



FCC TEST REPORT

According to

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

Applicant : Guangzhou Robustel Technologies Co., Limited

Address : No.263 Zhongshan Ave, Tianhe District, Guangzhou, China
: 510660

Equipment : Industrial Cellular Router

Model No. : R3000-3P

- The test result refers exclusively to the test presented test model / sample.
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Applicant : Guangzhou Robustel Technologies Co., Limited
Address : No.263 Zhongshan Ave, Tianhe District, Guangzhou, China
510660
Equipment : Industrial Cellular Router
Model No. : R3000-3P
Trade Name : ***Robustel***

I **HEREBY** CERTIFY THAT :

The measurements shown in this test report were made in accordance with the procedures given in **ANSI C63.4 – 2009** and the energy emitted by this equipment was passed **CISPR PUB. 22, FCC Part 15 in** both radiated and conducted emission class B limits. Testing was carried out on Apr. 01~09, 2014 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. Factory

Guangzhou Robustel Technologies Co., Limited
No.263 Zhongshan Ave, Tianhe District, Guangzhou, China 510660

2.2. Feature of Equipment under Test

Industrial Cellular Router	Model No:	R3000-3P
	Supply Voltage:	9-60 VDC
Adapter	Model No.:	SYS1357-1812
	Input:	100-240VAC 50/60Hz 1.0A MAX
	Output:	12.0VDC, 1.5A

2.3. Test Manner

Test Manner	
a	During testing, the interface cables and equipment positions were varied according to ANSI C63.4.
b	The complete test system included LCD monitor, NB, USB Keyboard, USB Mouse, PC and EUT for EMI test.
c	Connect the, and then test.
The pre-test modes	
	Test Mode 1: RS232+SD+USB+PIN
	Test Mode 2: RS485+SD+USB+PIN
Select the worst case of the pre-test modes as the final test mode	
	Test Mode 1: RS232+SD+USB+PIN



2.4. Description of Test System

No.	Device	Manufacturer	Model No.	Description
1	LCD monitor	BENQ	Q24W5	R41126
2	Notebook	SONY	PCG-71811P	R33021
3	USB Keyboard	DELL	SK-8115	T3A002
4	USB Mouse	DELL	OXN967	R41108
5	PC	DELL	Dell Optitle 380	N/A
6	Printer	HP	DESKJET 400	N/A

Item	Cable	Quantity	Description
A	RJ45 Cable	1	1.2m Shielding
B	RJ45 Cable	1	1.8m Shielding
C	HDMI Cable	1	1.5m Shielding with two Core
D	MOUSE Cable	1	1.5m Non Shielding
E	Keyboard Cable	1	1.8m Non Shielding
F	USB Cable	1	1.2m Non Shielding



2.5. General Information of Test

Test Site:	Cerpass 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

Laboratory accreditation



2.6. Measurement Uncertainty

Measurement Item	Measurement Frequency	Polarization	Uncertainty
Conducted Emission	9 kHz ~ 30 MHz	LINE/NEUTRAL	±2.71 dB
Radiated Emission	30 MHz ~ 25GHz	Vertical	±4.11 dB
		Horizontal	±4.10 dB
Occupied Bandwidth	---	---	±7500 Hz
Maximum Peak Output Power	---	---	±1.4 dB
Band Edges	---	---	±2.2 dB
Power Spectral Density	---	---	±2.2 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 C63.4-2009 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.

Conducted Emission Limits:

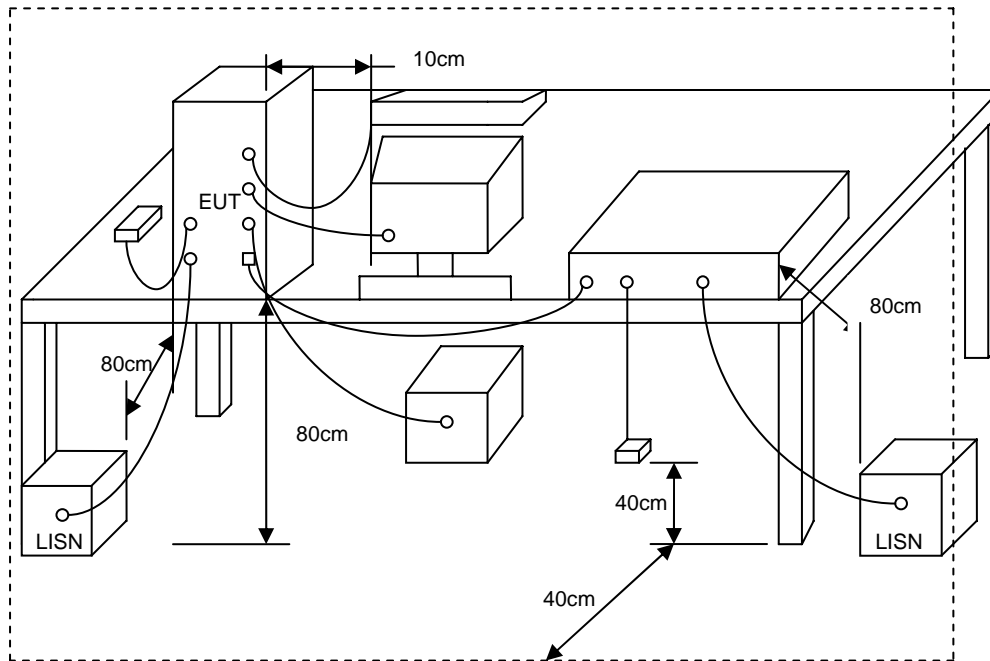
Frequency (MHz)	Quasi Peak (dB μ V)	Average (dB μ V)
0.15 – 0.5	66-56*	56-46*
0.5 – 5.0	56	46
5.0 – 30.0	60	50

