



FCC EVALUATION REPORT FOR CERTIFICATION

Manufacturer : KIMIN ELECTRONIC CO., LTD.

Date of Issue : May 11 , 2009

293-4, Gongdan -dong, Gumi-si,

Order Number: GETEC-C1-09-109

Gyeongbuk, Korea.

Test Report Number: GETEC-E3-09-055

Attn : Mr. Se-bong Jang, General Manager

Test Site: Gumi College EMC Center

FCC Registration Number: (100749, 443957)

FCC ID.: TGELT47U5

Applicant: KIMIN ELECTRONIC CO., LTD.

Rule Part(s)	: FCC Part 15 Subpart B
Equipment Class	: Class B computing device peripheral (JBP)
EUT Type	: LCD TV/Monitor
Type of Authority	: Certification
Model Name(Brand Name)	: LT47U53P (KIMIN), HLD-47SAT (HCT)

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: KIMIN ELECTRONIC CO., LTD.
Applicant Address: 293-4, Gongdan-dong, Gumi-si, Gyeongbuk, Korea.
Manufacturer: KIMIN ELECTRONIC CO., LTD.
Manufacturer Address: 293-4, Gongdan-dong, Gumi-si, Gyeongbuk, Korea.
Contact Person: Mr. Se-bong Jang, General Manager
Tel Number: +82-54-462-0100
Fax Number: +82-54-462-7500

- **FCC ID.** TGELT47U5
- **EUT Type** LCD TV/Monitor
- **Model Name(Brand Name)** LT47U53P (KIMIN), HLD-47SAT (HCT)
- **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 6 ~ 8, 2009
- **Place of Test** **Gumi College EMC Center** (FCC Registration No.: 100749, 443957)
407, Bugok-dong, Gumi-si, Gyeongbuk, Korea
- **Test Report Number** GETEC-E3-09-055
- **Dates of Issue** May 11, 2009



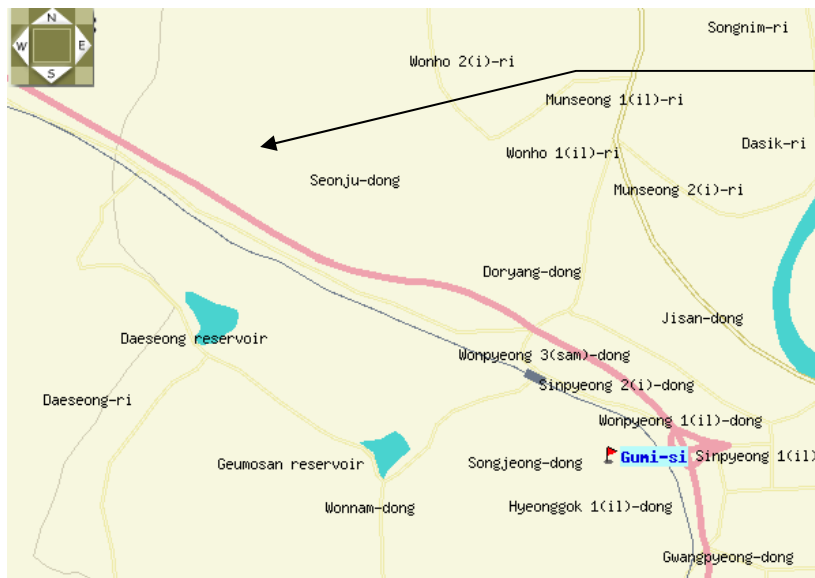
2. Introduction

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 **KIMIN ELECTRONIC CO., LTD. LCD TV/Monitor (Model Name: LT47U53P, HLD-47SAT)**

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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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 **KIMIN ELECTRONIC CO., LTD. LCD TV/Monitor (Model Name: LT47U53P, HLD-47SAT) FCC ID.: TGELT47U5**

Model	HLD-47SAT
Dimension (Width x Hight x Depth)	1140mm (44.88") x 740mm (97.63") x 248mm (29.13")
Weight (kg / lbs)	29.7 kg (65.47 lbs)
Broadcast Signal System	ATSC / NTSC
Receiving Channel	Air : 2 ~ 69, Cable : 1 ~ 135
Contrast Ratio	1,000:1
Brightness	500 cd/m ²
Panel Resolution	1920 (H) x 1080 (V)
Power Rating	AC100-240V ~50/60Hz
Consumption	300W
Audio Output	10W + 10W
Operating Temperature	0°C ~ 40°C
Accessories	<ul style="list-style-type: none">• Batteries• Power Cord• Plug Adaptor (UL to VDE)• Owner's Manual• Remote
External Port	<ul style="list-style-type: none">• 5 x HDMI• RGB IN(PC)• 2 x COMPONENT IN• S-VIDEO IN• AV IN• AUDIO IN (RGB / DVI)• ANTENNA / CABLE IN• DIGITAL AUDIO OUT (COAXIAL)• AC IN

LCD Panel : LC470WX1 (LG Philips LCD)

TV Tuner : DTV S205ER201A (SAMSUNG)

Maximum Frequency range : 166 MHz



3.2 Support Equipment / Cables used

3.2.1 Used Support Equipment

Description	Manufacturer	Model Name	S/N & FCC ID
PC	Hewlett Packard	D530	S/N: CNG34800PY FCC ID: DoC
Video card	ATI	ATI RV360(9600)	S/N: SN0402017176 FCC ID: DoC
Key-board	COMPAQ	166516-AD6	S/N: B13BBOR391006D FCC ID: AQ6-23K15
Serial mouse	LOGITECH	M-S69	S/N: 334684-108 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	PI International	TPG430B	S/N: 93.01.20.05.09.00.00.02 FCC ID: DoC
8-VSB modulator	Telecommunication Inc.	VSB-ENC-150E	S/N: 2005-726 FCC ID: DoC

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



3.2.2 Used Cable(s)

Cable Name	Condition	Description
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 with a ferrite core
AV input cable	Connected to the EUT and DVD player	1.8 m shielded with two ferrite cores
Component cable	Connected to the EUT and DVD player	3.0 m shielded with two ferrite cores
Component sound cable	Connected to the EUT and DVD player	3.0 m shielded with two ferrite cores
S-video cable	Connected to the EUT and DVD player	1.8 m shielded
Antenna cable	Connected to the EUT and TV signal generator	10 m shielded with two ferrite cores
Digital audio out	Connected to the EUT and DVD player	1.8 m shielded

3.3 Modification Item(s)

- None



4. Description of tests

4.1 Test Condition

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

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

- Test Voltage / Frequency : AC 120 V / 60 Hz
- Test Mode(s)
 - . Monitor mode
 - . Radiated emission : 1 024 * 768 / 60 Hz (RGB_Analog), 1 024 * 768 / 60 Hz (HDMI/DVI_Digital)
 - . Conducted emission : 1 024 * 768 / 60 Hz (RGB_Analog), 1 024 * 768 / 60 Hz (HDMI/DVI_Digital)
800 * 600 / 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.
- TV & AV portion of this equipment will be applied the “Verification” procedure.



