

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 : April 6, 2011

Order Number: GETEC-C1-11-059

Test Report Number: GETEC-E3-11-019

Test Site: Gumi College EMC Center

FCC Registration Number: (100749, 443957)

FCC ID. : BEJHW300TJE

Applicant : LG Electronics Inc.

Rule Part(s)	: FCC Part 15 Subpart B
Equipment Class	: Class B computing device peripheral (JBP)
EUT Type	: DLP PROJECTOR
Type of Authority	: Certification
Model Name	: HW300T-JE
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 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,

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.** BEJHW300TJE
- **EUT Type** DLP PROJECTOR
- **Model Name** HW300T-JE
- **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** March 18 ~ 24, 2011
- **Place of Test** **Gumi College EMC Center** (FCC Registration Number: 100749, 443957)
407, Bugok-dong, Gumi-si, Gyeongbuk, Korea.
- **Test Report Number** GETEC-E3-11-019
- **Dates of Issue** April 6, 2011

EUT Type: DLP PROJECTOR

FCC ID.: BEJHW300TJE



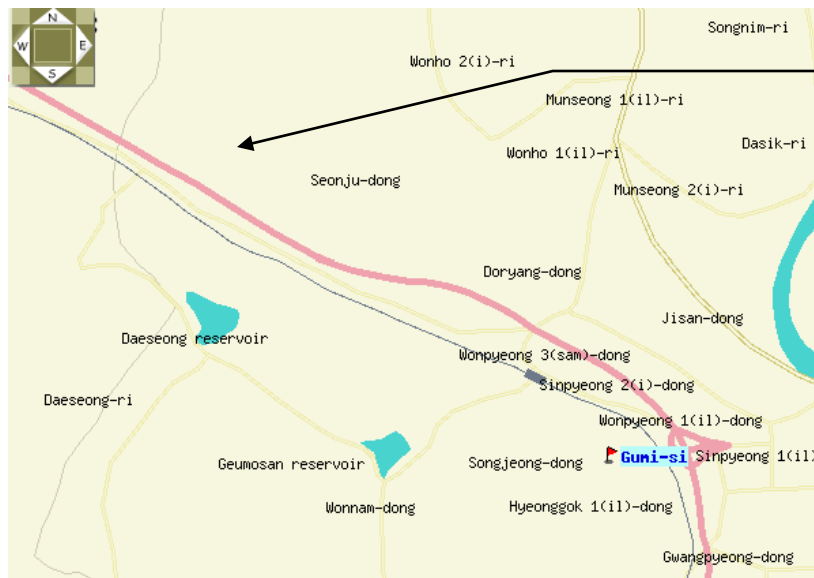
2. Introduction

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. DLP PROJECTOR (Model Name: HW300T-JE)**

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. DLP PROJECTOR (Model Name: HW300T-JE)**
FCC ID.: BEJHW300TJE

MODEL	HW300T (HW300T-JE)
Resolution (Pixel)	1280 (Horizontal) × 800 (Vertical)
Ratio	16:10 (Horizontal:Vertical)
Panel size (mm)	11.623
Projection distance (Screen size)	0.59 m - 3.00 m (50.8 cm - 254.0 cm)
Projection Offset	100 %
Remote control distance	6 m
Video compatibility	NTSC
AC-DC Adapter	LG, SD-B191A, 19.5 V  , 5.64 A
Audio Output	1 W + 1 W
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
Height (mm)	54.0 (without foot), 57.0 (with foot)
Width (mm)	160.0
Length (mm)	119.5
Weight (g)	780
USB Device	5 V, 0.5 A (max)

- Maximum Frequency Range : 512 MHz

EUT Type: DLP PROJECTOR

FCC ID.: BEJHW300TJE



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
PS2 mouse	LOGITECH	M-S69	S/N: 334684-108 FCC ID.: JNZ211443
Joy stick	MICROSOFT	X05-92626	S/N: 9262600296169 FCC ID.: DoC
DVD player	LG Electronics Inc.	LC-954	S/N: 3850R-Z674K FCC ID.: DoC
Wireless dongle	LG Electronics Inc.	AN-WF100	S/N: N/A FCC ID.: N/A
TV signal generator	FLUKE	54200	S/N: 831011 FCC ID.: DoC
Headset	PHILIPS	SBC HL140	S/N: N/A 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.
AC/DC Adapter ¹⁾	Weihai Sunlin Electronics Co., Ltd.	SD-B191A	S/N: RA0Y0000649 FCC ID.: N/A

1) Input ratings: AC (100 – 240) V~, (50 – 60) Hz, 1.8 A / Output ratings: DC 19.5 V, 5.64 A



3.2.3 Used Cable(s)

Cable Name	Condition	Description
Power cable	Connected to the adapter	1.50 m unshielded
Adapter cable	Connected to the EUT	1.80 m shielded with a ferrite core
RGB(Analog) cable	Connected to the EUT and PC	1.80 m shielded with two ferrite cores
HDMI/DVI(Digital) cable	Connected to the EUT and PC	2.00 m shielded
Headset cable	Connected to the EUT and headset	1.20 m shielded
Component cable	Connected to the EUT and DVD player	1.50 m shielded
AV cable	Connected to the EUT and DVD player	1.50 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)

- . Projection mode

Radiated emission: 1 680 × 1 050 / 60 Hz (RGB: Analog, HDMI/DVI: Digital)

Conducted emission: 1 680 × 1 050 / 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
- . Wireless dongle 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

