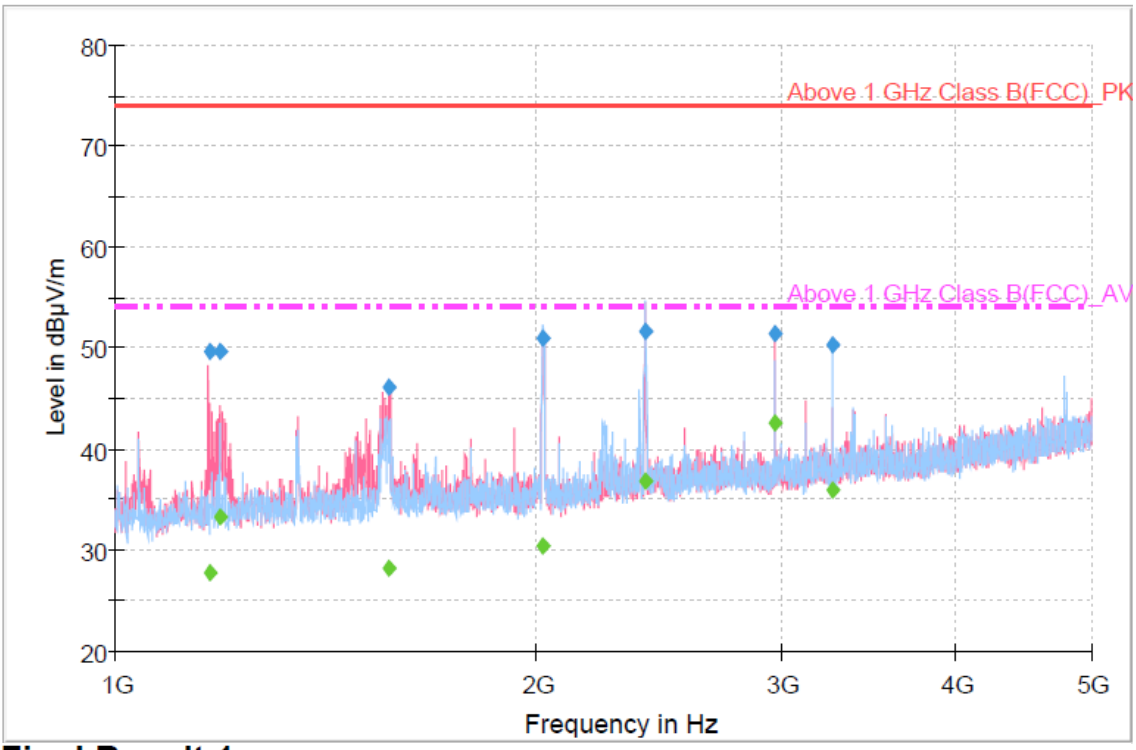
Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1127.140000	46.0	1000.0	1000.000	110.0	V	160.0	-10.6	28.0	74.0
1195.200000	49.4	1000.0	1000.000	131.0	V	181.0	-10.1	24.6	74.0
1571.340000	50.8	1000.0	1000.000	100.0	V	159.0	-8.4	23.2	74.0
1801.380000	48.3	1000.0	1000.000	148.0	H	81.0	-7.8	25.7	74.0
2020.980000	55.1	1000.0	1000.000	100.0	H	42.0	-7.5	18.9	74.0
2393.500000	53.8	1000.0	1000.000	141.0	V	222.0	-5.5	20.2	74.0
2969.900000	48.3	1000.0	1000.000	100.0	H	185.0	-4.3	25.7	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)
1127.140000	25.7	1000.0	1000.000	110.0	V	160.0	-10.6	28.3	54.0
1195.200000	28.1	1000.0	1000.000	131.0	V	181.0	-10.1	25.9	54.0
1571.340000	31.9	1000.0	1000.000	100.0	V	159.0	-8.4	22.1	54.0
1801.380000	25.6	1000.0	1000.000	148.0	H	81.0	-7.8	28.4	54.0
2020.980000	37.0	1000.0	1000.000	100.0	H	42.0	-7.5	17.0	54.0
2393.500000	35.5	1000.0	1000.000	141.0	V	222.0	-5.5	18.5	54.0
2969.900000	34.9	1000.0	1000.000	100.0	H	185.0	-4.3	19.1	54.0

