

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: August 31, 2011

Order Number: GETEC-C1-11-203

Test Report Number: GETEC-E3-11-099

Test Site: Gumi College EMC Center

FCC Registration Number: (100749, 443957)

FCC ID. : BEJ32LV3400UG

Applicant : LG Electronics Inc.

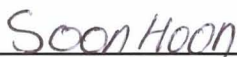
Rule Part(s)	: FCC Part 15 Subpart B
Equipment Class	: Class B computing device peripheral (JBP)
EUT Type	: LED LCD TV/Monitor
Type of Authority	: Certification
Model Name	: 32LV3400-UG
Trade Name	: LG

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

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

Tested by,

Reviewed by,



Soon-Hoon, Jeong, Associate 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.** BEJ32LV3400UG
- **EUT Type** LED LCD TV/Monitor
- **Model Name** 32LV3400-UG
- **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** August 22 ~ 25, 2011
- **Place of Test** **Gumi College EMC Center** (FCC Registration Number: 100749, 443957)
407, Bugok-dong, Gumi-si, Gyeongbuk, Korea.
- **Test Report Number** GETEC-E3-11-099
- **Dates of Issue** August 31, 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. LED LCD TV/Monitor (Model Name: 32LV3400-UG)**

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. LED LCD TV/Monitor (Model Name: 32LV3400-UG) FCC ID.: BEJ32LV3400UG**

MODELS		32LV3400 (32LV3400-UA)
		32LV3400 (32LV3400-UG)
Dimensions (W x H x D)	With stand	768.0 mm x 555.0 mm x 240.0 mm (30.2 inch x 21.8 inch x 9.4 inch)
	Without stand	768.0 mm x 492.0 mm x 45.0 mm (30.2 inch x 19.3 inch x 1.7 inch)
Weight	With stand	11.0 kg (24.2 lbs)
	Without stand	9.3 kg (20.5 lbs)
Current Value / Power consumption		0.8 A / 80 W
Power requirement		USA, Canada, Mexico: AC 120 V ~ 50 / 60 Hz Other Country: AC 100 - 240 V ~ 50 / 60 Hz
Television System		NTSC-M, ATSC, 64 & 256 QAM
Program Coverage		VHF 2-13, UHF 14-69, CATV 1-135, DTV 2-69, CADTV 1-135
External Antenna Impedance		75 Ω
Environment condition	Operating Temperature	0 - 40 °C
	Operating Humidity	Less than 80 %
	Storage Temperature	-20 - 60 °C
	Storage Humidity	Less than 85 %

-. 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	Hewlett Packard	D530	S/N: CNG34800PY FCC ID.: DoC
Video card	ATI	ATI RV360(9600)	S/N: SN0402017176 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
DVD player	LG Electronics Inc.	LC-954	S/N: 3850R-Z674K FCC ID.: Verification
USB memory stick	SAMSUNG	SUM-PSB4	S/N: TBBB202478F FCC ID.: DoC
TV signal generator	FLUKE	54200M01	S/N: 831011 FCC ID.: Verification

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

3.2.2 System configuration

Description	Manufacturer	Model Name	S/N & FCC ID.
IR remote controller	HANSUNG ELECTRONICS	AKB72915239	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) cable	Connected to the EUT and PC	1.50 m shielded
HDMI/DVI(Digital) cable	Connected to the EUT and PC	2.00 m shielded
RS-232C (Control & service) cable	Connected to the EUT and PC	1.80 m shielded
Audio(RGB/DVI) in cable	Connected to the EUT and PC	1.50 m shielded
AV in cable	Connected to the EUT and DVD player	3.00 m shielded
Component cable	Connected to the EUT and DVD player	3.00 m shielded
Antenna cable	Connected to the EUT and TV signal generator	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: 1 360 × 768 / 60 Hz (RGB: Analog, HDMI/DVI: Digital)

Conducted emission: 1 360 × 768 / 60 Hz (RGB: Analog, HDMI/DVI: Digital)

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

◆ Operating test pattern

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

"The verification report for TV/AV mode would be issued by LG Electronics Inc."



4.2 Conducted Emission

The Line conducted emission test facility is inside a 4 m × 8 m × 2.5 m shielded enclosure. (FCC Registration No.: 100749)

The EUT was placed on a non-conducting 1.0 m by 1.5 m table, which is 0.8 m in height and 0.4 m away from the vertical wall of the shielded enclosure.

The EUT is powered from the Rohde & Schwarz LISN (ESH2-Z5) and the support equipment is powered from the Rohde & Schwarz LISN (ESH3-Z5). Powers to the LISN are filtered by high-current high insertion loss power line filter.

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

The RF output of the LISN was connected to the EMI test receiver (Rohde & Schwarz, ESCS30).

The EMI test receiver was scanned from 150 kHz to 30 MHz with 20 ms sweep time to determine the frequency producing the maximum EME from the EUT. The frequency producing the maximum level was re-examined using Quasi-Peak mode of the EMI test receiver.

The bandwidth of Quasi-peak mode was set to 9 kHz. Each emission was maximized consistent with typical applications by varying the configuration of the test sample. Interface cables were connected to the available interface ports of the test unit. The effect of varying the position of cables was investigated to find the configuration that produces maximum diagram emission. Excess cable lengths were bundled at center with 30 cm ~ 40 cm.

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



Fig 2. Impedance of LISN



4.3 Radiated Emission

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

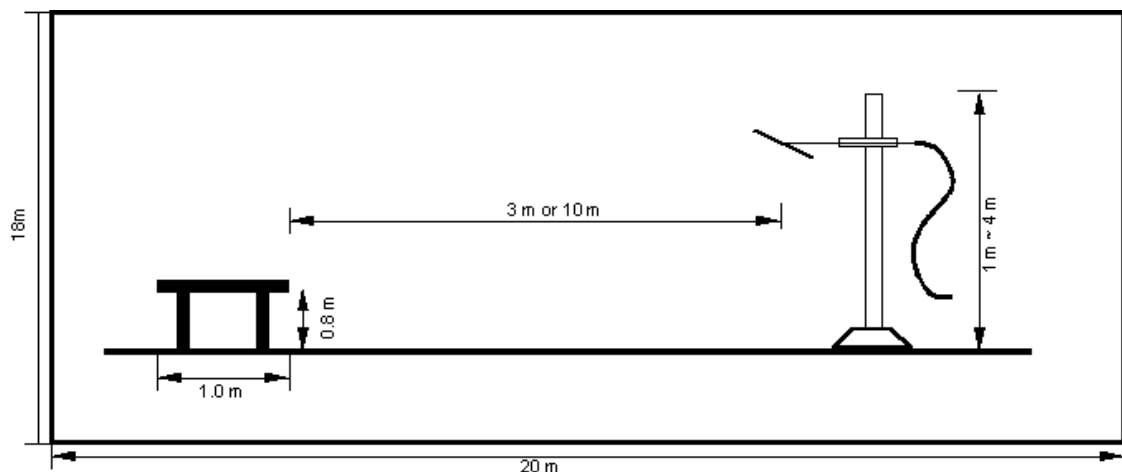


Fig 3. Dimensions of test site



5. Conducted Emission

5.1 Operating Environment

Temperature : 25.0 °C
Relative Humidity : 56.0 % 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

