

## ***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: July 25, 2011**

**Order Number: GETEC-C1-11-149**

**Test Report Number: GETEC-E3-11-068**

**Test Site: Gumi College EMC Center**

**FCC Registration Number: (100749, 443957)**

**FCC ID. : BEJDM2350DM**

**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 : DM2350DM**  
**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,**



**Hyun Kim, Engineer**  
**GUMI College EMC center**

**Reviewed by,**



**Jae-Hoon Jeong, Senior Engineer**  
**GUMI College EMC center**



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*Scope: Measurement and determination of electromagnetic emissions (EME) of radio frequency devices including intentional and / or unintentional radiators for compliance with technical rules and regulations of the Federal Communications Commission.*

## 1. General Information

**Applicant: LG Electronics Inc.**

**Applicant Address: 19-1, Cheongho-ri, Jinwi-myeon, Pyeongteak-si, Gyeonggi-do, Korea.**

**Manufacturer: LG Electronics Inc.**

**Manufacturer Address: 19-1, Cheongho-ri, Jinwi-myeon, Pyeongteak-si, Gyeonggi-do, Korea.**

**Contact Person: Mr. Do-Hyung Kim, Chief research engineer**

**Tel Number: +82-31-610-9623**

- **FCC ID.** BEJDM2350DM
- **EUT Type** LED LCD TV/Monitor
- **Model Name** DM2350DM
- **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** July 15 ~ 20, 2011
- **Place of Test** **Gumi College EMC Center** ( FCC Registration Number: 100749, 443957)  
407, Bugok-dong, Gumi-si, Gyeongbuk, Korea.
- **Test Report Number** GETEC-E3-11-068
- **Dates of Issue** July 25, 2011

**EUT Type: LED LCD TV/Monitor**

**FCC ID.: BEJDM2350DM**



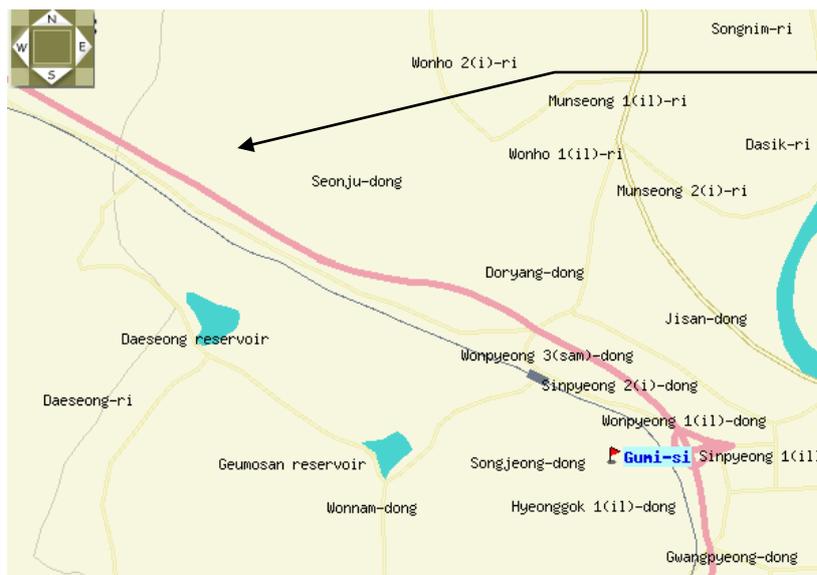
## 2. Introduction

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: DM2350DM)**

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: DM2350DM)**  
**FCC ID.: BEJDM2350DM**

LCD Panel	Screen Type	584.2 mm Wide (23 inch) TFT (Thin Film Transistor) LCD (Liquid Crystal Display) Panel. Visible diagonal size : 584.2 mm
	Pixel Pitch	0.265 mm (H) x 0.265 mm (V)
Video Signal	Max. Resolution	1920 x 1080 @ 60 Hz
	Recommended Resolution	1920 x 1080 @ 60 Hz
	Horizontal Frequency	30 kHz to 83 kHz
	Vertical Frequency	56 Hz to 75 Hz
	Synchronization Type	Separate Sync, Digital
Input Connector		TV, D-Sub Analog, PC Audio In, Component, HDMI,DVI-D
Power	Rated Voltage	
	Power Consumption	On Mode : 48 W (typ.) Off Mode ≤ 0.5 W
AC/DC Adapter		Manufacturer: LITE-ON, Model PA-1650-68 INPUT: AC 100-240 V 50/60 Hz 2.0 A OUTPUT: DC 19 V / 3.42 A
Tilt	Tilt Range	-5 to 18°
Dimensions (Width x Height x Depth) Weight		546.7 mm x 423.8 mm x 180 mm 3.9 kg
Environmental conditions	Operating Temperature Operating Humidity	10 °C to 35 °C 20 % to 80 %
	Storage Temperature Storage Humidity	-10 °C to 60 °C 5 % to 90 %

- . Maximum Frequency Range : 400 MHz



### 3.2 Support Equipment / Cables used

#### 3.2.1 Used Support Equipment

Description	Manufacturer	Model Name	S/N & FCC ID.
PC (Main board)	ASRock	770iCafe	S/N: 0AM0X3097310 FCC ID.: DoC
Video card	Rextechnology Co., Ltd.	HD4850	S/N: L5H041947 FCC ID.: DoC
PS2 keyboard	COMPAQ	166516-AD6	S/N: B13BBOR391006D FCC ID.: AQ6-23K15
USB mouse	Great Pleasure Electronics Co., Ltd.	GP-M3100UE	S/N: 14036766 FCC ID.: N/A
DVD player	LG Electronics Inc.	LC-954	S/N: 3850R-Z674K FCC ID.: DoC
USB memory stick	SAMSUNG	SUM-PSB4	S/N: TBBB202478F FCC ID.: N/A
Headset	PHILIPS	SBC HL140	S/N: N/A FCC ID.: N/A
TV signal generator	FLUKE	54200M01	S/N: 831011 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 <sup>1)</sup>	LITE-ON Technology corporation	PA-1650-68	S/N: OB5DM612314013727 FCC ID.: -

1) Input ratings: AC (100 – 240) V~, (50 – 60) Hz, 2.0 A / Output ratings: DC 19 V, 3.42 A



### 3.2.3 Used Cable(s)

<b>Cable Name</b>	<b>Condition</b>	<b>Description</b>
Power cable	Connected to the adapter	1.80 m unshielded
Adapter cable	Connected to the EUT	1.50 m shielded with a ferrite core
RGB(Analog) cable	Connected to the EUT and PC	1.50 m shielded
DVI(Digital) cable	Connected to the EUT and PC	1.80 m shielded with two ferrite cores
HDMI(Digital) cable	Connected to the EUT and PC	2.00 m shielded
Audio in cable	Connected to the EUT and PC	1.50 m shielded with a ferrite core
RS-232C (Control & service) cable	Connected to the EUT and PC	1.80 m shielded
Component cable	Connected to the EUT and DVD player	3.00 m shielded
Headset cable	Connected to the EUT and headset	1.20 m shielded
Antenna cable	Connected to the EUT and TV signal generator	10.00 m shielded with two ferrite cores

### 3.3 Modification Item(s)

- None



## 4. Description of tests

### 4.1 Test Condition

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

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

- Test Voltage / Frequency : AC 120 V / 60 Hz

- Test Mode(s)

#### - . Monitor mode

Radiated emission: 1 920 × 1 080 / 60 Hz (RGB: Analog, DVI: Digital, HDMI: Digital)

Conducted emission: 1 920 × 1 080 / 60 Hz (RGB: Analog, DVI: Digital, HDMI: 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

