



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	: BEJ IPS231PX
Trade Name	: LG

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

- The test result refers exclusively to the test presented test model / sample.
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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)
SEFD1010035-D	Apr 10, 2013	Third edition (Add a panel and Power Supply Cable,VGA Cable,DVI Cable)



FCC TEST REPORT

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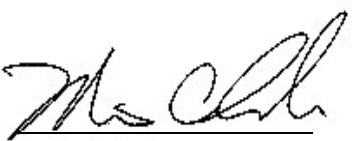
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I HEREBY CERTIFY THAT :

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 Apr 08, 2013 at **CerpPASS Technology (Suzhou) Co., Ltd**

Approved By:



Miro Chueh/ Technical director



1. Summary of Test Procedure and Test Results

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, 1.5m&1.8m	
VGA Cable	Shielded, 1.5m&1.8m	
Audio Cable	Non-Shielded, 1.5m, with one ferrite core bonded	
Power Supply cable	Non-Shielded, 1.5&1.8m	
Panel	LGM230BA41	

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) for horizontal

Test Mode 2: Full system (VGA mode 1024*768@75Hz) for horizontal

Test Mode 3: Full system (VGA mode 720*400@60Hz) for horizontal

Test Mode 4: Full system (DVI mode 1920*1080@60Hz) for horizontal

Test Mode 5: Full system (DVI mode 1024*768@75Hz) for horizontal

Test Mode 6: Full system (DVI mode 720*400@60Hz) for horizontal

Test Mode 7: Full system (VGA mode 1920*1080@60Hz) for vertical

Select the worst case of the pre-test modes as the final test mode

Test Mode 1: Full system (VGA mode 1920*1080@60Hz) for horizontal



2.3. Description of Support Unit

For CE:

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

For RE:

No	Device	Manufacturer	Model No.	Description
1	PC	Dell	DCMF	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, 1.5m
B	VGA Cable	1	Shielded, 1.5m
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 (Suzhou) Co., Ltd
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.

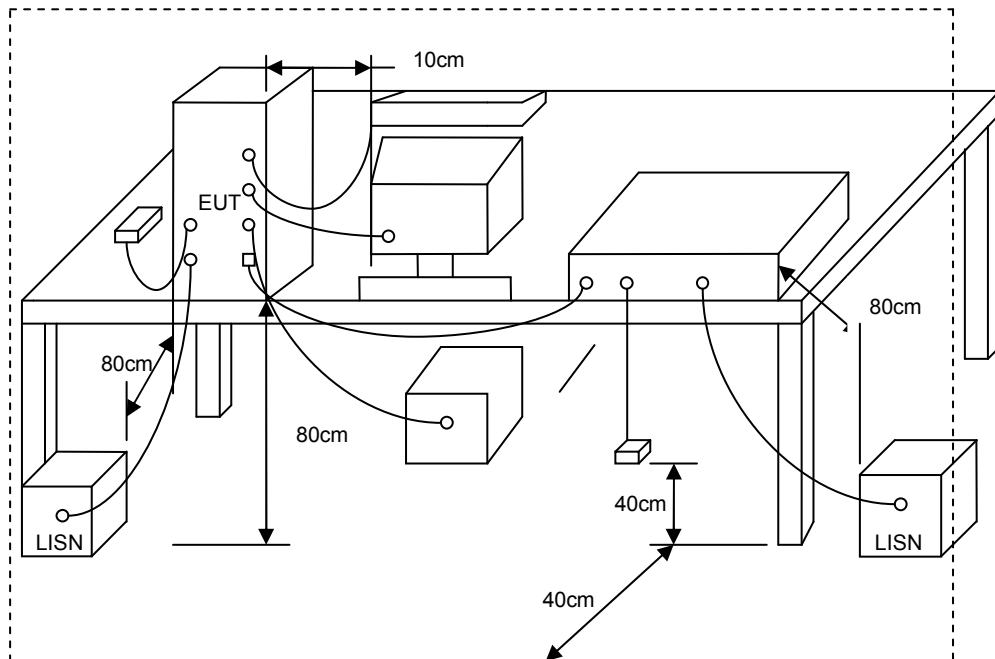
Frequency (MHz)	Quasi Peak (dB μ V)	Average (dB μ V)
0.15 – 0.5	66-56*	56-46*
0.5 – 5.0	56	46
5.0 – 30.0	60	50