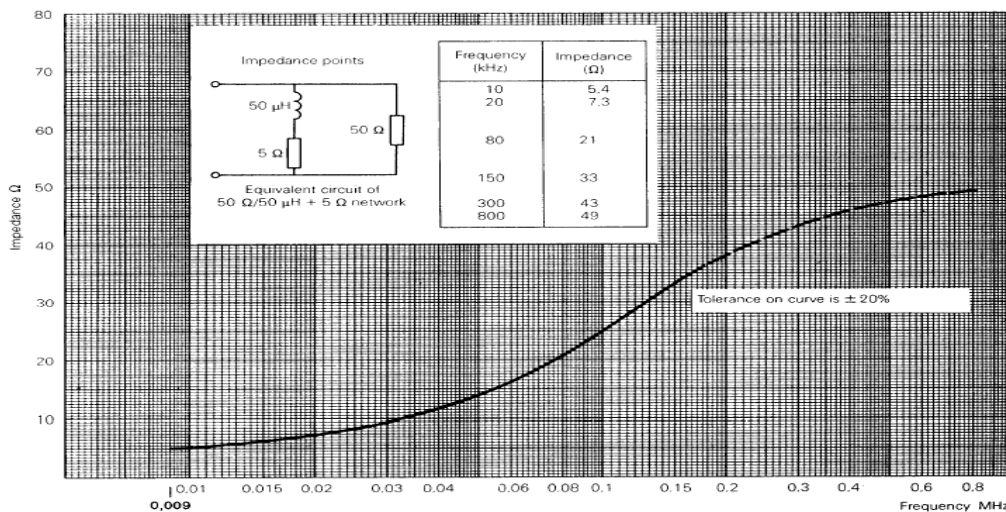


Fig 2. Impedance of LISN



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

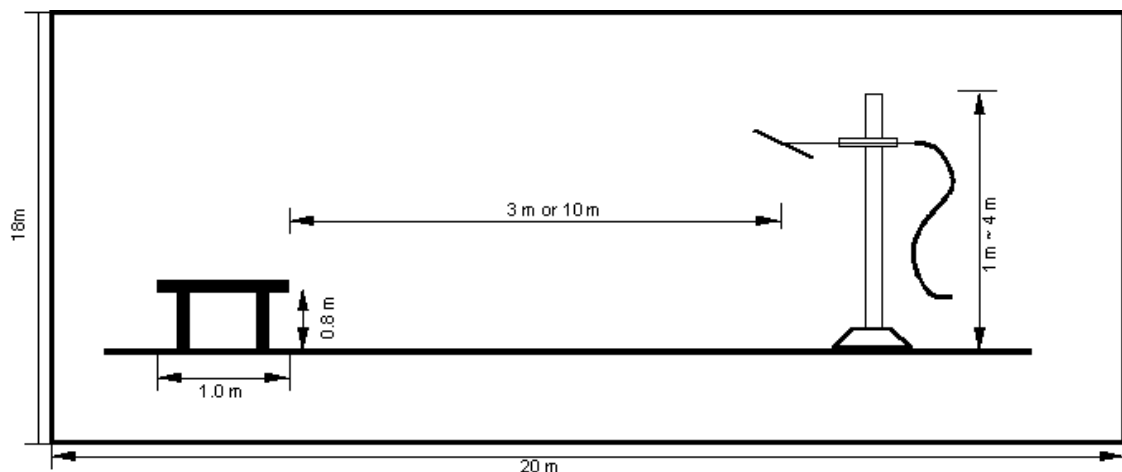


Fig 3. Dimensions of test site



5. Conducted Emission

5.1 Operating Environment

Temperature : 25 °C
Relative Humidity : 43 % 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

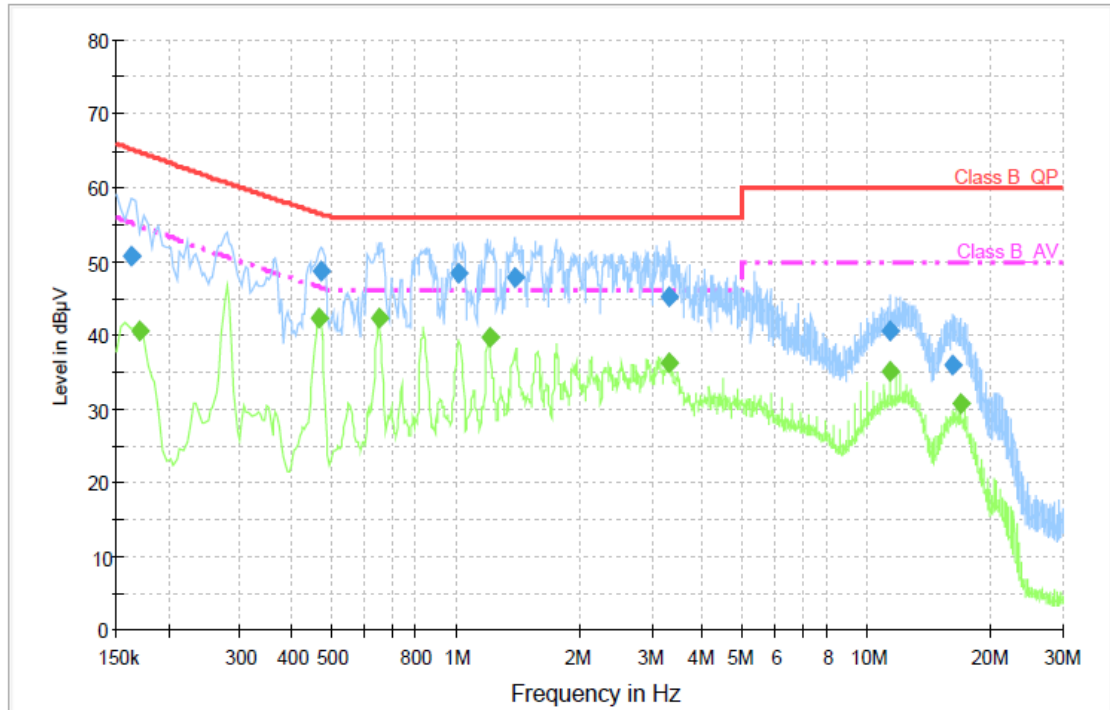
5.6 Test data for Conducted Emission

- Test Date : March 18, 2011
- Resolution Bandwidth : 9 kHz
- Frequency Range : 0.15 MHz ~ 30 MHz



◆ Operating condition: 1 680 × 1 050 / 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
0.162000	50.7	1000.000	9.000	GND	L1	10.1	14.6	65.3	
0.470000	48.6	1000.000	9.000	GND	L1	10.1	7.9	56.5	
1.018000	48.4	1000.000	9.000	GND	L1	10.1	7.6	56.0	
1.386000	47.9	1000.000	9.000	GND	L1	10.1	8.1	56.0	
3.322000	45.3	1000.000	9.000	GND	L1	10.3	10.7	56.0	
11.398000	40.6	1000.000	9.000	GND	L1	10.7	19.4	60.0	
16.202000	35.9	1000.000	9.000	GND	L1	11.0	24.1	60.0	

