



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 : June 4, 2009

Order Number: GETEC-C1-09-127

Test Report Number: GETEC-E3-09-071

Test Site: Gumi College EMC Center

FCC Registration Number: (100749)

FCC ID.: BEJHSTND-2781-G

Applicant: LG Electronics Inc.

Rule Part(s)	: FCC Part 15 Subpart B
Equipment Class	: Class B computing device peripheral (JBP)
EUT Type	: LCD Monitor
Type of Authority	: Certification
Model Name	: HSTND-2781-G, LD4700
Trade Name	: HP

This equipment has been shown to be in compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.4-2003 / Canadian standard ICES-003

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

Tested by,

Reviewed by,

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.** BEJHSTND-2781-G
- **EUT Type** LCD Monitor
- **Model Name** HSTND-2781-G, LD4700
- **Trade Name** HP
- **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 27 ~ 28, 2009
- **Place of Test** **Gumi College EMC Center** (FCC Registration No.: 100749)
407, Bugok-dong, Gumi-si, Gyeongbuk, Korea.
- **Test Report Number** GETEC-E3-09-071
- **Dates of Issue** June 4, 2009



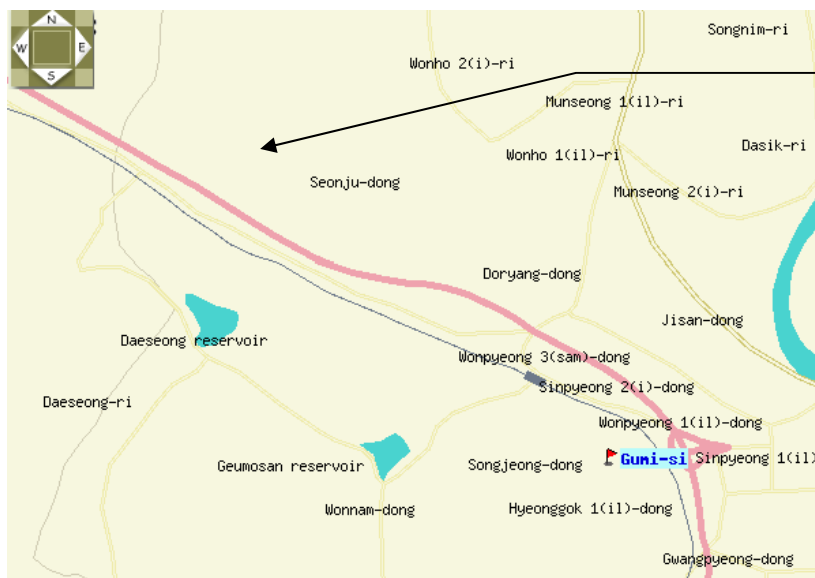
2. Introduction

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 Monitor (Model Name: HSTND-2781-G)**

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)



GUMI COLLEGE EMC CENTER
407,Bugok-dong, Gumi-si,
Gyeongbuk 730-711, Korea.
Tel: +82-54-440-1195
Fax: +82-54-440-1199

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 Monitor (Model Name: HSTND-2781-G) FCC ID.: BEJHSTND-2781-G**

Power supply	AC (100-240) V, (50/60) Hz, 3.0 A
Input Connector	15- pin D-sub type, HDMI(Digital), S-video, Composite Video, Component, RS-232C
Frequency Range(s)	Horizontal Frequency: (31.468- 65.500) kHz Vertical Frequency: (59.855-75.029) Hz
Maximum Frequency	210 MHz
Dimensions	111.70 cm * 75.78 cm * 30.26 cm (W * H * D)
Weight	33.56 kg



3.2 Support Equipment / Cables used

3.2.1 Used Support Equipment

Description	Manufacturer	Model Name	S/N & FCC ID
PC	Hewlett Packard	m9425f	S/N: CNX84403CT FCC ID: DoC
Video card	NVIDIA	Geforce 9500 GS	S/N: MS-V133B0810370406 FCC ID: V133
DVD player	LG Electronics Inc.	LC-954	S/N: 3850R-Z674K FCC ID: DoC
PS2 mouse	Suzho ligitech electronics	M-S35	S/N: 340249-001 FCC ID: DILZ11029
PS2 keyboard	Hewlett Packard	5189	S/N: 5188-6077 FCC ID: DoC
Joystick	MICROSOFT	X05-92626	S/N: 9262600296169 FCC ID: DoC
Monitor	MAJESTIC	TM154	S/N: D07030CP01003 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
Control(RS-232C) cable	Connected to the EUT	1.2 m shielded with two ferrite cores
Video(HDMI/DVI) cable	Connected to the EUT and PC	1.95 m shielded
Video(D-sub) input cable	Connected to the EUT and PC	1.8 m shielded with two ferrite cores
Video(D-sub) output cable	Connected to the EUT and Monitor	1.8 m shielded with two ferrite cores
PC sound cable	Connected to the EUT and PC	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
AV input cable	Connected to the EUT and DVD player	1.8 m shielded
S-video cable	Connected to the EUT and DVD player	1.8 m shielded
Remote control input cable	Connected to the EUT and PC	1.2 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: 1 920 * 1 080 / 60 Hz (D-sub: Analog), 1 920 * 1 080 / 60 Hz (HDMI/DVI: Digital)
 - . Conducted emission: 1 920 * 1 080 / 60 Hz (D-sub: Analog), 1 920 * 1 080 / 60 Hz (HDMI/DVI: Digital)
1 024 * 768 / 60 Hz (D-sub: Analog), 640 * 480 / 60 Hz (D-sub: 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



4.2 Conducted Emission

The Line conducted emission test facility is inside a 4 m × 8 m × 2.5 m shielded enclosure.

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

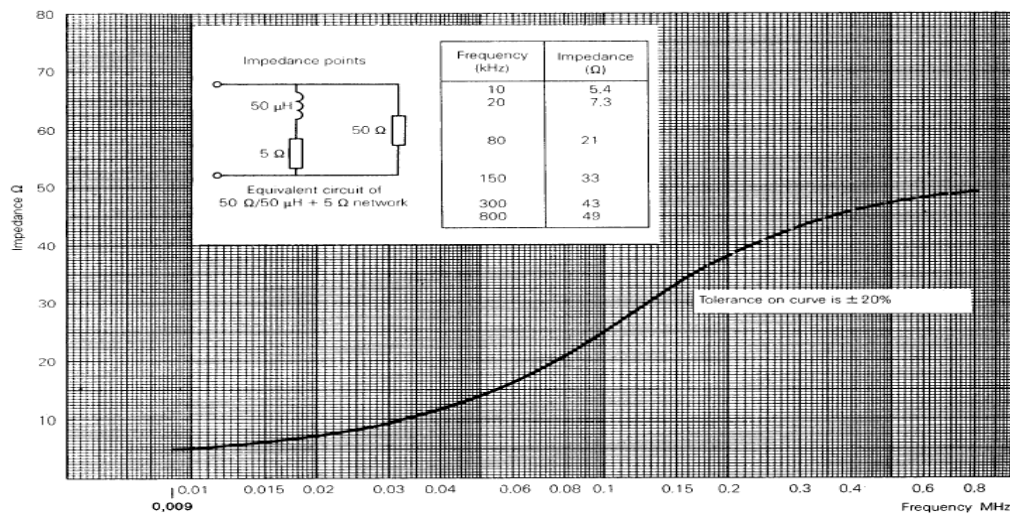


Fig 2. Impedance of LISN



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.