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

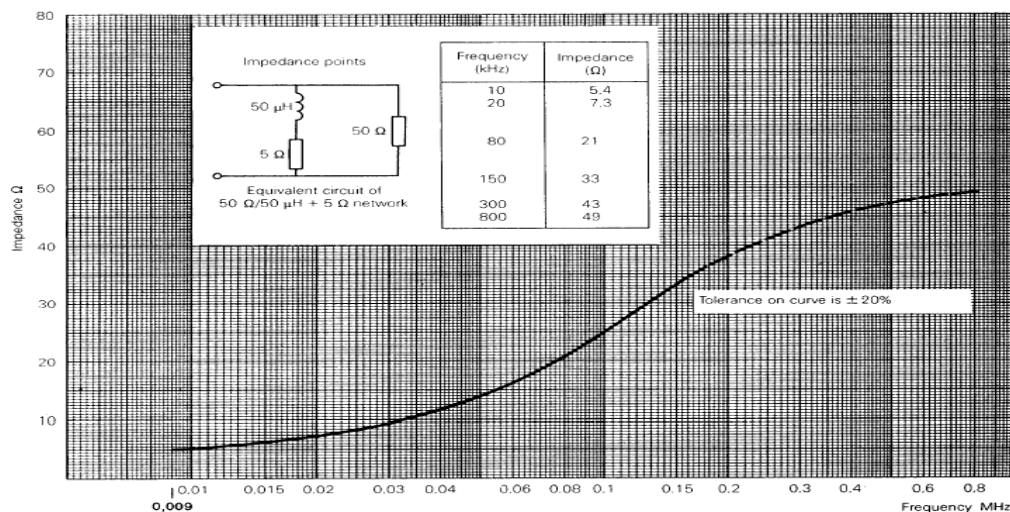


Fig 2. Impedance of LISN



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 biconical log antenna (Schwarzbeck, VULB9160).

Above 1 GHz, 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 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 1MHz 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 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

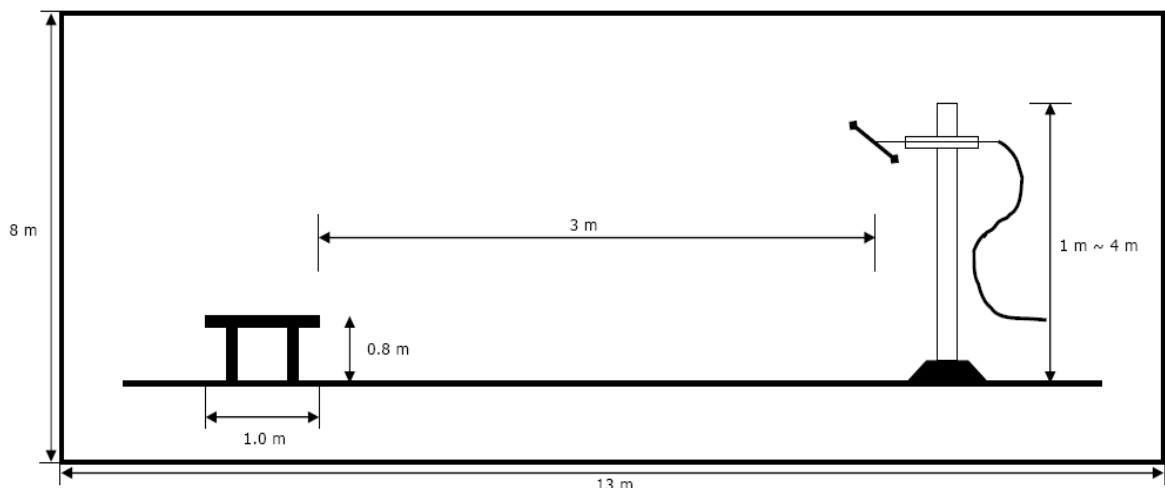


Fig 3. Dimensions of test site.



5. Conducted Emission

5.1 Operating Environment

Temperature : 25 °C
Relative Humidity : 36 % 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	
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. 13. 2009
■ - ESH3-Z5	Rohde & Schwarz	LISN	838979/020	12. 12. 2009
■ - ESH2-Z5	Rohde & Schwarz	LISN	829991/009	12. 12. 2009

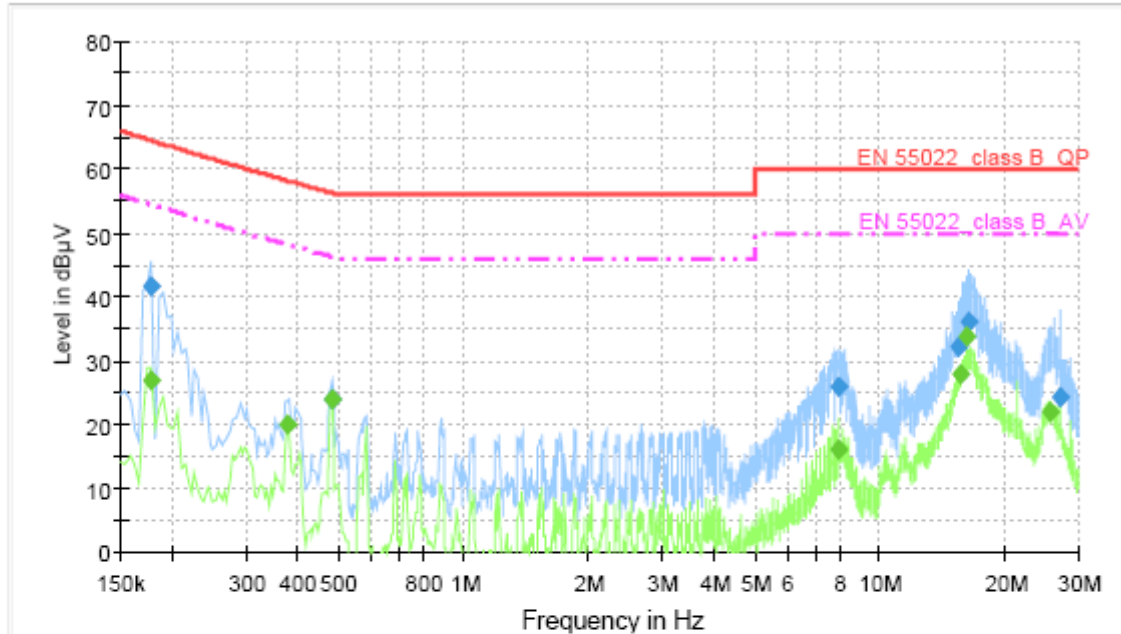
5.6 Test data for Conducted Emission

- Test Date : May 7, 2009
- Resolution Bandwidth : 9 kHz
- Frequency Range : 0.15 MHz ~ 30 MHz