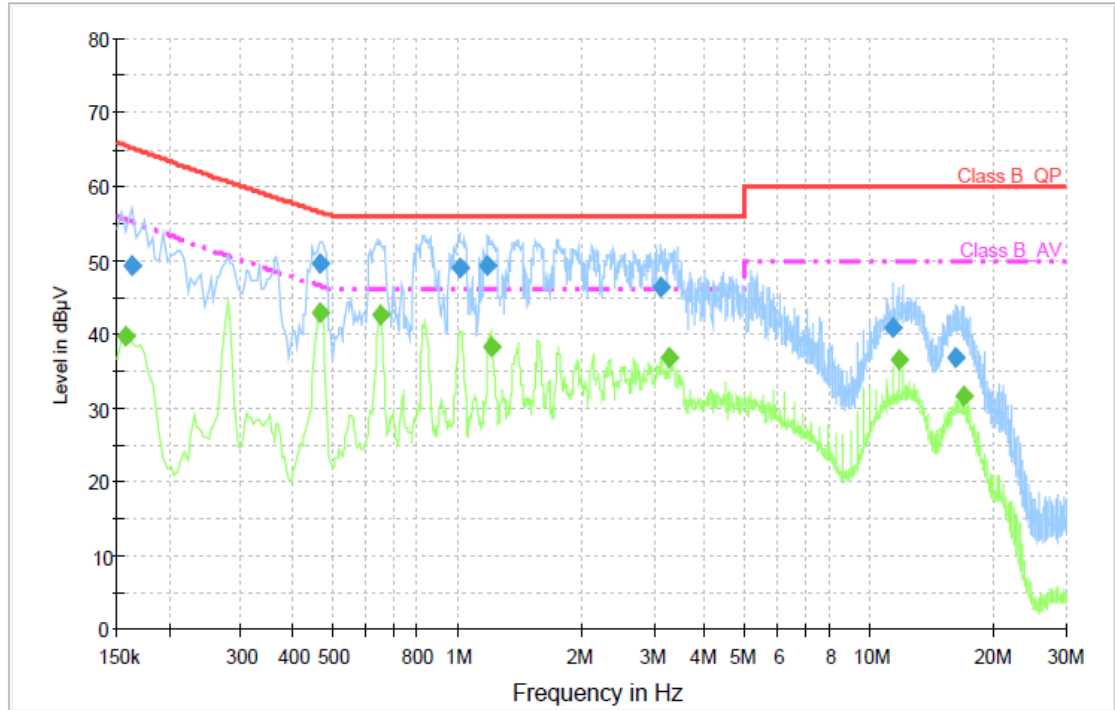
Final Measurement Detector 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.170000	40.7	1000.000	9.000	GND	L1	10.1	14.2	54.9	
0.466000	42.5	1000.000	9.000	GND	L1	10.1	4.0	46.5	
0.650000	42.2	1000.000	9.000	GND	L1	10.1	3.8	46.0	
1.210000	39.8	1000.000	9.000	GND	L1	10.1	6.2	46.0	
3.310000	36.2	1000.000	9.000	GND	L1	10.3	9.8	46.0	
11.398000	35.1	1000.000	9.000	GND	L1	10.7	14.9	50.0	
16.926000	30.8	1000.000	9.000	GND	L1	11.1	19.2	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
0.162000	49.3	1000.000	9.000	GND	N	10.1	16.0	65.3	
0.466000	49.4	1000.000	9.000	GND	N	10.1	7.1	56.5	
1.014000	49.1	1000.000	9.000	GND	N	10.1	6.9	56.0	
1.190000	49.3	1000.000	9.000	GND	N	10.1	6.7	56.0	
3.114000	46.4	1000.000	9.000	GND	N	10.2	9.6	56.0	
11.402000	40.9	1000.000	9.000	GND	N	10.6	19.1	60.0	
16.202000	36.9	1000.000	9.000	GND	N	10.8	23.1	60.0	

Final Measurement Detector 2

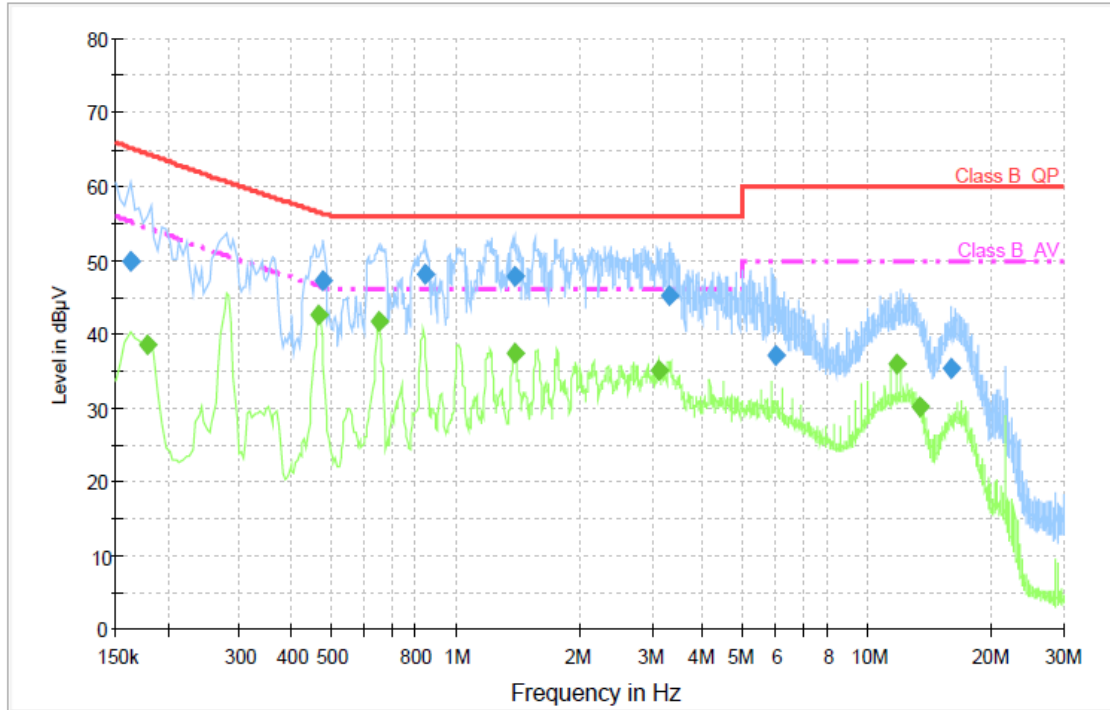
Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.158000	39.6	1000.000	9.000	GND	N	10.1	15.9	55.5	
0.466000	43.0	1000.000	9.000	GND	N	10.1	3.5	46.5	
0.650000	42.5	1000.000	9.000	GND	N	10.1	3.5	46.0	
1.210000	38.3	1000.000	9.000	GND	N	10.1	7.7	46.0	
3.286000	36.8	1000.000	9.000	GND	N	10.3	9.2	46.0	
11.746000	36.4	1000.000	9.000	GND	N	10.6	13.6	50.0	
16.930000	31.6	1000.000	9.000	GND	N	10.9	18.4	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
0.162000	49.8	1000.000	9.000	GND	L1	10.1	15.5	65.3	
0.478000	47.3	1000.000	9.000	GND	L1	10.1	9.0	56.3	
0.842000	48.2	1000.000	9.000	GND	L1	10.1	7.8	56.0	
1.390000	47.7	1000.000	9.000	GND	L1	10.1	8.3	56.0	
3.294000	45.3	1000.000	9.000	GND	L1	10.3	10.7	56.0	
5.962000	37.0	1000.000	9.000	GND	L1	10.4	23.0	60.0	
15.902000	35.4	1000.000	9.000	GND	L1	11.0	24.6	60.0	

