

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 : May 20, 2011

Order Number: GETEC-C1-11-098

Test Report Number: GETEC-E3-11-039

Test Site: Gumi College EMC Center

FCC Registration Number: (100749, 443957)

FCC ID. : BEJHW300YJE

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	: HW300Y-JE, HW300G-JE, HW301Y-JE, HW301G-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 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.** BEJHW300YJE
- **EUT Type** DLP PROJECTOR
- **Model Name** HW300Y-JE, HW300G-JE, HW301Y-JE, HW301G-JE
[The differences for all models are as follow:](#)

Model Name	Description
HW300Y-JE	External color: Black / Sales option: Included a wireless dongle.
HW300G-JE	External color: Black / Sales option: Excluded a wireless dongle.
HW301Y-JE	External color: White / Sales option: Included a wireless dongle.
HW301G-JE	External color: White / Sales option: Excluded a wireless dongle.

- **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** May 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-E3-11-039
- **Dates of Issue** May 20, 2011

EUT Type: DLP PROJECTOR

FCC ID.: BEJHW300YJE



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: HW300Y-JE, HW300G-JE, HW301Y-JE, HW301G-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: HW300Y-JE, HW300G-JE, HW301Y-JE, HW301G-JE)** FCC ID.: BEJHW300YJE

MODEL	HW300Y(HW300Y-JE)	HW300G(HW300G-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/PAL/SECAM/NTSC4.43/PAL-M/PAL-N/PAL-60	
AC-DC Adapter	19.5 V  , 5.64 A	
Audio Output	1 W + 1 W	
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)	
Operating Condition	Temperature	
	In operation	0°C - 40°C
	In storage and transit	-20°C - 60°C
	Humidity (relative humidity)	
	In operation	0 % - 80%
	Not in operation	0 % - 85%

-. Maximum Resolution : 1 680 × 1 050

-. Maximum Frequency Range : 405 MHz

EUT Type: DLP PROJECTOR

FCC ID.: BEJHW300YJE



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
Headset	PHILIPS	SBC HL140	S/N: N/A FCC ID.: DoC
Wireless Dongle	LG Electronics Inc.	AN-WF100	S/N: N/A FCC ID.: N/A

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

3.2.2 System configuration

Description	Manufacturer	Model Name	S/N & FCC ID.
Adapter #1 ¹⁾	Weihai Sunlin Electronics. Co., Ltd.	SD-B191A	S/N: RA0Y0000448 FCC ID.: N/A
Adapter #2 ²⁾	AMLINK (SHANGHAI) LTD.	AAM-00	S/N: JB4NC625333010008(0.4) 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

2) Input ratings: AC (100 – 240) V, (50 – 60) Hz, 1.8 A / Output ratings: DC 19.5 V, 5.65 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) in cable	Connected to the EUT and PC	1.80 m shielded with two ferrite cores
HDMI/DVI(Digital) in cable	Connected to the EUT and PC	1.80 m shielded
AV in cable	Connected to the EUT and DVD player	1.30 m shielded
Component in cable	Connected to the EUT and DVD player	2.20 m shielded
Headset cable	Connected to the EUT and headset	1.20 m shielded

3.3 Modification Item(s)

- None



4. Description of tests

4.1 Test Condition

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

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

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

- . 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
- . USB port was connected to the wireless dongle

“The verification report for 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

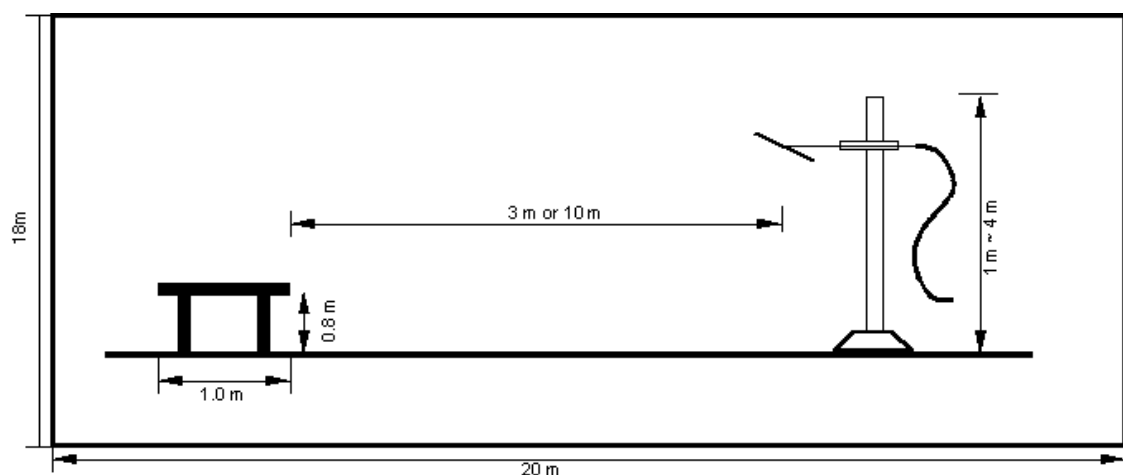


Fig 3. Dimensions of test site



5. Conducted Emission

5.1 Operating Environment

Temperature : 24 °C
Relative Humidity : 40 % 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

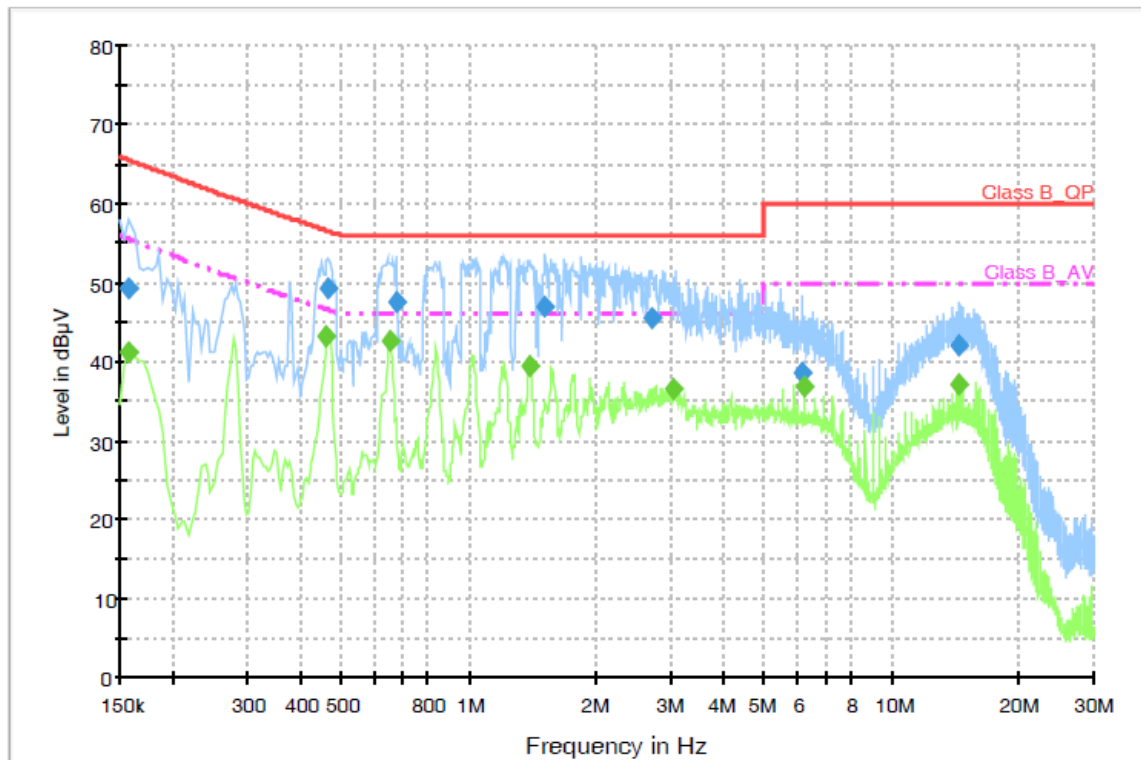
5.6 Test data for Conducted Emission

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



- ◆ Test adapter (Model name / Manufacturer): SD-B191A / Weihai Sunlin Electronics. Co., Ltd.
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
0.158000	49.2	1000.000	9.000	GND	L1	10.1	16.3	65.5	
0.466000	49.3	1000.000	9.000	GND	L1	10.1	7.2	56.5	
0.674000	47.6	1000.000	9.000	GND	L1	10.1	8.4	56.0	
1.518000	47.0	1000.000	9.000	GND	L1	10.1	9.0	56.0	
2.718000	45.6	1000.000	9.000	GND	L1	10.2	10.4	56.0	
6.134000	38.6	1000.000	9.000	GND	L1	10.4	21.4	60.0	
14.322000	41.9	1000.000	9.000	GND	L1	10.8	18.1	60.0	

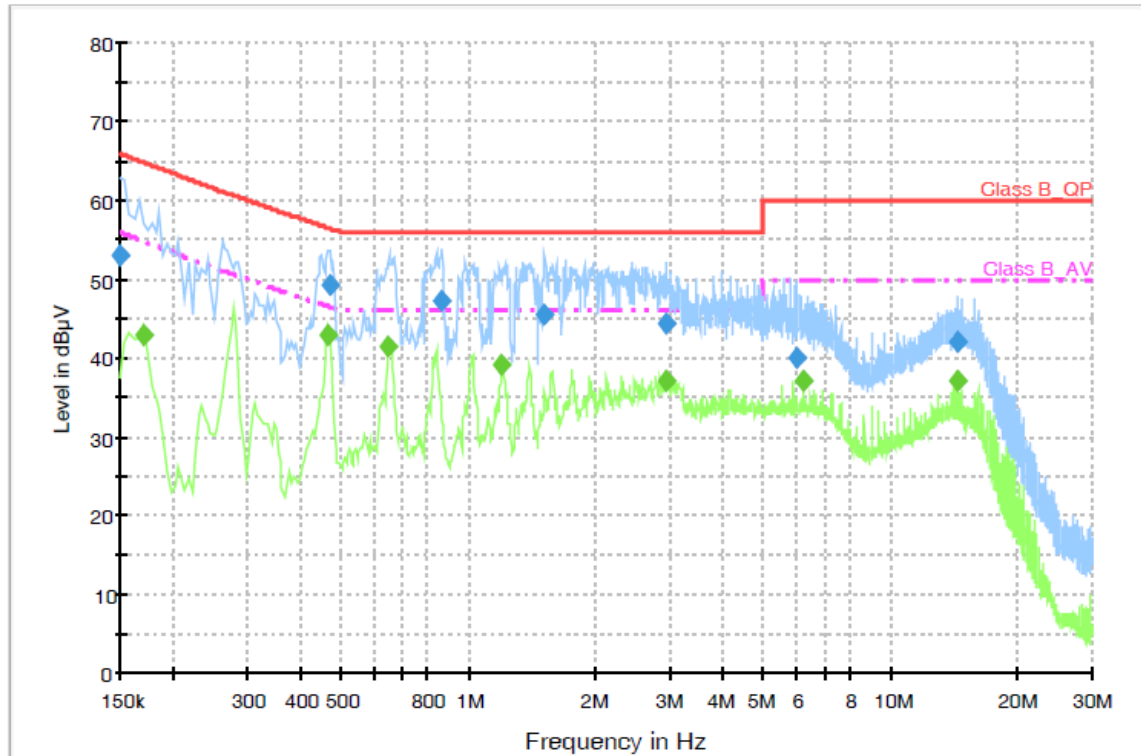
Final Measurement Detector 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.158000	41.3	1000.000	9.000	GND	L1	10.1	14.2	55.5	
0.462000	43.1	1000.000	9.000	GND	L1	10.1	3.5	46.6	
0.650000	42.5	1000.000	9.000	GND	L1	10.1	3.5	46.0	
1.394000	39.6	1000.000	9.000	GND	L1	10.1	6.4	46.0	
3.042000	36.6	1000.000	9.000	GND	L1	10.2	9.4	46.0	
6.230000	36.7	1000.000	9.000	GND	L1	10.4	13.3	50.0	
14.322000	37.1	1000.000	9.000	GND	L1	10.8	12.9	50.0	

< Fig 4. Graph of continuous disturbance (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	52.9	1000.000	9.000	GND	N	10.1	13.1	66.0	
0.470000	49.3	1000.000	9.000	GND	N	10.1	7.2	56.5	
0.866000	47.4	1000.000	9.000	GND	N	10.1	8.6	56.0	
1.518000	45.6	1000.000	9.000	GND	N	10.1	10.4	56.0	
2.930000	44.3	1000.000	9.000	GND	N	10.2	11.7	56.0	
5.962000	39.9	1000.000	9.000	GND	N	10.4	20.1	60.0	
14.322000	41.9	1000.000	9.000	GND	N	10.7	18.1	60.0	