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



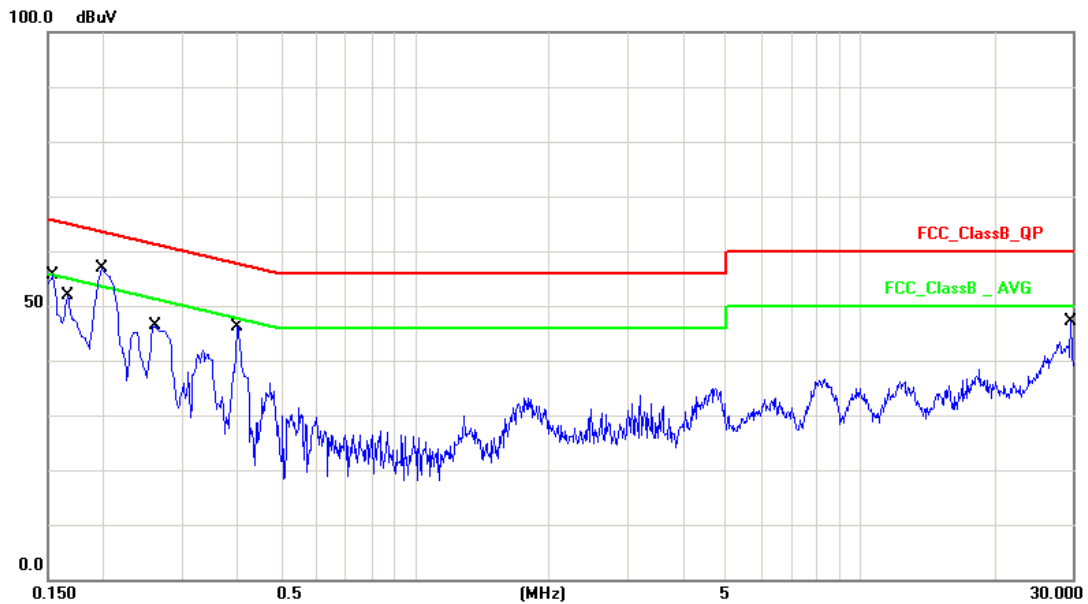
3.4. Measurement equipment

Instrument/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 1: Full system (VGA mode 1920*1080@60Hz) for horizontal		
AC Power :	AC 120V/60Hz	Phase :	LINE
Temperature :	22°C	Humidity :	50%
Pressure(mbar) :	1002	Date:	2013/04/08