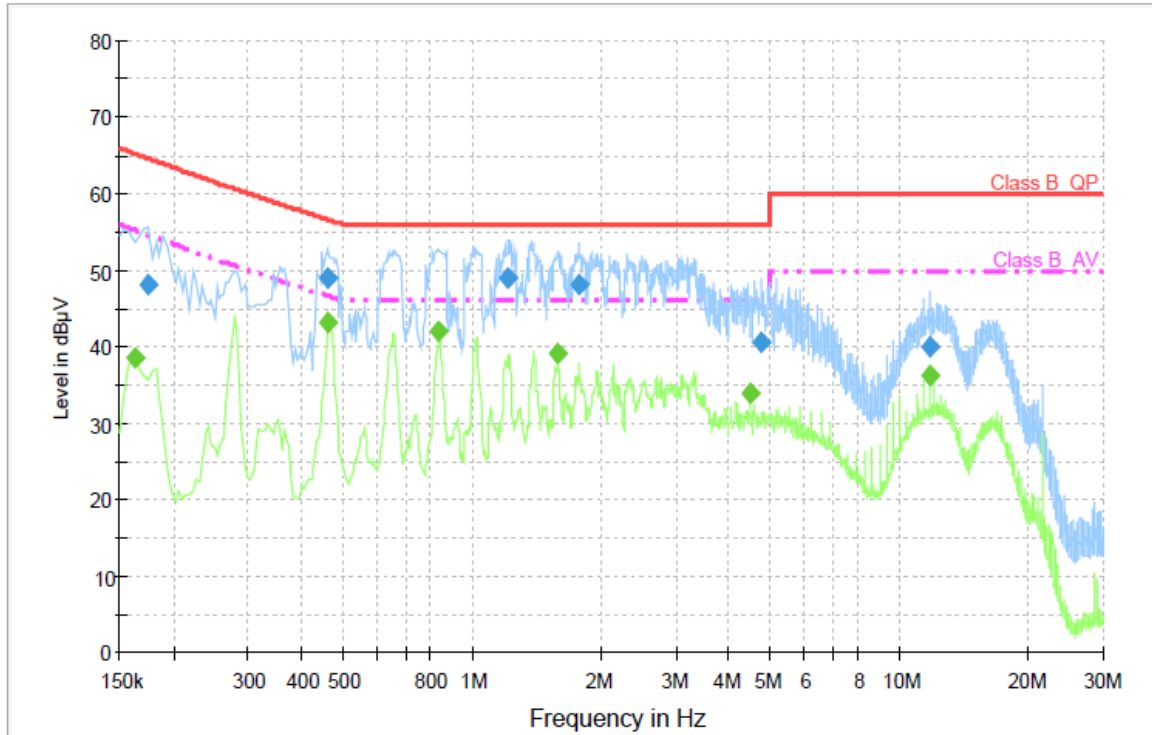
Final Measurement Detector 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.178000	38.6	1000.000	9.000	GND	L1	10.1	15.9	54.5	
0.466000	42.6	1000.000	9.000	GND	L1	10.1	3.9	46.5	
0.650000	41.7	1000.000	9.000	GND	L1	10.1	4.3	46.0	
1.390000	37.4	1000.000	9.000	GND	L1	10.1	8.6	46.0	
3.102000	35.1	1000.000	9.000	GND	L1	10.2	10.9	46.0	
11.746000	35.9	1000.000	9.000	GND	L1	10.7	14.1	50.0	
13.366000	30.1	1000.000	9.000	GND	L1	10.8	19.9	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
0.174000	48.1	1000.000	9.000	GND	N	10.1	16.6	64.7	
0.458000	48.9	1000.000	9.000	GND	N	10.1	7.8	56.7	
1.218000	49.1	1000.000	9.000	GND	N	10.1	6.9	56.0	
1.786000	48.0	1000.000	9.000	GND	N	10.2	8.0	56.0	
4.766000	40.5	1000.000	9.000	GND	N	10.3	15.5	56.0	
11.742000	40.1	1000.000	9.000	GND	N	10.6	19.9	60.0	

Final Measurement Detector 2

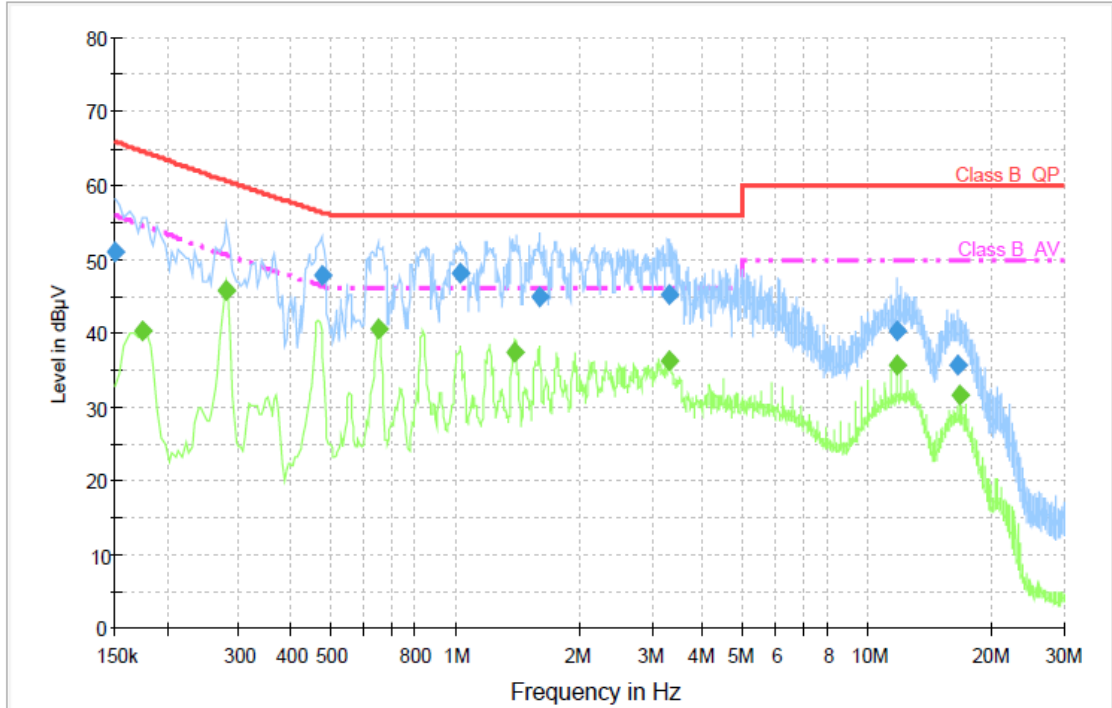
Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.162000	38.6	1000.000	9.000	GND	N	10.1	16.7	55.3	
0.462000	43.1	1000.000	9.000	GND	N	10.1	3.5	46.6	
0.838000	42.1	1000.000	9.000	GND	N	10.1	3.9	46.0	
1.586000	39.0	1000.000	9.000	GND	N	10.1	7.0	46.0	
4.490000	34.0	1000.000	9.000	GND	N	10.3	12.0	46.0	
11.746000	36.2	1000.000	9.000	GND	N	10.6	13.8	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
0.150000	51.0	1000.000	9.000	GND	L1	10.1	15.0	66.0	
0.474000	47.8	1000.000	9.000	GND	L1	10.1	8.6	56.4	
1.030000	48.1	1000.000	9.000	GND	L1	10.1	7.9	56.0	
1.602000	45.0	1000.000	9.000	GND	L1	10.1	11.0	56.0	
3.294000	45.3	1000.000	9.000	GND	L1	10.3	10.7	56.0	
11.746000	40.4	1000.000	9.000	GND	L1	10.7	19.6	60.0	
16.506000	35.5	1000.000	9.000	GND	L1	11.0	24.5	60.0	

