



FCC TEST REPORT

According to

47 CFR, Part 2, Part 15 and CISPR PUB. 22

Applicant	: LG Electronics USA
Address	: 1000 Sylvan Avenue Englewood Cliffs New Jersey United States
Manufacturer	: LG Electronics Nanjing Display Co., Ltd.
Address	: No.346,Yaoxin Road Economic & Technical Development Zone Nanjing China
Equipment	: LCD Monitor
Model No.	: IPS231PX
FCC ID	: BEJIPS231PX
Trade Name	: LG

This is a series report. The original report No. is SEFD1010035

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Document history

Attachment No.	Date	Description
SEFD1010035	Oct 27, 2010	First edition
SEFD1010035-B	Sep 06, 2011	Second edition (Update the motherboard, Power board and Internal structure design)



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I HEREBY CERTIFY THAT :

The measurements shown in this test report were made in accordance with the procedures given in **ANSI C63.4 – 2003** and the energy emitted by this equipment was **passed CISPR PUB. 22 and FCC Part 15** in both radiated and conducted emission class B limits. Testing was carried out on Sep 04, 2011 at **Cerpass Technology Corp.**

Documented By:

Approved By:

Sophie Li/ Administration

Miro Chueh/ Technical director



1. Summary of Test Procedure and Test Result

Test Item	Normative References	Test Result
Conducted Emission	ANSI C63.4-2003 FCC Part 15 Subpart B	PASS
Radiated Emission	ANSI C63.4-2003 FCC Part 15 Subpart B	PASS



2. Test Configuration of Equipment under Test

2.1. Feature of Equipment under Test

LCD Monitor	Model No:	IPS231PX
DVI Cable	Shielded, 2.0m, with two ferrite cores bonded	
VGA Cable	Shielded, 1.8m, with two ferrite cores bonded	
Audio Cable	Non-Shielded, 1.5m, with one ferrite core bonded	
Power Supply cable	Non-Shielded, 1.8m	

2.2. Test Manner

Test Software	
a	During testing, the interface cables and equipment positions were varied according to ANSI C63.4.
b	The complete test system included the PC, USB Mouse, USB Keyboard, Printer and EUT for EMI test.
c	During the test, setup up the EUT and all system, turn on the power of all Equipments, run the EMC test software "H", set the contrast control to maximum, set the brightness control to maximum, use white letters on a black background to represent all colors, make the EUT at the test mode and it is normal operation, and then test.
The pre-test modes	
	Test Mode 1: Full system (VGA mode 1920*1080@60Hz)
	Test Mode 2: Full system (VGA mode 1024*768@75Hz)
	Test Mode 3: Full system (VGA mode 720*400@70Hz)
	Test Mode 4: Full system (DVI mode 1920*1080@60Hz)
	Test Mode 5: Full system (DVI mode 1024*768@75Hz)
	Test Mode 6: Full system (DVI mode 720*400@70Hz)
Select the worst case of the pre-test modes as the final test mode	
	Test Mode 1: Full system (VGA mode 1920*1080@60Hz)

**2.3. Description of Support Unit**

No	Device	Manufacturer	Model No.	Description
1	PC	Dell	DCSM	N/A
2	USB Mouse	DELL	G0K02XYK	N/A
3	USB Keyboard	DELL	SK-8115	N/A
4	Printer	Epson	EX3	N/A

No	Cable	Quantity	Description
A	DVI Cable	1	Shielded, 2.0m, with two ferrite cores bonded
B	VGA Cable	1	Shielded, 1.8m, with two ferrite cores bonded
C	Audio Cable	1	Non-Shielded, 1.5m, with one ferrite core bonded
D	USB Cable	1	Shielded, 1.8m, with one ferrite core bonded
E	USB Cable	1	Shielded, 1.5m
F	Parallel Cable	1	Shielded, 1.8m



2.4. General Information of Test

Test Site:	CerpPASS Technology Corp.
Performand Location :	No.66,Tangzhuang Road, Suzhou Industrial Park, Jiangsu 215006, China
NVLAP LAB Code :	200814-0
FCC Registration Number :	916572, 331395
IC Registration Number :	7290A-1, 7290A-2
VCCI Registration Number :	T-1945 for Telecommunication Test C-2919 for Conducted emission test R-2670 for Radiated emission test below 1GHz G-227 for Radiated emission test above 1GHz
Frequency Range Investigated :	Conducted Emission Test: from 150kHz to 30 MHz Radiated Emission Test: from 30 MHz to 1,000 MHz Radiated Emission Test: from 1GHz to 18GHz
Test Distance :	The test distance of radiated emission below 1GHz from antenna to EUT is 3 M. The test distance of radiated emission above 1GHz from antenna to EUT is 3 M.