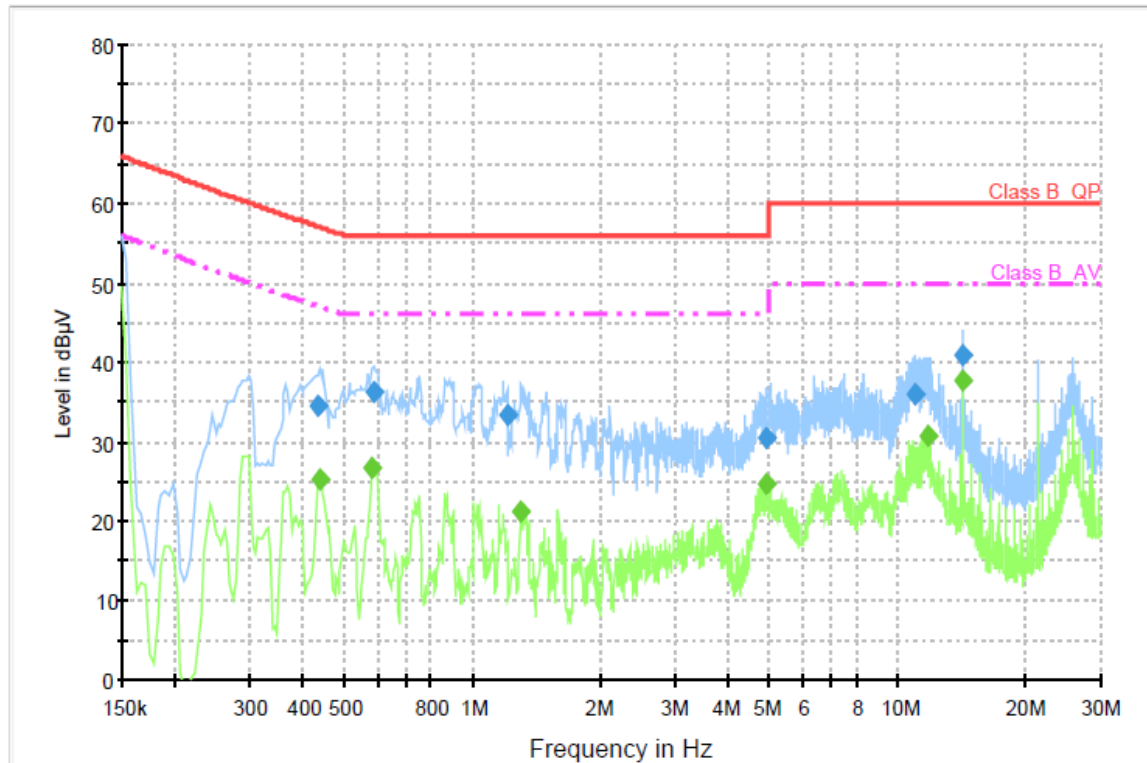
5.6 Test data for Conducted Emission

-. Test Date : August 25, 2011
-. Resolution Bandwidth : 9 kHz
-. Frequency Range : 0.15 MHz ~ 30 MHz



◆ Operating condition: 1 360 × 768 / 60 Hz (RGB: Analog)

Voltage with 4-Line-LISN_L1



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.436000	34.5	1000.000	9.000	GND	L1	10.1	22.6	57.1	
0.588000	36.3	1000.000	9.000	GND	L1	10.1	19.7	56.0	
1.208000	33.5	1000.000	9.000	GND	L1	10.1	22.5	56.0	
4.900000	30.5	1000.000	9.000	GND	L1	10.3	25.5	56.0	
11.008000	36.0	1000.000	9.000	GND	L1	10.6	24.0	60.0	
14.264000	40.8	1000.000	9.000	GND	L1	10.8	19.2	60.0	

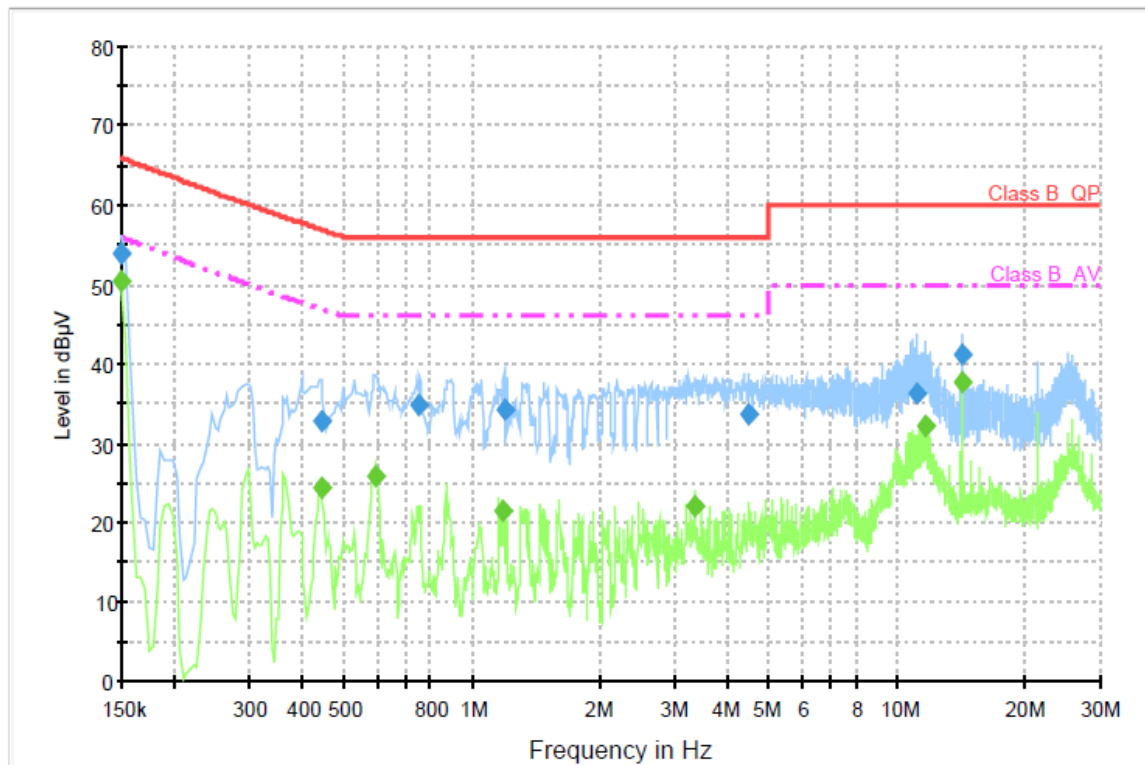
Final Measurement Detector 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.440000	25.1	1000.000	9.000	GND	L1	10.1	21.9	47.0	
0.580000	26.6	1000.000	9.000	GND	L1	10.1	19.4	46.0	
1.304000	21.3	1000.000	9.000	GND	L1	10.1	24.7	46.0	
4.908000	24.7	1000.000	9.000	GND	L1	10.3	21.3	46.0	
11.800000	30.7	1000.000	9.000	GND	L1	10.6	19.3	50.0	
14.264000	37.8	1000.000	9.000	GND	L1	10.8	12.2	50.0	

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



Voltage with 4-Line-LISN_N



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.150000	54.1	1000.000	9.000	GND	N	10.1	12.0	66.0	
0.442000	32.8	1000.000	9.000	GND	N	10.1	24.2	57.0	
0.754000	34.9	1000.000	9.000	GND	N	10.1	21.1	56.0	
1.194000	34.3	1000.000	9.000	GND	N	10.1	21.7	56.0	
4.498000	33.8	1000.000	9.000	GND	N	10.3	22.2	56.0	
11.162000	36.2	1000.000	9.000	GND	N	10.6	23.8	60.0	
14.266000	41.0	1000.000	9.000	GND	N	10.7	19.0	60.0	