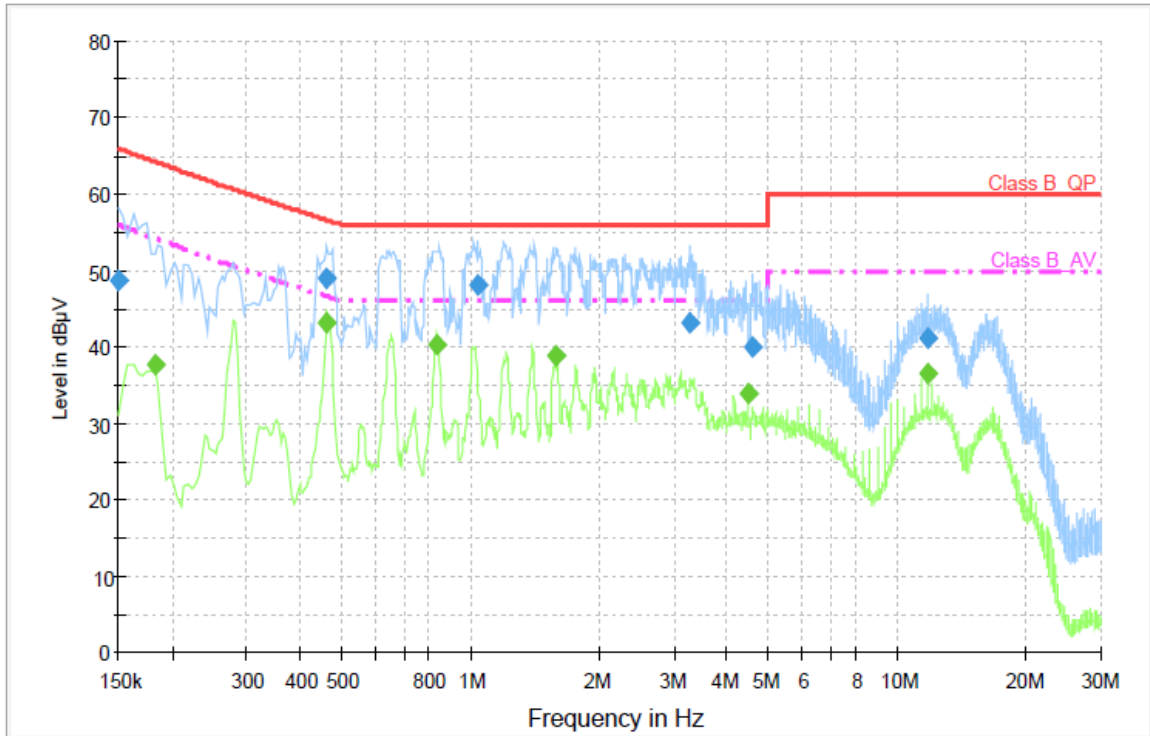
Final Measurement Detector 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.174000	40.2	1000.000	9.000	GND	L1	10.1	14.5	54.7	
0.278000	45.8	1000.000	9.000	GND	L1	10.1	4.8	50.6	
0.654000	40.6	1000.000	9.000	GND	L1	10.1	5.4	46.0	
1.398000	37.4	1000.000	9.000	GND	L1	10.1	8.6	46.0	
3.294000	36.2	1000.000	9.000	GND	L1	10.3	9.8	46.0	
11.746000	35.8	1000.000	9.000	GND	L1	10.7	14.2	50.0	
16.702000	31.5	1000.000	9.000	GND	L1	11.0	18.5	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	48.7	1000.000	9.000	GND	N	10.1	17.3	66.0	
0.462000	49.1	1000.000	9.000	GND	N	10.1	7.5	56.6	
1.042000	48.0	1000.000	9.000	GND	N	10.1	8.0	56.0	
3.258000	43.3	1000.000	9.000	GND	N	10.2	12.7	56.0	
4.602000	39.9	1000.000	9.000	GND	N	10.3	16.1	56.0	
11.746000	41.2	1000.000	9.000	GND	N	10.6	18.8	60.0	

Final Measurement Detector 2

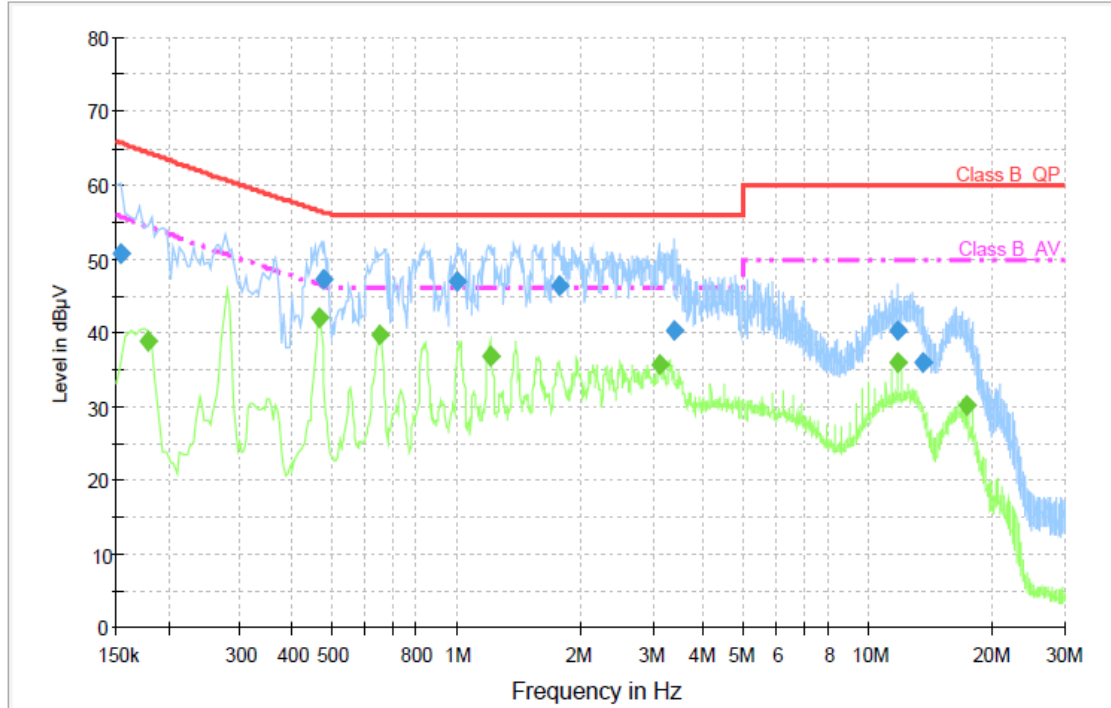
Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.182000	37.6	1000.000	9.000	GND	N	10.1	16.7	54.3	
0.462000	43.1	1000.000	9.000	GND	N	10.1	3.5	46.6	
0.838000	40.3	1000.000	9.000	GND	N	10.1	5.7	46.0	
1.582000	38.7	1000.000	9.000	GND	N	10.1	7.3	46.0	
4.490000	33.8	1000.000	9.000	GND	N	10.3	12.2	46.0	
11.746000	36.4	1000.000	9.000	GND	N	10.6	13.6	50.0	