LABORATORY ACCREDITATION



2.5. Measurement Uncertainty

Conducted Emission		
The measurement uncertainty is evaluated as ± 2.71 dB.		
Radiated Emission		
(30MHz -1000MHz)	Horizontal	The measurement uncertainty is evaluated as ± 3.59 dB.
	Vertical	The measurement uncertainty is evaluated as ± 3.89 dB
(1G-18GHz)	Horizontal	The measurement uncertainty is evaluated as ± 2.31 dB.
	Vertical	The measurement uncertainty is evaluated as ± 2.15 dB.



3. Test of Conducted Emission

3.1. Test Limit

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 KHz on the 120 VAC power and return leads of the EUT according to the methods defined in ANSI C63.4-2003 Section 3.1. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane as shown in section 2.2. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

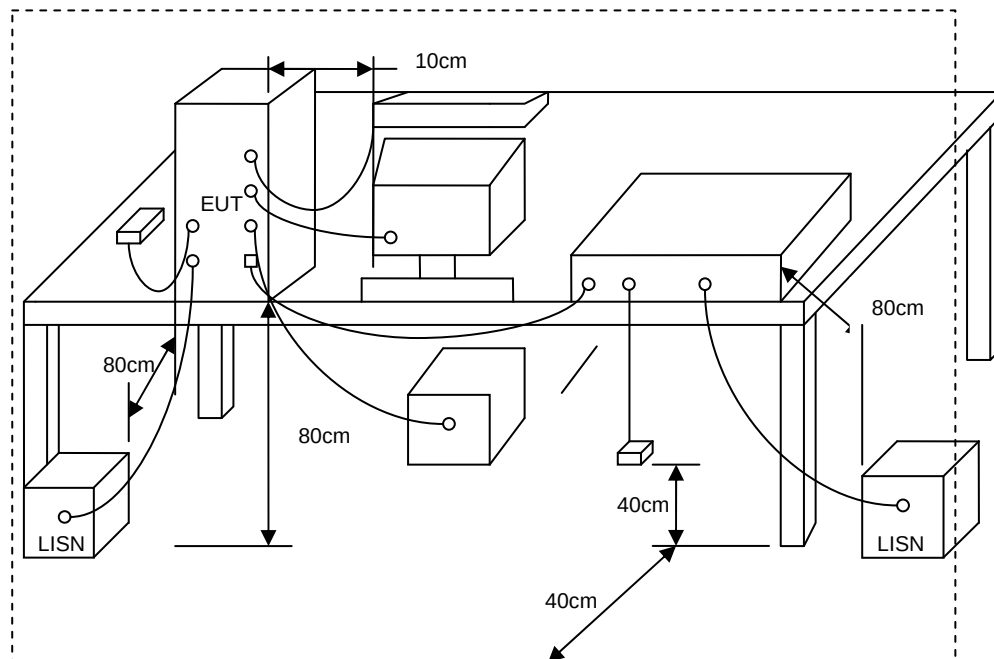
Frequency (MHz)	Quasi Peak (dB μ V)	Average (dB μ V)
0.15 – 0.5	66-56*	56-46*
0.5 – 5.0	56	46
5.0 – 30.0	60	50

3.2. Test Procedures

- The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
- Connect EUT to the power mains through a line impedance stabilization network (LISN).
- All the support units are connecting to the other LISN.
- The LISN provides 50 ohm coupling impedance for the measuring instrument.
- The FCC states that a 50 ohm, 50 micro-Henry LISN should be used.
- Both sides of AC line were checked for maximum conducted interference.
- The frequency range from 150 kHz to 30 MHz was searched.
- Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.



