

EMC TEST REPORT

Test item : LED TV Monitor
Model No. : 50LN5400-UA
Order No. : DEMC1302-00843
Date of receipt : 2013-02-27
Test duration : 2013-03-07 ~ 2013-03-08
Use of report : FCC CoC Marking
Date of Issue : 2013-03-11

Applicant : LG Electronics Inc.

19-1, Cheongho-ri, Jinwi-myeon, Pyeongtaek-si, Gyeonggi-do, 451-713, Korea

Test laboratory : Digital EMC Co., Ltd.

683-3, Yubang-Dong, Cheoin-Gu, Yongin-Si, Gyeonggi-Do, 449-080, Korea

Test specification : ANSI C 63.4:2003
FCC Part 15 Subpart B
(Type of Device : Class B Personal Computers
and Peripherals (JBP))

Test environment : Temperature : (19 ~ 21) °C,
Humidity : (38 ~ 40) % R.H.

Test result : ☒ Comply ☐ Not Comply

The test results presented in this test report are limited only to the sample supplied by applicant and
the use of this test report is inhibited other than its purpose.

This test report shall not be reproduced except in full, without the written approval of DIGITAL EMC CO., LTD.

Tested by:

Reviewed by:



Engineer
HyungJun Kim



General Manager
ChangHo Lee

PRESIDENT OF DIGITAL EMC CO., LTD.

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1. General Remarks

This report contains the result of tests performed by:

DIGITAL EMC CO., LTD.

Address : 683-3, Yubang-Dong, Cheoin-Gu, Yongin-Si, Gyeonggi-Do, 449-080, Korea

<http://www.digitalemcc.com>

Tel: +82-31-321-2664 Fax: +82-31-321-1664

2. Test Laboratory

Digital EMC Co., Ltd. has been accredited / filed / authorized by the agencies listed in the following table;

Certificate	Nation	Agency	Code	Mark
Accreditation	Korea	KOLAS	393	ISO/IEC 17025
Site Filing	USA	FCC	101842 678747	Test Facility list & NSA Data
	Canada	IC	5740A-1 5740A-2	Test Facility list & NSA Data
	Japan	VCCI	C-1427 R-1364, R-3385 T-1442, G-338	Test Facility list & NSA Data
Certification	Korea	KC	KR0034	Test Facility list & NSA Data
	Germany	TUV	ROK1221C	ISO/IEC 17025

Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the "General requirements for the competent of calibration and testing laboratory".

3. General Information of EUT

Model No.	50LN5400-UA
EUT Type	LED TV Monitor
Serial No	NONE
FCC ID	BEJ50LN5400UA
Type of Sample Tested	Pre-Production
High Frequency	800 MHz
Rating	AC 100-240 V~ 50/60 Hz, 1.4 A
Supplied Power for Test	AC 120 V, 60 Hz
Applicant	LG Electronics Inc. 19-1, Cheongho-ri, Jinwi-myeon, Pyeongtaek-si, Gyeonggi-do, 451-713, Korea
Manufacturer	LG Electronics Inc. 19-1, Cheongho-ri, Jinwi-myeon, Pyeongtaek-si, Gyeonggi-do, 451-713, Korea

Component supported mode

Resolution	Horizontal Frequency (KHz)	Vertical Frequency (Hz)
720 x 480i	31.47	59.94
	31.50	60.00
1280 x 720p	44.96	59.94
	45.00	60.00
1920 x 1080i	33.72	59.94
	33.75	60.00
1920 x 1080p	26.97	23.976
	27.00	24.00
	33.71	29.97
	33.75	30.00
	67.432	59.94
	67.50	60.00

4. Test Summary

4.1 Applied standards and test results

Test Items	Applied Standards	Results
Conducted Disturbance	ANSI C63.4:2003	C
Radiated Disturbance	ANSI C63.4:2003	C
C=Comply N/C=Not Comply N/T=Not Tested N/A=Not Applicable		

The data in this test report are traceable to the national or international standards.

4.2 Test environment and conditions

Test Items	Test date (MM-DD)	Temp (°C)	Humidity (% R.H.)
Conducted Disturbance	03-07	19	38
Radiated Disturbance	03-08	20	39
	03-08	21	40

4.3 Test result Summary

(1) Conducted Emission (HDMI MODE)

Frequency [MHz]	Phase	Result [dB μ V]	Detector	Limit [dB μ V]	Margin [dB]
0.15185	L	54.4	Quasi-Peak	65.9	11.5

(2) Radiated Emission (HDMI MODE)

Frequency [MHz]	Pol.	Result [dB(μ V/m)]	Detector	Limit [dB(μ V/m)]	Margin [dB]
864.762	V	42.7	Quasi-Peak	46.0	3.3

5. Test Set-up and operation mode

5.1 Principle of Configuration Selection

Emission : The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

5.2 Test Operation Mode

- HDMI MODE : 1920x1080 Resolution (Worst case)
- HDMI MODE : “H” characters scroll on the LCD TV screen.