Final Measurement Detector 2

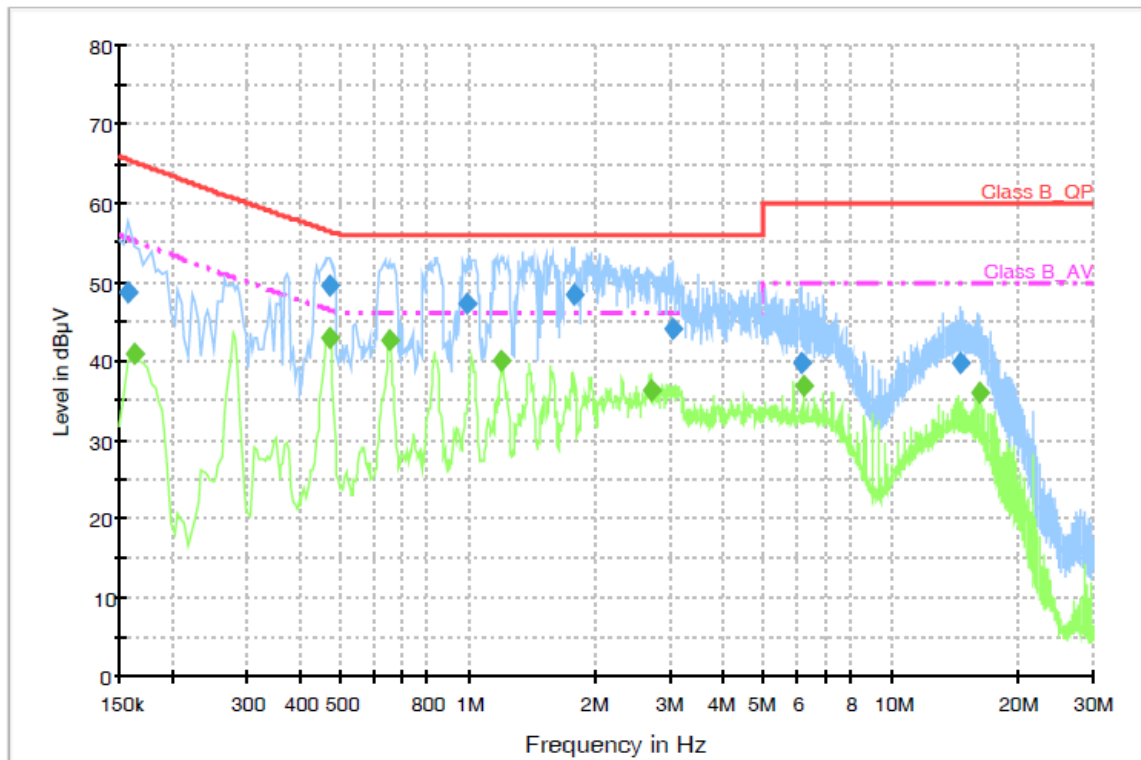
Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.170000	42.9	1000.000	9.000	GND	N	10.1	12.0	54.9	
0.466000	43.0	1000.000	9.000	GND	N	10.1	3.5	46.5	
0.646000	41.4	1000.000	9.000	GND	N	10.1	4.6	46.0	
1.202000	39.1	1000.000	9.000	GND	N	10.1	6.9	46.0	
2.942000	37.2	1000.000	9.000	GND	N	10.2	8.8	46.0	
6.230000	37.1	1000.000	9.000	GND	N	10.4	13.0	50.0	
14.322000	37.2	1000.000	9.000	GND	N	10.7	12.8	50.0	

< Fig 5. Graph of continuous disturbance (Neutral line) >



- ◆ Test adapter (Model name / Manufacturer): SD-B191A / Weihai Sunlin Electronics. Co., Ltd.
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
0.158000	48.7	1000.000	9.000	GND	L1	10.1	16.8	65.5	
0.470000	49.7	1000.000	9.000	GND	L1	10.1	6.8	56.5	
0.994000	47.2	1000.000	9.000	GND	L1	10.1	8.8	56.0	
1.778000	48.5	1000.000	9.000	GND	L1	10.1	7.5	56.0	
3.054000	44.0	1000.000	9.000	GND	L1	10.2	12.0	56.0	
6.150000	39.8	1000.000	9.000	GND	L1	10.4	20.2	60.0	
14.534000	39.6	1000.000	9.000	GND	L1	10.8	20.4	60.0	

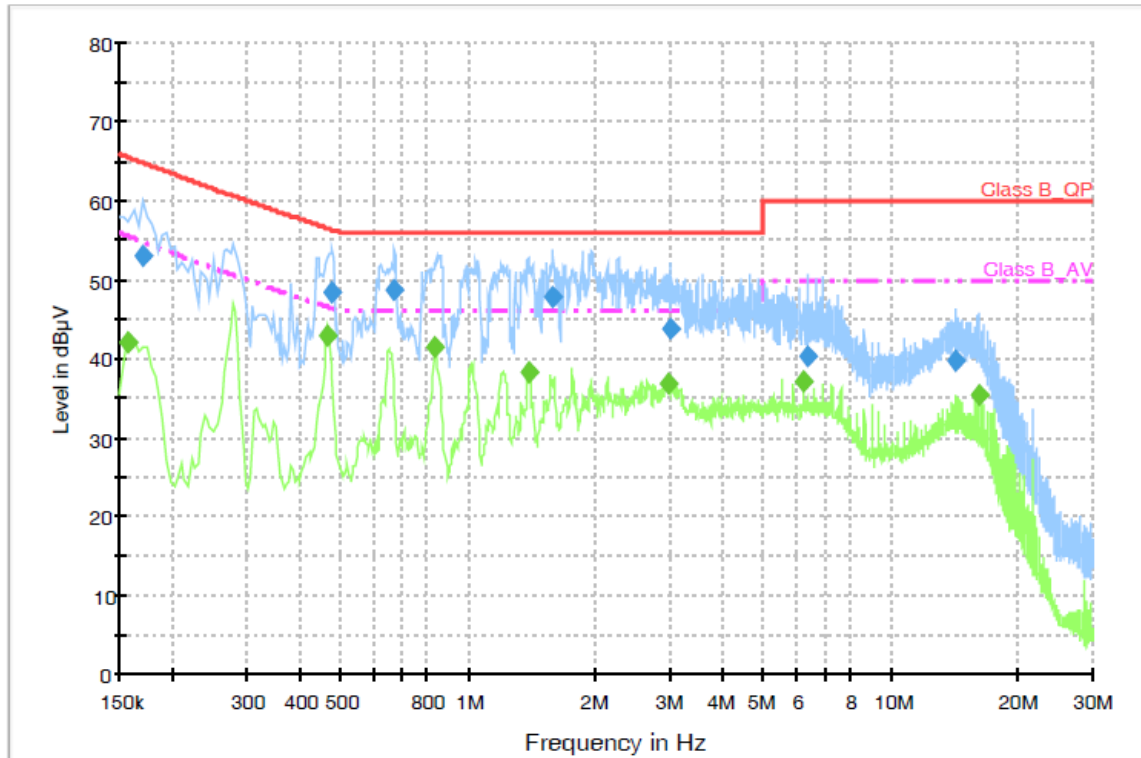
Final Measurement Detector 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.162000	40.8	1000.000	9.000	GND	L1	10.1	14.5	55.3	
0.470000	42.9	1000.000	9.000	GND	L1	10.1	3.6	46.5	
0.650000	42.5	1000.000	9.000	GND	L1	10.1	3.5	46.0	
1.202000	40.1	1000.000	9.000	GND	L1	10.1	5.9	46.0	
2.698000	36.3	1000.000	9.000	GND	L1	10.2	9.7	46.0	
6.230000	36.8	1000.000	9.000	GND	L1	10.4	13.2	50.0	
16.070000	35.8	1000.000	9.000	GND	L1	10.9	14.2	50.0	

< Fig 6. Graph of continuous disturbance (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
0.170000	52.9	1000.000	9.000	GND	N	10.1	12.0	64.9	
0.478000	48.4	1000.000	9.000	GND	N	10.1	7.9	56.3	
0.670000	48.6	1000.000	9.000	GND	N	10.1	7.4	56.0	
1.586000	47.8	1000.000	9.000	GND	N	10.1	8.2	56.0	
3.014000	43.6	1000.000	9.000	GND	N	10.2	12.4	56.0	
6.346000	40.4	1000.000	9.000	GND	N	10.4	19.6	60.0	
14.194000	39.6	1000.000	9.000	GND	N	10.7	20.4	60.0	

Final Measurement Detector 2

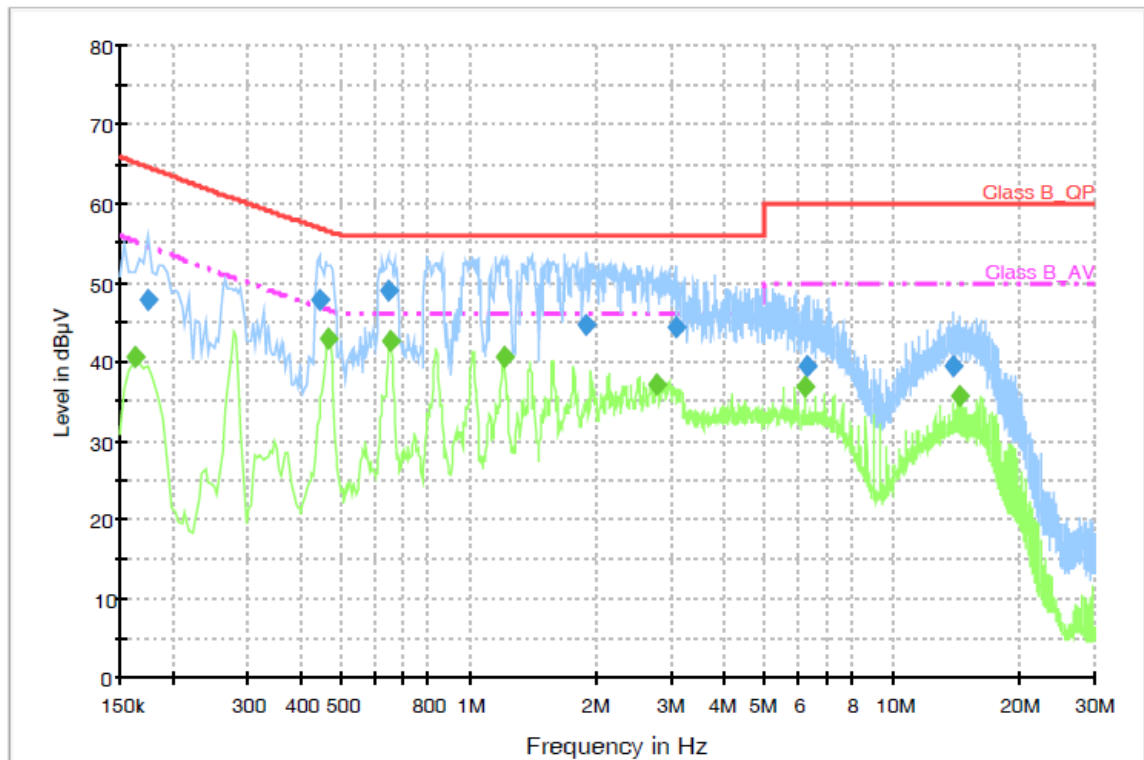
Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.158000	42.2	1000.000	9.000	GND	N	10.1	13.3	55.5	
0.466000	43.0	1000.000	9.000	GND	N	10.1	3.5	46.5	
0.838000	41.6	1000.000	9.000	GND	N	10.1	4.4	46.0	
1.386000	38.3	1000.000	9.000	GND	N	10.1	7.7	46.0	
2.974000	36.9	1000.000	9.000	GND	N	10.2	9.1	46.0	
6.230000	37.2	1000.000	9.000	GND	N	10.4	12.8	50.0	
16.070000	35.5	1000.000	9.000	GND	N	10.8	14.5	50.0	