3.3. Typical test Setup



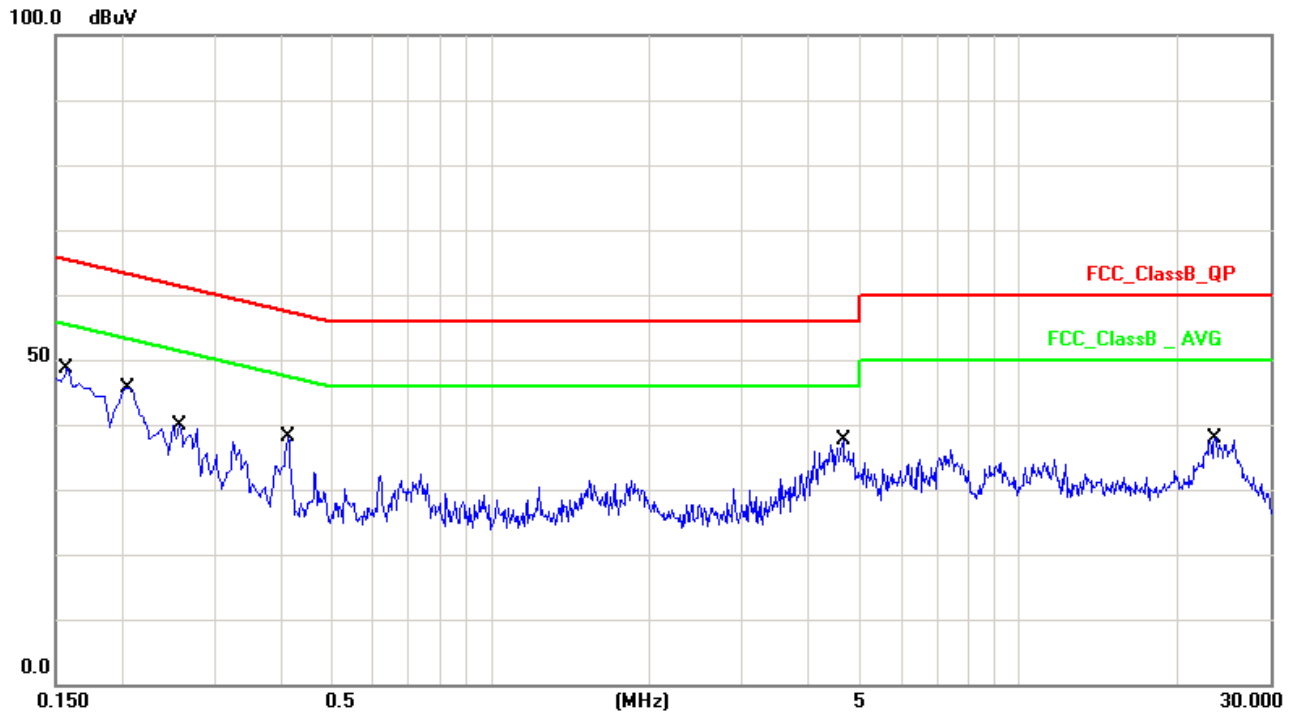
3.4. Measurement equipment

Instrument	Manufacturer	Model No.	Serial No.	Calibration Date
Test Receiver	R&S	ESCI	100565	2011.01.15
AMN	R&S	ESH2-Z5	100182	2011.03.14
Two-Line V-Network	R&S	ENV216	100325	2011.03.14
ISN	FCC	FCC-TLISN-T2-02	20379	2011.03.14
ISN	FCC	FCC-TLISN-T4-02	20380	2011.03.14
ISN	FCC	FCC-TLISN-T8-02	20381	2011.03.14
Current Probe	R&S	EZ-17	100303	2011.03.14
Passive Voltage Probe	R&S	ESH2-Z3	100026	2011.03.14
Attenuator	R&S	ESH3-Z2	100529	2011.01.11
Temperature/ Humidity Meter	Zhicheng	ZC1-11	CEP-TH-004	2011.08.14



3.5. Test Result and Data

Test Mode :	Mode 1: Full system (VGA mode 1920*1080@60Hz)		
AC Power :	AC 120V/60Hz	Phase :	L
Temperature :	20°C	Humidity :	52%
Pressur(mbar) :	1002	Date :	2011/09/02