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



◆ Operating condition: 1 680 × 1 050 / 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
0.154000	50.8	1000.000	9.000	GND	L1	10.1	15.0	65.8	
0.478000	47.1	1000.000	9.000	GND	L1	10.1	9.2	56.3	
1.006000	47.0	1000.000	9.000	GND	L1	10.1	9.0	56.0	
1.774000	46.4	1000.000	9.000	GND	L1	10.2	9.6	56.0	
3.382000	40.4	1000.000	9.000	GND	L1	10.3	15.6	56.0	
11.742000	40.2	1000.000	9.000	GND	L1	10.7	19.8	60.0	
13.518000	35.9	1000.000	9.000	GND	L1	10.8	24.1	60.0	

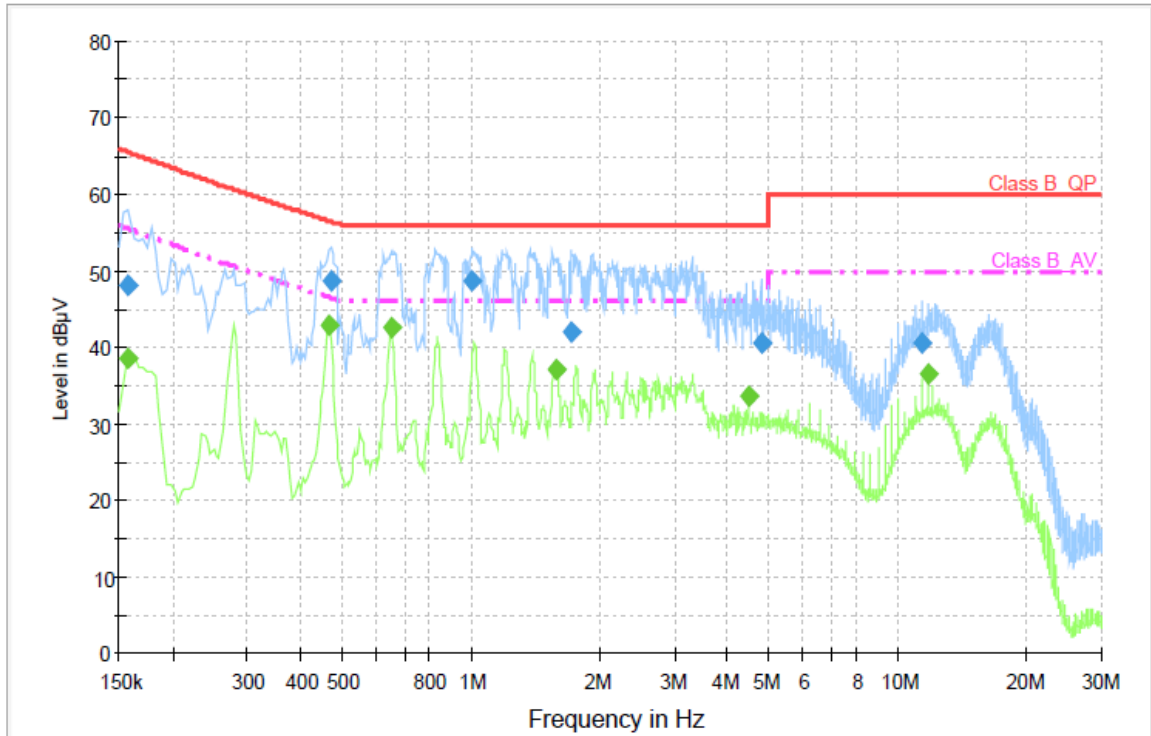
Final Measurement Detector 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.178000	38.8	1000.000	9.000	GND	L1	10.1	15.7	54.5	
0.466000	42.0	1000.000	9.000	GND	L1	10.1	4.5	46.5	
0.654000	39.8	1000.000	9.000	GND	L1	10.1	6.2	46.0	
1.210000	36.9	1000.000	9.000	GND	L1	10.1	9.1	46.0	
3.118000	35.5	1000.000	9.000	GND	L1	10.2	10.5	46.0	
11.746000	35.8	1000.000	9.000	GND	L1	10.7	14.2	50.0	
17.274000	30.2	1000.000	9.000	GND	L1	11.1	19.8	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
0.158000	48.2	1000.000	9.000	GND	N	10.1	17.3	65.5	
0.470000	48.8	1000.000	9.000	GND	N	10.1	7.7	56.5	
1.006000	48.7	1000.000	9.000	GND	N	10.1	7.4	56.0	
1.722000	42.1	1000.000	9.000	GND	N	10.2	13.9	56.0	
4.774000	40.5	1000.000	9.000	GND	N	10.3	15.5	56.0	
11.398000	40.5	1000.000	9.000	GND	N	10.6	19.5	60.0	

Final Measurement Detector 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.158000	38.5	1000.000	9.000	GND	N	10.1	17.0	55.5	
0.466000	43.0	1000.000	9.000	GND	N	10.1	3.5	46.5	
0.650000	42.5	1000.000	9.000	GND	N	10.1	3.5	46.0	
1.578000	37.0	1000.000	9.000	GND	N	10.1	9.0	46.0	
4.490000	33.8	1000.000	9.000	GND	N	10.3	12.2	46.0	
11.746000	36.4	1000.000	9.000	GND	N	10.6	13.6	50.0	

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



6. Radiated Emission

6.1 Operating Environment

Temperature : 10 °C
Relative Humidity : 30 % 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	1258943	11. 12. 2011

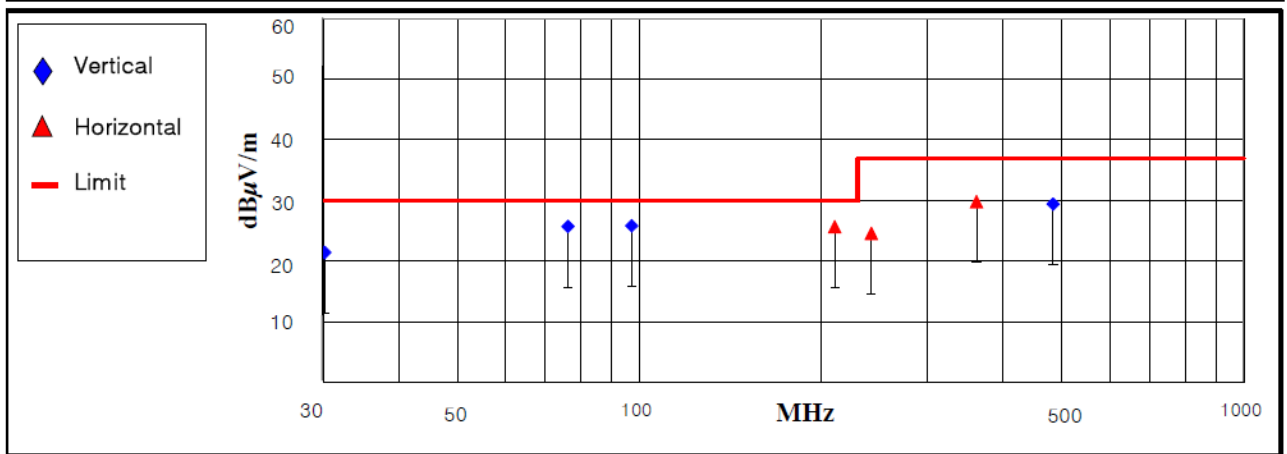


6.6 Test data for Radiated Emission

- Test Date : March 22 ~ 24, 2011
- Resolution Bandwidth : 120 kHz/1 MHz
- Frequency Range : 30 MHz ~ 5 000 MHz
- Measurement Distance : 10 m/3 m
- Note : The highest frequency of the internal source of the EUT is between 500 MHz and 1 000 MHz (512 MHz). The measurement was made up to 5 000 MHz

