



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
Equipment	: LCD Monitor
Model No.	: IPS224VA
FCC ID	: BEJ IPS224VA

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History of this test report

☐ ORIGINAL.

☒ Additional attachment as following record:

Attachment No.	Date	Description
SEFD1203062	Mar 19, 2012	First edition
SEFD1203062-B	Aug 17, 2012	Second edition(Add two adapter)
SEFD1208028-A	Apr 10, 2013	Third edition (add a panel: LGM215BA41; update the PCB board ,DVI cable, VGA cable and Power Supply cable)



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Model No.	: IPS224VA
FCC ID	: BEJ IPS224VA

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 Apr 03, 2013 at ***CerpPASS Technology Corp.***

Signature

Miro Chueh/ Technical director



1. Summary of Test Procedure and Test Result

Test Item	Normative References	Test Result
Conducted Emission	ANSI C63.4-2009 FCC Part 15 Subpart B	PASS
Radiated Emission	ANSI C63.4-2009 FCC Part 15 Subpart B	PASS



2. Test Configuration of Equipment under Test

2.1. Manufacturer

LG Electronics Nanjing Display Co.,Ltd.

No.346,Yaoxin Road Economic & Technical Development Zone Nanjing China

2.2. Feature of Equipment under Test

LCD Monitor	Model No:	IPS224VA
Adapter #1	Manufacturer:	Lien Chang Electronic Enterprise Co.,Ltd.
	Model No.:	LCAP21
	Input Rating:	100-240V~ 50-60Hz,1.1 A
	Output Rating:	19V  1.3A
DC Cable	Non-Shielded, 1.5m, with one ferrite cores bonded	
Adapter #2	Manufacturer:	SHENZHEN HONOR ELECTRONIC CO.,LTD.
	Model No.:	ADS-40SG-19-3 19025G
	Input Rating:	100-240V~ 50/60Hz,1.0A
	Output Rating:	19V  1.3A
DC Cable	Non-Shielded, 1.5m	
Adapter #3	Manufacturer:	SHENZHEN HONOR ELECTRONIC CO.,LTD.
	Model No.:	ADS-40FSG-19 19025G***-1(*** can be PG,PBR,PI,PCU,PB-2 (direct plug-in type) represents different plug types, ADS-40FSG-19 19025GPG-1 was selected as the test model)
	Input:	100-240V~ 50/60Hz 1.0A max
	Output:	19V  1.3A
DC Cable	Non-Shielded, 1.5m	
Adapter #4	Manufacturer:	Lien Chang Electronic Enterprise Co.,Ltd.
	Model No.:	LCAP26-* (* can be A,E,I,B direct plug-in type) represents different plug types, LCAP26-E was selected as the test model)
	Input:	100-240V~50-60Hz 1.1A
	Output:	19V  1.3A
DC Cable	Non-Shielded, 1.5m	
VGA Cable	Non-Shielded, 1.5m&1.8m	
DVI Cable	Non-Shielded, 1.5m&1.8m	
Power Supply cable	Non-Shielded, 1.0&1.5m	
※ the EUT Photos of 3-5, 11-12, 14-15 Just a publicity.		



Panel manufacturer	Panel No.
LG Display	LM215WF3

Second edition : Add two adapter

Adapter #5	Manufacturer:	LG Innotek Co.,Ltd.
	Model No.:	PSAB-L203A
	Input:	100-240V~50-60Hz 1.1A
	Output:	19V $\overline{\text{---}}$ 1.3A
DC Cable	Non-shielded, 1.5m, with one ferrite cores bonded	
Adapter #6	Manufacturer:	LG Innotek Co.,Ltd.
	Model No.:	PSAB-L202*(* can be A,B,C,D direct plug-in type) represents different plug types, PSAB-L202A was selected as the test model)
	Input:	100-240V~ 50/60Hz 1.1A
	Output:	19V $\overline{\text{---}}$ 1.3A
DC Cable	Non-shielded, 1.5m, with one ferrite cores bonded	

Third edition: Add a panel:

Panel manufacturer	Panel No.
LG Electronics Inc	LGM215BA41



2.3. 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, Microphone& Earphone, USB Keyboard, USB Mouse 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)With PSAB-L203A
	Test Mode 2: Full system (VGA mode 1024*768@75Hz) With PSAB-L203A
	Test Mode 3: Full system (VGA mode 720*400@70Hz) With PSAB-L203A
	Test Mode 4: Full system (DVI mode 1920*1080@60Hz)With PSAB-L203A
	Test Mode 5: Full system (DVI mode 1024*768@75Hz) With PSAB-L203A
	Test Mode 6: Full system (DVI mode 720*400@70Hz) With PSAB-L203A
	Test Mode 7: Full system (HDMI mode 1920*1080@60Hz)With PSAB-L203A
	Test Mode 8: Full system (HDMI mode 1024*768@75Hz) With PSAB-L203A
	Test Mode 9: Full system (HDMI mode 720*400@70Hz) With PSAB-L203A
The worse case was selected as the final test mode and record in the report	
	Test Mode 4: Full system (DVI mode 1920*1080@60Hz)With PSAB-L203A

2.4. Description of Support Unit

No	Device	Manufacturer	Model No.	Description
1	PC	Dell	Vostro200	N/A
2	Microphone& Earphone	SALAR	N/A	N/A
3	USB Keyboard	DELL	SK-8115	N/A
4	USB Mouse	DELL	G0K02XYK	N/A
5	USB Printer	HP	VCVRA-1001	N/A

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



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-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



2.6. Measurement Uncertainty

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

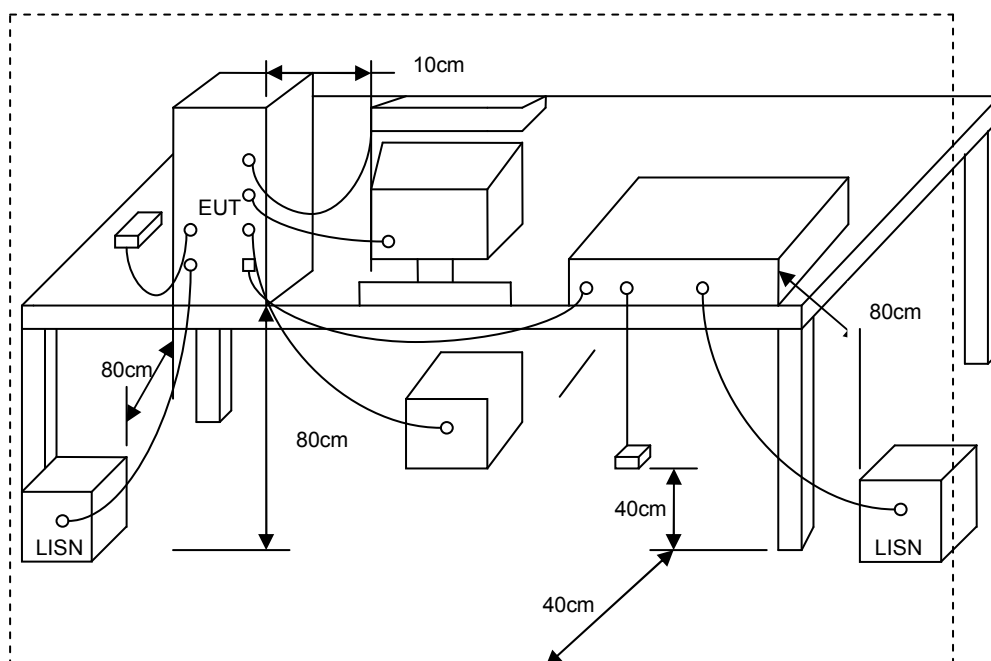
Frequency (MHz)	Quasi Peak (dB μ V)	Average (dB μ V)
0.15 – 0.5	66-56*	56-46*
0.5 – 5.0	56	46
5.0 – 30.0	60	50