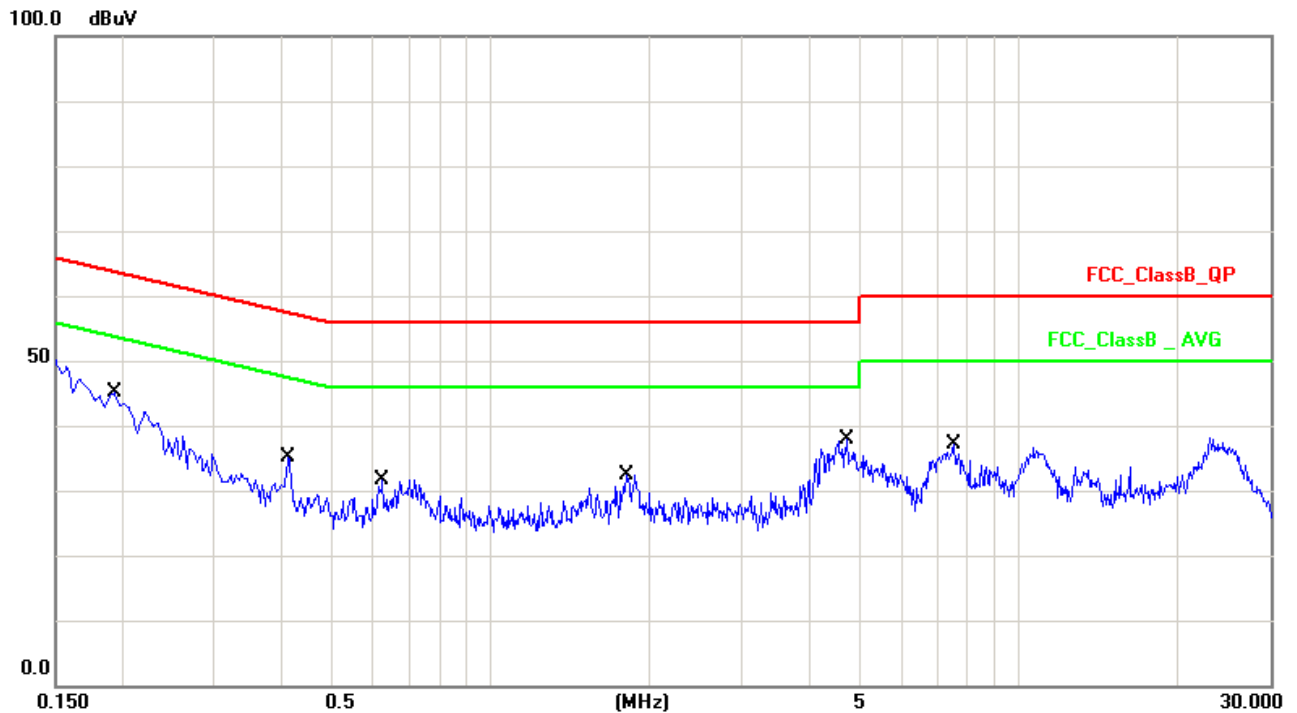


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1580	19.87	20.33	40.20	65.57	-25.37	QP
2	0.1580	19.87	1.13	21.00	55.57	-34.57	AVG
3	0.2060	19.87	23.42	43.29	63.37	-20.08	QP
4	0.2060	19.87	19.46	39.33	53.37	-14.04	AVG
5	0.2580	19.86	11.77	31.63	61.50	-29.87	QP
6	0.2580	19.86	0.55	20.41	51.50	-31.09	AVG
7	0.4140	19.86	14.62	34.48	57.57	-23.09	QP
8	0.4140	19.86	12.24	32.10	47.57	-15.47	AVG
9	4.6620	19.71	9.59	29.30	56.00	-26.70	QP
10	4.6620	19.71	-0.07	19.64	46.00	-26.36	AVG
11	23.5660	19.57	9.57	29.14	60.00	-30.86	QP
12	23.5660	19.57	3.93	23.50	50.00	-26.50	AVG

Note: Measurement Level = Reading Level + Correct Factor



Test Mode :	Mode 1: Full system (VGA mode 1920*1080@60Hz)		
AC Power :	AC 120V/60Hz	Phase :	N
Temperature :	20°C	Humidity :	52%
Pressur(mbar) :	1002	Date :	2011/09/02



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1940	19.50	21.64	41.14	63.86	-22.72	QP
2	0.1940	19.50	6.50	26.00	53.86	-27.86	AVG
3	0.4140	19.50	13.40	32.90	57.57	-24.67	QP
4	0.4140	19.50	11.95	31.45	47.57	-16.12	AVG
5	0.6260	19.50	5.83	25.33	56.00	-30.67	QP
6	0.6260	19.50	2.81	22.31	46.00	-23.69	AVG
7	1.8100	19.50	5.21	24.71	56.00	-31.29	QP
8	1.8100	19.50	-1.18	18.32	46.00	-27.68	AVG
9	4.7220	19.63	10.09	29.72	56.00	-26.28	QP
10	4.7220	19.63	0.99	20.62	46.00	-25.38	AVG
11	7.5620	19.72	11.21	30.93	60.00	-29.07	QP
12	7.5620	19.72	4.80	24.52	50.00	-25.48	AVG

Note: Measurement Level = Reading Level + Correct Factor

Test engineer: Seben



4. Test of Radiated Emission

4.1. Test Limit

Radiated emissions from 30 MHz to 1,000 MHz were measured with a bandwidth of 120 kHz according to the methods defines in ANSI C63.4-2003. The EUT was placed on a nonmetallic stand in the open-field site, 0.8 meter above the ground plane, as shown in section 3.2. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions.

For unintentional device, according to § 15.109(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency (MHz)	Distance (m)	Level (dBuV/m)	Level (dBuV/m)
30 - 88	3	40(QP)	N/A
88 - 216	3	43(QP)	N/A
216-960	3	46(QP)	N/A
960-1000	3	54(QP)	N/A
1000-18000	3	74(PK)	54(AV)

For unintentional device, according to CISPR PUB.22, for Class B digital devices, the general requirement of field strength of radiated emissions from intentional radiators at a distance of 10 meters shall not exceed the below table.