3.2. Test Procedures

- a. 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.
- b. Connect EUT to the power mains through a line impedance stabilization network (LISN).
- c. All the support units are connecting to the other LISN.
- d. The LISN provides 50 ohm coupling impedance for the measuring instrument.
- e. The FCC states that a 50 ohm, 50 micro-Henry LISN should be used.
- f. Both sides of AC line were checked for maximum conducted interference.
- g. The frequency range from 150 kHz to 30 MHz was searched.
- h. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.



3.3. Typical test Setup



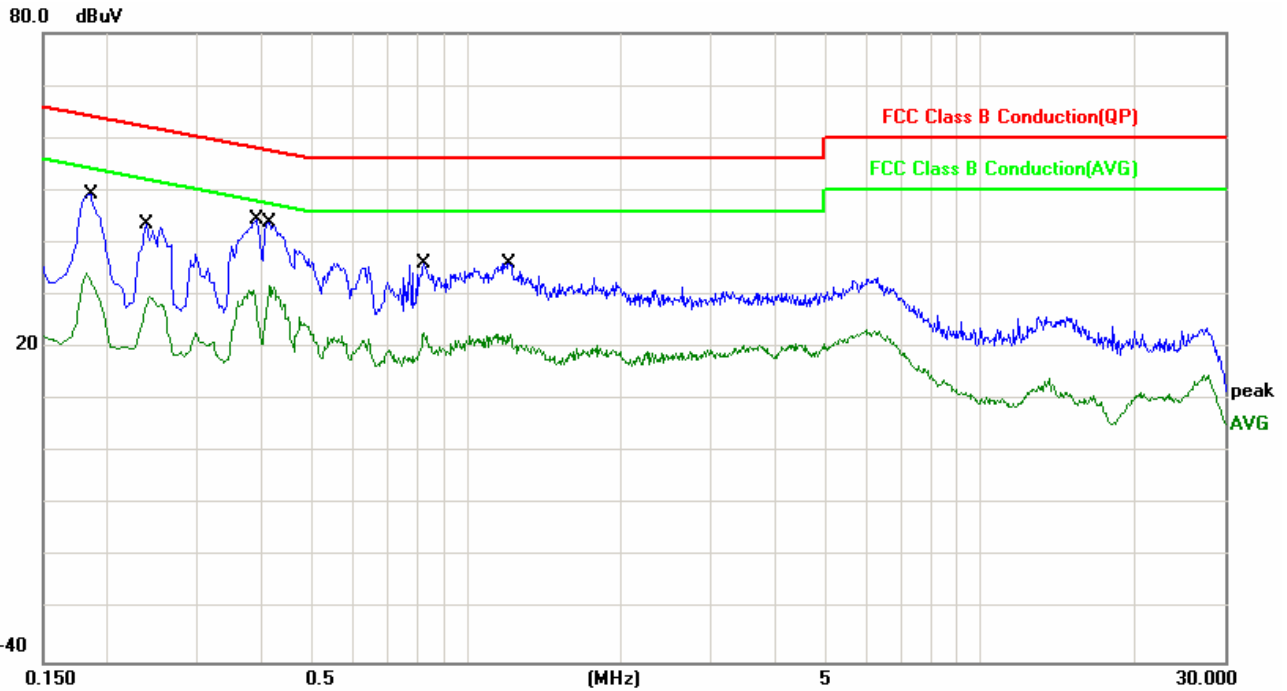
3.4. Measurement Equipment

Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date.
Test Receiver	R&S	ESCI	100565	2013.11.05	2014.11.04
AMN	R&S	ESH2-Z5	100182	2013.11.05	2014.11.04
Two-Line V-Network	R&S	ENV216	100325	2014.03.10	2015.03.09
ISN	FCC	FCC-TLISN-T 2-02	20379	2013.06.25	2014.06.24
ISN	FCC	FCC-TLISN-T 4-02	20380	2013.06.25	2014.06.24
ISN	FCC	FCC-TLISN-T 8-02	20381	2013.07.09	2014.07.08
