

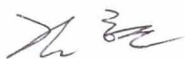
FCC EVALUATION REPORT FOR CERTIFICATION

Applicant: LG Electronics Inc.**19-1, Cheongho-ri, Jinwi-myeon,****Pyeongteak-si, Gyeonggi-do, Korea.****Attn: Mr. Do-Hyung Kim, Chief research engineer****Date of Issue: October 17, 2011****Order Number: GETEC-C1-11-234****Test Report Number: GETEC-E3-11-118****Test Site: Gumi College EMC Center****FCC Registration Number: (100749, 443957)****FCC ID. : BEJ47VS20****Applicant : LG Electronics Inc.**

Rule Part(s)	: FCC Part 15 Subpart B
Equipment Class	: Class B computing device peripheral (JBP)
EUT Type	: SIGNAGE DISPLAY
Type of Authority	: Certification
Model Name	: 47VS20
Trade Name	: LG

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

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

Tested by,**Reviewed by,**

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. Do-Hyung Kim, Chief research engineer

Tel Number: +82-31-610-9623

- **FCC ID.** BEJ47VS20
- **EUT Type** SIGNAGE DISPLAY
- **Model Name** 47VS20
- **Trade Name** LG
- **Serial Number** Prototype
- **Rule Part(s)** FCC Part 15 Subpart B
- **Type of Authority** Certification
- **Test Procedure(s)** ANSI C63.4 (2003) / Canadian standard ICES-003
- **Dates of Test** October 5 ~ 12, 2011
- **Place of Test** **Gumi College EMC Center** (FCC Registration Number: 100749, 443957)
407, Bugok-dong, Gumi-si, Gyeongbuk, Korea.
- **Test Report Number** GETEC-E3-11-118
- **Dates of Issue** October 17, 2011



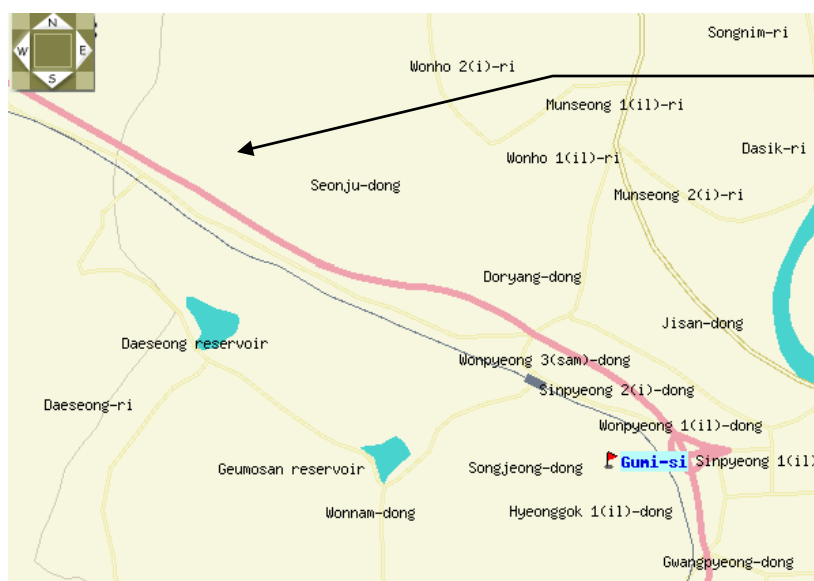
2. Introduction

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. SIGNAGE DISPLAY (Model Name: 47VS20)**

These measurement tests were conducted at **Gumi College EMC Center**.

The site address is 407, Bugok-dong, Gumi-si, Gyeongbuk, Korea.

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



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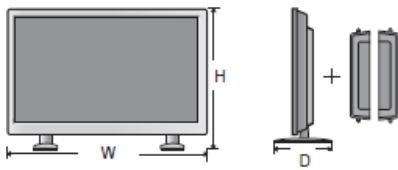
Fig 1. The map above shows the Gumi College in vicinity area.



3. Product Information

3.1 Description of EUT

The Equipment under Test (EUT) is the **LG Electronics Inc. SIGNAGE DISPLAY (Model Name: 47VS20) FCC ID.: BEJ47VS20**

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 : 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 : 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 : 30 kHz to 83 kHz
	Vertical Frequency	RGB : 56 Hz to 75 Hz HDMI/DVI : 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 2.2 A
	Power Consumption	On Mode : 260 W Typ. Sleep Mode : ≤ 1 W Off Mode : ≤ 0.5 W
Dimensions (Width x Height x Depth) / Weight		
	1079.5 mm x 697.7 mm x 298.3 mm / 24.4 kg	

-. 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)	ASLOCK	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	Great Pleasure Electronics Co., Ltd.	GP-M3100UE	S/N: 14036766 FCC ID: DoC
Monitor	Dell computer corporation.	1800FP	S/N: KR-07R477-48324-33J-03WH FCC ID.: DoC
USB memory stick	SAMSUNG	SUM-PSB4	S/N: TBBB202478F FCC ID.: DoC

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

3.2.2 System configuration

Description	Manufacturer	Model Name	S/N & FCC ID.
Speaker	LG Electronics Inc.	SP-0000K	S/N: None. FCC ID.: None.
IR remote controller	HANSUNG ELECTRONICS	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	1.50 m shielded
RGB (Analog) out cable	Connected to the EUT and monitor	1.50 m shielded
DVI (Digital) in cable	Connected to the EUT and PC	1.50 m shielded
DVI (Digital) out cable	Connected to the EUT and monitor	1.50 m shielded
HDMI (Digital) cable	Connected to the EUT and PC	2.00 m shielded
DP (Digital) in cable	Connected to the EUT and PC	3.00 m shielded
RS-232C cable	Connected to the EUT(RS-232C in) and EUT(RS-232C out)	1.80 m shielded
Audio in cable	Connected to the EUT and PC	1.50 m shielded
Speaker (Left) cable	Connected to the EUT and speaker	0.90 m shielded
Speaker (Right) cable	Connected to the EUT and speaker	0.90 m shielded
LAN cable	Connected to the EUT and Network	10.00 m shielded

3.3 Modification Item(s)

- None



4. Description of tests

4.1 Test Condition

The EUT was installed, arranged and operated in a manner that is most representative of equipment as typically used. The measurements were carried out while varying operating modes and cable positions within typically arrangement to determine maximum emission level.

The representative and worst test mode(s) were noted in the test report.

- Test Voltage / Frequency : AC 120 V / 60 Hz
- Test Mode(s)

- . Monitor mode

Radiated emission: 1 920 × 1 080 / 60 Hz (RGB: Analog, 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
- . Settings and control the display via the Network from a PC
- . 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

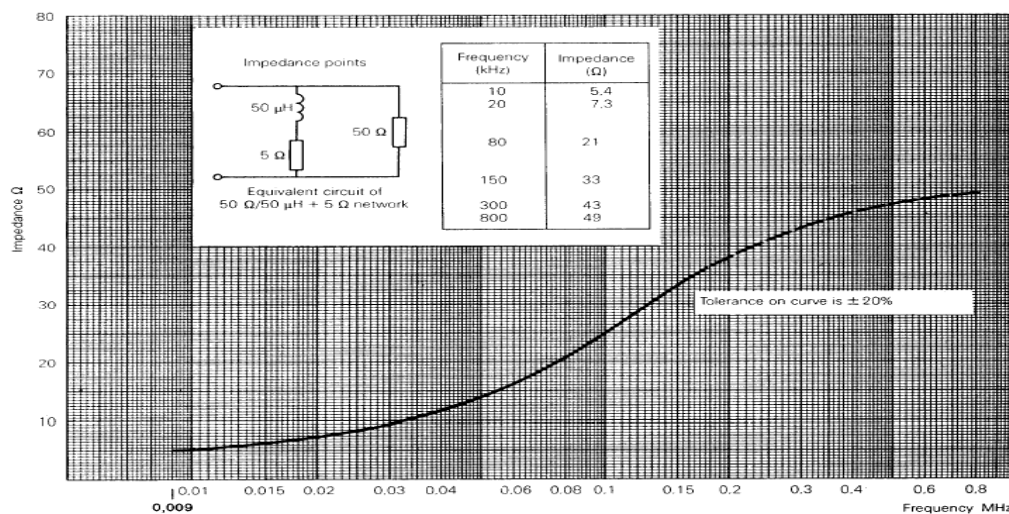


Fig 2. Impedance of LISN



4.3 Radiated Emission

Preliminary measurements were conducted 3 m semi anechoic chamber using broadband antennas to determine the frequency producing the maximum EME. Appropriate precaution was taken to ensure that all EME from the EUT were maximized and investigated. The technology configuration, mode of operation and turntable azimuth with respect to antenna was note for each frequency found.

Final measurements were made 3 m chamber (FCC registration No.: 443957) and/or 10 m OATS (FCC registration No.: 100749).

Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition.

Each frequency found during pre-scan measurements was re-examined and investigated using EMI test receiver. The detector function was set to CISPR quasi-peak mode average mode and the bandwidth of the receiver was set to 120 kHz or 1 MHz depending on the frequency or type of signal.

The EUT, support equipment and interconnecting cables were reconfigured to the setup producing the maximum emission for the frequency and were placed on top of a 0.8 m high non-metallic 1.0 m × 1.5 m table.

The turntable containing the test sample was rotated; the antenna height was varied 1 to 4 meter and stopped at the azimuth or height producing the maximum emission.

Each EME reported was calibrated using the R/S signal generator

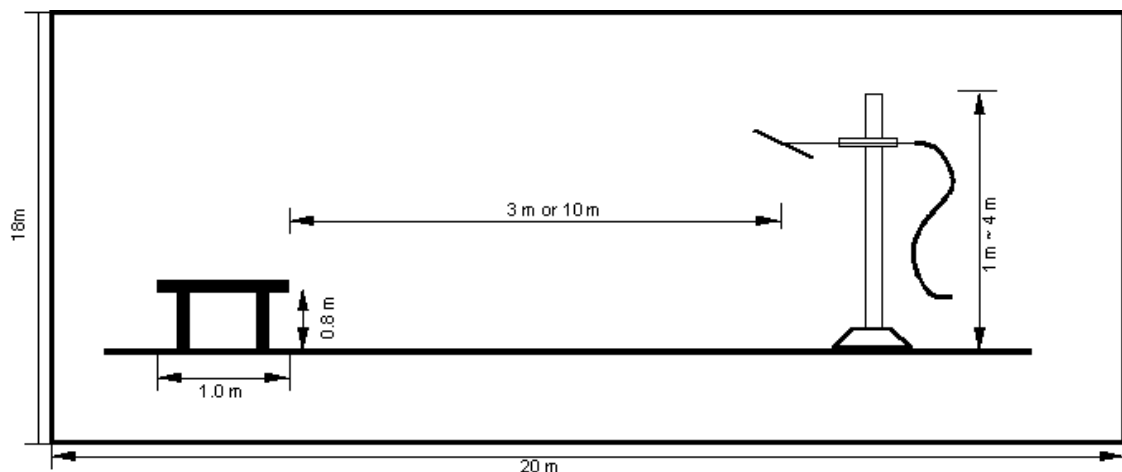


Fig 3. Dimensions of test site



5. Conducted Emission

5.1 Operating Environment

Temperature : 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)	± 2.71 dB	Confidence levels of 95 % ($k = 2$)
Conducted emission (150 kHz ~ 30 MHz)	± 3.34 dB	Confidence levels of 95 % ($k = 2$)



5.4 Limit

RFI Conducted	FCC Limit(dB μ V/m) Class B	
Freq. Range	Quasi-Peak	Average
150 kHz ~ 0.5 MHz	66 ~ 56*	56 ~ 46*
0.5 MHz ~ 5 MHz	56	46
5 MHz ~ 30 MHz	60	50
*Limits decreases linearly with the logarithm of frequency.		