5.3 Support Equipment Used

Unit	Model No.	Serial No.	Manufacturer	CABLE				Backshell	FCC ID
				Connect type	Length (m)	ferrite core	shield		
PC	DC8CMF	G3RZKBX	DELL INC.	POWER	1.8	Not use	Non-shield	Plastic	DOC
				HDMI	1.8	Not use	Shield		
				USB	1.8	Not use	Shield		
				USB	1.8	Not use	Shield		
				USB	1.5	Not use	Shield		
KEYBOARD	KB-065	CN111363232	HP	USB	1.8	Not use	Shield	Plastic	DOC
MOUSE	1094	X817158-002	MICROSOFT CORPORATION	USB	1.6	Not use	Shield	Plastic	DOC
CD/DVD PLAYER	DVP-NS92V	2000407	SONY EMCS	POWER	1.8	Not use	Non-shield	Plastic	VER
				COMPONENT	1.6	Not use	Non-shield		
PRINTER	Aculaser M1200	LWTZ181070	EPSON	USB	1.8	Not use	Shield	Plastic	-
				AC POWER	1.5	Not use	Non-shield		
REMOTE CONTROL	AKB737 15608	N/A	OHSUNG ELECTRONIC	-	-	-	-	-	-

6. Test Results : Emission

6.1 Conducted Disturbance

6.1.1 Measurement Procedure

In the range of 0.15 MHz to 30 MHz, the conducted disturbance was measured and set-up was made accordance with **ANSI C63.4**.

If the EUT is table top equipment, it was placed on a wooden table with a height of 0.8 m above the reference ground plane and 0.4 m from the conducting wall of the shielded room.

Also if the EUT is floor-standing equipment, it was placed on a non-conducted support with a height up to 0.15 m above the reference ground plane.

Connect the EUT's power source lines to the appropriate power mains / peripherals through the LISN. All the other peripherals are connected to the 2nd LISN, if any.

Unused measuring port of the LISN was resistively terminated by 50 ohm terminator.

The measuring port of the LISN for EUT was connected to spectrum analyzer.

Using conducted emission test software, the emissions were scanned with peak detector mode.

After scanning over the frequency range, suspected emissions were selected to perform final measurement. When performing final measurement, the receiver was used which has Quasi-Peak detector and Average detector.

By varying the configuration of the test sample and the cable routing it was attempted to maximize the emission.

For further description of the configuration refer to the picture of the test set-up.

6.1.2 Limit for Conducted Disturbance

(1) Conducted disturbance at mains ports.

Frequency range (MHz)	Limits dB(μV)			
	Quasi-peak		Average	
	Class A	Class B	Class A	Class B
0.15 to 0.50	79	66 to 56	66	56 to 46
0.50 to 5	73	56	60	46
5 to 30		60		50
Note 1 The lower limit shall apply at the transition frequencies.				
Note 2 The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.				

Note) 1. Emission Level = Reading Value + Correction Factor.