< Fig 7. Graph of continuous disturbance (Neutral line) >



- ◆ Test adapter (Model name / Manufacturer): SD-B191A / Weihai Sunlin Electronics. Co., Ltd.
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
0.174000	48.0	1000.000	9.000	GND	L1	10.1	16.7	64.7	
0.442000	47.7	1000.000	9.000	GND	L1	10.1	9.3	57.0	
0.642000	49.1	1000.000	9.000	GND	L1	10.1	6.9	56.0	
1.898000	44.6	1000.000	9.000	GND	L1	10.1	11.4	56.0	
3.066000	44.2	1000.000	9.000	GND	L1	10.2	11.8	56.0	
6.298000	39.4	1000.000	9.000	GND	L1	10.4	20.6	60.0	
13.846000	39.5	1000.000	9.000	GND	L1	10.8	20.5	60.0	

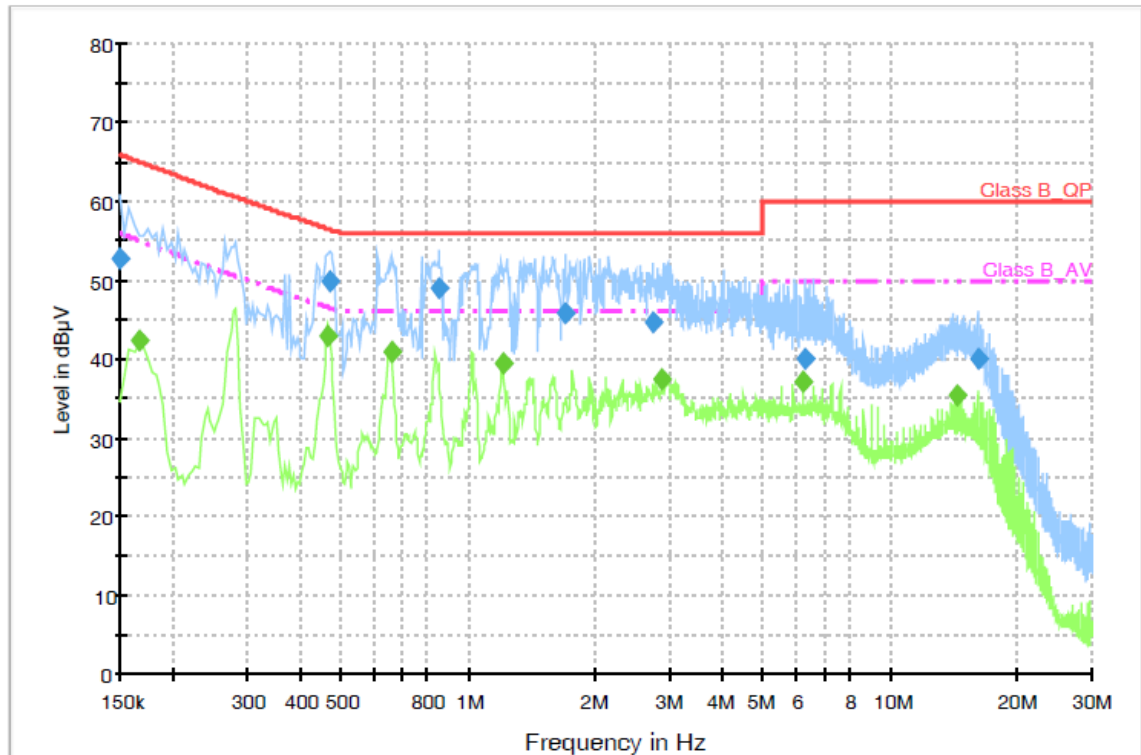
Final Measurement Detector 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.162000	40.6	1000.000	9.000	GND	L1	10.1	14.7	55.3	
0.466000	43.0	1000.000	9.000	GND	L1	10.1	3.5	46.5	
0.650000	42.5	1000.000	9.000	GND	L1	10.1	3.5	46.0	
1.206000	40.5	1000.000	9.000	GND	L1	10.1	5.5	46.0	
2.778000	37.0	1000.000	9.000	GND	L1	10.2	9.0	46.0	
6.230000	36.7	1000.000	9.000	GND	L1	10.4	13.3	50.0	
14.322000	35.5	1000.000	9.000	GND	L1	10.8	14.5	50.0	

< Fig 8. Graph of continuous disturbance (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	52.7	1000.000	9.000	GND	N	10.1	13.3	66.0	
0.470000	50.0	1000.000	9.000	GND	N	10.1	6.5	56.5	
0.854000	49.0	1000.000	9.000	GND	N	10.1	7.0	56.0	
1.698000	45.8	1000.000	9.000	GND	N	10.1	10.2	56.0	
2.734000	44.6	1000.000	9.000	GND	N	10.2	11.4	56.0	
6.310000	39.9	1000.000	9.000	GND	N	10.4	20.1	60.0	
16.070000	40.1	1000.000	9.000	GND	N	10.8	19.9	60.0	

Final Measurement Detector 2

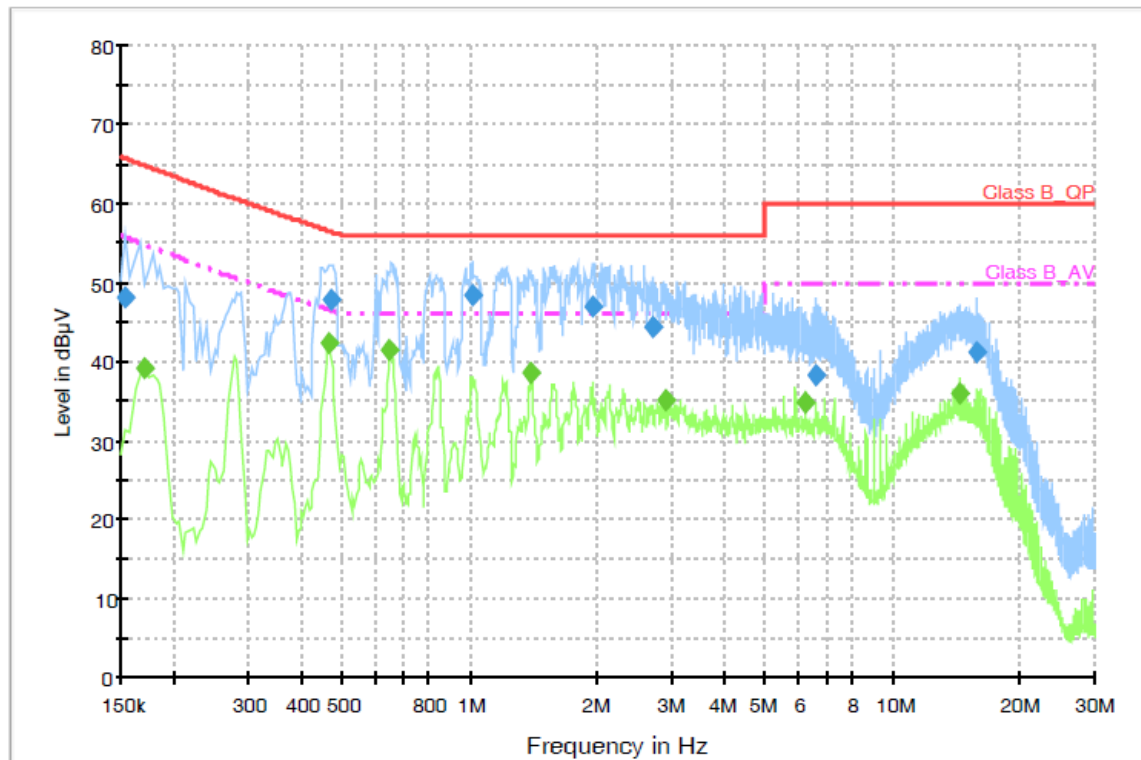
Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.166000	42.2	1000.000	9.000	GND	N	10.1	12.9	55.1	
0.466000	43.0	1000.000	9.000	GND	N	10.1	3.5	46.5	
0.658000	40.8	1000.000	9.000	GND	N	10.1	5.2	46.0	
1.210000	39.4	1000.000	9.000	GND	N	10.1	6.6	46.0	
2.878000	37.4	1000.000	9.000	GND	N	10.2	8.6	46.0	
6.230000	37.1	1000.000	9.000	GND	N	10.4	13.0	50.0	
14.322000	35.4	1000.000	9.000	GND	N	10.7	14.6	50.0	

< Fig 9. Graph of continuous disturbance (Neutral line) >



- ◆ Test adapter (Model name / Manufacturer): SD-B191A / Weihai Sunlin Electronics. Co., Ltd.
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	48.0	1000.000	9.000	GND	L1	10.1	17.8	65.8	
0.470000	48.0	1000.000	9.000	GND	L1	10.1	8.5	56.5	
1.018000	48.3	1000.000	9.000	GND	L1	10.1	7.7	56.0	
1.954000	47.0	1000.000	9.000	GND	L1	10.1	9.0	56.0	
2.702000	44.3	1000.000	9.000	GND	L1	10.2	11.7	56.0	
6.590000	38.3	1000.000	9.000	GND	L1	10.4	21.7	60.0	
15.722000	41.2	1000.000	9.000	GND	L1	10.9	18.8	60.0	

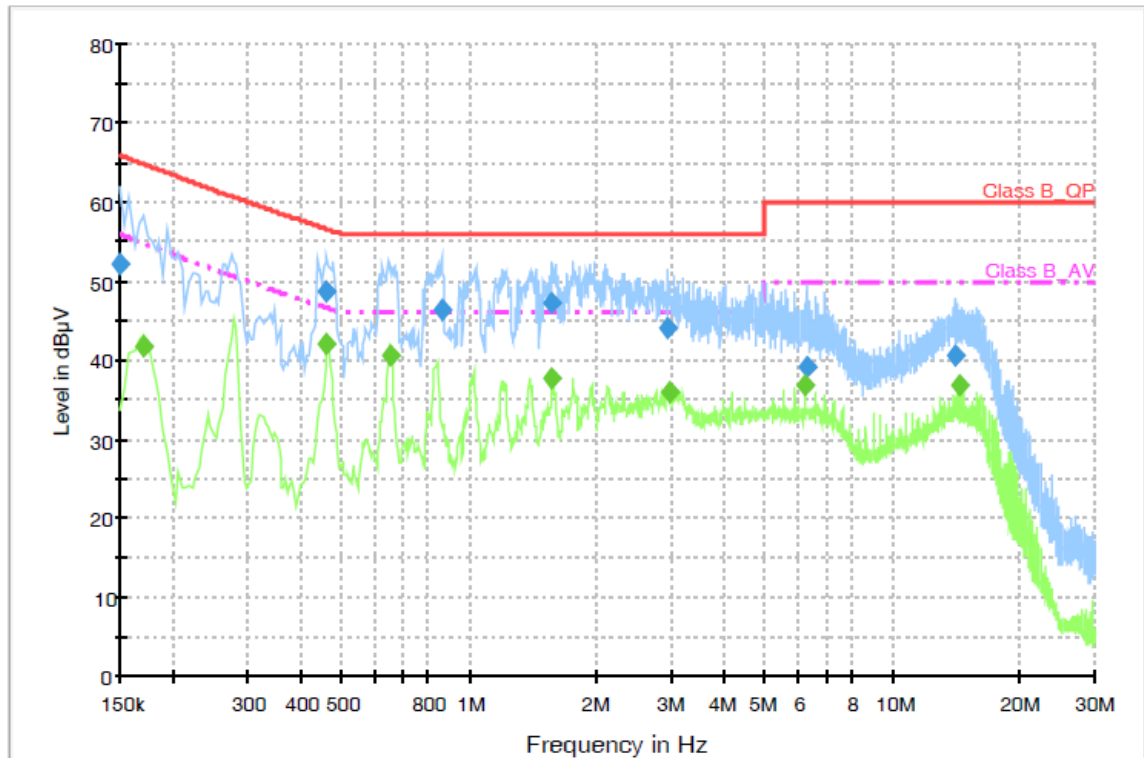
Final Measurement Detector 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.170000	39.2	1000.000	9.000	GND	L1	10.1	15.7	54.9	
0.466000	42.2	1000.000	9.000	GND	L1	10.1	4.3	46.5	
0.646000	41.4	1000.000	9.000	GND	L1	10.1	4.6	46.0	
1.390000	38.7	1000.000	9.000	GND	L1	10.1	7.3	46.0	
2.894000	35.1	1000.000	9.000	GND	L1	10.2	10.9	46.0	
6.234000	34.7	1000.000	9.000	GND	L1	10.4	15.3	50.0	
14.326000	36.1	1000.000	9.000	GND	L1	10.8	13.9	50.0	