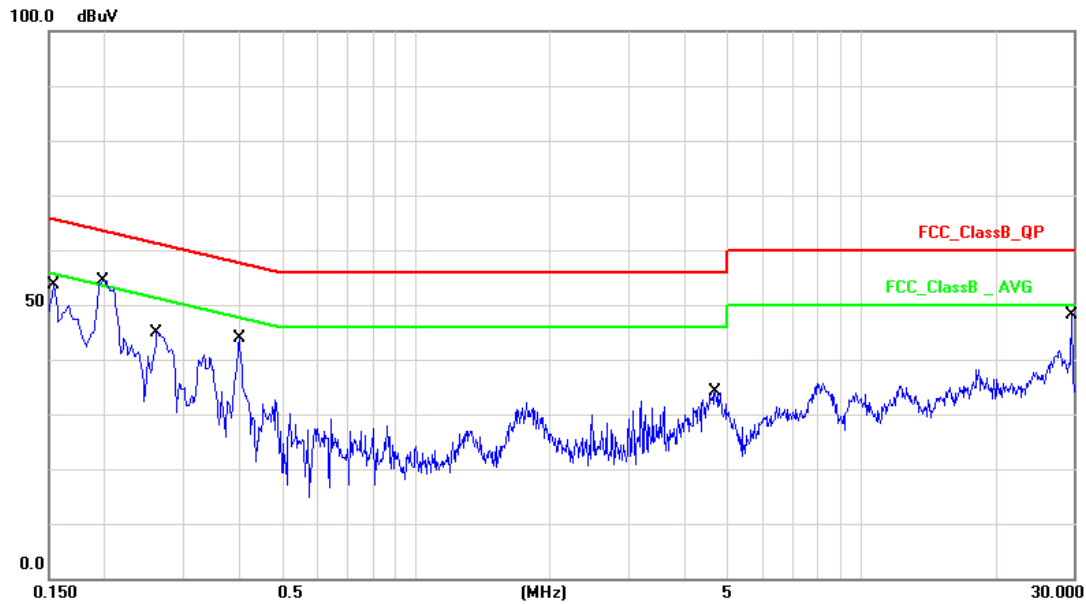


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1540	9.87	34.09	43.96	65.78	-21.82	QP
2	0.1540	9.87	13.41	23.28	55.78	-32.50	AVG
3	0.1660	9.87	30.43	40.30	65.16	-24.86	QP
4	0.1660	9.87	8.29	18.16	55.16	-37.00	AVG
5	0.1980	9.87	44.33	54.20	63.69	-9.49	QP
6	0.1980	9.87	36.88	46.75	53.69	-6.94	AVG
7	0.2620	9.86	33.50	43.36	61.37	-18.01	QP
8	0.2620	9.86	17.87	27.73	51.37	-23.64	AVG
9	0.3980	9.86	33.64	43.50	57.90	-14.40	QP
10	0.3980	9.86	33.29	43.15	47.90	-4.75	AVG
11	29.7020	9.56	34.52	44.08	60.00	-15.92	QP
12	29.7020	9.56	29.55	39.11	50.00	-10.89	AVG

Note: Measurement Level = Reading Level + Correct Factor



Test Mode :	Mode 1: Full system (VGA mode 1920*1080@60Hz) for horizontal		
AC Power :	AC 120V/60Hz	Phase :	NEUTRAL
Temperature :	22°C	Humidity :	50%
Pressure(mbar) :	1002	Date:	2013/04/08



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1540	9.50	33.73	43.23	65.78	-22.55	QP
2	0.1540	9.50	11.76	21.26	55.78	-34.52	AVG
3	0.1980	9.50	42.57	52.07	63.69	-11.62	QP
4	0.1980	9.50	33.03	42.53	53.69	-11.16	AVG
5	0.2620	9.50	32.47	41.97	61.37	-19.40	QP
6	0.2620	9.50	16.57	26.07	51.37	-25.30	AVG
7	0.4020	9.50	32.55	42.05	57.81	-15.76	QP
8	0.4020	9.50	32.01	41.51	47.81	-6.30	AVG
9	4.7020	9.63	17.74	27.37	56.00	-28.63	QP
10	4.7020	9.63	6.23	15.86	46.00	-30.14	AVG
11	29.7020	9.87	36.01	45.88	60.00	-14.12	QP
12	29.7020	9.87	30.99	40.86	50.00	-9.14	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

