



## ***FCC EVALUATION REPORT FOR CERTIFICATION***

**Manufacturer : LG Electronics Inc.**

**642, Jinpyeong-dong, Gumi-si,**

**Gyeongbuk, 730-360, Korea**

**Attn: Mr. Sang-Wook Lee, Chief research engineer**

**Date of Issue : May 11, 2009**

**Order Number: GETEC-C1-09-106**

**Test Report Number: GETEC-E3-09-051**

**Test Site: Gumi College EMC Center**

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

**FCC ID.: BEJ32CL20UA**

**Applicant: LG Electronics Inc.**

<b>Rule Part(s)</b>	<b>: FCC Part 15 Subpart B</b>
<b>Equipment Class</b>	<b>: Class B computing device peripheral (JBP)</b>
<b>EUT Type</b>	<b>: LCD TV/Monitor</b>
<b>Type of Authority</b>	<b>: Certification</b>
<b>Model Name</b>	<b>: 32CL20-UA</b>
<b>Trade Name</b>	<b>: LG</b>

**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,**

  
**Hyoung Seop Kim, Associate Engineer**  
**GUMI College EMC center**

  
**Tae-Sig Park, Technical Manager**  
**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: 642, Jinpyeong-dong, Gumi-si, Gyeongbuk, Korea**  
**Manufacturer: LG Electronics Inc.**  
**Manufacturer Address: 642, Jinpyeong-dong, Gumi-si, Gyeongbuk, Korea**  
**Contact Person: Mr. Sang -Wook Lee, Chief research engineer**  
**Tel Number: +82-54-470-5430**

- **FCC ID.** BEJ32CL20UA
- **EUT Type** LCD TV/Monitor
- **Model Name** 32CL20-UA
- **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** April 30 ~ May 1, 2009
- **Place of Test** **Gumi College EMC Center** ( FCC Registration No.: 100749, 443957)  
407, Bugok-dong, Gumi-si, Gyeongbuk, Korea.
- **Test Report Number** GETEC-E3-09-051
- **Dates of Issue** May 11, 2009



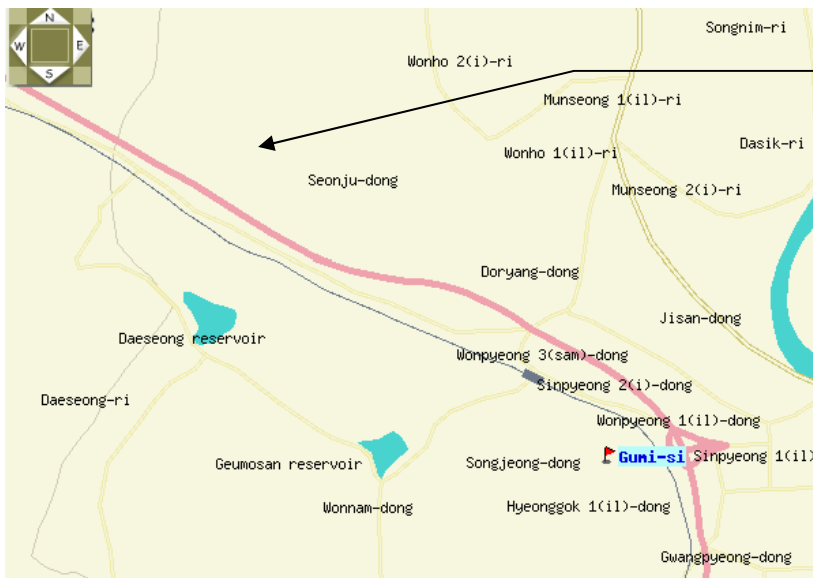
## 2. Introduction

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. LCD TV/Monitor (Model Name: 32CL20-UA)**

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 FCC §2.948 according to ANSI C63.4 (2003)



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Gyeongbuk 730-711, Korea.  
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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. LCD TV/Monitor (Model Name: 32CL20-UA) FCC ID.: BEJ32CL20UA**

MODELS		26LU55 (26LU55-UB)	32CL20 (32CL20-UA)
Dimensions (Width x Height x Depth)	With stand	26.2 x 21.1 x 9.2 inches 668.0 x 538.3 x 236.0 mm	32.0 x 23.5 x 9.1 inches 813.8 x 598.8 x 231.9 mm
	Without stand	26.2 x 17.9 x 3.1 inches 668.0 x 456.0 x 81.0 mm	32.0 x 21.2 x 3.1 inches 813.8 x 540.4 x 78.9 mm
Weight	With stand	19.6 lbs / 8.9 kg	26.8 lbs / 12.2 kg
	Without stand	16.9 lbs / 7.7 kg	23.3 lbs / 10.6 kg
Power requirement Television System Program Coverage External Antenna Impedance		AC100-240V ~ 50/60Hz NTSC-M, ATSC, 64 & 256 QAM VHF 2-13, UHF 14-69, CATV 1-135, DTV 2-69, CADTV 1-135 75 ohm	
Environment condition	Operating Temperature Operating Humidity	32 ~ 104°F (0 ~ 40°C) Less than 80%	
	Storage Temperature Storage Humidity	-4 ~ 140°F (-20 ~ 60°C) Less than 85%	

Maximum Frequency range:	200 MHz
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### 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
Key-board	COMPAQ	166516-AD6	S/N: B13BBOR391006D FCC ID: AQ6-23K15
PS2 mouse	LOGITECH	M-S69	S/N: N/A FCC ID: JNZ211443
Joystick	Microsoft	X05-92626	S/N: 9262600296169 FCC ID: DoC
DVD player	LG Electronics Inc	LC-954	S/N: 3850R-Z674K FCC ID: DoC
Printer	Hewlett Packard	970CXI	S/N: MY9B01F1FG FCC ID: DoC
TV signal generator	FLUKE	54200	S/N: 831011 FCC ID: DoC

*See "Appendix D – Test Setup Photographs" for actual system test set-up*



### 3.2.2 Used Cable(s)

<b>Cable Name</b>	<b>Condition</b>	<b>Description</b>
Power cable	Connected to the EUT	1.8 m unshielded
RGB(Analog) cable	Connected to the EUT and PC	1.8 m shielded with two ferrite cores
HDMI/DVI(Digital) cable	Connected to the EUT and PC	1.95 m shielded
PC Sound cable	Connected to the EUT and PC	1.8 m shielded
AV input cable	Connected to the EUT and DVD player	1.8 m shielded
Component cable	Connected to the EUT and DVD player	3.0 m shielded
Component sound cable	Connected to the EUT and DVD player	3.0 m shielded
Antenna cable	Connected to the EUT and TV signal generator	10 m shielded
RS-232C (Service only) cable	Connected to the EUT	1.2 m shielded whit 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: 1 360 \* 768 / 60 Hz (RGB: Analog), 1 360 \* 768 / 60 Hz (HDMI/DVI: Digital)
    - . Conducted emission: 1 360 \* 768 / 60 Hz (RGB: Analog), 1 360 \* 768 / 60 Hz (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
  - . 1 kHz sound tone with winamp player

***"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

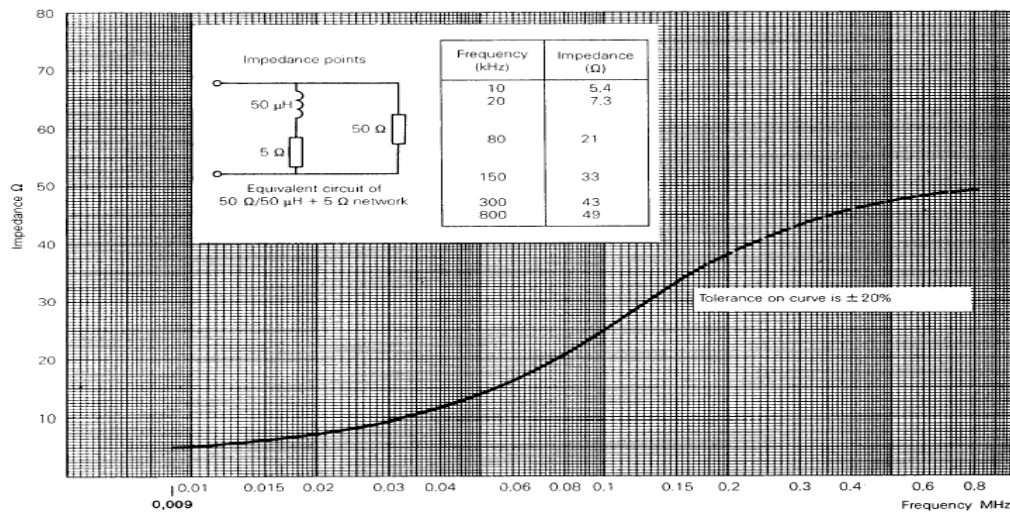


Fig 2. Impedance of LISN



### 4.3 Radiated Emission

The measurements were conducted in a 3 m anechoic chamber (FCC Registration No.: 443957) 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 noted for each frequency found.