2. Correction Factor = Cable Loss + Insertion Loss of LISN

3. Margin = Limit - Emission level

Test Result

< HDMI MODE >



Results of Conducted Emission

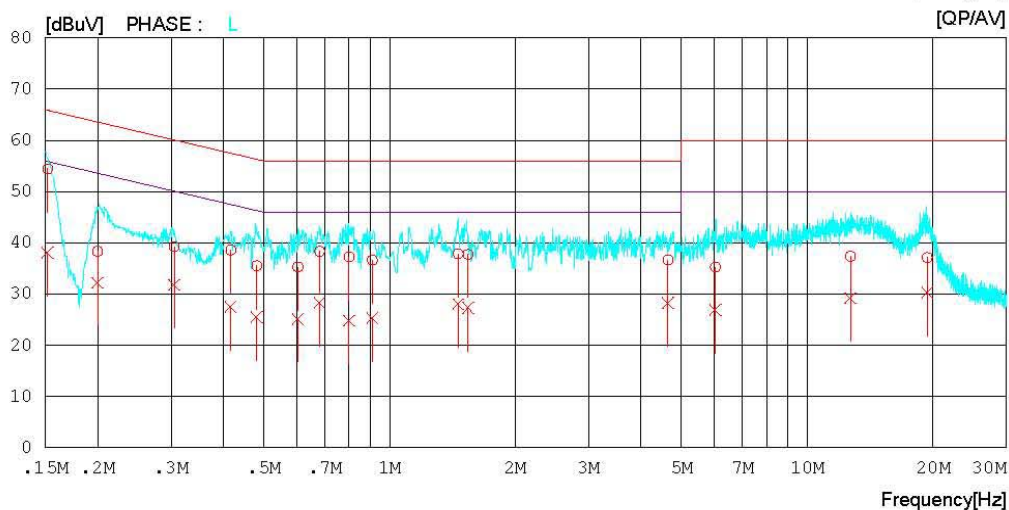
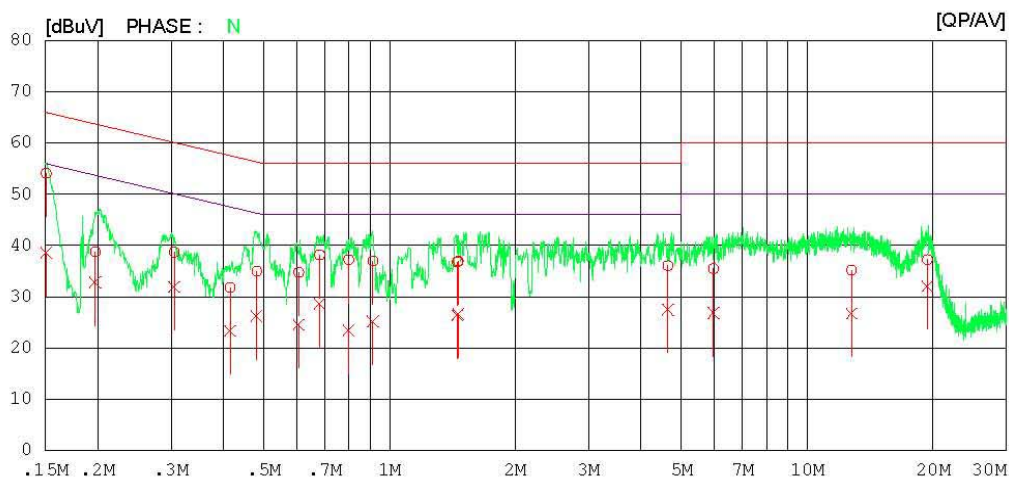
Digital EMC
Date : 2013-03-07

Model No. : 50LN5400-UA
Type :
Serial No. :
Test Condition : HDMI

Reference No. :
Power Supply : 120 V 60 Hz
Temp/Humi. : 19 °C 38 % R.H.
Operator :

Memo :

LIMIT : CISPR22_B QP
CISPR22_B AV



Results of Conducted Emission

Digital EMC
Date : 2013-03-07

Model No. : 50LN5400-UA
Type :
Serial No. :
Test Condition : HDMI

Reference No. :
Power Supply : 120 V 60 Hz
Temp/Humi. : 19 °C 38 % R.H.
Operator :

Memo :

LIMIT : CISPR22_B QP
CISPR22_B AV

NO	FREQ [MHz]	READING		C.FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	
1	0.15067	52.3	36.8	1.8	54.1	38.6	66.0	56.0	11.9	17.4	N
2	0.19755	37.5	31.6	1.2	38.7	32.8	63.7	53.7	25.0	20.9	N
3	0.30544	37.8	31.0	0.9	38.7	31.9	60.1	50.1	21.4	18.2	N
4	0.41554	31.0	22.5	0.8	31.8	23.3	57.5	47.5	25.7	24.2	N
5	0.48104	34.3	25.5	0.7	35.0	26.2	56.3	46.3	21.3	20.1	N
6	0.60650	34.1	23.9	0.6	34.7	24.5	56.0	46.0	21.3	21.5	N
7	0.68068	37.6	28.0	0.6	38.2	28.6	56.0	46.0	17.8	17.4	N
8	0.79859	36.7	22.9	0.5	37.2	23.4	56.0	46.0	18.8	22.6	N
9	0.91274	36.5	24.8	0.4	36.9	25.2	56.0	46.0	19.1	20.8	N
10	1.45400	36.4	26.0	0.4	36.8	26.4	56.0	46.0	19.2	19.6	N
11	1.46150	36.5	26.2	0.4	36.9	26.6	56.0	46.0	19.1	19.4	N
12	4.64250	35.9	27.3	0.2	36.1	27.5	56.0	46.0	19.9	18.5	N
13	5.96600	35.2	26.5	0.3	35.5	26.8	60.0	50.0	24.5	23.2	N
14	12.78050	34.8	26.3	0.4	35.2	26.7	60.0	50.0	24.8	23.3	N
15	19.40800	36.7	31.6	0.5	37.2	32.1	60.0	50.0	22.8	17.9	N
16	0.15185	52.6	36.3	1.8	54.4	38.1	65.9	55.9	11.5	17.8	L
17	0.20000	37.2	31.0	1.2	38.4	32.2	63.6	53.6	25.2	21.4	L
18	0.30550	38.3	31.0	0.9	39.2	31.9	60.1	50.1	20.9	18.2	L
19	0.41681	37.8	26.8	0.8	38.6	27.6	57.5	47.5	18.9	19.9	L
20	0.48126	34.8	24.8	0.7	35.5	25.5	56.3	46.3	20.8	20.8	L
21	0.60371	34.7	24.6	0.6	35.3	25.2	56.0	46.0	20.7	20.8	L
22	0.68085	37.7	27.7	0.6	38.3	28.3	56.0	46.0	17.7	17.7	L
23	0.80021	36.7	24.3	0.5	37.2	24.8	56.0	46.0	18.8	21.2	L
24	0.91024	36.2	24.9	0.4	36.6	25.3	56.0	46.0	19.4	20.7	L
25	1.46100	37.5	27.6	0.4	37.9	28.0	56.0	46.0	18.1	18.0	L
26	1.54250	37.4	27.0	0.3	37.7	27.3	56.0	46.0	18.3	18.7	L
27	4.64250	36.5	28.1	0.2	36.7	28.3	56.0	46.0	19.3	17.7	L
28	6.03000	35.0	26.6	0.3	35.3	26.9	60.0	50.0	24.7	23.1	L
29	12.69800	37.0	28.8	0.4	37.4	29.2	60.0	50.0	22.6	20.8	L
30	19.40050	36.6	29.8	0.5	37.1	30.3	60.0	50.0	22.9	19.7	L