< Fig 10. Graph of continuous disturbance (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	52.1	1000.000	9.000	GND	N	10.1	13.9	66.0	
0.462000	48.8	1000.000	9.000	GND	N	10.1	7.8	56.6	
0.862000	46.4	1000.000	9.000	GND	N	10.1	9.6	56.0	
1.574000	47.1	1000.000	9.000	GND	N	10.1	8.9	56.0	
2.930000	44.0	1000.000	9.000	GND	N	10.2	12.0	56.0	
6.246000	39.2	1000.000	9.000	GND	N	10.4	20.8	60.0	
13.970000	40.5	1000.000	9.000	GND	N	10.7	19.5	60.0	

Final Measurement Detector 2

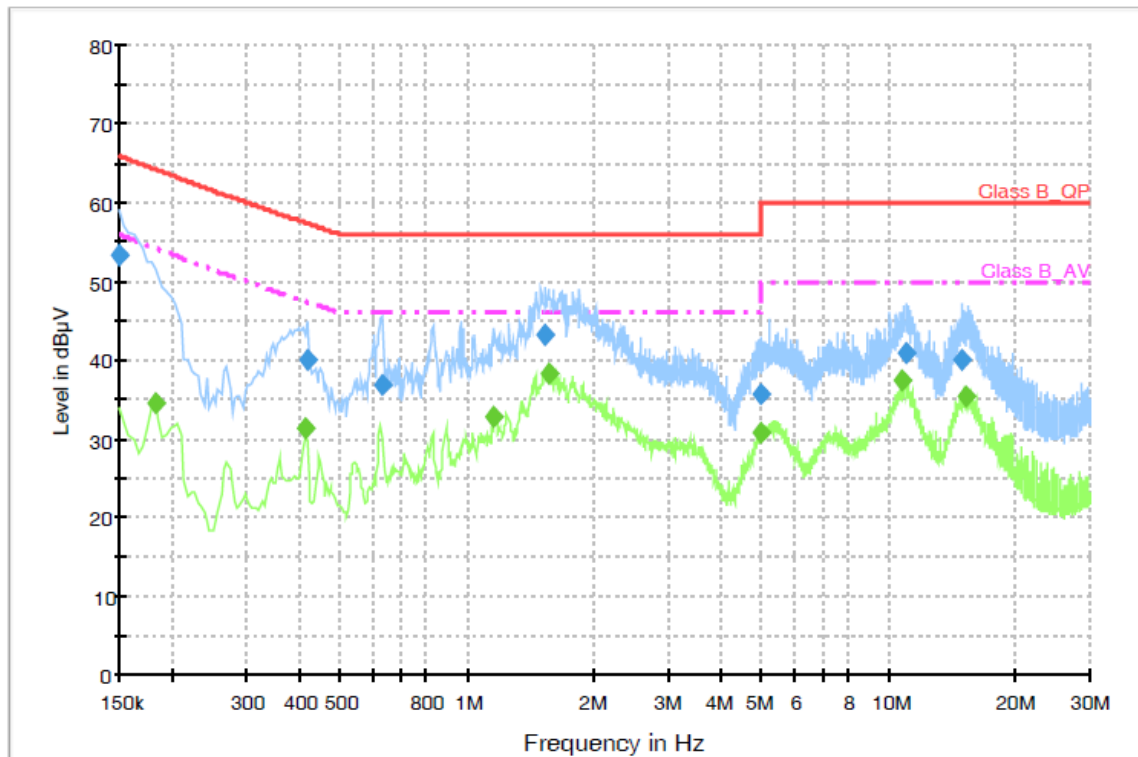
Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.170000	41.8	1000.000	9.000	GND	N	10.1	13.1	54.9	
0.462000	42.1	1000.000	9.000	GND	N	10.1	4.5	46.6	
0.654000	40.7	1000.000	9.000	GND	N	10.1	5.3	46.0	
1.574000	37.8	1000.000	9.000	GND	N	10.1	8.2	46.0	
2.970000	35.9	1000.000	9.000	GND	N	10.2	10.1	46.0	
6.230000	36.7	1000.000	9.000	GND	N	10.4	13.3	50.0	
14.322000	36.9	1000.000	9.000	GND	N	10.7	13.1	50.0	

< Fig 11. Graph of continuous disturbance (Neutral line) >



- ◆ Test adapter (Model name / Manufacturer): AAM-00 / AMLINK(SHANGHAI) LTD.
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
0.150000	53.5	1000.000	9.000	GND	L1	10.1	12.5	66.0	
0.418000	39.9	1000.000	9.000	GND	L1	10.1	17.5	57.4	
0.630000	36.7	1000.000	9.000	GND	L1	10.1	19.3	56.0	
1.526000	43.3	1000.000	9.000	GND	L1	10.1	12.7	56.0	
4.998000	35.8	1000.000	9.000	GND	L1	10.3	20.2	56.0	
10.954000	40.8	1000.000	9.000	GND	L1	10.6	19.2	60.0	
14.974000	39.9	1000.000	9.000	GND	L1	10.9	20.1	60.0	

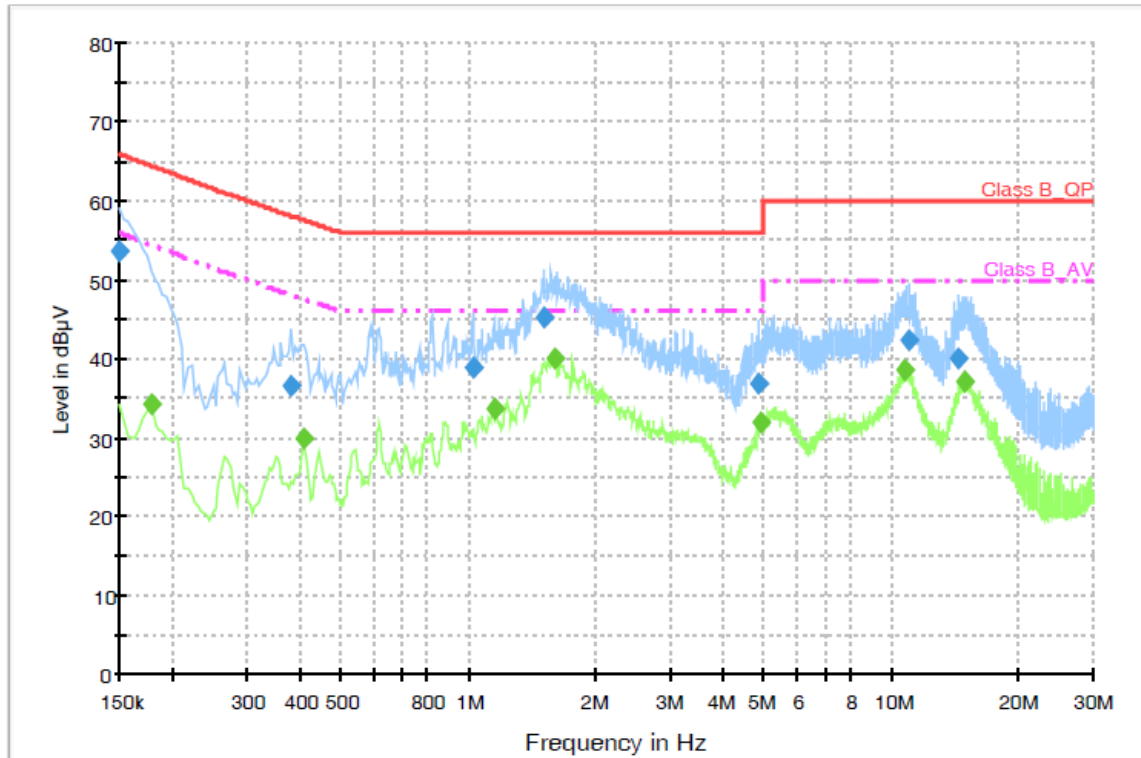
Final Measurement Detector 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.182000	34.5	1000.000	9.000	GND	L1	10.1	19.8	54.3	
0.414000	31.3	1000.000	9.000	GND	L1	10.1	16.1	47.4	
1.162000	32.8	1000.000	9.000	GND	L1	10.1	13.2	46.0	
1.566000	38.4	1000.000	9.000	GND	L1	10.1	7.6	46.0	
4.954000	30.8	1000.000	9.000	GND	L1	10.3	15.2	46.0	
10.730000	37.3	1000.000	9.000	GND	L1	10.6	12.8	50.0	
15.198000	35.5	1000.000	9.000	GND	L1	10.9	14.5	50.0	

< Fig 12. Graph of continuous disturbance (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	53.6	1000.000	9.000	GND	N	10.1	12.4	66.0	
0.382000	36.4	1000.000	9.000	GND	N	10.1	21.7	58.1	
1.026000	38.9	1000.000	9.000	GND	N	10.1	17.1	56.0	
1.514000	45.2	1000.000	9.000	GND	N	10.1	10.8	56.0	
4.834000	36.9	1000.000	9.000	GND	N	10.3	19.1	56.0	
10.966000	42.4	1000.000	9.000	GND	N	10.5	17.6	60.0	
14.398000	40.1	1000.000	9.000	GND	N	10.7	19.9	60.0	

Final Measurement Detector 2

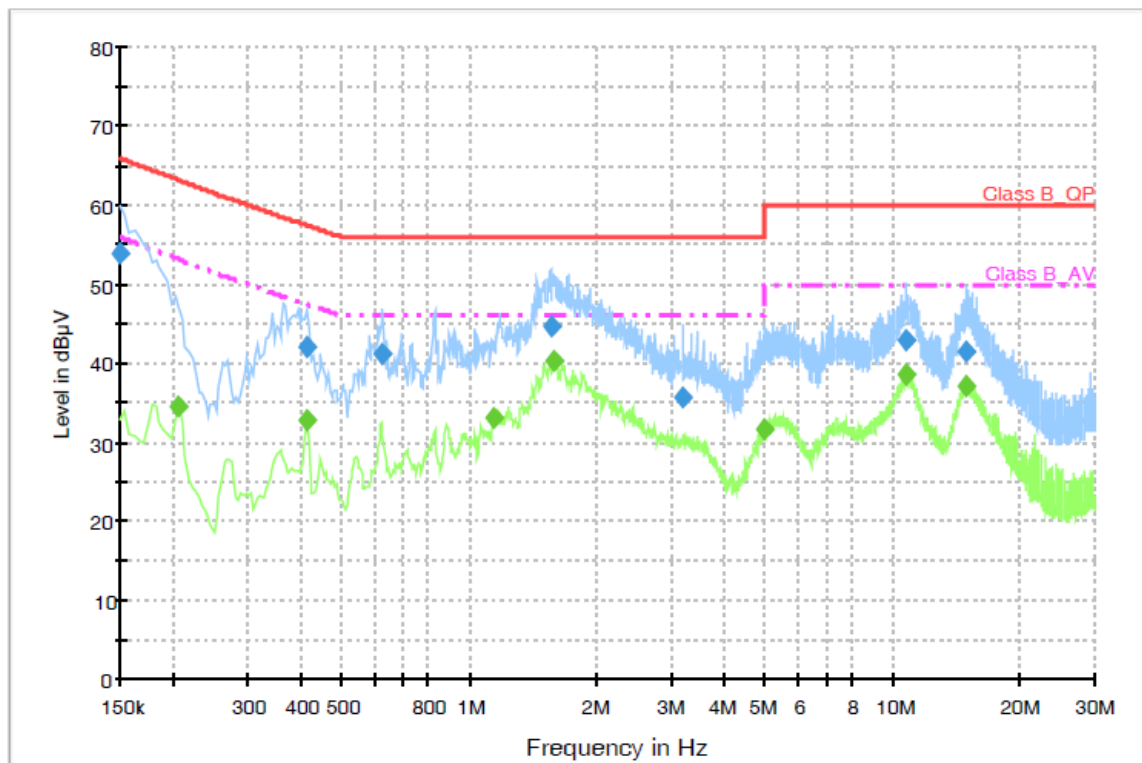
Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.178000	34.3	1000.000	9.000	GND	N	10.1	20.2	54.5	
0.410000	29.8	1000.000	9.000	GND	N	10.1	17.7	47.5	
1.150000	33.7	1000.000	9.000	GND	N	10.1	12.3	46.0	
1.594000	40.1	1000.000	9.000	GND	N	10.1	5.9	46.0	
4.938000	31.9	1000.000	9.000	GND	N	10.3	14.1	46.0	
10.730000	38.6	1000.000	9.000	GND	N	10.5	11.4	50.0	
14.894000	37.0	1000.000	9.000	GND	N	10.7	13.0	50.0	