The spectrum was scanned from 30 MHz to 1 000 MHz using bicornical log antenna (Schwarzbeck, VULB9160). Above 1 GHz, horn antenna (Schwarzbeck, BBHA9120D) was used.

Final measurements were made outdoors at 3 m /10 m test range.

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

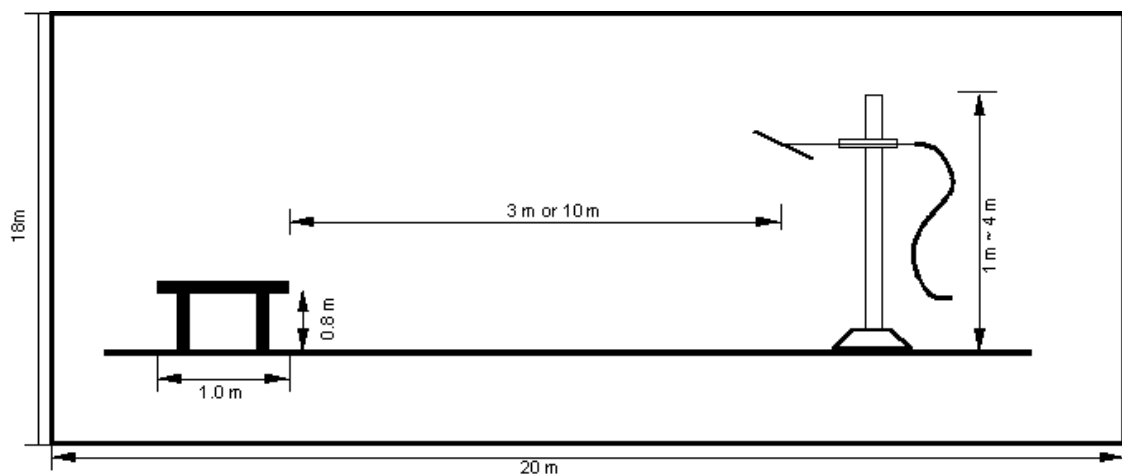


Fig 3. Dimensions of Open Site Test Area



5. Conducted Emission

5.1 Operating Environment

Temperature : 24 °C
Relative Humidity : 46 % 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

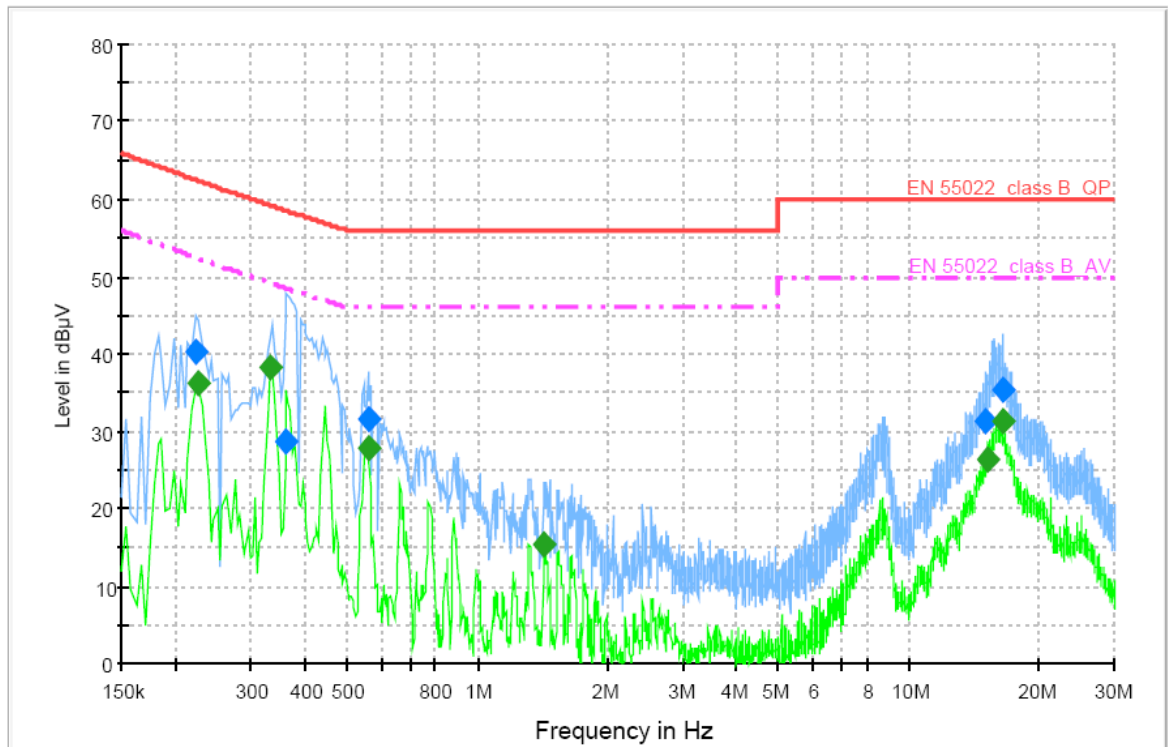
5.6 Test data for Conducted Emission

- . Test Date : May 27, 2009
- . Resolution Bandwidth : 9 kHz
- . Frequency Range : 0.15 MHz ~ 30 MHz



◆ Test resolution: 1 920 * 1 080 / 60 Hz (D-sub: 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
0.222000	40.2	1000.000	9.000	GND	L1	9.9	22.4	62.6	
0.362000	28.7	1000.000	9.000	GND	L1	10.0	29.8	58.5	
0.558000	31.6	1000.000	9.000	GND	L1	10.0	24.4	56.0	
15.114000	31.4	1000.000	9.000	GND	L1	10.6	28.6	60.0	
16.478000	35.3	1000.000	9.000	GND	L1	10.7	24.7	60.0	