5.5 Test Equipment used

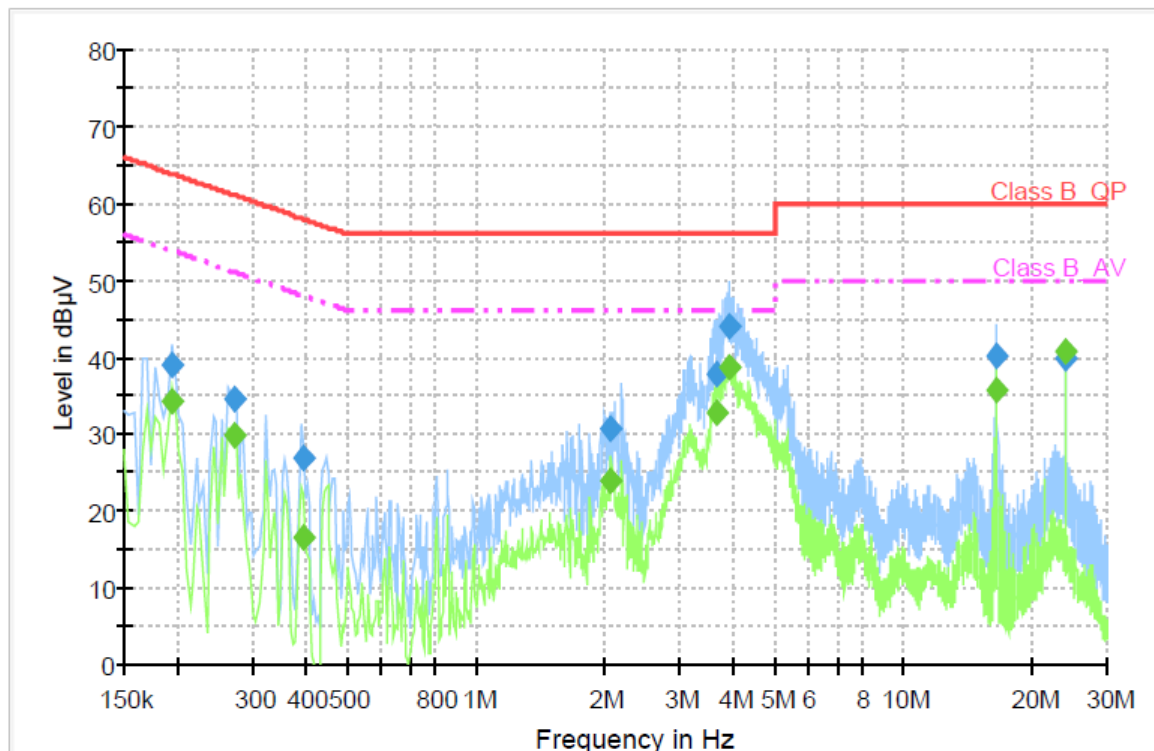
Model Name	Manufacturer	Description	Serial Number	Due to Calibration
■ - ESCS30	Rohde & Schwarz	EMI Test Receiver	839809/003	12. 10. 2011
■ - ESH3-Z5	Rohde & Schwarz	LISN	838979/020	12. 10. 2011
■ - ESH2-Z5	Rohde & Schwarz	LISN	829991/009	12. 10. 2011
■ - ISN T8	TESEQ. GmbH	ISN	24568	11. 09. 2011

5.6 Test data for Conducted Emission

- Test Date : October 12, 2011
- Resolution Bandwidth : 9 kHz
- Frequency Range : 0.15 MHz ~ 30 MHz



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



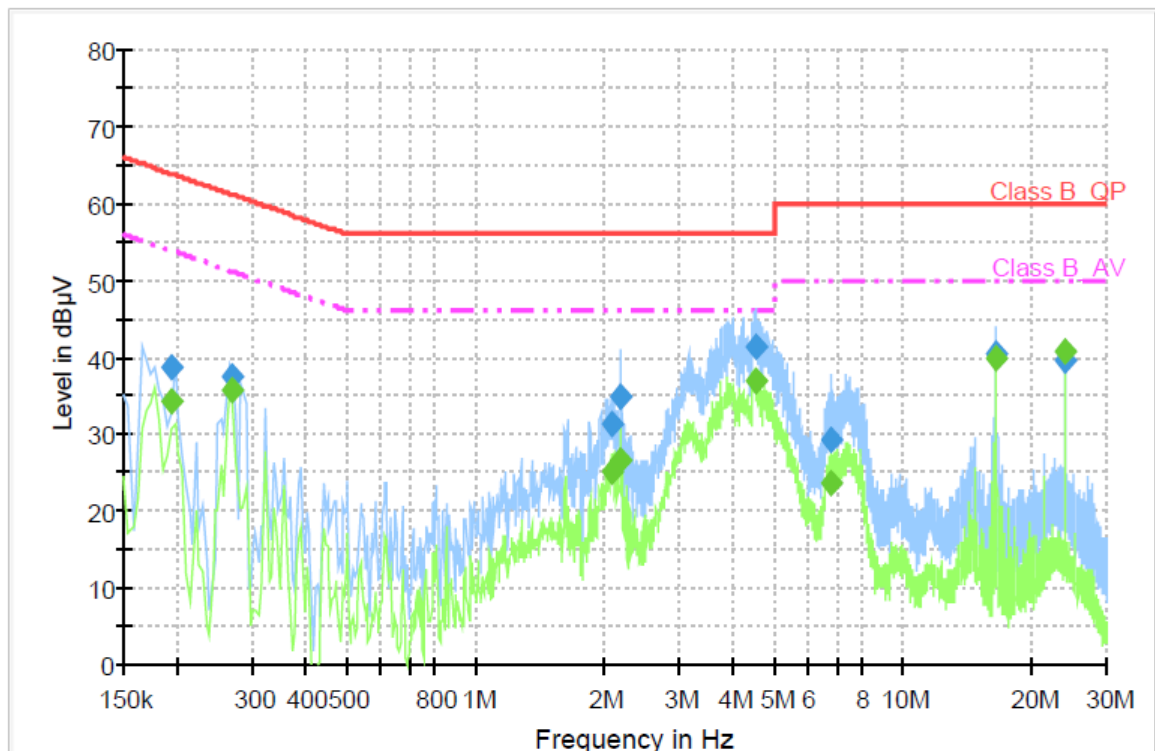
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.194000	39.0	1000.0	9.000	GND	L1	10.1	24.9	63.9	
0.272000	34.7	1000.0	9.000	GND	L1	10.1	26.4	61.1	
0.396000	26.8	1000.0	9.000	GND	L1	10.1	31.2	57.9	
2.068000	30.8	1000.0	9.000	GND	L1	10.2	25.2	56.0	
3.652000	37.7	1000.0	9.000	GND	L1	10.3	18.3	56.0	
3.920000	44.0	1000.0	9.000	GND	L1	10.3	12.0	56.0	
16.504000	40.3	1000.0	9.000	GND	L1	11.0	19.7	60.0	
24.000000	39.8	1000.0	9.000	GND	L1	11.1	20.2	60.0	

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.194000	34.1	1000.0	9.000	GND	L1	10.1	19.7	53.9	
0.272000	29.8	1000.0	9.000	GND	L1	10.1	21.3	51.1	
0.396000	16.5	1000.0	9.000	GND	L1	10.1	31.4	47.9	
2.068000	23.8	1000.0	9.000	GND	L1	10.2	22.2	46.0	
3.652000	32.7	1000.0	9.000	GND	L1	10.3	13.3	46.0	
3.920000	38.8	1000.0	9.000	GND	L1	10.3	7.2	46.0	
16.504000	35.6	1000.0	9.000	GND	L1	11.0	14.4	50.0	
24.000000	40.8	1000.0	9.000	GND	L1	11.1	9.2	50.0	

< Fig 4. Conducted emission result (Live line) >



Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.194000	38.7	1000.0	9.000	GND	N	10.1	25.1	63.9	
0.268000	37.4	1000.0	9.000	GND	N	10.1	23.8	61.2	
2.088000	31.2	1000.0	9.000	GND	N	10.2	24.8	56.0	
2.192000	34.8	1000.0	9.000	GND	N	10.2	21.2	56.0	
4.524000	41.4	1000.0	9.000	GND	N	10.3	14.6	56.0	
6.784000	29.3	1000.0	9.000	GND	N	10.4	30.7	60.0	
16.468000	40.6	1000.0	9.000	GND	N	10.8	19.4	60.0	
24.000000	39.7	1000.0	9.000	GND	N	10.7	20.3	60.0	

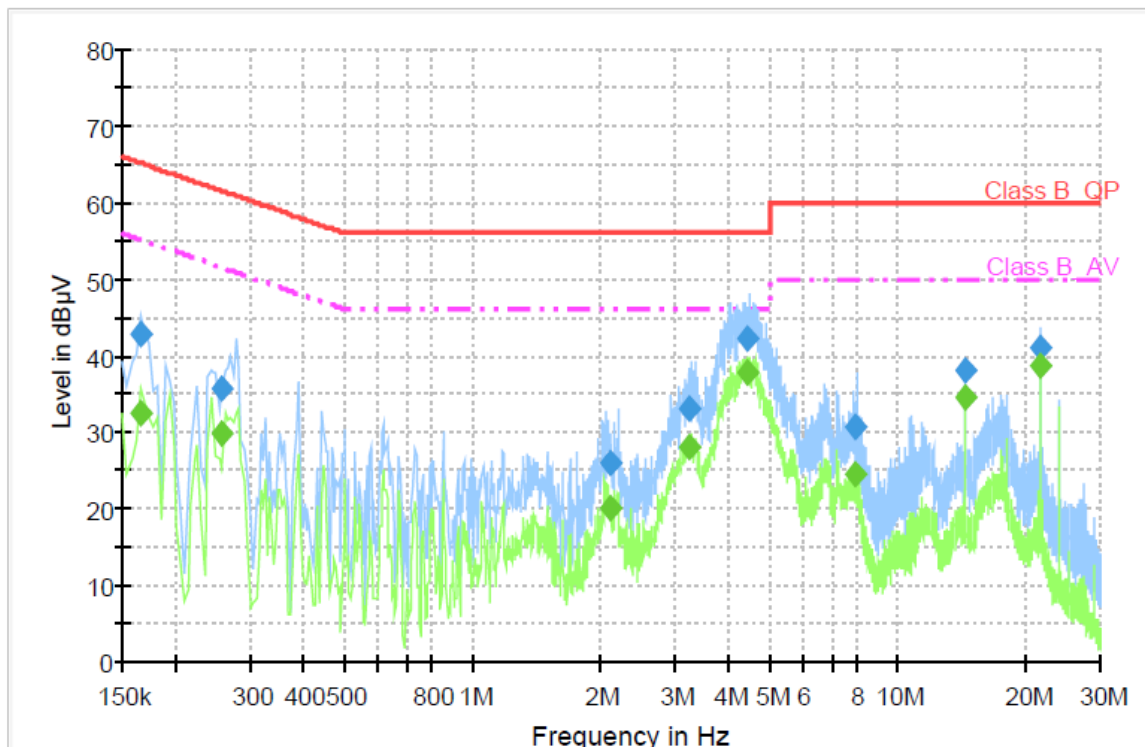
Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.194000	34.2	1000.0	9.000	GND	N	10.1	19.7	53.9	
0.268000	35.6	1000.0	9.000	GND	N	10.1	15.6	51.2	
2.088000	25.1	1000.0	9.000	GND	N	10.2	20.9	46.0	
2.192000	26.7	1000.0	9.000	GND	N	10.2	19.3	46.0	
4.524000	37.0	1000.0	9.000	GND	N	10.3	9.0	46.0	
6.784000	23.7	1000.0	9.000	GND	N	10.4	26.3	50.0	
16.468000	39.7	1000.0	9.000	GND	N	10.8	10.3	50.0	
24.000000	40.7	1000.0	9.000	GND	N	10.7	9.3	50.0	