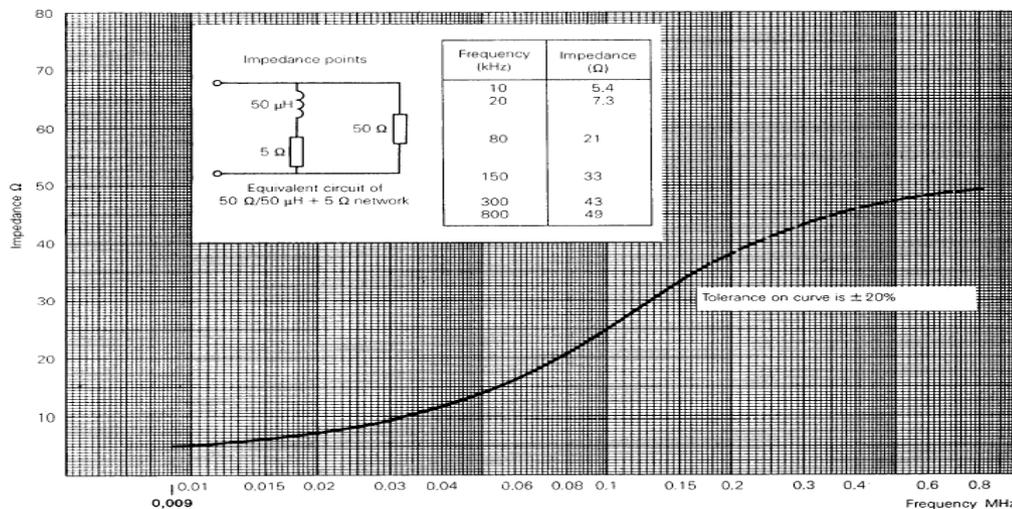


Fig 2. Impedance of LISN



### 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

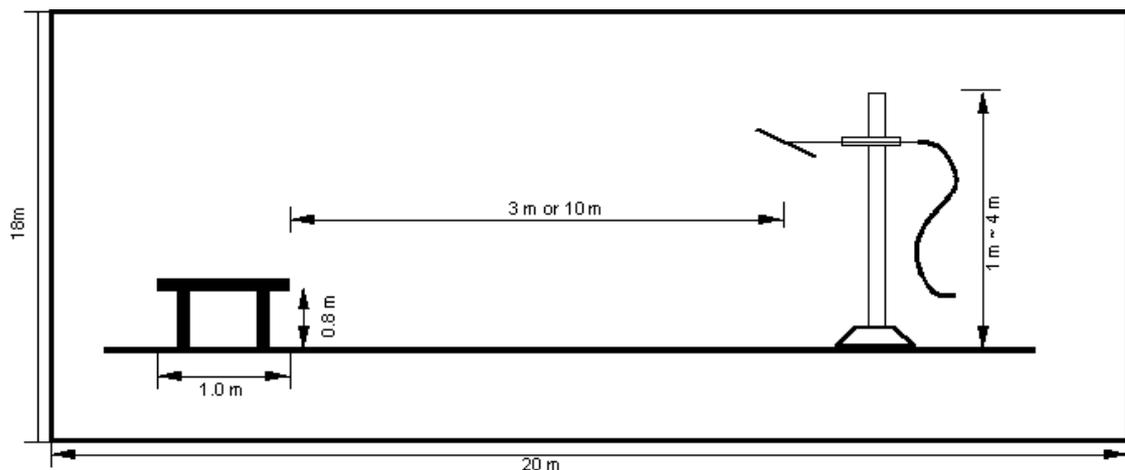


Fig 3. Dimensions of test site



## 5. Conducted Emission

### 5.1 Operating Environment

Temperature : 24 °C  
Relative Humidity : 48 % 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 $\mu$ V/m) Class B	
	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

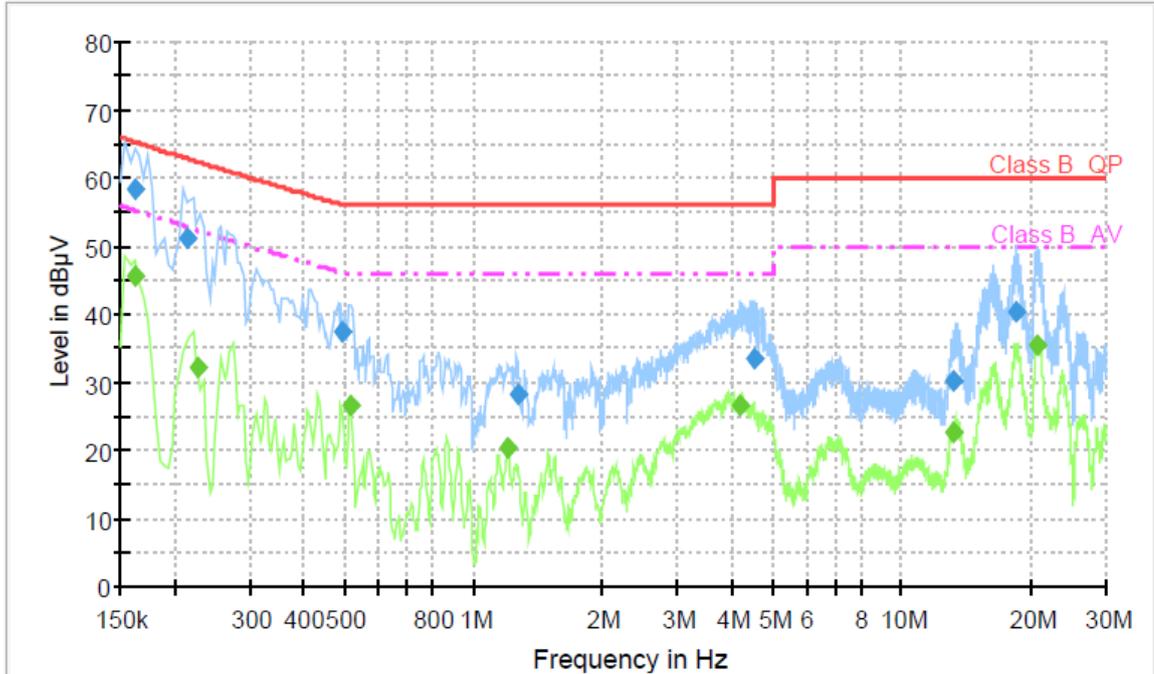
#### 5.6 Test data for Conducted Emission

- Test Date : July 16, 2011
- Resolution Bandwidth : 9 kHz
- Frequency Range : 0.15 MHz ~ 30 MHz



◆ Operating condition: 1 920 × 1 080 / 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	58.2	1000.000	9.000	GND	L1	10.1	7.1	65.3	
0.216000	51.0	1000.000	9.000	GND	L1	10.1	11.8	62.8	
0.492000	37.3	1000.000	9.000	GND	L1	10.1	18.8	56.1	
1.268000	28.4	1000.000	9.000	GND	L1	10.1	27.6	56.0	
4.528000	33.3	1000.000	9.000	GND	L1	10.3	22.7	56.0	
13.204000	30.2	1000.000	9.000	GND	L1	10.7	29.8	60.0	
18.568000	40.2	1000.000	9.000	GND	L1	11.1	19.8	60.0	

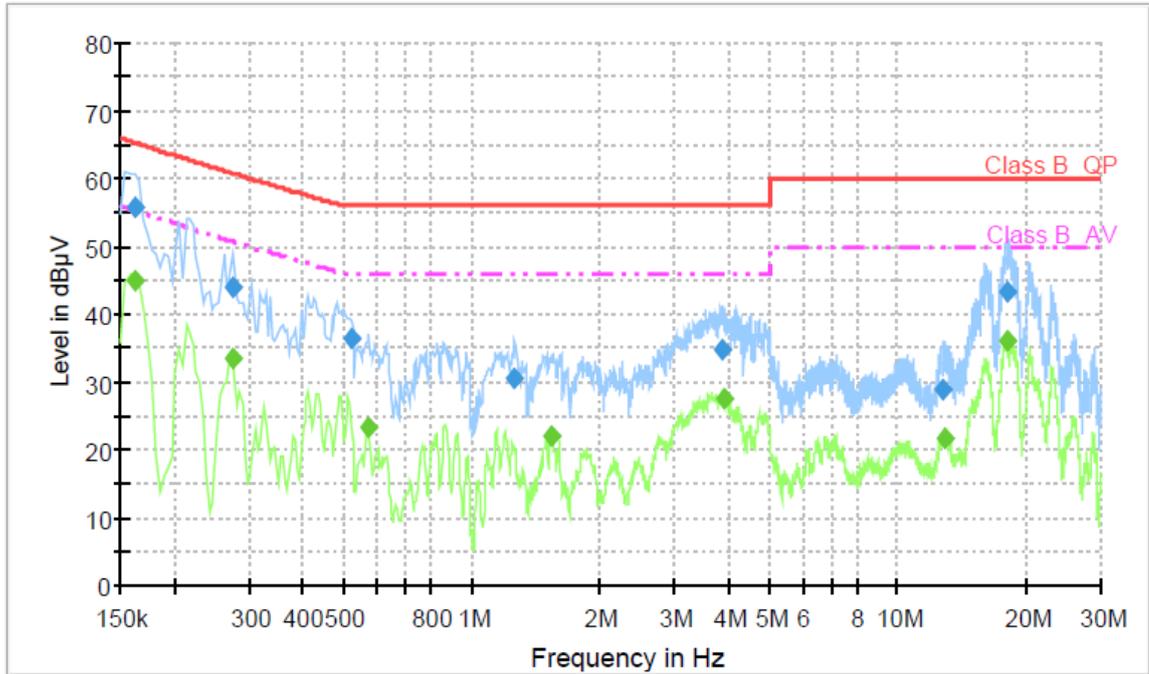
#### Final Measurement Detector 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.162000	45.7	1000.000	9.000	GND	L1	10.1	9.6	55.3	
0.228000	32.2	1000.000	9.000	GND	L1	10.1	20.1	52.3	
0.516000	26.6	1000.000	9.000	GND	L1	10.1	19.4	46.0	
1.200000	20.2	1000.000	9.000	GND	L1	10.1	25.8	46.0	
4.196000	26.6	1000.000	9.000	GND	L1	10.3	19.4	46.0	
13.232000	22.6	1000.000	9.000	GND	L1	10.7	27.4	50.0	
20.648000	35.5	1000.000	9.000	GND	L1	11.2	14.5	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	55.9	1000.000	9.000	GND	N	10.1	9.4	65.3	
0.274000	43.8	1000.000	9.000	GND	N	10.1	17.0	60.8	
0.522000	36.5	1000.000	9.000	GND	N	10.1	19.5	56.0	
1.262000	30.6	1000.000	9.000	GND	N	10.1	25.4	56.0	
3.882000	34.7	1000.000	9.000	GND	N	10.3	21.3	56.0	
12.830000	28.8	1000.000	9.000	GND	N	10.6	31.2	60.0	
18.130000	43.1	1000.000	9.000	GND	N	10.9	16.9	60.0	