The spectrum was scanned from 30 to 1000 MHz, using a biconical log antenna (Schwarzbeck, VULB9160).

Above 1 GHz, a horn antenna (Schwarzbeck, BBHA9120D / EMCO 3160) was used.

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 an 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 from 1 m to 4 m and stopped at the azimuth or height producing the maximum emission.

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

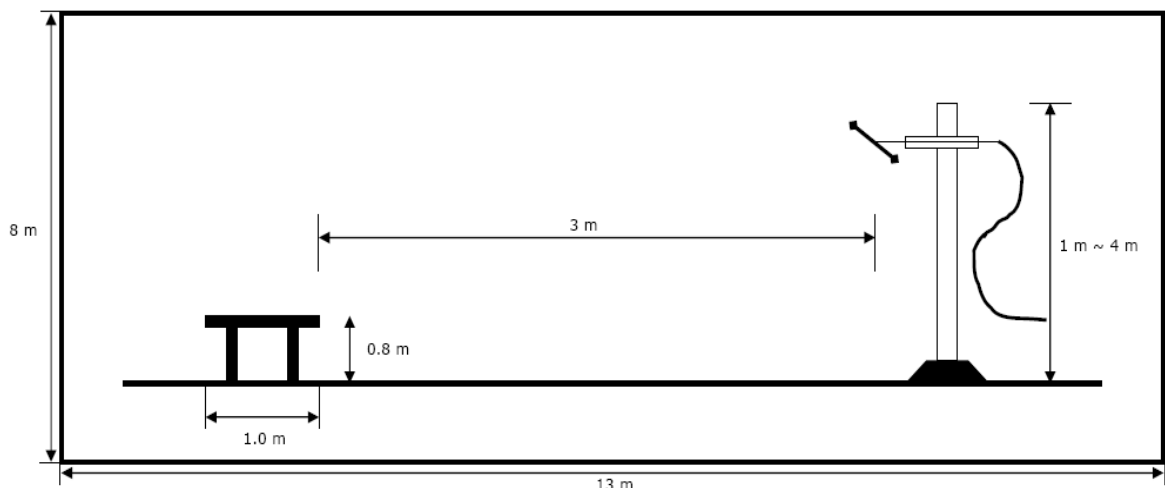


Fig 3. Dimensions of test site.



## 5. Conducted Emission

### 5.1 Operating Environment

Temperature : 23 °C  
Relative Humidity : 38 % 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.

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)	± 2.97 dB	Confidence levels of 95 % (k=2)
Conducted emission (150 kHz ~ 30 MHz)	± 4.05 dB	Confidence levels of 95 % (k=2)



#### 5.4 Limit

RFI Conducted	FCC Limit(dB) Class B	
	Quasi-Peak	Average
Freq. Range		
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. 13. 2009
■ - ESH3-Z5	Rohde & Schwarz	LISN	838979/020	12. 12. 2009
■ - ESH2-Z5	Rohde & Schwarz	LISN	829991/009	12. 12. 2009

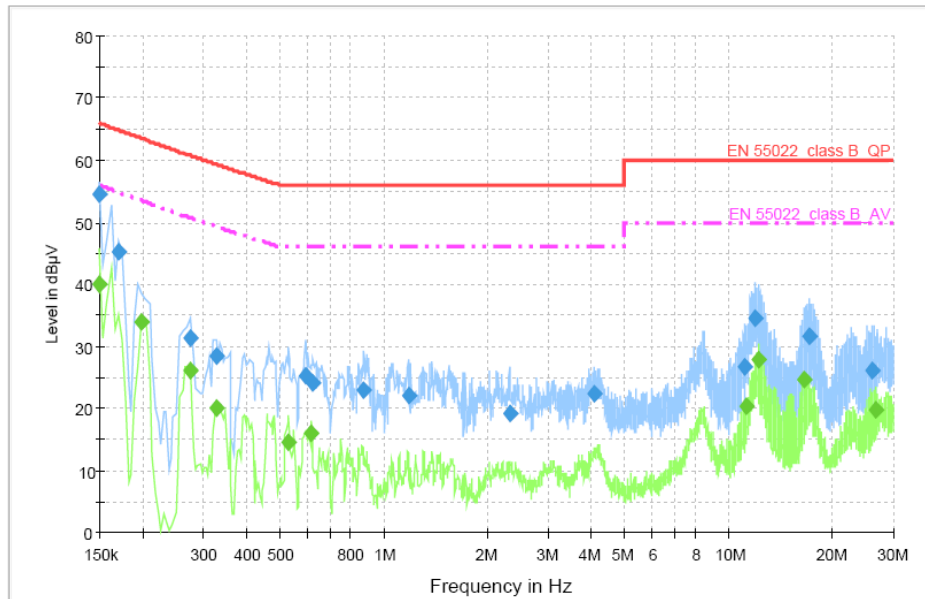
#### 5.6 Test data for Conducted Emission

- Test Date : May 1, 2009
- Resolution Bandwidth : 9 kHz
- Frequency Range : 0.15 MHz ~ 30 MHz



◆ Test resolution: 1 360 \* 768 / 60 Hz (RGB: Analog mode)

### Voltage with 4-Line-LISN\_L1



### Final Measurement Detector 1

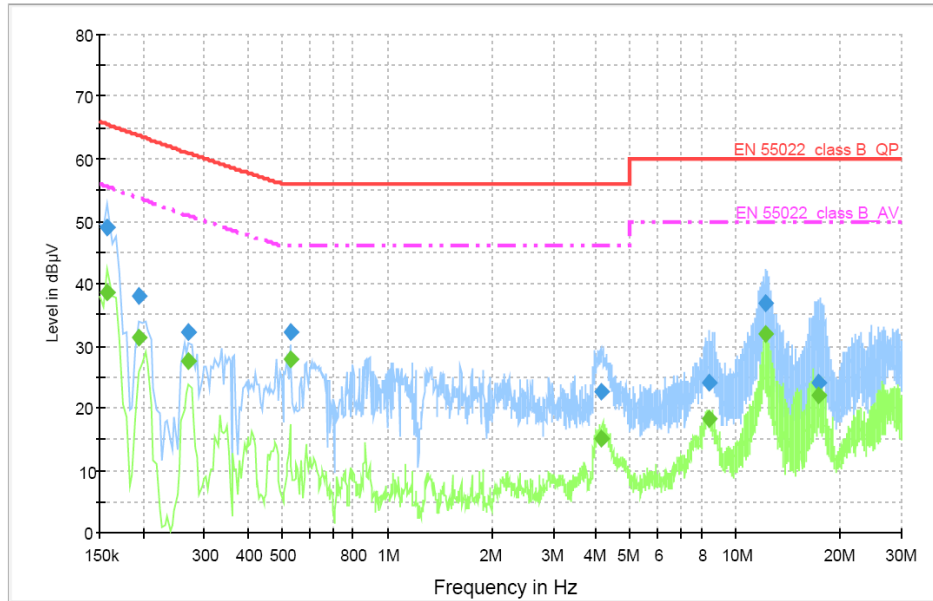
Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.150000	54.4	1000.000	9.000	GND	L1	9.9	11.6	66.0	
0.170000	45.2	1000.000	9.000	GND	L1	9.9	19.7	64.9	
0.274000	31.3	1000.000	9.000	GND	L1	10.0	29.5	60.8	
0.326000	28.3	1000.000	9.000	GND	L1	10.0	31.1	59.4	
0.594000	25.1	1000.000	9.000	GND	L1	10.0	30.9	56.0	
0.626000	24.0	1000.000	9.000	GND	L1	10.0	32.0	56.0	
0.878000	22.9	1000.000	9.000	GND	L1	10.0	33.1	56.0	
1.178000	22.0	1000.000	9.000	GND	L1	10.0	34.0	56.0	
2.318000	19.1	1000.000	9.000	GND	L1	10.1	36.9	56.0	
4.086000	22.4	1000.000	9.000	GND	L1	10.2	33.6	56.0	
11.094000	26.7	1000.000	9.000	GND	L1	10.3	33.3	60.0	
11.966000	34.4	1000.000	9.000	GND	L1	10.4	25.6	60.0	
17.178000	31.6	1000.000	9.000	GND	L1	10.7	28.4	60.0	
26.146000	26.2	1000.000	9.000	GND	L1	11.0	33.8	60.0	