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



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



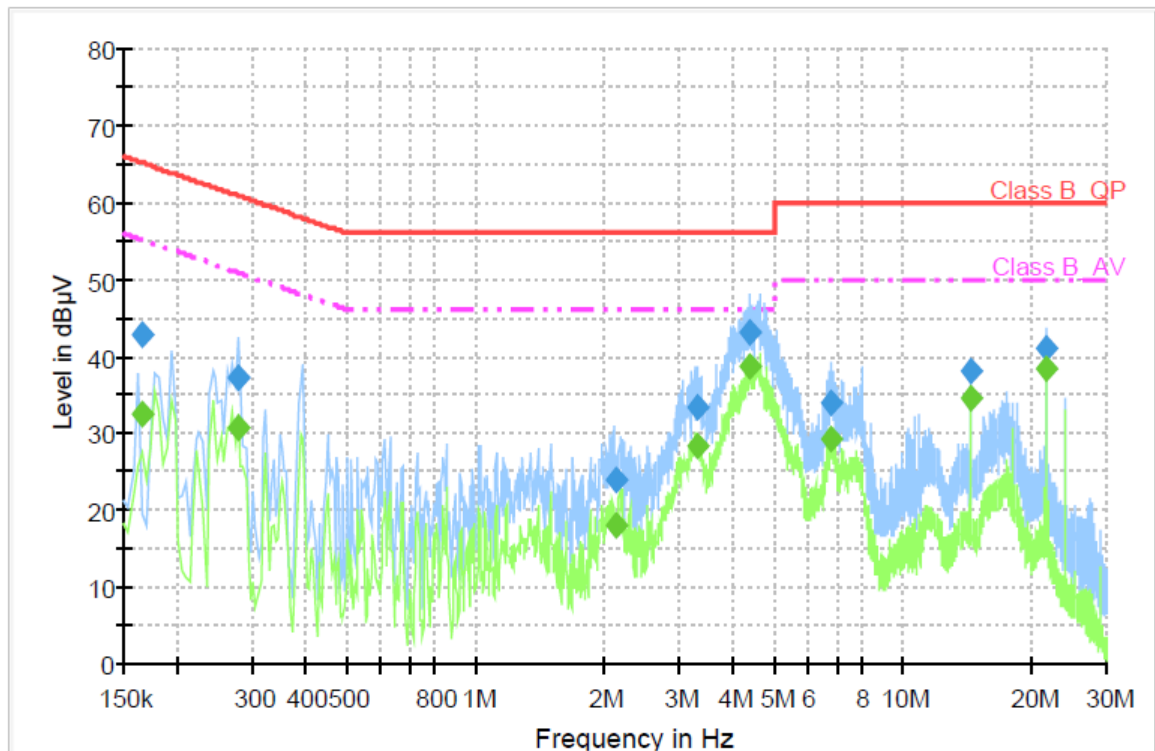
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.166000	42.8	1000.0	9.000	GND	L1	10.1	22.4	65.2	
0.256000	35.6	1000.0	9.000	GND	L1	10.1	26.0	61.6	
2.100000	26.0	1000.0	9.000	GND	L1	10.2	30.0	56.0	
3.228000	33.1	1000.0	9.000	GND	L1	10.2	22.9	56.0	
4.448000	42.3	1000.0	9.000	GND	L1	10.3	13.7	56.0	
7.980000	30.6	1000.0	9.000	GND	L1	10.5	29.4	60.0	
14.460000	38.2	1000.0	9.000	GND	L1	10.9	21.8	60.0	
21.668000	41.2	1000.0	9.000	GND	L1	11.1	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
0.166000	32.6	1000.0	9.000	GND	L1	10.1	22.6	55.2	
0.256000	29.8	1000.0	9.000	GND	L1	10.1	21.8	51.6	
2.100000	20.2	1000.0	9.000	GND	L1	10.2	25.8	46.0	
3.228000	28.2	1000.0	9.000	GND	L1	10.2	17.8	46.0	
4.448000	37.8	1000.0	9.000	GND	L1	10.3	8.2	46.0	
7.980000	24.5	1000.0	9.000	GND	L1	10.5	25.5	50.0	
14.460000	34.7	1000.0	9.000	GND	L1	10.9	15.3	50.0	
21.668000	38.6	1000.0	9.000	GND	L1	11.1	11.4	50.0	

< Fig 6. Conducted emission result (Live line) >



Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.166000	42.8	1000.0	9.000	GND	N	10.1	22.3	65.2	
0.280000	37.3	1000.0	9.000	GND	N	10.1	23.5	60.8	
2.124000	23.8	1000.0	9.000	GND	N	10.2	32.2	56.0	
3.292000	33.4	1000.0	9.000	GND	N	10.2	22.6	56.0	
4.400000	43.1	1000.0	9.000	GND	N	10.3	12.9	56.0	
6.804000	33.9	1000.0	9.000	GND	N	10.4	26.1	60.0	
14.460000	38.2	1000.0	9.000	GND	N	10.7	21.8	60.0	
21.668000	41.0	1000.0	9.000	GND	N	10.8	19.0	60.0	

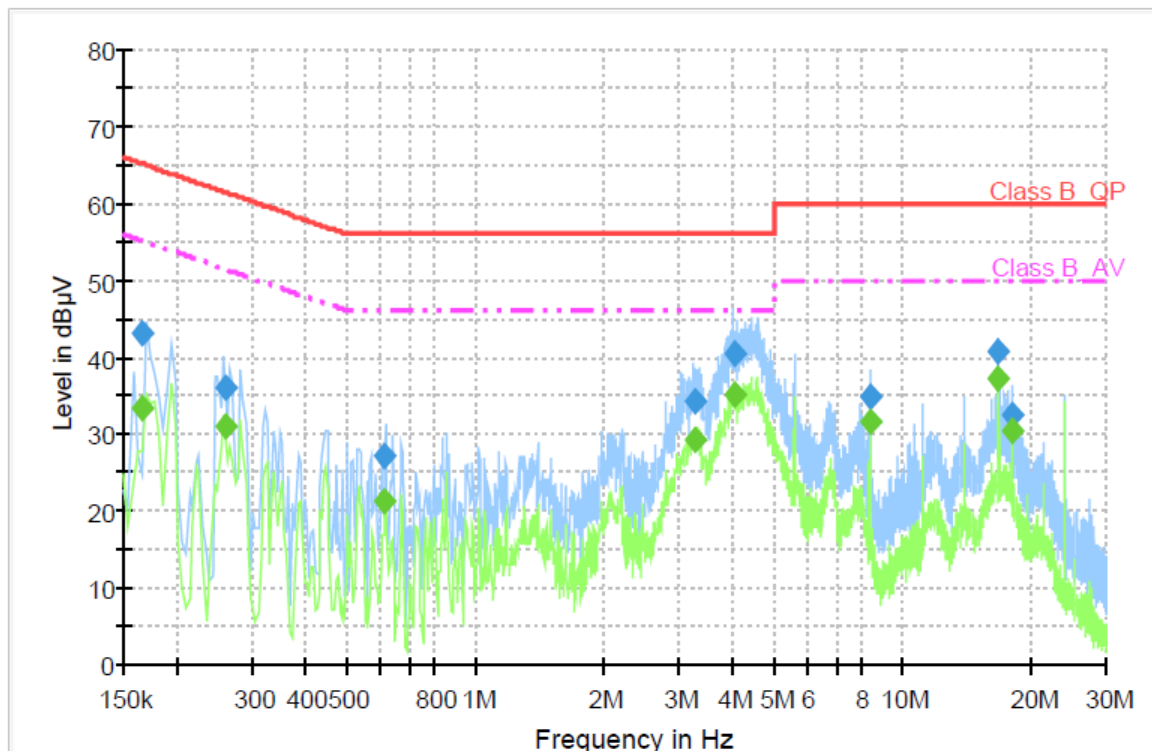
Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.166000	32.3	1000.0	9.000	GND	N	10.1	22.8	55.2	
0.280000	30.6	1000.0	9.000	GND	N	10.1	20.2	50.8	
2.124000	18.0	1000.0	9.000	GND	N	10.2	28.0	46.0	
3.292000	28.3	1000.0	9.000	GND	N	10.2	17.7	46.0	
4.400000	38.6	1000.0	9.000	GND	N	10.3	7.4	46.0	
6.804000	29.1	1000.0	9.000	GND	N	10.4	20.9	50.0	
14.460000	34.6	1000.0	9.000	GND	N	10.7	15.4	50.0	
21.668000	38.4	1000.0	9.000	GND	N	10.8	11.6	50.0	

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



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



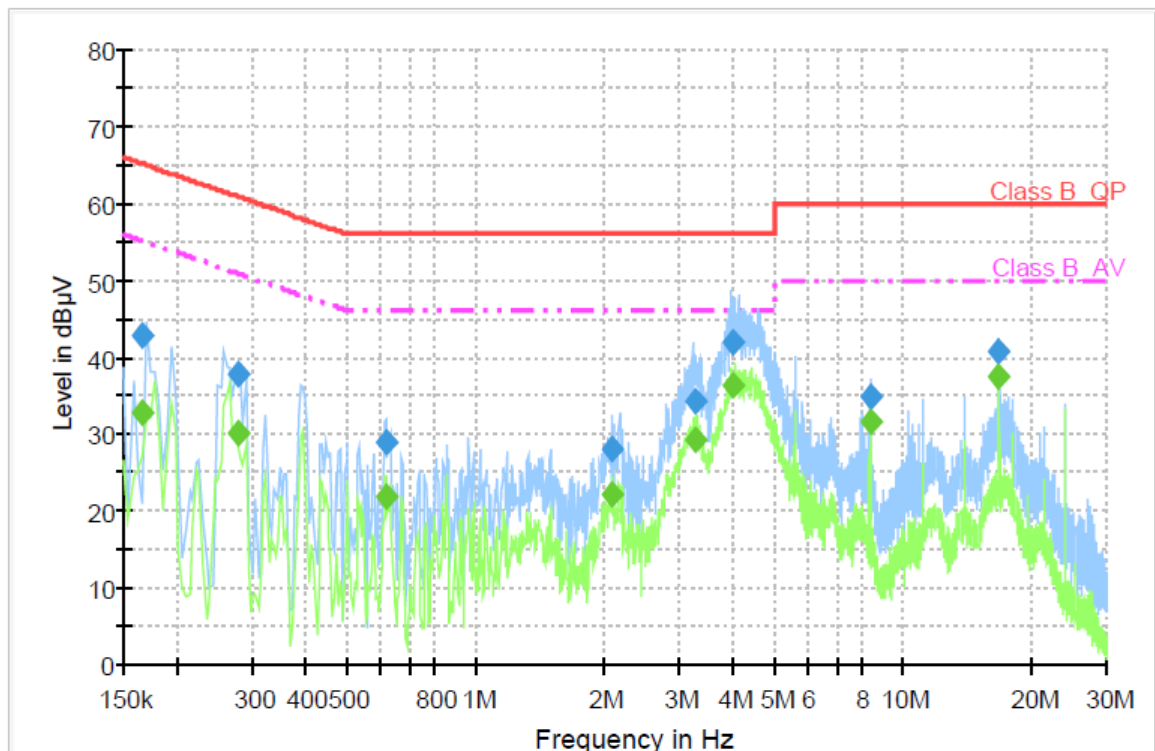
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.166000	43.1	1000.0	9.000	GND	L1	10.1	22.0	65.2	
0.260000	36.1	1000.0	9.000	GND	L1	10.1	25.3	61.4	
0.612000	27.1	1000.0	9.000	GND	L1	10.1	28.9	56.0	
3.256000	34.3	1000.0	9.000	GND	L1	10.2	21.7	56.0	
4.028000	40.5	1000.0	9.000	GND	L1	10.3	15.5	56.0	
8.400000	34.8	1000.0	9.000	GND	L1	10.5	25.2	60.0	
16.772000	40.8	1000.0	9.000	GND	L1	11.0	19.2	60.0	
18.024000	32.5	1000.0	9.000	GND	L1	11.1	27.5	60.0	