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



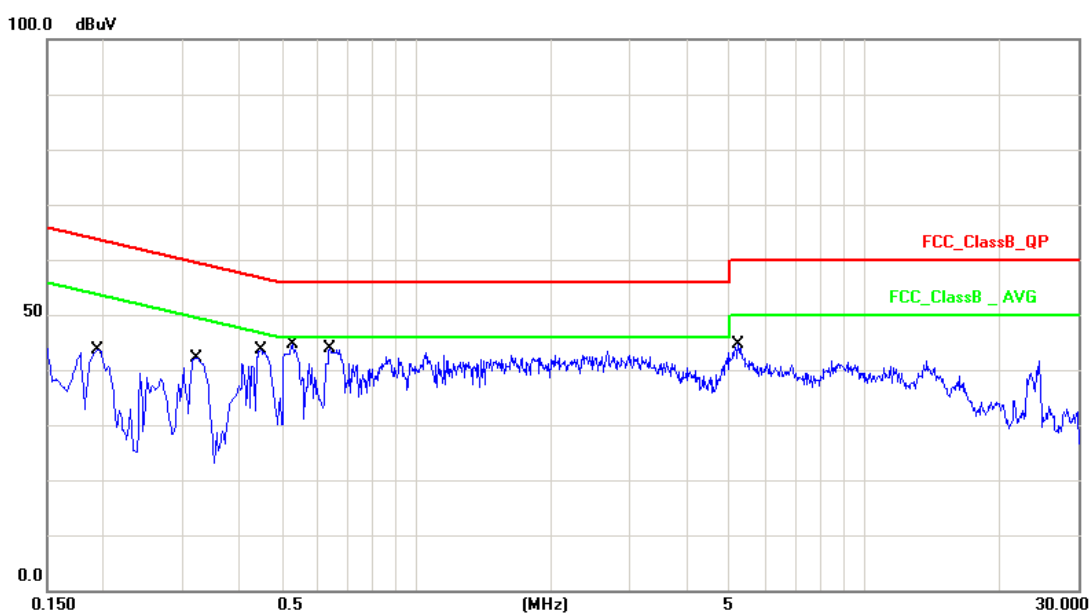
3.4. Measurement equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date.
Test Receiver	R&S	ESCI	100565	2012.11.05	2013.11.04
AMN	R&S	ESH2-Z5	100182	2012.11.05	2013.11.04
Two-Line V-Network	R&S	ENV216	100325	2013.03.10	2014.03.09
ISN	FCC	FCC-TLISN-T2-02	20379	2012.12.08	2013.12.07
ISN	FCC	FCC-TLISN-T4-02	20380	2012.12.08	2013.12.07
ISN	FCC	FCC-TLISN-T8-02	20381	2012.12.08	2013.12.07
ISN	TESEQ	ISN ST08	30175	2012.09.13	2013.09.12
Current Probe	R&S	EZ-17	100303	2013.03.10	2014.03.09
Passive Voltage Probe	R&S	ESH2-Z3	100026	2013.03.10	2014.03.09
Attenuator	R&S	ESH3-Z2	100529	2013.03.10	2014.03.09
Temperature/ Humidity Meter	Zhicheng	ZC1-11	CEP-TH-004	2013.03.10	2014.03.09



3.5. Test Result and Data

Test Mode :	Mode 4: Full system (DVI mode 1920*1080@60Hz)With PSAB-L203A		
AC Power :	AC 120V/60Hz	Phase :	LINE
Equipment :	LCD Monitor	Model No :	IPS224VA
Temperature :	22°C	Humidity :	50%
Pressure(mbar) :	1002	Date:	2013/04/03