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

Voltage with 4-Line-LISN L1



Final Measurement Detector 1

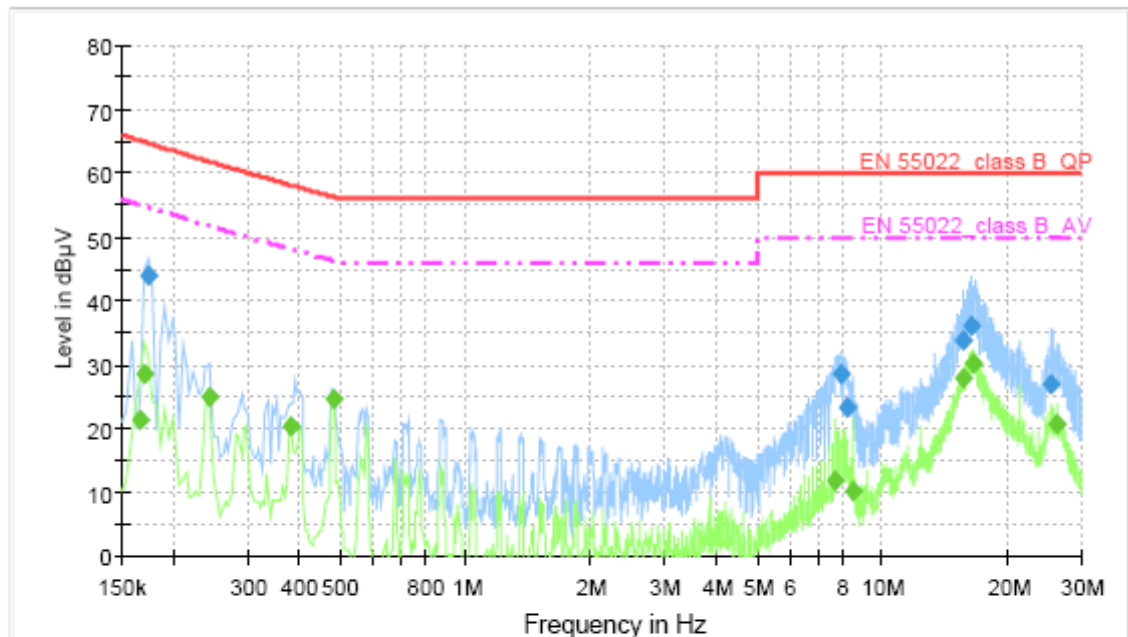
Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.178000	41.8	1000.000	9.000	GND	L1	9.9	22.7	64.5	
0.482000	24.1	1000.000	9.000	GND	L1	10.0	32.2	56.3	
7.962000	26.0	1000.000	9.000	GND	L1	10.3	34.0	60.0	
15.374000	32.0	1000.000	9.000	GND	L1	10.6	28.0	60.0	
16.306000	36.0	1000.000	9.000	GND	L1	10.7	24.0	60.0	
27.154000	24.4	1000.000	9.000	GND	L1	11.0	35.6	60.0	

Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.178000	26.9	1000.000	9.000	GND	L1	9.9	27.6	54.5	
0.378000	20.1	1000.000	9.000	GND	L1	10.0	28.1	48.2	
0.482000	24.0	1000.000	9.000	GND	L1	10.0	22.3	46.3	
7.958000	16.2	1000.000	9.000	GND	L1	10.3	33.8	50.0	
15.662000	27.9	1000.000	9.000	GND	L1	10.6	22.1	50.0	
16.230000	33.9	1000.000	9.000	GND	L1	10.7	16.1	50.0	
25.726000	22.0	1000.000	9.000	GND	L1	11.0	28.0	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
0.174000	43.8	1000.000	9.000	GND	N	9.9	20.9	64.7	
7.934000	28.4	1000.000	9.000	GND	N	10.3	31.6	60.0	
8.218000	23.3	1000.000	9.000	GND	N	10.3	36.7	60.0	
15.658000	33.6	1000.000	9.000	GND	N	10.6	26.4	60.0	
16.258000	36.2	1000.000	9.000	GND	N	10.6	23.8	60.0	
25.230000	26.9	1000.000	9.000	GND	N	10.8	33.1	60.0	

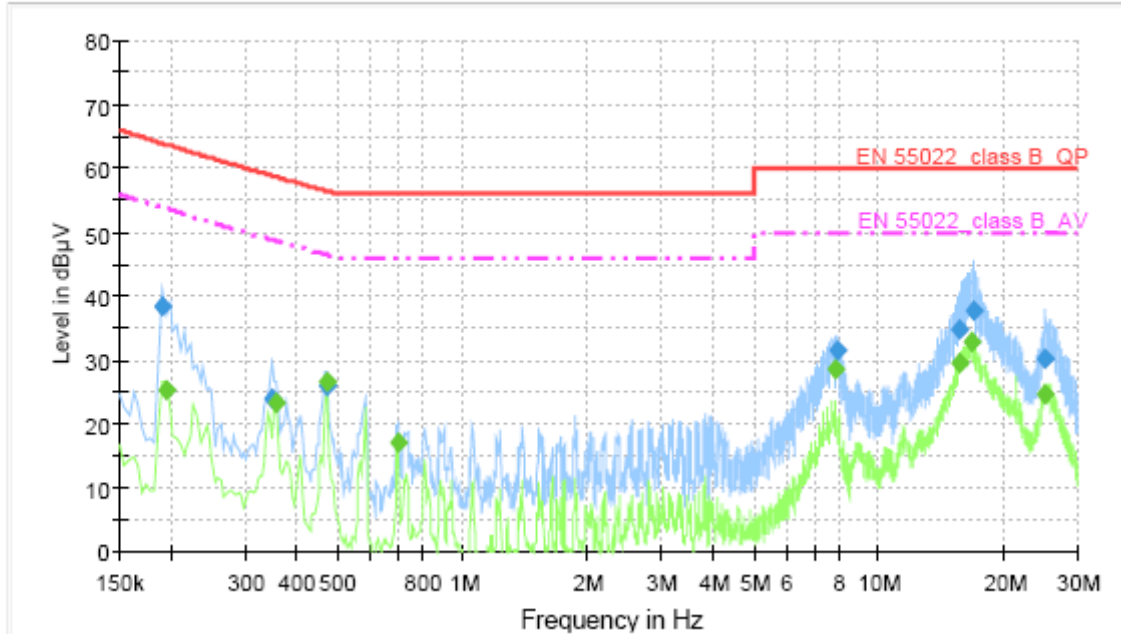
Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.166000	21.4	1000.000	9.000	GND	N	9.9	33.7	55.1	
0.170000	28.6	1000.000	9.000	GND	N	9.9	26.3	54.9	
0.242000	24.8	1000.000	9.000	GND	N	10.0	27.0	51.8	
0.382000	20.2	1000.000	9.000	GND	N	10.0	27.9	48.1	
0.482000	24.6	1000.000	9.000	GND	N	10.0	21.7	46.3	
7.706000	11.9	1000.000	9.000	GND	N	10.3	38.1	50.0	
8.478000	10.2	1000.000	9.000	GND	N	10.3	39.8	50.0	
15.658000	27.8	1000.000	9.000	GND	N	10.6	22.2	50.0	
16.574000	30.3	1000.000	9.000	GND	N	10.6	19.7	50.0	
26.214000	20.6	1000.000	9.000	GND	N	10.8	29.4	50.0	



◆ Test resolution: 1 024 * 768/ 60 Hz (HDMI/DVI: Digital mode)