ISN	TESEQ	ISN ST08	30175	2013.09.13	2014.09.12
Current Probe	R&S	EZ-17	100303	2014.03.10	2015.03.09
Passive Voltage Probe	R&S	ESH2-Z3	100026	2014.03.10	2015.03.09
Attenuator	R&S	ESH3-Z2	100529	2014.03.10	2015.03.09
Temperature/ Humidity Meter	Zhicheng	ZC1-11	CEP-TH-004	2014.03.10	2015.03.09



3.5. Test Result and Data

Test Mode :	Mode 1:RS232+USB+SD+PIN		
AC Power :	AC 120V/60Hz	Phase :	LINE
Temperature :	22°C	Humidity :	50%
Pressure(mbar) :	1002	Date:	2014/04/09

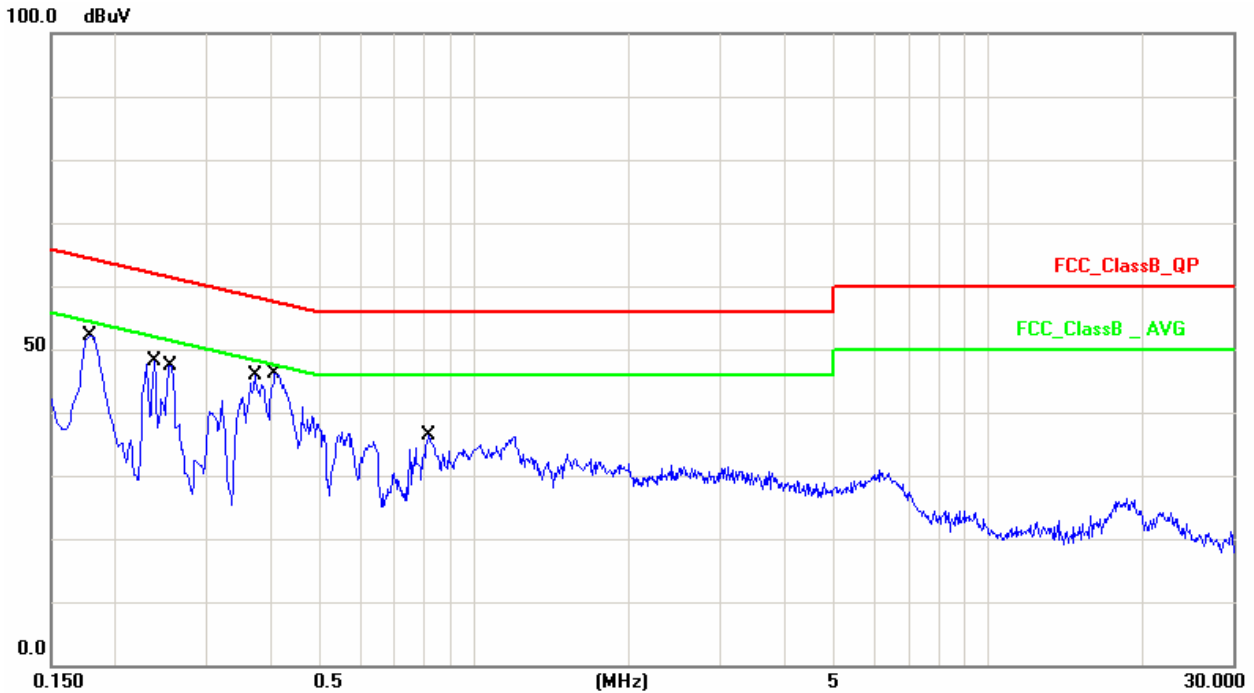


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1820	10.12	37.87	47.99	64.39	-16.40	QP
2	0.1820	10.12	21.62	31.74	54.39	-22.65	AVG
3	0.2300	10.12	30.68	40.80	62.45	-21.65	QP
4	0.2300	10.12	12.28	22.40	52.45	-30.05	AVG
5	0.3100	10.14	24.90	35.04	59.97	-24.93	QP
6	0.3100	10.14	7.22	17.36	49.97	-32.61	AVG
7	0.3780	10.15	32.97	43.12	58.32	-15.20	QP
8	0.3780	10.15	20.09	30.24	48.32	-18.08	AVG
9	0.4620	10.16	26.13	36.29	56.66	-20.37	QP
10	0.4620	10.16	10.82	20.98	46.66	-25.68	AVG
11	1.1940	10.16	20.17	30.33	56.00	-25.67	QP
12	1.1940	10.16	8.24	18.40	46.00	-27.60	AVG