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.166000	33.2	1000.0	9.000	GND	L1	10.1	21.9	55.2	
0.260000	30.9	1000.0	9.000	GND	L1	10.1	20.6	51.4	
0.612000	21.3	1000.0	9.000	GND	L1	10.1	24.7	46.0	
3.256000	29.4	1000.0	9.000	GND	L1	10.2	16.6	46.0	
4.028000	35.3	1000.0	9.000	GND	L1	10.3	10.7	46.0	
8.400000	31.5	1000.0	9.000	GND	L1	10.5	18.5	50.0	
16.772000	37.1	1000.0	9.000	GND	L1	11.0	12.9	50.0	
18.024000	30.3	1000.0	9.000	GND	L1	11.1	19.7	50.0	

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



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.166000	42.9	1000.0	9.000	GND	N	10.1	22.3	65.2	
0.280000	37.9	1000.0	9.000	GND	N	10.1	22.9	60.8	
0.616000	28.8	1000.0	9.000	GND	N	10.1	27.2	56.0	
2.076000	28.1	1000.0	9.000	GND	N	10.2	27.9	56.0	
3.256000	34.2	1000.0	9.000	GND	N	10.2	21.8	56.0	
4.016000	41.8	1000.0	9.000	GND	N	10.3	14.2	56.0	
8.400000	34.8	1000.0	9.000	GND	N	10.5	25.2	60.0	
16.772000	40.8	1000.0	9.000	GND	N	10.8	19.2	60.0	

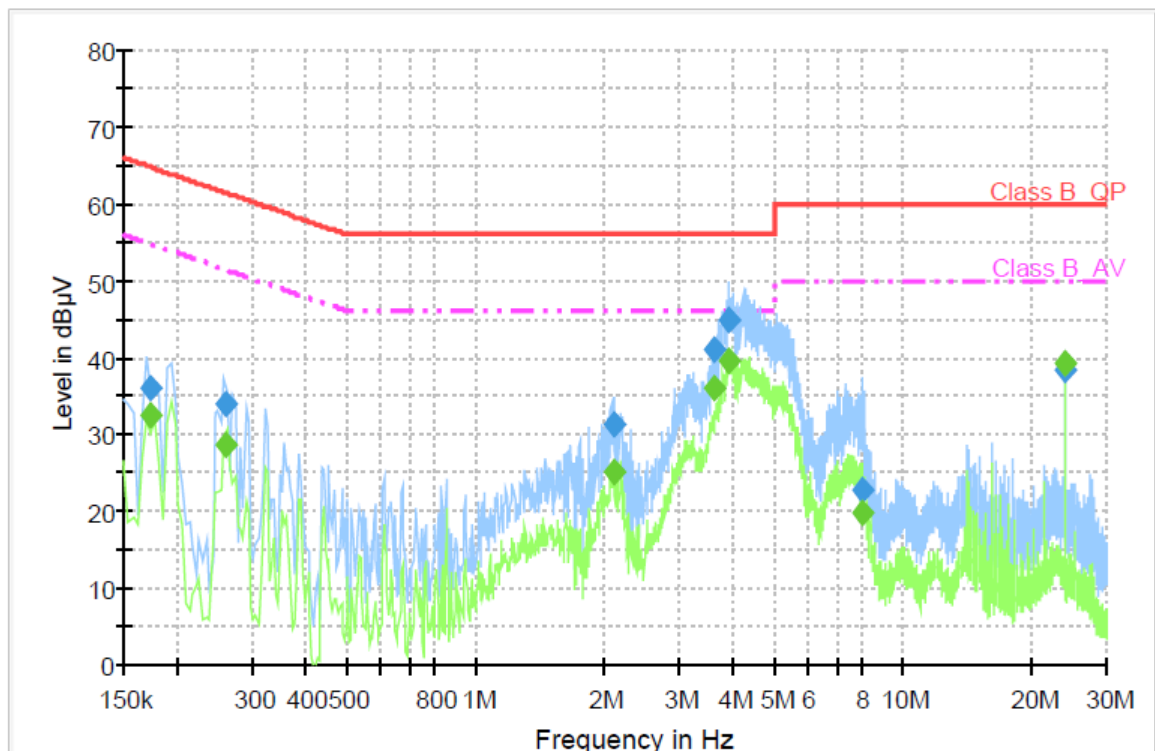
Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.166000	32.8	1000.0	9.000	GND	N	10.1	22.4	55.2	
0.280000	30.0	1000.0	9.000	GND	N	10.1	20.8	50.8	
0.616000	22.0	1000.0	9.000	GND	N	10.1	24.0	46.0	
2.076000	22.1	1000.0	9.000	GND	N	10.2	23.9	46.0	
3.256000	29.3	1000.0	9.000	GND	N	10.2	16.7	46.0	
4.016000	36.4	1000.0	9.000	GND	N	10.3	9.6	46.0	
8.400000	31.6	1000.0	9.000	GND	N	10.5	18.4	50.0	
16.772000	37.4	1000.0	9.000	GND	N	10.8	12.6	50.0	

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



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



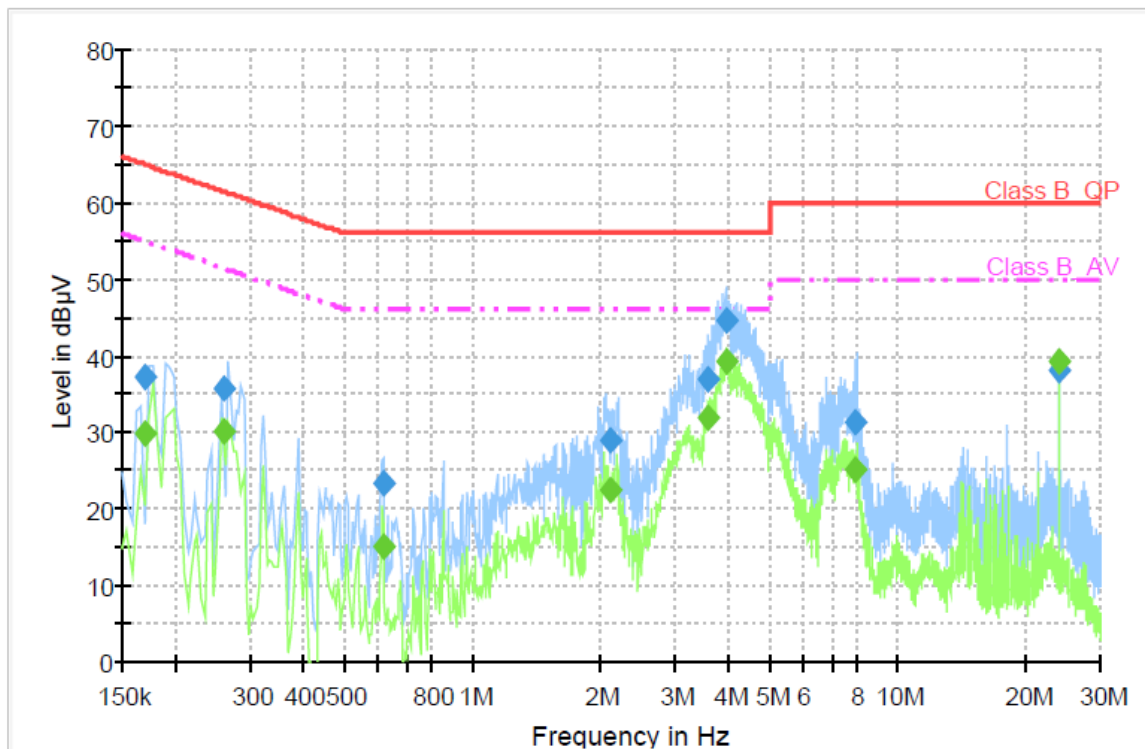
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.174000	36.2	1000.0	9.000	GND	L1	10.1	28.6	64.8	
0.260000	33.9	1000.0	9.000	GND	L1	10.1	27.6	61.4	
2.100000	31.3	1000.0	9.000	GND	L1	10.2	24.7	56.0	
3.624000	41.1	1000.0	9.000	GND	L1	10.3	14.9	56.0	
3.908000	44.9	1000.0	9.000	GND	L1	10.3	11.1	56.0	
8.036000	22.7	1000.0	9.000	GND	L1	10.5	37.3	60.0	
24.000000	38.3	1000.0	9.000	GND	L1	11.1	21.7	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	32.6	1000.0	9.000	GND	L1	10.1	22.2	54.8	
0.260000	28.6	1000.0	9.000	GND	L1	10.1	22.8	51.4	
2.100000	25.1	1000.0	9.000	GND	L1	10.2	20.9	46.0	
3.624000	35.9	1000.0	9.000	GND	L1	10.3	10.1	46.0	
3.908000	39.7	1000.0	9.000	GND	L1	10.3	6.3	46.0	
8.036000	19.7	1000.0	9.000	GND	L1	10.5	30.3	50.0	
24.000000	39.3	1000.0	9.000	GND	L1	11.1	10.7	50.0	

< Fig 10. Conducted emission result (Live line) >



Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.170000	37.3	1000.0	9.000	GND	N	10.1	27.7	65.0	
0.260000	35.6	1000.0	9.000	GND	N	10.1	25.8	61.4	
0.616000	23.3	1000.0	9.000	GND	N	10.1	32.7	56.0	
2.104000	29.0	1000.0	9.000	GND	N	10.2	27.0	56.0	
3.592000	36.9	1000.0	9.000	GND	N	10.3	19.1	56.0	
3.968000	44.6	1000.0	9.000	GND	N	10.3	11.4	56.0	
7.960000	31.2	1000.0	9.000	GND	N	10.4	28.8	60.0	
24.000000	38.2	1000.0	9.000	GND	N	10.7	21.8	60.0	

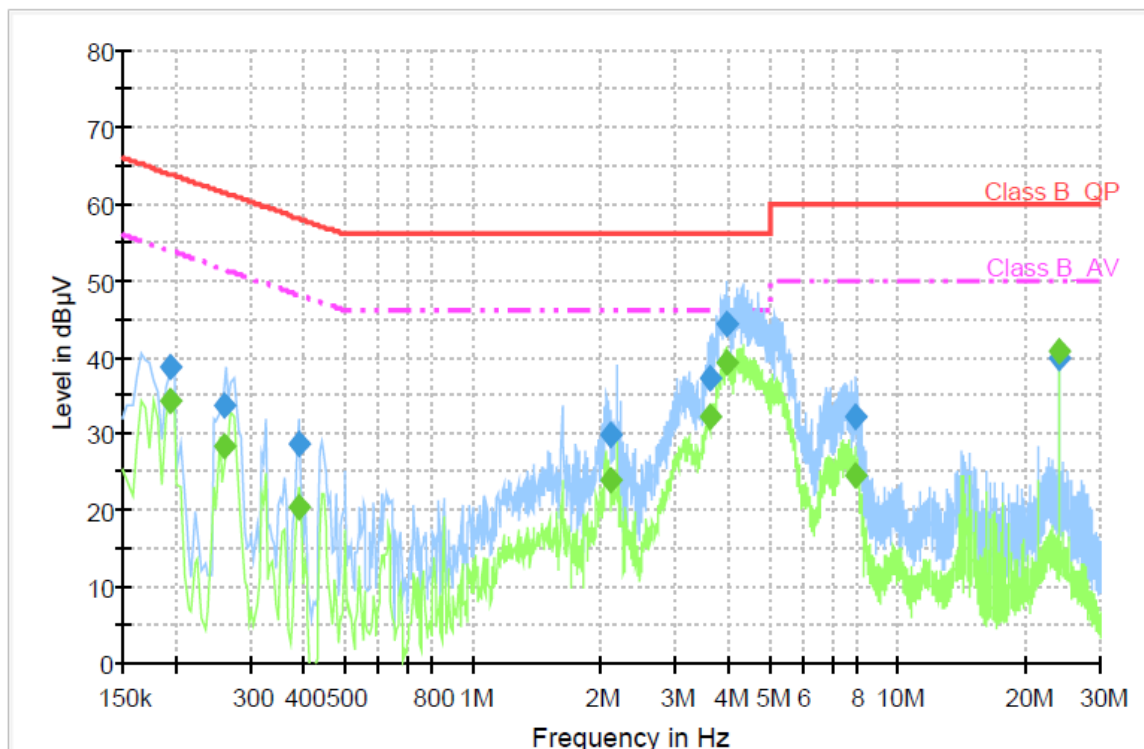
Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.170000	29.9	1000.0	9.000	GND	N	10.1	25.0	55.0	
0.260000	30.2	1000.0	9.000	GND	N	10.1	21.2	51.4	
0.616000	15.1	1000.0	9.000	GND	N	10.1	30.9	46.0	
2.104000	22.4	1000.0	9.000	GND	N	10.2	23.6	46.0	
3.592000	32.0	1000.0	9.000	GND	N	10.3	14.0	46.0	
3.968000	39.3	1000.0	9.000	GND	N	10.3	6.7	46.0	
7.960000	25.0	1000.0	9.000	GND	N	10.4	25.0	50.0	
24.000000	39.1	1000.0	9.000	GND	N	10.7	10.9	50.0	