### Final Measurement Detector 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.150000	40.0	1000.000	9.000	GND	L1	9.9	16.0	56.0	
0.198000	34.0	1000.000	9.000	GND	L1	9.9	19.5	53.5	
0.274000	26.1	1000.000	9.000	GND	L1	10.0	24.7	50.8	
0.326000	20.0	1000.000	9.000	GND	L1	10.0	29.3	49.3	
0.530000	14.4	1000.000	9.000	GND	L1	10.0	31.6	46.0	
0.618000	16.0	1000.000	9.000	GND	L1	10.0	30.0	46.0	
11.198000	20.4	1000.000	9.000	GND	L1	10.3	29.6	50.0	
12.206000	27.9	1000.000	9.000	GND	L1	10.4	22.1	50.0	
16.534000	24.6	1000.000	9.000	GND	L1	10.7	25.4	50.0	
26.598000	19.8	1000.000	9.000	GND	L1	11.0	30.2	50.0	



### 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	49.0	1000.000	9.000	GND	N	9.9	16.5	65.5	
0.194000	37.9	1000.000	9.000	GND	N	9.9	26.0	63.9	
0.270000	32.2	1000.000	9.000	GND	N	10.0	28.9	61.1	
0.526000	32.1	1000.000	9.000	GND	N	10.0	23.9	56.0	
4.102000	22.6	1000.000	9.000	GND	N	10.2	33.4	56.0	
8.430000	24.1	1000.000	9.000	GND	N	10.3	35.9	60.0	
12.214000	36.8	1000.000	9.000	GND	N	10.4	23.2	60.0	
17.365000	24.0	1000.000	9.000	GND	N	10.6	36.0	60.0	

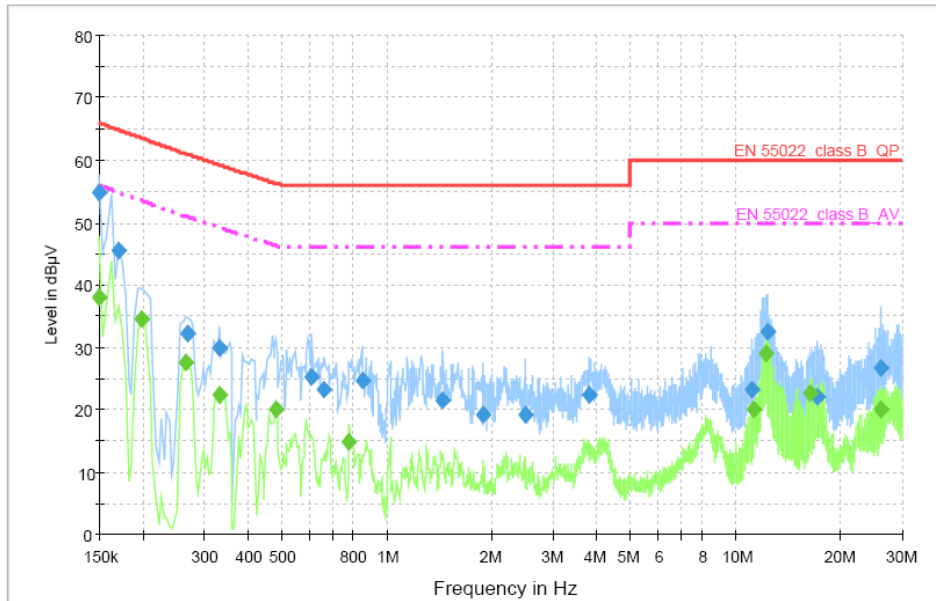
### Final Measurement Detector 2

Frequency (MHz)	Average (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	9.9	17.0	55.5	
0.194000	31.2	1000.000	9.000	GND	N	9.9	53.9	53.9	
0.270000	27.4	1000.000	9.000	GND	N	10.0	51.1	51.1	
0.526000	27.7	1000.000	9.000	GND	N	10.0	46.0	46.0	
4.102000	15.2	1000.000	9.000	GND	N	10.2	45.8	46.0	
8.430000	18.3	1000.000	9.000	GND	N	10.3	49.7	50.0	
12.214000	31.9	1000.000	9.000	GND	N	10.4	18.1	50.0	
17.365000	22.1	1000.000	9.000	GND	N	10.6	49.4	50.0	



◆ Test resolution: 1 360 \* 768 / 60 Hz (HDMI/DVI: Digital mode)

**Voltage with 4-Line-LISN\_L1**



**Final Measurement Detector 1**

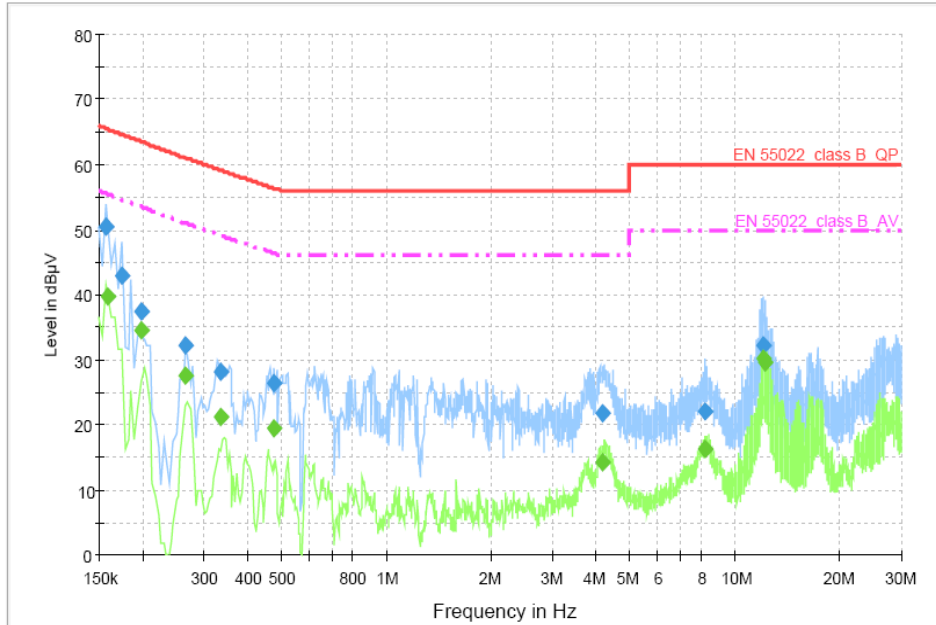
Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.150000	54.7	1000.000	9.000	GND	L1	9.9	11.3	66.0	
0.170000	45.6	1000.000	9.000	GND	L1	9.9	19.3	64.9	
0.270000	32.3	1000.000	9.000	GND	L1	10.0	28.6	60.9	
0.330000	29.8	1000.000	9.000	GND	L1	10.0	29.5	59.3	
0.610000	25.3	1000.000	9.000	GND	L1	10.0	30.7	56.0	
0.662000	23.3	1000.000	9.000	GND	L1	10.0	32.7	56.0	
0.850000	24.6	1000.000	9.000	GND	L1	10.0	31.4	56.0	
1.450000	21.5	1000.000	9.000	GND	L1	10.1	34.5	56.0	
1.886000	19.2	1000.000	9.000	GND	L1	10.1	36.8	56.0	
2.498000	19.1	1000.000	9.000	GND	L1	10.1	36.9	56.0	
3.790000	22.2	1000.000	9.000	GND	L1	10.2	33.8	56.0	
11.166000	23.2	1000.000	9.000	GND	L1	10.3	36.8	60.0	
12.366000	32.6	1000.000	9.000	GND	L1	10.5	27.4	60.0	
17.098000	22.0	1000.000	9.000	GND	L1	10.7	38.0	60.0	
26.210000	26.7	1000.000	9.000	GND	L1	11.0	33.3	60.0	