Note: Measurement Level = Reading Level + Correct Factor



Test Mode :	Mode 1:RS232+USB+SD+PIN		
AC Power :	AC 120V/60Hz	Phase :	NEUTRAL
Temperature :	22°C	Humidity :	50%
Pressure(mbar) :	1002	Date:	2014/04/09



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1780	10.13	38.02	48.15	64.57	-16.42	QP
2	0.1780	10.13	20.54	30.67	54.57	-23.90	AVG
3	0.2380	10.13	33.12	43.25	62.16	-18.91	QP
4	0.2380	10.13	16.97	27.10	52.16	-25.06	AVG
5	0.2562	10.13	31.44	41.57	61.55	-19.98	QP
6	0.2562	10.13	14.21	24.34	51.55	-27.21	AVG
7	0.3740	10.15	31.22	41.37	58.41	-17.04	QP
8	0.3740	10.15	18.66	28.81	48.41	-19.60	AVG
9	0.4100	10.15	32.93	43.08	57.65	-14.57	QP
10	0.4100	10.15	20.34	30.49	47.65	-17.16	AVG
11	0.8139	10.16	22.53	32.69	56.00	-23.31	QP
12	0.8139	10.16	11.76	21.92	46.00	-24.08	AVG

Note: Measurement Level = Reading Level + Correct Factor

Test engineer: Amos



4. Test of Radiated Emission

4.1. Test Limit

Radiated emissions from 30 MHz to 15,000 MHz were measured with a bandwidth of 120 kHz according to the methods defines in ANSI C63.4-2009. 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 Meters	Radiated ($\mu\text{V} / \text{M}$)	Radiated (dB $\mu\text{V} / \text{M}$)
30-88	3	100	40.0
88-216	3	150	43.5
216-960	3	200	46.0
Above 960	3	500	54.0

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 $\mu\text{V} / \text{M}$)
30-230	10	30
230-1000	10	37

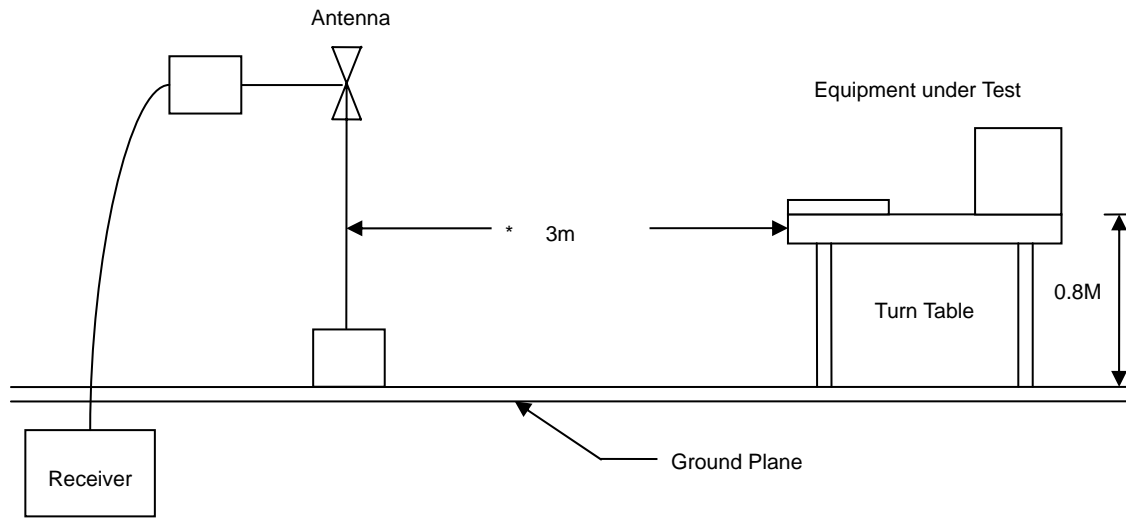
4.2. Test Procedures

- The EUT was placed on a Rota table top 0.8 meter above ground.
- The EUT was set 3/10 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
- The table was rotated 360 degrees to determine the position of the highest radiation.
- The antenna is a half wave dipole and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
- For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
- Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.
- If the emission level of the EUT in peak mode was 6 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 6 dB margin will be repeated one by one using the quasi-peak method and reported.