Voltage with 4-Line-LISN L1



Final Measurement Detector 1

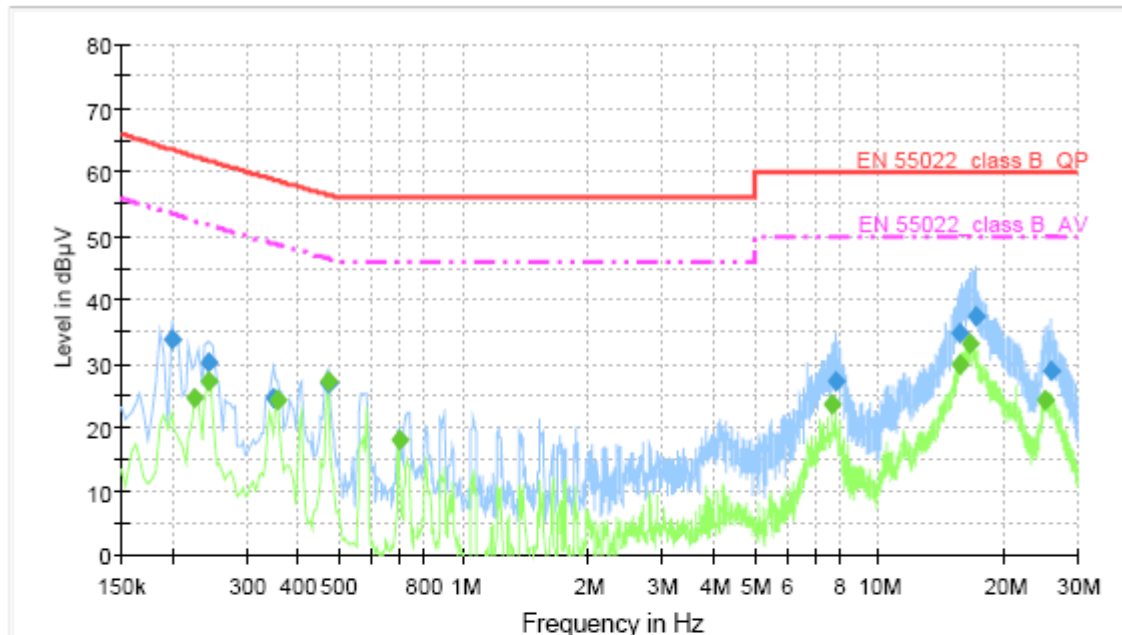
Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.190000	38.3	1000.000	9.000	GND	L1	9.9	25.6	63.9	
0.350000	23.8	1000.000	9.000	GND	L1	10.0	35.0	58.8	
0.470000	26.0	1000.000	9.000	GND	L1	10.0	30.5	56.5	
7.930000	31.4	1000.000	9.000	GND	L1	10.3	28.6	60.0	
15.650000	34.8	1000.000	9.000	GND	L1	10.6	25.2	60.0	
16.814000	37.7	1000.000	9.000	GND	L1	10.7	22.3	60.0	
25.038000	30.1	1000.000	9.000	GND	L1	11.0	29.9	60.0	

Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.194000	25.2	1000.000	9.000	GND	L1	9.9	28.5	53.7	
0.358000	23.4	1000.000	9.000	GND	L1	10.0	25.2	48.6	
0.470000	26.4	1000.000	9.000	GND	L1	10.0	20.1	46.5	
0.698000	17.1	1000.000	9.000	GND	L1	10.0	28.9	46.0	
7.878000	28.4	1000.000	9.000	GND	L1	10.3	21.6	50.0	
15.654000	29.5	1000.000	9.000	GND	L1	10.6	20.5	50.0	
16.622000	32.7	1000.000	9.000	GND	L1	10.7	17.3	50.0	
24.958000	24.6	1000.000	9.000	GND	L1	11.0	25.4	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
0.198000	33.7	1000.000	9.000	GND	N	9.9	29.8	63.5	
0.242000	30.3	1000.000	9.000	GND	N	10.0	31.5	61.8	
0.350000	24.7	1000.000	9.000	GND	N	10.0	34.1	58.8	
0.470000	26.8	1000.000	9.000	GND	N	10.0	29.7	56.5	
7.826000	27.3	1000.000	9.000	GND	N	10.3	32.7	60.0	
15.638000	34.8	1000.000	9.000	GND	N	10.6	25.2	60.0	
17.002000	37.3	1000.000	9.000	GND	N	10.6	22.7	60.0	
26.038000	28.8	1000.000	9.000	GND	N	10.8	31.2	60.0	

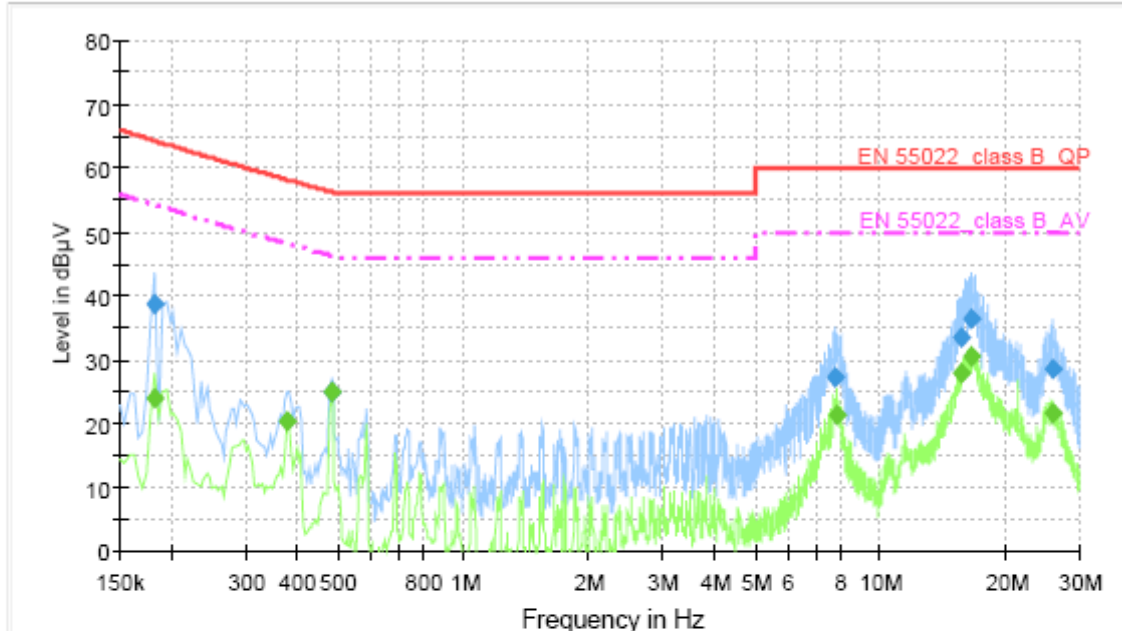
Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.226000	24.6	1000.000	9.000	GND	N	10.0	27.8	52.4	
0.242000	27.3	1000.000	9.000	GND	N	10.0	24.5	51.8	
0.358000	24.4	1000.000	9.000	GND	N	10.0	24.2	48.6	
0.470000	27.2	1000.000	9.000	GND	N	10.0	19.3	46.5	
0.698000	17.9	1000.000	9.000	GND	N	10.0	28.1	46.0	
7.670000	23.7	1000.000	9.000	GND	N	10.3	26.3	50.0	
15.678000	30.0	1000.000	9.000	GND	N	10.6	20.0	50.0	
16.578000	33.1	1000.000	9.000	GND	N	10.6	16.9	50.0	
25.194000	24.3	1000.000	9.000	GND	N	10.8	25.7	50.0	



◆ Test resolution: 800 * 600 / 60 Hz (RGB: Analog mode)