Final Measurement Detector 2

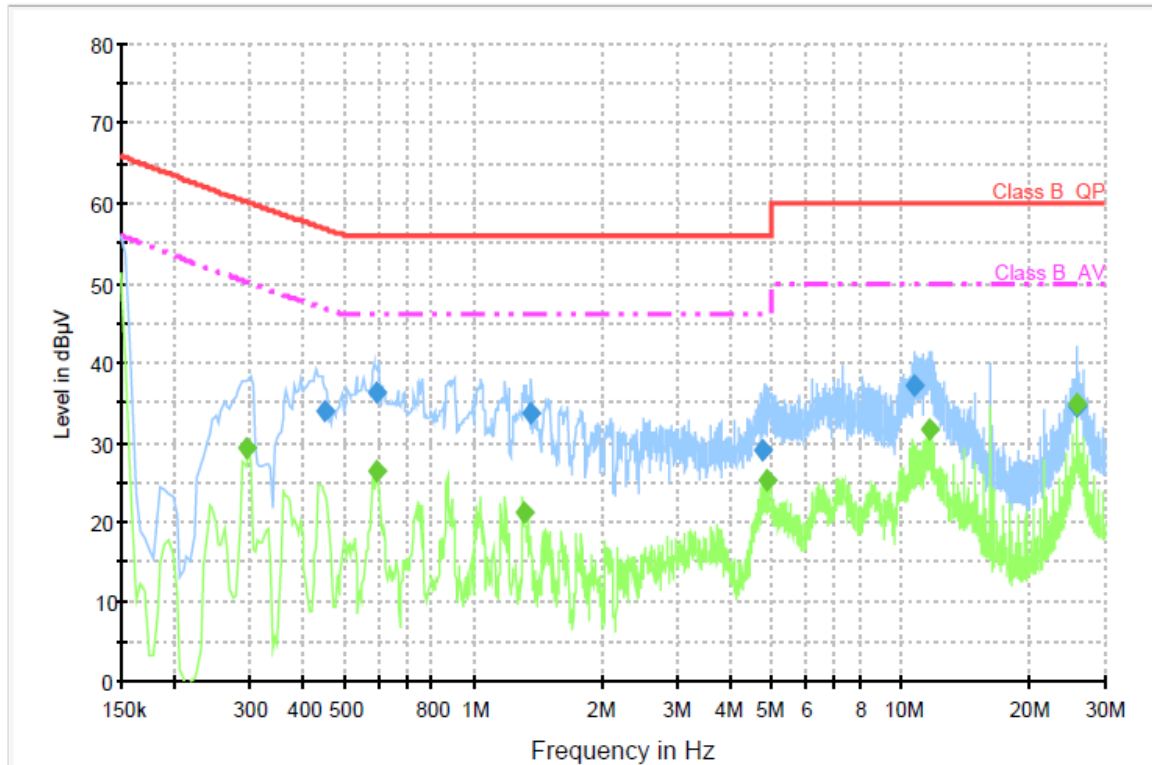
Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.150000	50.5	1000.000	9.000	GND	N	10.1	5.5	56.0	
0.442000	24.3	1000.000	9.000	GND	N	10.1	22.6	46.9	
0.594000	25.9	1000.000	9.000	GND	N	10.1	20.1	46.0	
1.190000	21.4	1000.000	9.000	GND	N	10.1	24.6	46.0	
3.330000	22.1	1000.000	9.000	GND	N	10.2	23.9	46.0	
11.666000	32.1	1000.000	9.000	GND	N	10.6	17.9	50.0	
14.266000	37.6	1000.000	9.000	GND	N	10.7	12.4	50.0	

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



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

Voltage with 4-Line-LISN_L1



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.448000	34.0	1000.000	9.000	GND	L1	10.1	22.8	56.8	
0.592000	36.3	1000.000	9.000	GND	L1	10.1	19.7	56.0	
1.364000	33.5	1000.000	9.000	GND	L1	10.1	22.5	56.0	
4.760000	29.1	1000.000	9.000	GND	L1	10.3	26.9	56.0	
10.736000	37.0	1000.000	9.000	GND	L1	10.6	23.0	60.0	
25.876000	34.6	1000.000	9.000	GND	L1	11.1	25.4	60.0	

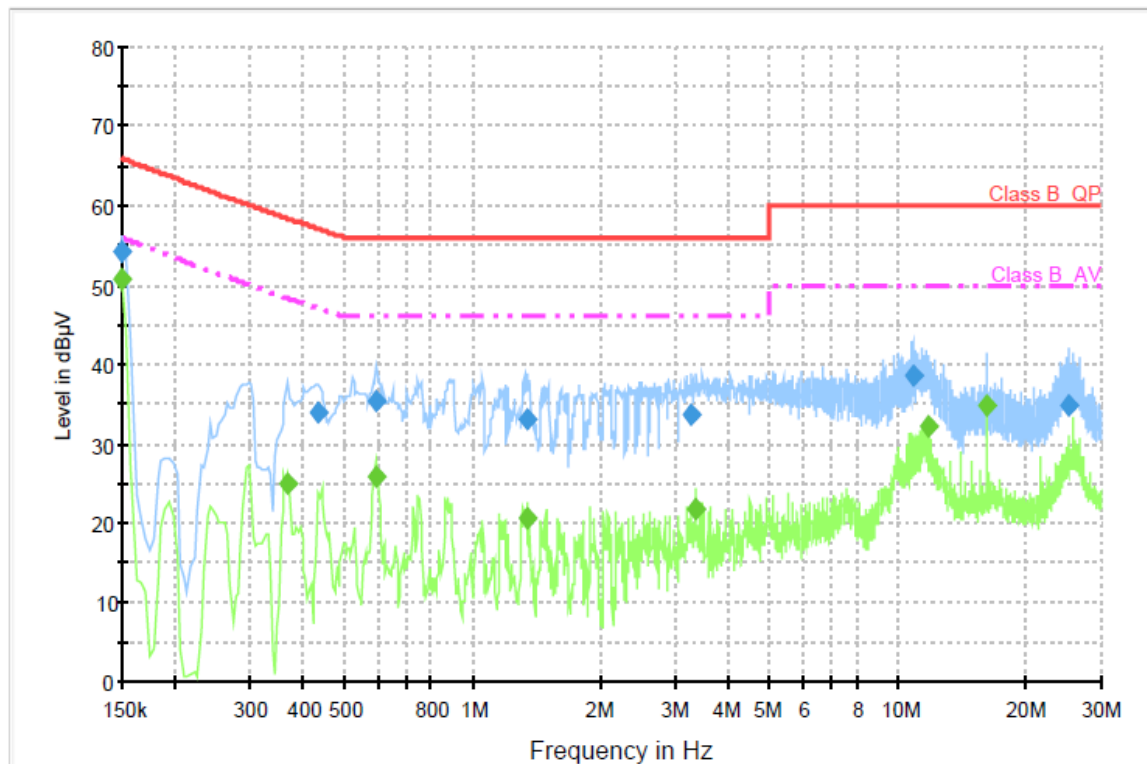
Final Measurement Detector 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.296000	29.2	1000.000	9.000	GND	L1	10.1	20.9	50.1	
0.596000	26.4	1000.000	9.000	GND	L1	10.1	19.6	46.0	
1.312000	21.2	1000.000	9.000	GND	L1	10.1	24.8	46.0	
4.836000	25.2	1000.000	9.000	GND	L1	10.3	20.8	46.0	
11.664000	31.6	1000.000	9.000	GND	L1	10.6	18.4	50.0	
25.868000	34.9	1000.000	9.000	GND	L1	11.1	15.1	50.0	