Frequency (MHz)	Distance Meters	Radiated (dB μ V/ M)
30-230	10	30
230-1000	10	37

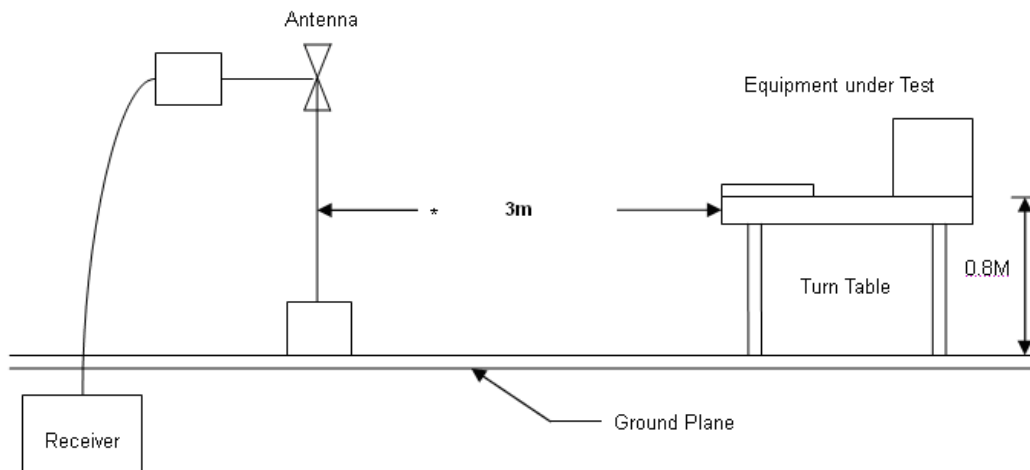


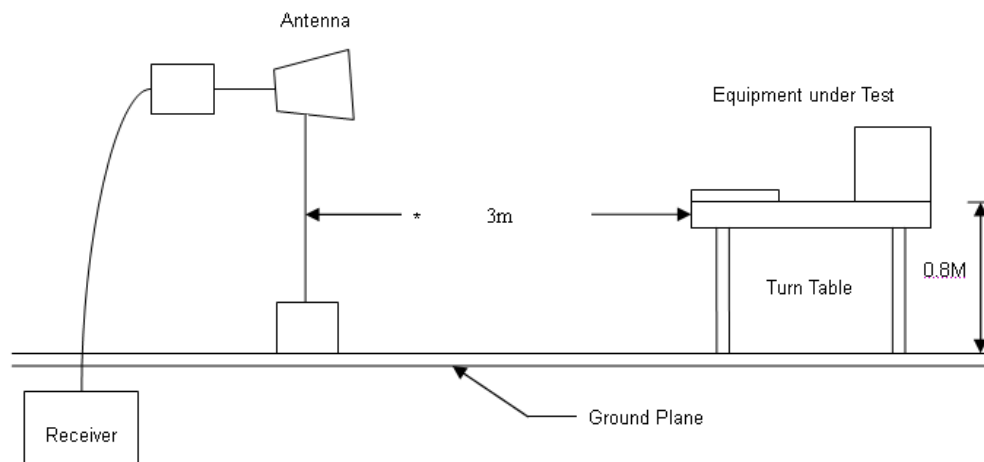
4.2. Test Procedures

- The EUT was placed on a Rota table top 0.8 meter above ground.
- The EUT and its simulators are placed on the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters or 1 meter.
- The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.
- Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated on radiated measurement.
- Radiated emissions were investigated over the frequency range from 30MHz to 1GHz using a receiver bandwidth of 120KHz and the frequency range from 1GHz to 18GHz using a receiver bandwidth of 1MHz.