- ◆ Operating Condition: 1 680 × 1 050 / 60 Hz (RGB: Analog)
 Detector mode: Quasi-peak detector mode

Frequency (MHz)	Measurement Level				Limit (dBμ V/m)	Margin (dB)	Positioning System		
	Reading	Antenna	Cable	Test Result			Pol. (H/V)	Height (cm)	Angle (°)
	Value(dBμ V)	Factor(dB/m)	Loss(dB)	(dBμ V/m)					
30.20	6.39	13.69	1.32	21.40	30.00	8.60	V	100	258
76.25	14.99	8.54	2.18	25.71	30.00	4.29	V	100	17
97.20	14.09	9.24	2.49	25.82	30.00	4.18	V	206	159
210.60	7.56	14.26	3.87	25.69	30.00	4.31	H	100	246
242.13	6.88	13.52	4.18	24.58	37.00	12.42	H	220	186
361.33	9.62	14.94	5.24	29.80	37.00	7.20	H	100	82
483.94	5.89	17.32	6.19	29.40	37.00	7.60	V	100	172

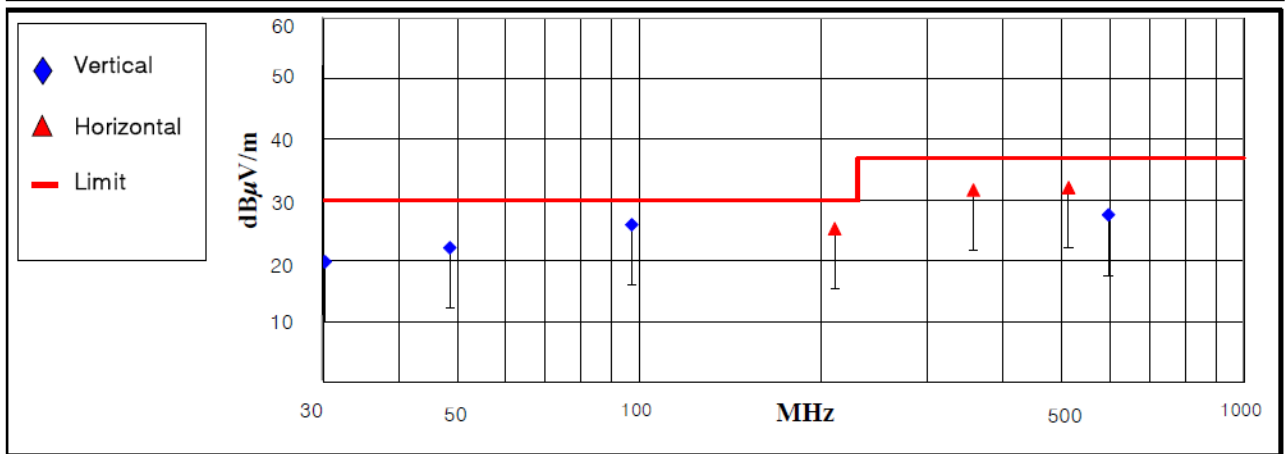


< Fig 12. Radiated emission result (30 MHz ~ 1 000 MHz) >



- ◆ Operating Condition: 1 680 × 1 050 / 60 Hz (HDMI/DVI: Digital)
 Detector mode: Quasi-peak detector mode

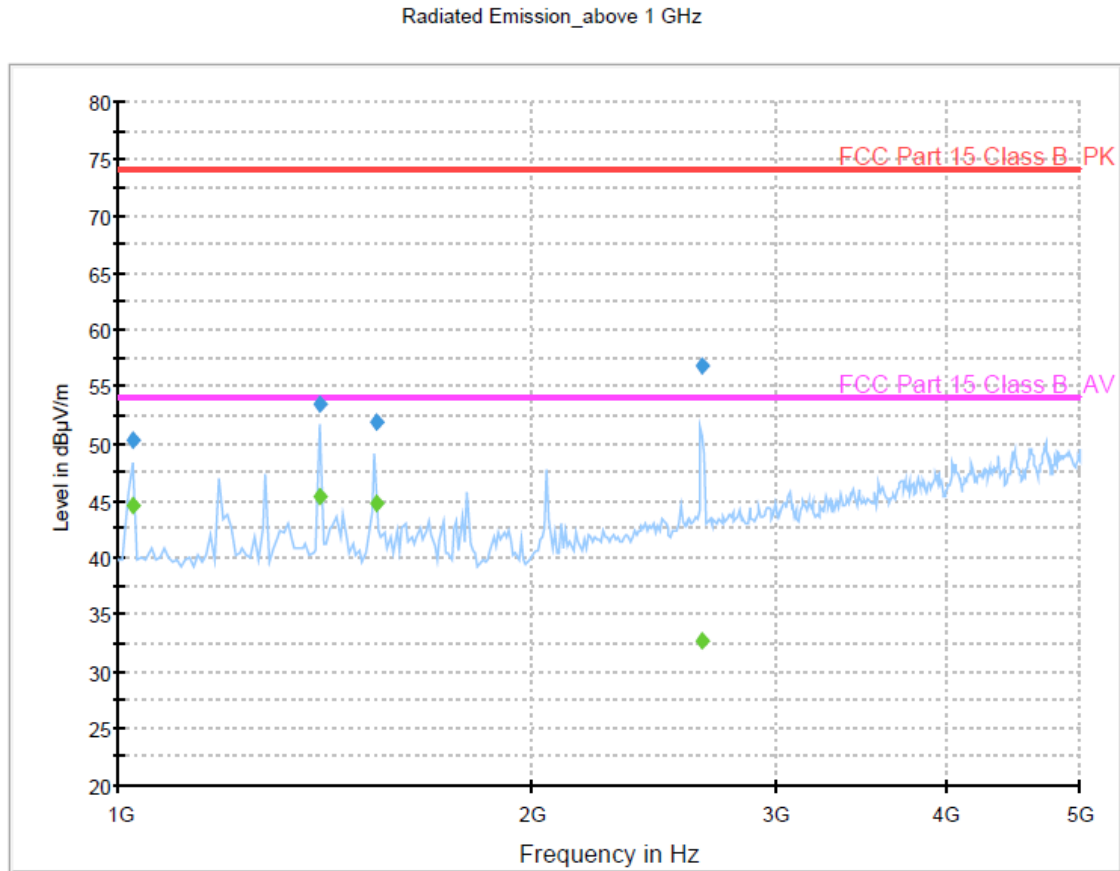
Frequency (MHz)	Measurement Level				Limit (dBμ V/m)	Margin (dB)	Positioning System		
	Reading Value(dBμ V)	Antenna Factor(dB/m)	Cable Loss(dB)	Test Result (dBμ V/m)			Pol. (H/V)	Height (cm)	Angle (°)
30.23	4.85	13.68	1.32	19.85	30.00	10.15	V	165	175
48.61	10.93	9.54	1.69	22.16	30.00	7.84	V	100	135
97.19	14.23	9.24	2.49	25.96	30.00	4.04	V	240	152
210.60	7.17	14.26	3.87	25.30	30.00	4.70	H	218	236
357.11	11.69	14.80	5.20	31.69	37.00	5.31	H	100	113
513.00	7.98	17.72	6.40	32.10	37.00	4.90	H	211	130
597.00	1.63	18.97	7.00	27.60	37.00	9.40	V	119	169