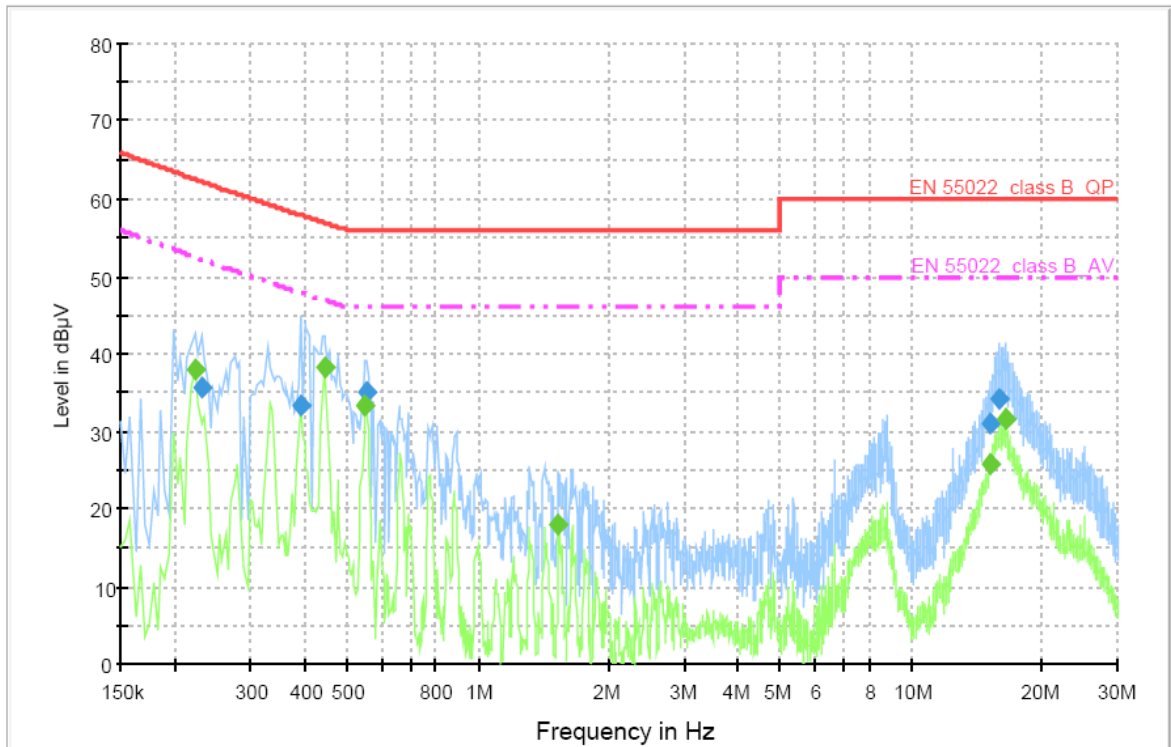
Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.226000	36.1	1000.000	9.000	GND	L1	9.9	16.3	52.4	
0.330000	38.2	1000.000	9.000	GND	L1	10.0	11.0	49.2	
0.558000	27.8	1000.000	9.000	GND	L1	10.0	18.2	46.0	
1.434000	15.4	1000.000	9.000	GND	L1	10.0	30.6	46.0	
15.234000	26.2	1000.000	9.000	GND	L1	10.6	23.8	50.0	
16.474000	31.4	1000.000	9.000	GND	L1	10.7	18.6	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
0.230000	35.7	1000.000	9.000	GND	N	10.0	26.6	62.3	
0.390000	33.4	1000.000	9.000	GND	N	10.0	24.5	57.9	
0.554000	35.1	1000.000	9.000	GND	N	10.0	20.9	56.0	
15.242000	31.0	1000.000	9.000	GND	N	10.6	29.0	60.0	
15.890000	34.2	1000.000	9.000	GND	N	10.6	25.8	60.0	

Final Measurement Detector 2

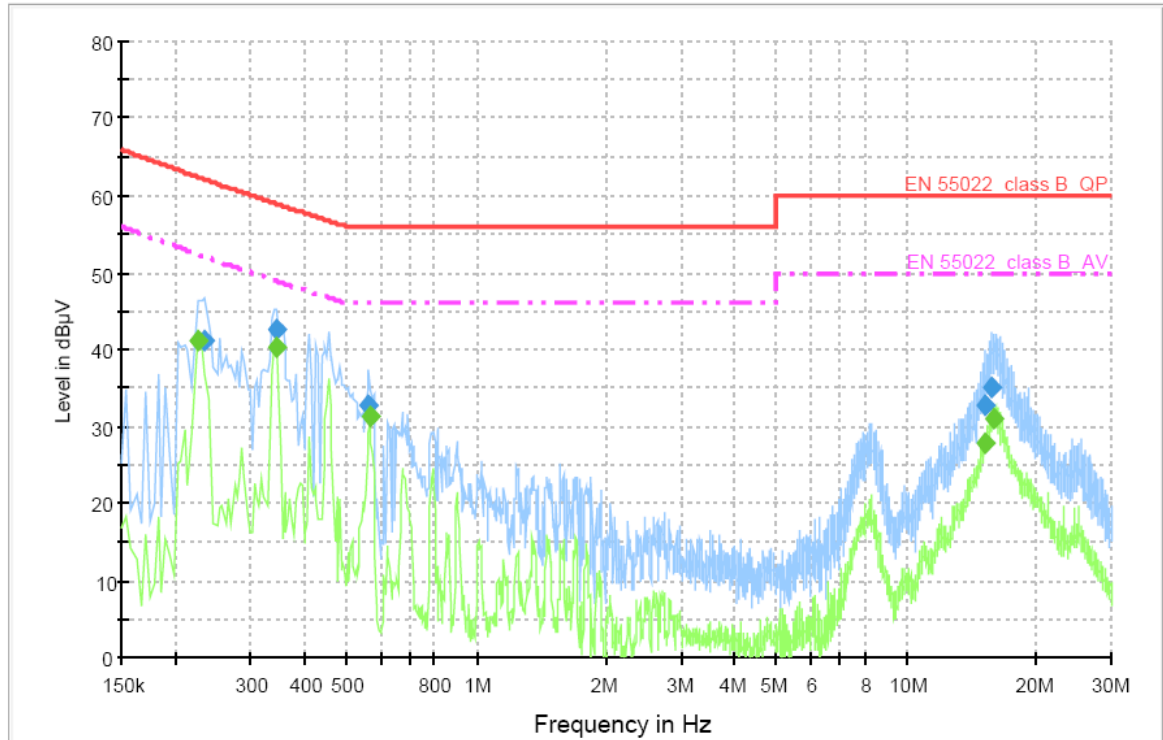
Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.222000	38.0	1000.000	9.000	GND	N	10.0	14.5	52.5	
0.442000	38.3	1000.000	9.000	GND	N	10.0	8.6	46.9	
0.550000	33.2	1000.000	9.000	GND	N	10.0	12.8	46.0	
1.538000	18.0	1000.000	9.000	GND	N	10.1	28.0	46.0	
15.250000	25.8	1000.000	9.000	GND	N	10.6	24.2	50.0	
16.470000	31.5	1000.000	9.000	GND	N	10.6	18.5	50.0	