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



Voltage with 4-Line-LISN_N



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.150000	54.1	1000.000	9.000	GND	N	10.1	11.9	66.0	
0.434000	33.9	1000.000	9.000	GND	N	10.1	23.2	57.1	
0.594000	35.3	1000.000	9.000	GND	N	10.1	20.7	56.0	
1.346000	32.9	1000.000	9.000	GND	N	10.1	23.1	56.0	
3.278000	33.6	1000.000	9.000	GND	N	10.2	22.4	56.0	
10.870000	38.5	1000.000	9.000	GND	N	10.5	21.5	60.0	
25.090000	34.7	1000.000	9.000	GND	N	10.7	25.3	60.0	

Final Measurement Detector 2

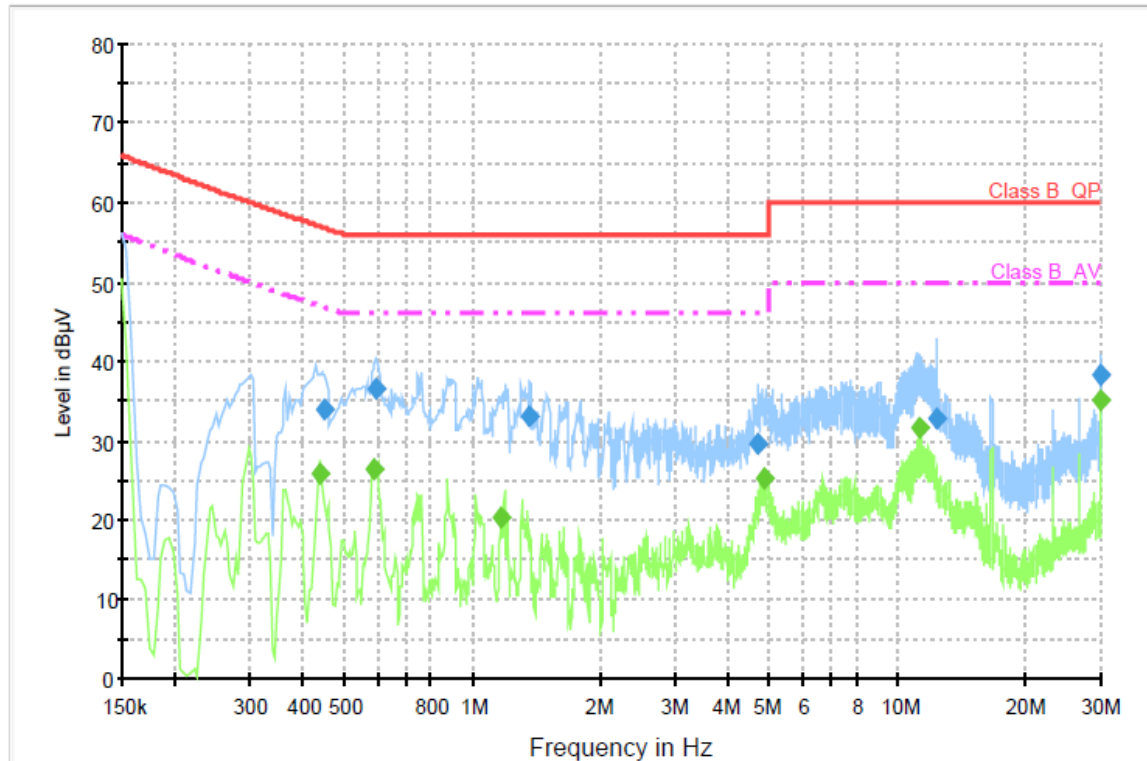
Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.150000	50.7	1000.000	9.000	GND	N	10.1	5.3	56.0	
0.370000	25.1	1000.000	9.000	GND	N	10.1	23.2	48.3	
0.594000	25.9	1000.000	9.000	GND	N	10.1	20.1	46.0	
1.342000	20.5	1000.000	9.000	GND	N	10.1	25.5	46.0	
3.330000	21.7	1000.000	9.000	GND	N	10.2	24.3	46.0	
11.730000	32.2	1000.000	9.000	GND	N	10.6	17.8	50.0	
16.234000	34.7	1000.000	9.000	GND	N	10.8	15.3	50.0	

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



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

Voltage with 4-Line-LISN_L1



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.448000	34.0	1000.000	9.000	GND	L1	10.1	22.8	56.8	
0.592000	36.6	1000.000	9.000	GND	L1	10.1	19.4	56.0	
1.364000	33.0	1000.000	9.000	GND	L1	10.1	23.0	56.0	
4.708000	29.7	1000.000	9.000	GND	L1	10.3	26.3	56.0	
12.392000	32.8	1000.000	9.000	GND	L1	10.7	27.2	60.0	
29.952000	38.1	1000.000	9.000	GND	L1	11.3	21.9	60.0	

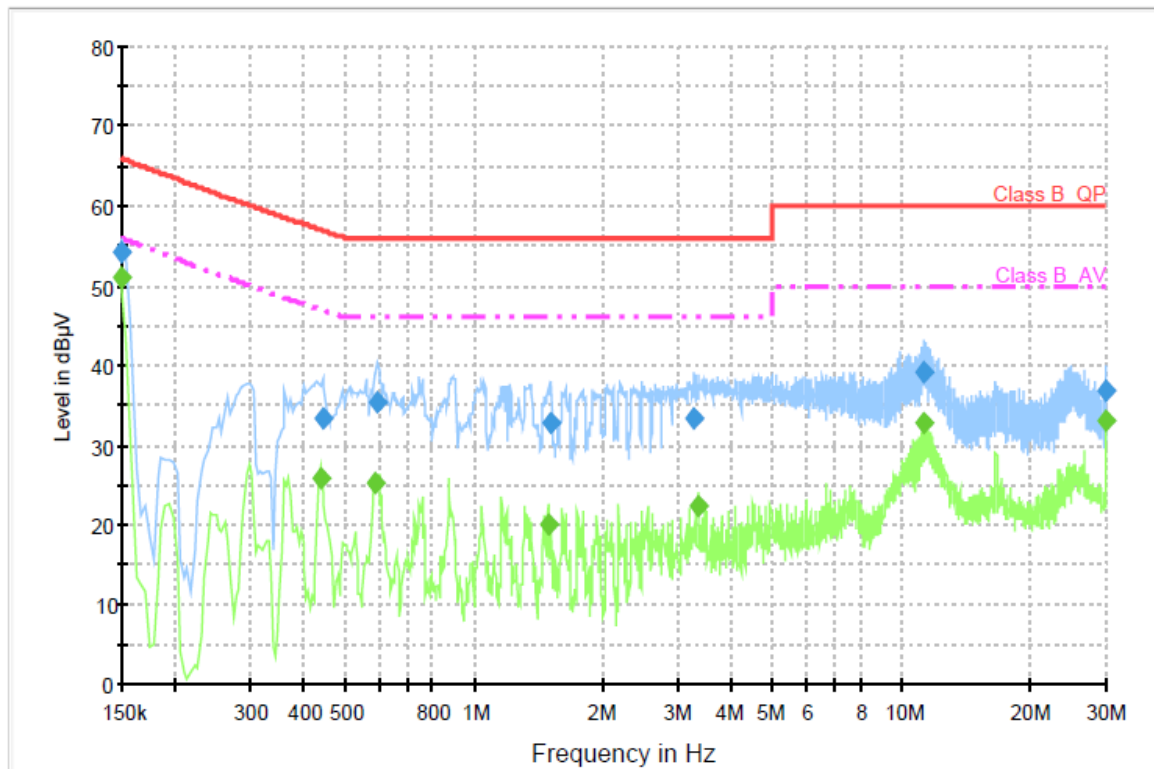
Final Measurement Detector 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.440000	25.8	1000.000	9.000	GND	L1	10.1	21.2	47.0	
0.588000	26.3	1000.000	9.000	GND	L1	10.1	19.7	46.0	
1.164000	20.3	1000.000	9.000	GND	L1	10.1	25.7	46.0	
4.836000	25.2	1000.000	9.000	GND	L1	10.3	20.8	46.0	
11.264000	31.5	1000.000	9.000	GND	L1	10.6	18.5	50.0	
29.952000	34.9	1000.000	9.000	GND	L1	11.3	15.1	50.0	