### Final Measurement Detector 2

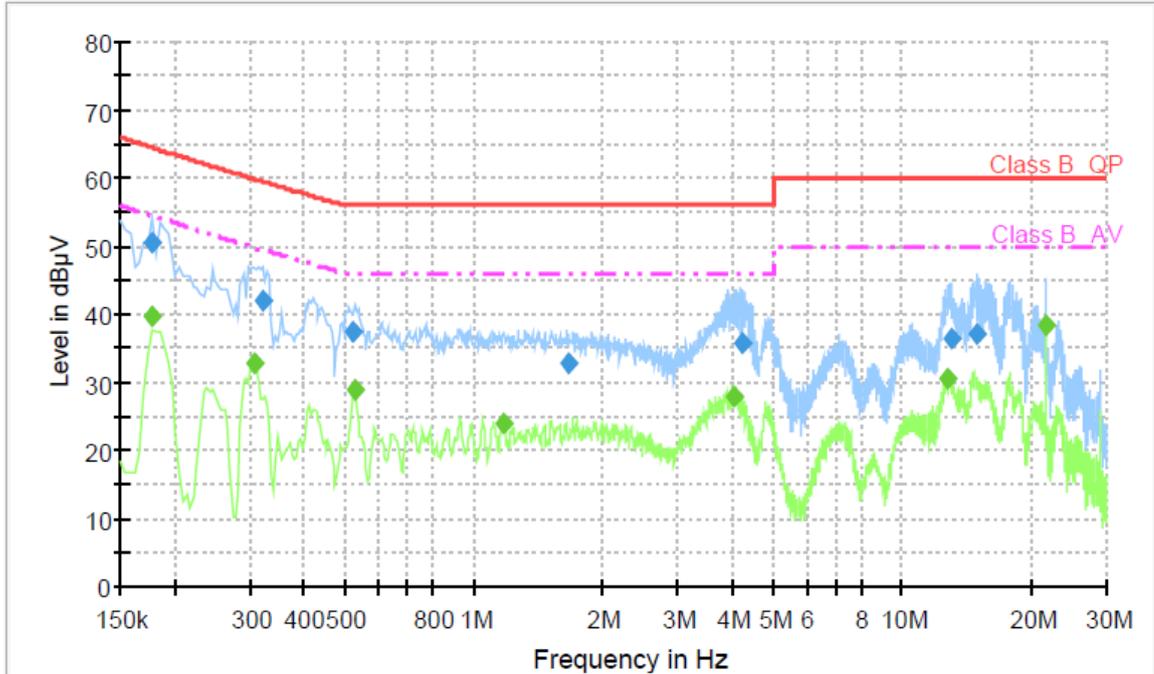
Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.162000	45.1	1000.000	9.000	GND	N	10.1	10.2	55.3	
0.274000	33.4	1000.000	9.000	GND	N	10.1	17.4	50.8	
0.570000	23.4	1000.000	9.000	GND	N	10.1	22.6	46.0	
1.546000	22.1	1000.000	9.000	GND	N	10.1	23.9	46.0	
3.930000	27.5	1000.000	9.000	GND	N	10.3	18.5	46.0	
12.946000	21.7	1000.000	9.000	GND	N	10.6	28.3	50.0	
18.146000	36.1	1000.000	9.000	GND	N	10.9	13.9	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
0.178000	50.6	1000.000	9.000	GND	L1	10.1	13.9	64.5	
0.324000	41.9	1000.000	9.000	GND	L1	10.1	17.5	59.4	
0.520000	37.4	1000.000	9.000	GND	L1	10.1	18.6	56.0	
1.672000	32.7	1000.000	9.000	GND	L1	10.1	23.3	56.0	
4.240000	35.6	1000.000	9.000	GND	L1	10.3	20.4	56.0	
13.000000	36.4	1000.000	9.000	GND	L1	10.7	23.6	60.0	
14.904000	37.0	1000.000	9.000	GND	L1	10.9	23.0	60.0	

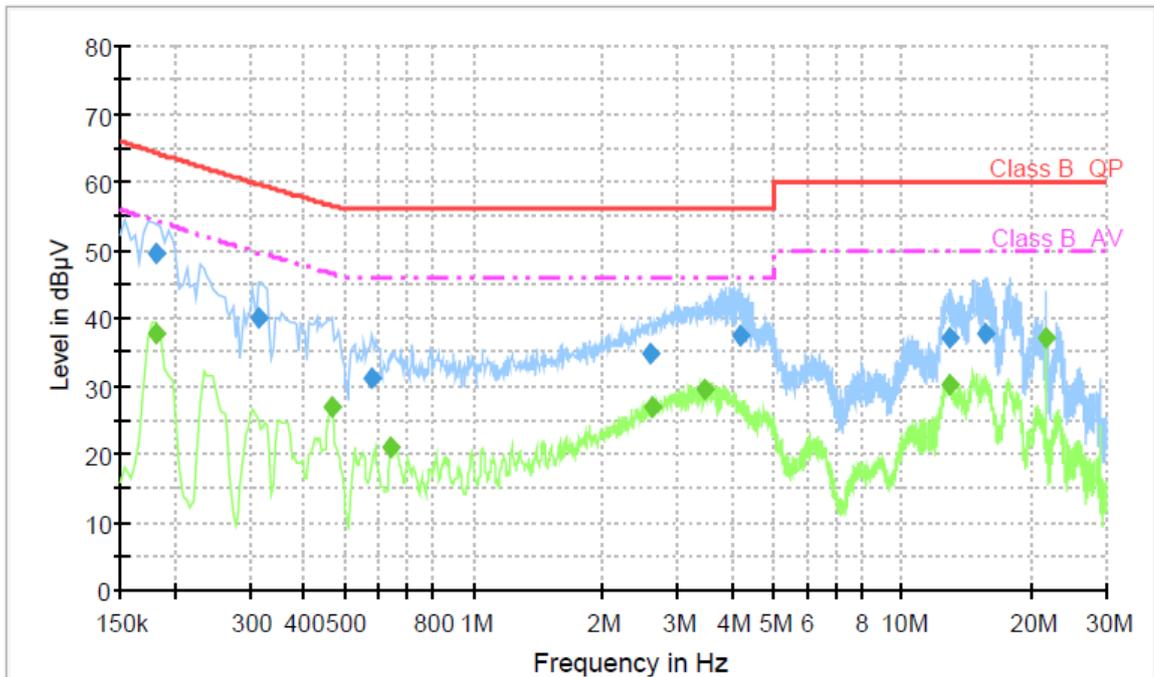
#### Final Measurement Detector 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.178000	39.7	1000.000	9.000	GND	L1	10.1	14.8	54.5	
0.308000	32.6	1000.000	9.000	GND	L1	10.1	17.2	49.8	
0.528000	28.9	1000.000	9.000	GND	L1	10.1	17.1	46.0	
1.176000	23.9	1000.000	9.000	GND	L1	10.1	22.1	46.0	
4.040000	27.9	1000.000	9.000	GND	L1	10.3	18.1	46.0	
12.736000	30.5	1000.000	9.000	GND	L1	10.7	19.5	50.0	
21.668000	38.5	1000.000	9.000	GND	L1	11.1	11.5	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
0.182000	49.6	1000.000	9.000	GND	N	10.1	14.7	64.3	
0.314000	39.9	1000.000	9.000	GND	N	10.1	19.8	59.7	
0.578000	31.3	1000.000	9.000	GND	N	10.1	24.7	56.0	
2.594000	34.8	1000.000	9.000	GND	N	10.2	21.2	56.0	
4.206000	37.3	1000.000	9.000	GND	N	10.3	18.7	56.0	
12.870000	37.0	1000.000	9.000	GND	N	10.6	23.0	60.0	
15.658000	37.7	1000.000	9.000	GND	N	10.8	22.3	60.0	

### Final Measurement Detector 2

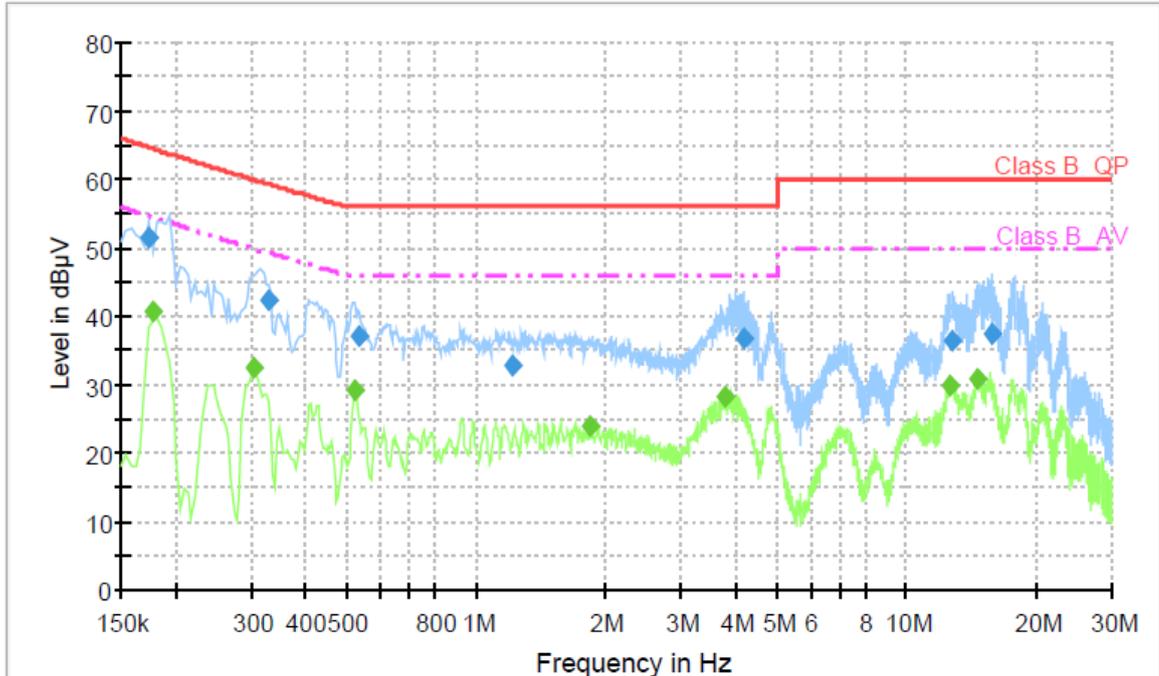
Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.182000	37.9	1000.000	9.000	GND	N	10.1	16.4	54.3	
0.466000	27.0	1000.000	9.000	GND	N	10.1	19.5	46.5	
0.642000	21.0	1000.000	9.000	GND	N	10.1	25.0	46.0	
2.614000	26.8	1000.000	9.000	GND	N	10.2	19.2	46.0	
3.474000	29.7	1000.000	9.000	GND	N	10.2	16.3	46.0	
12.838000	30.2	1000.000	9.000	GND	N	10.6	19.8	50.0	
21.666000	37.2	1000.000	9.000	GND	N	10.8	12.8	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
0.174000	51.5	1000.000	9.000	GND	L1	10.1	13.2	64.7	
0.328000	42.3	1000.000	9.000	GND	L1	10.1	17.0	59.3	
0.532000	37.0	1000.000	9.000	GND	L1	10.1	19.0	56.0	
1.216000	32.9	1000.000	9.000	GND	L1	10.1	23.1	56.0	
4.176000	36.6	1000.000	9.000	GND	L1	10.3	19.4	56.0	
12.728000	36.5	1000.000	9.000	GND	L1	10.7	23.5	60.0	
15.784000	37.3	1000.000	9.000	GND	L1	10.9	22.7	60.0	