Voltage with 4-Line-LISN L1



Final Measurement Detector 1

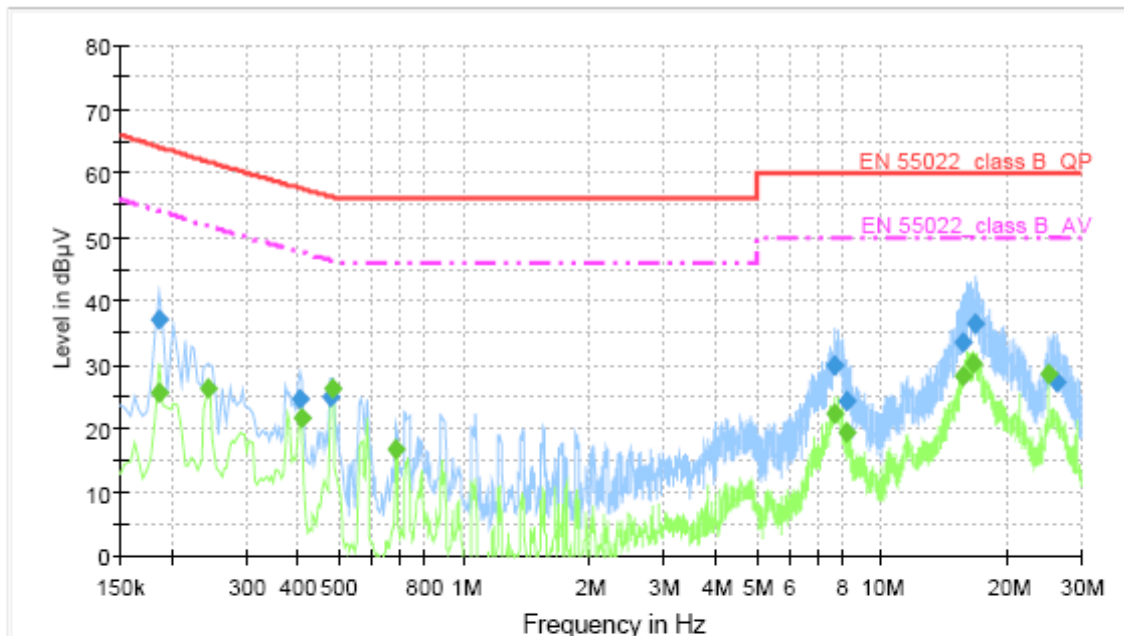
Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.182000	38.8	1000.000	9.000	GND	L1	9.9	25.5	64.3	
0.482000	24.8	1000.000	9.000	GND	L1	10.0	31.5	56.3	
7.794000	27.2	1000.000	9.000	GND	L1	10.3	32.8	60.0	
15.542000	33.3	1000.000	9.000	GND	L1	10.6	26.7	60.0	
16.490000	36.5	1000.000	9.000	GND	L1	10.7	23.5	60.0	
25.866000	28.6	1000.000	9.000	GND	L1	11.0	31.4	60.0	

Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.182000	24.0	1000.000	9.000	GND	L1	9.9	30.3	54.3	
0.378000	20.2	1000.000	9.000	GND	L1	10.0	28.0	48.2	
0.482000	25.0	1000.000	9.000	GND	L1	10.0	21.3	46.3	
7.830000	21.4	1000.000	9.000	GND	L1	10.3	28.6	50.0	
15.666000	28.0	1000.000	9.000	GND	L1	10.6	22.0	50.0	
16.586000	30.5	1000.000	9.000	GND	L1	10.7	19.5	50.0	
25.834000	21.6	1000.000	9.000	GND	L1	11.0	28.4	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
0.186000	37.1	1000.000	9.000	GND	N	9.9	27.0	64.1	
0.402000	24.7	1000.000	9.000	GND	N	10.0	33.0	57.7	
0.478000	24.9	1000.000	9.000	GND	N	10.0	31.4	56.3	
7.702000	29.9	1000.000	9.000	GND	N	10.3	30.1	60.0	
8.218000	24.2	1000.000	9.000	GND	N	10.3	35.8	60.0	
15.602000	33.3	1000.000	9.000	GND	N	10.6	26.7	60.0	
16.778000	36.3	1000.000	9.000	GND	N	10.6	23.7	60.0	
26.182000	27.1	1000.000	9.000	GND	N	10.8	32.9	60.0	

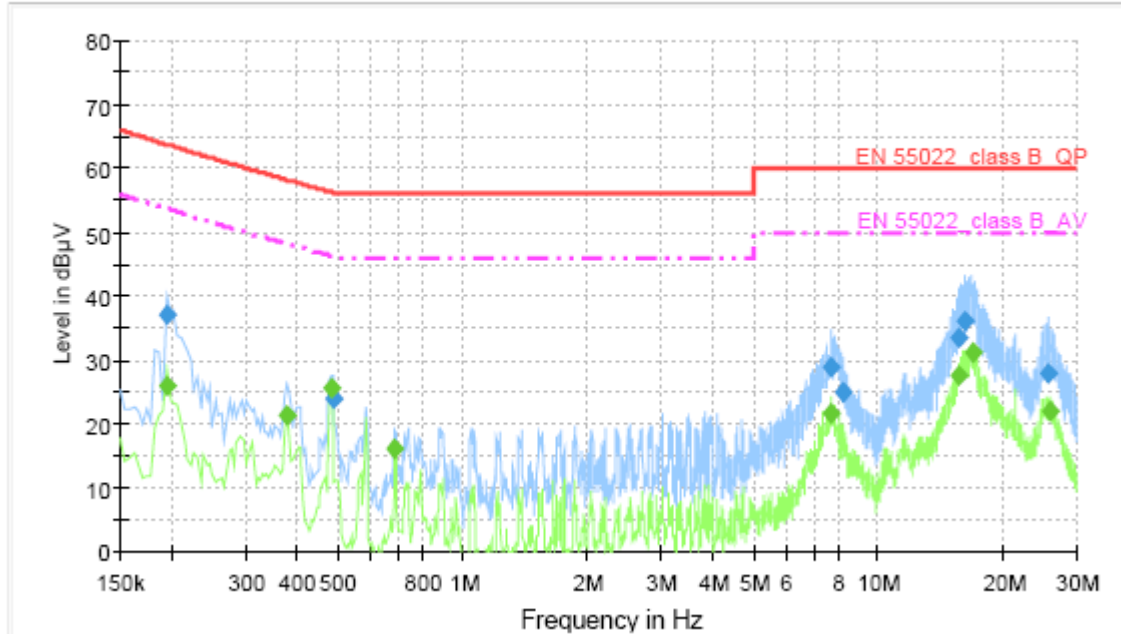
Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.186000	25.4	1000.000	9.000	GND	N	9.9	28.7	54.1	
0.242000	26.3	1000.000	9.000	GND	N	10.0	25.5	51.8	
0.406000	21.8	1000.000	9.000	GND	N	10.0	25.8	47.6	
0.482000	26.2	1000.000	9.000	GND	N	10.0	20.1	46.3	
0.686000	16.7	1000.000	9.000	GND	N	10.0	29.3	46.0	
7.682000	22.3	1000.000	9.000	GND	N	10.3	27.7	50.0	
8.194000	19.5	1000.000	9.000	GND	N	10.3	30.5	50.0	
15.678000	28.3	1000.000	9.000	GND	N	10.6	21.7	50.0	
16.490000	30.3	1000.000	9.000	GND	N	10.6	19.7	50.0	
25.002000	28.6	1000.000	9.000	GND	N	10.8	21.4	50.0	