**Final Measurement Detector 2**

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.150000	38.1	1000.000	9.000	GND	L1	9.9	17.9	56.0	
0.198000	34.5	1000.000	9.000	GND	L1	9.9	19.0	53.5	
0.266000	27.7	1000.000	9.000	GND	L1	10.0	23.3	51.0	
0.330000	22.4	1000.000	9.000	GND	L1	10.0	26.8	49.2	
0.482000	20.1	1000.000	9.000	GND	L1	10.0	26.2	46.3	
0.782000	14.7	1000.000	9.000	GND	L1	10.0	31.3	46.0	
11.254000	19.9	1000.000	9.000	GND	L1	10.3	30.1	50.0	
12.226000	28.8	1000.000	9.000	GND	L1	10.4	21.2	50.0	
16.410000	22.7	1000.000	9.000	GND	L1	10.7	27.3	50.0	
26.194000	19.9	1000.000	9.000	GND	L1	11.0	30.1	50.0	



### 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	50.3	1000.000	9.000	GND	N	9.9	15.2	65.5	
0.174000	42.8	1000.000	9.000	GND	N	9.9	21.9	64.7	
0.198000	37.5	1000.000	9.000	GND	N	9.9	26.2	63.7	
0.266000	32.1	1000.000	9.000	GND	N	10.0	29.1	61.2	
0.337000	28.1	1000.000	9.000	GND	N	10.0	30.2	58.3	
0.475000	26.3	1000.000	9.000	GND	N	10.0	30.1	56.4	
4.158000	21.7	1000.000	9.000	GND	N	10.2	34.3	56.0	
8.234000	22.1	1000.000	9.000	GND	N	10.3	37.9	60.0	
12.078000	32.3	1000.000	9.000	GND	N	10.4	27.7	60.0	

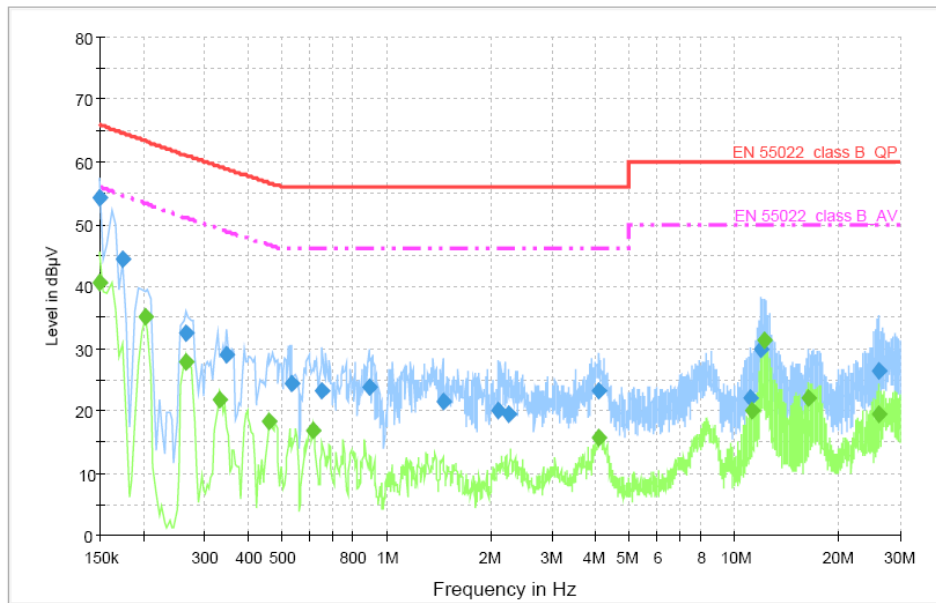
### Final Measurement Detector 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.159000	39.6	1000.000	9.000	GND	N	9.9	15.9	55.5	
0.198000	34.4	1000.000	9.000	GND	N	9.9	19.3	53.7	
0.266000	27.6	1000.000	9.000	GND	N	10.0	23.6	51.2	
0.337000	21.1	1000.000	9.000	GND	N	10.0	28.2	49.3	
0.475000	19.4	1000.000	9.000	GND	N	10.0	27.0	46.4	
4.158000	14.2	1000.000	9.000	GND	N	10.2	31.8	46.0	
8.234000	16.2	1000.000	9.000	GND	N	10.3	33.8	50.0	
12.078000	30.1	1000.000	9.000	GND	N	10.4	19.9	50.0	
12.218000	29.7	1000.000	9.000	GND	N	10.4	20.3	50.0	



◆ Test resolution: 1 024 \* 768 / 60 Hz (RGB: Analog mode)

Voltage with 4-Line-LISN\_L1



Final Measurement Detector 1

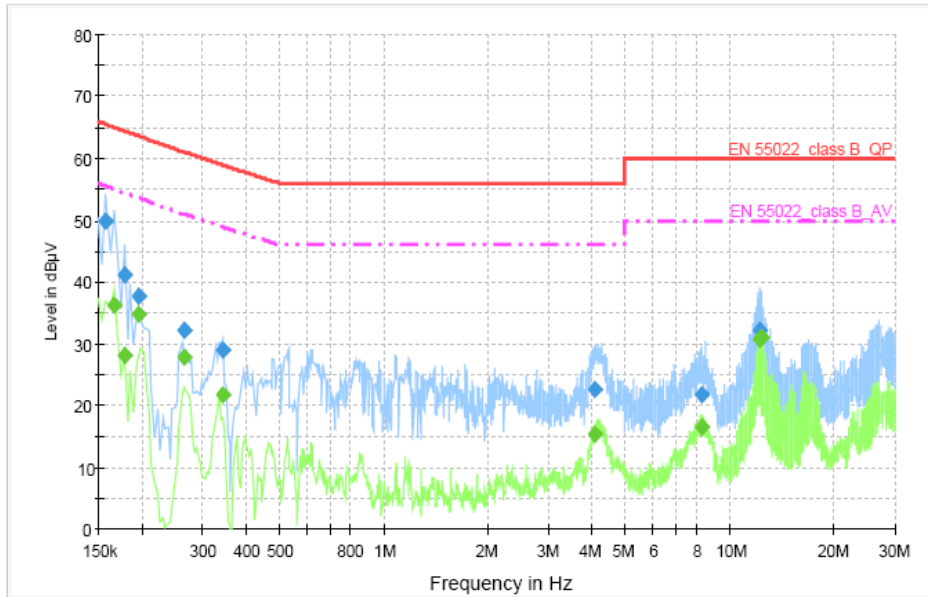
Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.150000	54.2	1000.000	9.000	GND	L1	9.9	11.8	66.0	
0.174000	44.3	1000.000	9.000	GND	L1	9.9	20.4	64.7	
0.266000	32.5	1000.000	9.000	GND	L1	10.0	28.5	61.0	
0.346000	28.9	1000.000	9.000	GND	L1	10.0	30.0	58.9	
0.534000	24.2	1000.000	9.000	GND	L1	10.0	31.8	56.0	
0.654000	23.1	1000.000	9.000	GND	L1	10.0	32.9	56.0	
0.890000	23.7	1000.000	9.000	GND	L1	10.0	32.3	56.0	
1.454000	21.4	1000.000	9.000	GND	L1	10.1	34.6	56.0	
2.098000	19.9	1000.000	9.000	GND	L1	10.1	36.1	56.0	
2.246000	19.3	1000.000	9.000	GND	L1	10.1	36.7	56.0	
4.098000	23.1	1000.000	9.000	GND	L1	10.2	32.9	56.0	
11.174000	21.9	1000.000	9.000	GND	L1	10.3	38.1	60.0	
11.966000	29.8	1000.000	9.000	GND	L1	10.4	30.2	60.0	
26.114000	26.4	1000.000	9.000	GND	L1	11.0	33.6	60.0	