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



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



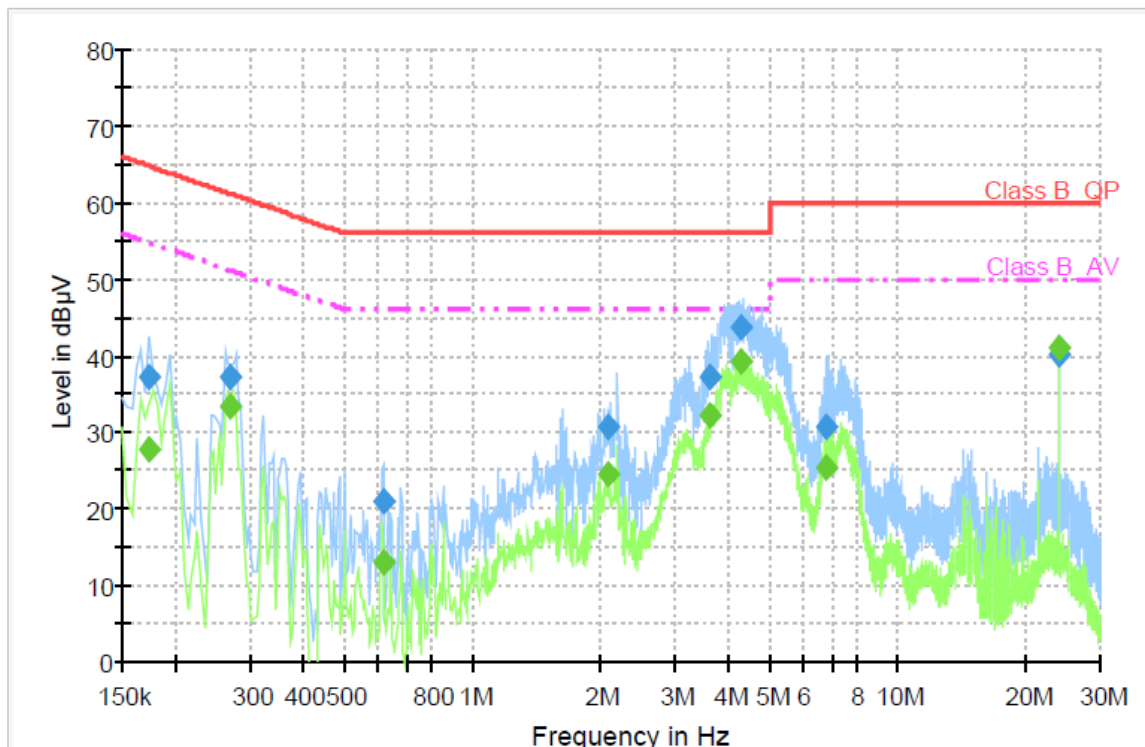
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.194000	38.7	1000.0	9.000	GND	L1	10.1	25.2	63.9	
0.260000	33.7	1000.0	9.000	GND	L1	10.1	27.7	61.4	
0.392000	28.7	1000.0	9.000	GND	L1	10.1	29.4	58.0	
2.100000	29.8	1000.0	9.000	GND	L1	10.2	26.2	56.0	
3.620000	37.2	1000.0	9.000	GND	L1	10.3	18.8	56.0	
3.944000	44.3	1000.0	9.000	GND	L1	10.3	11.7	56.0	
7.984000	32.2	1000.0	9.000	GND	L1	10.5	27.8	60.0	
24.000000	39.8	1000.0	9.000	GND	L1	11.1	20.2	60.0	

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.194000	34.2	1000.0	9.000	GND	L1	10.1	19.7	53.9	
0.260000	28.3	1000.0	9.000	GND	L1	10.1	23.1	51.4	
0.392000	20.5	1000.0	9.000	GND	L1	10.1	27.5	48.0	
2.100000	23.9	1000.0	9.000	GND	L1	10.2	22.1	46.0	
3.620000	32.1	1000.0	9.000	GND	L1	10.3	13.9	46.0	
3.944000	39.1	1000.0	9.000	GND	L1	10.3	6.9	46.0	
7.984000	24.4	1000.0	9.000	GND	L1	10.5	25.6	50.0	
24.000000	40.8	1000.0	9.000	GND	L1	11.1	9.2	50.0	

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



Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.174000	37.1	1000.0	9.000	GND	N	10.1	27.7	64.8	
0.268000	37.1	1000.0	9.000	GND	N	10.1	24.1	61.2	
0.616000	21.1	1000.0	9.000	GND	N	10.1	34.9	56.0	
2.088000	30.6	1000.0	9.000	GND	N	10.2	25.4	56.0	
3.628000	37.3	1000.0	9.000	GND	N	10.3	18.7	56.0	
4.308000	43.8	1000.0	9.000	GND	N	10.3	12.2	56.0	
6.812000	30.6	1000.0	9.000	GND	N	10.4	29.4	60.0	
24.000000	40.1	1000.0	9.000	GND	N	10.7	19.9	60.0	

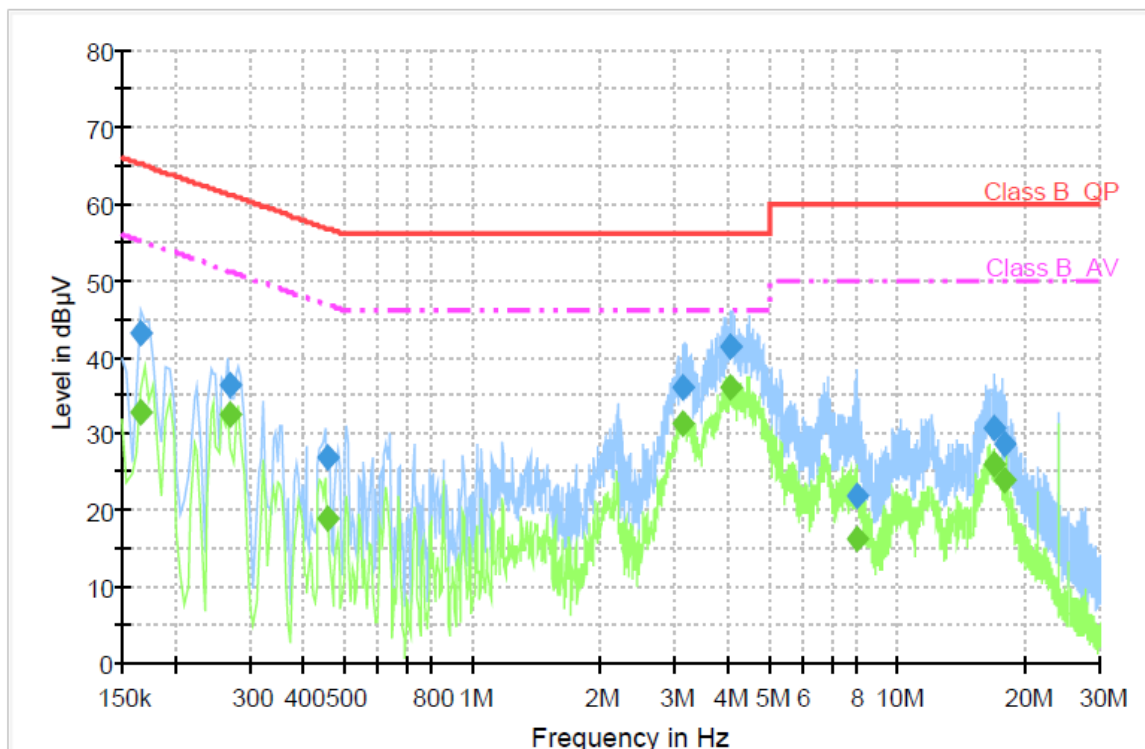
Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.174000	27.8	1000.0	9.000	GND	N	10.1	26.9	54.8	
0.268000	33.5	1000.0	9.000	GND	N	10.1	17.7	51.2	
0.616000	12.9	1000.0	9.000	GND	N	10.1	33.1	46.0	
2.088000	24.6	1000.0	9.000	GND	N	10.2	21.4	46.0	
3.628000	32.3	1000.0	9.000	GND	N	10.3	13.7	46.0	
4.308000	39.1	1000.0	9.000	GND	N	10.3	6.9	46.0	
6.812000	25.2	1000.0	9.000	GND	N	10.4	24.8	50.0	
24.000000	41.1	1000.0	9.000	GND	N	10.7	8.9	50.0	

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



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



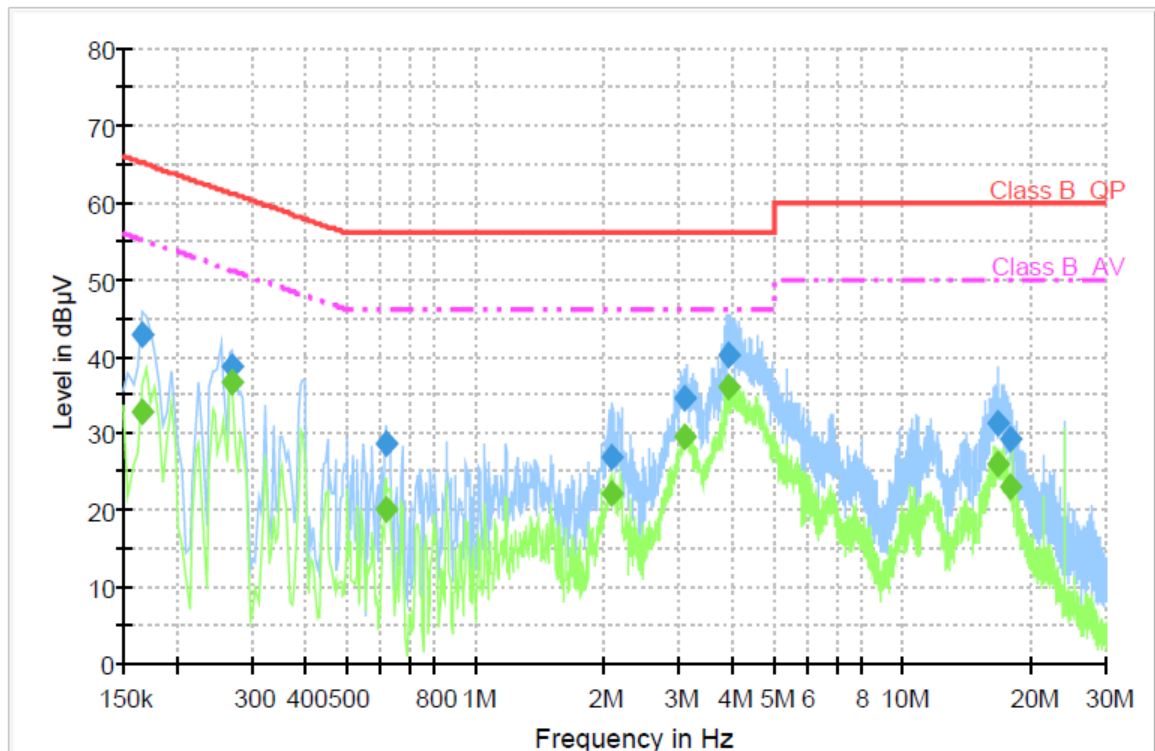
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.166000	43.1	1000.0	9.000	GND	L1	10.1	22.1	65.2	
0.268000	36.4	1000.0	9.000	GND	L1	10.1	24.8	61.2	
0.456000	26.8	1000.0	9.000	GND	L1	10.1	29.9	56.8	
3.112000	36.1	1000.0	9.000	GND	L1	10.2	19.9	56.0	
4.052000	41.2	1000.0	9.000	GND	L1	10.3	14.8	56.0	
8.012000	21.7	1000.0	9.000	GND	L1	10.5	38.3	60.0	
16.864000	30.7	1000.0	9.000	GND	L1	11.0	29.3	60.0	
17.804000	28.7	1000.0	9.000	GND	L1	11.1	31.3	60.0	