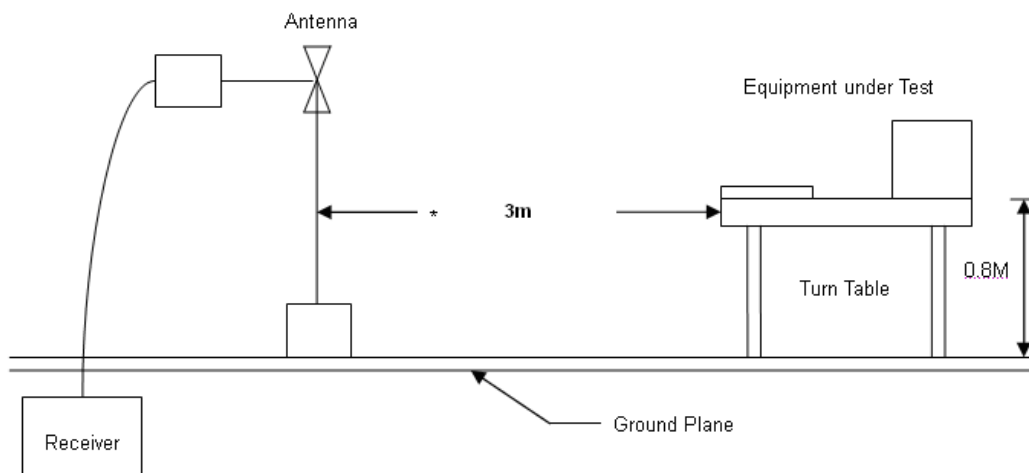


4.2. Test Procedures

- 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.