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



Voltage with 4-Line-LISN_N



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.150000	54.2	1000.000	9.000	GND	N	10.1	11.8	66.0	
0.442000	33.3	1000.000	9.000	GND	N	10.1	23.7	57.0	
0.594000	35.4	1000.000	9.000	GND	N	10.1	20.6	56.0	
1.518000	32.7	1000.000	9.000	GND	N	10.1	23.3	56.0	
3.282000	33.3	1000.000	9.000	GND	N	10.2	22.7	56.0	
11.266000	39.0	1000.000	9.000	GND	N	10.6	21.0	60.0	
29.954000	36.7	1000.000	9.000	GND	N	10.7	23.3	60.0	

Final Measurement Detector 2

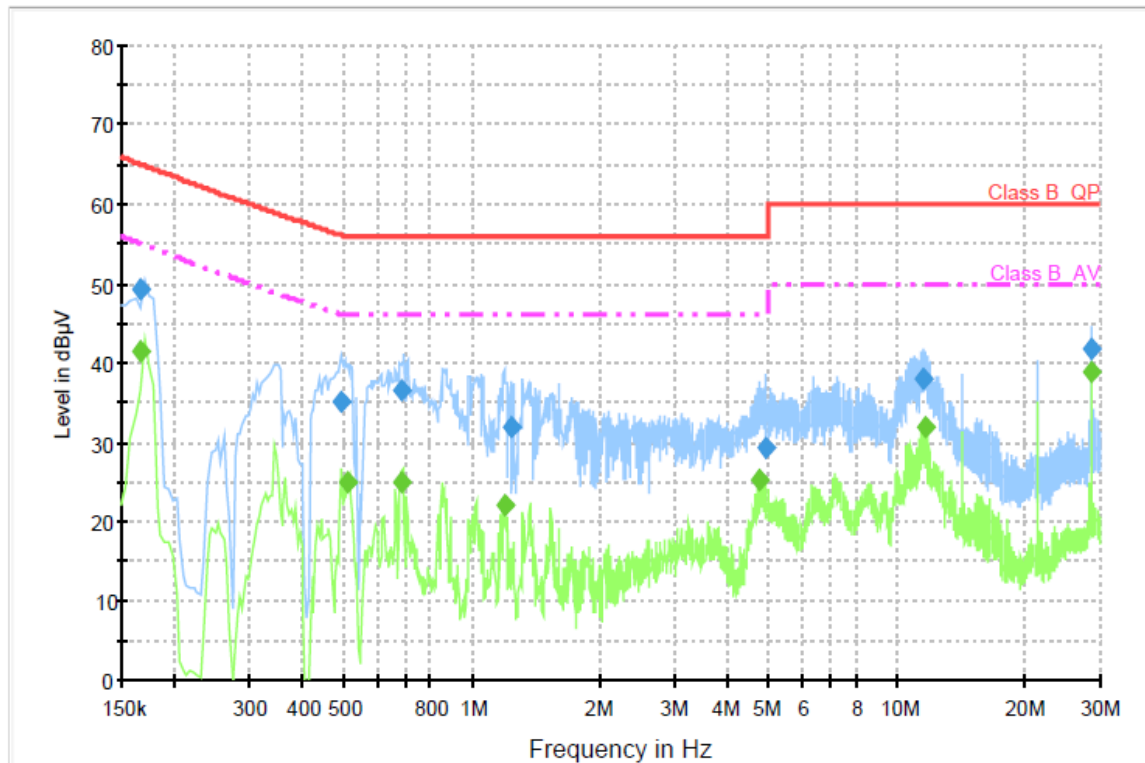
Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.150000	51.0	1000.000	9.000	GND	N	10.1	5.0	56.0	
0.438000	25.8	1000.000	9.000	GND	N	10.1	21.2	47.0	
0.586000	25.2	1000.000	9.000	GND	N	10.1	20.8	46.0	
1.490000	20.1	1000.000	9.000	GND	N	10.1	25.9	46.0	
3.346000	22.3	1000.000	9.000	GND	N	10.2	23.7	46.0	
11.266000	32.7	1000.000	9.000	GND	N	10.6	17.3	50.0	
29.954000	33.2	1000.000	9.000	GND	N	10.7	16.8	50.0	

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



◆ Operating condition: 1 360 × 768 / 60 Hz (HDMI/DVI: Digital)

Voltage with 4-Line-LISN_L1



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.166000	49.4	1000.000	9.000	GND	L1	10.1	15.7	65.1	
0.492000	34.9	1000.000	9.000	GND	L1	10.1	21.2	56.1	
0.684000	36.7	1000.000	9.000	GND	L1	10.1	19.3	56.0	
1.236000	31.8	1000.000	9.000	GND	L1	10.1	24.2	56.0	
4.940000	29.3	1000.000	9.000	GND	L1	10.3	26.7	56.0	
11.536000	38.0	1000.000	9.000	GND	L1	10.6	22.0	60.0	
28.484000	41.8	1000.000	9.000	GND	L1	11.2	18.2	60.0	

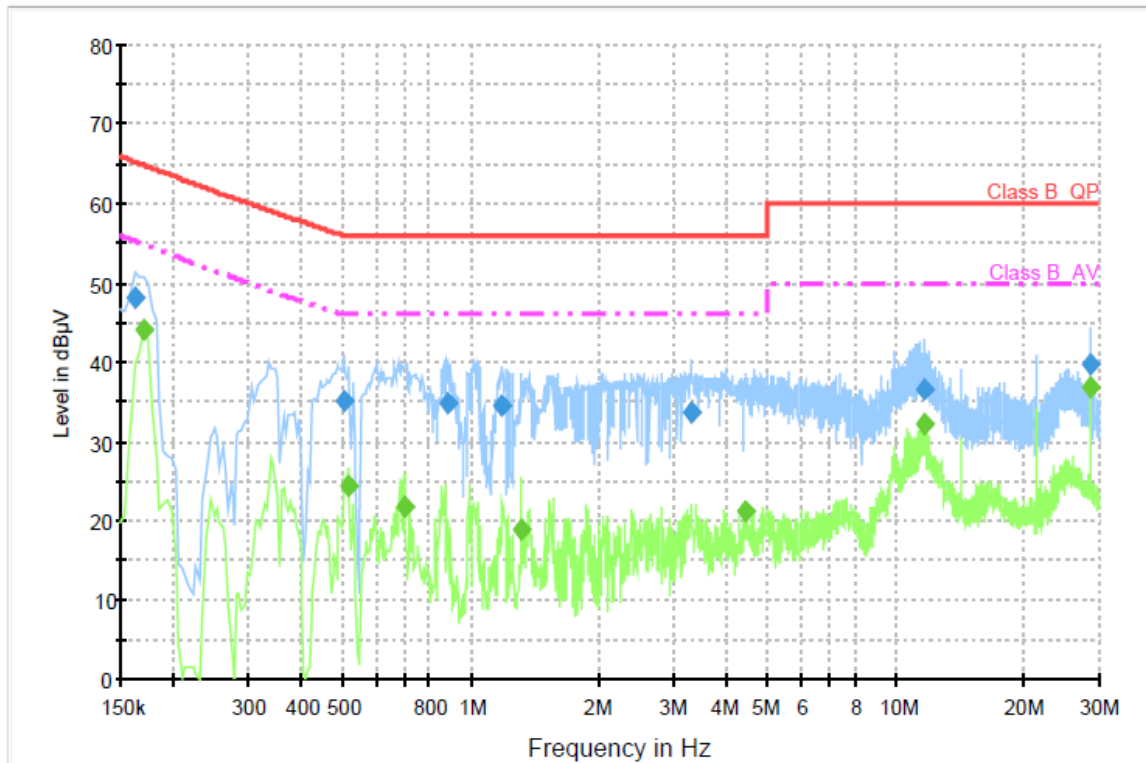
Final Measurement Detector 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.166000	41.5	1000.000	9.000	GND	L1	10.1	13.6	55.1	
0.508000	25.0	1000.000	9.000	GND	L1	10.1	21.0	46.0	
0.680000	24.9	1000.000	9.000	GND	L1	10.1	21.1	46.0	
1.196000	22.1	1000.000	9.000	GND	L1	10.1	23.9	46.0	
4.772000	25.1	1000.000	9.000	GND	L1	10.3	20.9	46.0	
11.600000	31.7	1000.000	9.000	GND	L1	10.6	18.3	50.0	
28.484000	38.8	1000.000	9.000	GND	L1	11.2	11.2	50.0	