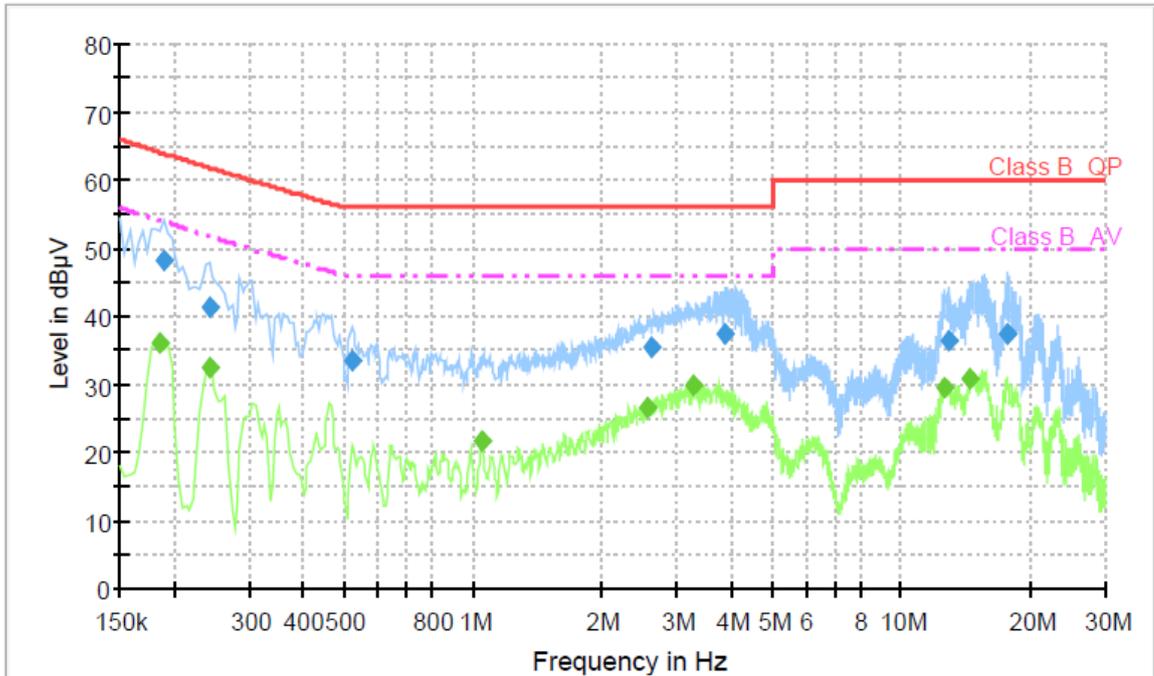
#### Final Measurement Detector 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.178000	40.5	1000.000	9.000	GND	L1	10.1	14.0	54.5	
0.304000	32.5	1000.000	9.000	GND	L1	10.1	17.4	49.9	
0.524000	29.3	1000.000	9.000	GND	L1	10.1	16.7	46.0	
1.848000	24.0	1000.000	9.000	GND	L1	10.1	22.0	46.0	
3.804000	28.3	1000.000	9.000	GND	L1	10.3	17.7	46.0	
12.616000	29.9	1000.000	9.000	GND	L1	10.7	20.1	50.0	
14.684000	30.7	1000.000	9.000	GND	L1	10.8	19.3	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
0.190000	48.3	1000.000	9.000	GND	N	10.1	15.6	63.9	
0.242000	41.3	1000.000	9.000	GND	N	10.1	20.5	61.8	
0.522000	33.5	1000.000	9.000	GND	N	10.1	22.5	56.0	
2.602000	35.4	1000.000	9.000	GND	N	10.2	20.6	56.0	
3.878000	37.3	1000.000	9.000	GND	N	10.3	18.7	56.0	
12.842000	36.5	1000.000	9.000	GND	N	10.6	23.5	60.0	
17.730000	37.5	1000.000	9.000	GND	N	10.8	22.5	60.0	

#### Final Measurement Detector 2

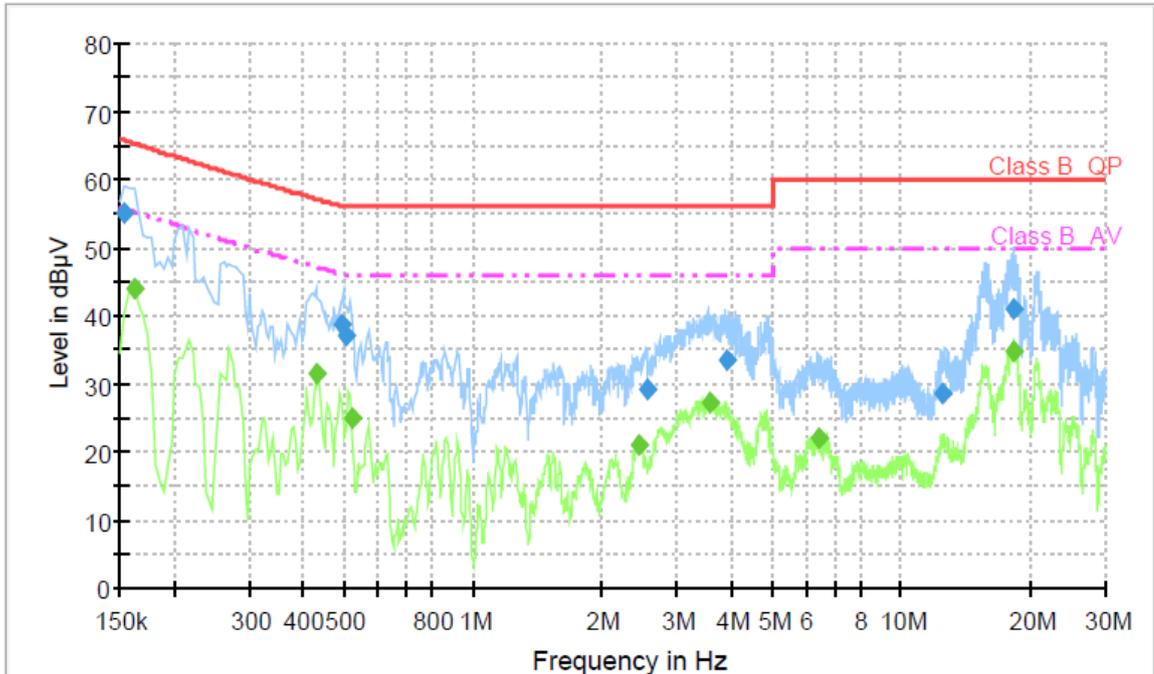
Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.186000	35.9	1000.000	9.000	GND	N	10.1	18.2	54.1	
0.242000	32.6	1000.000	9.000	GND	N	10.1	19.2	51.8	
1.050000	21.6	1000.000	9.000	GND	N	10.1	24.4	46.0	
2.550000	26.7	1000.000	9.000	GND	N	10.2	19.3	46.0	
3.286000	30.0	1000.000	9.000	GND	N	10.2	16.0	46.0	
12.666000	29.6	1000.000	9.000	GND	N	10.6	20.4	50.0	
14.502000	31.0	1000.000	9.000	GND	N	10.7	19.0	50.0	

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



◆ Operating condition: 1 920 × 1 080 / 60 Hz (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	55.0	1000.000	9.000	GND	L1	10.1	10.8	65.8	
0.492000	38.6	1000.000	9.000	GND	L1	10.1	17.5	56.1	
0.508000	37.1	1000.000	9.000	GND	L1	10.1	18.9	56.0	
2.540000	29.3	1000.000	9.000	GND	L1	10.2	26.7	56.0	
3.904000	33.4	1000.000	9.000	GND	L1	10.3	22.6	56.0	
12.536000	28.7	1000.000	9.000	GND	L1	10.7	31.3	60.0	
18.316000	41.1	1000.000	9.000	GND	L1	11.1	18.9	60.0	