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.166000	32.9	1000.0	9.000	GND	L1	10.1	22.2	55.2	
0.268000	32.6	1000.0	9.000	GND	L1	10.1	18.6	51.2	
0.456000	18.8	1000.0	9.000	GND	L1	10.1	28.0	46.8	
3.112000	31.2	1000.0	9.000	GND	L1	10.2	14.8	46.0	
4.052000	36.0	1000.0	9.000	GND	L1	10.3	10.0	46.0	
8.012000	16.2	1000.0	9.000	GND	L1	10.5	33.8	50.0	
16.864000	25.9	1000.0	9.000	GND	L1	11.0	24.1	50.0	
17.804000	24.0	1000.0	9.000	GND	L1	11.1	26.0	50.0	

< Fig 14. Conducted emission result (Live line) >



Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.166000	42.8	1000.0	9.000	GND	N	10.1	22.4	65.2	
0.268000	38.8	1000.0	9.000	GND	N	10.1	22.4	61.2	
0.620000	28.7	1000.0	9.000	GND	N	10.1	27.3	56.0	
2.088000	26.8	1000.0	9.000	GND	N	10.2	29.2	56.0	
3.108000	34.4	1000.0	9.000	GND	N	10.2	21.6	56.0	
3.920000	40.1	1000.0	9.000	GND	N	10.3	15.9	56.0	
16.656000	31.3	1000.0	9.000	GND	N	10.8	28.7	60.0	
17.836000	29.3	1000.0	9.000	GND	N	10.9	30.7	60.0	

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.166000	32.7	1000.0	9.000	GND	N	10.1	22.4	55.2	
0.268000	36.5	1000.0	9.000	GND	N	10.1	14.7	51.2	
0.620000	20.1	1000.0	9.000	GND	N	10.1	25.9	46.0	
2.088000	22.2	1000.0	9.000	GND	N	10.2	23.8	46.0	
3.108000	29.5	1000.0	9.000	GND	N	10.2	16.5	46.0	
3.920000	36.1	1000.0	9.000	GND	N	10.3	9.9	46.0	
16.656000	25.9	1000.0	9.000	GND	N	10.8	24.1	50.0	
17.836000	23.1	1000.0	9.000	GND	N	10.9	26.9	50.0	

< Fig 15. Conducted emission result (Neutral line) >



6. Radiated Emission

6.1 Operating Environment

Temperature : 22.0 °C
Relative Humidity : 38.0 % 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)	± 4.03 dB	Confidence levels of 95 % ($k = 2$)
Radiated emission (30 MHz ~ 300 MHz, 10 m, Horizontal)	± 3.96 dB	Confidence levels of 95 % ($k = 2$)
Radiated emission (300 MHz ~ 1 000 MHz, 10 m, Vertical)	± 4.01 dB	Confidence levels of 95 % ($k = 2$)
Radiated emission (300 MHz ~ 1 000 MHz, 10 m, Horizontal)	± 3.88 dB	Confidence levels of 95 % ($k = 2$)



6.4 Limit

Frequency (MHz)	FCC Limit @ 3 m. dB μ V/m	CISPR Limit @ 10 m. dB μ V/m
30 ~ 88	40.0	30.0
88 ~ 216	43.5	30.0
216 ~ 230	46.0	30.0
230 ~ 960	46.0	37.0
960 ~ 1 000	54.0	37.0
> 1 000	54.0	No Specified limit

6.5 Test Equipment used

Model Name	Manufacturer	Description	Serial Number	Due to Calibration
■ - ESCS30	Rohde & Schwarz	EMI Test Receiver	839809/003	12. 10. 2011
■ - HK116	Rohde & Schwarz	Biconical Antenna	832639/007	03. 15. 2012
■ - HL223	Rohde & Schwarz	Log Periodic Antenna	835998/004	03. 15. 2012
■ - 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	12. 11. 2011
■ - BBHA9120D	Schwarzbeck	Horn Antenna	207	12. 22. 2011
■ - MCU066	maturo GmbH	Position Controller	1390306	N/A
■ - TT2.5SI	maturo GmbH	Turntable	1390307	N/A
■ - AM 4.0	maturo GmbH	Antenna Mast	1390308	N/A
■ - AFS 44 00101800-25-10P-44	MITEQ	Preamplifier	1258942	11. 12. 2011

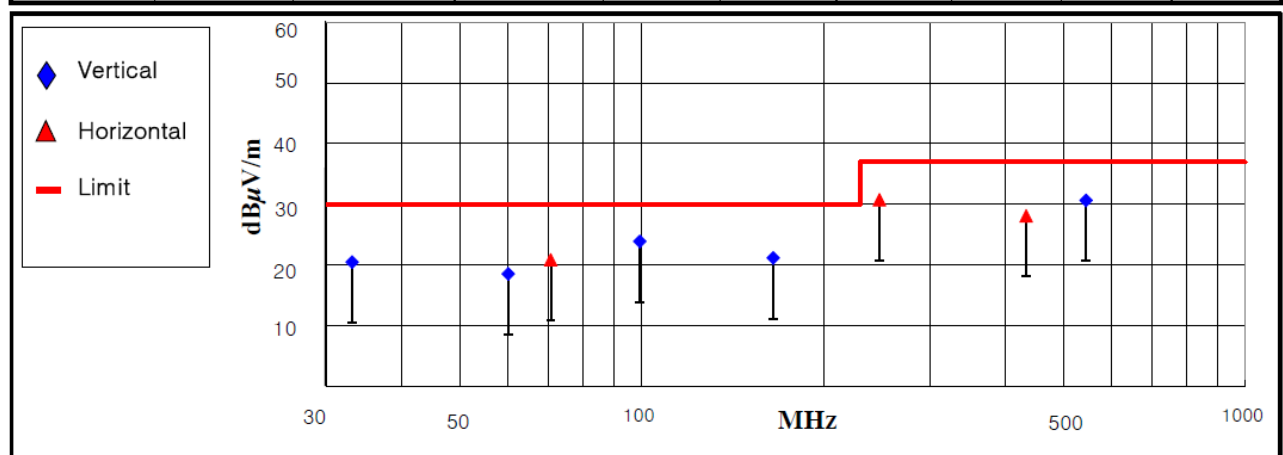


6.6 Test data for Radiated Emission

- Test Date : October 6 ~ 11, 2011
- Resolution Bandwidth : 120 kHz / 1 MHz
- Measurement Distance : 10 m / 3 m
- Frequency Range (Detector mode) : 30 MHz ~ 1 GHz (Quasi-peak detector mode)
1 GHz ~ 5 GHz (Average detector mode, Peak detector mode)
- 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

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

Frequency (MHz)	Measurement Level				Limit (dBμV/m)	Margin (dB)	Positioning System		
	Reading Value(dBμV)	Antenna Factor(dB/m)	Cable Loss(dB)	Test Result (dBμV/m)			Pol. (H/V)	Height (cm)	Angle (°)
33.12	6.65	12.45	1.38	20.48	30.00	9.52	V	100	134
60.07	8.56	8.04	1.91	18.51	30.00	11.49	V	104	145
70.65	10.08	8.69	2.08	20.85	30.00	9.15	H	200	175
99.24	11.93	9.42	2.52	23.87	30.00	6.13	V	111	164
165.12	5.34	12.46	3.36	21.16	30.00	8.84	V	1002	355
247.60	13.14	13.39	4.24	30.77	37.00	6.23	H	100	52
433.32	5.67	16.65	5.80	28.12	37.00	8.88	H	100	53
544.69	5.83	18.19	6.63	30.65	37.00	6.35	V	119	4

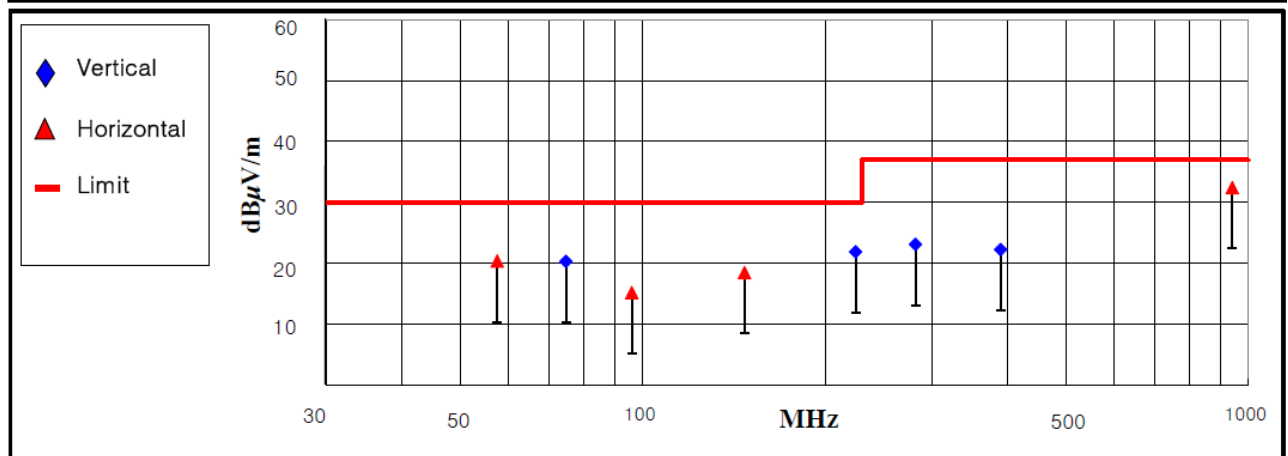


< Fig 16. Radiated emission result (30 MHz ~ 1 000 MHz) >



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

Frequency (MHz)	Measurement Level				Limit (dBμ V/m)	Margin (dB)	Positioning System		
	Reading	Antenna	Cable	Test Result			Pol.	Height	Angle
	Value(dBμ V)	Factor(dB/m)	Loss(dB)	(dBμ V/m)			(H/V)	(cm)	(°)
57.50	10.15	8.37	1.86	20.38	30.00	9.62	H	154	174
74.68	9.58	8.58	2.15	20.31	30.00	9.69	V	102	322
95.89	3.57	9.13	2.48	15.18	30.00	14.82	H	182	24
147.21	3.40	11.93	3.13	18.46	30.00	11.54	H	193	220
224.65	3.93	13.93	4.01	21.87	30.00	8.13	V	200	165
282.14	2.43	16.12	4.56	23.11	37.00	13.89	V	147	161
389.85	0.91	15.88	5.45	22.24	37.00	14.76	V	148	270
940.54	0.46	22.73	9.26	32.45	37.00	4.55	H	100	198

