



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.	: N224WHAT
FCC ID	: BEJN224WHAT
Trade Name	: LG

- The test result refers exclusively to the test presented test model / sample.
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Table of Contents

1. Summary of Test Procedure and Test Result	5
2. Test Configuration of Equipment under Test.....	6
2.1. Feature of Equipment under Test	6
2.2. Test Manner.....	6
2.3. Description of Test System	7
2.4. Connection Diagram of Test System	8
2.5. General Information of Test	9
2.6. Measurement Uncertainty	9
3. Test of Conducted Emission	10
3.1. Test Limit	10
3.2. Test Procedures.....	10
3.3. Typical test Setup	11
3.4. Measurement equipment.....	11
3.5. Test Result and Data	12
4. Test of Radiated Emission	13
4.1. Test Limit	13
4.2. Test Procedures.....	14
4.3. Typical test Setup	14
4.4. Measurement equipment.....	15
4.5. Test Result and Data	16

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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 Dec 25, 2010 at **CerpPASS Technology Corp.**

Documented By:

Approved By:

Sophie Li/ Administration

Clinton Kao/ 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:	N224WHAT
AC Adapter	Manufacturer:	LG
	Model No:	PA-1650-68
	Input:	100~240V~, 50-60Hz 2.0A
	Output:	19V  3.42A
DC Cable	Non-Shielded, 1.5m, with one ferrite core bonded	
VGA Cable	Shielded, 1.8m, with two ferrite cores bonded	
Power Supply Cable	Non-Shielded, 1.8m	

2.2. Test Manner

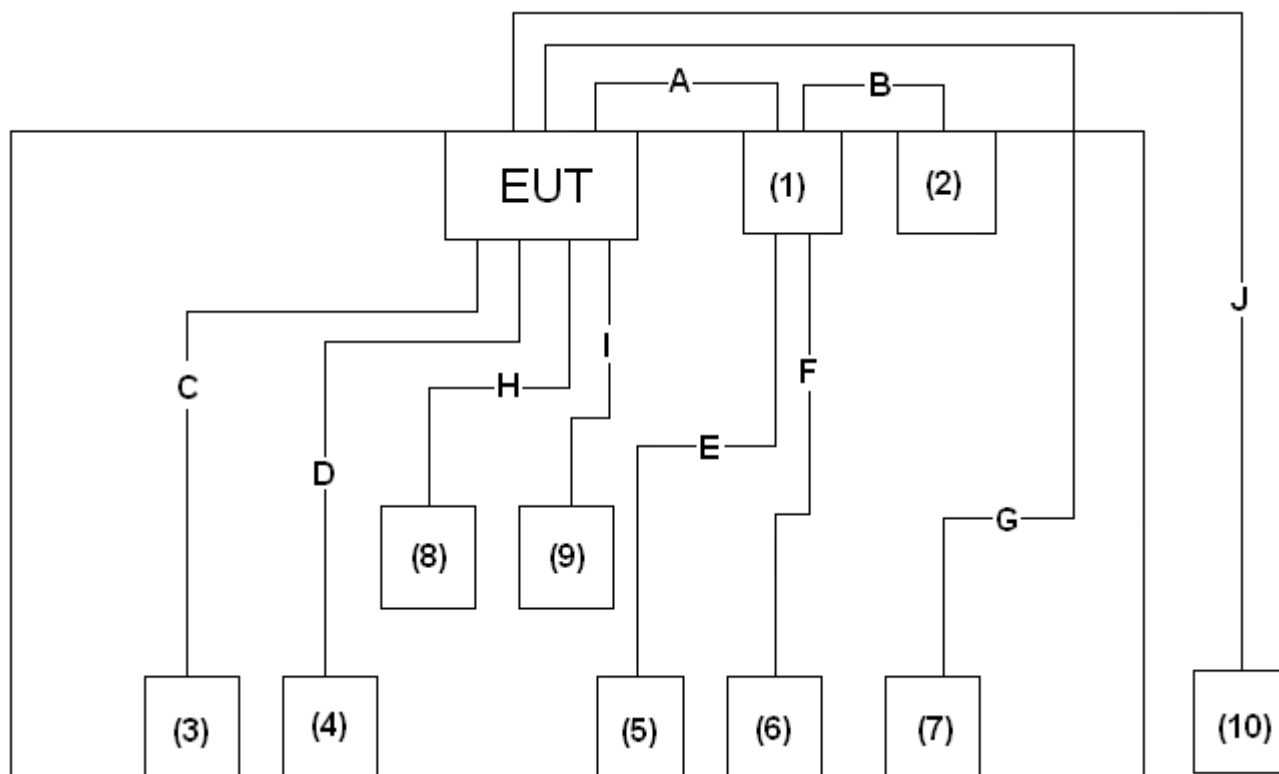
Test Software	
a	During testing, the interface cables and equipment positions were varied according to ANSI C63.4.
b	The complete test system included the PC, Printer, USB Mouse, USB Keyboard, Microphone&Earphone, HDD, Notebook and EUT for EMI test.
c	During the test, setup up the EUT and all system, 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 640*480@60Hz)
	Test Mode 2: Full system (VGA mode 1024*768@60Hz)
	Test Mode 3: Full system (VGA mode 1680*1050@60Hz)
	Test Mode 4: Full system (LAN mode)
Select the worst case of the pre-test modes as the final test mode	
	Test Mode 3: Full system (VGA mode 1680*1050@60Hz)