6.2 Radiated Disturbance

6.2.1 Measurement Procedure

The radiated disturbance was measured and set-up was made accordance with **ANSI C63.4**.

If the EUT is tabletop equipment, it was placed on a wooden table with a height of 0.8 m above the reference ground plane and 3 m or 10 m away from the interference receiving antenna in the **10m semi-anechoic chamber**.

Also if the EUT is floor-standing equipment, it was placed on a non-conducted support with a height up to 0.15 m above the reference ground plane.

Rotate the EUT from (0 - 360)° and position the receiving antenna at heights from (1 - 4) m above the reference ground plane continuously to determine associated with higher emission levels and record them.

The measurement was made in both the vertical and horizontal polarization, and the maximum value is presented in the report.

For below 1 GHz frequency range, Quasi-Peak detector with 120 kHz RBW was used.

Also Peak and Average detector with 1 MHz RBW were used for above 1 GHz frequency range.

For further description of the configuration refer to the picture of the test set-up.

6.2.2 Limit for Radiated Disturbance

- The test frequency range of Radiated Disturbance measurements are listed below.

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 108	1 000
108 – 500	2 000
500 – 1 000	5 000
Above 1 000	5 th harmonic of the highest frequency or 40 GHz, whichever is lower

(1) Limit for Radiated Emission below 1 000MHz

Frequency range (MHz)	Class A Equipment (10 m distance)	Class B Equipment (3 m distance)
	Quasi-peak (dB μ V/m)	Quasi-peak (dB μ V/m)
30 to 88	39.1	40
88 to 216	43.5	43.5
216 to 960	46.4	46
960 to 1 000	49.5	54

Note 1 The lower limit shall apply at the transition frequency.

Note 2 Additional provisions may be required for cases where interference occurs.

Note 3 According to 15.109(g), as an alternative to the radiated emission limit shown above, digital devices may be shown to comply with the standards(CISPR), Pub. 22 shown as below.

Frequency range (MHz)	Class A Equipment (10 m distance)	Class B Equipment (10 m distance)
	Quasi-peak (dB μ V/m)	Quasi-peak (dB μ V/m)
30 to 230	40	30
230 to 1 000	47	37

(2) Limits for Radiated Emission above 1 000MHz at a measuring distance of 3 m

Frequency (GHz)	Class A Equipment		Class B Equipment	
	Peak (dB μ V/m)	Average (dB μ V/m)	Peak (dB μ V/m)	Average (dB μ V/m)
1 to 40	80	60	74	54

Note) 1. Emission Level = Reading Value + Correction Factor.