Final Measurement Detector 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.150000	40.6	1000.000	9.000	GND	L1	9.9	15.4	56.0	
0.202000	35.0	1000.000	9.000	GND	L1	9.9	18.3	53.3	
0.266000	27.9	1000.000	9.000	GND	L1	10.0	23.1	51.0	
0.330000	21.8	1000.000	9.000	GND	L1	10.0	27.4	49.2	
0.462000	18.3	1000.000	9.000	GND	L1	10.0	28.3	46.6	
0.618000	16.7	1000.000	9.000	GND	L1	10.0	29.3	46.0	
4.086000	15.7	1000.000	9.000	GND	L1	10.2	30.3	46.0	
11.206000	19.9	1000.000	9.000	GND	L1	10.3	30.1	50.0	
12.218000	31.2	1000.000	9.000	GND	L1	10.4	18.8	50.0	
16.438000	22.0	1000.000	9.000	GND	L1	10.7	28.0	50.0	
26.114000	19.6	1000.000	9.000	GND	L1	11.0	30.4	50.0	



### 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	49.9	1000.000	9.000	GND	N	9.9	15.6	65.5	
0.178000	41.1	1000.000	9.000	GND	N	9.9	23.4	64.5	
0.197000	37.6	1000.000	9.000	GND	N	9.9	26.1	63.7	
0.265000	32.2	1000.000	9.000	GND	N	10.0	29.1	61.3	
0.342000	29.1	1000.000	9.000	GND	N	10.0	30.1	59.2	
4.095000	22.7	1000.000	9.000	GND	N	10.2	33.3	56.0	
8.262000	21.8	1000.000	9.000	GND	N	10.3	38.2	60.0	
12.215000	32.1	1000.000	9.000	GND	N	10.4	27.9	60.0	

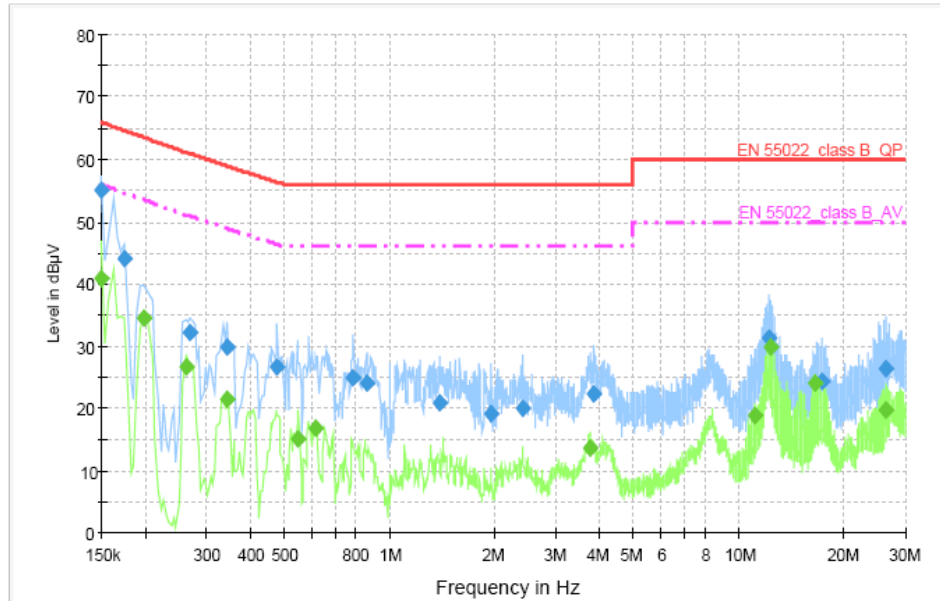
#### Final Measurement Detector 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.166000	36.4	1000.000	9.000	GND	N	9.9	18.7	55.1	
0.178000	28.1	1000.000	9.000	GND	M	9.9	26.5	54.6	
0.197000	34.9	1000.000	9.000	GND	N	9.9	18.8	53.7	
0.265000	27.9	1000.000	9.000	GND	N	10.0	23.4	51.3	
0.342000	21.7	1000.000	9.000	GND	N	10.0	27.5	49.2	
4.095000	15.3	1000.000	9.000	GND	N	10.2	30.7	46.0	
8.262000	16.6	1000.000	9.000	GND	N	10.3	33.4	50.0	
12.215000	30.7	1000.000	9.000	GND	N	10.4	19.3	50.0	
12.358000	31.0	1000.000	9.000	GND	N	10.4	19.0	50.0	



◆ Test resolution: 640 \* 480 / 60 Hz (RGB: Analog mode)

### Voltage with 4-Line-LISN\_L1



### Final Measurement Detector 1

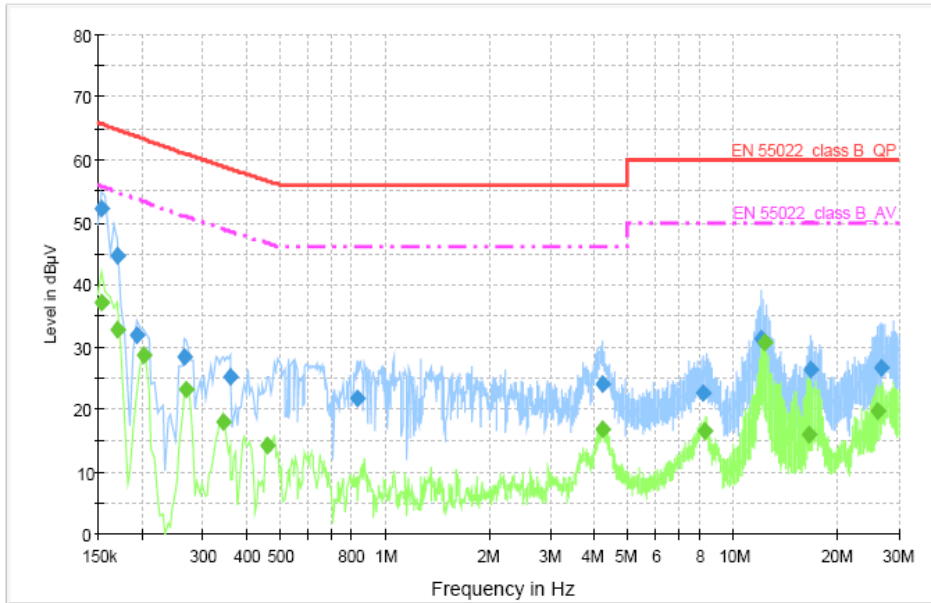
Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.150000	55.1	1000.000	9.000	GND	L1	9.9	10.9	66.0	
0.174000	44.0	1000.000	9.000	GND	L1	9.9	20.7	64.7	
0.270000	32.1	1000.000	9.000	GND	L1	10.0	28.8	60.9	
0.342000	29.9	1000.000	9.000	GND	L1	10.0	29.1	59.0	
0.478000	26.6	1000.000	9.000	GND	L1	10.0	29.7	56.3	
0.790000	24.8	1000.000	9.000	GND	L1	10.0	31.2	56.0	
0.862000	24.1	1000.000	9.000	GND	L1	10.0	31.9	56.0	
1.390000	20.9	1000.000	9.000	GND	L1	10.0	35.1	56.0	
1.966000	19.1	1000.000	9.000	GND	L1	10.1	36.9	56.0	
2.402000	19.9	1000.000	9.000	GND	L1	10.1	36.1	56.0	
3.866000	22.3	1000.000	9.000	GND	L1	10.2	33.7	56.0	
12.266000	31.2	1000.000	9.000	GND	L1	10.4	28.8	60.0	
17.282000	24.3	1000.000	9.000	GND	L1	10.7	35.7	60.0	
26.454000	26.3	1000.000	9.000	GND	L1	11.0	33.7	60.0	