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

Voltage with 4-Line-LISN L1



Final Measurement Detector 1

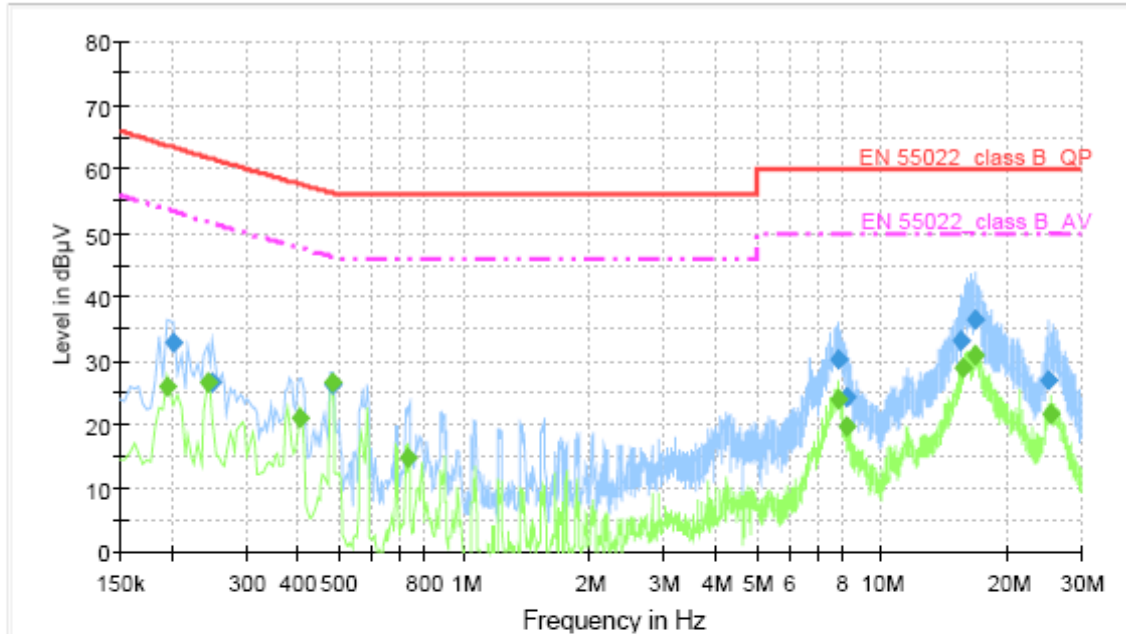
Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.194000	36.9	1000.000	9.000	GND	L1	9.9	26.8	63.7	
0.486000	23.9	1000.000	9.000	GND	L1	10.0	32.3	56.2	
7.694000	28.8	1000.000	9.000	GND	L1	10.3	31.2	60.0	
8.194000	25.0	1000.000	9.000	GND	L1	10.3	35.0	60.0	
15.586000	33.6	1000.000	9.000	GND	L1	10.6	26.4	60.0	
16.230000	36.0	1000.000	9.000	GND	L1	10.7	24.0	60.0	
25.550000	27.9	1000.000	9.000	GND	L1	11.0	32.1	60.0	

Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.194000	26.0	1000.000	9.000	GND	L1	9.9	27.7	53.7	
0.378000	21.2	1000.000	9.000	GND	L1	10.0	27.0	48.2	
0.482000	25.6	1000.000	9.000	GND	L1	10.0	20.7	46.3	
0.686000	15.9	1000.000	9.000	GND	L1	10.0	30.1	46.0	
7.698000	21.6	1000.000	9.000	GND	L1	10.3	28.4	50.0	
15.562000	27.7	1000.000	9.000	GND	L1	10.6	22.3	50.0	
16.902000	31.1	1000.000	9.000	GND	L1	10.7	18.9	50.0	
25.890000	21.9	1000.000	9.000	GND	L1	11.0	28.1	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
0.202000	32.6	1000.000	9.000	GND	N	9.9	30.8	63.4	
0.250000	26.5	1000.000	9.000	GND	N	10.0	35.1	61.6	
0.482000	26.1	1000.000	9.000	GND	N	10.0	30.2	56.3	
7.874000	30.3	1000.000	9.000	GND	N	10.3	29.7	60.0	
8.234000	24.4	1000.000	9.000	GND	N	10.3	35.6	60.0	
15.478000	33.1	1000.000	9.000	GND	N	10.6	26.9	60.0	
16.738000	36.3	1000.000	9.000	GND	N	10.6	23.7	60.0	
25.046000	26.9	1000.000	9.000	GND	N	10.8	33.1	60.0	

Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.194000	25.9	1000.000	9.000	GND	N	9.9	27.8	53.7	
0.242000	26.5	1000.000	9.000	GND	N	10.0	25.3	51.8	
0.402000	21.1	1000.000	9.000	GND	N	10.0	26.6	47.7	
0.482000	26.6	1000.000	9.000	GND	N	10.0	19.7	46.3	
0.734000	14.8	1000.000	9.000	GND	N	10.0	31.2	46.0	
7.862000	23.9	1000.000	9.000	GND	N	10.3	26.1	50.0	
8.202000	19.7	1000.000	9.000	GND	N	10.3	30.3	50.0	
15.678000	28.9	1000.000	9.000	GND	N	10.6	21.1	50.0	
16.790000	30.8	1000.000	9.000	GND	N	10.6	19.2	50.0	
25.334000	21.7	1000.000	9.000	GND	N	10.8	28.3	50.0	



6. Radiated Emission

6.1 Operating Environment

Temperature : 23 °C
Relative Humidity : 40 % 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	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 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
■ - ESI	Rohde & Schwarz	EMI test receiver	830482/010	12. 14. 2009
■ - VULB9160	Schwarzbeck	Broadband Test ANT	3193	12. 11. 2009
■ - BBHA9120D	Schwarzbeck	Horn ANT	207	12. 26. 2009
■ - MCU066	Maturo GmbH	Position Controller	1390306	N/A
■ - AM 4.0	Maturo GmbH	Turntable	1390308	N/A
■ - TT2.5SI	Maturo GmbH	Antenna Mast	1390307	N/A
■ - AFS 44 00101800- 25-10P-44	MITEQ	Preamplifier	1258943	11. 11. 2009

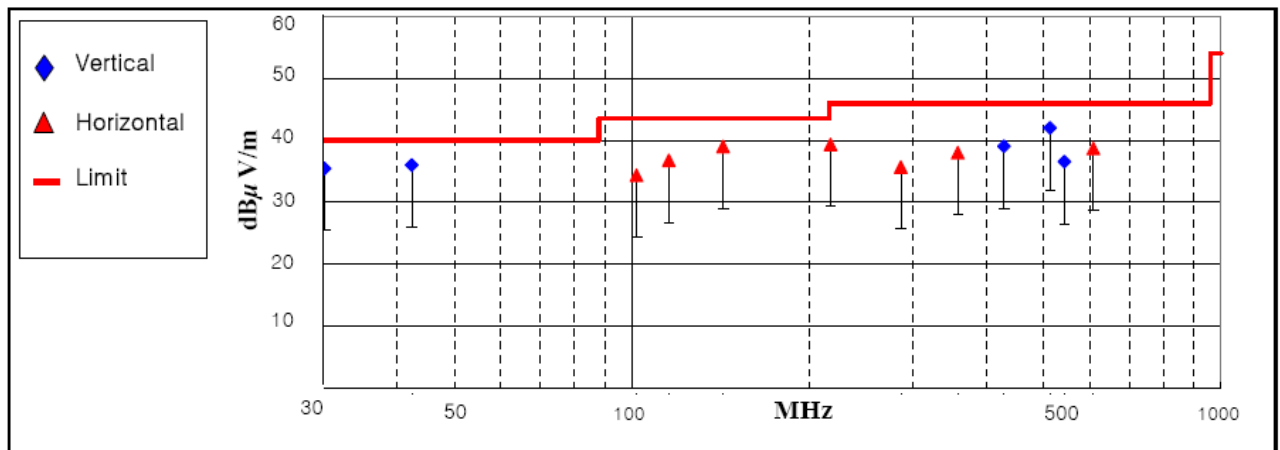
6.6 Test data for Radiated Emission

- Test Date : May 6, 2009
- Resolution Bandwidth : 120 kHz/ 1 MHz
- Frequency Range : 30 MHz ~ 2 000 MHz
- Measurement Distance : 3 m



- ◆ Operating Condition: 1 024 * 768/ 60 Hz (RGB: Analog mode)
Detector mode: Quasi- peak detector mode