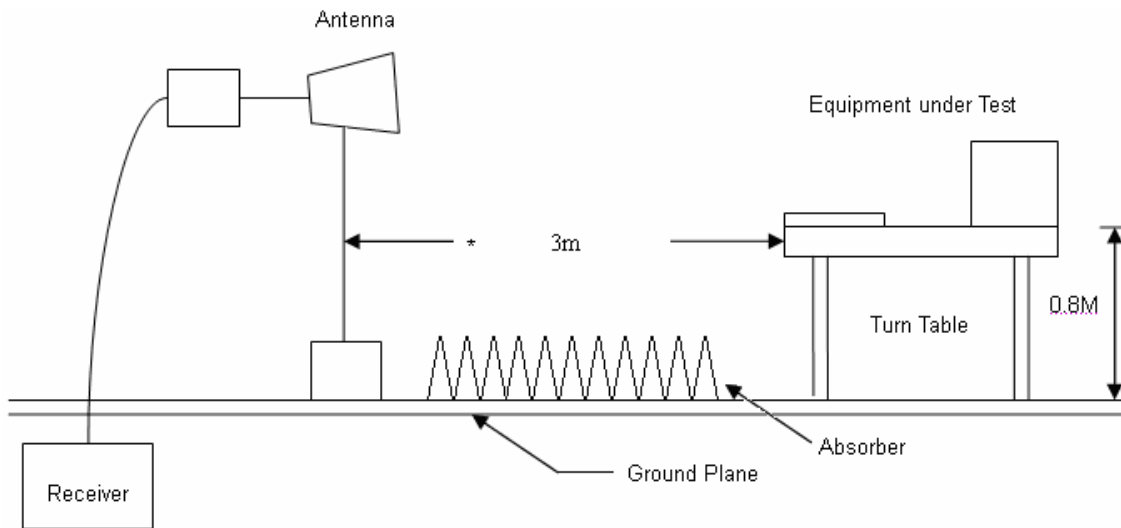


4.3. Typical test Setup

Below 1GHz Test Setup



Above 1GHz Test Setup





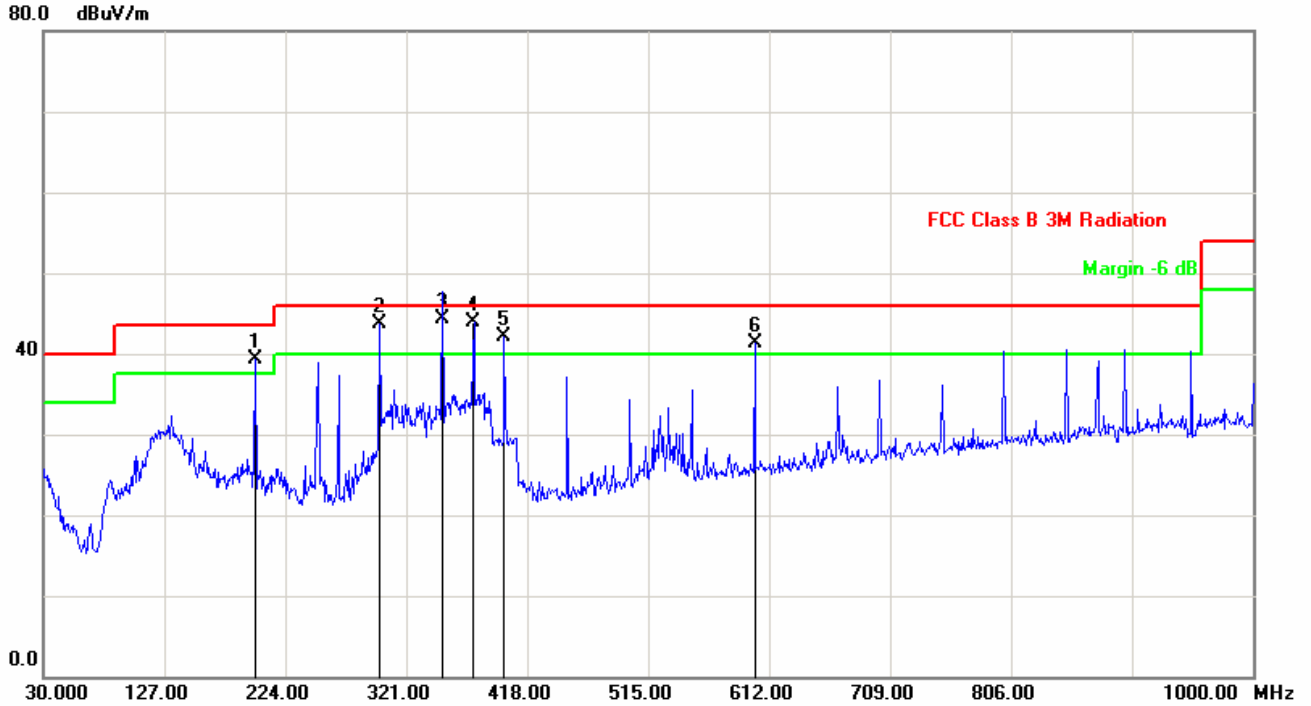
4.4. Measurement Equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date.
EMI Test Receiver	R&S	ESCI	100563	2014.03.10	2015.03.09
H64 Preamplifier	HP	8447F	3113A05582	2014.03.10	2015.03.09
Preamplifier	Agilent	8449B	3008A02342	2014.03.10	2015.03.09
Ultra Broadband Antenna	R&S	HL562	100362	2013.05.02	2014.05.01
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	9120D-619	2013.05.02	2014.05.01
Broad-Band Horn Antenna	Schwarzbeck	BBHA9170	9170-348	2013.11.04	2014.11.03
Spectrum Analyzer	R&S	FSP40	100324	2014.03.10	2015.03.09
Temperature/ Humidity Meter	Zhicheng	ZC1-11	CEP-TH-002	2014.03.10	2015.03.09