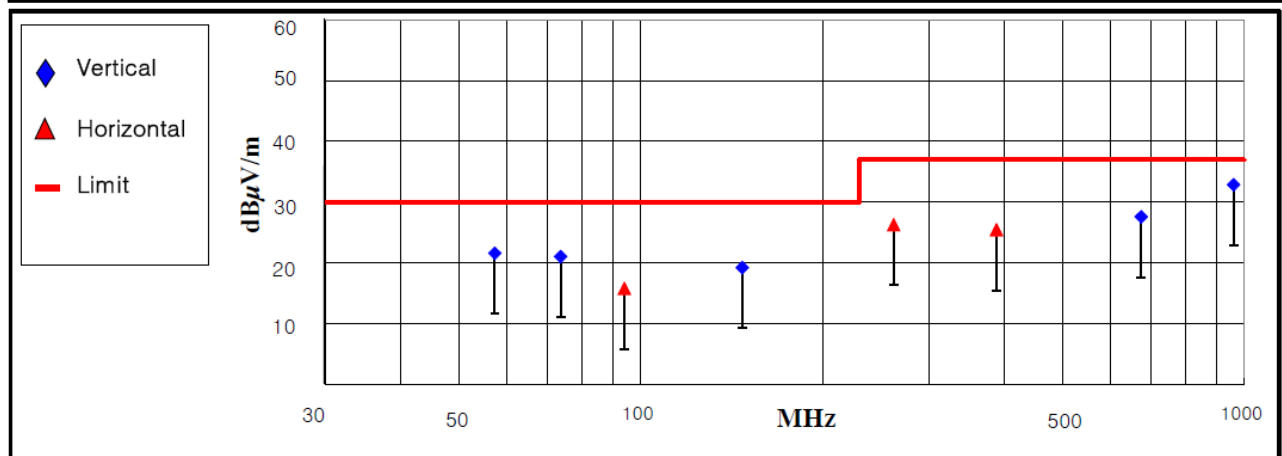


< Fig 17. Radiated emission result (30 MHz ~ 1 000 MHz) >



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

Frequency (MHz)	Measurement Level				Limit (dBμV/m)	Margin (dB)	Positioning System		
	Reading	Antenna	Cable	Test Result			Pol.	Height	Angle
	Value(dBμV)	Factor(dB/m)	Loss(dB)	(dBμV/m)			(H/V)	(cm)	(°)
57.30	11.34	8.39	1.86	21.59	30.00	8.41	V	105	280
73.65	10.29	8.61	2.14	21.04	30.00	8.96	V	104	11
93.94	4.37	8.97	2.45	15.79	30.00	14.21	H	196	354
147.30	4.17	11.93	3.13	19.23	30.00	10.77	V	105	336
262.54	7.52	14.42	4.38	26.32	37.00	10.68	H	100	225
388.69	4.20	15.84	5.44	25.48	37.00	11.52	H	184	210
674.82	0.16	19.90	7.55	27.61	37.00	9.39	V	105	358
960.10	0.45	23.05	9.38	32.88	37.00	4.12	V	104	217

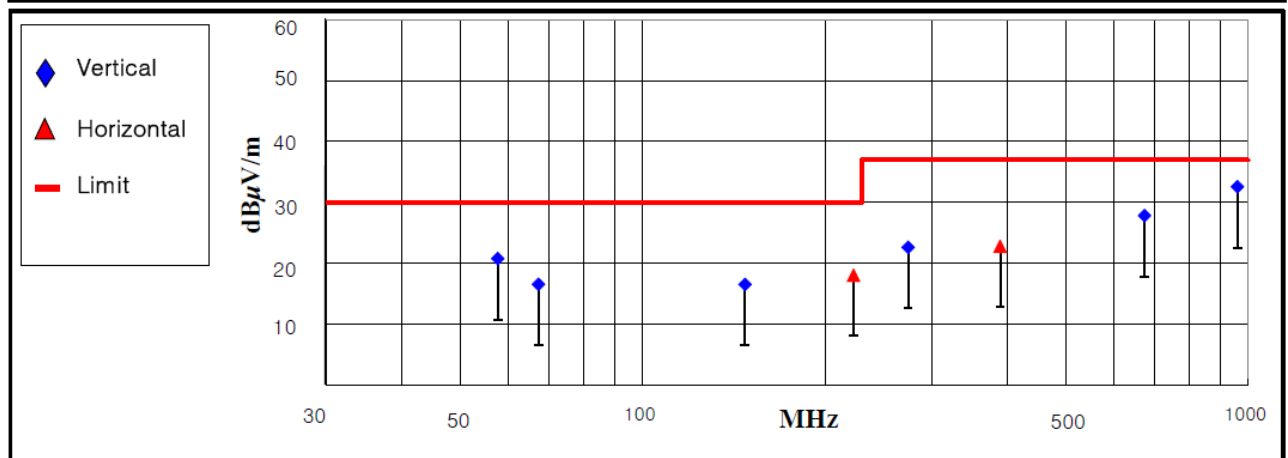


< Fig 18. Radiated emission result (30 MHz ~ 1 000 MHz) >



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

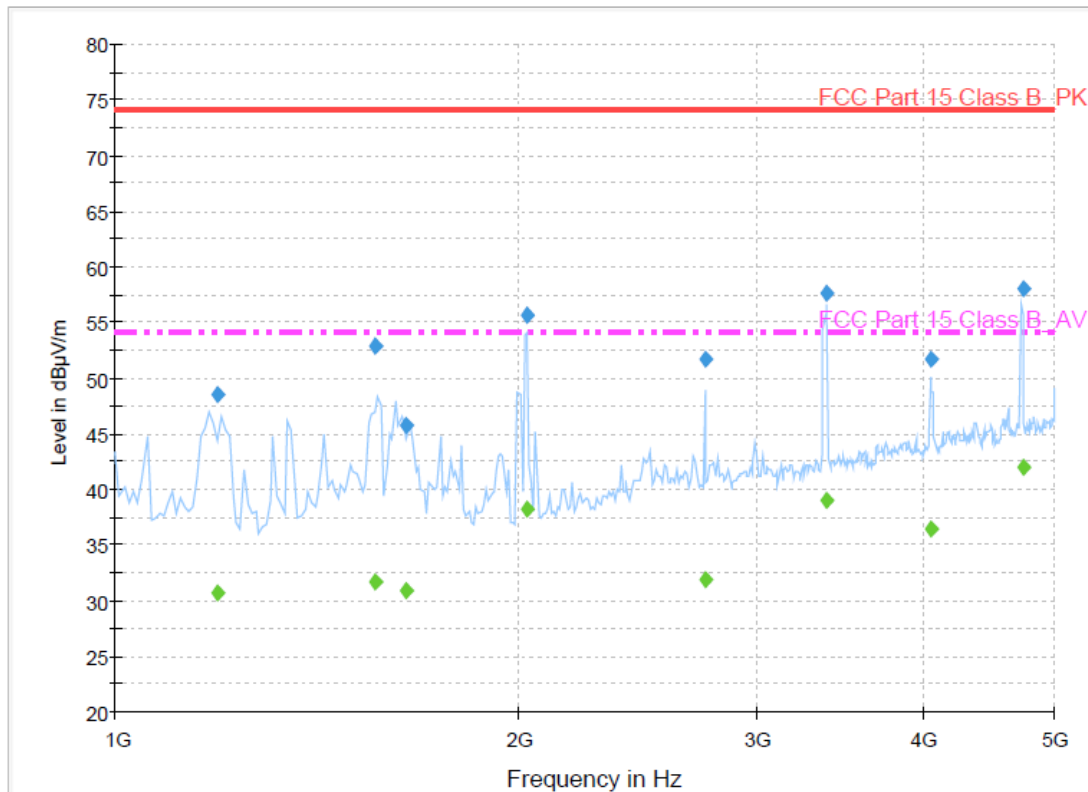
Frequency (MHz)	Measurement Level				Limit (dBμ V/m)	Margin (dB)	Positioning System		
	Reading	Antenna	Cable	Test Result			Pol.	Height	Angle
	Value(dBμ V)	Factor(dB/m)	Loss(dB)	(dBμ V/m)			(H/V)	(cm)	(°)
57.58	10.56	8.35	1.86	20.77	30.00	9.23	V	102	265
67.24	5.98	8.53	2.03	16.54	30.00	13.46	V	103	174
147.52	1.45	11.93	3.14	16.52	30.00	13.48	V	102	338
222.98	0.07	13.97	4.00	18.04	30.00	11.96	H	135	16
274.31	2.71	15.44	4.48	22.63	37.00	14.37	V	144	185
389.45	1.47	15.86	5.45	22.78	37.00	14.22	H	200	247
674.16	0.40	19.89	7.55	27.84	37.00	9.16	V	104	0
960.17	0.14	23.05	9.39	32.58	37.00	4.42	V	104	215



< Fig 19. 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)
1194.152706	48.5	1000.0	1000.000	100.0	V	170.0	-14.1	25.5	74.0
1562.538277	52.8	1000.0	1000.000	100.0	V	9.0	-12.8	21.2	74.0
1646.266533	45.8	1000.0	1000.000	150.0	V	162.0	-12.6	28.2	74.0
2025.452104	55.6	1000.0	1000.000	100.0	H	225.0	-11.3	18.4	74.0
2750.094990	51.7	1000.0	1000.000	100.0	H	226.0	-7.8	22.3	74.0
3383.777555	57.6	1000.0	1000.000	100.0	H	214.0	-5.4	16.4	74.0
4045.892184	51.6	1000.0	1000.000	100.0	H	285.0	-2.8	22.4	74.0
4737.654910	58.0	1000.0	1000.000	100.0	H	221.0	-1.4	16.0	74.0

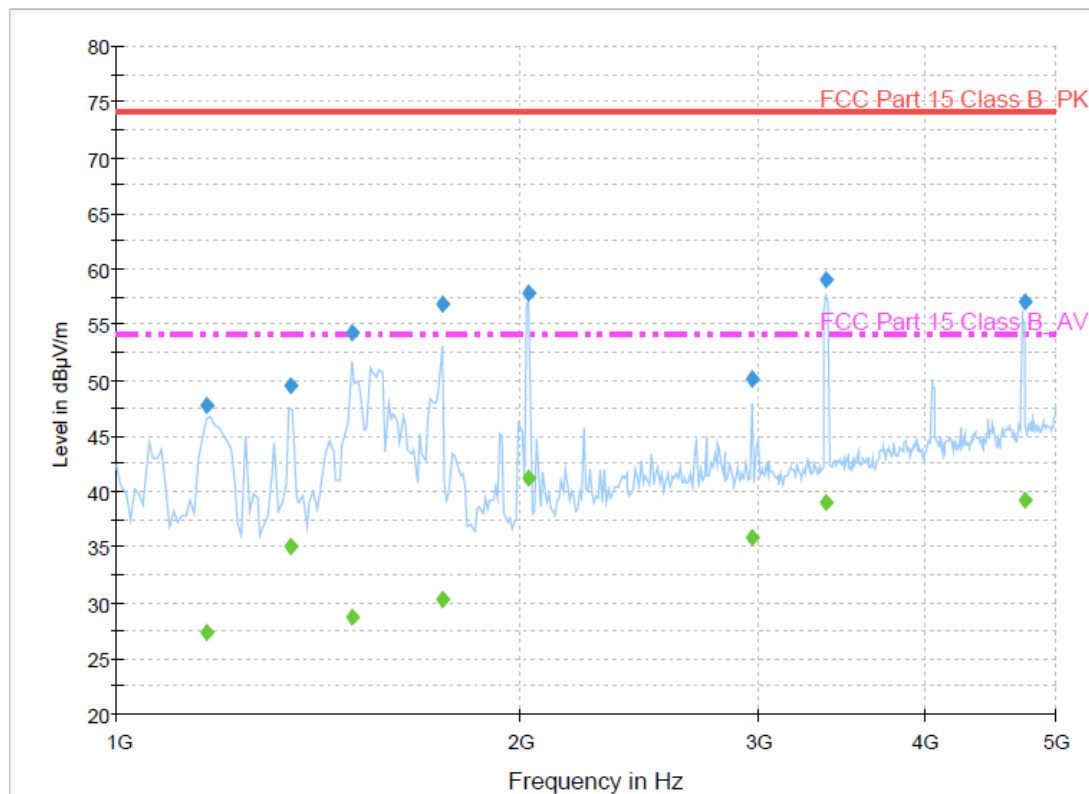
Final Result 2

Frequency (MHz)	CAverage (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1194.152706	30.8	1000.0	1000.000	100.0	V	170.0	-14.1	23.2	54.0
1562.538277	31.7	1000.0	1000.000	100.0	V	9.0	-12.8	22.3	54.0
1646.266533	31.0	1000.0	1000.000	150.0	V	162.0	-12.6	23.0	54.0
2025.452104	38.2	1000.0	1000.000	100.0	H	225.0	-11.3	15.8	54.0
2750.094990	31.9	1000.0	1000.000	100.0	H	226.0	-7.8	22.1	54.0
3383.777555	39.1	1000.0	1000.000	100.0	H	214.0	-5.4	14.9	54.0
4045.892184	36.5	1000.0	1000.000	100.0	H	285.0	-2.8	17.5	54.0
4737.654910	42.0	1000.0	1000.000	100.0	H	221.0	-1.4	12.0	54.0