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



Voltage with 4-Line-LISN_N



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.162000	48.1	1000.000	9.000	GND	N	10.1	17.2	65.3	
0.502000	35.1	1000.000	9.000	GND	N	10.1	20.9	56.0	
0.886000	34.7	1000.000	9.000	GND	N	10.1	21.3	56.0	
1.190000	34.6	1000.000	9.000	GND	N	10.1	21.4	56.0	
3.310000	33.6	1000.000	9.000	GND	N	10.2	22.4	56.0	
11.662000	36.5	1000.000	9.000	GND	N	10.6	23.5	60.0	
28.482000	39.8	1000.000	9.000	GND	N	10.7	20.2	60.0	

Final Measurement Detector 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.170000	44.1	1000.000	9.000	GND	N	10.1	10.8	54.9	
0.514000	24.4	1000.000	9.000	GND	N	10.1	21.6	46.0	
0.698000	21.7	1000.000	9.000	GND	N	10.1	24.3	46.0	
1.318000	19.0	1000.000	9.000	GND	N	10.1	27.0	46.0	
4.438000	21.2	1000.000	9.000	GND	N	10.3	24.8	46.0	
11.602000	32.2	1000.000	9.000	GND	N	10.6	17.8	50.0	
28.486000	36.8	1000.000	9.000	GND	N	10.7	13.2	50.0	

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



6. Radiated Emission

6.1 Operating Environment

Temperature : 24.0 °C
Relative Humidity : 55.0 % R.H.

6.2 Test Set-up

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

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

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

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

6.3 Measurement Uncertainty

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

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

Test Items(Anechoic Chamber)	Uncertainty	Remark
Radiated emission (30 MHz ~ 300 MHz, 3 m, Vertical)	± 4.38 dB	Confidence levels of 95 % ($k = 2$)
Radiated emission (30 MHz ~ 300 MHz, 3 m, Horizontal)	± 3.50 dB	Confidence levels of 95 % ($k = 2$)
Radiated emission (300 MHz ~ 1 000 MHz, 3 m, Vertical)	± 3.75 dB	Confidence levels of 95 % ($k = 2$)
Radiated emission (300 MHz ~ 1 000 MHz, 3 m, Horizontal)	± 3.59 dB	Confidence levels of 95 % ($k = 2$)



6.4 Limit

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

6.5 Test Equipment used

Model Name	Manufacturer	Description	Serial Number	Due to Calibration
■ - ESIB26	Rohde & Schwarz	EMI Test Receiver	830482/010	12. 11. 2011
■ - VULB9160	Schwarzbeck	Broadband Test Antenna	3193	03. 15. 2012
■ - BBHA9120D	Schwarzbeck	Horn ANT	207	12. 22. 2011
■ - MCU066	maturo GmbH	Position Controller	1390306	N/A
■ - TT2.5SI	maturo GmbH	Turntable	1390307	N/A
■ - AM 4.0	maturo GmbH	Antenna Mast	1390308	N/A
■ - AFS 44 00101800-25-10P-44	MITEQ	Preamplifier	1258942	11. 12. 2011

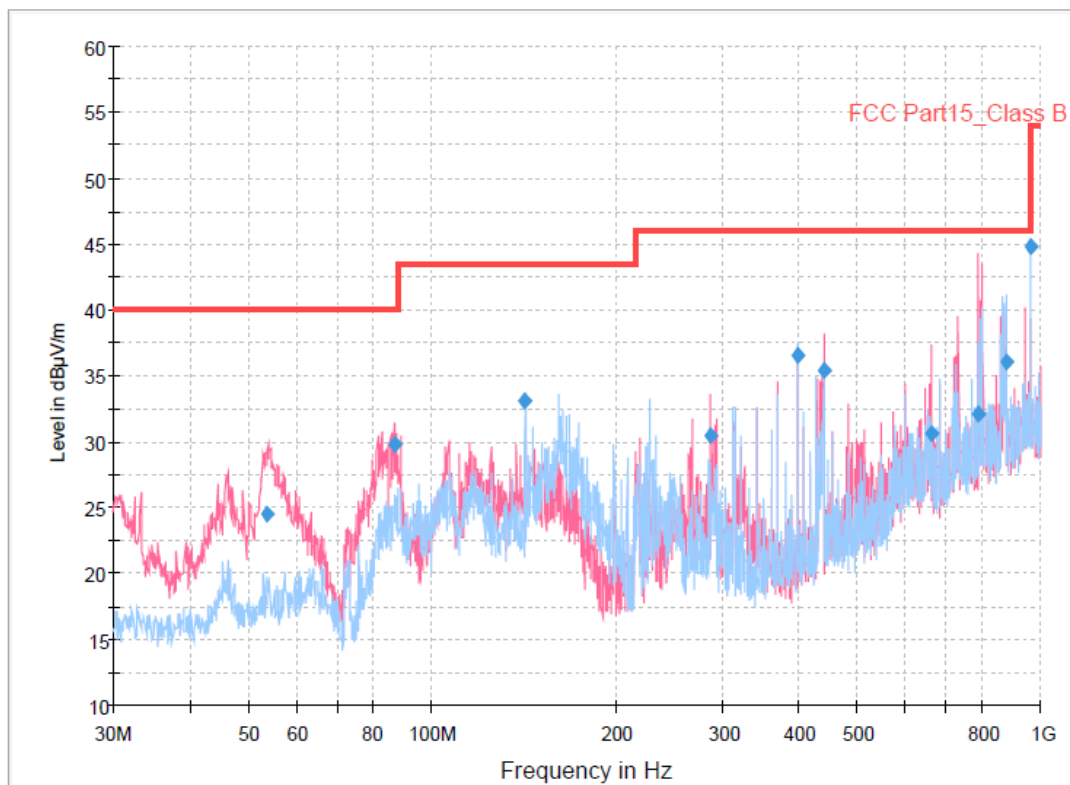
6.6 Test data for Radiated Emission

- Test Date : August 23 ~ 25, 2011
- Resolution Bandwidth : 120 kHz/1 MHz
- Frequency Range : 30 MHz ~ 5 000 MHz
- 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