< Fig 16. 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

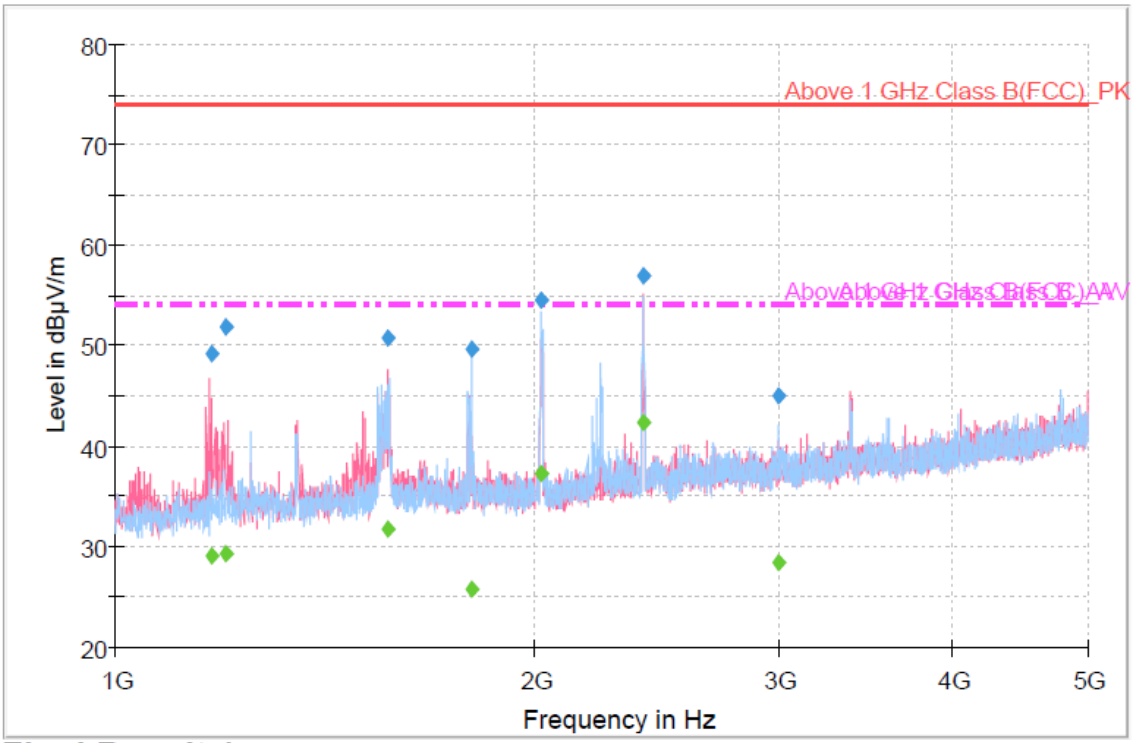
Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1170.260000	49.6	1000.0	1000.000	100.0	V	160.0	-10.3	24.4	74.0
1187.880000	49.7	1000.0	1000.000	100.0	V	173.0	-10.1	24.3	74.0
1571.220000	46.0	1000.0	1000.000	200.0	V	134.0	-8.4	28.0	74.0
2020.760000	51.1	1000.0	1000.000	100.0	H	276.0	-7.5	22.9	74.0
2395.720000	51.7	1000.0	1000.000	111.0	H	129.0	-5.5	22.3	74.0
2970.080000	51.5	1000.0	1000.000	100.0	V	200.0	-4.3	22.5	74.0
3266.960000	50.2	1000.0	1000.000	100.0	H	153.0	-3.6	23.8	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)
1170.260000	27.8	1000.0	1000.000	100.0	V	160.0	-10.3	26.2	54.0
1187.880000	33.3	1000.0	1000.000	100.0	V	173.0	-10.1	20.7	54.0
1571.220000	28.1	1000.0	1000.000	200.0	V	134.0	-8.4	25.9	54.0
2020.760000	30.3	1000.0	1000.000	100.0	H	276.0	-7.5	23.7	54.0
2395.720000	36.8	1000.0	1000.000	111.0	H	129.0	-5.5	17.2	54.0
2970.080000	42.6	1000.0	1000.000	100.0	V	200.0	-4.3	11.4	54.0
3266.960000	35.8	1000.0	1000.000	100.0	H	153.0	-3.6	18.2	54.0

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

♦ Operating Condition: 1 920 × 1 080 / 60 Hz (DP: 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)
1173.120000	49.2	1000.0	1000.000	100.0	V	164.0	-10.2	24.8	74.0
1199.320000	51.9	1000.0	1000.000	100.0	V	165.0	-10.0	22.1	74.0
1571.320000	50.7	1000.0	1000.000	100.0	V	157.0	-8.4	23.3	74.0
1802.220000	49.7	1000.0	1000.000	150.0	H	325.0	-7.8	24.3	74.0
2021.140000	54.5	1000.0	1000.000	100.0	H	43.0	-7.5	19.6	74.0
2397.160000	57.0	1000.0	1000.000	119.0	V	209.0	-5.5	17.0	74.0
2995.000000	45.0	1000.0	1000.000	150.0	H	302.0	-4.2	29.0	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)
1173.120000	29.1	1000.0	1000.000	100.0	V	164.0	-10.2	24.9	54.0
1199.320000	29.2	1000.0	1000.000	100.0	V	165.0	-10.0	24.8	54.0
1571.320000	31.7	1000.0	1000.000	100.0	V	157.0	-8.4	22.3	54.0
1802.220000	25.7	1000.0	1000.000	150.0	H	325.0	-7.8	28.3	54.0
2021.140000	37.2	1000.0	1000.000	100.0	H	43.0	-7.5	16.8	54.0
2397.160000	42.3	1000.0	1000.000	119.0	V	209.0	-5.5	11.7	54.0
2995.000000	28.4	1000.0	1000.000	150.0	H	302.0	-4.2	25.6	54.0

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

7. Sample Calculations

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

7.1 Example 1 :

■ **20.3 MHz**

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

7.2 Example 2 :

■ **66.7 MHz**

Class B Limit	**= 100 μV/m = 40.0 dBμV/m**
Reading	**= 31.0 dBμV**
Antenna Factor + Cable Loss = 5.8 dB	
Total	**= 36.8 dBμV/m**
Margin	**= 40.0 dBμV/m – 36.8 dBμV/m**
	= 3.2 dB

8. Recommendation & Conclusion

The data collected shows that the **LG Electronics Inc. MONITOR SIGNAGE (Model Name: 47VX30AF)** was complies with §15.107 and 15.109 of the FCC Rules.

- The end -