< Fig 13. Graph of continuous disturbance (Neutral line) >



- ◆ Test adapter (Model name / Manufacturer): AAM-00 / AMLINK(SHANGHAI) LTD.
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
0.150000	54.0	1000.000	9.000	GND	L1	10.1	12.0	66.0	
0.414000	42.1	1000.000	9.000	GND	L1	10.1	15.4	57.5	
0.626000	41.0	1000.000	9.000	GND	L1	10.1	15.0	56.0	
1.558000	44.7	1000.000	9.000	GND	L1	10.1	11.3	56.0	
3.190000	35.7	1000.000	9.000	GND	L1	10.2	20.3	56.0	
10.730000	43.0	1000.000	9.000	GND	L1	10.6	17.0	60.0	
14.914000	41.5	1000.000	9.000	GND	L1	10.9	18.5	60.0	

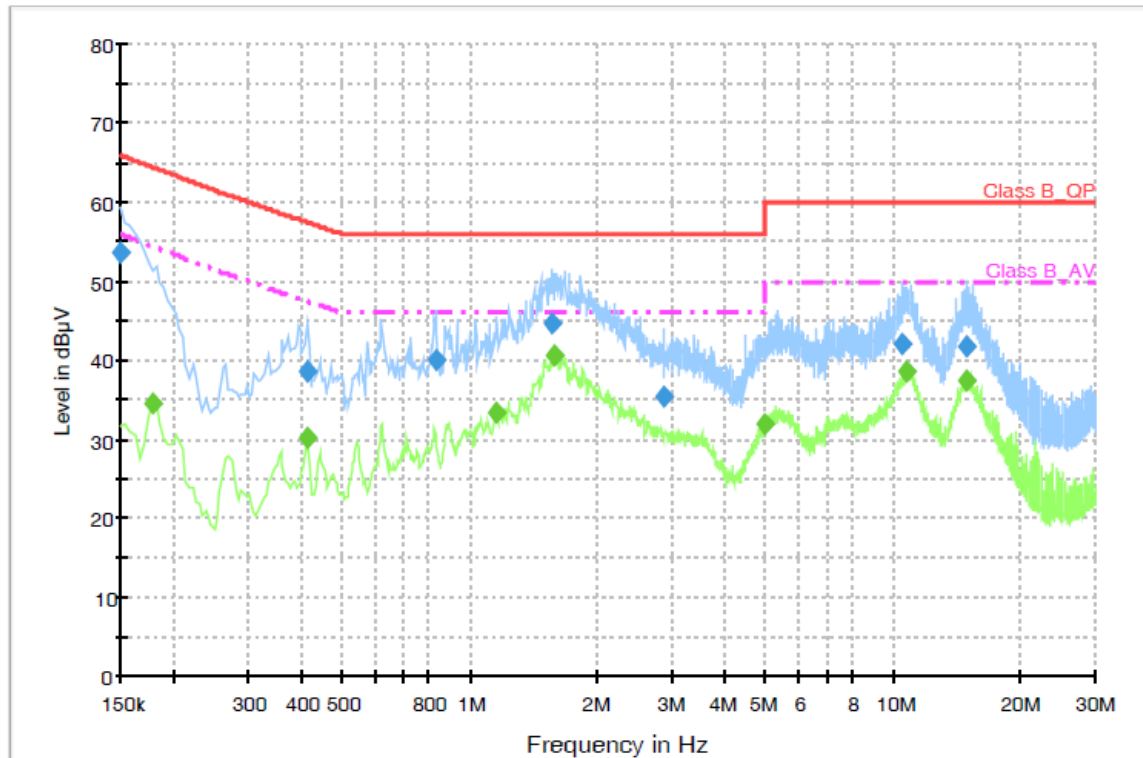
Final Measurement Detector 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.206000	34.4	1000.000	9.000	GND	L1	10.1	18.8	53.2	
0.414000	32.6	1000.000	9.000	GND	L1	10.1	14.8	47.4	
1.142000	33.1	1000.000	9.000	GND	L1	10.1	12.9	46.0	
1.586000	40.4	1000.000	9.000	GND	L1	10.1	5.6	46.0	
4.978000	31.5	1000.000	9.000	GND	L1	10.3	14.5	46.0	
10.730000	38.6	1000.000	9.000	GND	L1	10.6	11.4	50.0	
14.962000	37.1	1000.000	9.000	GND	L1	10.9	12.9	50.0	

< Fig 14. Graph of continuous disturbance (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	53.8	1000.000	9.000	GND	N	10.1	12.2	66.0	
0.414000	38.6	1000.000	9.000	GND	N	10.1	18.9	57.5	
0.834000	40.0	1000.000	9.000	GND	N	10.1	16.0	56.0	
1.570000	44.8	1000.000	9.000	GND	N	10.1	11.2	56.0	
2.862000	35.5	1000.000	9.000	GND	N	10.2	20.5	56.0	
10.490000	42.1	1000.000	9.000	GND	N	10.5	17.9	60.0	
14.970000	41.9	1000.000	9.000	GND	N	10.7	18.1	60.0	

Final Measurement Detector 2

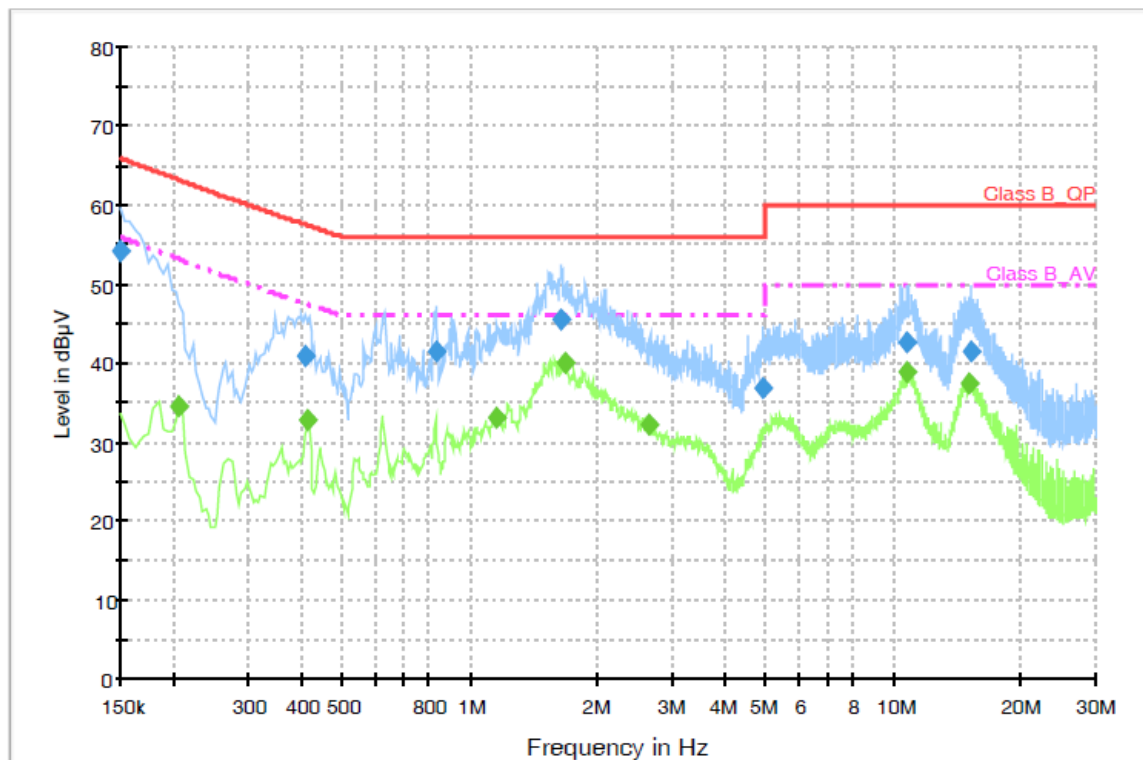
Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.178000	34.4	1000.000	9.000	GND	N	10.1	20.1	54.5	
0.414000	30.1	1000.000	9.000	GND	N	10.1	17.3	47.4	
1.154000	33.4	1000.000	9.000	GND	N	10.1	12.6	46.0	
1.586000	40.5	1000.000	9.000	GND	N	10.1	5.5	46.0	
4.982000	32.0	1000.000	9.000	GND	N	10.3	14.0	46.0	
10.798000	38.5	1000.000	9.000	GND	N	10.5	11.5	50.0	
14.962000	37.5	1000.000	9.000	GND	N	10.7	12.5	50.0	

< Fig 15. Graph of continuous disturbance (Neutral line) >



- ◆ Test adapter (Model name / Manufacturer): AAM-00 / AMLINK(SHANGHAI) LTD.
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	54.1	1000.000	9.000	GND	L1	10.1	11.9	66.0	
0.410000	40.8	1000.000	9.000	GND	L1	10.1	16.7	57.5	
0.834000	41.4	1000.000	9.000	GND	L1	10.1	14.6	56.0	
1.642000	45.4	1000.000	9.000	GND	L1	10.1	10.6	56.0	
4.934000	36.8	1000.000	9.000	GND	L1	10.3	19.2	56.0	
10.742000	42.5	1000.000	9.000	GND	L1	10.6	17.5	60.0	
15.194000	41.6	1000.000	9.000	GND	L1	10.9	18.4	60.0	

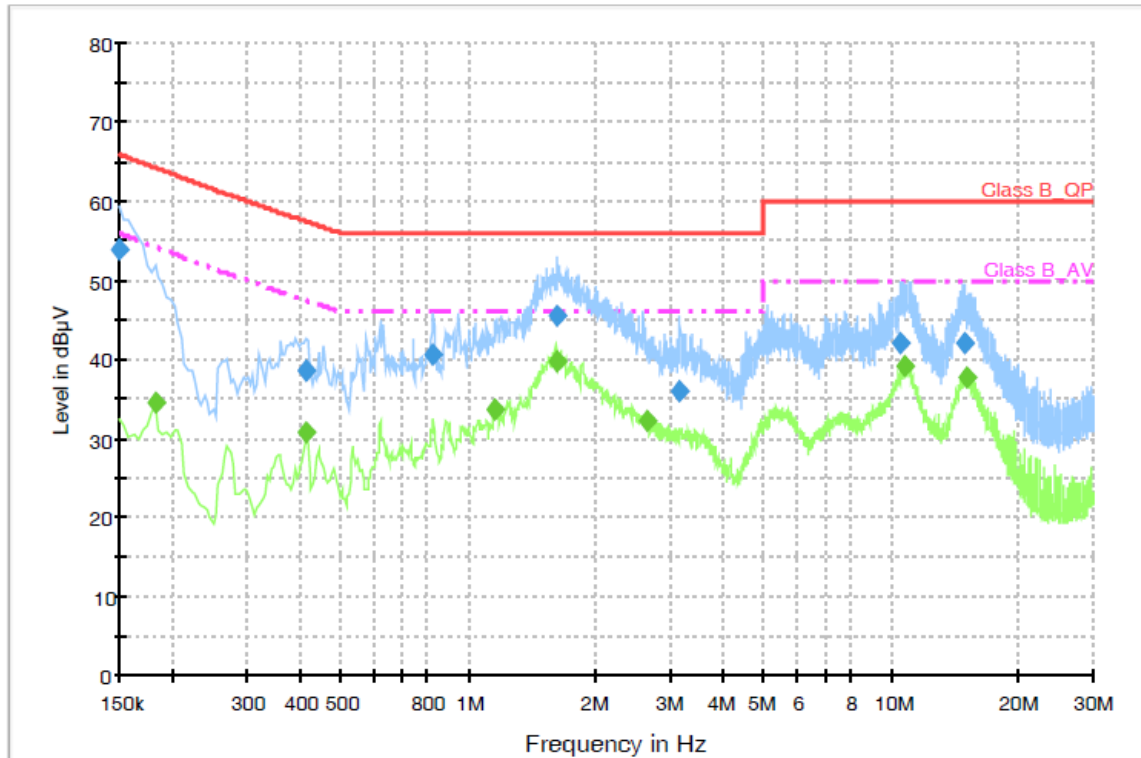
Final Measurement Detector 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.206000	34.6	1000.000	9.000	GND	L1	10.1	18.6	53.2	
0.414000	32.8	1000.000	9.000	GND	L1	10.1	14.6	47.4	
1.162000	33.0	1000.000	9.000	GND	L1	10.1	13.0	46.0	
1.674000	40.1	1000.000	9.000	GND	L1	10.1	5.9	46.0	
2.650000	32.3	1000.000	9.000	GND	L1	10.2	13.7	46.0	
10.730000	38.9	1000.000	9.000	GND	L1	10.6	11.1	50.0	
15.034000	37.3	1000.000	9.000	GND	L1	10.9	12.7	50.0	