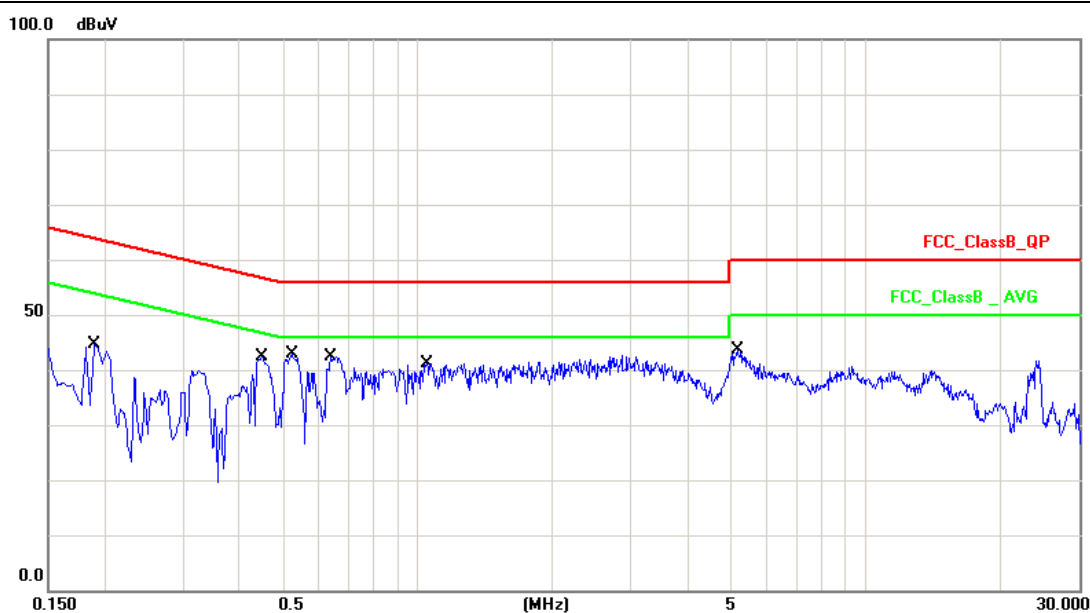


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1940	9.87	31.64	41.51	63.86	-22.35	QP
2	0.1940	9.87	23.88	33.75	53.86	-20.11	AVG
3	0.3220	9.87	30.45	40.32	59.66	-19.34	QP
4	0.3220	9.87	22.81	32.68	49.66	-16.98	AVG
5	0.4500	9.85	31.30	41.15	56.88	-15.73	QP
6	0.4500	9.85	22.11	31.96	46.88	-14.92	AVG
7	0.5300	9.85	31.82	41.67	56.00	-14.33	QP
8	0.5300	9.85	22.66	32.51	46.00	-13.49	AVG
9	0.6420	9.85	31.35	41.20	56.00	-14.80	QP
10	0.6420	9.85	21.02	30.87	46.00	-15.13	AVG
11	5.2300	9.72	30.13	39.85	60.00	-20.15	QP
12	5.2300	9.72	22.25	31.97	50.00	-18.03	AVG

Note: Measurement Level = Reading Level + Correct Factor



Test Mode :	Mode 4: Full system (DVI mode 1920*1080@60Hz)With PSAB-L203A		
AC Power :	AC 120V/60Hz	Phase :	NEUTRAL
Equipment :	LCD Monitor	Model No :	IPS224VA
Temperature :	22°C	Humidity :	50%
Pressure(mbar) :	1002	Date:	2013/04/03



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1900	9.50	31.49	40.99	64.04	-23.05	QP
2	0.1900	9.50	17.85	27.35	54.04	-26.69	AVG
3	0.4500	9.50	30.33	39.83	56.88	-17.05	QP
4	0.4500	9.50	20.92	30.42	46.88	-16.46	AVG
5	0.5260	9.50	31.04	40.54	56.00	-15.46	QP
6	0.5260	9.50	21.51	31.01	46.00	-14.99	AVG
7	0.6420	9.50	30.37	39.87	56.00	-16.13	QP
8	0.6420	9.50	19.66	29.16	46.00	-16.84	AVG
9	1.0500	9.44	28.17	37.61	56.00	-18.39	QP
10	1.0500	9.44	18.64	28.08	46.00	-17.92	AVG
11	5.1900	9.65	28.83	38.48	60.00	-21.52	QP
12	5.1900	9.65	21.77	31.42	50.00	-18.58	AVG