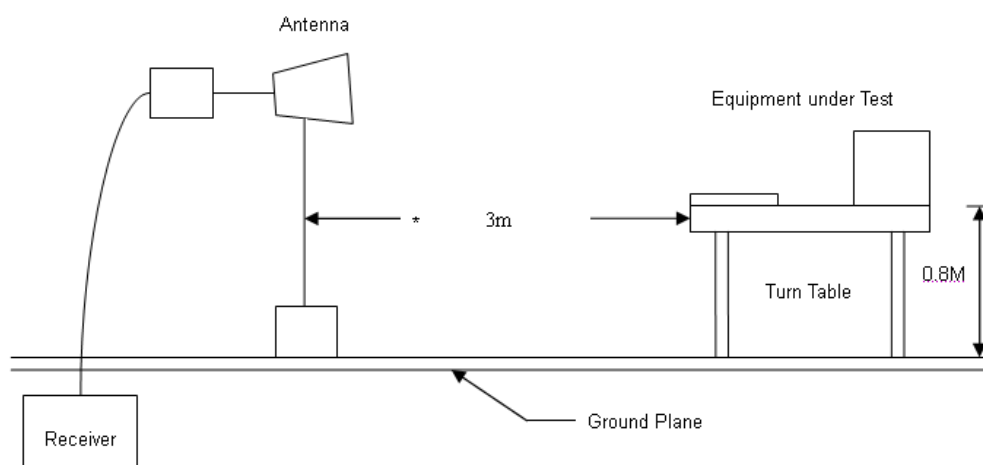
4.3. Typical test Setup

Below 1GHz Test Setup





Above 1GHz Test Setup



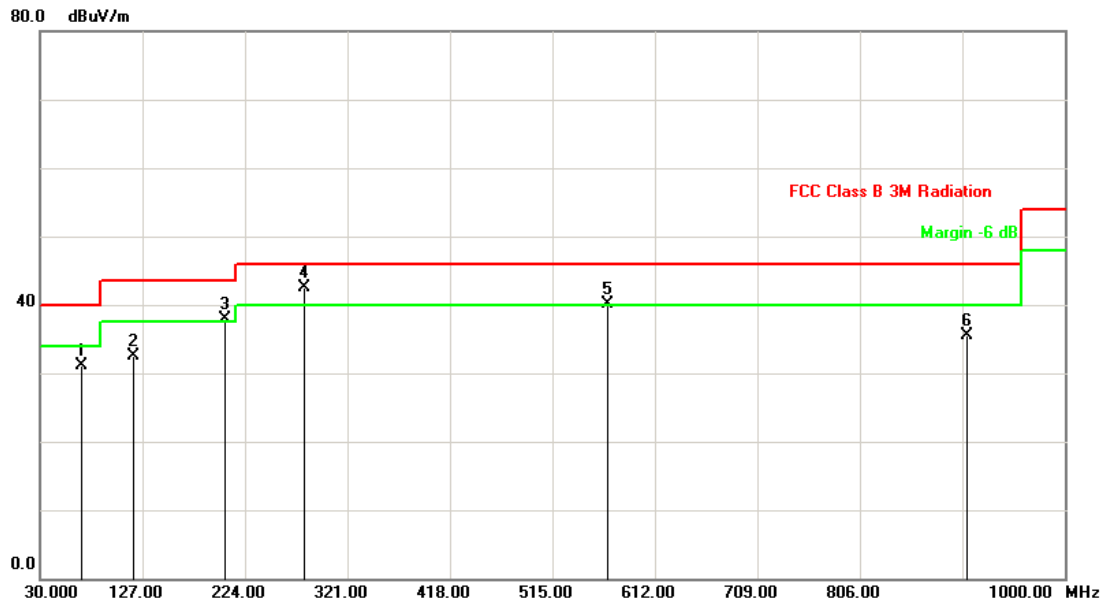
4.4. Measurement equipment

Instrument/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 :	Test Mode 1: Full system (VGA mode 1920*1080@60Hz) for horizontal		
AC Power :	AC 120V/60Hz	Ant. Polarization:	Horizontal
Temp :	23°C	Humidity :	52%
Pressure(mbar) :	1002	Date :	2013/04/08

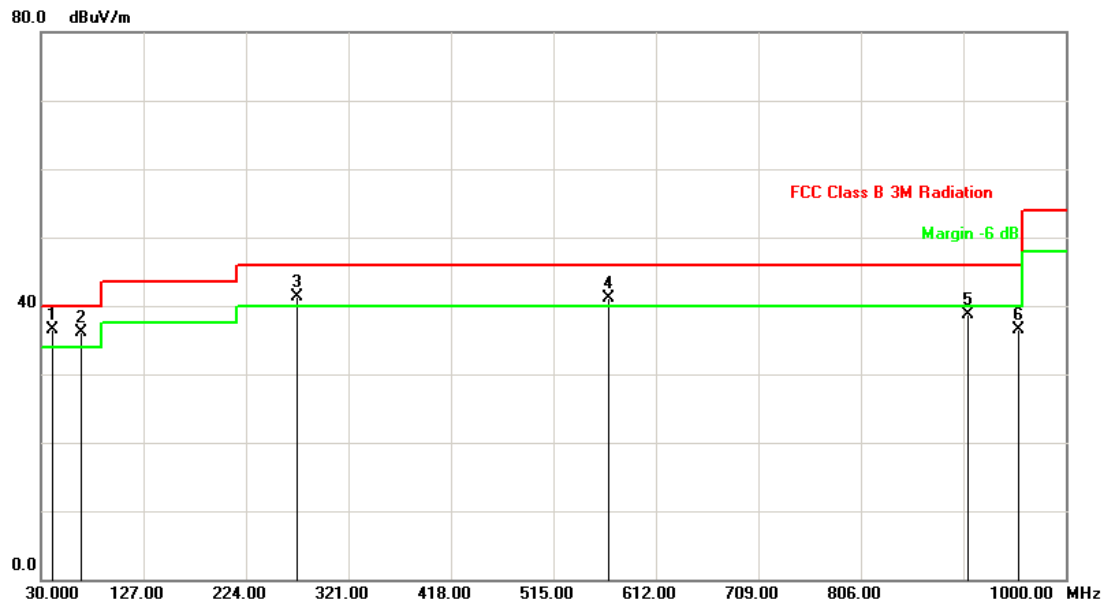


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	69.7700	-16.99	48.01	31.02	40.00	-8.98	QP	200	143
2	118.2700	-13.72	46.28	32.56	43.50	-10.94	QP	200	286
3	204.6000	-15.13	52.98	37.85	43.50	-5.65	QP	100	29
4	280.2600	-11.62	54.18	42.56	46.00	-3.44	QP	100	14
5	567.3800	-3.36	43.38	40.02	46.00	-5.98	QP	100	320
6	907.8500	3.14	32.44	35.58	46.00	-10.42	QP	200	257

Note: Measurement Level = Reading Level + Correct Factor



Test Mode :	Test Mode 1: Full system (VGA mode 1920*1080@60Hz) for horizontal		
AC Power :	AC 120V/60Hz	Ant. Polarization:	Vertical
Temp :	23°C	Humidity :	52%
Pressure(mbar) :	1002	Date :	2013/04/08