**2.3. Description of Test System**

No	Device	Manufacturer	Model No.	Description
1	PC	Dell	DCSM	N/A
2	Printer	Epson	EX3	N/A
3	USB Keyboard	DELL	SK-8115	N/A
4	USB Mouse	Logitech	831912-0000	N/A
5	USB Keyboard	DELL	SK-8115	N/A
6	USB Mouse	DELL	G0K02XYK	N/A
7	Microphone&Earphone	SALAR	N/A	N/A
8	HDD	Vipower	630707620	N/A
9	HDD	SSK	SSK-HD-0706	N/A
10	Notebook	SONY	PCG-594P	Power by adaptor



2.4. Connection Diagram of Test System



No	Cable	Quantity	Description
A	VGA Cable	1	Shielded, 1.8m, with two ferrite cores bonded
B	Parallel Cable	1	Shielded, 1.8m
C	USB Cable	1	Shielded, 1.8m, with one ferrite core bonded
D	USB Cable	1	Shielded, 1.5m
E	USB Cable	1	Shielded, 1.8m, with one ferrite core bonded
F	USB Cable	1	Shielded, 1.5m
G	Audio Cable	1	Non-Shielded, 2.0m
H	USB Cable	1	Shielded, 0.5m
I	USB Cable	1	Shielded, 0.5m
J	RJ45 Cable	1	Non-Shielded,>3m

**2.5. 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-343 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

**2.6. Measurement Uncertainty**

Conducted Emission		
The measurement uncertainty is evaluated as ± 2.71 dB.		
Radiated Emission		
(30MHz -1000MHz)	Horizontal	The measurement uncertainty is evaluated as ± 3.89 dB.
	Vertical	The measurement uncertainty is evaluated as ± 3.59 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.

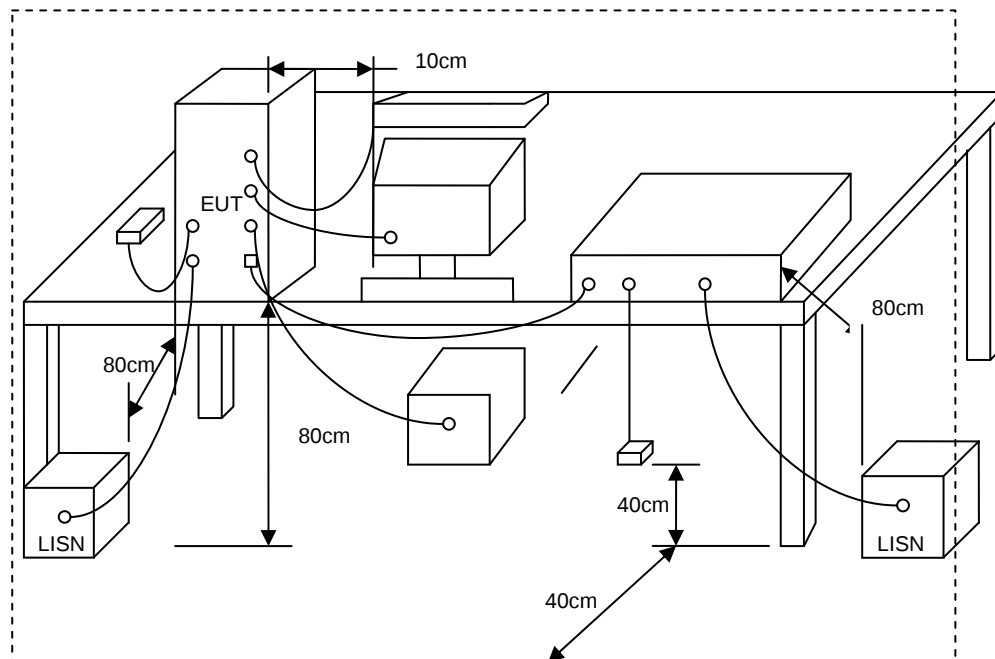
Frequency (MHz)	Quasi Peak (dB μ V)	Average (dB μ V)
0.15 – 0.5	66-56*	56-46*
0.5 – 5.0	56	46
5.0 – 30.0	60	50