< Fig 5. Conducted emission result (Neutral line)>



◆ Test resolution: 1 920 * 1 080 / 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
0.234000	41.1	1000.000	9.000	GND	L1	9.9	21.0	62.1	
0.342000	42.6	1000.000	9.000	GND	L1	10.0	16.4	59.0	
0.562000	32.9	1000.000	9.000	GND	L1	10.0	23.1	56.0	
15.234000	32.8	1000.000	9.000	GND	L1	10.6	27.2	60.0	
15.782000	35.1	1000.000	9.000	GND	L1	10.6	24.9	60.0	

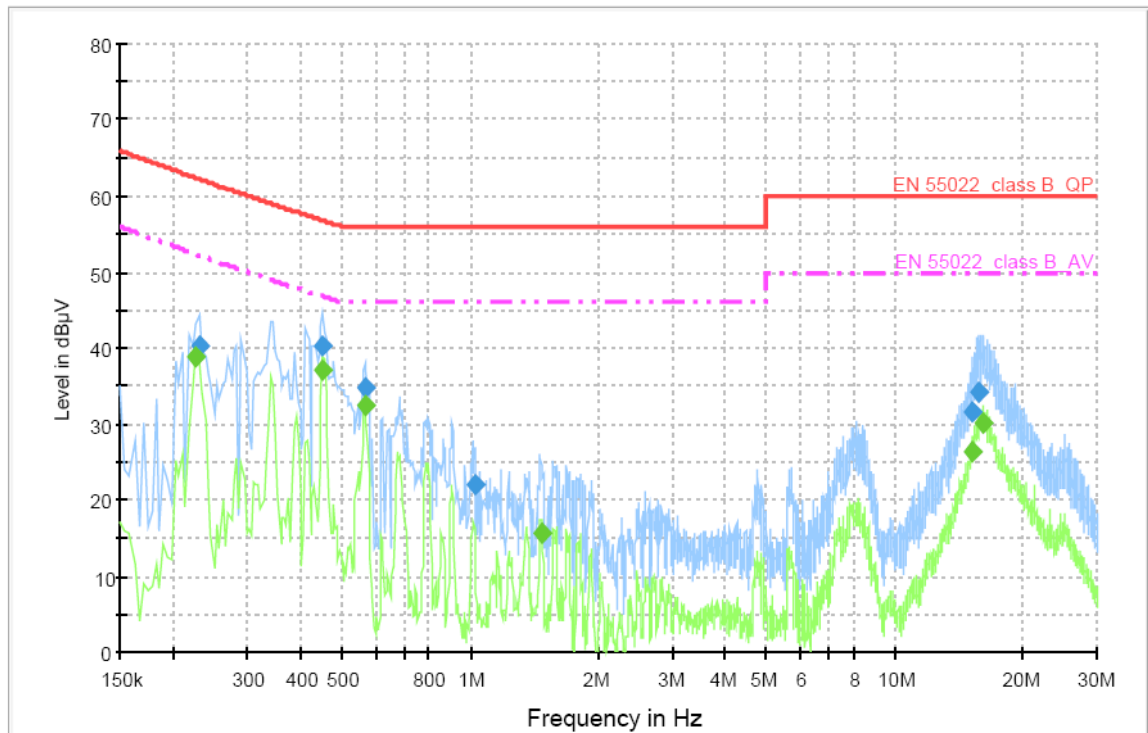
Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.226000	41.1	1000.000	9.000	GND	L1	9.9	11.3	52.4	
0.342000	40.3	1000.000	9.000	GND	L1	10.0	8.6	48.9	
0.566000	31.2	1000.000	9.000	GND	L1	10.0	14.8	46.0	
15.254000	27.9	1000.000	9.000	GND	L1	10.6	22.1	50.0	
15.930000	30.9	1000.000	9.000	GND	L1	10.7	19.1	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
0.230000	40.2	1000.000	9.000	GND	N	10.0	22.1	62.3	
0.450000	40.3	1000.000	9.000	GND	N	10.0	16.5	56.8	
0.566000	34.7	1000.000	9.000	GND	N	10.0	21.3	56.0	
1.026000	22.1	1000.000	9.000	GND	N	10.0	33.9	56.0	
15.246000	31.7	1000.000	9.000	GND	N	10.6	28.3	60.0	
15.762000	34.3	1000.000	9.000	GND	N	10.6	25.7	60.0	

Final Measurement Detector 2

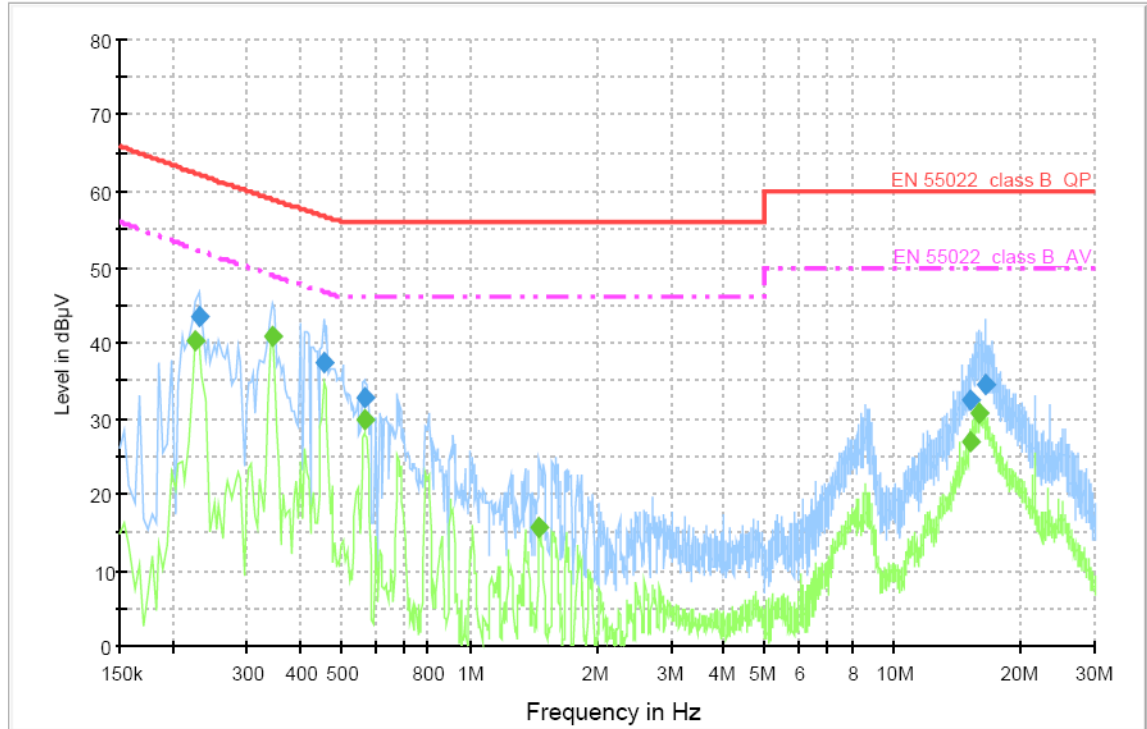
Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.226000	38.9	1000.000	9.000	GND	N	10.0	13.5	52.4	
0.450000	37.1	1000.000	9.000	GND	N	10.0	9.7	46.8	
0.566000	32.6	1000.000	9.000	GND	N	10.0	13.4	46.0	
1.470000	15.8	1000.000	9.000	GND	N	10.1	30.2	46.0	
15.234000	26.3	1000.000	9.000	GND	N	10.6	23.7	50.0	
16.162000	30.2	1000.000	9.000	GND	N	10.6	19.8	50.0	