2. Correction Factor = Cable loss - Amp gain + Antenna Factor

3. Margin = Limit - Emission level

Test Result

< 30 MHz ~ 1 GHz >

RADIATED EMISSION

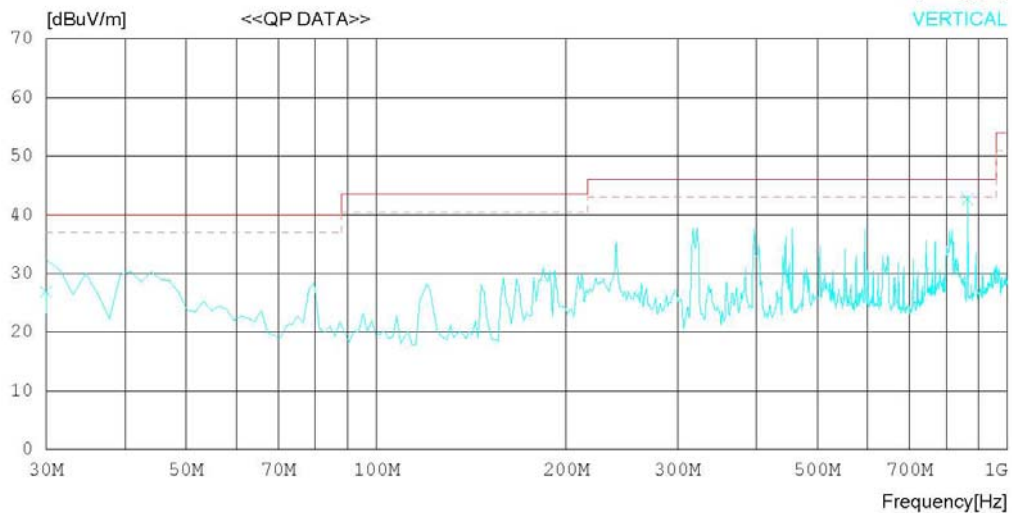
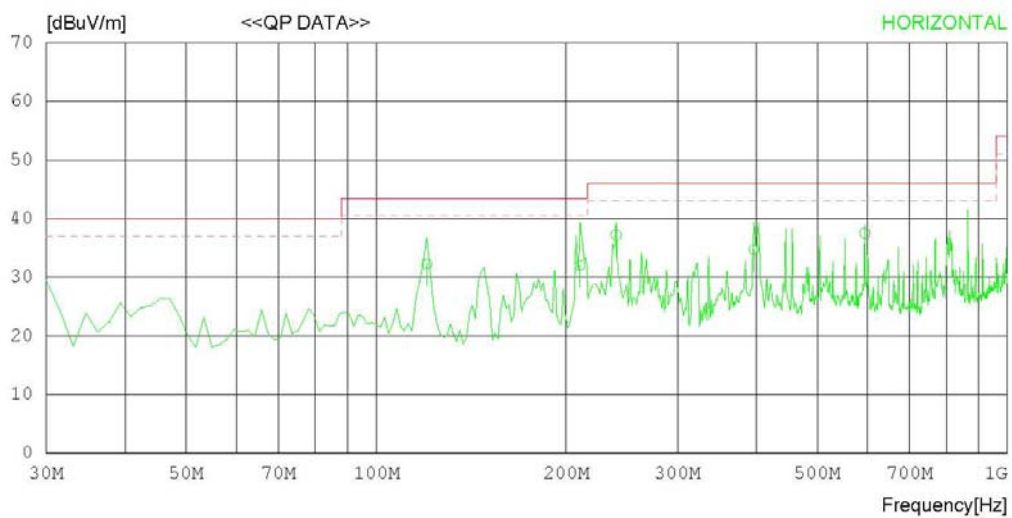
Date : 2013-03-08

Model Name : 50LN5400-UA
Model No. :
Serial No. :
Test Condition : HDMI

Reference No. :
Power Supply : 120 V 60 Hz
Temp/Humi : 21 'C 40 % R.H
Operator :

Memo :

LIMIT : FCC Part15 Subpart.B Class B (3m)
MARGIN: 3 dB



RADIATED EMISSION

Date : 2013-03-08

Model Name : 50LN5400-UA
Model No. :
Serial No. :
Test Condition : HDMI

Reference No. :
Power Supply : 120 V 60 Hz
Temp/Humi : 21 °C 40 % R.H
Operator :

Memo :

LIMIT : FCC Part15 Subpart.B Class B (3m)
MARGIN: 3 dB

No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal -----										
1	120.160	43.2	11.6	1.6	24.1	32.3	43.5	11.2	237	8
2	210.321	43.2	10.3	2.4	23.9	32.0	43.5	11.5	235	237
3	239.856	46.4	12.1	2.5	23.8	37.2	46.0	8.8	115	1
4	396.858	38.7	16.0	3.5	23.5	34.7	46.0	11.3	100	129
5	594.278	38.2	18.6	4.1	23.4	37.5	46.0	8.5	100	0
----- Vertical -----										
6	30.000	32.0	17.9	0.8	23.8	26.9	40.0	13.1	141	1
7	864.762	40.5	20.5	4.9	23.2	42.7	46.0	3.3	100	0