Note: Measurement Level = Reading Level + Correct Factor

Test engineer: Ceben



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

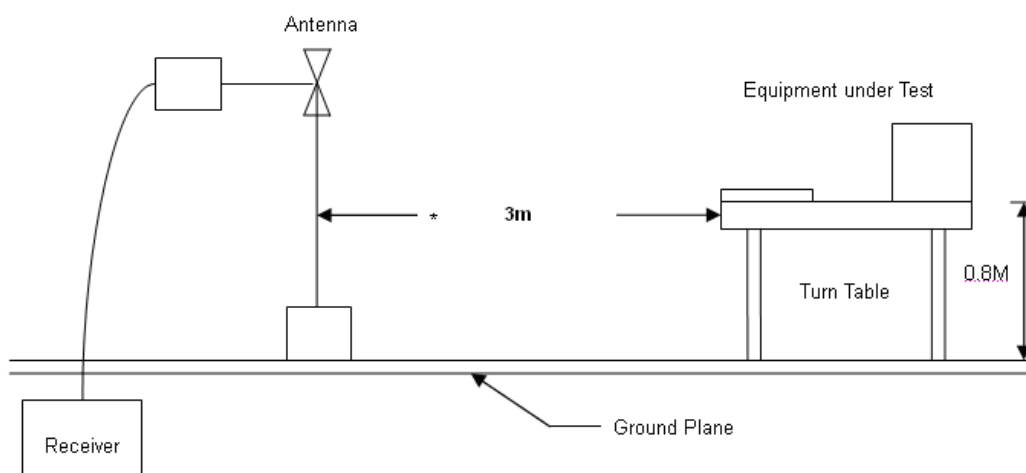


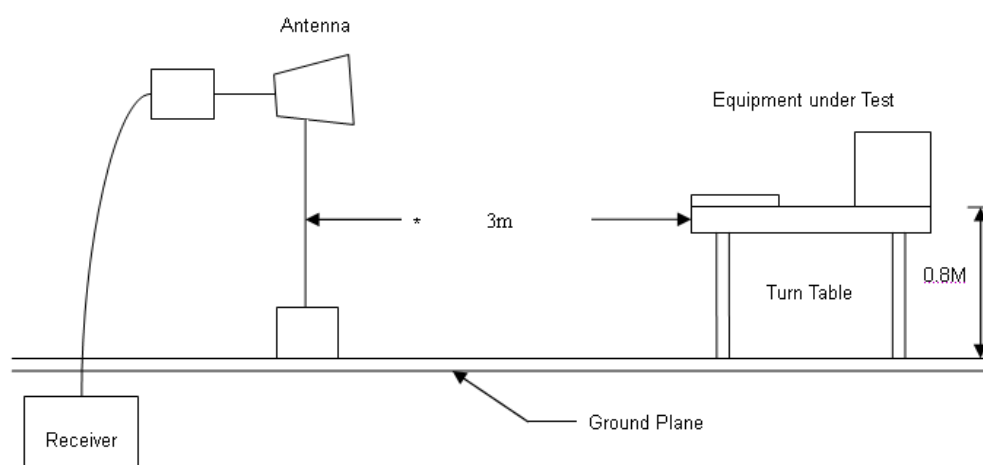
4.2. Test Procedures

- a. The EUT was placed on a Rota table top 0.8 meter above ground.
- b. 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.
- c. The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.
- d. 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.
- e. 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



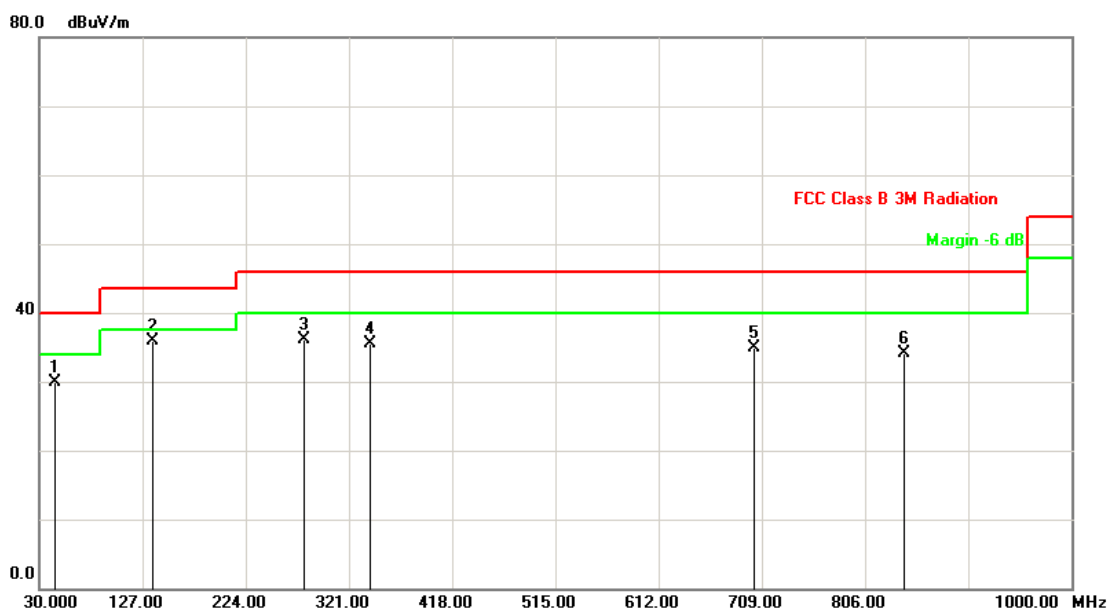
**Above 1GHz Test Setup****4.4. Measurement equipment**