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



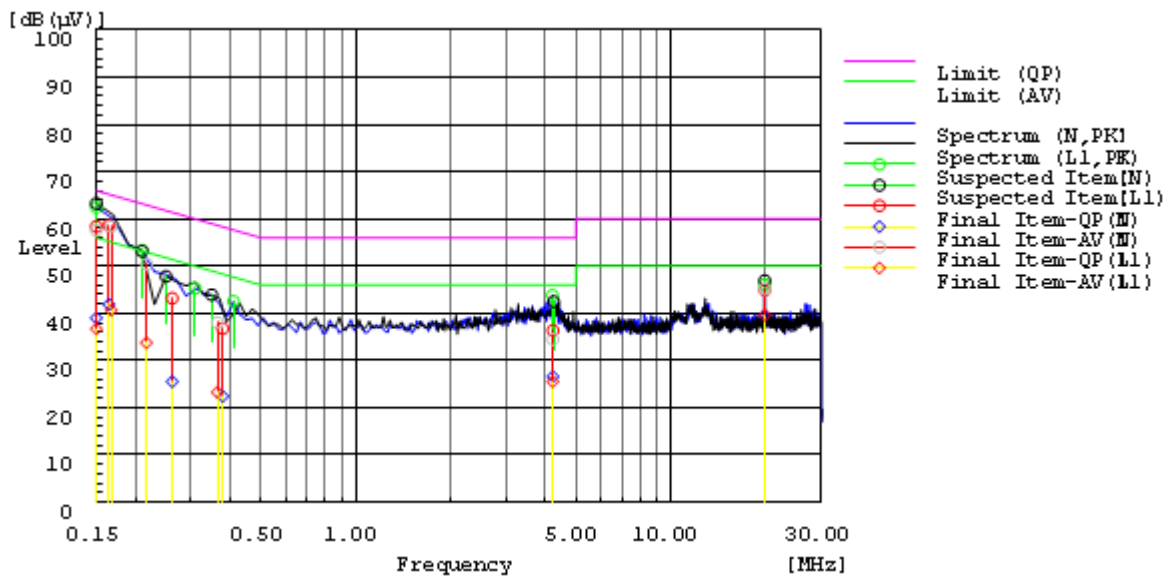
3.4. Measurement equipment

Instrument	Manufacturer	Model No.	Serial No.	Calibration Date
Test Receiver	R&S	ESCI	100565	2010.01.15
AMN	R&S	ESH2-Z5	100182	2010.06.23
Two-Line V-Network	R&S	ENV216	100325	2010.04.18
ISN	FCC	FCC-TLISN-T2-02	20379	2010.06.23
ISN	FCC	FCC-TLISN-T4-02	20380	2010.06.23
ISN	FCC	FCC-TLISN-T8-02	20381	2010.06.23
Current Probe	R&S	EZ-17	100303	2010.06.23
Attenuator	R&S	ESH3-Z2	100529	2010.01.11
Temperature/ Humidity Meter	Zhicheng	ZC1-11	CEP-TH-004	2010.08.14



3.5. Test Result and Data

Test Mode :	Mode 3: Full system (VGA mode 1680*1050@60Hz)		
AC Power :	AC 120V/60Hz	Phase :	L&N
EUT :	LCD Monitor	Model No.:	N224WHAT
Temperature :	22°C	Humidity :	50%
Pressur(mbar) :	1002	Date :	2010/12/22