Frequency (MHz)	Measurement Level				Limit (dB μ V/m)	Margin (dB)	Positioning System		
	Reading	Antenna	Cable	Test Result			Pol.	Height	Angle
	Value(dB μ V)	Factor(dB/m)	Loss(dB)	(dB μ V/m)			(H/V)	(cm)	(°)
30.15	23.42	11.02	1.00	35.44	40.00	4.56	V	106	163
42.35	22.99	11.75	1.25	35.99	40.00	4.01	V	100	177
101.99	23.38	9.26	1.70	34.34	43.50	9.16	H	301	180
115.73	24.27	10.73	1.77	36.77	43.50	6.73	H	295	259
142.99	24.43	12.64	1.94	39.01	43.50	4.49	H	313	262
217.58	26.79	9.99	2.53	39.31	46.00	6.69	H	212	188
286.25	20.42	12.30	2.94	35.66	46.00	10.34	H	241	243
357.77	20.86	13.96	3.19	38.01	46.00	7.99	H	200	173
428.48	19.91	15.66	3.45	39.02	46.00	6.98	V	105	166
513.00	21.28	17.03	3.71	42.02	46.00	3.98	V	166	180
607.55	15.23	19.27	4.16	38.66	46.00	7.34	H	250	191
542.33	15.03	17.73	3.79	36.55	46.00	9.45	V	102	95

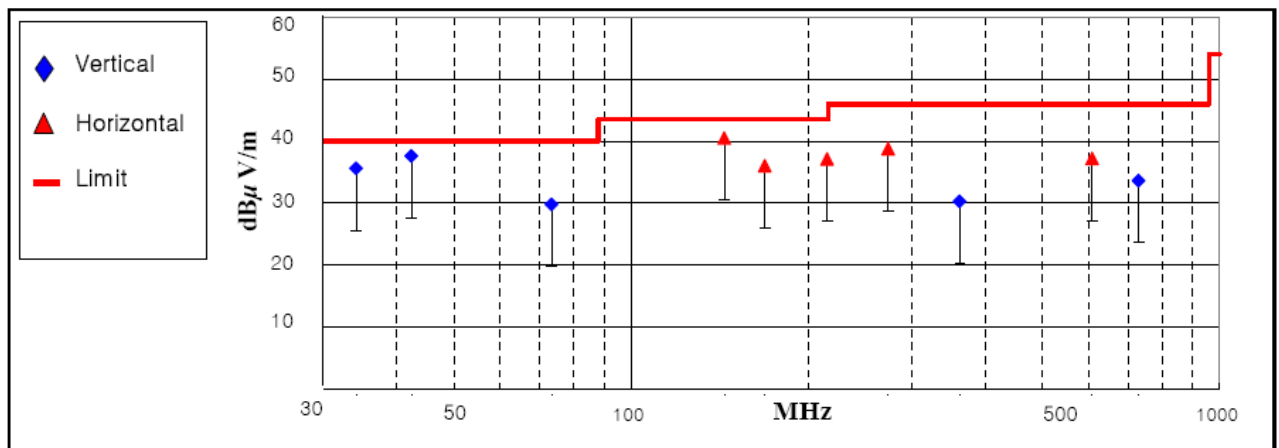


< Fig 4. Radiated emission result (30 MHz ~ 1 000 MHz)>



- ◆ Operating Condition: 1 024 * 768/ 60 Hz (HDMI/DVI: Digital mode)
Detector mode: Quasi- peak detector mode

Frequency (MHz)	Measurement Level				Limit (dB μ V/m)	Margin (dB)	Positioning System		
	Reading	Antenna	Cable	Test Result			Pol.	Height	Angle
	Value(dB μ V)	Factor(dB/m)	Loss(dB)	(dB μ V/m)			(H/V)	(cm)	(°)
34.14	23.62	10.90	1.09	35.61	40.00	4.39	V	103	256
42.35	24.61	11.75	1.25	37.61	40.00	2.39	V	122	110
73.32	18.98	9.06	1.73	29.77	40.00	10.23	V	100	349
143.99	25.91	12.64	1.97	40.52	43.50	2.98	H	296	255
168.80	21.83	11.91	2.28	36.02	43.50	7.48	H	301	261
215.40	24.69	9.91	2.52	37.12	43.50	6.38	H	103	250
273.60	23.97	11.91	2.88	38.76	46.00	7.24	H	115	350
361.49	13.02	14.03	3.21	30.26	46.00	15.74	V	195	177
607.56	13.79	19.27	4.16	37.22	46.00	8.78	H	200	173
728.50	8.04	20.80	4.75	33.59	46.00	12.41	V	195	159

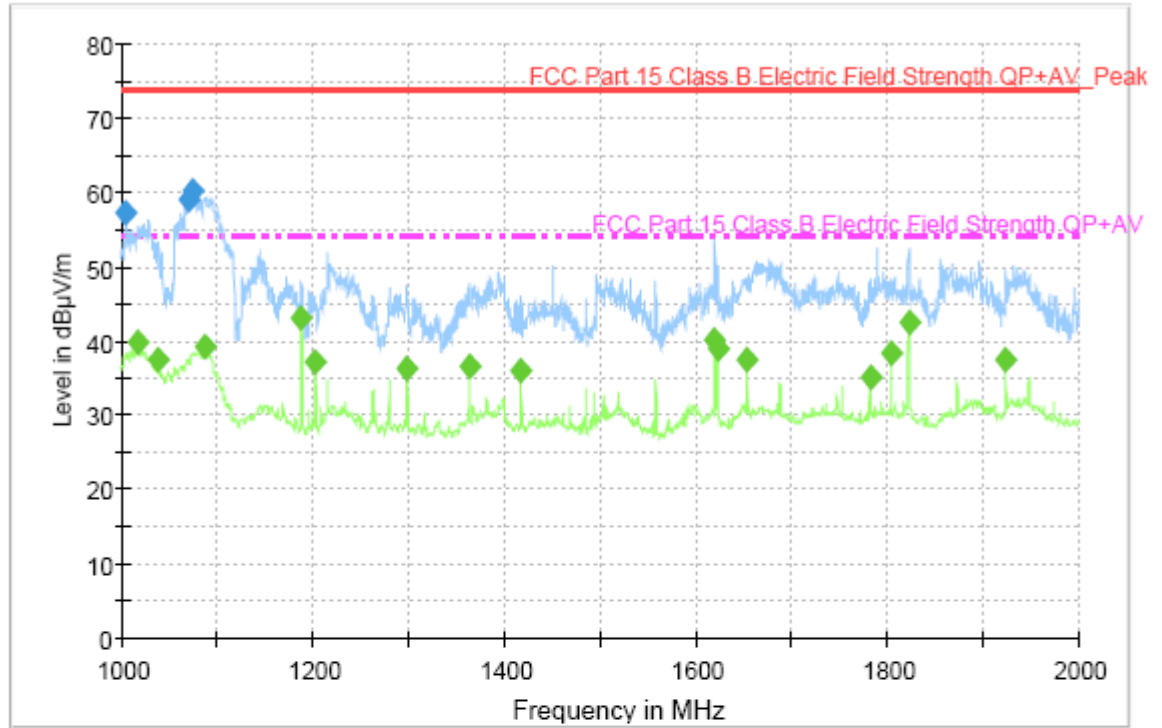


< Fig 5. Radiated emission result (30 MHz ~ 1 000 MHz)>



- ◆ Operating Condition: 1 024 * 768/ 60 Hz (RGB: Analog mode)
Detector mode: Peak detector mode / Average detector mode