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date.
EMI Test Receiver	R&S	ESCI	100563	2013.03.10	2014.03.09
H64 Preamplifier	HP	8447F	3113A05582	2013.03.10	2014.03.09
Preamplifier	Agilent	8449B	3008A02342	2013.03.10	2014.03.09
Ultra Broadband Antenna	R&S	HL562	100362	2012.05.03	2013.05.02
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	9120D-619	2012.05.03	2013.05.02
Broad-Band Horn Antenna	Schwarzbeck	BBHA9170	9170-347	2012.05.15	2013.05.15
Spectrum Analyzer	R&S	FSP40	100324	2013.03.10	2014.03.09
Temperature/ Humidity Meter	Zhicheng	ZC1-11	CEP-TH-002	2013.03.10	2014.03.09



4.5. Test Result and Data (30MHz ~ 1000MHz)

Test Mode :	Mode 4: Full system (DVI mode 1920*1080@60Hz)With PSAB-L203A		
AC Power :	AC 120V/60Hz	Ant. Polarization:	Horizontal
Equipment :	LCD Monitor	Model No :	IPS224VA
Temp :	22°C	Humidity :	50%
Pressure(mbar) :	1002	Date:	2013/04/03

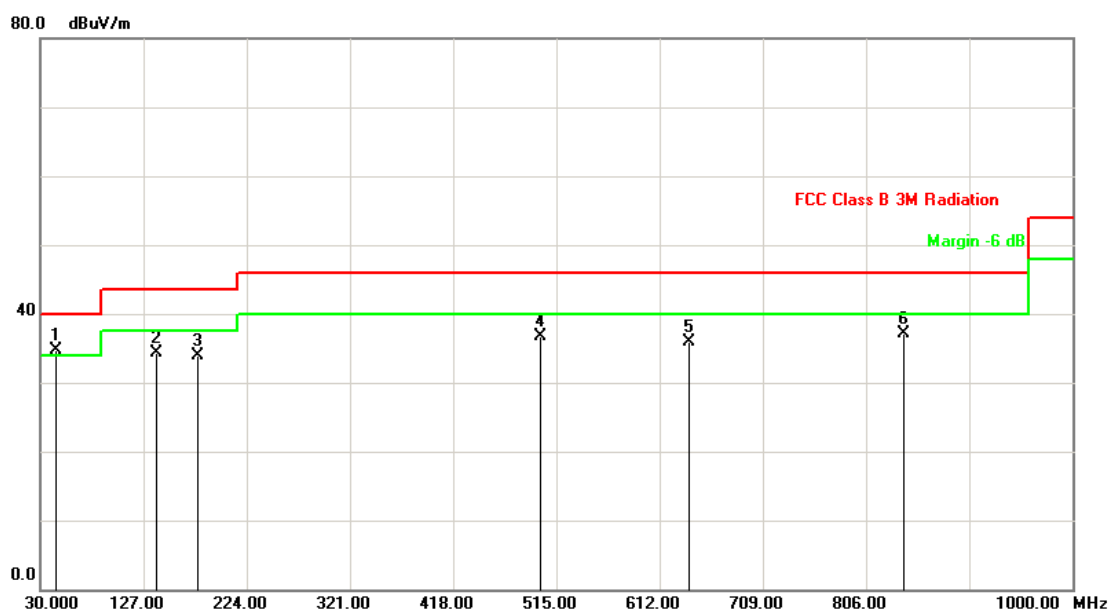


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	44.5500	-9.03	38.99	29.96	40.00	-10.04	QP	200	133
2	136.7000	-14.77	50.61	35.84	43.50	-7.66	QP	200	115
3	279.2900	-11.66	47.67	36.01	46.00	-9.99	QP	100	188
4	341.3700	-9.49	44.97	35.48	46.00	-10.52	QP	100	178
5	701.2400	-0.51	35.47	34.96	46.00	-11.04	QP	100	240
6	842.8600	1.91	32.27	34.18	46.00	-11.82	QP	100	231