Frequency MHz	Line Phase	Reading dB(uV) QP	Reading dB(uV) AV	Factor dB	Level dB(uV) QP	Level dB(uV) AV	Limit dB(uV) QP	Limit dB(uV) AV	Margin dB QP	Margin dB AV	Pass/Fail
0.150	L1	37.7	16.8	19.9	57.6	36.7	66.0	56.0	8.4	19.3	Pass
0.16734	L1	38.5	20.8	19.9	58.4	40.7	65.1	55.1	6.7	14.4	Pass
0.21659	L1	30.5	13.9	19.9	50.4	33.8	62.9	52.9	12.5	19.1	Pass
0.36296	L1	18.1	3.4	19.9	38.0	23.3	58.7	48.7	20.7	25.4	Pass
4.21766	L1	14.8	5.9	19.7	34.5	25.6	56.0	46.0	21.5	20.4	Pass
19.8576	L1	25.6	20.1	19.6	45.2	39.7	60.0	50.0	14.8	10.3	Pass
0.150	N	38.9	19.5	19.5	58.4	39.0	66.0	56.0	7.6	17.0	Pass
0.16438	N	39.2	22.4	19.5	58.7	41.9	65.2	55.2	6.5	13.3	Pass
0.2613	N	23.7	6.1	19.5	43.2	25.6	61.4	51.4	18.2	25.8	Pass
0.37773	N	17.3	2.9	19.5	36.8	22.4	58.3	48.3	21.5	25.9	Pass
4.22416	N	16.8	7.0	19.6	36.4	26.6	56.0	46.0	19.6	19.4	Pass
19.8576	N	24.9	19.6	20.0	44.9	39.6	60.0	50.0	15.1	10.4	Pass

Note: Measurement Level = Reading Level + Correct Factor

Test engineer: cheney yan



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

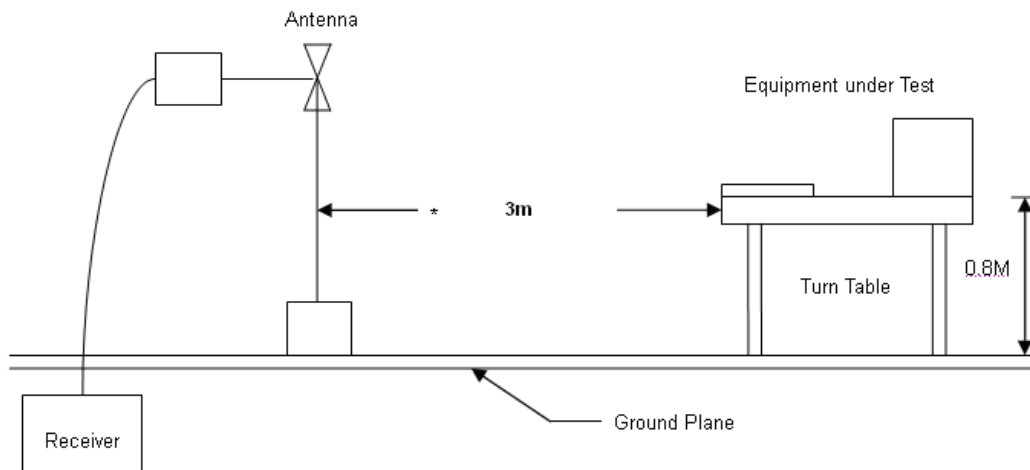


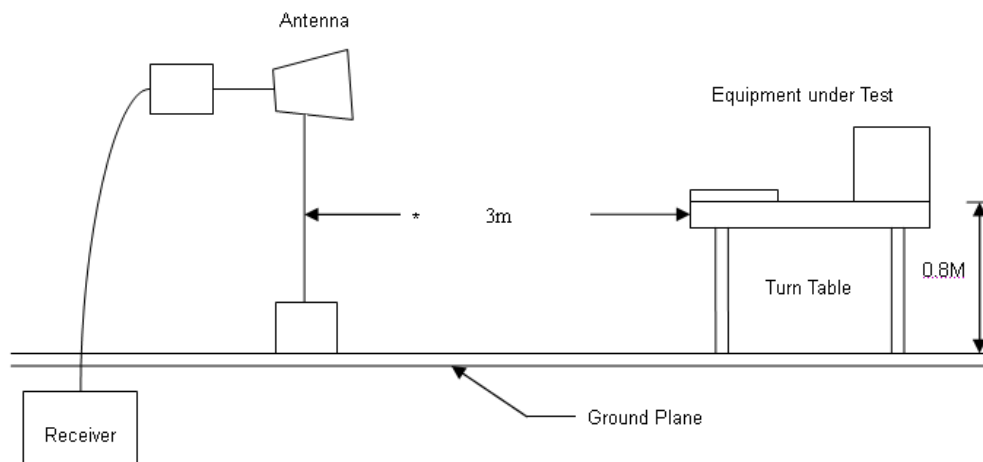
4.2. Test Procedures

- 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.
- 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**