### Final Measurement Detector 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.150000	41.0	1000.000	9.000	GND	L1	9.9	15.0	56.0	
0.198000	34.5	1000.000	9.000	GND	L1	9.9	19.0	53.5	
0.262000	26.7	1000.000	9.000	GND	L1	10.0	24.4	51.1	
0.342000	21.6	1000.000	9.000	GND	L1	10.0	27.3	48.9	
0.550000	15.0	1000.000	9.000	GND	L1	10.0	31.0	46.0	
0.618000	16.9	1000.000	9.000	GND	L1	10.0	29.1	46.0	
3.754000	13.7	1000.000	9.000	GND	L1	10.2	32.3	46.0	
11.106000	18.8	1000.000	9.000	GND	L1	10.3	31.2	50.0	
12.362000	29.9	1000.000	9.000	GND	L1	10.5	20.1	50.0	
16.550000	24.0	1000.000	9.000	GND	L1	10.7	26.0	50.0	
26.454000	19.7	1000.000	9.000	GND	L1	11.0	30.3	50.0	



### 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
0.154000	52.2	1000.000	9.000	GND	N	9.9	13.6	65.8	
0.170000	44.5	1000.000	9.000	GND	N	9.9	20.4	64.9	
0.194000	32.0	1000.000	9.000	GND	N	9.9	31.7	63.7	
0.266000	28.4	1000.000	9.000	GND	N	10.0	32.6	61.0	
0.358000	25.3	1000.000	9.000	GND	N	10.0	33.3	58.6	
0.830000	21.8	1000.000	9.000	GND	N	10.0	34.2	56.0	
4.218000	24.1	1000.000	9.000	GND	N	10.2	31.9	56.0	
8.222000	22.7	1000.000	9.000	GND	N	10.3	37.3	60.0	
12.070000	31.3	1000.000	9.000	GND	N	10.4	28.7	60.0	
16.754000	26.4	1000.000	9.000	GND	N	10.6	33.6	60.0	
26.760000	26.8	1000.000	9.000	GND	N	10.8	33.2	60.0	

### Final Measurement Detector 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.154000	37.2	1000.000	9.000	GND	N	9.9	18.6	55.8	
0.170000	32.8	1000.000	9.000	GND	N	9.9	22.1	54.9	
0.202000	28.6	1000.000	9.000	GND	N	9.9	24.7	53.3	
0.270000	23.2	1000.000	9.000	GND	N	10.0	27.7	50.9	
0.342000	17.8	1000.000	9.000	GND	N	10.0	31.1	48.9	
0.458000	14.3	1000.000	9.000	GND	N	10.0	32.4	46.7	
4.214000	16.7	1000.000	9.000	GND	N	10.2	29.3	46.0	
8.262000	16.4	1000.000	9.000	GND	N	10.3	33.6	50.0	
12.366000	30.7	1000.000	9.000	GND	N	10.4	19.3	50.0	
16.514000	16.0	1000.000	9.000	GND	N	10.6	34.0	50.0	
26.210000	19.7	1000.000	9.000	GND	N	10.8	30.3	50.0	



## 6. Radiated Emission

### 6.1 Operating Environment

Temperature : 22 °C  
Relative Humidity : 40 % R.H.

### 6.2 Test Set-up

A preliminary scan with peak mode was performed in the semi anechoic chamber and found frequency for open area test site.

The formal radiated emission was measured at 3 m / 10 m distance open area test site.

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	Uncertainty	Remark
Radiated emission (30 MHz ~ 300 MHz, 3 m, Vertical)	± 3.54 dB	Confidence levels of 95 % (k=2)
Radiated emission (30 MHz ~ 300 MHz, 3 m, Horizontal)	± 3.49 dB	Confidence levels of 95 % (k=2)
Radiated emission (300 MHz ~ 1 000 MHz, 3 m, Vertical)	± 3.85 dB	Confidence levels of 95 % (k=2)
Radiated emission (300 MHz ~ 1 000 MHz, 3 m, Horizontal)	± 3.76 dB	Confidence levels of 95 % (k=2)
Radiated emission (30 MHz ~ 300 MHz, 10 m, Vertical)	± 3.21 dB	Confidence levels of 95 % (k=2)
Radiated emission (30 MHz ~ 300 MHz, 10 m, Horizontal)	± 3.32 dB	Confidence levels of 95 % (k=2)
Radiated emission (300 MHz ~ 1 000 MHz, 10 m, Vertical)	± 3.77 dB	Confidence levels of 95 % (k=2)
Radiated emission (300 MHz ~ 1 000 MHz, 10 m, Horizontal)	± 3.84 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
■ - ESI	Rohde & Schwarz	EMI test receiver	830482/010	12. 14. 2009
■ - VULB9160	Schwarzbeck	Broaband test antenna	3193	12. 11. 2009
■ - BBHA9120D	Schwarzbeck	Horn ANT	207	12. 26. 2009
■ - MCU066	maturo GmbH	Position Controller	100/692/01	N/A
■ - AM4.0	maturo GmbH	Turntable	415/657/01	N/A
■ - TT2.5SI	maturo GmbH	Antenna Mast	240/565/01	N/A
■ - AFS 44 00101800- 25-10P-44	MITEQ	Preamplifier	1258943	11. 11. 2009

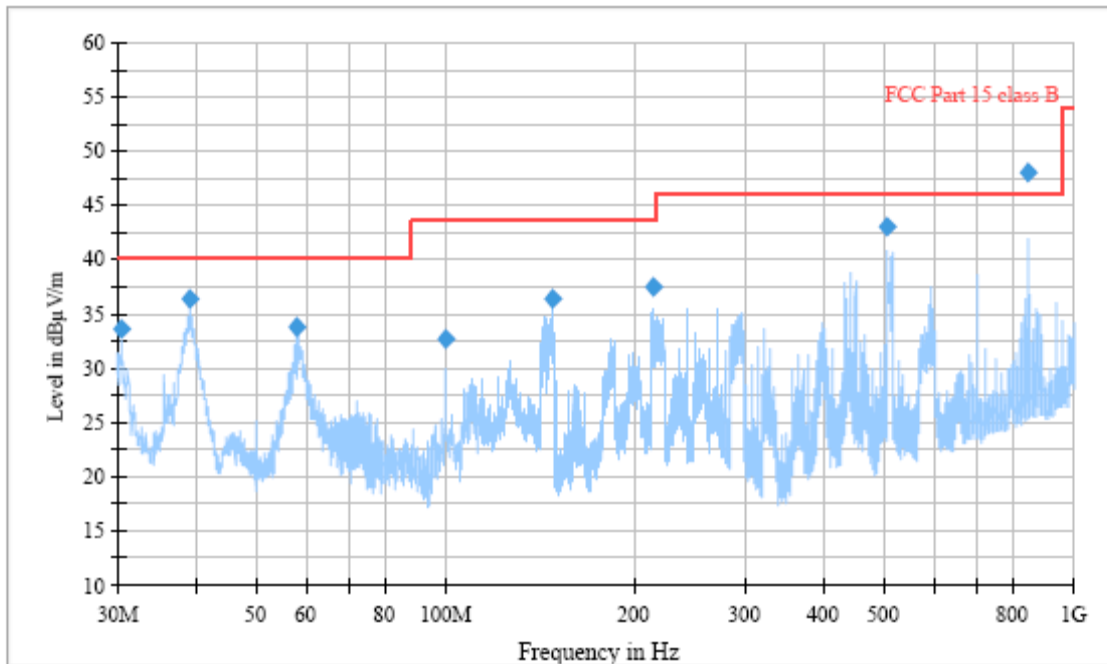
#### 6.6 Test data for Radiated Emission

- Test Date : April 30, 2009
- Resolution Bandwidth : 120 kHz/ 1 MHz
- Frequency Range : 30 MHz ~ 2 000 MHz
- Measurement Distance : 3 m