< Fig 16. Graph of continuous disturbance (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	53.9	1000.000	9.000	GND	N	10.1	12.1	66.0	
0.414000	38.6	1000.000	9.000	GND	N	10.1	18.9	57.5	
0.826000	40.5	1000.000	9.000	GND	N	10.1	15.5	56.0	
1.626000	45.4	1000.000	9.000	GND	N	10.1	10.6	56.0	
3.166000	36.0	1000.000	9.000	GND	N	10.2	20.0	56.0	
10.490000	42.1	1000.000	9.000	GND	N	10.5	17.9	60.0	
14.942000	41.9	1000.000	9.000	GND	N	10.7	18.1	60.0	

Final Measurement Detector 2

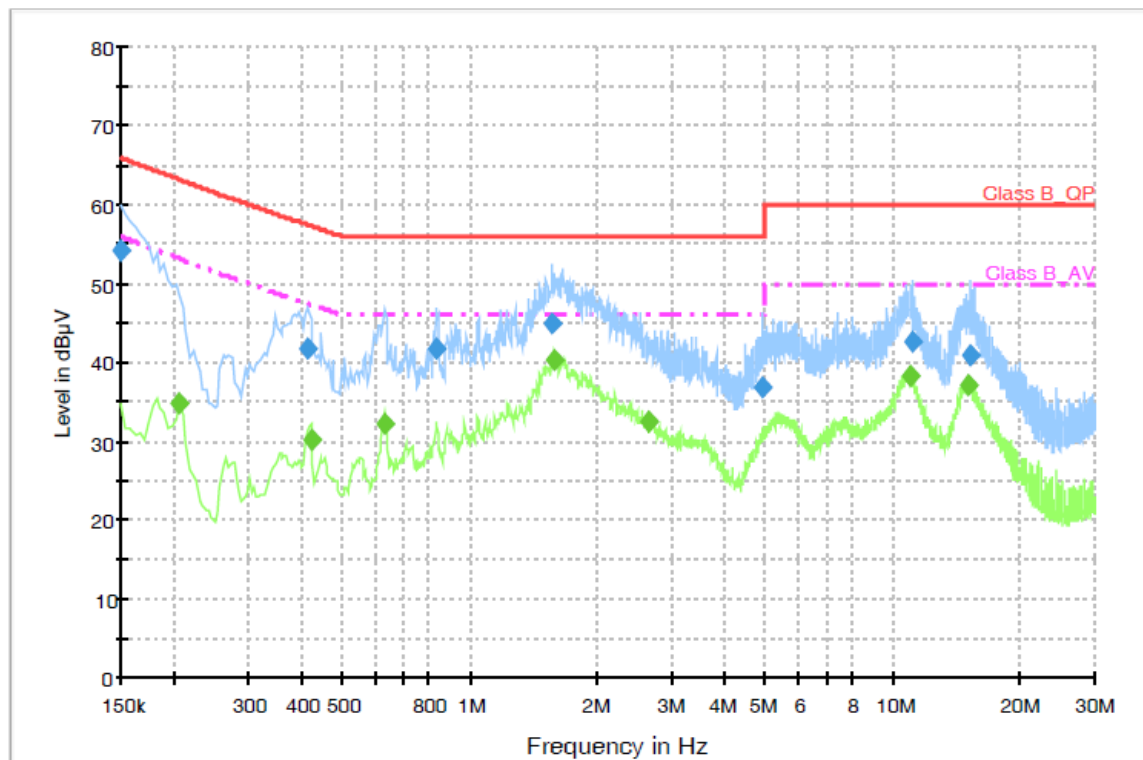
Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.182000	34.5	1000.000	9.000	GND	N	10.1	19.8	54.3	
0.414000	30.7	1000.000	9.000	GND	N	10.1	16.8	47.4	
1.150000	33.5	1000.000	9.000	GND	N	10.1	12.5	46.0	
1.630000	39.8	1000.000	9.000	GND	N	10.1	6.2	46.0	
2.646000	32.3	1000.000	9.000	GND	N	10.2	13.7	46.0	
10.730000	39.2	1000.000	9.000	GND	N	10.5	10.8	50.0	
15.042000	37.6	1000.000	9.000	GND	N	10.7	12.4	50.0	

< Fig 17. Graph of continuous disturbance (Neutral line) >



- ◆ Test adapter (Model name / Manufacturer): AAM-00 / AMLINK(SHANGHAI) LTD.
Operating condition: 1 680 × 1 050 / 60 Hz (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
0.150000	54.2	1000.000	9.000	GND	L1	10.1	11.8	66.0	
0.414000	41.8	1000.000	9.000	GND	L1	10.1	15.7	57.5	
0.834000	41.8	1000.000	9.000	GND	L1	10.1	14.2	56.0	
1.566000	45.0	1000.000	9.000	GND	L1	10.1	11.0	56.0	
4.934000	36.7	1000.000	9.000	GND	L1	10.3	19.3	56.0	
11.074000	42.7	1000.000	9.000	GND	L1	10.6	17.3	60.0	
15.270000	41.0	1000.000	9.000	GND	L1	10.9	19.0	60.0	

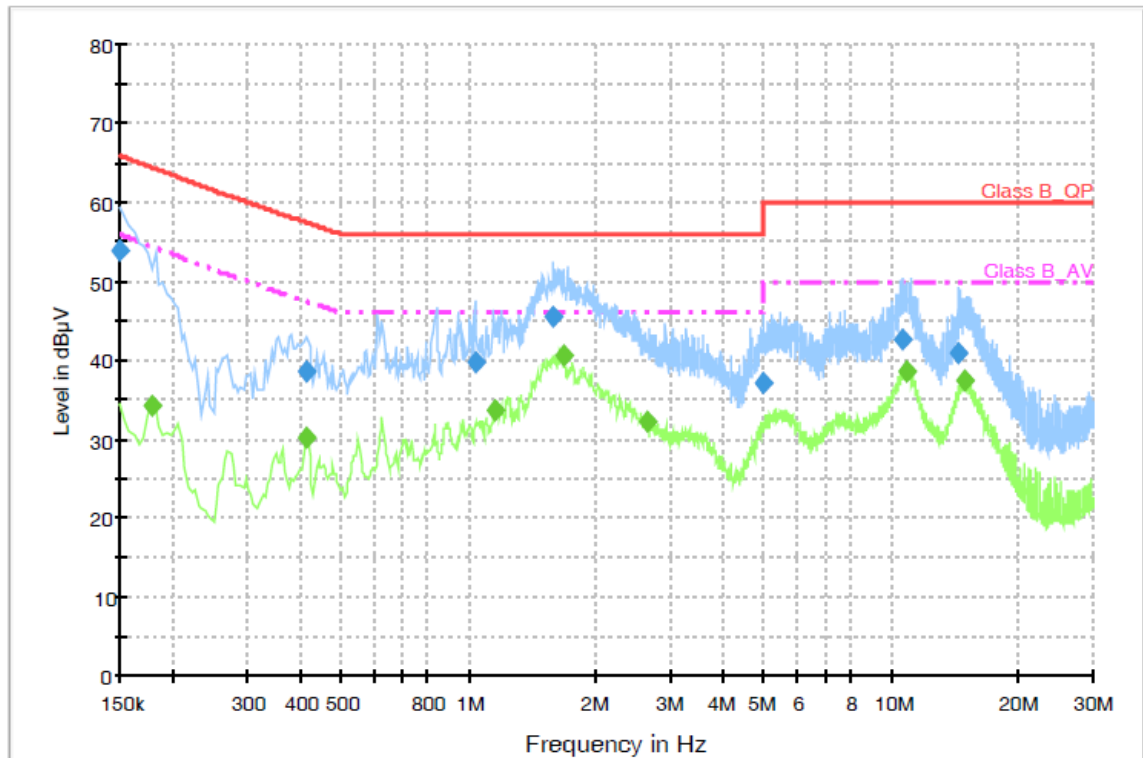
Final Measurement Detector 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.206000	34.8	1000.000	9.000	GND	L1	10.1	18.4	53.2	
0.422000	30.3	1000.000	9.000	GND	L1	10.1	17.0	47.3	
0.630000	32.2	1000.000	9.000	GND	L1	10.1	13.8	46.0	
1.590000	40.4	1000.000	9.000	GND	L1	10.1	5.6	46.0	
2.650000	32.4	1000.000	9.000	GND	L1	10.2	13.6	46.0	
10.954000	38.2	1000.000	9.000	GND	L1	10.6	11.8	50.0	
15.070000	37.1	1000.000	9.000	GND	L1	10.9	12.9	50.0	

< Fig 18. Graph of continuous disturbance (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	53.9	1000.000	9.000	GND	N	10.1	12.1	66.0	
0.414000	38.4	1000.000	9.000	GND	N	10.1	19.1	57.5	
1.038000	39.7	1000.000	9.000	GND	N	10.1	16.3	56.0	
1.582000	45.4	1000.000	9.000	GND	N	10.1	10.6	56.0	
4.978000	37.1	1000.000	9.000	GND	N	10.3	18.9	56.0	
10.610000	42.6	1000.000	9.000	GND	N	10.5	17.4	60.0	
14.466000	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
0.178000	34.3	1000.000	9.000	GND	N	10.1	20.2	54.5	
0.414000	30.2	1000.000	9.000	GND	N	10.1	17.2	47.4	
1.150000	33.5	1000.000	9.000	GND	N	10.1	12.5	46.0	
1.670000	40.7	1000.000	9.000	GND	N	10.1	5.3	46.0	
2.662000	32.2	1000.000	9.000	GND	N	10.2	13.8	46.0	
10.918000	38.7	1000.000	9.000	GND	N	10.5	11.3	50.0	
14.858000	37.5	1000.000	9.000	GND	N	10.7	12.5	50.0	

< Fig 19. Graph of continuous disturbance (Neutral line) >



6. Radiated Emission

6.1 Operating Environment

Temperature : 19 °C
Relative Humidity : 46 % 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
■ - 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
■ - 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

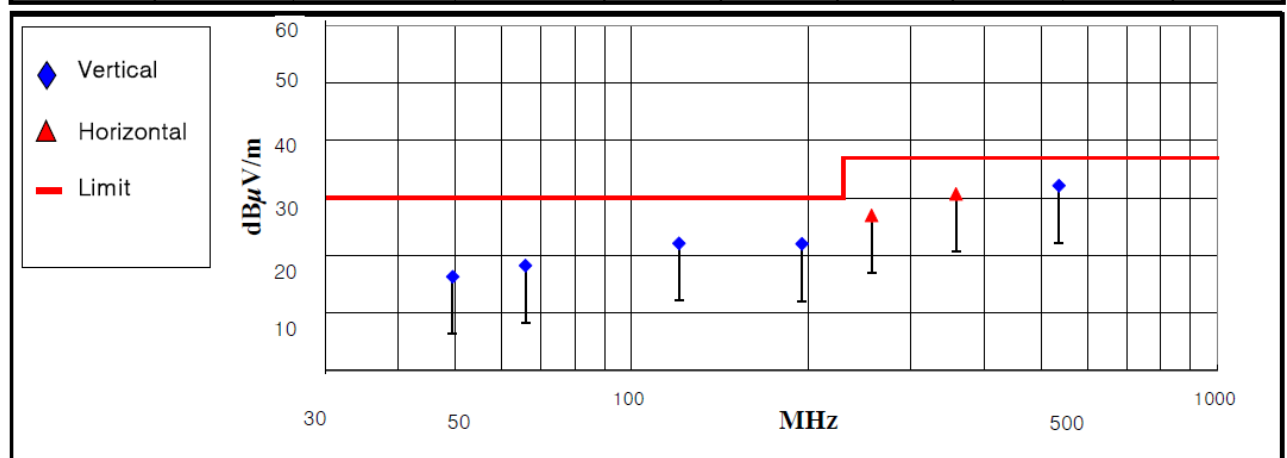


6.6 Test data for Radiated Emission

- Test Date : May 6, 2011
- Resolution Bandwidth : 120 kHz/1 MHz
- Frequency Range : 30 MHz ~ 2 000 MHz
- Detector Mode : Quasi-peak mode
- Measurement Distance : 10 m / 3 m
- Note : The highest frequency of the internal source of the EUT is between 108 MHz and 500 MHz (405 MHz). The measurement was made up to 2 000 MHz

- ◆ Test adapter (Model name / Manufacturer): SD-B191A / Weihai Sunlin Electronics. Co., Ltd.
Operating Condition: 1 680 × 1 050 / 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 (°)
49.52	5.21	9.41	1.71	16.33	30.00	13.67	V	132	0
65.89	7.85	8.43	2.00	18.28	30.00	11.72	V	109	41
120.50	8.09	11.25	2.80	22.14	30.00	7.86	V	102	345
195.34	4.07	14.29	3.71	22.07	30.00	7.93	V	102	17
256.74	8.78	13.92	4.32	27.02	37.00	9.98	H	127	301
358.11	10.70	14.83	5.21	30.74	37.00	6.26	H	104	82
536.37	7.53	18.07	6.57	32.17	37.00	4.83	V	102	194