< (1 ~ 6) GHz _ Peak >

RADIATED EMISSION

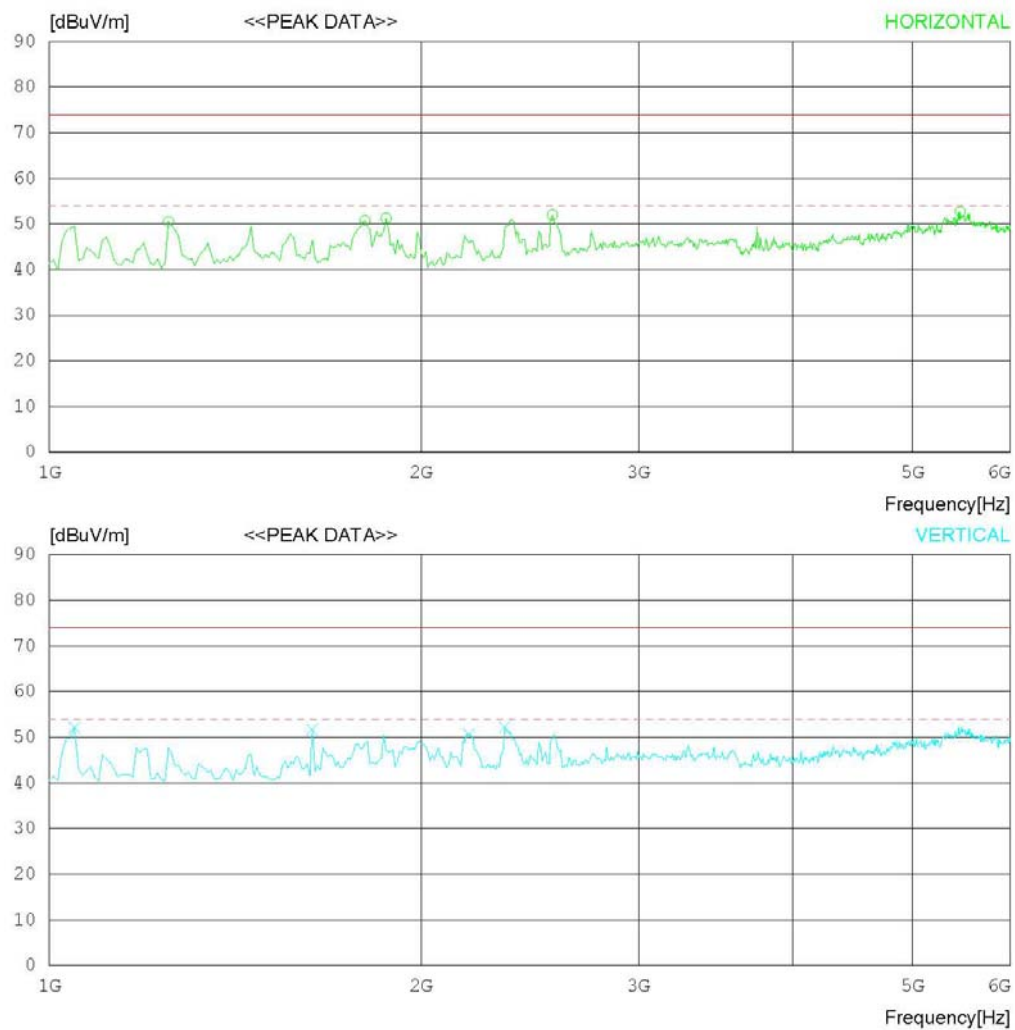
Date : 2013-03-08

Model Name : 50LN5400-UA
Model No. :
Serial No. :
Test Condition : HDMI

Reference No. :
Power Supply : 120 V 60 Hz
Temp/Humi : 20 °C 39 % R.H
Operator :

Memo :

LIMIT : FCC Part15 Subpart.B Class B (3m) - 18G(Peak)
FCC Part15 Subpart.B Class B (3m) - 18G(Avg)



RADIATED EMISSION

Date : 2013-03-08

Model Name : 50LN5400-UA	Reference No. :
Model No. :	Power Supply : 120 V 60 Hz
Serial No. :	Temp/Humi : 20 °C 39 % R.H
Test Condition : HDMI	Operator :

Memo :

LIMIT : FCC Part15 Subpart B Class B (3m) - 18G(Peak)
FCC Part15 Subpart B Class B (3m) - 18G(Avg)