- ◆ Operating Condition: 1 360 × 768 / 60 Hz (RGB: Analog)
Red trace: Vertical polarization, Blue trace: Horizontal polarization

RE below 1GHz



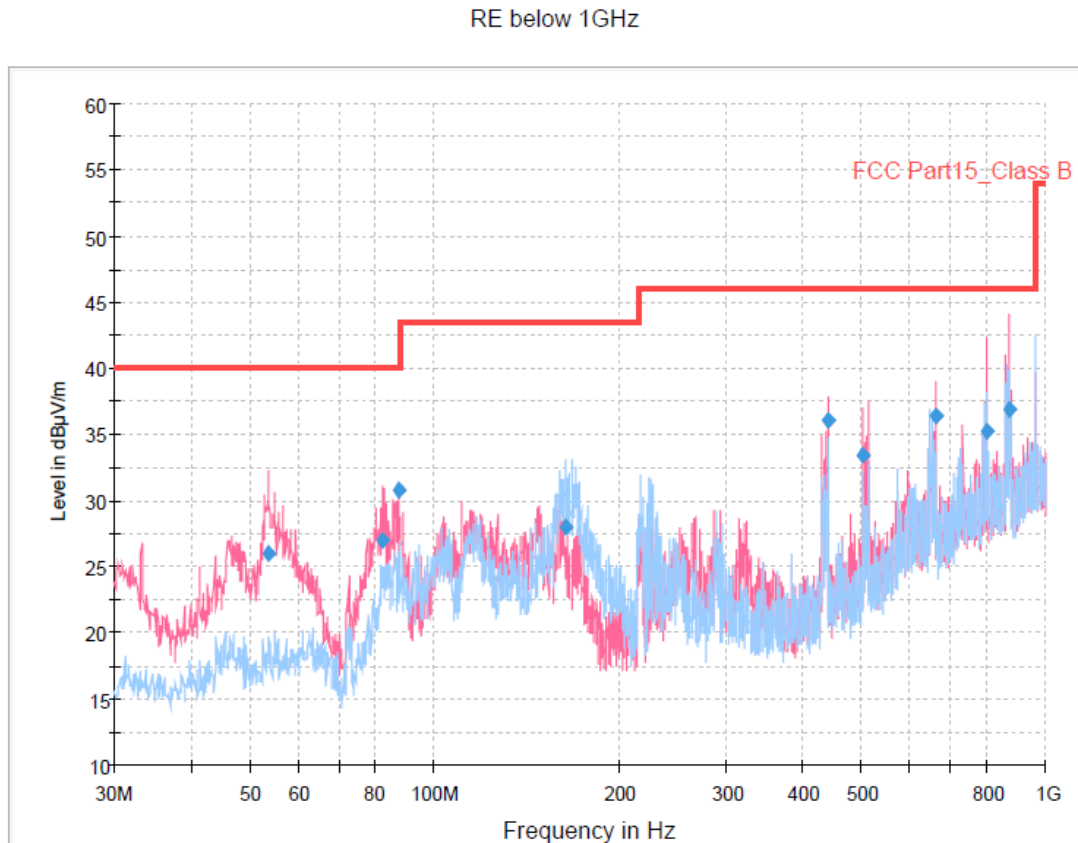
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
53.887500	24.5	1000.0	120.000	123.0	V	128.0	13.0	15.5	40.0
86.785000	29.9	1000.0	120.000	101.0	V	263.0	9.1	10.1	40.0
142.480000	33.2	1000.0	120.000	205.0	H	13.0	13.9	10.3	43.5
287.898750	30.4	1000.0	120.000	200.0	V	67.0	14.7	15.6	46.0
399.005000	36.5	1000.0	120.000	205.0	H	143.0	17.7	9.5	46.0
439.825000	35.5	1000.0	120.000	125.0	V	200.0	19.1	10.5	46.0
659.813750	30.7	1000.0	120.000	101.0	V	16.0	24.0	15.3	46.0
791.045000	32.1	1000.0	120.000	101.0	V	154.0	26.4	13.9	46.0
879.801250	36.2	1000.0	120.000	100.0	H	84.0	27.5	9.8	46.0
960.028750	44.7	1000.0	120.000	150.0	H	165.0	29.2	9.3	54.0

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



- ◆ Operating Condition: 1 360 × 768 / 60 Hz (HDMI/DVI: Digital)
Red trace: Vertical polarization, Blue trace: Horizontal polarization



Final Result 1

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
53.685000	26.0	1000.0	120.000	100.0	V	156.0	13.0	14.0	40.0
82.178750	27.0	1000.0	120.000	100.0	V	246.0	9.0	13.0	40.0
87.552500	30.8	1000.0	120.000	100.0	V	262.0	9.2	9.2	40.0
164.467500	27.9	1000.0	120.000	172.0	H	164.0	13.9	15.6	43.5
439.825000	36.0	1000.0	120.000	150.0	V	10.0	19.1	10.0	46.0
503.158750	33.5	1000.0	120.000	100.0	V	354.0	20.1	12.5	46.0
659.812500	36.4	1000.0	120.000	100.0	V	354.0	24.0	9.6	46.0
800.746250	35.2	1000.0	120.000	100.0	V	159.0	26.5	10.8	46.0
870.303750	36.9	1000.0	120.000	100.0	V	154.0	27.3	10.1	46.0

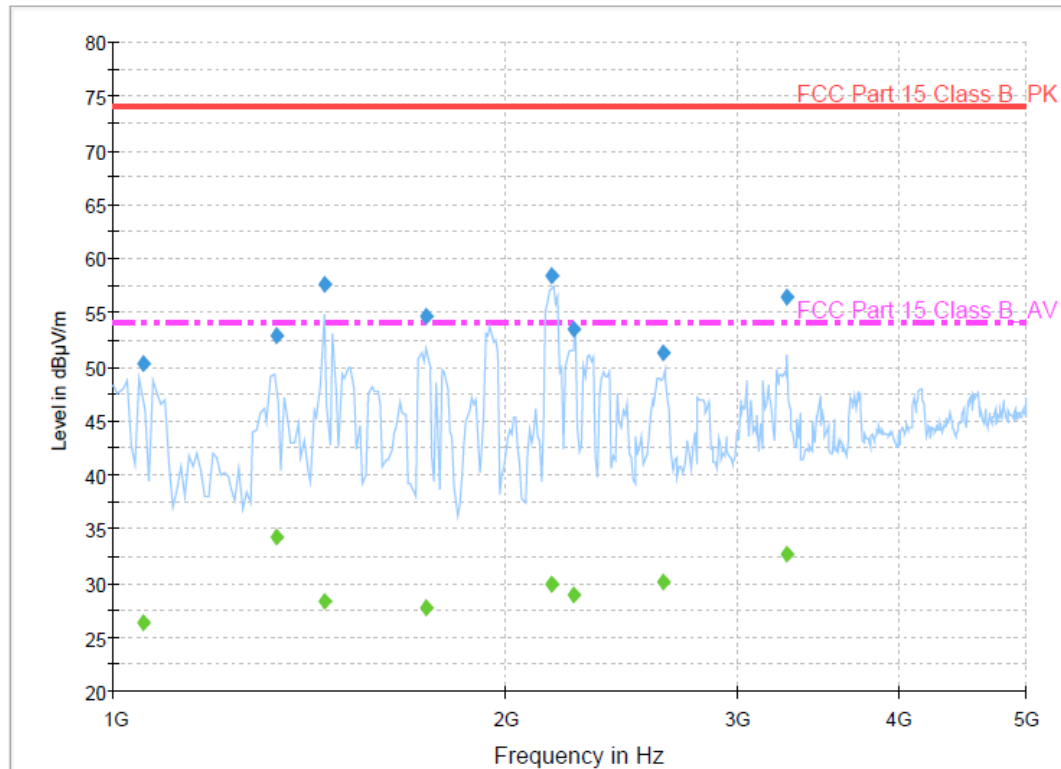
< Fig 13. Radiated emission result (30 MHz ~ 1 000 MHz) >