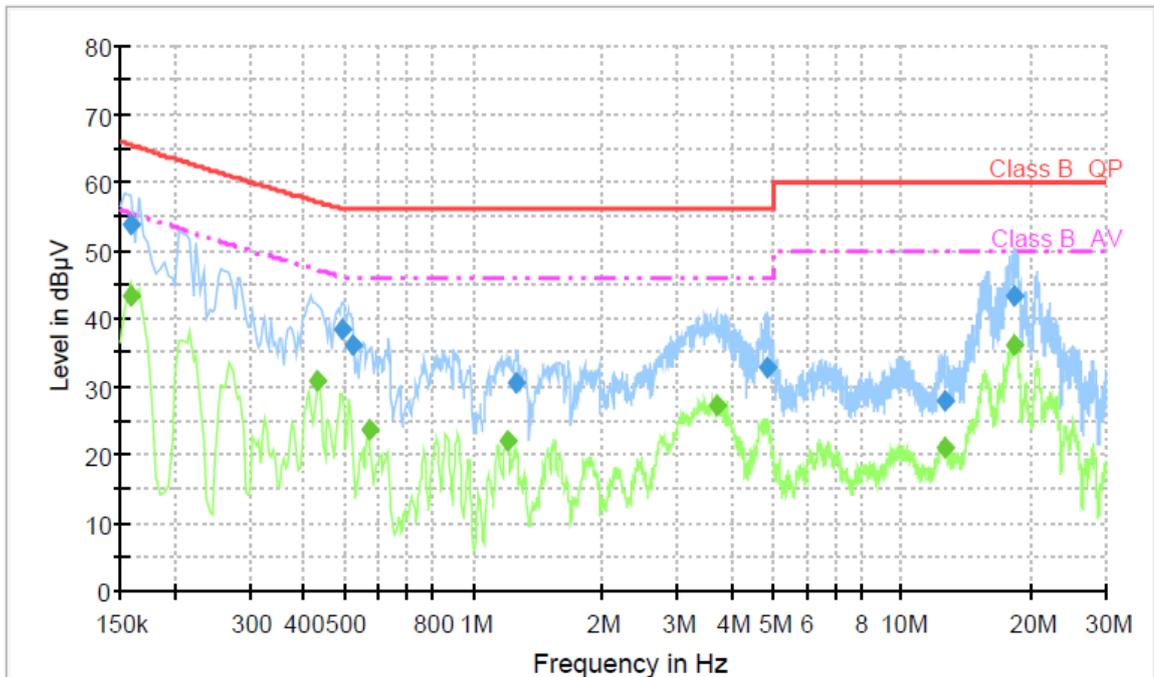
#### Final Measurement Detector 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.162000	44.0	1000.000	9.000	GND	L1	10.1	11.3	55.3	
0.432000	31.5	1000.000	9.000	GND	L1	10.1	15.6	47.1	
0.520000	24.9	1000.000	9.000	GND	L1	10.1	21.1	46.0	
2.448000	20.9	1000.000	9.000	GND	L1	10.2	25.1	46.0	
3.580000	27.1	1000.000	9.000	GND	L1	10.3	18.9	46.0	
6.452000	22.0	1000.000	9.000	GND	L1	10.4	28.0	50.0	
18.320000	34.9	1000.000	9.000	GND	L1	11.1	15.1	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	53.8	1000.000	9.000	GND	N	10.1	11.7	65.5	
0.494000	38.4	1000.000	9.000	GND	N	10.1	17.7	56.1	
0.522000	36.1	1000.000	9.000	GND	N	10.1	19.9	56.0	
1.258000	30.4	1000.000	9.000	GND	N	10.1	25.6	56.0	
4.842000	32.9	1000.000	9.000	GND	N	10.3	23.1	56.0	
12.638000	27.9	1000.000	9.000	GND	N	10.6	32.1	60.0	
18.306000	43.2	1000.000	9.000	GND	N	10.9	16.8	60.0	

#### Final Measurement Detector 2

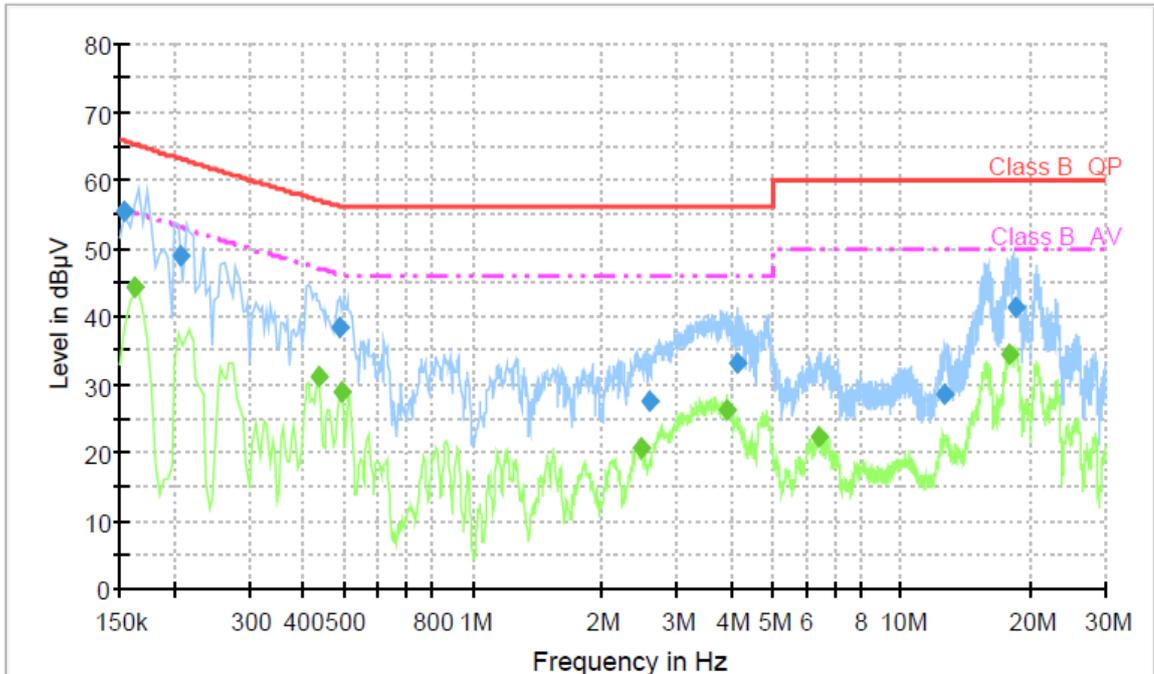
Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.158000	43.1	1000.000	9.000	GND	N	10.1	12.4	55.5	
0.434000	31.0	1000.000	9.000	GND	N	10.1	16.1	47.1	
0.570000	23.7	1000.000	9.000	GND	N	10.1	22.3	46.0	
1.198000	21.9	1000.000	9.000	GND	N	10.1	24.1	46.0	
3.682000	27.2	1000.000	9.000	GND	N	10.3	18.8	46.0	
12.658000	21.1	1000.000	9.000	GND	N	10.6	28.9	50.0	
18.350000	36.2	1000.000	9.000	GND	N	10.9	13.8	50.0	

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



◆ Operating condition: 1 920 × 1 080 / 60 Hz (HDMI: 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	55.3	1000.000	9.000	GND	L1	10.1	10.5	65.8	
0.208000	48.9	1000.000	9.000	GND	L1	10.1	14.2	63.1	
0.488000	38.3	1000.000	9.000	GND	L1	10.1	17.9	56.2	
2.592000	27.6	1000.000	9.000	GND	L1	10.2	28.4	56.0	
4.160000	33.0	1000.000	9.000	GND	L1	10.3	23.0	56.0	
12.672000	28.6	1000.000	9.000	GND	L1	10.7	31.4	60.0	
18.420000	41.2	1000.000	9.000	GND	L1	11.1	18.8	60.0	

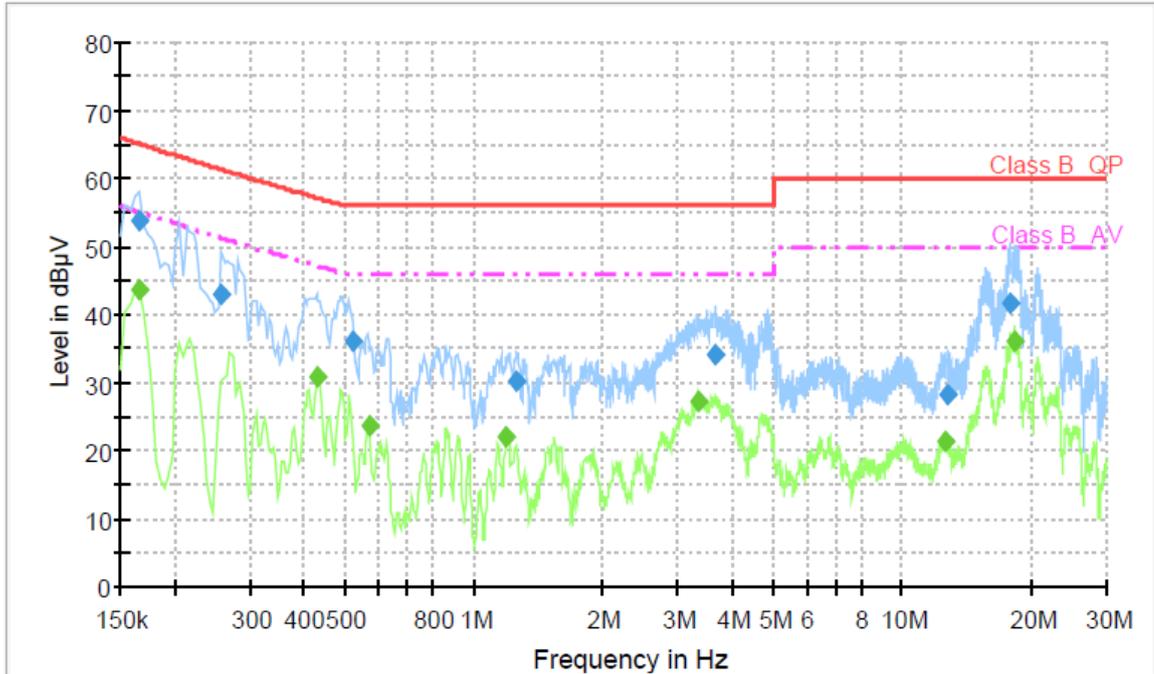
#### Final Measurement Detector 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.162000	44.1	1000.000	9.000	GND	L1	10.1	11.2	55.3	
0.436000	31.2	1000.000	9.000	GND	L1	10.1	15.8	47.0	
0.492000	28.9	1000.000	9.000	GND	L1	10.1	17.2	46.1	
2.472000	20.6	1000.000	9.000	GND	L1	10.2	25.4	46.0	
3.936000	26.3	1000.000	9.000	GND	L1	10.3	19.7	46.0	
6.404000	22.2	1000.000	9.000	GND	L1	10.4	27.8	50.0	
17.952000	34.3	1000.000	9.000	GND	L1	11.0	15.7	50.0	