No.	FREQ [MHz]	READING PEAK [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal -----										
1	1248.397	61.0	24.3	3.7	38.4	50.6	74.0	23.4	100	1
2	1801.282	59.4	24.6	4.5	37.7	50.8	74.0	23.2	100	221
3	1873.397	59.8	24.6	4.6	37.7	51.3	74.0	22.7	100	212
4	2554.494	56.4	27.6	5.3	37.3	52.0	74.0	22	100	210
5	5463.150	46.2	34.9	7.9	36.3	52.7	74.0	21.3	100	101
----- Vertical -----										
6	1048.077	63.5	23.9	3.4	38.7	52.1	74.0	21.9	100	358
7	1633.013	60.7	24.6	4.2	37.8	51.7	74.0	22.3	100	358
8	2185.899	57.7	25.6	4.9	37.5	50.7	74.0	23.3	100	229
9	2338.145	58.0	26.5	5.1	37.4	52.2	74.0	21.8	100	358

< (1 ~ 6) GHz _ Average >

RADIATED EMISSION

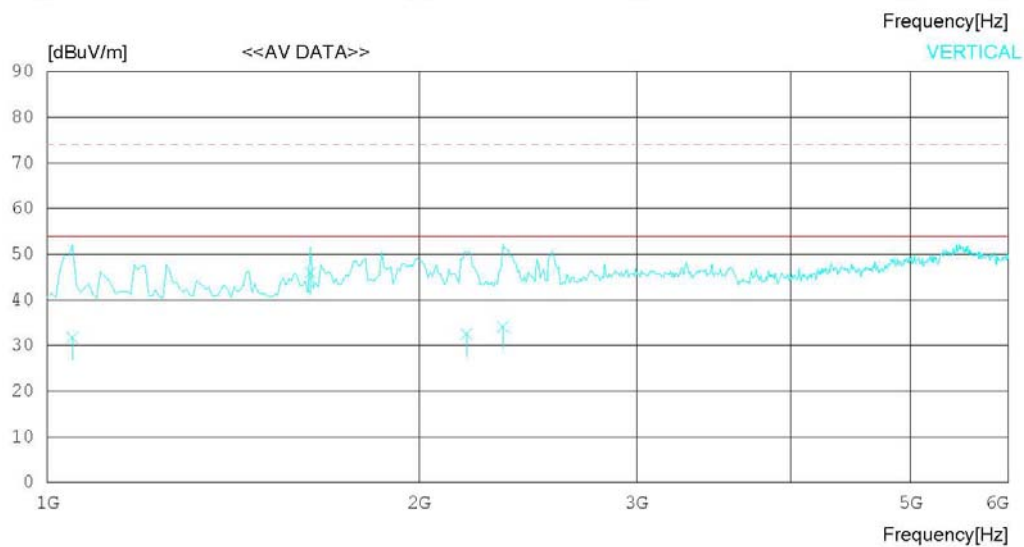
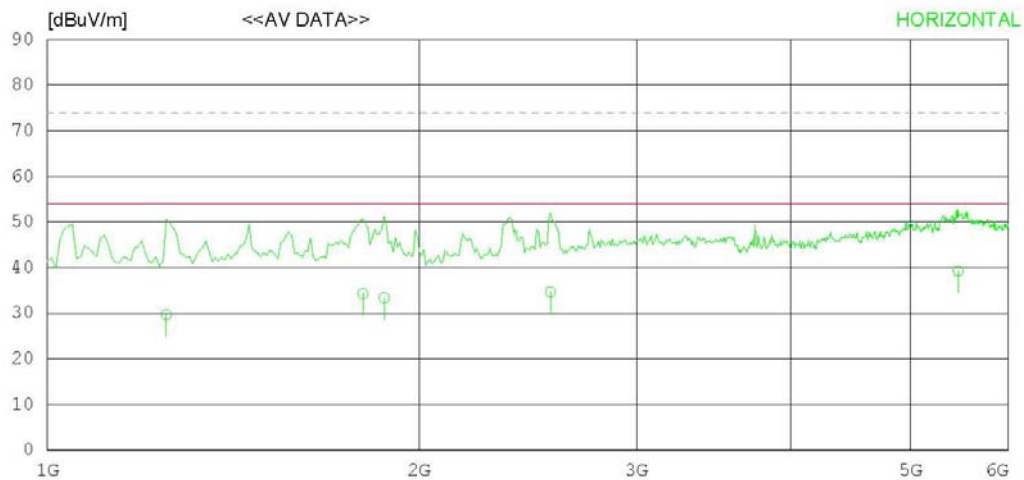
Date : 2013-03-08

Model Name : 50LN5400-UA
Model No. :
Serial No. :
Test Condition : HDMI

Reference No. :
Power Supply : 120 V 60 Hz
Temp/Humi : 20 °C 39 % R.H
Operator :

Memo :