< Fig 7. Conducted emission result (Neutral line)>



◆ Test resolution: 1 024 * 768 / 60 Hz (D-sub: 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
0.230000	43.3	1000.000	9.000	GND	L1	9.9	19.0	62.3	
0.454000	37.4	1000.000	9.000	GND	L1	10.0	19.3	56.7	
0.566000	32.8	1000.000	9.000	GND	L1	10.0	23.2	56.0	
15.258000	32.5	1000.000	9.000	GND	L1	10.6	27.5	60.0	
16.526000	34.4	1000.000	9.000	GND	L1	10.7	25.6	60.0	

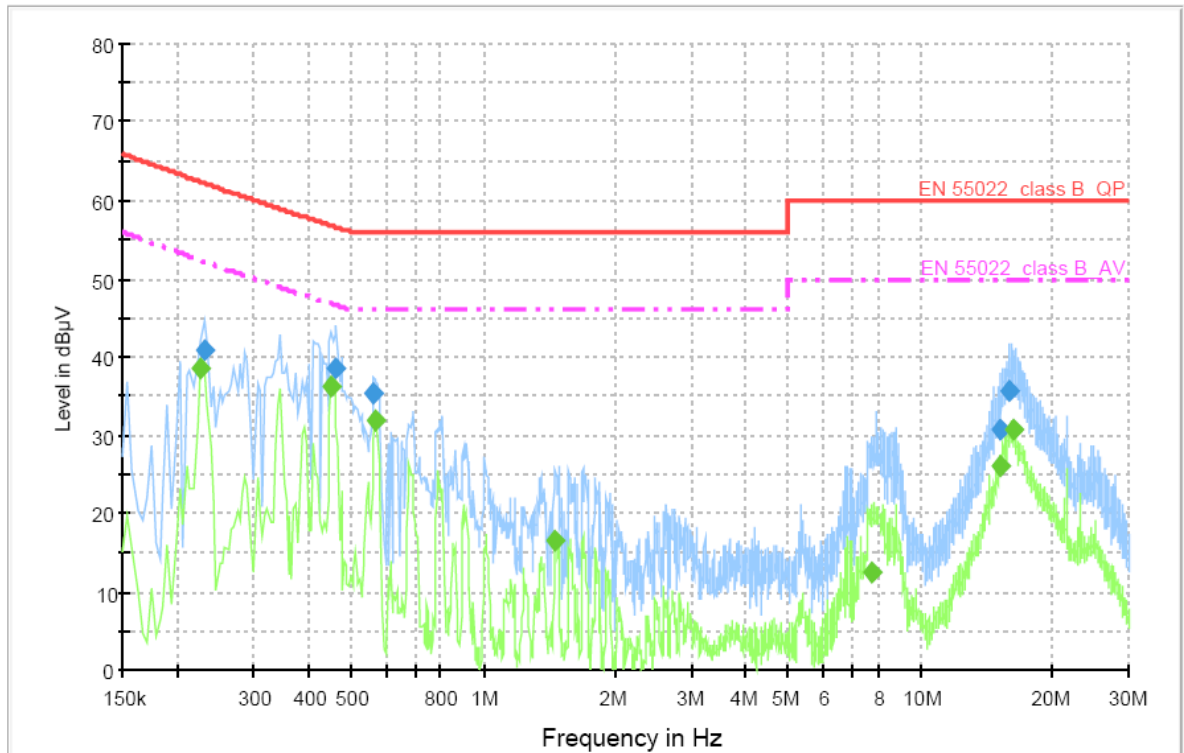
Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.226000	40.4	1000.000	9.000	GND	L1	9.9	12.0	52.4	
0.342000	40.8	1000.000	9.000	GND	L1	10.0	8.1	48.9	
0.566000	29.9	1000.000	9.000	GND	L1	10.0	16.1	46.0	
1.466000	15.5	1000.000	9.000	GND	L1	10.1	30.5	46.0	
15.174000	27.0	1000.000	9.000	GND	L1	10.6	23.0	50.0	
15.882000	30.9	1000.000	9.000	GND	L1	10.7	19.1	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
0.230000	40.8	1000.000	9.000	GND	N	10.0	21.5	62.3	
0.462000	38.4	1000.000	9.000	GND	N	10.0	18.2	56.6	
0.562000	35.3	1000.000	9.000	GND	N	10.0	20.7	56.0	
15.170000	30.8	1000.000	9.000	GND	N	10.6	29.2	60.0	
16.034000	35.6	1000.000	9.000	GND	N	10.6	24.4	60.0	

Final Measurement Detector 2

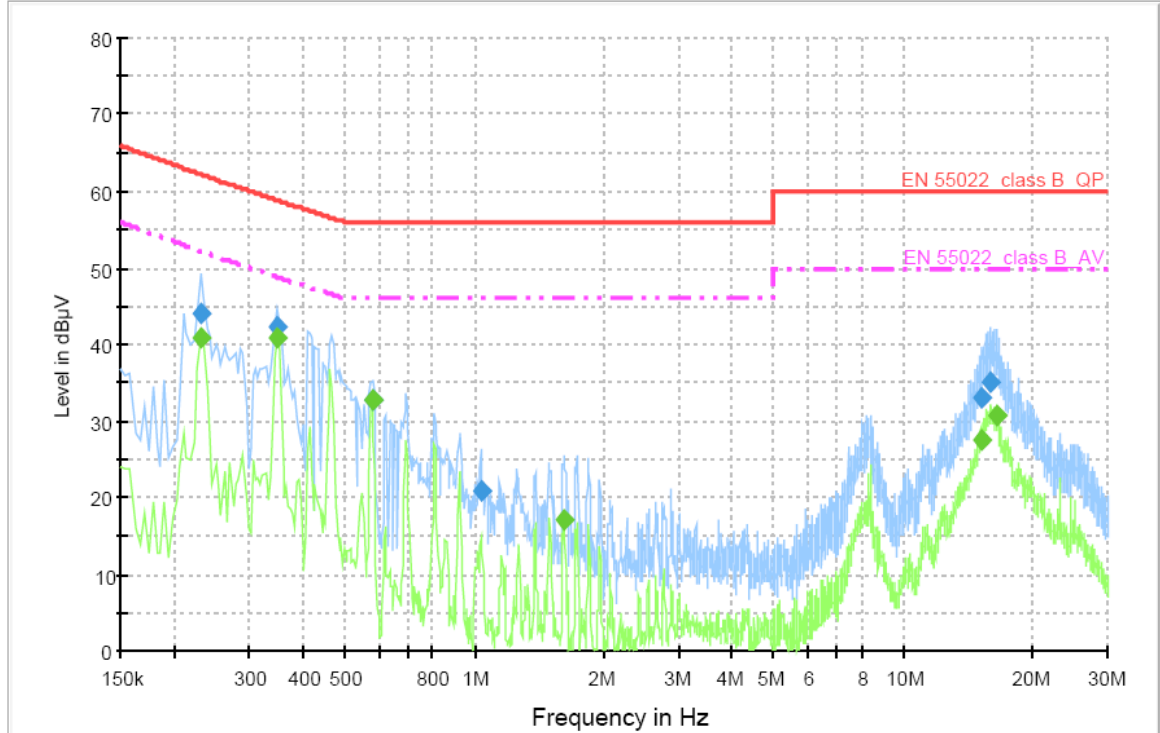
Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.226000	38.4	1000.000	9.000	GND	N	10.0	14.0	52.4	
0.450000	36.2	1000.000	9.000	GND	N	10.0	10.6	46.8	
0.566000	31.9	1000.000	9.000	GND	N	10.0	14.1	46.0	
1.466000	16.5	1000.000	9.000	GND	N	10.1	29.5	46.0	
7.754000	12.6	1000.000	9.000	GND	N	10.3	37.4	50.0	
15.242000	26.0	1000.000	9.000	GND	N	10.6	24.0	50.0	
16.286000	30.8	1000.000	9.000	GND	N	10.6	19.2	50.0	