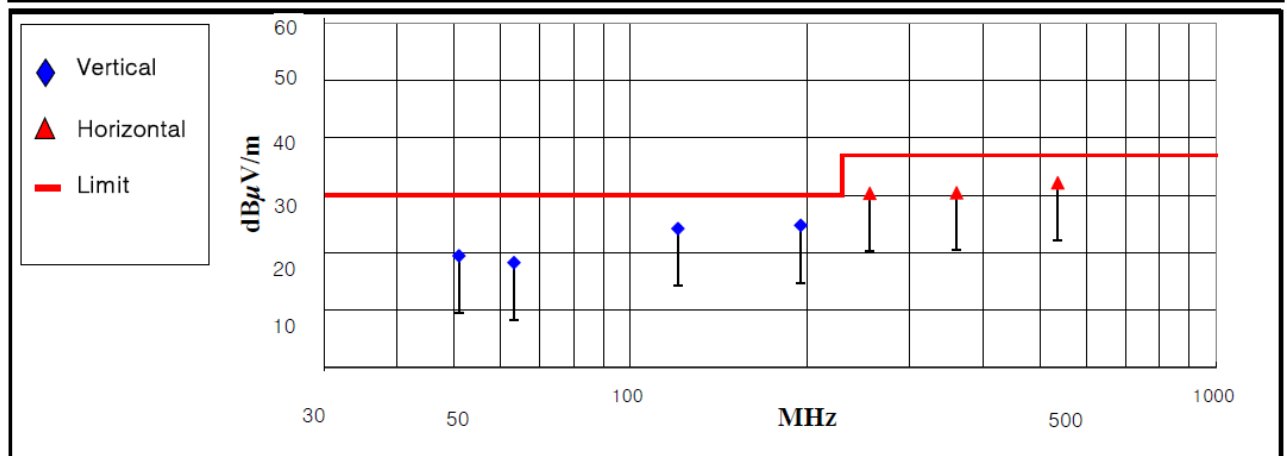


< Fig 20. Radiated emission result (30 MHz ~ 1 000 MHz) >



- ◆ Test adapter (Model name / Manufacturer): SD-B191A / Weihai Sunlin Electronics. Co., Ltd.
Operating Condition: 1 680 × 1 050 / 60 Hz (HDMI/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)	(°)
51.01	8.50	9.21	1.74	19.45	30.00	10.55	V	110	12
63.30	8.05	8.26	1.96	18.27	30.00	11.73	V	112	95
120.55	10.16	11.25	2.80	24.21	30.00	5.79	V	115	235
195.27	6.80	14.29	3.71	24.80	30.00	5.20	V	101	199
256.18	12.18	13.87	4.32	30.37	37.00	6.63	H	129	303
360.38	10.31	14.91	5.23	30.45	37.00	6.55	H	100	97
536.32	7.57	18.07	6.57	32.21	37.00	4.79	H	182	154

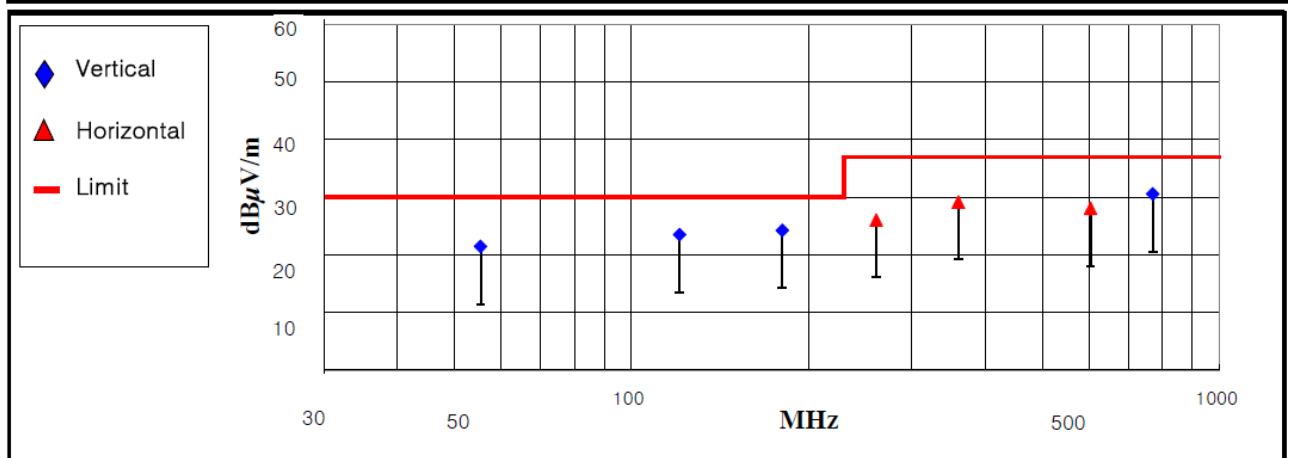


< Fig 21. Radiated emission result (30 MHz ~ 1 000 MHz) >



- ◆ Test adapter (Model name / Manufacturer): AAM-00 / AMLINK(SHANGHAI) LTD.
Operating Condition: 1 680 × 1 050 / 60 Hz (RGB: Analog)

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)	(°)
55.41	11.01	8.64	1.82	21.47	30.00	8.53	V	107	12
120.80	9.45	11.25	2.80	23.50	30.00	6.50	V	149	205
180.61	7.11	13.60	3.54	24.25	30.00	5.75	V	102	179
260.79	7.45	14.27	4.36	26.08	37.00	10.92	H	131	82
359.73	9.06	14.89	5.22	29.17	37.00	7.83	H	106	240
603.57	2.00	19.05	7.05	28.10	37.00	8.90	H	112	192
770.10	1.40	20.99	8.17	30.56	37.00	6.44	V	106	101

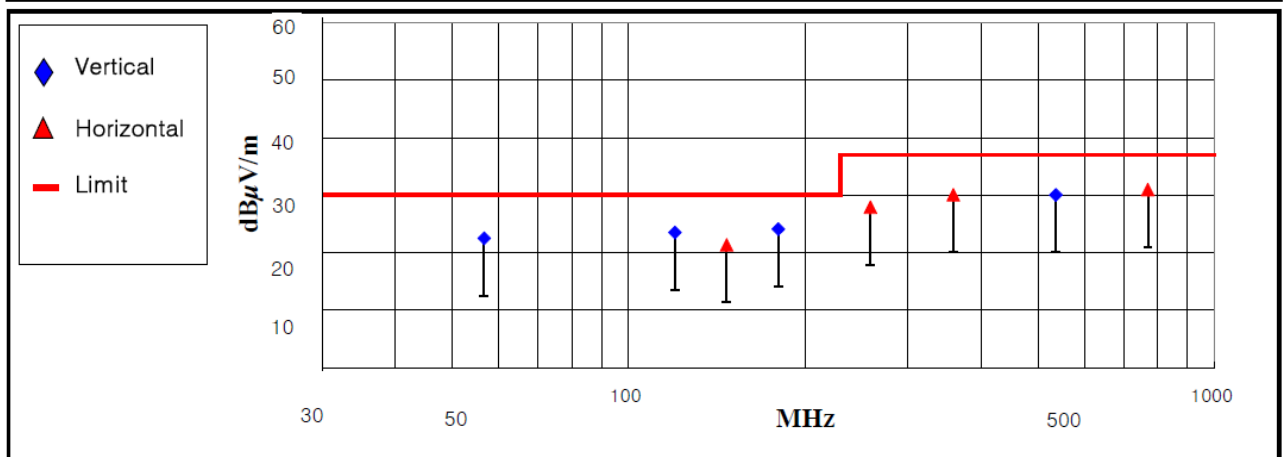


< Fig 22. Radiated emission result (30 MHz ~ 1 000 MHz) >



- ◆ Test adapter (Model name / Manufacturer): AAM-00 / AMLINK(SHANGHAI) LTD.
Operating Condition: 1 680 × 1 050 / 60 Hz (HDMI/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)	(°)
56.70	12.16	8.47	1.85	22.48	30.00	7.52	V	104	71
119.98	9.48	11.23	2.79	23.50	30.00	6.50	V	103	220
147.01	6.33	11.92	3.13	21.38	30.00	8.62	H	207	321
180.14	6.96	13.58	3.53	24.07	30.00	5.93	V	103	303
258.74	9.50	14.09	4.34	27.93	37.00	9.07	H	109	89
358.39	10.02	14.84	5.21	30.07	37.00	6.93	H	113	266
536.31	5.38	18.07	6.57	30.02	37.00	6.98	V	102	207
769.68	1.83	20.98	8.17	30.98	37.00	6.02	H	141	241

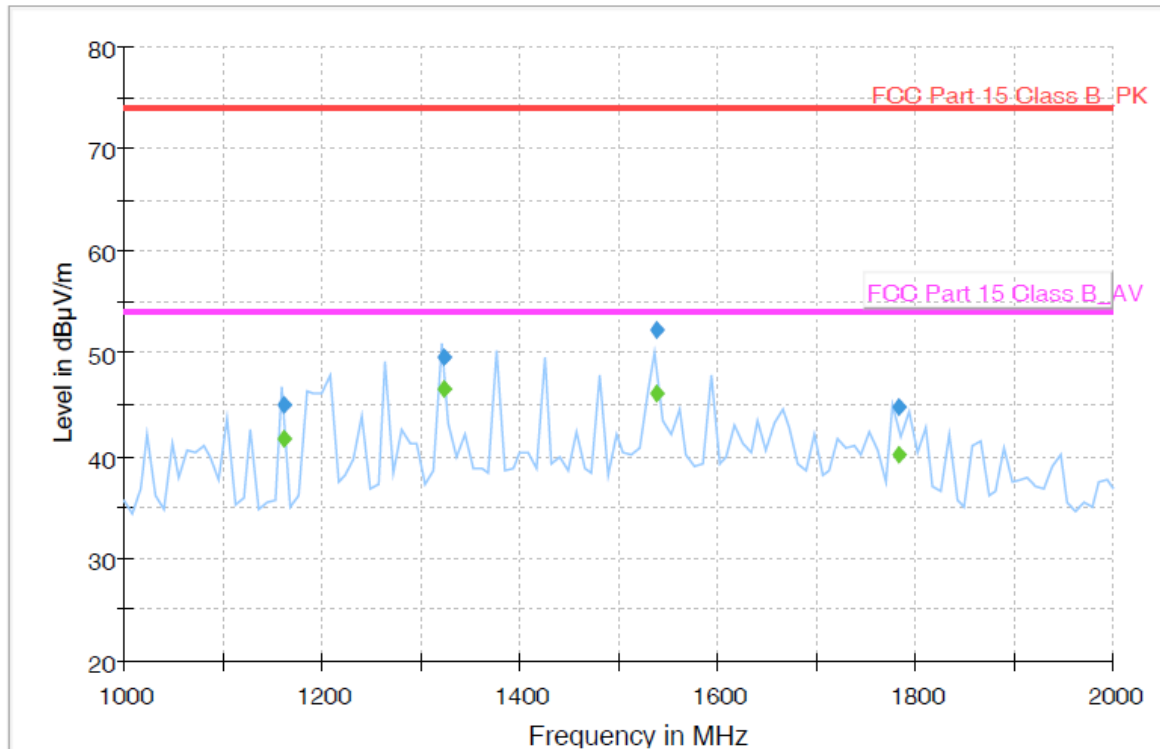


< Fig 23. Radiated emission result (30 MHz ~ 1 000 MHz) >



- ◆ Test adapter (Model name / Manufacturer): SD-B191A / Weihai Sunlin Electronics. Co., Ltd.
Operating Condition: 1 680 × 1 050 / 60 Hz (RGB: Analog)
Green marker: Average detector, Blue marker: Peak detector

Radiated Emission_above 1 GHz



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)
1160.920641	45.1	100.0	1000.000	100.0	V	201.0	-13.8	28.9	74.0
1322.841283	49.7	100.0	1000.000	100.0	V	21.0	-13.4	24.3	74.0
1538.874148	52.4	100.0	1000.000	100.0	H	127.0	-12.9	21.6	74.0
1782.155110	44.8	100.0	1000.000	100.0	V	185.0	-12.2	29.2	74.0