LIMIT : FCC Part15 Subpart.B Class B (3m) - 18G(Avg)
FCC Part15 Subpart.B Class B (3m) - 18G(Peak)



RADIATED EMISSION

Date : 2013-03-08

Model Name : 50LN5400-UA	Reference No. :
Model No. :	Power Supply : 120 V 60 Hz
Serial No. :	Temp/Humi : 20 °C 39 % R.H
Test Condition : HDMI	Operator :

Memo :

LIMIT : FCC Part15 Subpart B Class B (3m) - 18G(Avg)
FCC Part15 Subpart B Class B (3m) - 18G(Peak)

No.	FREQ [MHz]	READING AV [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal -----										
1	1248.397	40.1	24.3	3.7	38.4	29.7	54.0	24.3	100	1
2	1801.282	42.9	24.6	4.5	37.7	34.3	54.0	19.7	100	221
3	1873.397	41.9	24.6	4.6	37.7	33.4	54.0	20.6	100	212
4	2554.494	39.1	27.6	5.3	37.3	34.7	54.0	19.3	100	210
5	5463.150	32.8	34.9	7.9	36.3	39.3	54.0	14.7	100	101
----- Vertical -----										
6	1048.077	43.2	23.9	3.4	38.7	31.8	54.0	22.2	100	358
7	1633.013	55.0	24.6	4.2	37.8	46.0	54.0	8.0	100	358
8	2185.899	39.5	25.6	4.9	37.5	32.5	54.0	21.5	100	229
9	2338.145	39.9	26.5	5.1	37.4	34.1	54.0	19.9	100	358

Appendix 1

List of Test and Measurement Instruments

To facilitate inclusion on each page of the test equipment used for related tests, each item of test equipment is identified by the Test Laboratory.

1. Conducted Disturbance

Name of Instrument	Model No.	Manufacturer	Serial No.	Cal. Date	Next Cal. Date
☐ SPECTRUM ANALYZER	8591E	H/P	3649A05889	2013.02.28	2014.02.28
☐ RFI/FIELD INTENSITY METER	KNM-2402	KYORITSU	4N-170-3	2012.07.02	2013.07.02
☐ LISN	KNW-407	KYORITSU	8-317-8	2013.01.08	2014.01.08
☒ LISN	PMM L2-16B	NARDA S.T.S. / PMM	000WX20305	2012.07.25	2013.07.25
☐ 50 OHM TERMINATOR	CT-01	TME	N/A	2013.01.08	2014.01.08
☒ EMI TEST RECEIVER	ESCI	ROHDE & SCHWARZ	100364	2013.02.27	2014.02.27
☐ LISN	ESH2-Z5	ROHDE & SCHWARZ	828739/006	2012.09.18	2013.09.18
☒ LISN	LISN1600	TTI	197204	2012.07.02	2013.07.02
☒ 50 OHM TERMINATOR	CT-01	TME	N/A	2013.01.08	2014.01.08

2. Radiated Disturbance

Name of Instrument	Model No.	Manufacturer	Serial No.	Cal. Date	Next Cal. Date
☒ EMI TEST RECEIVER	ESU	ROHDE & SCHWARZ	100014	2013.01.08	2014.01.08
☒ BILOG ANTENNA	CBL6112B	SCHAFFNER	2737	2012.11.06	2014.11.06
☒ HORN ANTENNA	BBHA9120A	SCHWARZBECK	322	2012.05.15	2014.05.15
☒ AMPLIFIER	8447E	H/P	2945A02865	2013.01.08	2014.01.08
☒ PREAMPLIFIER	8449B	AGILENT	3008A01590	2013.02.27	2014.02.27
☐ SPECTRUM ANALYZER	E4411B	AGILENT	US41062735	2012.07.11	2013.07.11
☐ AMPLIFIER	8447D	AGILENT	2443A03690	2012.07.01	2013.07.01
☐ EMI TEST RECEIVER	ESCI	ROHDE & SCHWARZ	100364	2013.02.27	2014.02.27
☐ BICONICAL ANT.	VHA 9103	SCHWARZBECK	91032789	2012.04.10	2014.04.10
☐ LOG-PERIODIC ANT.	UHALP 9108A	SCHWARZBECK	590	2012.04.10	2014.04.10
☐ BICONICAL ANT.	VHA 9103	SCHWARZBECK	91031946	2012.03.12	2014.03.12
☐ LOG-PERIODIC ANT.	UHALP 9108-A1	SCHWARZBECK	1098	2012.03.12	2014.03.12
☐ AMPLIFIER	MLA-100K01-B01-26	TSJ	1252741	2013.02.28	2014.02.28

Appendix 2

Report Revision History

Revision Date	Description	Revised By	Revision Reviewed By
None	Original	N/A	N/A