Note: Measurement Level = Reading Level + Correct Factor



Test Mode :	Mode 4: Full system (DVI mode 1920*1080@60Hz)With PSAB-L203A		
AC Power :	AC 120V/60Hz	Ant. Polarization:	Vertical
Equipment :	LCD Monitor	Model No :	IPS224VA
Temp :	22 °C	Humidity :	50%
Pressure(mbar) :	1002	Date:	2013/04/03

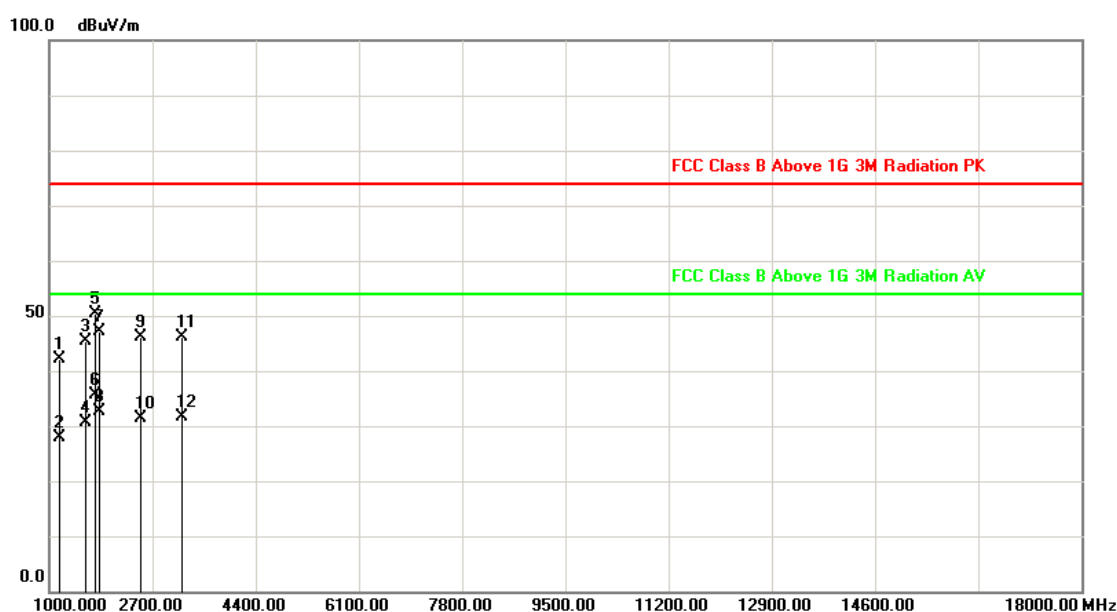


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	44.5500	-9.03	43.72	34.69	40.00	-5.31	QP	100	74
2	139.6100	-14.93	49.19	34.26	43.50	-9.24	QP	100	216
3	178.4100	-14.83	48.81	33.98	43.50	-9.52	QP	100	226
4	500.4500	-4.81	41.55	36.74	46.00	-9.26	QP	100	209
5	639.1600	-1.82	37.71	35.89	46.00	-10.11	QP	100	149
6	841.8900	1.90	35.11	37.01	46.00	-8.99	QP	100	171

Note: Measurement Level = Reading Level + Correct Factor

**4.6. Test Result and Data (1000MHz ~ 18000MHz)**

Test Mode :	Mode 4: Full system (DVI mode 1920*1080@60Hz)With PSAB-L203A		
AC Power :	AC 120V/60Hz	Ant. Polarization:	Horizontal
Equipment :	LCD Monitor	Model No :	IPS224VA
Temp :	22°C	Humidity :	50%
Pressure(mbar) :	1002	Date:	2013/04/03