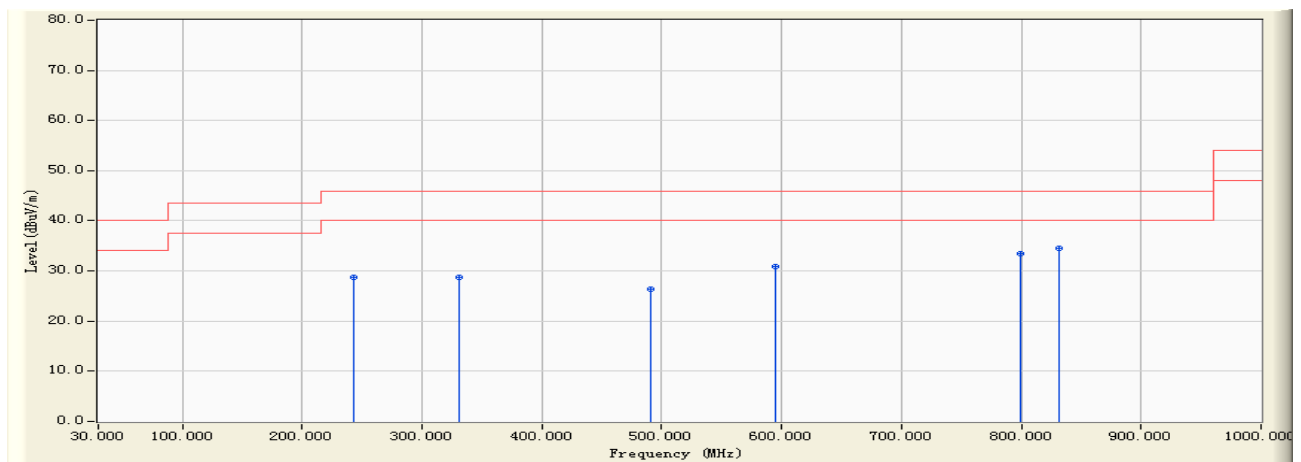
Instrument	Model No.	Manufacturer	Serial No.	Calibration Date
EMI Test Receiver	R&S	ESCI	100563	2010.06.23
H64 Amplifier	HP	8447F	3113A05582	2010.08.14
Preamplifier	Agilent	8449B	3008A02342	2010.02.10
Ultra Broadband Antenna	R&S	HL562	100363	2010.08.14
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	9120D-619	2010.08.14
Spectrum Analyzer	R&S	FSP40	100324	2010.08.14
Temperature/ Humidity Meter	Zhicheng	ZC1-11	CEP-TH-002	2010.08.17



4.5. Test Result and Data

Under 1G

Engineer : Seven	
Site : EMC Lab AC 102	Time : 2010/12/25 - 14:36
Limit : FCC_CLASS_B_03M_QP	Margin : 6
EUT : LCD Monitor	Probe : HL562(30-1000MHz) - HORIZONTAL
Power : AC 120V/60Hz	Note : Mode 3: Full system (VGA mode 1680*1050@60Hz)



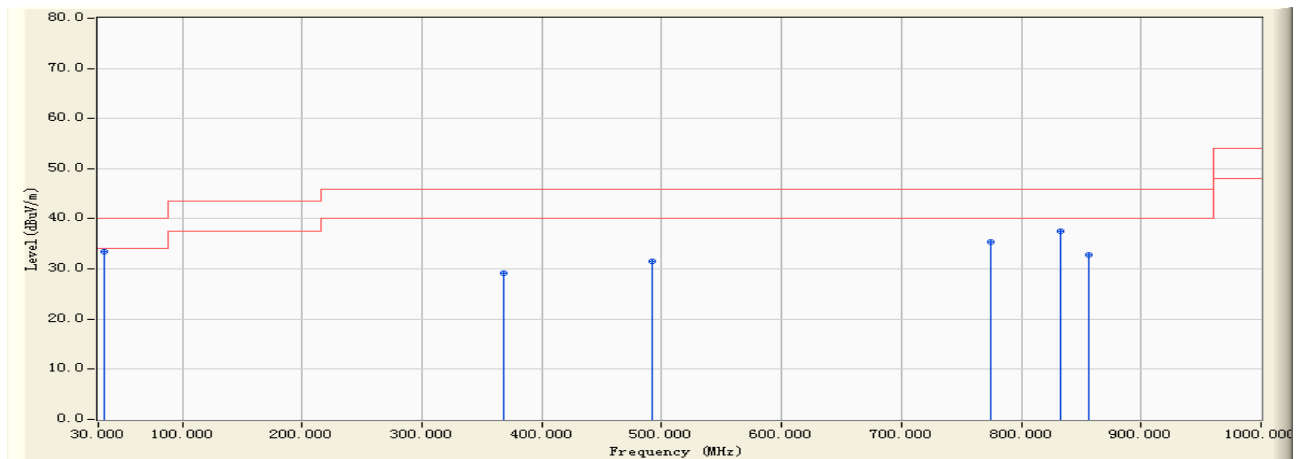
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type	Ant Pos (cm)	Table Pos (deg)
1		243.650	-15.452	44.250	28.799	-17.201	46.000	QUASIPeAK	200.000	51.600
2		331.620	-11.978	40.810	28.832	-17.168	46.000	QUASIPeAK	200.000	152.400
3		491.230	-8.962	35.250	26.288	-19.712	46.000	QUASIPeAK	200.000	246.500
4		594.680	-6.713	37.580	30.868	-15.132	46.000	QUASIPeAK	400.000	216.400
5		799.690	-3.390	36.840	33.450	-12.550	46.000	QUASIPeAK	200.000	254.600
6	*	831.800	-3.035	37.500	34.465	-11.535	46.000	QUASIPeAK	200.000	0.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor



Engineer : Seven	
Site : EMC Lab AC 102	Time : 2010/12/25 - 14:37
Limit : FCC_CLASS_B_03M_QP	Margin : 6
EUT : LCD Monitor	Probe : HL562(30-1000MHz) - VERTICAL
Power : AC 120V/60Hz	Note : Mode 3: Full system (VGA mode 1680*1050@60Hz)



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type	Ant Pos (cm)	Table Pos (deg)
1	*	34.800	-10.353	43.900	33.548	-6.452	40.000	QUASIPeAK	100.000	0.000
2		367.860	-11.372	40.520	29.149	-16.851	46.000	QUASIPeAK	100.000	214.600
3		491.850	-8.964	40.570	31.606	-14.394	46.000	QUASIPeAK	100.000	54.700
4		774.850	-3.490	38.980	35.490	-10.510	46.000	QUASIPeAK	200.000	215.700
5		832.620	-2.989	40.570	37.581	-8.419	46.000	QUASIPeAK	100.000	186.400
6		855.920	-1.728	34.600	32.871	-13.129	46.000	QUASIPeAK	100.000	0.000

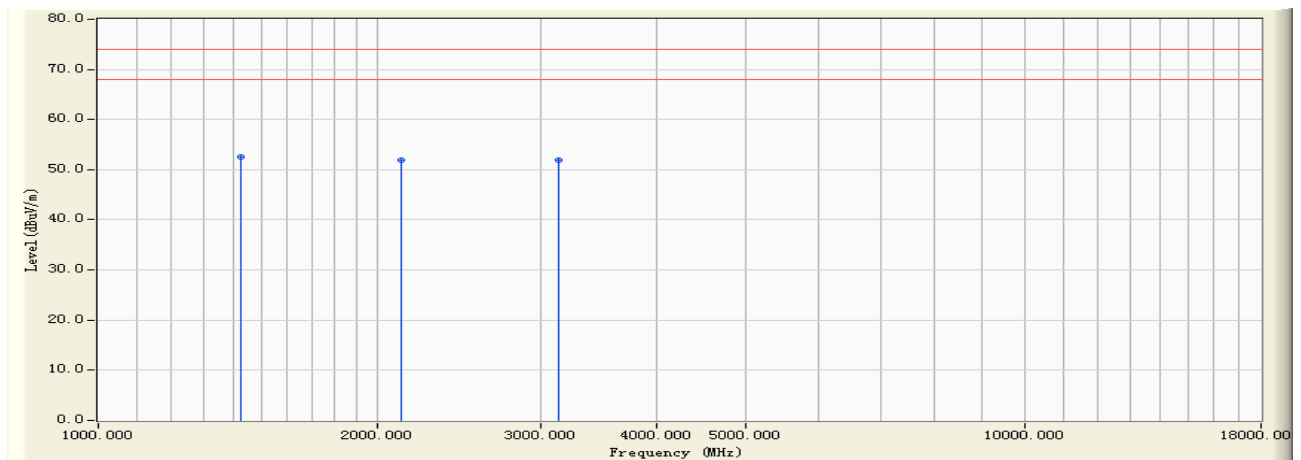
Note:

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2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor



Above 1G

Engineer : Seven	
Site : EMC Lab AC 102	Time : 2010/12/25 - 14:52
Limit : FCC_15_03M_PK	Margin : 6
EUT : LCD Monitor	Probe : BBHA9120D(1-18GHz) - HORIZONTAL
Power : AC 120V/60Hz	Note : Mode 3: Full system (VGA mode 1680*1050@60Hz)



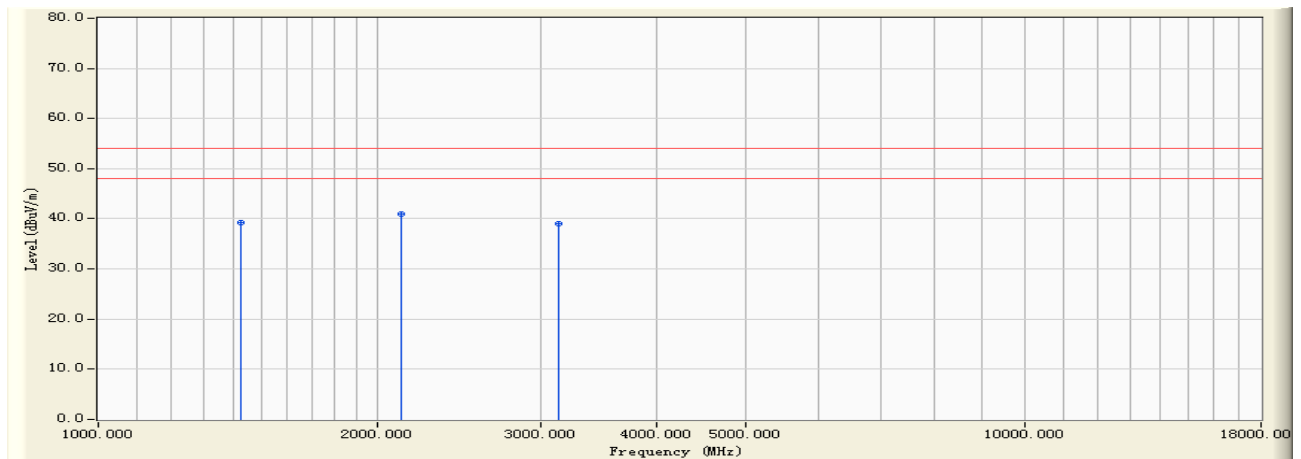
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type	Ant Pos (cm)	Table Pos (deg)
1	*	1425.620	-4.291	56.850	52.558	-21.442	74.000	PEAK	200.000	214.600
2		2123.340	-1.019	52.890	51.872	-22.128	74.000	PEAK	200.000	176.300
3		3136.530	1.150	50.840	51.989	-22.011	74.000	PEAK	400.000	213.800

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor



Engineer : Seven	
Site : EMC Lab AC 102	Time : 2010/12/25 - 14:52
Limit : FCC_15_03M_AV	Margin : 6
EUT : LCD Monitor	Probe : BBHA9120D(1-18GHz) - HORIZONTAL
Power : AC 120V/60Hz	Note : Mode 3: Full system (VGA mode 1680*1050@60Hz)



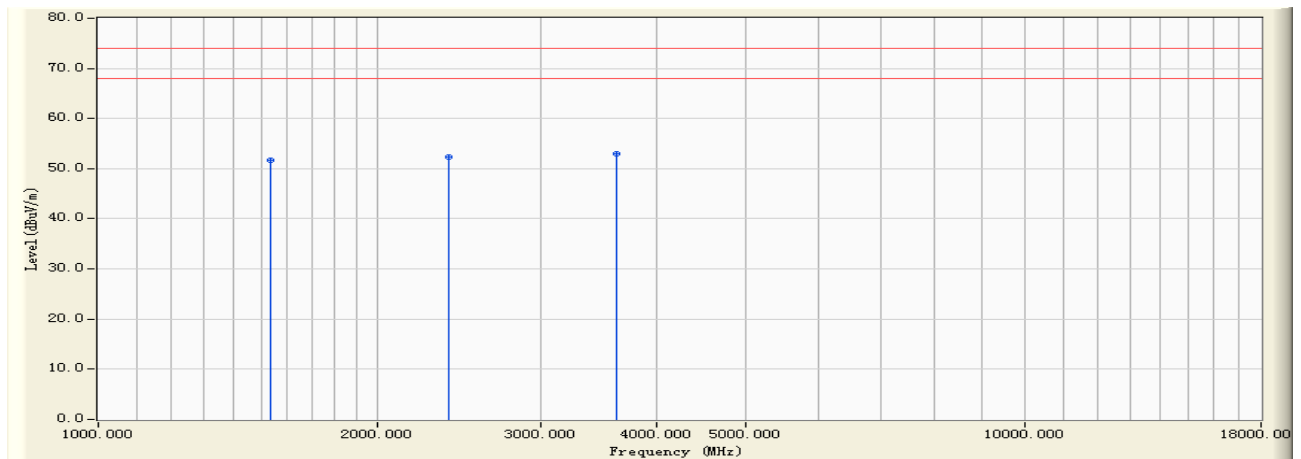
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type	Ant Pos (cm)	Table Pos (deg)
1		1425.620	-4.291	43.570	39.278	-14.722	54.000	AVERAGE	200.000	214.600
2	*	2123.340	-1.019	41.890	40.872	-13.128	54.000	AVERAGE	200.000	176.300
3		3136.530	1.150	37.840	38.989	-15.011	54.000	AVERAGE	400.000	213.800