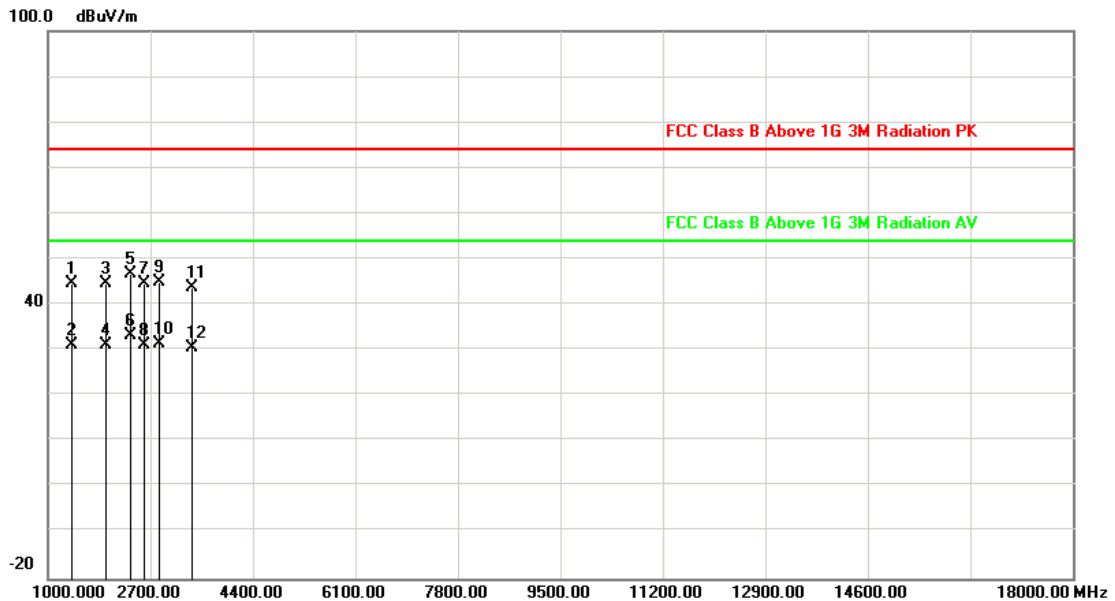
No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	40.6700	-6.86	43.45	36.59	40.00	-3.41	QP	100	58
2	67.8300	-17.08	53.20	36.12	40.00	-3.88	QP	200	153
3	272.5000	-11.90	53.13	41.23	46.00	-4.77	QP	200	175
4	567.3800	-3.36	44.39	41.03	46.00	-4.97	QP	200	71
5	907.8500	3.14	35.60	38.74	46.00	-7.26	QP	200	68
6	955.3800	3.77	32.68	36.45	46.00	-9.55	QP	101	360

Note: Measurement Level = Reading Level + Correct Factor



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

Test Mode :	Test Mode 1: Full system (VGA mode 1920*1080@60Hz) for horizontal		
AC Power :	AC 120V/60Hz	Ant. Polarization:	Horizontal
Temp :	23℃	Humidity :	52%
Pressure(mbar) :	1002	Date :	2013/04/08