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



◆ Test resolution: 640 * 480 / 60 Hz (D-sub: 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
0.230000	44.1	1000.000	9.000	GND	L1	9.9	18.2	62.3	
0.346000	42.5	1000.000	9.000	GND	L1	10.0	16.4	58.9	
0.582000	32.8	1000.000	9.000	GND	L1	10.0	23.2	56.0	
1.038000	20.8	1000.000	9.000	GND	L1	10.0	35.2	56.0	
15.250000	33.1	1000.000	9.000	GND	L1	10.6	26.9	60.0	
15.994000	35.2	1000.000	9.000	GND	L1	10.7	24.8	60.0	

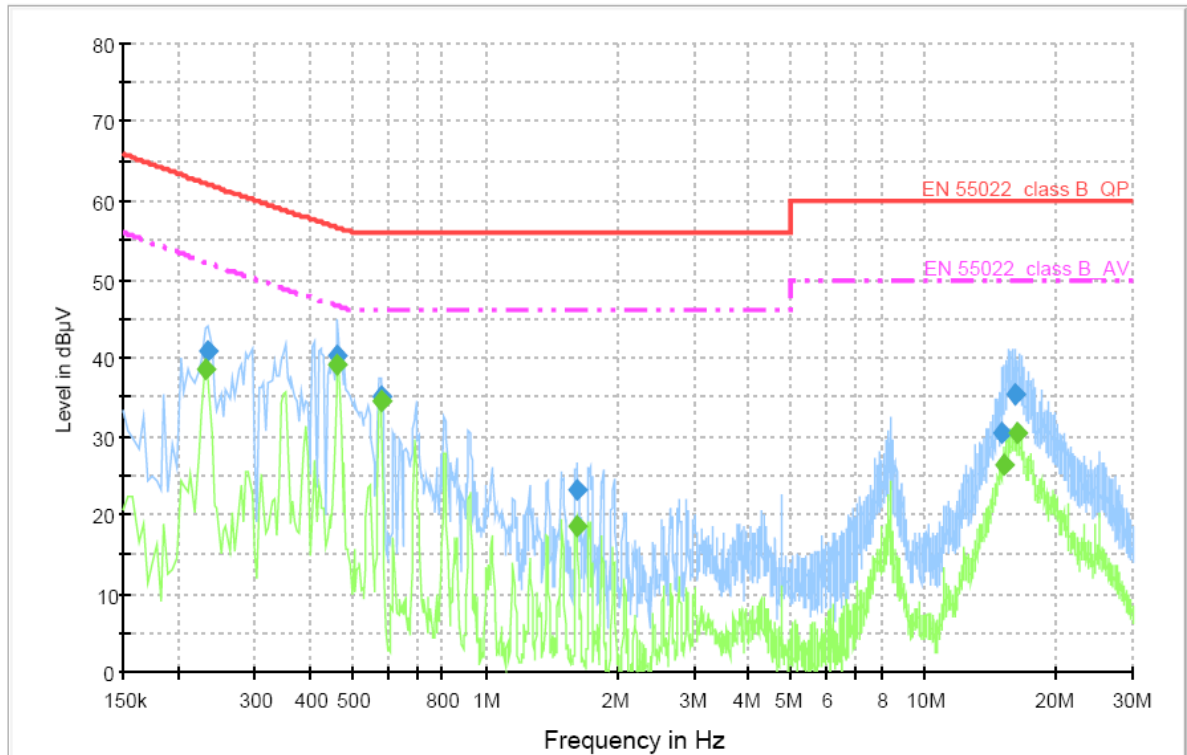
Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.230000	41.0	1000.000	9.000	GND	L1	9.9	11.2	52.2	
0.346000	40.9	1000.000	9.000	GND	L1	10.0	8.0	48.9	
0.578000	32.7	1000.000	9.000	GND	L1	10.0	13.3	46.0	
1.614000	17.0	1000.000	9.000	GND	L1	10.1	29.0	46.0	
15.158000	27.4	1000.000	9.000	GND	L1	10.6	22.6	50.0	
16.526000	30.7	1000.000	9.000	GND	L1	10.7	19.3	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
0.234000	40.8	1000.000	9.000	GND	N	10.0	21.3	62.1	
0.462000	40.2	1000.000	9.000	GND	N	10.0	16.4	56.6	
0.578000	35.2	1000.000	9.000	GND	N	10.0	20.8	56.0	
1.622000	23.3	1000.000	9.000	GND	N	10.1	32.7	56.0	
15.070000	30.4	1000.000	9.000	GND	N	10.6	29.6	60.0	
16.206000	35.4	1000.000	9.000	GND	N	10.6	24.6	60.0	

Final Measurement Detector 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.230000	38.5	1000.000	9.000	GND	N	10.0	13.7	52.2	
0.462000	39.1	1000.000	9.000	GND	N	10.0	7.5	46.6	
0.578000	34.6	1000.000	9.000	GND	N	10.0	11.4	46.0	
1.614000	18.6	1000.000	9.000	GND	N	10.1	27.4	46.0	
15.202000	26.3	1000.000	9.000	GND	N	10.6	23.7	50.0	
16.318000	30.5	1000.000	9.000	GND	N	10.6	19.5	50.0	