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor



Engineer : Seven	
Site : EMC Lab AC 102	Time : 2010/12/25 - 14:53
Limit : FCC_15_03M_PK	Margin : 6
EUT : LCD Monitor	Probe : BBHA9120D(1-18GHz) - VERTICAL
Power : AC 120V/60Hz	Note : Mode 3: Full system (VGA mode 1680*1050@60Hz)



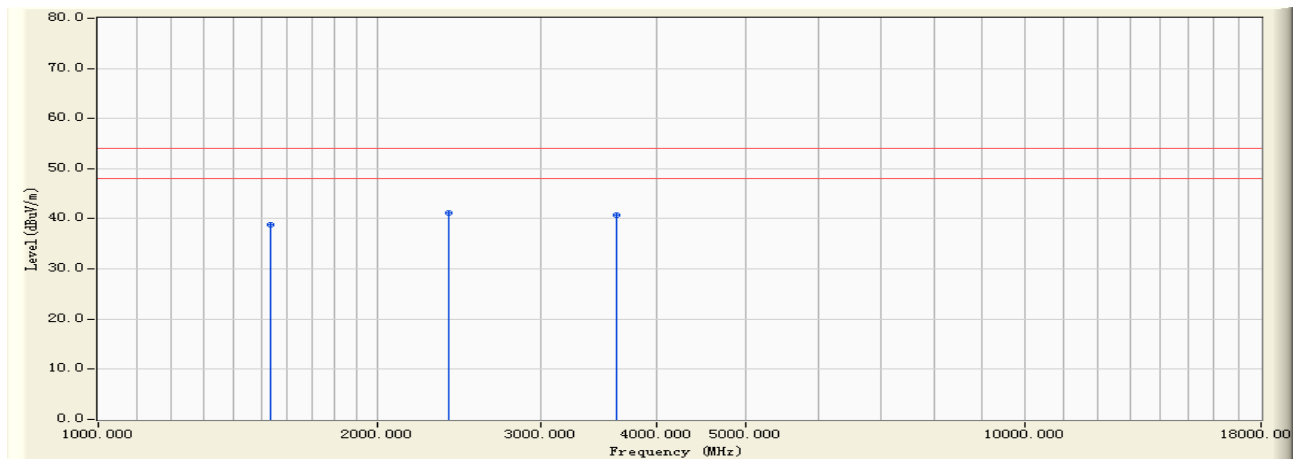
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type	Ant Pos (cm)	Table Pos (deg)
1		1536.580	-4.151	55.870	51.719	-22.281	74.000	PEAK	200.000	136.500
2		2385.420	0.348	51.970	52.318	-21.682	74.000	PEAK	100.000	152.300
3	*	3632.520	3.169	49.850	53.019	-20.981	74.000	PEAK	100.000	145.700

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor



Engineer : Seven	
Site : EMC Lab AC 102	Time : 2010/12/25 - 14:53
Limit : FCC_15_03M_AV	Margin : 6
EUT : LCD Monitor	Probe : BBHA9120D(1-18GHz) - VERTICAL
Power : AC 120V/60Hz	Note : Mode 3: Full system (VGA mode 1680*1050@60Hz)



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type	Ant Pos (cm)	Table Pos (deg)
1		1536.580	-4.151	42.970	38.819	-15.181	54.000	AVERAGE	200.000	136.500
2	*	2385.420	0.348	40.850	41.198	-12.802	54.000	AVERAGE	100.000	152.300
3		3632.520	3.169	37.540	40.709	-13.291	54.000	AVERAGE	100.000	145.700

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Test engineer: _____

Seven