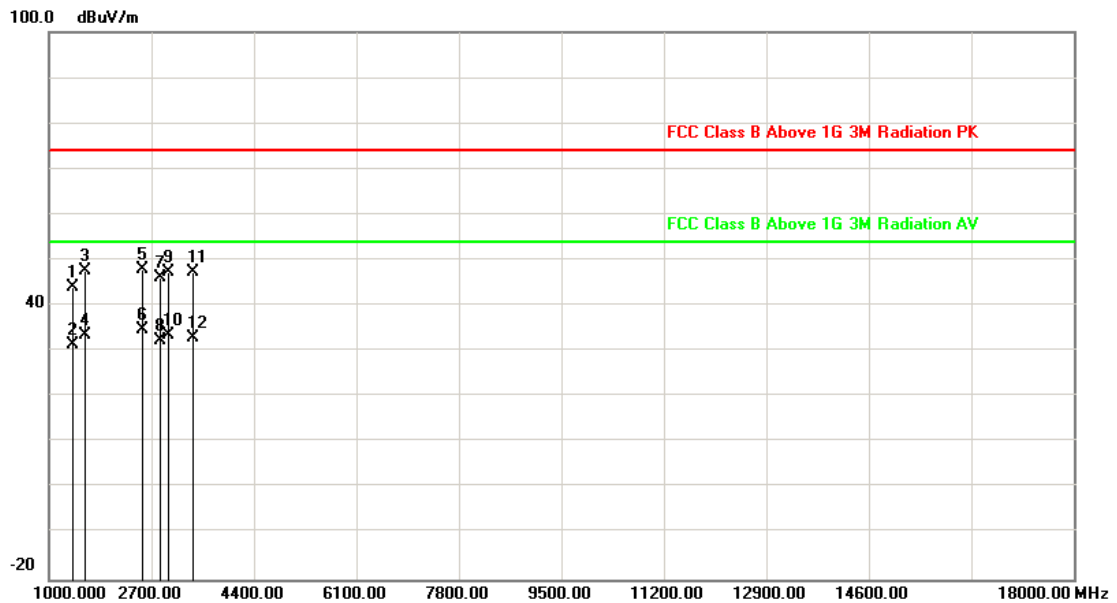


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	1391.000	-15.22	60.01	44.79	74.00	-29.21	peak	100	153
2	1391.000	-15.22	46.24	31.02	54.00	-22.98	AVG	100	153
3	1952.000	-14.14	58.77	44.63	74.00	-29.37	peak	400	262
4	1952.000	-14.14	45.34	31.20	54.00	-22.80	AVG	400	262
5	2377.000	-12.24	58.97	46.73	74.00	-27.27	peak	400	360
6	2377.000	-12.24	45.50	33.26	54.00	-20.74	AVG	400	360
7	2598.000	-11.42	56.02	44.60	74.00	-29.40	peak	100	23
8	2598.000	-11.42	42.68	31.26	54.00	-22.74	AVG	100	23
9	2836.000	-10.71	55.70	44.99	74.00	-29.01	peak	100	213
10	2836.000	-10.71	42.23	31.52	54.00	-22.48	AVG	100	213
11	3397.000	-10.43	54.20	43.77	74.00	-30.23	peak	100	22
12	3397.000	-10.43	40.97	30.54	54.00	-23.46	AVG	100	22

Note: Measurement Level = Reading Level + Correct Factor



Test Mode :	Test Mode 1: Full system (VGA mode 1920*1080@60Hz) for horizontal		
AC Power :	AC 120V/60Hz	Ant. Polarization:	Vertical
Temp :	23°C	Humidity :	52%
Pressure(mbar) :	1002	Date :	2013/04/08



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	1391.000	-15.22	59.38	44.16	74.00	-29.84	peak	100	156
2	1391.000	-15.22	46.74	31.52	54.00	-22.48	AVG	100	156
3	1595.000	-15.18	62.72	47.54	74.00	-26.46	peak	100	360
4	1595.000	-15.18	48.83	33.65	54.00	-20.35	AVG	100	360
5	2547.000	-11.57	59.60	48.03	74.00	-25.97	peak	100	26
6	2547.000	-11.57	46.41	34.84	54.00	-19.16	AVG	100	26
7	2836.000	-10.71	56.80	46.09	74.00	-27.91	peak	100	321
8	2836.000	-10.71	43.02	32.31	54.00	-21.69	AVG	100	321
9	2989.000	-10.25	57.47	47.22	74.00	-26.78	peak	100	102
10	2989.000	-10.25	43.87	33.62	54.00	-20.38	AVG	100	102
11	3397.000	-10.43	57.87	47.44	74.00	-26.56	peak	100	15
12	3397.000	-10.43	43.52	33.09	54.00	-20.91	AVG	100	15

Note: Measurement Level = Reading Level + Correct Factor

Test engineer: Seben