< Fig 12. 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
0.166000	53.7	1000.000	9.000	GND	N	10.1	11.4	65.1	
0.258000	42.8	1000.000	9.000	GND	N	10.1	18.5	61.3	
0.522000	36.1	1000.000	9.000	GND	N	10.1	19.9	56.0	
1.262000	30.3	1000.000	9.000	GND	N	10.1	25.7	56.0	
3.674000	34.2	1000.000	9.000	GND	N	10.3	21.8	56.0	
12.702000	28.1	1000.000	9.000	GND	N	10.6	31.9	60.0	
17.826000	41.8	1000.000	9.000	GND	N	10.8	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	43.5	1000.000	9.000	GND	N	10.1	11.6	55.1	
0.434000	30.7	1000.000	9.000	GND	N	10.1	16.4	47.1	
0.570000	23.6	1000.000	9.000	GND	N	10.1	22.4	46.0	
1.194000	22.0	1000.000	9.000	GND	N	10.1	24.0	46.0	
3.362000	27.2	1000.000	9.000	GND	N	10.2	18.8	46.0	
12.606000	21.4	1000.000	9.000	GND	N	10.6	28.6	50.0	
18.350000	36.0	1000.000	9.000	GND	N	10.9	14.0	50.0	

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



## 6. Radiated Emission

### 6.1 Operating Environment

Temperature : 23 °C  
Relative Humidity : 43 % 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 $\mu$ V/m	CISPR Limit @ 10 m. dB $\mu$ 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

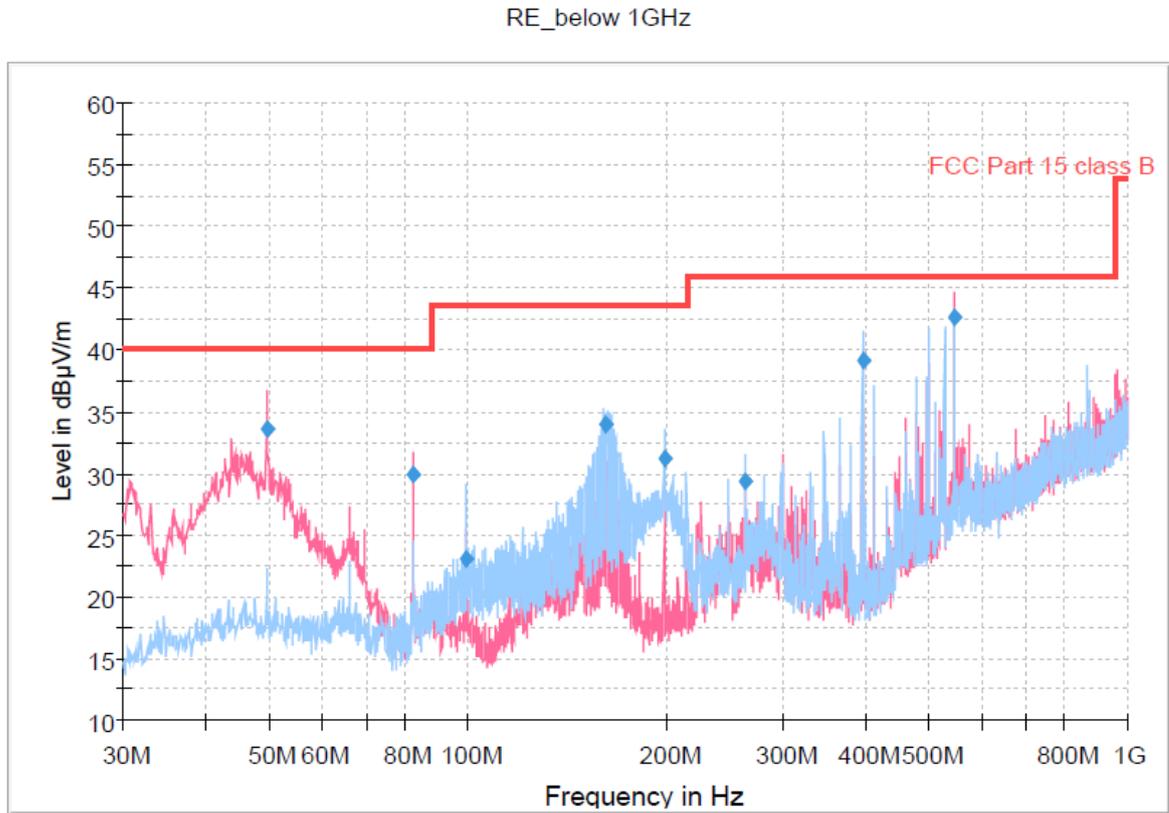
Model Name	Manufacturer	Description	Serial Number	Due to Calibration
■ - ESIB26	Rohde & Schwarz	EMI Test Receiver	830482/010	12. 11. 2011
■ - VULB9160	Schwarzbeck	Broadband Test Antenna	3193	03. 15. 2012
■ - BBHA9120D	Schwarzbeck	Horn ANT	207	12. 22. 2011
■ - MCU066	maturu GmbH	Position Controller	1390306	N/A
■ - TT2.5SI	maturu GmbH	Turntable	1390307	N/A
■ - AM 4.0	maturu 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 : July 15 ~ 20, 2011
- Resolution Bandwidth : 120 kHz/1 MHz
- Frequency Range : 30 MHz ~ 2 000 MHz
- Measurement Distance : 3 m
- Note : The highest frequency of the internal source of the EUT is between 108 MHz and 500 MHz (400 MHz). The measurement was made up to 2 000 MHz



- ◆ Operating Condition: 1 920 × 1 080 / 60 Hz (RGB: Analog)  
 Red trace: Vertical polarization, Blue trace: Horizontal polarization



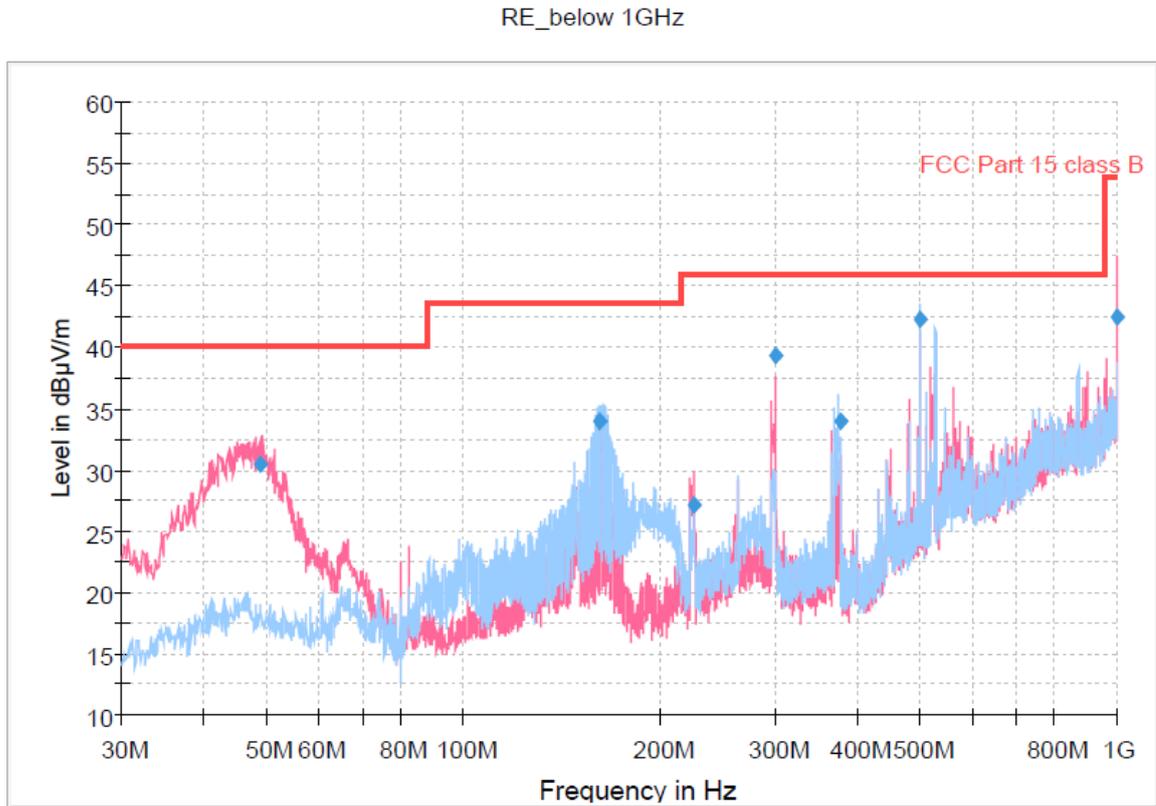
### Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
49.541250	33.6	1000.0	120.000	100.0	V	272.0	13.3	6.43	40.00
82.521250	29.9	1000.0	120.000	100.0	V	194.0	9.2	10.07	40.00
99.051250	23.1	1000.0	120.000	139.0	H	127.0	11.1	20.39	43.50
161.207500	34.0	1000.0	120.000	200.0	H	0.0	15.4	9.48	43.50
198.072500	31.2	1000.0	120.000	100.0	H	88.0	11.9	12.27	43.50
262.537500	29.3	1000.0	120.000	139.0	H	92.0	15.0	16.67	46.00
396.115000	39.1	1000.0	120.000	100.0	H	11.0	17.7	6.89	46.00
544.646250	42.6	1000.0	120.000	100.0	V	38.0	23.3	3.37	46.00