Final Result 2

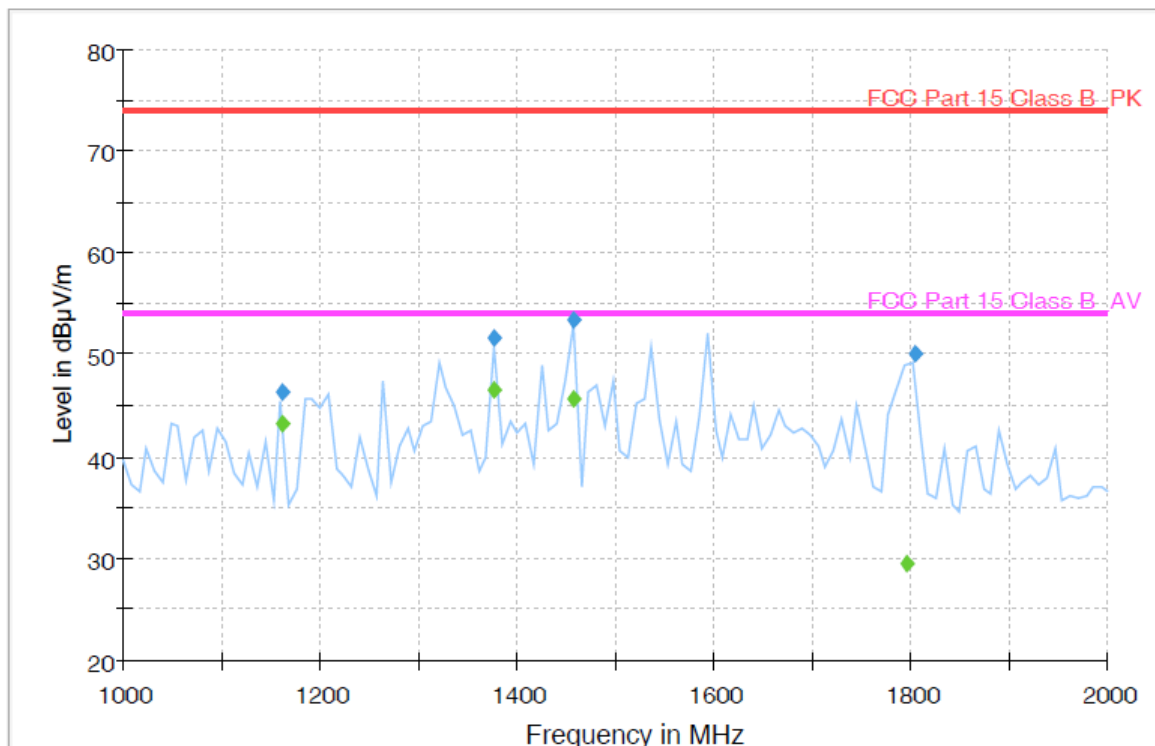
Frequency (MHz)	CAverage (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1160.920641	41.7	100.0	1000.000	100.0	V	201.0	-13.8	12.3	54.0
1322.841283	46.5	100.0	1000.000	113.0	V	21.0	-13.4	7.5	54.0
1538.874148	46.2	100.0	1000.000	100.0	H	127.0	-12.9	7.8	54.0
1782.155110	40.3	100.0	1000.000	100.0	V	185.0	-12.2	13.7	54.0

< Fig 24. Radiated emission result (1 000 MHz ~ 2 000 MHz) >



- ◆ Test adapter (Model name / Manufacturer): SD-B191A / Weihai Sunlin Electronics. Co., Ltd.
Operating Condition: 1 680 × 1 050 / 60 Hz (HDMI/DVI: Digital)
Green marker: Average detector, Blue marker: Peak detector

Radiated Emission_above 1 GHz



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)
1160.920641	46.3	100.0	1000.000	100.0	V	208.0	-13.8	27.7	74.0
1376.953507	51.7	100.0	1000.000	100.0	H	141.0	-13.3	22.3	74.0
1457.913828	53.5	100.0	1000.000	100.0	H	212.0	-13.1	20.5	74.0
1805.003206	50.1	100.0	1000.000	100.0	V	216.0	-12.1	23.9	74.0

Final Result 2

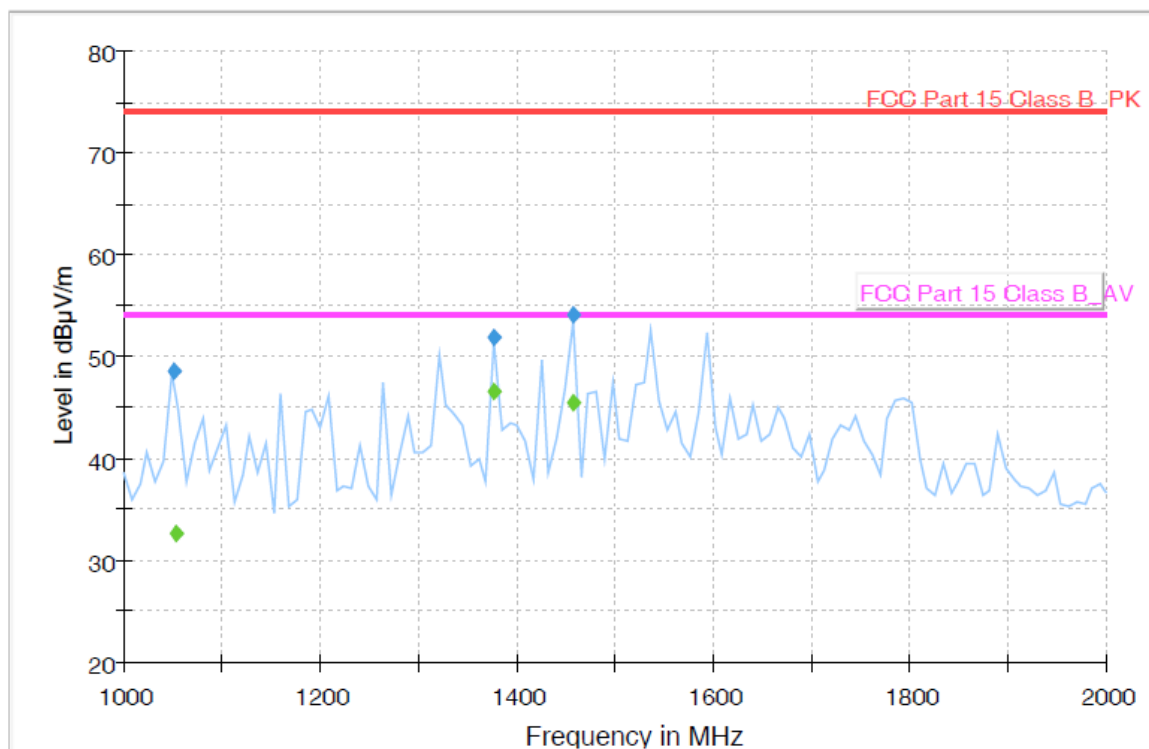
Frequency (MHz)	CAverage (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1160.920641	43.2	100.0	1000.000	100.0	V	208.0	-13.8	10.8	54.0
1376.953507	46.5	100.0	1000.000	113.0	H	141.0	-13.3	7.5	54.0
1457.913828	45.7	100.0	1000.000	100.0	H	212.0	-13.1	8.3	54.0
1796.603206	29.4	100.0	1000.000	100.0	V	216.0	-12.1	24.6	54.0

< Fig 25. Radiated emission result (1 000 MHz ~ 2 000 MHz) >



- ◆ Test adapter (Model name / Manufacturer): AAM-00 / AMLINK(SHANGHAI) LTD.
Operating Condition: 1 680 × 1 050 / 60 Hz (RGB: Analog)
Green marker: Average detector, Blue marker: Peak detector

Radiated Emission_above 1 GHz



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)
1051.096192	48.5	100.0	1000.000	100.0	V	348.0	-14.2	25.5	74.0
1376.953507	52.0	100.0	1000.000	100.0	H	184.0	-13.3	22.0	74.0
1457.913828	54.2	100.0	1000.000	100.0	H	200.0	-13.1	19.8	74.0

Final Result 2

Frequency (MHz)	CAverage (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1053.096192	32.6	100.0	1000.000	100.0	V	348.0	-14.2	21.4	54.0
1376.953507	46.5	100.0	1000.000	122.0	H	184.0	-13.3	7.5	54.0
1457.913828	45.5	100.0	1000.000	100.0	H	200.0	-13.1	8.5	54.0

< Fig 26. Radiated emission result (1 000 MHz ~ 2 000 MHz) >

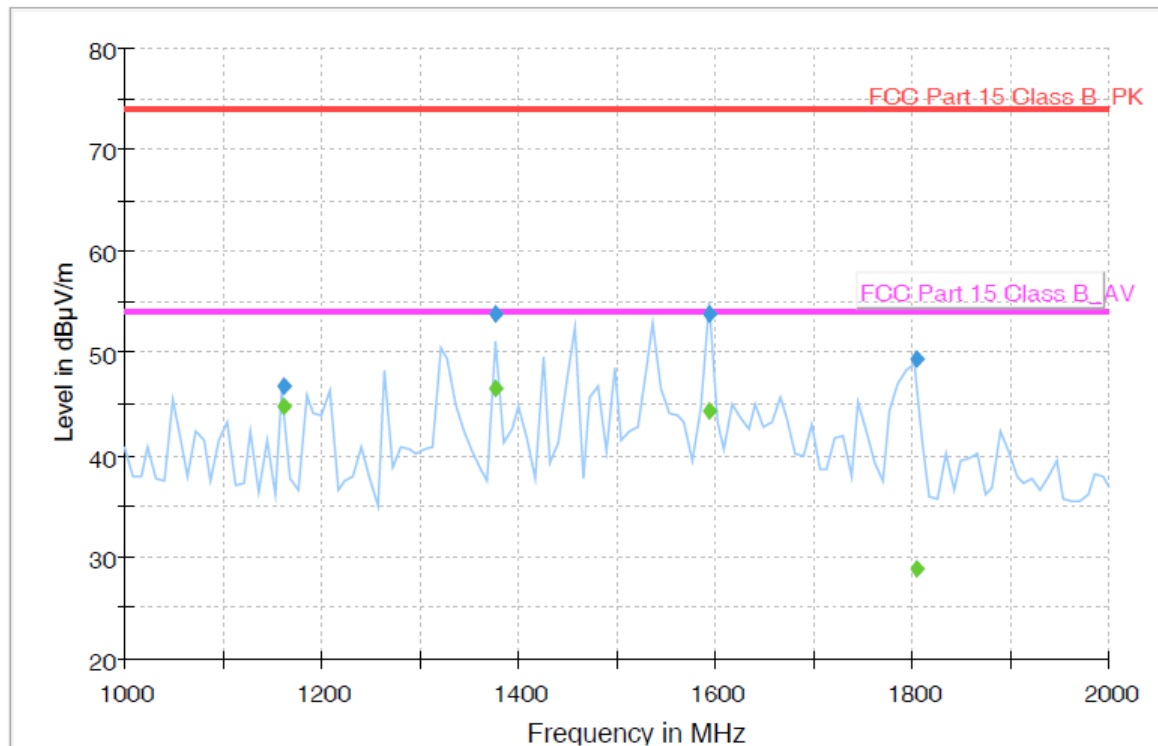


◆ Test adapter (Model name / Manufacturer): AAM-00 / AMLINK(SHANGHAI) LTD.

Operating Condition: 1 680 × 1 050 / 60 Hz (HDMI/DVI: Digital)

Green marker: Average detector, Blue marker: Peak detector

Radiated Emission_above 1 GHz



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)
1160.920641	46.9	100.0	1000.000	100.0	V	177.0	-13.8	27.1	74.0
1376.953507	53.9	100.0	1000.000	113.0	H	181.0	-13.3	20.1	74.0
1592.986373	53.8	100.0	1000.000	100.0	V	177.0	-12.7	20.2	74.0
1805.003206	49.5	100.0	1000.000	100.0	V	193.0	-12.1	24.5	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)
1160.920641	44.7	100.0	1000.000	100.0	V	177.0	-13.8	9.3	54.0
1376.953507	46.5	100.0	1000.000	122.0	H	181.0	-13.3	7.5	54.0
1592.986373	44.3	100.0	1000.000	113.0	V	177.0	-12.7	9.7	54.0
1805.003206	28.9	100.0	1000.000	100.0	V	193.0	-12.1	25.1	54.0

< Fig 27. Radiated emission result (1 000 MHz ~ 2 000 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: HW300Y-JE, HW300G-JE, HW301Y-JE, HW301G-JE)** was complies with §15.107 and 15.109 of the FCC Rules.