- ◆ Operating Condition: 1 360 \* 768 / 60 Hz (RGB: Analog mode)  
 Detector mode: Quasi- peak detector mode

ESI\_Radiated Field Strength

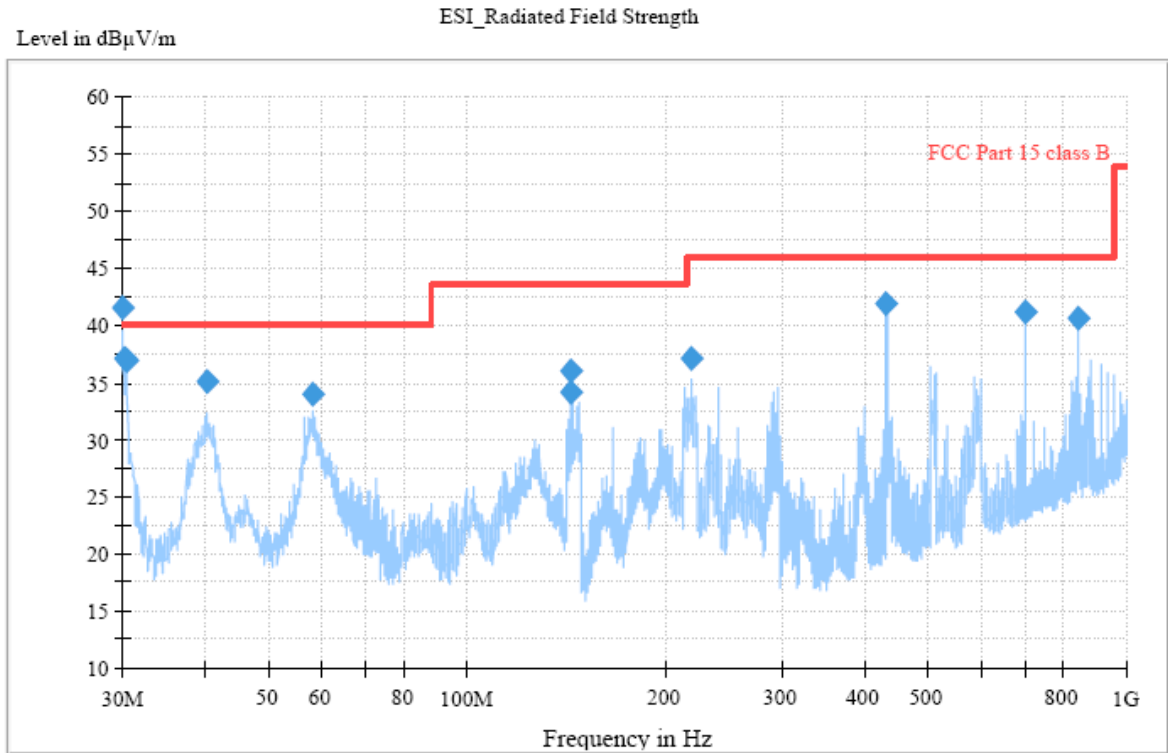


### Final Result 1

Frequency (MHz)	MaxPeak-ClearWrite (dBµV/m)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Q,P (dBµV/m)
30.400000	33.6	100.0	V	116.0	11.5	12.47	40.00	27.53
38.190000	34.6	100.0	V	275.0	12.0	7.91	40.00	32.09
58.000000	33.7	100.0	V	0.0	12.3	11.09	40.00	28.91
99.750000	32.6	200.0	H	162.0	10.0	14.62	43.50	28.88
127.930000	31.4	100.0	V	171.0	12.9	17.69	43.50	25.81
149.570000	34.2	100.0	V	229.0	13.8	11.55	43.50	31.95
199.040000	34.7	120.0	V	262.0	11.4	12.68	43.50	30.82
300.690000	32.2	170.0	H	133.0	14.5	15.94	46.00	30.06
503.850000	43.0	100.0	V	185.0	19.3	6.60	46.00	39.40
842.500000	48.0	109.0	H	279.0	25.5	12.62	46.00	33.38



- ◆ Operating Condition: 1 360 \* 768 / 60 Hz (HDMI/DVI: Digital mode)  
 Detector mode: Quasi- peak detector mode



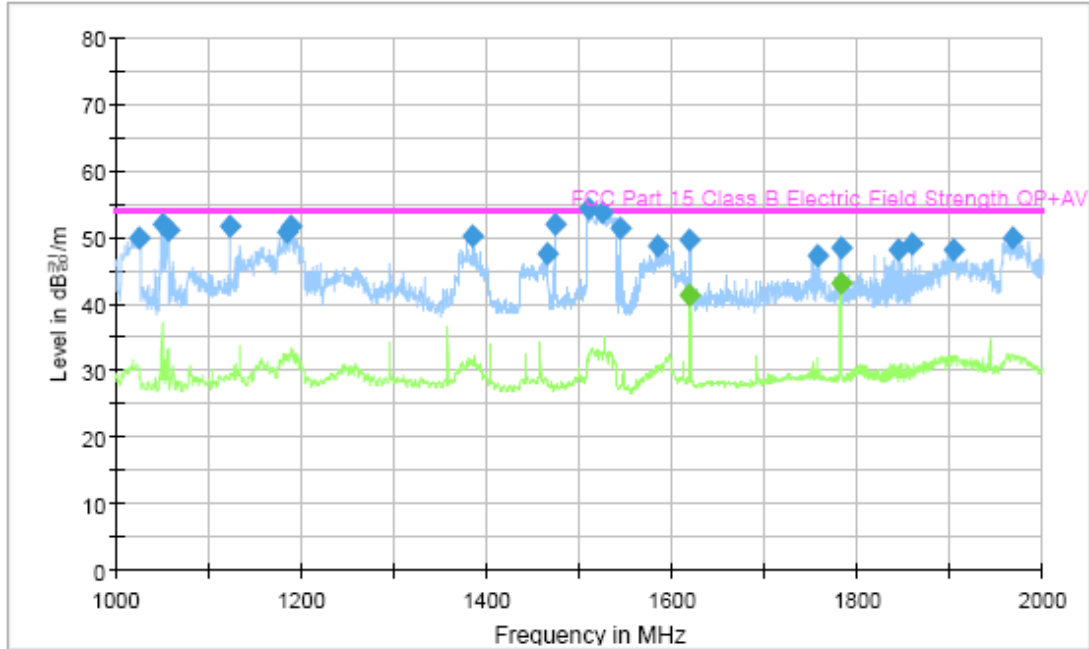
### Final Result 1

Frequency (MHz)	MaxPeak-ClearWrite (dBµV/m)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Q.P (dBµV/m)
30.000000	41.6	100.0	V	270.0	11.5	4.07	40.00	35.93
30.250000	37.2	100.0	V	270.0	11.5	---	40.00	---
30.350000	37.0	100.0	V	270.0	11.5	---	40.00	---
40.350000	35.2	100.0	V	45.8	12.1	6.77	40.00	33.23
58.300000	34.1	100.0	V	0.0	12.2	10.8	40.00	29.2
143.970000	34.2	100.0	V	342.0	13.8	5.46	43.50	28.04
144.000000	35.9	100.0	V	0.0	13.8	10.37	43.50	33.13
218.550000	37.1	100.0	H	108.0	11.5	14.37	46.00	31.63
431.500000	42.0	100.0	V	180.0	18.0	8.82	46.00	37.18
702.000000	41.2	100.0	H	270.0	23.1	3.82	46.00	42.18
842.750000	40.7	200.0	V	0.0	25.5	8.75	46.00	37.25



- ◆ Operating Condition: 1 360 \* 768 / 60 Hz (RGB: Analog mode)  
 Detector mode: Peak detector mode / Average detector mode