4.3. Typical test Setup

Below 1GHz Test Setup



**Above 1GHz Test Setup****4.4. Measurement equipment**

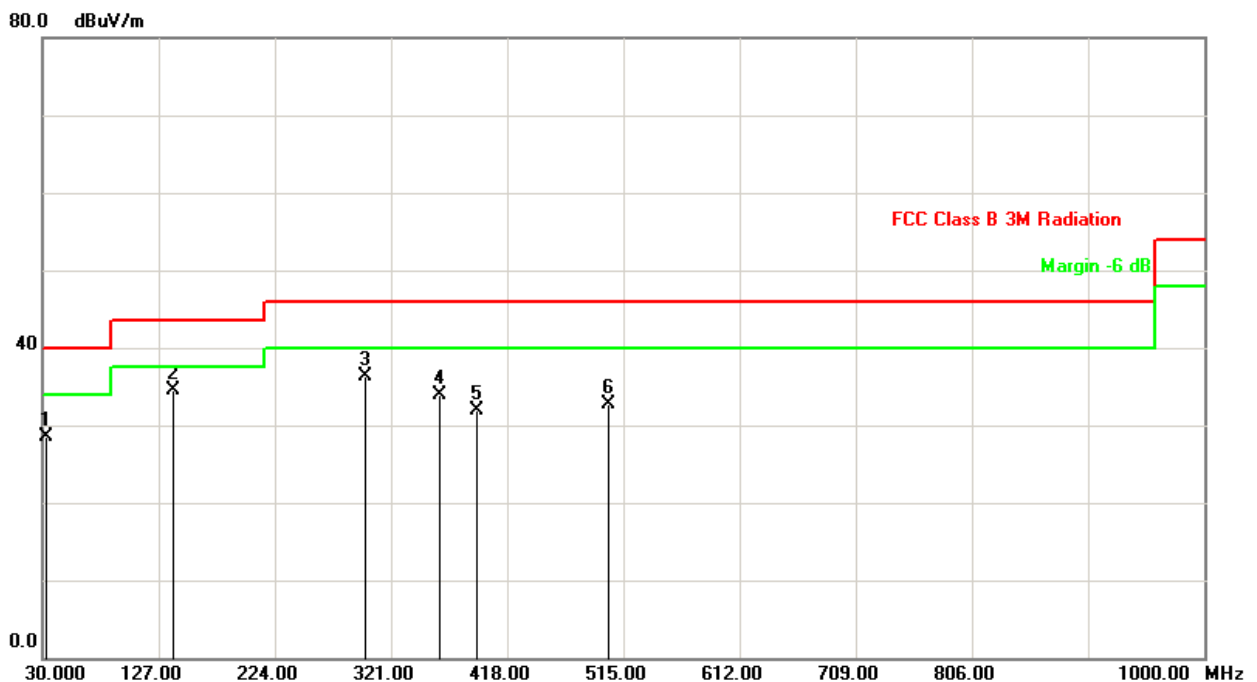
Instrument	Model No.	Manufacturer	Serial No.	Calibration Date
EMI Test Receiver	R&S	ESCI	100563	2011.03.14
H64 Amplifier	HP	8447F	3113A05582	2011.08.14
Preamplifier	Agilent	8449B	3008A02342	2011.02.10
Ultra Broadband Antenna	R&S	HL562	100363	2011.05.07
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	9120D-619	2011.05.07
Spectrum Analyzer	R&S	FSP40	100324	2011.08.14
Temperature/ Humidity Meter	Zhicheng	ZC1-11	CEP-TH-002	2011.08.17



4.5. Test Result and Data

Under 1G:

Engineer : Seven	
Site : EMC Lab AC 102	Time : 2011/09/04 -09:43:06
Limit : FCC_CLASS_B_03M_QP	Margin : 6
EUT : LCD Monitor	Probe : HL562(30-1000MHz) - HORIZONTAL
Power : AC 120V/60Hz	Note : Mode 1: Full system (VGA mode 1920*1080@60Hz)