< Fig 14. Radiated emission result (30 MHz ~ 1 000 MHz) >



- ◆ Operating Condition: 1 920 × 1 080 / 60 Hz (DVI: Digital)  
 Red trace: Vertical polarization, Blue trace: Horizontal polarization



### Final Result 1

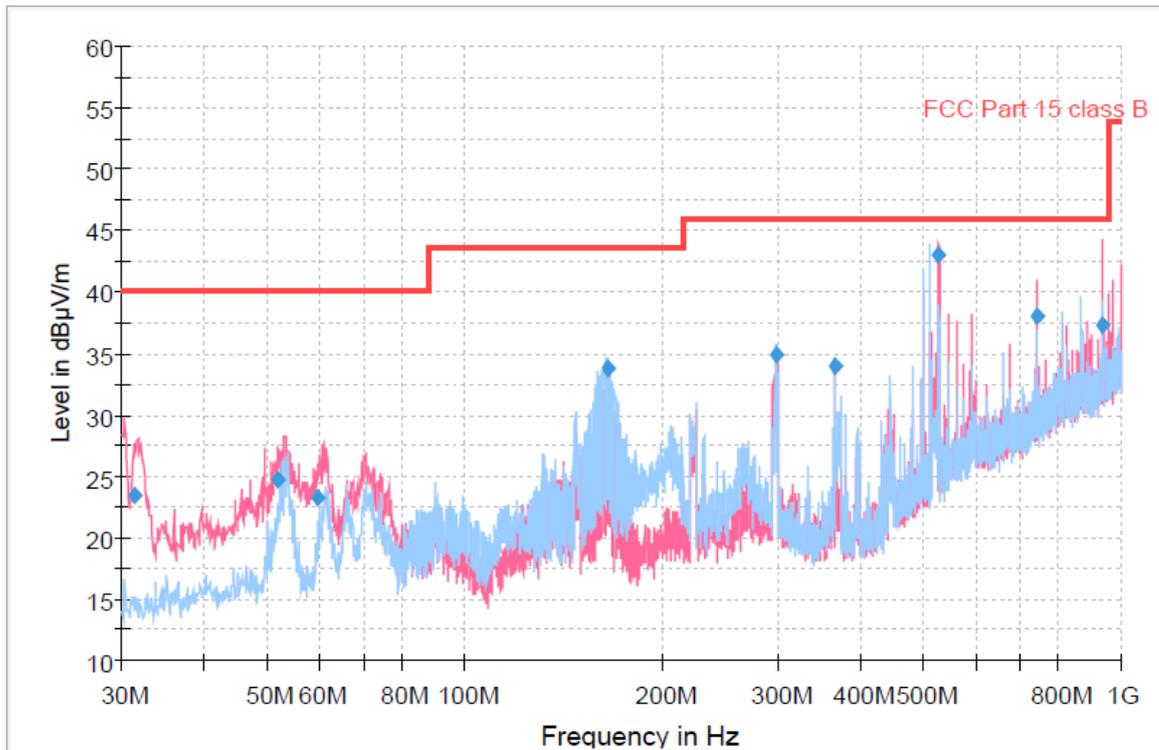
Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
48.698750	30.5	1000.0	120.000	100.0	V	280.0	13.1	9.50	40.00
161.217500	34.0	1000.0	120.000	200.0	H	0.0	15.4	9.48	43.50
225.676250	27.2	1000.0	120.000	200.0	V	350.0	13.1	18.84	46.00
300.892500	39.4	1000.0	120.000	200.0	V	185.0	16.9	6.60	46.00
376.185000	34.0	1000.0	120.000	100.0	H	211.0	17.6	11.99	46.00
499.985000	42.3	1000.0	120.000	200.0	H	314.0	22.2	3.74	46.00
1000.000000	42.4	1000.0	120.000	100.0	V	61.0	31.7	3.58	46.00

< Fig 15. Radiated emission result (30 MHz ~ 1 000 MHz) >



- ◆ Operating Condition: 1 920 × 1 080 / 60 Hz (HDMI: Digital)  
 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)
31.280000	23.4	1000.0	120.000	100.0	V	56.0	11.3	16.59	40.00
51.858750	24.8	1000.0	120.000	100.0	V	265.0	13.2	15.24	40.00
59.617500	23.3	1000.0	120.000	100.0	V	232.0	12.8	16.72	40.00
165.051250	33.9	1000.0	120.000	200.0	H	10.0	15.0	9.62	43.50
296.972500	34.9	1000.0	120.000	100.0	H	99.0	16.7	11.10	46.00
366.691250	33.9	1000.0	120.000	100.0	H	279.0	17.6	12.07	46.00
527.993750	43.0	1000.0	120.000	100.0	V	352.0	22.9	3.03	46.00
742.486250	38.0	1000.0	120.000	100.0	V	232.0	27.6	8.03	46.00
937.976250	37.2	1000.0	120.000	100.0	V	352.0	30.5	8.75	46.00

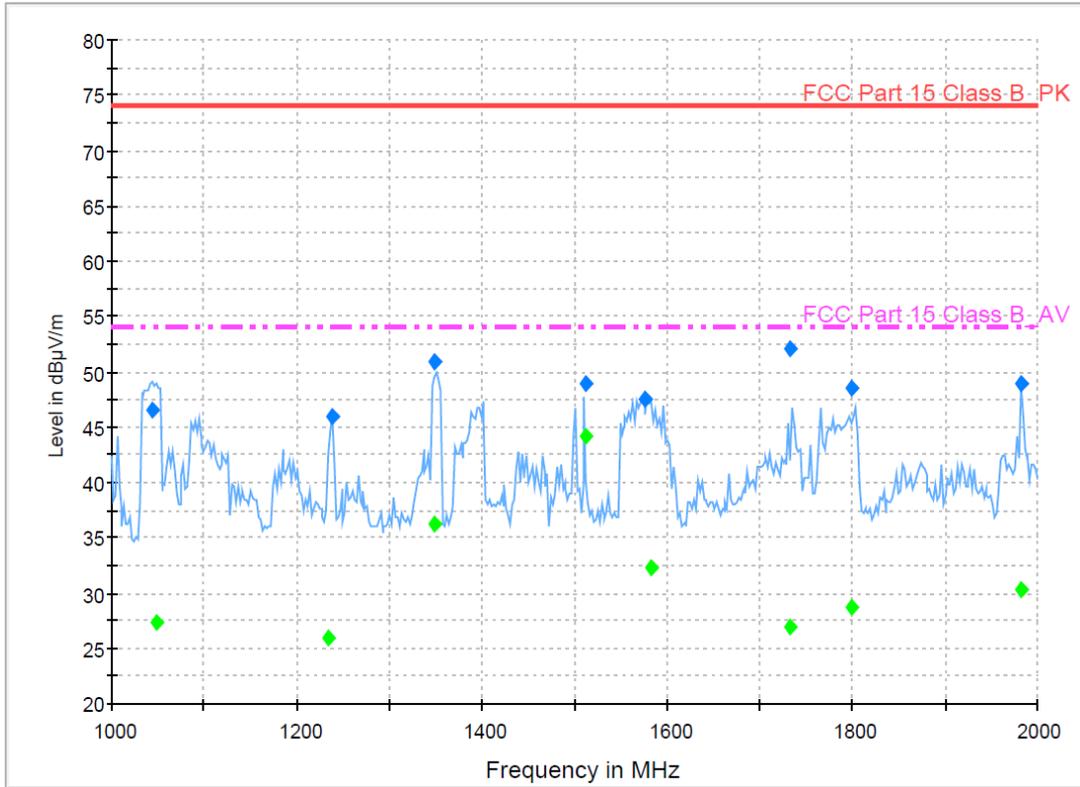
< Fig 16. Radiated emission result (30 MHz ~ 1 000 MHz) >



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

Green market: Average detector, Blue market: 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)
1044.288176	46.5	1000.0	1000.000	100.0	V	221.0	-14.3	27.5	74.0
1237.876954	45.9	1000.0	1000.000	100.0	V	190.0	-13.6	28.1	74.0
1349.701403	50.9	1000.0	1000.000	100.0	V	355.0	-13.3	23.1	74.0
1511.222044	48.9	1000.0	1000.000	130.0	H	210.0	-13.0	25.1	74.0
1576.158317	47.5	1000.0	1000.000	112.0	V	142.0	-12.7	26.5	74.0
1733.670942	52.2	1000.0	1000.000	100.0	V	348.0	-12.4	21.8	74.0
1800.207214	48.5	1000.0	1000.000	100.0	V	46.0	-12.1	25.5	74.0
1981.363928	48.9	1000.0	1000.000	200.0	V	5.0	-11.7	25.1	74.0