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



6. Radiated Emission

6.1 Operating Environment

Temperature : 27 °C
Relative Humidity : 38 % 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
■ - ESCS30	Rohde & Schwarz	EMI test receiver	839809/003	12. 13. 2009
■ - HK116	Rohde & Schwarz	Biconical ANT	832639/007	12. 28. 2009
■ - HL223	Rohde & Schwarz	Log-periodic antenna	835998/004	12. 28. 2009
■ - BBHA9120D	Schwarzbeck	Horn ANT	207	12. 26. 2009
■ - HD100	HD GmbH	Position Controller	100/692/01	N/A
■ - DS415S	HD GmbH	Turntable	415/657/01	N/A
■ - MA240	HD GmbH	Antenna Mast	240/565/01	N/A
■ - AFS 44 00101800- 25-10P-44	MITEQ	Preamplifier	1258943	11. 11. 2009

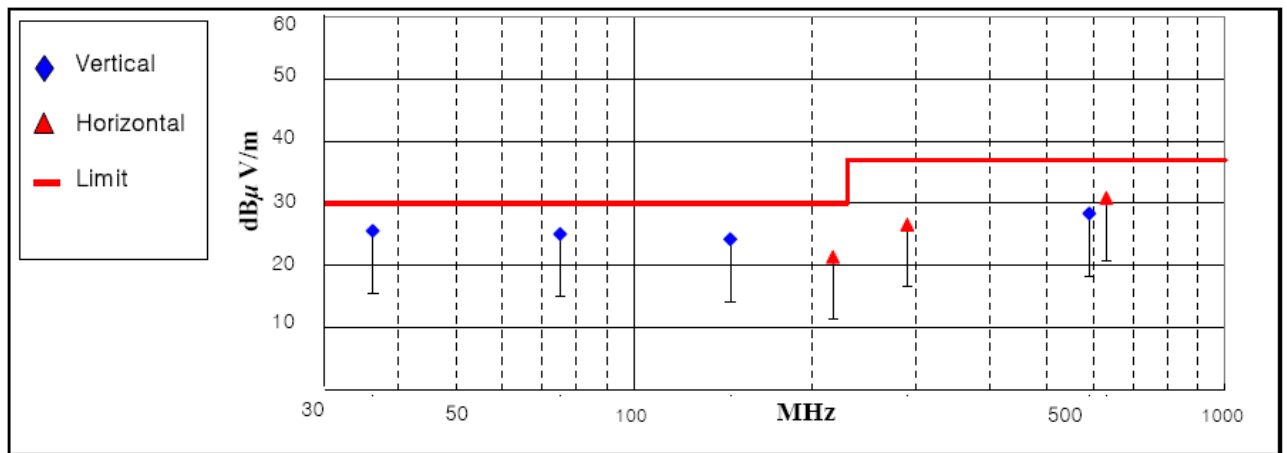
6.6 Test data for Radiated Emission

- Test Date : May 27, 2009
- Resolution Bandwidth : 120 kHz/ 1 MHz
- Frequency Range : 30 MHz ~ 2 000 MHz
- Measurement Distance : 3 m



- ◆ Operating Condition: 1 920 * 1 080 / 60 Hz (D-sub: 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)	(°)
36.20	12.30	11.43	1.79	25.52	30.00	4.48	V	100	201
75.11	14.69	7.74	2.58	25.01	30.00	4.99	V	113	288
145.71	9.23	11.44	3.55	24.22	30.00	5.78	V	101	141
217.19	2.66	14.19	4.49	21.34	30.00	8.66	H	135	116
290.01	3.27	17.83	5.42	26.52	37.00	10.48	H	212	312
589.40	2.72	17.99	7.62	28.33	37.00	8.67	V	201	11
629.99	4.11	18.87	7.82	30.80	37.00	6.20	H	106	185

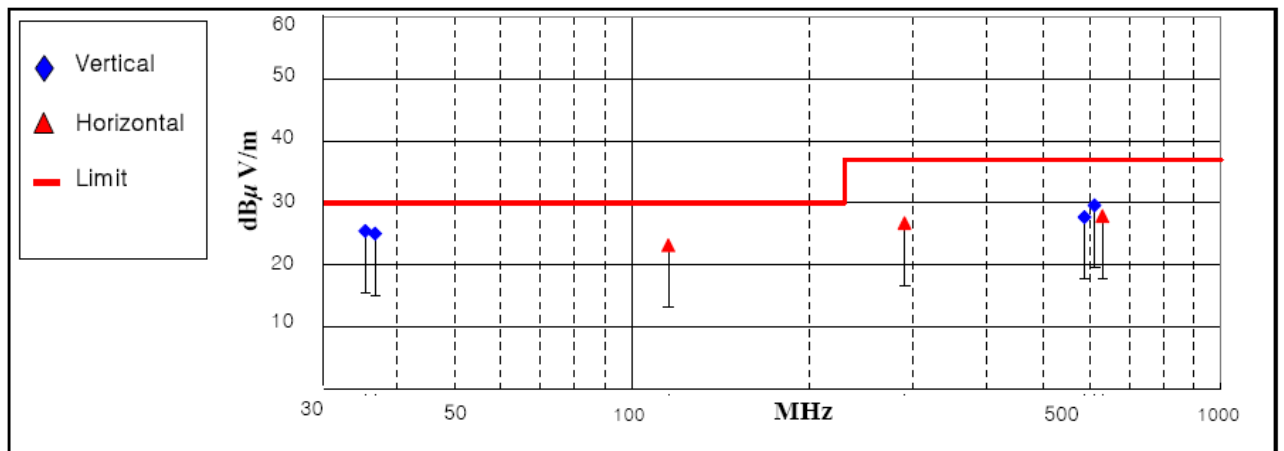


< Fig 12. Radiated emission result (30 MHz ~ 1 000 MHz)>



- ◆ Operating Condition: 1 920 * 1 080 / 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)	(°)
35.31	12.01	11.68	1.76	25.45	30.00	4.55	V	100	215
36.73	11.92	11.29	1.80	25.01	30.00	4.99	V	111	229
115.48	9.59	10.45	3.09	23.13	30.00	6.87	H	172	101
290.60	3.37	17.90	5.44	26.71	37.00	10.29	H	215	313
587.12	2.08	17.97	7.61	27.66	37.00	9.34	V	200	15
609.92	3.50	18.34	7.75	29.59	37.00	7.41	V	195	1
629.30	1.18	18.86	7.82	27.86	37.00	9.14	H	133	195