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

Test Mode :	Mode 1:RS232+USB+SD+PIN		
Power :	AC 120V/60Hz	Ant. Polarization:	Horizontal
Temp :	23°C	Humidity :	52%
Pressure(mbar) :	1002	Date :	2014/04/09

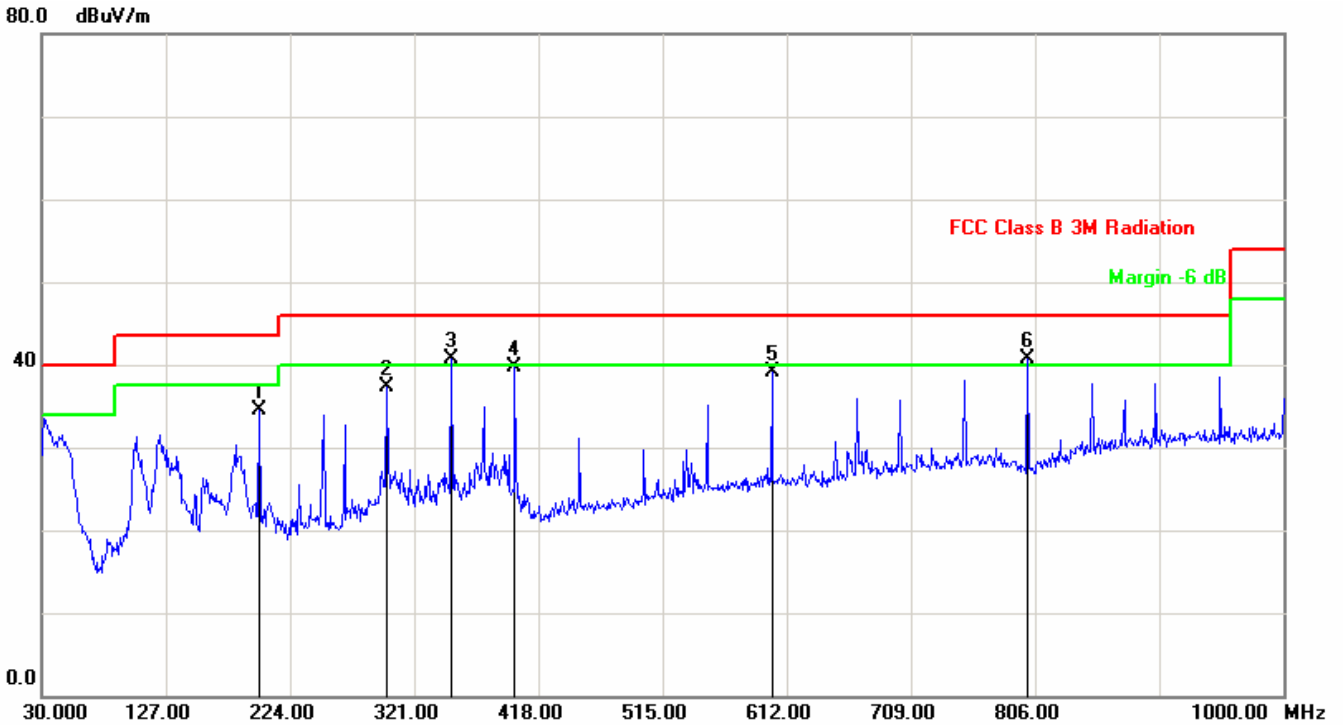


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	199.7500	-15.42	54.75	39.33	43.50	-4.17	QP	200	27
2	299.6600	-10.92	54.61	43.69	46.00	-2.31	QP	100	100
3	350.0100	-9.19	53.45	44.26	46.00	-1.74	QP	100	116
4	375.3199	-8.36	52.17	43.81	46.00	-2.19	QP	100	180
5	399.5699	-7.57	49.70	42.13	46.00	-3.87	QP	100	180
6	600.3600	-2.64	43.99	41.35	46.00	-4.65	QP	200	172