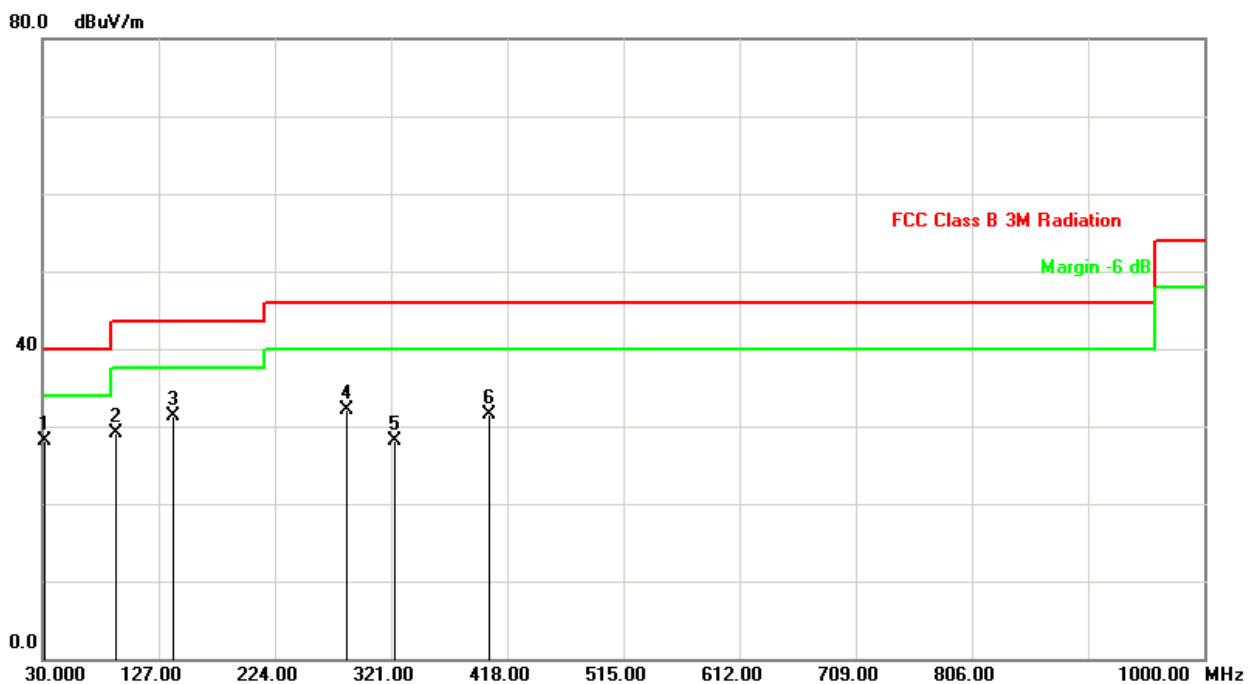


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	33.6200	-7.31	35.87	28.56	40.00	-11.44	QP	100	165
2	139.1800	-14.90	49.41	34.51	43.50	-8.99	QP	382	316
3	299.7300	-10.92	47.21	36.29	46.00	-9.71	QP	203	137
4	361.4800	-8.82	42.79	33.97	46.00	-12.03	QP	198	56
5	392.3500	-7.81	39.77	31.96	46.00	-14.04	QP	184	13
6	502.3300	-4.77	37.39	32.62	46.00	-13.38	QP	213	155

Note: Measurement Level = Reading Level + Correct Factor



Engineer : Seven	
Site : EMC Lab AC 102	Time : 2011/09/04 -09:43:06
Limit : FCC_CLASS_B_03M_QP	Margin : 6
EUT : LCD Monitor	Probe : HL562(30-1000MHz) - VERTICAL
Power : AC 120V/60Hz	Note : Mode 1: Full system (VGA mode 1920*1080@60Hz)



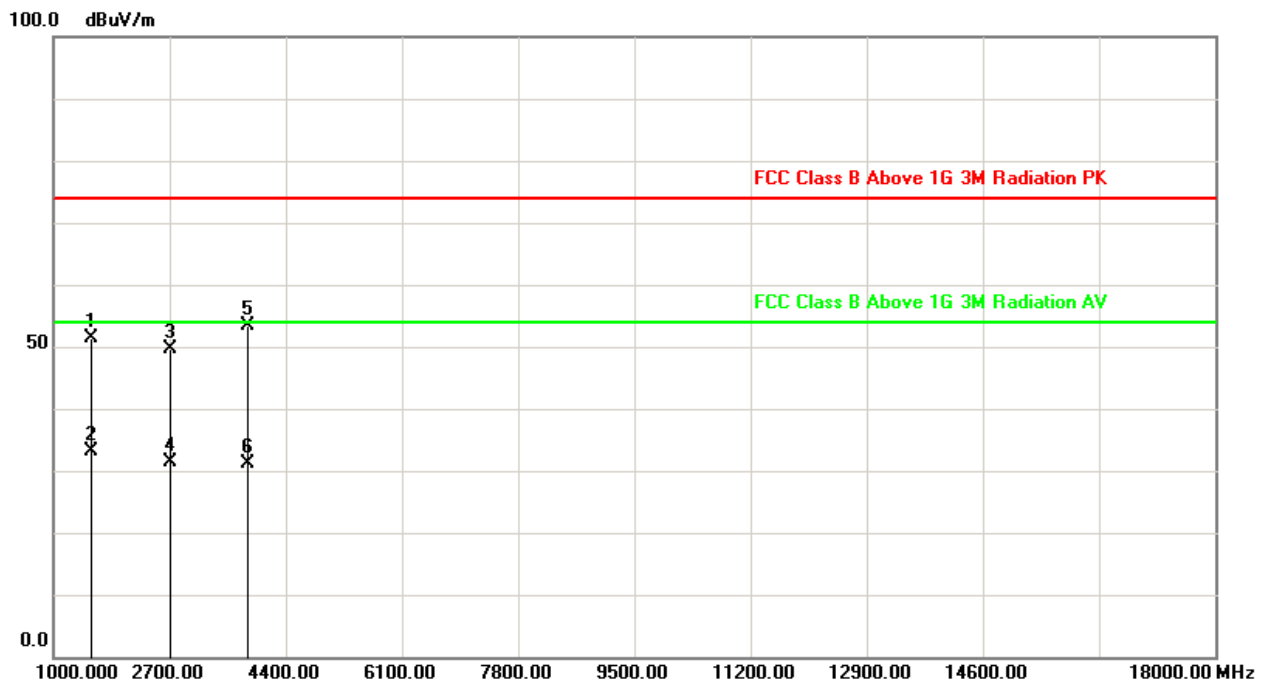
No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	31.6500	-6.03	34.19	28.16	40.00	-11.84	QP	125	163
2	91.8200	-14.88	44.05	29.17	43.50	-14.33	QP	198	46
3	138.8800	-14.89	46.16	31.27	43.50	-12.23	QP	312	103
4	283.5200	-11.50	43.62	32.12	46.00	-13.88	QP	113	157
5	323.9200	-10.09	38.25	28.16	46.00	-17.84	QP	213	204
6	403.1700	-7.47	38.93	31.46	46.00	-14.54	QP	125	241