◆ Operating Condition: 1 360 × 768 / 60 Hz (RGB: Analog)

Green market: Average detector, Blue market: Peak detector

Radiated emission_above 1GHz-6GHz



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)
1052.296192	50.3	1000.0	1000.000	100.0	V	24.0	-14.4	23.7	74.0
1332.857315	52.9	1000.0	1000.000	100.0	V	192.0	-13.4	21.1	74.0
1453.497796	57.6	1000.0	1000.000	100.0	V	215.0	-13.3	16.4	74.0
1734.874950	54.6	1000.0	1000.000	200.0	V	134.0	-12.3	19.4	74.0
2166.940681	58.5	1000.0	1000.000	100.0	V	159.0	-10.6	15.5	74.0
2253.517034	53.4	1000.0	1000.000	100.0	H	222.0	-10.1	20.6	74.0
2639.886573	51.3	1000.0	1000.000	198.0	V	224.0	-8.3	22.7	74.0
3282.369138	56.4	1000.0	1000.000	150.0	V	198.0	-5.7	17.6	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)
1052.296192	26.3	1000.0	1000.000	100.0	V	24.0	-14.4	27.7	54.0
1332.857315	34.3	1000.0	1000.000	100.0	V	192.0	-13.4	19.7	54.0
1453.497796	28.3	1000.0	1000.000	100.0	V	215.0	-13.3	25.7	54.0
1734.874950	27.8	1000.0	1000.000	200.0	V	134.0	-12.3	26.2	54.0
2166.940681	30.0	1000.0	1000.000	100.0	V	159.0	-10.6	24.0	54.0
2253.517034	29.0	1000.0	1000.000	100.0	H	222.0	-10.1	25.0	54.0
2639.886573	30.1	1000.0	1000.000	198.0	V	224.0	-8.3	23.9	54.0
3282.369138	32.6	1000.0	1000.000	150.0	V	198.0	-5.7	21.4	54.0

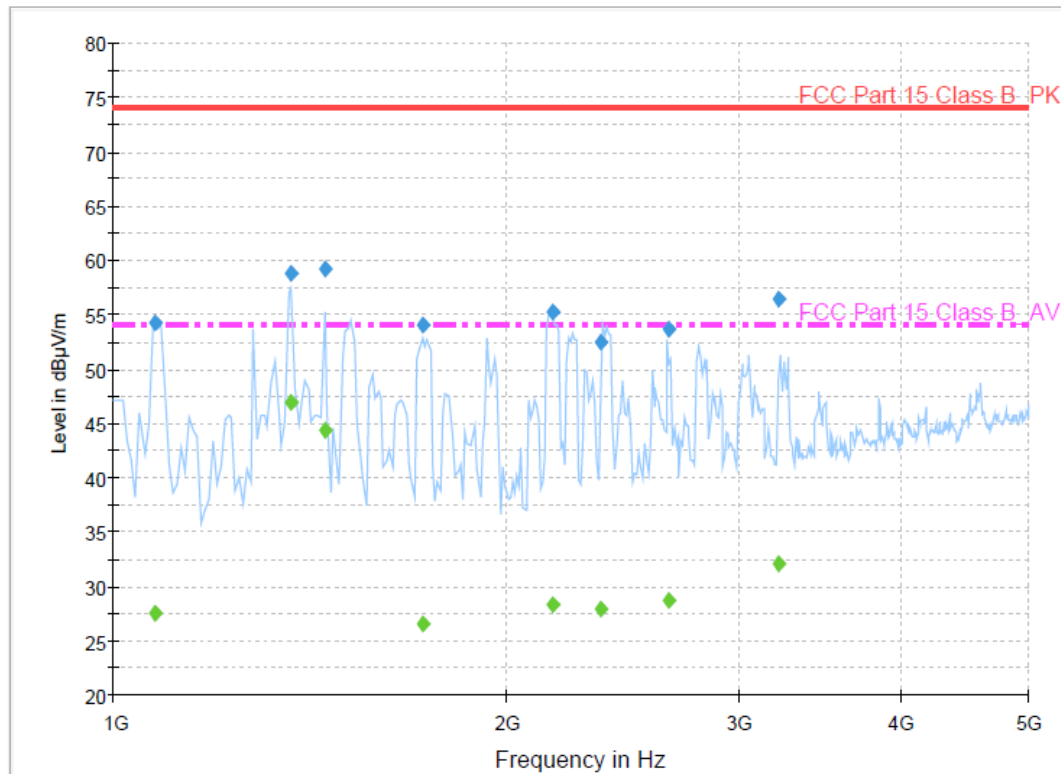
< Fig 14. Radiated emission result (1 000 MHz ~ 5 000 MHz) >



◆ Operating Condition: 1 360 × 768 / 60 Hz (HDMI/DVI: Digital)

Green marker: Average detector, Blue marker: Peak detector

Radiated emission_above 1GHz-6GHz



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)
1074.744289	54.2	1000.0	1000.000	100.0	H	181.0	-14.3	19.8	74.0
1368.137475	58.8	1000.0	1000.000	100.0	V	223.0	-13.4	15.2	74.0
1453.497796	59.2	1000.0	1000.000	137.0	V	217.0	-13.3	14.8	74.0
1724.842886	54.1	1000.0	1000.000	208.0	V	137.0	-12.4	19.9	74.0
2166.524649	55.2	1000.0	1000.000	100.0	V	157.0	-10.6	18.8	74.0
2360.125451	52.5	1000.0	1000.000	208.0	H	216.0	-9.6	21.5	74.0
2653.902605	53.6	1000.0	1000.000	200.0	V	3.0	-8.2	20.4	74.0
3226.256914	56.5	1000.0	1000.000	138.0	V	188.0	-5.9	17.5	74.0

Final Result 2

Frequency (MHz)	CAverage (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1074.744289	27.4	1000.0	1000.000	100.0	H	181.0	-14.3	26.6	54.0
1368.137475	46.9	1000.0	1000.000	100.0	V	223.0	-13.4	7.1	54.0
1453.497796	44.4	1000.0	1000.000	137.0	V	217.0	-13.3	9.6	54.0
1724.842886	26.5	1000.0	1000.000	208.0	V	137.0	-12.4	27.5	54.0
2166.524649	28.2	1000.0	1000.000	100.0	V	157.0	-10.6	25.8	54.0
2360.125451	27.9	1000.0	1000.000	208.0	H	216.0	-9.6	26.1	54.0
2653.902605	28.7	1000.0	1000.000	200.0	V	3.0	-8.2	25.3	54.0
3226.256914	32.1	1000.0	1000.000	138.0	V	188.0	-5.9	21.9	54.0

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



7. Sample Calculations

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

7.1 Example 1 :

■ 20.3 MHz

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

7.2 Example 2 :

■ 66.7 MHz

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



8. Recommendation & Conclusion

The data collected shows that the **LG Electronics Inc. LED LCD TV/Monitor (Model Name: 32LV3400-UG)** was complies with §15.107 and 15.109 of the FCC Rules.