Note: Measurement Level = Reading Level + Correct Factor



Test Mode :	Mode 1:RS232+USB+SD+PIN		
Power :	AC 120V/60Hz	Ant. Polarization:	Vertical
Temp :	23°C	Humidity :	52%
Pressure(mbar) :	1002	Date :	2014/04/09



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	199.7500	-15.42	49.84	34.42	43.50	-9.08	QP	200	52
2	299.6600	-10.92	48.15	37.23	46.00	-8.77	QP	162	360
3	350.1000	-9.19	49.90	40.71	46.00	-5.29	QP	172	360
4	399.5700	-7.57	47.33	39.76	46.00	-6.24	QP	100	42
5	600.3600	-2.64	41.78	39.14	46.00	-6.86	QP	100	358
6	800.1800	1.07	39.64	40.71	46.00	-5.29	QP	100	138

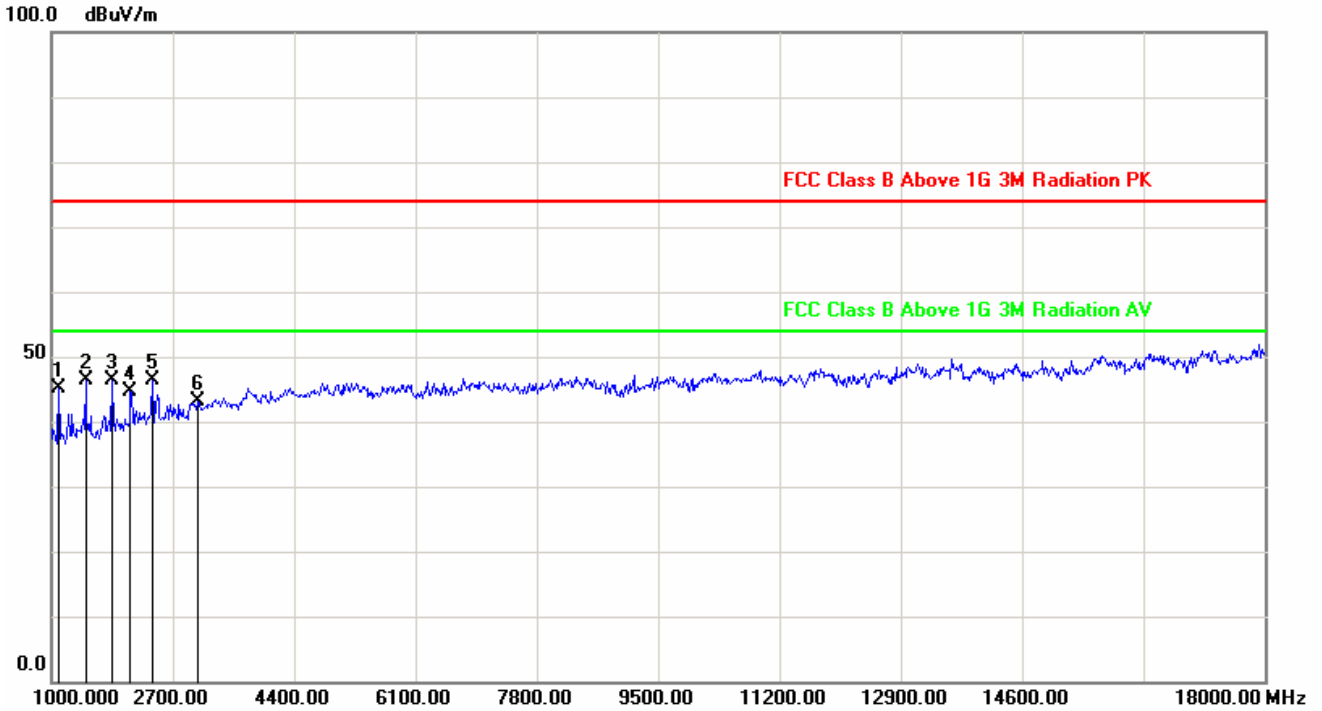
Note: Measurement Level = Reading Level + Correct Factor

Test engineer: Amos



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

Test Mode :	Mode 1:RS232+USB+SD+PIN		
AC Power :	AC 120V/60Hz	Ant. Polarization:	Horizontal
Temp :	23°C	Humidity :	52%
Pressure(mbar) :	1002	Date :	2014/04/09