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



- ◆ Operating Condition: 1 680 × 1 050 / 60 Hz (RGB: Analog)
- Green trace: Average detector, Blue trace: 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)
1025.848096	50.3	100.0	1000.000	194.0	V	0.0	-14.3	23.7	74.0
1401.401603	53.5	100.0	1000.000	198.0	H	227.0	-13.2	20.5	74.0
1538.874148	51.9	100.0	1000.000	198.0	V	0.0	-12.9	22.1	74.0
2654.302605	56.8	100.0	1000.000	130.0	H	157.0	-8.7	17.2	74.0

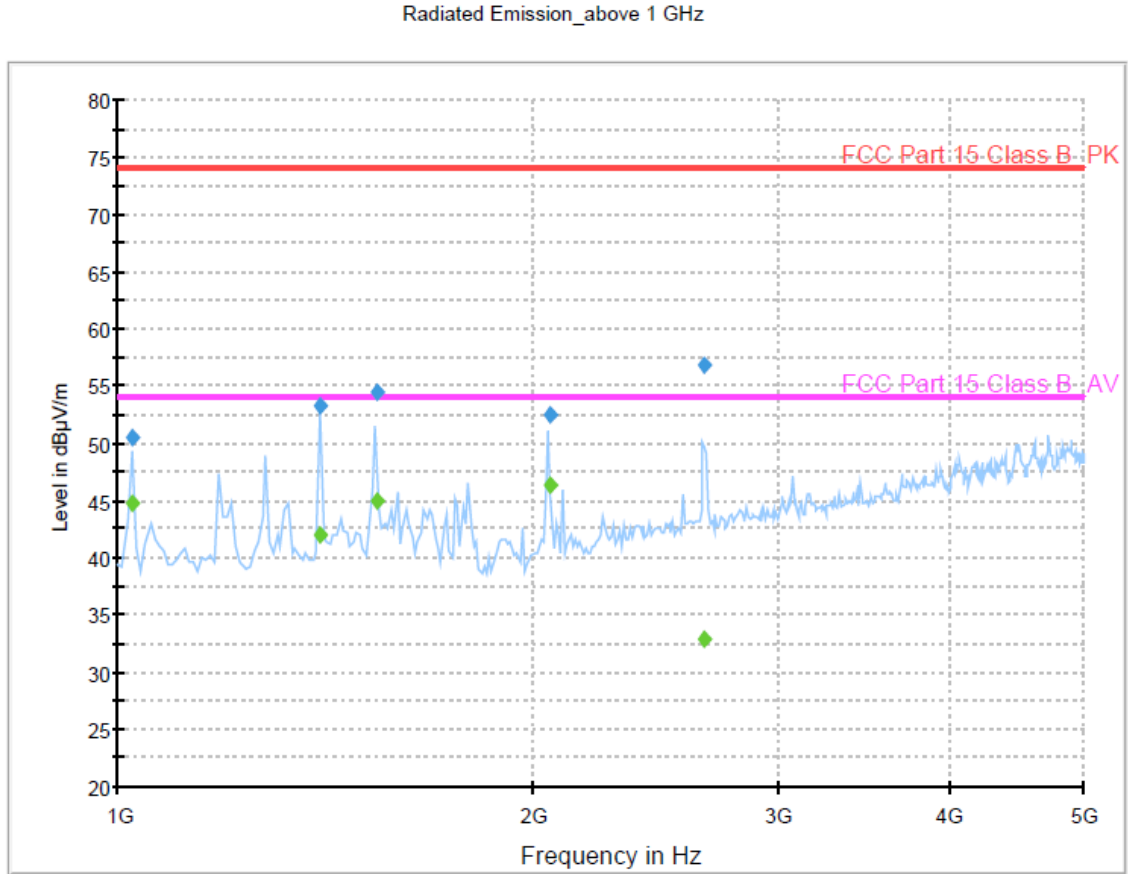
Final Result 2

Frequency (MHz)	CAverage (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1025.848096	44.6	100.0	1000.000	198.0	V	0.0	-14.3	9.4	54.0
1401.401603	45.3	100.0	1000.000	198.0	H	227.0	-13.2	8.7	54.0
1538.874148	44.8	100.0	1000.000	198.0	V	0.0	-12.9	9.2	54.0
2655.102605	32.8	100.0	1000.000	138.0	H	157.0	-8.7	21.2	54.0

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



- ◆ Operating Condition: 1 680 × 1 050 / 60 Hz (HDMI/DVI: Digital)
- Green trace: Average detector, Blue trace: 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)
1025.848096	50.6	100.0	1000.000	122.0	V	6.0	-14.3	23.4	74.0
1401.401603	53.2	100.0	1000.000	100.0	H	163.0	-13.2	20.8	74.0
1538.874148	54.5	100.0	1000.000	113.0	H	138.0	-12.9	19.5	74.0
2051.900200	52.6	100.0	1000.000	100.0	V	218.0	-11.4	21.4	74.0
2654.702605	56.8	100.0	1000.000	130.0	H	154.0	-8.7	17.2	74.0

Final Result 2

Frequency (MHz)	CAverage (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1025.848096	44.8	100.0	1000.000	130.0	V	6.0	-14.3	9.2	54.0
1401.401603	42.1	100.0	1000.000	113.0	H	163.0	-13.2	11.9	54.0
1538.874148	45.0	100.0	1000.000	113.0	H	138.0	-12.9	9.0	54.0
2051.900200	46.4	100.0	1000.000	100.0	V	218.0	-11.4	7.6	54.0
2655.102605	32.8	100.0	1000.000	113.0	H	154.0	-8.7	21.2	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. DLP PROJECTOR (Model Name: HW300T-JE)** was complies with §15.107 and 15.109 of the FCC Rules.