FCC_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
1004.000000	57.1	200.0	V	180.0	-15.9	16.8	73.9	
1069.200000	59.0	100.0	V	180.0	-15.6	14.9	73.9	
1073.600000	60.3	100.0	V	180.0	-15.6	13.6	73.9	

Final Result 2

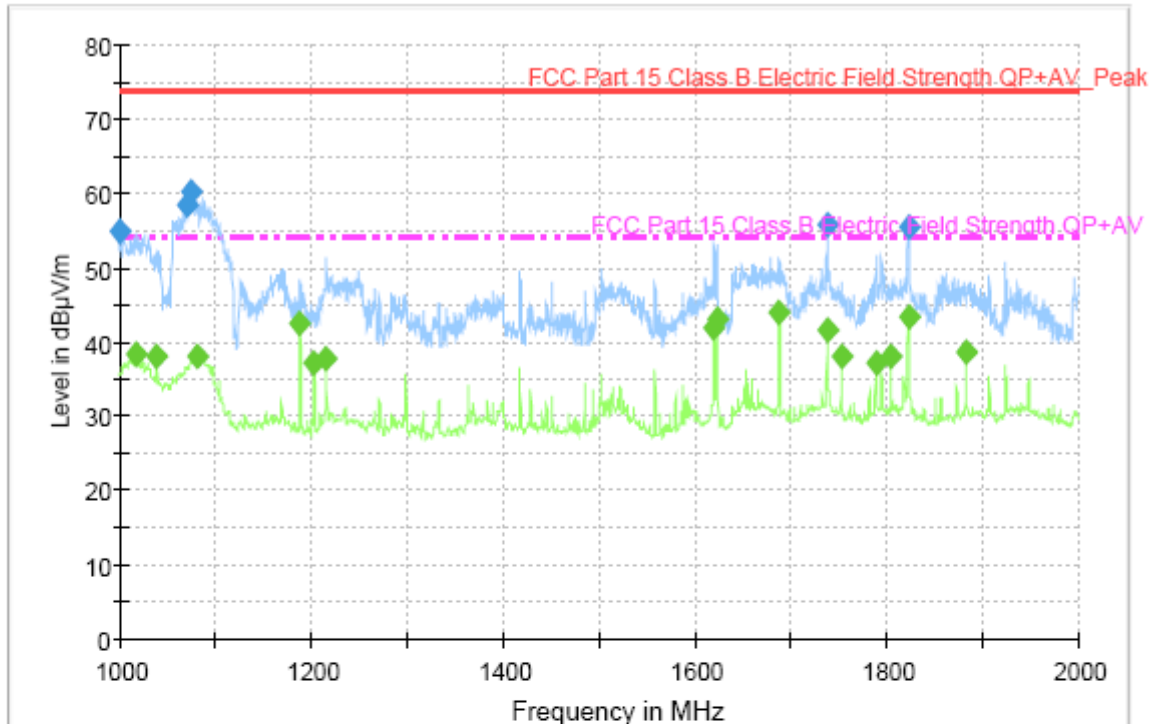
Frequency (MHz)	Average-MaxHold (dBμV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
1017.600000	39.7	200.0	V	180.0	-15.8	14.2	53.9	
1038.800000	37.5	200.0	V	180.0	-15.7	16.4	53.9	
1087.200000	39.2	100.0	V	180.0	-15.5	14.7	53.9	
1188.000000	43.1	100.0	V	0.0	-15.2	10.8	53.9	
1202.800000	37.1	200.0	V	0.0	-15.2	16.8	53.9	
1298.400000	36.3	200.0	V	180.0	-14.5	17.6	53.9	
1363.600000	36.6	200.0	V	180.0	-14.4	17.3	53.9	
1417.600000	36.1	100.0	V	180.0	-14.3	17.8	53.9	
1620.000000	40.2	100.0	H	180.0	-13.6	13.7	53.9	
1623.200000	39.0	200.0	V	180.0	-13.6	14.9	53.9	
1653.600000	37.5	100.0	V	0.0	-13.6	16.4	53.9	
1782.000000	35.0	200.0	V	0.0	-13.2	18.9	53.9	
1804.000000	38.3	100.0	H	90.0	-13.1	15.6	53.9	
1822.400000	42.4	100.0	V	180.0	-13.1	11.5	53.9	
1924.000000	37.4	100.0	V	180.0	-12.9	16.5	53.9	

< Fig 7. Radiated emission result (1 000 MHz ~ 2 000 MHz)>



- ◆ Operating Condition: 1 024 * 768/ 60 Hz (HDMI/DVI: Digital mode)
Detector mode: Peak detector mode / Average detector mode

FCC_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
1000.000000	55.0	200.0	V	180.0	-15.9	18.9	73.9	
1071.200000	58.4	100.0	V	180.0	-15.6	15.5	73.9	
1074.000000	60.2	100.0	V	180.0	-15.6	13.7	73.9	
1738.000000	55.7	100.0	H	180.0	-13.4	18.2	73.9	
1822.800000	55.5	100.0	V	180.0	-13.1	18.4	73.9	

Final Result 2

Frequency (MHz)	Average-MaxHold (dBμV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
1017.600000	38.4	200.0	V	180.0	-15.8	15.5	53.9	
1038.800000	38.1	100.0	H	90.0	-15.7	15.8	53.9	
1080.800000	38.2	100.0	V	180.0	-15.5	15.7	53.9	
1188.000000	42.4	100.0	V	0.0	-15.2	11.5	53.9	
1202.800000	37.3	200.0	V	0.0	-15.2	16.6	53.9	
1215.200000	37.7	200.0	H	180.0	-15.1	16.2	53.9	
1620.000000	41.8	100.0	H	180.0	-13.6	12.1	53.9	
1623.200000	43.2	300.0	V	180.0	-13.6	10.7	53.9	
1688.000000	44.0	100.0	V	180.0	-13.6	9.9	53.9	
1738.000000	41.5	100.0	H	180.0	-13.4	12.4	53.9	
1753.200000	38.1	200.0	V	180.0	-13.3	15.8	53.9	
1788.800000	37.1	100.0	H	180.0	-13.1	16.8	53.9	
1804.000000	37.9	100.0	H	90.0	-13.1	16.0	53.9	
1822.400000	43.5	100.0	V	180.0	-13.1	10.4	53.9	
1882.800000	38.8	200.0	V	180.0	-13.0	15.1	53.9	

< Fig 8. 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	=	- 67.8 dBm(Calibrated level)		
Convert to dB μV	=	- 67.8 dBm + 107	=	39.2 dB μV
$10^{(39.2\text{dB}\mu\text{V}/20)}$	=	91.2 μV		
Margin	=	39.2 – 48	=	-8.8
	=	8.8 dB below Limit		

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	=	- 76.0 dBm(Calibrated level)		
Convert to dB $\mu\text{V}/\text{m}$	=	- 76.0 dBm + 107	=	31.0 dB $\mu\text{V}/\text{m}$
Antenna Factor + Cable Loss	=	5.8 dB		
Total	=	36.8 dB $\mu\text{V}/\text{m}$		
Margin	=	36.8 – 40.0	=	-3.2
	=	3.2 dB below Limit		



8. Recommendation & Conclusion

The data collected shows that the **KIMIN ELECTRONIC CO., LTD. LCD TV/Monitor (Model Name: LT47U53P, HLD-47SAT)** was complies with §15.107 and 15.109 of the FCC Rules.