< Fig 20. 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)
1166.536673	47.7	1000.0	1000.000	100.0	V	168.0	-14.2	26.3	74.0
1350.089379	49.6	1000.0	1000.000	100.0	H	216.0	-13.4	24.4	74.0
1497.993988	54.2	1000.0	1000.000	127.0	H	139.0	-13.2	19.8	74.0
1750.090982	56.9	1000.0	1000.000	150.0	V	305.0	-12.2	17.1	74.0
2025.052104	57.9	1000.0	1000.000	100.0	H	206.0	-11.3	16.1	74.0
2970.143888	50.1	1000.0	1000.000	115.0	V	184.0	-6.8	23.9	74.0
3368.145491	59.0	1000.0	1000.000	100.0	H	165.0	-5.4	15.0	74.0
4737.238878	57.0	1000.0	1000.000	100.0	H	215.0	-1.4	17.0	74.0

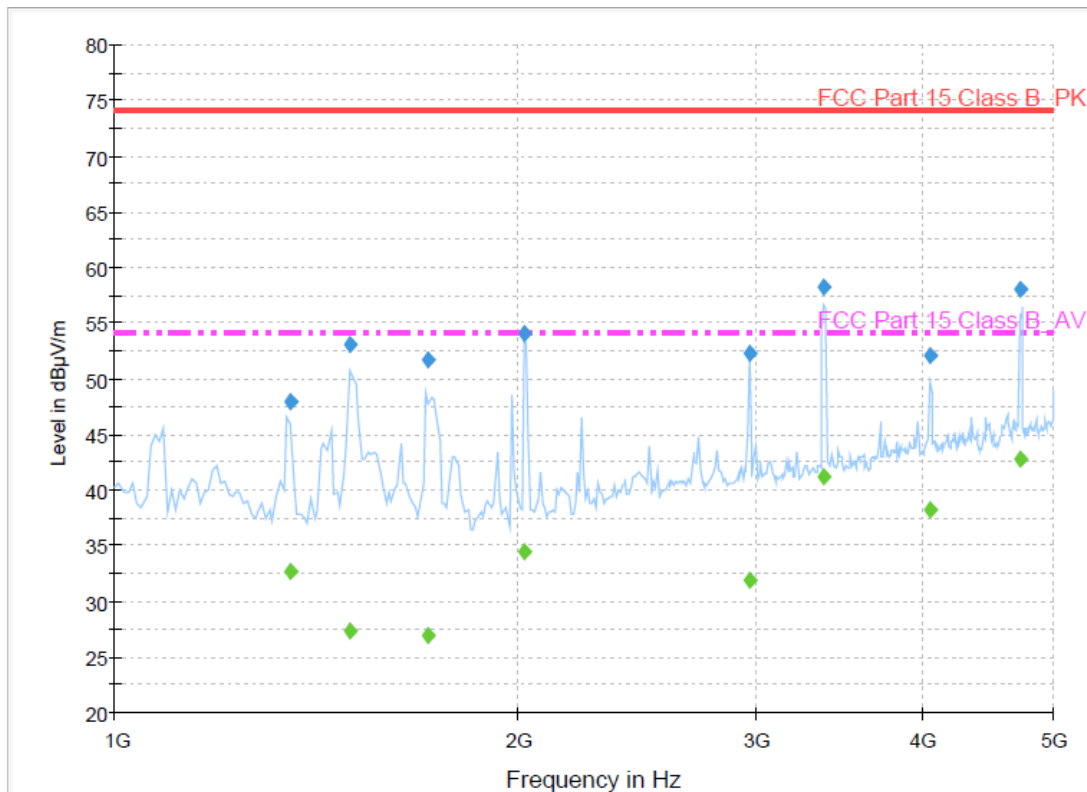
Final Result 2

Frequency (MHz)	CAverage (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1166.536673	27.3	1000.0	1000.000	100.0	V	168.0	-14.2	26.7	54.0
1350.089379	35.1	1000.0	1000.000	100.0	H	216.0	-13.4	18.9	54.0
1497.993988	28.6	1000.0	1000.000	127.0	H	139.0	-13.2	25.4	54.0
1750.090982	30.4	1000.0	1000.000	150.0	V	305.0	-12.2	23.6	54.0
2025.052104	41.1	1000.0	1000.000	100.0	H	206.0	-11.3	12.9	54.0
2970.143888	35.8	1000.0	1000.000	115.0	V	184.0	-6.8	18.2	54.0
3368.145491	39.0	1000.0	1000.000	100.0	H	165.0	-5.4	15.0	54.0
4737.238878	39.2	1000.0	1000.000	100.0	H	215.0	-1.4	14.8	54.0

< Fig 21. 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)
1351.689379	47.9	1000.0	1000.000	100.0	H	220.0	-13.4	26.1	74.0
1497.193988	53.2	1000.0	1000.000	100.0	H	135.0	-13.2	20.8	74.0
1710.410822	51.7	1000.0	1000.000	100.0	V	181.0	-12.5	22.3	74.0
2020.636072	54.0	1000.0	1000.000	100.0	H	227.0	-11.4	20.0	74.0
2972.143888	52.2	1000.0	1000.000	176.0	H	40.0	-6.8	21.8	74.0
3371.745491	58.2	1000.0	1000.000	100.0	H	40.0	-5.4	15.8	74.0
4047.108216	52.1	1000.0	1000.000	100.0	H	283.0	-2.8	21.9	74.0
4734.886974	58.1	1000.0	1000.000	100.0	H	221.0	-1.4	15.9	74.0

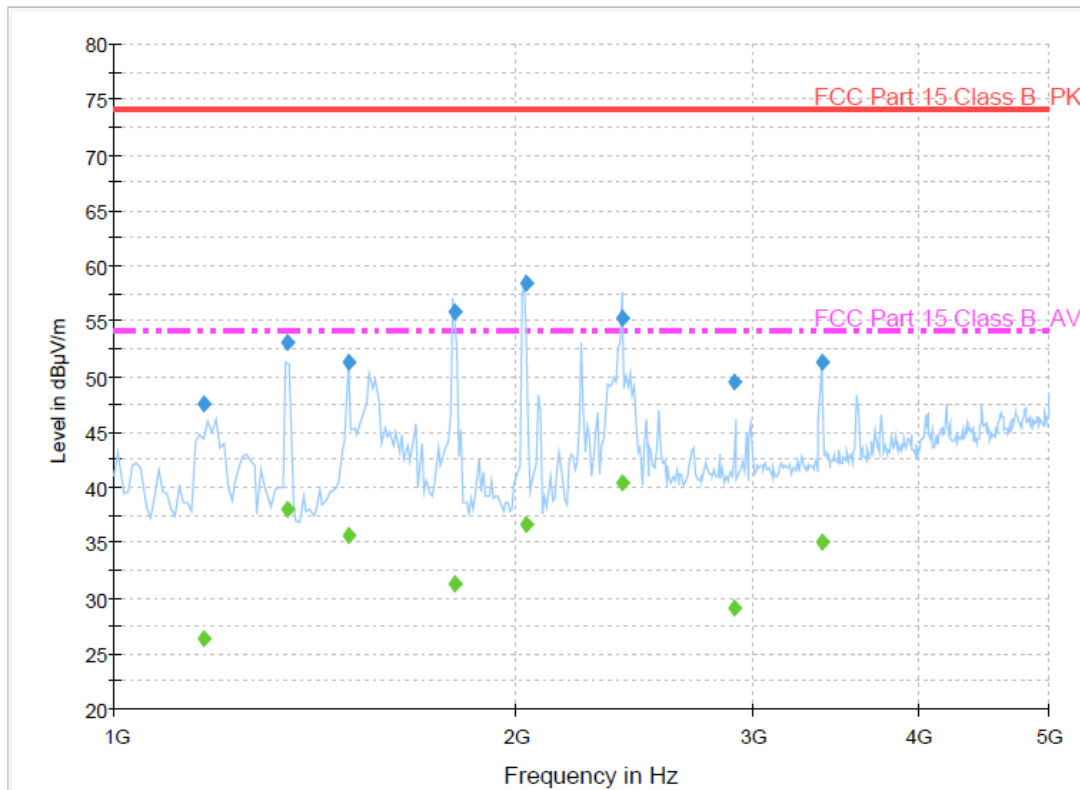
Final Result 2

Frequency (MHz)	CAverage (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1351.689379	32.8	1000.0	1000.000	100.0	H	220.0	-13.4	21.3	54.0
1497.193988	27.3	1000.0	1000.000	100.0	H	135.0	-13.2	26.7	54.0
1710.410822	27.0	1000.0	1000.000	100.0	V	181.0	-12.5	27.1	54.0
2020.636072	34.5	1000.0	1000.000	100.0	H	227.0	-11.4	19.5	54.0
2972.143888	31.8	1000.0	1000.000	176.0	H	40.0	-6.8	22.2	54.0
3371.745491	41.3	1000.0	1000.000	100.0	H	40.0	-5.4	12.7	54.0
4047.108216	38.2	1000.0	1000.000	100.0	H	283.0	-2.8	15.8	54.0
4734.886974	42.9	1000.0	1000.000	100.0	H	221.0	-1.4	11.1	54.0

< Fig 22. 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)
1165.320641	47.5	1000.0	1000.000	100.0	V	159.0	-14.2	26.5	74.0
1350.089379	53.1	1000.0	1000.000	100.0	V	326.0	-13.4	20.9	74.0
1500.393988	51.3	1000.0	1000.000	100.0	V	347.0	-13.2	22.7	74.0
1800.187174	55.7	1000.0	1000.000	100.0	V	291.0	-11.9	18.3	74.0
2031.052104	58.5	1000.0	1000.000	100.0	H	285.0	-11.3	15.5	74.0
2399.389579	55.3	1000.0	1000.000	165.0	H	302.0	-9.4	18.7	74.0
2912.431663	49.6	1000.0	1000.000	100.0	H	213.0	-7.1	24.4	74.0
3382.561523	51.3	1000.0	1000.000	100.0	V	219.0	-5.4	22.7	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)
1165.320641	26.3	1000.0	1000.000	100.0	V	159.0	-14.2	27.7	54.0
1350.089379	38.0	1000.0	1000.000	100.0	V	326.0	-13.4	16.0	54.0
1500.393988	35.6	1000.0	1000.000	100.0	V	347.0	-13.2	18.4	54.0
1800.187174	31.2	1000.0	1000.000	100.0	V	291.0	-11.9	22.8	54.0
2031.052104	36.6	1000.0	1000.000	100.0	H	285.0	-11.3	17.4	54.0
2399.389579	40.3	1000.0	1000.000	165.0	H	302.0	-9.4	13.7	54.0
2912.431663	29.0	1000.0	1000.000	100.0	H	213.0	-7.1	25.0	54.0
3382.561523	35.0	1000.0	1000.000	100.0	V	219.0	-5.4	19.0	54.0

< Fig 23. 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. SIGNAGE DISPLAY (Model Name: 47VS20)** was complies with §15.107 and 15.109 of the FCC Rules.