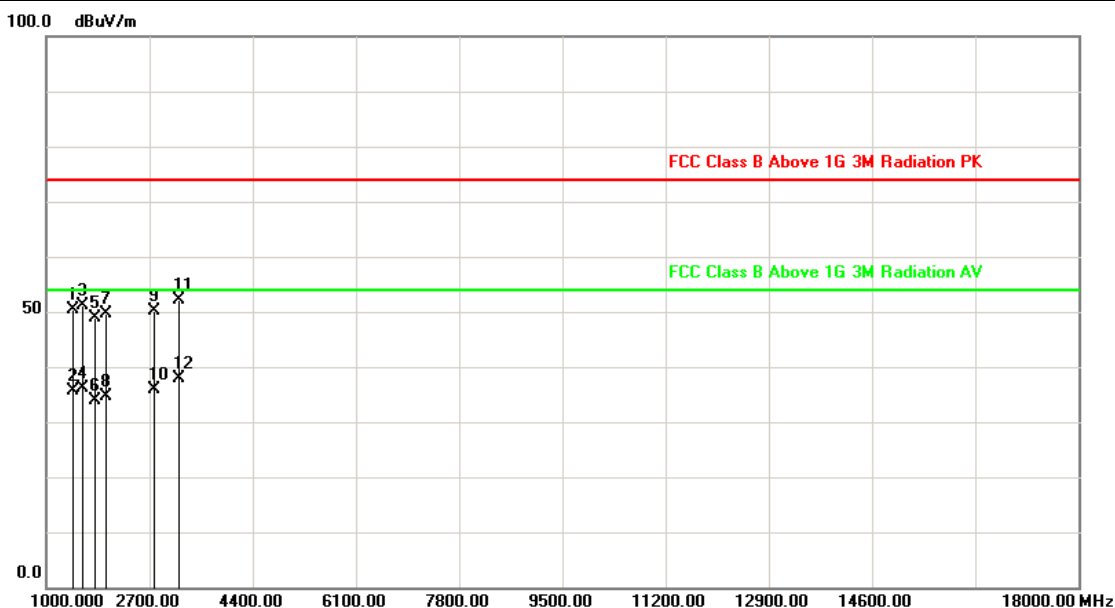


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	1170.000	-6.16	48.18	42.02	74.00	-31.98	peak	100	0
2	1170.000	-6.16	34.12	27.96	54.00	-26.04	AVG	100	0
3	1595.000	-4.39	49.68	45.29	74.00	-28.71	peak	100	30
4	1595.000	-4.39	35.08	30.69	54.00	-23.31	AVG	100	30
5	1748.000	-3.75	54.21	50.46	74.00	-23.54	peak	100	360
6	1748.000	-3.75	39.44	35.69	54.00	-18.31	AVG	100	360
7	1833.000	-3.40	50.42	47.02	74.00	-26.98	peak	200	25
8	1833.000	-3.40	36.00	32.60	54.00	-21.40	AVG	200	25
9	2496.000	-1.04	47.10	46.06	74.00	-27.94	peak	100	152
10	2496.000	-1.04	32.32	31.28	54.00	-22.72	AVG	100	152
11	3193.000	1.37	44.71	46.08	74.00	-27.92	peak	200	36
12	3193.000	1.37	30.25	31.62	54.00	-22.38	AVG	200	36

Note: Measurement Level = Reading Level + Correct Factor



Test Mode :	Mode 4: Full system (DVI mode 1920*1080@60Hz)With PSAB-L203A		
AC Power :	AC 120V/60Hz	Ant. Polarization:	Vertical
Equipment :	LCD Monitor	Model No :	IPS224VA
Temp :	22°C	Humidity :	50%
Pressure(mbar) :	1002	Date:	2013/04/03



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	1442.000	-5.03	55.50	50.47	74.00	-23.53	peak	200	215
2	1442.000	-5.03	40.72	35.69	54.00	-18.31	AVG	200	215
3	1595.000	-4.39	55.52	51.13	74.00	-22.87	peak	200	36
4	1595.000	-4.39	40.54	36.15	54.00	-17.85	AVG	200	36
5	1799.000	-3.54	52.48	48.94	74.00	-25.06	peak	100	152
6	1799.000	-3.54	37.46	33.92	54.00	-20.08	AVG	100	152
7	1986.000	-2.76	52.34	49.58	74.00	-24.42	peak	100	48
8	1986.000	-2.76	37.33	34.57	54.00	-19.43	AVG	100	48
9	2785.000	-0.07	50.31	50.24	74.00	-23.76	peak	100	96
10	2785.000	-0.07	35.95	35.88	54.00	-18.12	AVG	100	96
11	3193.000	1.37	50.70	52.07	74.00	-21.93	peak	100	82
12	3193.000	1.37	36.44	37.81	54.00	-16.19	AVG	100	82

Note: Measurement Level = Reading Level + Correct Factor

Test engineer: Cerpass