Note: Measurement Level = Reading Level + Correct Factor



Above 1G

Engineer : Seven	
Site : EMC Lab AC 102	Time : 2011/09/04 - 10:20:21
Limit : FCC_15_03M_PK/ AV	Margin : 6
EUT : LCD Monitor	Probe : BBHA9120D(1-18GHz) - HORIZONTAL
Power : AC 120V/60Hz	Note : Mode 1: Full system (VGA mode 1920*1080@60Hz)

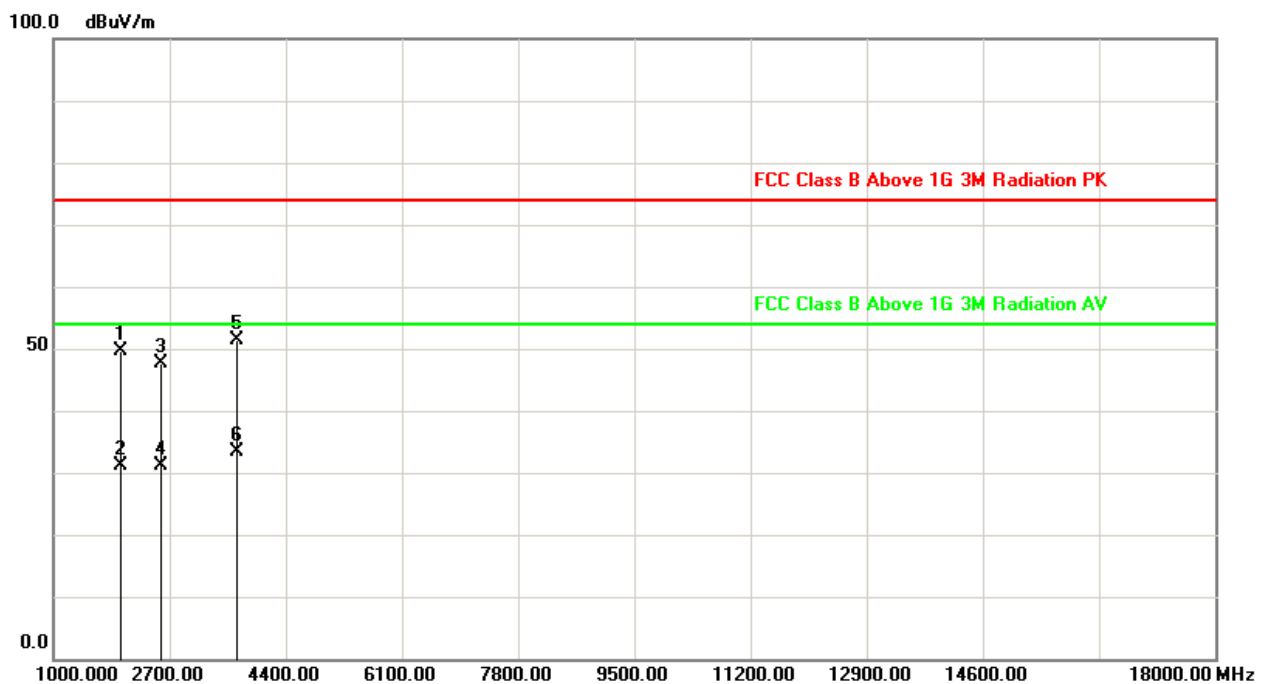


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	1562.950	-15.18	66.50	51.32	74.00	-22.68	peak	392	131
2	1562.950	-15.18	48.35	33.17	54.00	-20.83	AVG	392	131
3	2716.530	-11.06	60.61	49.55	74.00	-24.45	peak	198	154
4	2716.530	-11.06	42.35	31.29	54.00	-22.71	AVG	198	154
5	3852.610	-9.12	62.44	53.32	74.00	-20.68	peak	203	348
6	3852.610	-9.12	40.26	31.14	54.00	-22.86	AVG	203	348

Note: Measurement Level = Reading Level + Correct Factor



Engineer : Seven	
Site : EMC Lab AC 102	Time : 2011/09/04 - 10:20:21
Limit : FCC_15_03M_PK/AV	Margin : 6
EUT : LCD Monitor	Probe : BBHA9120D(1-18GHz) - VERTICAL
Power : AC 120V/60Hz	Note : Mode 1: Full system (VGA mode 1920*1080@60Hz)



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	1993.650	-13.91	63.57	49.66	74.00	-24.34	peak	113	45
2	1993.650	-13.91	45.11	31.20	54.00	-22.80	AVG	113	45
3	2569.680	-11.50	59.06	47.56	74.00	-26.44	peak	256	173
4	2569.680	-11.50	42.72	31.22	54.00	-22.78	AVG	256	173
5	3678.520	-9.80	61.29	51.49	74.00	-22.51	peak	217	134
6	3678.520	-9.80	43.08	33.28	54.00	-20.72	AVG	217	134

Note: Measurement Level = Reading Level + Correct Factor

Test engineer: Seven