### Final Result 2

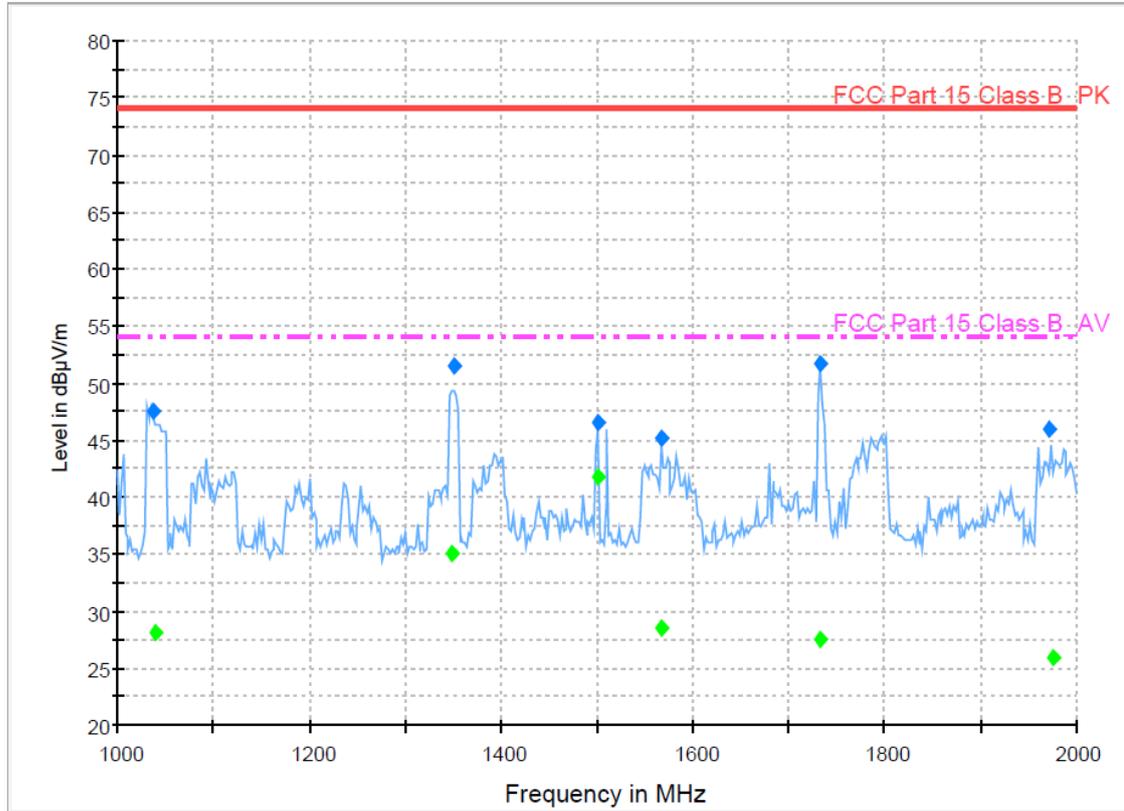
Frequency (MHz)	CAverage (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1047.488176	27.3	1000.0	1000.000	100.0	V	212.0	-14.2	26.7	54.0
1233.476954	25.9	1000.0	1000.000	100.0	V	186.0	-13.6	28.1	54.0
1348.901403	36.2	1000.0	1000.000	100.0	V	1.0	-13.3	17.8	54.0
1511.222044	44.2	1000.0	1000.000	129.0	H	206.0	-13.0	9.8	54.0
1582.958317	32.2	1000.0	1000.000	113.0	V	145.0	-12.7	21.8	54.0
1733.670942	27.0	1000.0	1000.000	100.0	V	353.0	-12.4	27.0	54.0
1800.207214	28.7	1000.0	1000.000	112.0	V	46.0	-12.1	25.3	54.0
1981.363928	30.4	1000.0	1000.000	200.0	V	8.0	-11.7	23.6	54.0

< Fig 17. Radiated emission result (1 000 MHz ~ 2 000 MHz) >



- ◆ Operating Condition: 1 920 × 1 080 / 60 Hz 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)
1037.072144	47.5	1000.0	1000.000	100.0	V	136.0	-14.3	26.5	74.0
1350.101403	51.4	1000.0	1000.000	100.0	V	355.0	-13.3	22.6	74.0
1500.402004	46.5	1000.0	1000.000	198.0	V	14.0	-13.0	27.5	74.0
1567.334269	45.1	1000.0	1000.000	100.0	V	141.0	-12.8	28.9	74.0
1732.466934	51.7	1000.0	1000.000	100.0	V	1.0	-12.4	22.3	74.0
1970.947896	45.9	1000.0	1000.000	100.0	V	172.0	-11.8	28.1	74.0

### Final Result 2

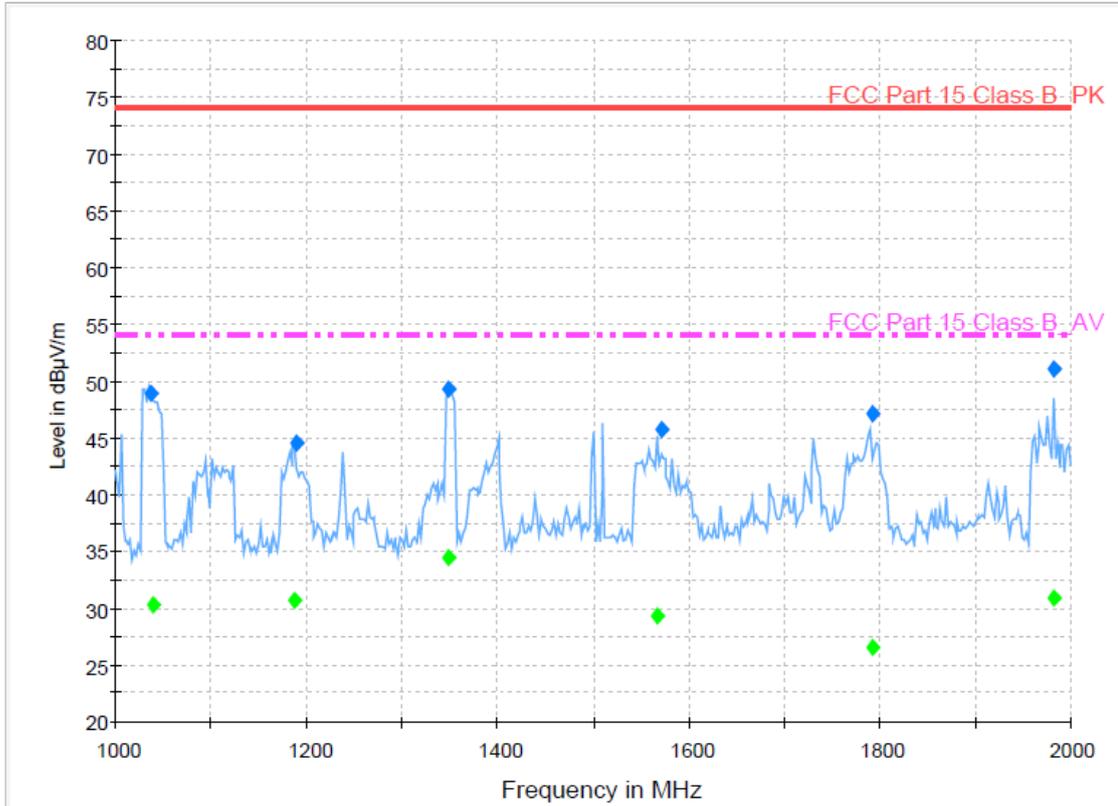
Frequency (MHz)	CAverage (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1039.472144	28.2	1000.0	1000.000	100.0	V	121.0	-14.3	25.8	54.0
1349.301403	35.1	1000.0	1000.000	100.0	V	1.0	-13.3	18.9	54.0
1500.402004	41.8	1000.0	1000.000	200.0	V	14.0	-13.0	12.2	54.0
1567.334269	28.5	1000.0	1000.000	146.0	V	144.0	-12.8	25.6	54.0
1733.666934	27.5	1000.0	1000.000	100.0	V	2.0	-12.4	26.5	54.0
1976.547896	26.0	1000.0	1000.000	100.0	V	170.0	-11.8	28.0	54.0

< Fig 18. Radiated emission result (1 000 MHz ~ 2 000 MHz) >



- ◆ Operating Condition: 1 920 × 1 080 / 60 Hz HDMI: 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)
1038.272144	48.9	1000.0	1000.000	100.0	V	126.0	-14.3	25.1	74.0
1188.976754	44.5	1000.0	1000.000	100.0	V	195.0	-13.7	29.5	74.0
1349.697395	49.3	1000.0	1000.000	100.0	V	5.0	-13.3	24.7	74.0
1571.734269	45.7	1000.0	1000.000	100.0	V	141.0	-12.8	28.3	74.0
1791.779158	47.1	1000.0	1000.000	100.0	V	47.0	-12.2	26.9	74.0
1981.363928	51.1	1000.0	1000.000	100.0	V	150.0	-11.7	22.9	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)
1039.472144	30.3	1000.0	1000.000	100.0	V	124.0	-14.3	23.7	54.0
1187.776754	30.8	1000.0	1000.000	100.0	V	200.0	-13.7	23.2	54.0
1348.897395	34.4	1000.0	1000.000	100.0	V	3.0	-13.3	19.6	54.0
1567.334269	29.3	1000.0	1000.000	100.0	V	141.0	-12.8	24.7	54.0
1792.979158	26.6	1000.0	1000.000	113.0	V	50.0	-12.2	27.4	54.0
1981.363928	31.0	1000.0	1000.000	100.0	V	150.0	-11.7	23.0	54.0

< Fig 19. 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 $\mu\text{V}$ = 48 $\text{dB}\mu\text{V}$
Reading	= 39.2 $\text{dB}\mu\text{V}$
$10^{(39.2\text{dB}\mu\text{V}/20)}$	= 91.2 $\mu\text{V}$
Margin	= 48 $\text{dB}\mu\text{V}$ - 39.2 $\text{dB}\mu\text{V}$ = 8.8 dB

### 7.2 Example 2 :

#### ■ 66.7 MHz

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



## 8. Recommendation & Conclusion

The data collected shows that the **LG Electronics Inc. LED LCD TV/Monitor (Model Name: DM2350DM)** was complies with §15.107 and 15.109 of the FCC Rules.