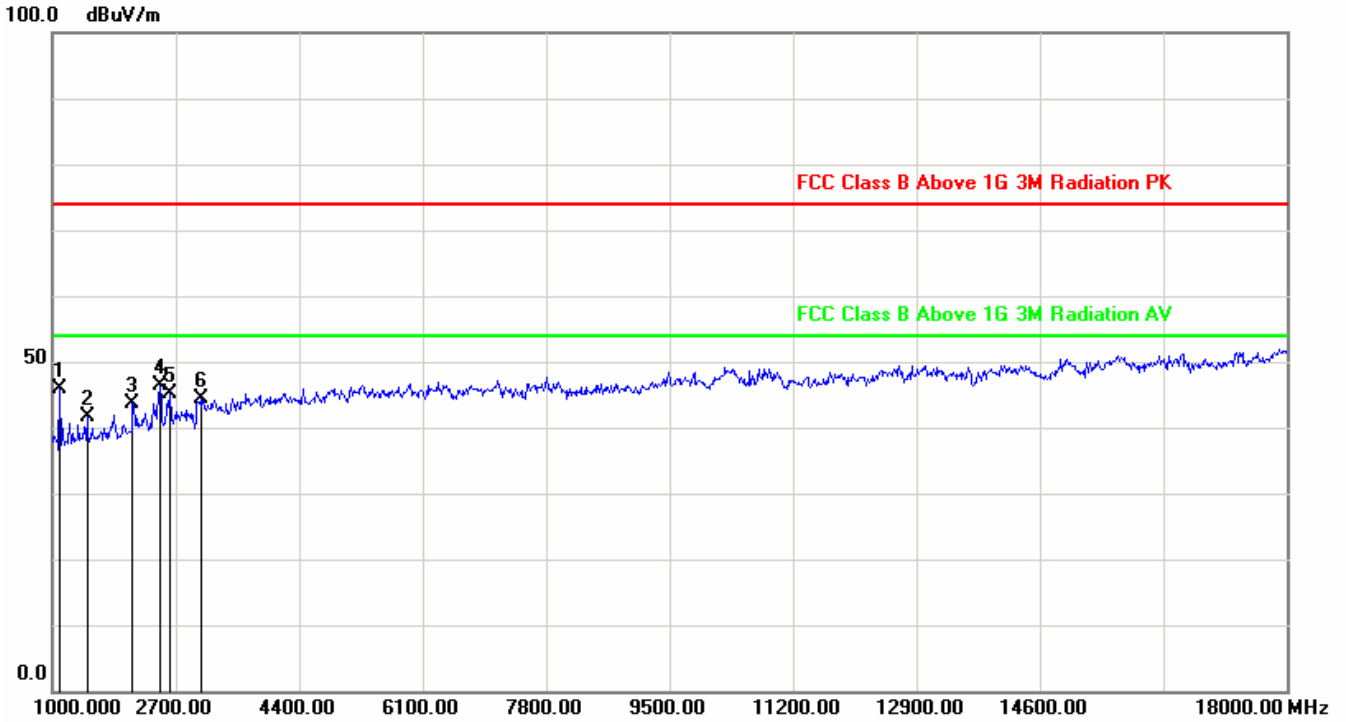


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	1102.000	-6.44	51.50	45.06	74.00	-28.94	peak	100	325
2	1476.000	-4.89	51.27	46.38	74.00	-27.62	peak	100	358
3	1850.000	-3.33	49.70	46.37	74.00	-27.63	peak	100	69
4	2105.000	-2.35	47.09	44.74	74.00	-29.26	peak	100	154
5	2411.000	-1.32	47.69	46.37	74.00	-27.63	peak	100	52
6	3040.000	0.80	42.30	43.10	74.00	-30.90	peak	200	250

Note: Measurement Level = Reading Level + Correct Factor



Test Mode :	Mode 1:RS232+USB+SD+PIN		
AC Power :	AC 120V/60Hz	Ant. Polarization:	Vertical
Temp :	23°C	Humidity :	52%
Pressure(mbar) :	1002	Date :	2014/04/09



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	1102.000	-6.44	52.31	45.87	74.00	-28.13	peak	100	187
2	1476.000	-4.89	46.49	41.60	74.00	-32.40	peak	100	353
3	2105.000	-2.35	46.07	43.72	74.00	-30.28	peak	100	162
4	2479.000	-1.10	47.59	46.49	74.00	-27.51	peak	100	224
5	2615.000	-0.64	45.80	45.16	74.00	-28.84	peak	100	224
6	3040.000	0.80	43.66	44.46	74.00	-29.54	peak	200	340

Note: Measurement Level = Reading Level + Correct Factor