ESIB\_Preamplifier\_RE with Scans



### Final Result 1

Frequency (MHz)	MaxPeak-MaxHold (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
1024.800000	50.0	200.0	V	180.0	-15.8	23.9	73.9	
1050.800000	51.9	150.0	V	0.0	-15.7	22.0	73.9	
1056.400000	51.2	150.0	V	0.0	-15.6	22.7	73.9	
1124.000000	51.7	150.0	V	270.0	-15.4	22.2	73.9	
1184.800000	50.7	100.0	H	180.0	-15.2	23.2	73.9	
1190.000000	51.7	100.0	H	180.0	-15.2	22.2	73.9	
1384.800000	50.3	150.0	V	180.0	-14.4	23.6	73.9	
1466.000000	47.6	150.0	H	180.0	-14.2	26.3	73.9	
1474.000000	51.8	100.0	V	0.0	-14.2	22.1	73.9	
1509.600000	54.4	150.0	H	180.0	-14.1	19.5	73.9	
1526.000000	53.6	150.0	H	180.0	-14.0	20.3	73.9	
1544.400000	51.2	200.0	H	0.0	-13.9	22.7	73.9	
1585.600000	48.8	150.0	H	180.0	-13.7	25.1	73.9	
1620.000000	49.7	200.0	V	180.0	-13.6	24.2	73.9	
1758.000000	47.3	100.0	V	180.0	-13.3	26.6	73.9	
1782.000000	48.3	200.0	V	180.0	-13.2	25.6	73.9	
1845.600000	48.1	100.0	V	180.0	-13.0	25.8	73.9	
1860.000000	49.1	100.0	V	180.0	-13.0	24.8	73.9	
1904.400000	48.2	100.0	V	180.0	-13.0	25.7	73.9	
1967.200000	49.9	150.0	V	180.0	-12.7	24.0	73.9	

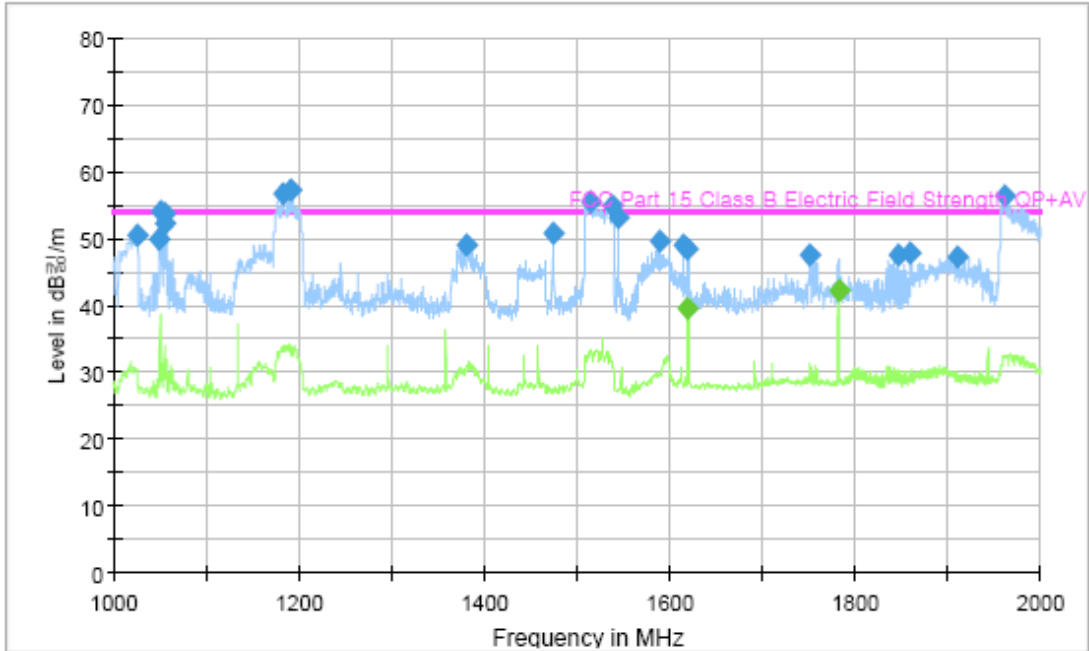
### Final Result 2

Frequency (MHz)	Average-MaxHold (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
1620.000000	41.2	200.0	V	180.0	-13.6	12.7	53.9	
1782.000000	43.2	150.0	V	180.0	-13.2	10.7	53.9	



- ◆ Operating Condition: 1 360 \* 768 / 60 Hz (HDMI/DVI: Digital mode)  
 Detector mode: Peak detector mode / Average detector mode

ESIB\_Preamplifier with Scans



### Final Result 1

Frequency (MHz)	MaxPeak-MaxHold (dBμV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
1026.000000	50.5	200.0	V	180.0	-15.8	23.4	73.9	
1048.400000	49.8	150.0	V	0.0	-15.7	24.1	73.9	
1050.000000	53.9	150.0	V	0.0	-15.7	20.0	73.9	
1054.400000	52.1	150.0	V	0.0	-15.7	21.8	73.9	
1055.600000	53.8	150.0	V	0.0	-15.6	20.1	73.9	
1182.000000	56.7	100.0	H	180.0	-15.3	17.2	73.9	
1191.200000	57.2	100.0	H	180.0	-15.2	16.7	73.9	
1381.200000	48.9	150.0	V	180.0	-14.4	25.0	73.9	
1474.400000	50.7	150.0	H	0.0	-14.2	23.2	73.9	
1514.800000	55.4	150.0	H	180.0	-14.1	18.5	73.9	
1538.800000	54.8	150.0	H	180.0	-14.0	19.1	73.9	
1544.400000	53.1	150.0	V	0.0	-13.9	20.8	73.9	
1588.800000	49.5	150.0	H	180.0	-13.7	24.4	73.9	
1614.800000	49.0	150.0	H	0.0	-13.6	24.9	73.9	
1620.000000	48.4	200.0	V	180.0	-13.6	25.5	73.9	
1751.600000	47.4	100.0	V	180.0	-13.3	26.5	73.9	
1846.000000	47.6	100.0	V	180.0	-13.0	26.3	73.9	
1860.400000	47.8	100.0	V	180.0	-13.0	26.1	73.9	
1909.600000	47.3	100.0	V	180.0	-13.0	26.6	73.9	
1962.400000	56.5	150.0	V	180.0	-12.7	17.4	73.9	

### Final Result 2

Frequency (MHz)	Average-MaxHold (dBμV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
1620.000000	39.7	200.0	V	180.0	-13.6	14.2	53.9	
1782.000000	42.1	150.0	V	180.0	-13.2	11.8	53.9	



## 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

$$\begin{aligned} \text{Class B Limit} &= 250 \mu\text{V} &= 48 \text{ dB}\mu\text{V} \\ \text{Reading} &= -67.8 \text{ dBm (Calibrated level)} \\ \text{Convert to dB}\mu\text{V} &= -67.8 \text{ dBm} + 107 &= 39.2 \text{ dB}\mu\text{V} \\ 10^{(39.2 \text{ dB}\mu\text{V}/20)} &= 91.2 \mu\text{V} \\ \text{Margin} &= 39.2 - 48 &= -8.8 \\ &= 8.8 \text{ dB below Limit} \end{aligned}$$

### 7.2 Example 2 :

#### ■ 66.7 MHz

$$\begin{aligned} \text{Class B Limit} &= 100 \mu\text{V}/\text{m} &= 40.0 \text{ dB}\mu\text{V}/\text{m} \\ \text{Reading} &= -76.0 \text{ dBm (Calibrated level)} \\ \text{Convert to dB}\mu\text{V}/\text{m} &= -76.8 \text{ dBm} + 107 &= 31.0 \text{ dB}\mu\text{V}/\text{m} \\ \text{Antenna Factor + Cable Loss} &= 5.8 \text{ dB} \\ \text{Total} &= 36.8 \text{ dB}\mu\text{V}/\text{m} \\ \text{Margin} &= 36.8 - 40.0 &= -3.2 \\ &= 3.2 \text{ dB below Limit} \end{aligned}$$



## 8. Recommendation & Conclusion

The data collected shows that the **LG Electronics Inc. LCD TV/Monitor (Model Name: 32CL20-UA)** was complies with §15.107 and 15.109 of the FCC Rules.