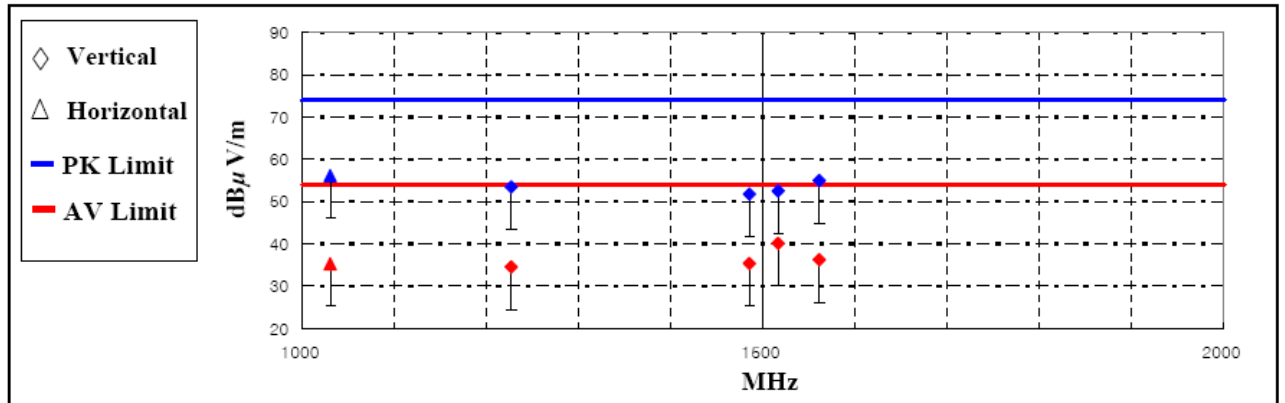


< Fig 13. Radiated emission result (30 MHz ~ 1 000 MHz)>



- ◆ Operating Condition: 1 920 * 1 080 / 60 Hz (D-sub: Analog mode)
Detector mode: Peak detector mode / Average detector mode

Frequency (MHz)	Measurement Level						Limit (dBμ V/m)		Margin (dB)		Positioning System		
	Reading Value (dBμ V/m)		AF	AMP / CL	Test Result (dBμ V/m)						Pol.	Height	Angle
	Peak	Average	(dB/m)	(dB)	Peak	Average	Peak	Average	Peak	Average	(H/V)	(cm)	(°)
1030.11	72.15	51.31	24.92	-40.97	56.10	35.26	74.00	54.00	17.90	18.74	H	300	65
1226.45	68.71	49.81	25.27	-40.58	53.40	34.50	74.00	54.00	20.60	19.50	V	157	285
1485.15	66.03	49.63	25.73	-40.06	51.70	35.30	74.00	54.00	22.30	18.70	V	185	142
1516.30	66.74	54.34	25.77	-40.01	52.50	40.10	74.00	54.00	21.50	13.90	V	200	130
1560.99	69.06	50.36	25.81	-39.97	54.90	36.20	74.00	54.00	19.10	17.80	V	195	100



*Comment : AMP/CL_Cable loss value + AMP gain value
AF : Antenna factor value
Pol. : H(Horizontal), V(Vertical)

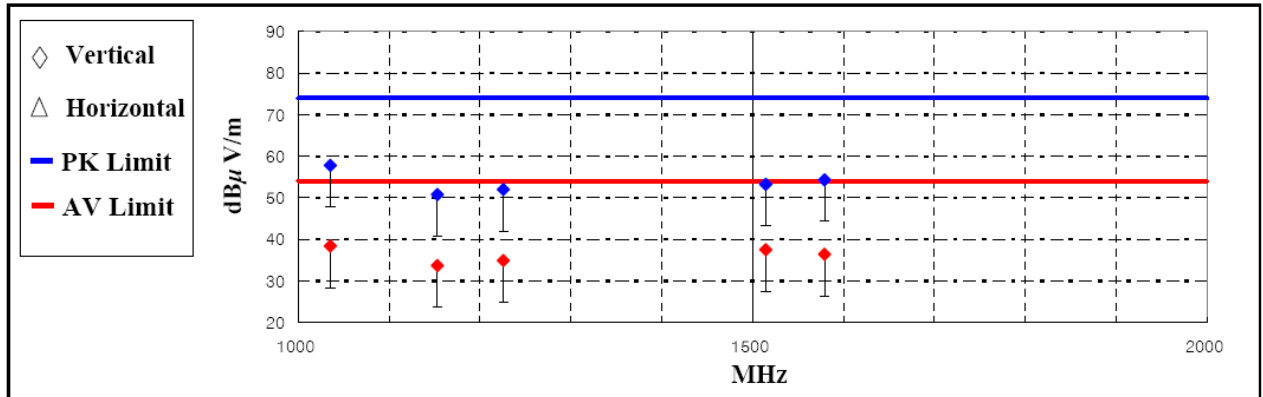
< Fig 14. Radiated emission result (1 000 MHz ~ 2 000 MHz)>



◆ Operating Condition: 1 920 * 1 080 / 60 Hz (HDMI/DVI: Digital mode)

Detector mode: Peak detector mode / Average detector mode

Frequency (MHz)	Measurement Level						Limit (dBμ V/m)		Margin (dB)		Positioning System		
	Reading Value (dBμ V/m)		AF	AMP / CL	Test Result (dBμ V/m)						Pol.	Height	Angle
	Peak	Average	(dB/m)	(dB)	Peak	Average	Peak	Average	Peak	Average	(H/V)	(cm)	(°)
1035.20	73.84	54.44	24.93	-40.97	57.80	38.40	74.00	54.00	16.20	15.60	V	125	25
1153.20	66.38	49.27	25.14	-40.72	50.80	33.69	74.00	54.00	23.20	20.31	V	175	185
1225.60	67.31	50.20	25.27	-40.58	52.00	34.89	74.00	54.00	22.00	19.11	V	200	100
1514.40	67.44	51.74	25.77	-40.01	53.20	37.50	74.00	54.00	20.80	16.50	V	210	19
1579.20	68.42	50.52	25.83	-39.95	54.30	36.40	74.00	54.00	19.70	17.60	V	194	31



*Comment : AMP/CL_Cable loss value + AMP gain value

AF : Antenna factor value

Pol. : H(Horizontal), V(Vertical)

< Fig 15. Radiated emission result (1 000 MHz ~ 2 000 MHz)>



7. Sample Calculations

$$\begin{aligned} \text{dB}\mu\text{V} &= 20 \text{ Log}_{10}(\mu\text{V}/\text{m}) \\ \text{dB}\mu\text{V} &= \text{dBm} + 107 \\ \mu\text{V} &= 10^{(\text{dB}\mu\text{V}/20)} \end{aligned}$$

7.1 Example 1 :

■ 20.3 MHz

Class B Limit	= 250 μV = 48 dB μV
Reading	= 39.2 dB μV
$10^{(39.2\text{dB}\mu\text{V}/20)}$	= 91.2 μV
Margin	= 48 dB μV - 39.2 dB μV = 8.8 dB

7.2 Example 2 :

■ 66.7 MHz

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



8. Recommendation & Conclusion

The data collected shows that the **LG Electronics Inc. LCD Monitor (Model Name: HSTND-2781-G)** was complies with §15.107 and 15.109 of the FCC Rules.