



# FCC TEST REPORT

According to

**47 CFR, Part 2, Part 15, CISPR PUB. 22  
ICES 003 Issue 6**

Applicant : Suzhou Switek Electronics&Technology Co, Ltd.  
Address : No.86, South WuSong Road, Luzhi Town, Wuzhong  
District, Suzhou City.  
Equipment : IP OVER KVM  
Model No. : KI-4101, KI-4101C  
FCC ID : ZQXKI4101

**I HEREBY CERTIFY THAT :**

**The sample was received on Jul 11, 2017 and the testing was carried out on Jul 14, 2017 at Cerpass Technology Corp. The test result refers exclusively to the test presented test model / sample. Without written approval of Cerpass Technology Corp., the test report shall not be reproduced except in full.**

Approved by

Ray Chou

EMC/RF B.U. Assistant Manager



# FCC TEST REPORT

Issued by:

**Cerpass Technology Co.,Ltd**

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The test record, data evaluation & Equipment Under Test configurations represented herein are true and accurate accounts of the measurements of the samples EMC characteristics under the conditions specified in this report.

Laboratory Accreditation:

Cerpass Technology Corporation Test Laboratory

<b>TAF LAB Code:</b>	<b>1439</b>
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## History of this test report

■ ORIGINAL.

Additional attachment as following record:



## 1. Summary of Test Procedure and Test Result

### 1.1. Applicable Standards

The measurements shown in this test report were made in accordance with the procedures given in ANSI C63.4 – 2014 and the energy emitted by this equipment was passed Part 2, Part 15, CISPR PUB. 22.

The energy emitted by this equipment was passed both Radiated and Conducted Emissions Class B limits.

Test Item	Normative References	Test Result	Remarks
Conducted Emission	ANSI C63.4-2014 FCC Part 15 Subpart B ICES 003 Issue 6	PASS	Meets Class B Limit Minimum passing margin(QP) is -10.48 dB at 0.1500 MHz
Radiated Emission	ANSI C63.4-2014 FCC Part 15 Subpart B ICES 003 Issue 6	PASS	Meets Class B Limit Minimum passing margin(peak) is -5.60 dB at 444.1899 MHz



## 2. Test Configuration of Equipment under Test

### 2.1. Feature of Equipment under Test

Product Name:	IP OVER KVM	
Model Name:	KI-4101, KI-4101C	
Remark:	<p>The working principle of the product, the circuit, is exactly the same. Compared to KI-4101, you can work alone, and KI-4101C is only IP card, which needs to be matched with power and interface to work.</p> <p>KI-4101 was selected as the test model and its data have been recorded in this report.</p>	
Adapter	Model:	SSA101F090100US
	Input:	100-240V~ 50/60Hz 0.4A
	Output:	9V, 1A

Note: Please refer to user manual.

### 2.2. Test Manner

- a. During testing, the interface cables and equipment positions were varied according to ANSI C63.4.
- b. Turn on the power of all equipment.
- c. The complete test system included Computer, USB Keyboard, USB Mouse, Monitor, Notebook PC and EUT for EMI test.
- d. The test mode as follow:

Mode 1: Full system

The "Test Mode 1" were reported as final data.

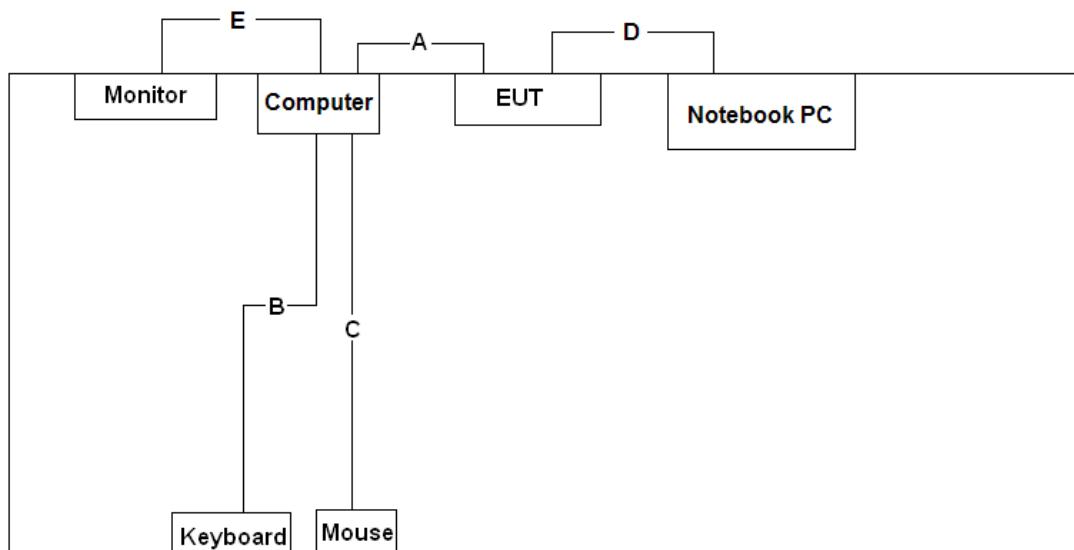


### 2.3. Description of Test System

No.	Device	Manufacturer	Model No.	Description
1	Computer	HP	HP Compaq Elite 8200 MTPC	Non-Shielded ,1.8m
2	USB Keyboard	DELL	SK-8115	N/A
3	USB Mouse	DELL	G0K02XYK	N/A
4	LCD Monitor	DELL	U2713HMT	Non-Shielded, 1.8m
5	Notebook PC	SONY	PCG-71811P	Non-Shielded, 1.5m



## 2.4. Connection Diagram of Test System



No.	Cable	Quantity	Description
A	VGA to VGA + USB Cable	1	Shielded, 1.8m, with one ferrite core bonded
B	USB Cable	1	Shielded, 1.8m, with one ferrite core bonded
C	USB Cable	1	Shielded, 1.5m
D	LAN Cable	1	Non-shielded, 1.8m
E	HDMI Cable	1	Shielded, 1.8m



## 2.5. General Information of Test

Test Site :	<b>Cerpass Technology Corporation Test Laboratory</b> Address: No.10, Ln. 2, Lianfu St., Luzhu Dist., Taoyuan City 33848, Taiwan (R.O.C.) Tel:+886-3-3226-888 Fax:+886-3-3226-881 Address: No.68-1, Shihbachongsi, Shihding Township, New Taipei City 223, Taiwan, R.O.C. Tel: +886-2-2663-8582
FCC Registration Number :	TW1079, TW1061,390316, 228391, 641184
IC Registration Number :	4934B-1, 4934E-1, 4934E-2
VCCI	T-2205 for Telecommunication Test C-4663 for Conducted emission test R-3428, R-4218 for Radiated emission test G-812, G-813 for radiated disturbance above 1GHz
Frequency Range Investigated :	Conducted Emission Test: from 150 kHz to 30 MHz Radiated Emission Test: from 30 MHz to 18,000 MHz
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.

## 2.6. Measurement Uncertainty

Measurement Item	Measurement Frequency	Polarization	Uncertainty
Conducted Emission	9 kHz ~ 30 MHz	LINE / NEUTRAL	3.25 dB
Radiated Emission	30 MHz ~ 1,000 MHz 1,000 MHz ~ 18,000 MHz	Vertical / Horizontal	3.93 dB 5.18 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 C63.4-2014 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:

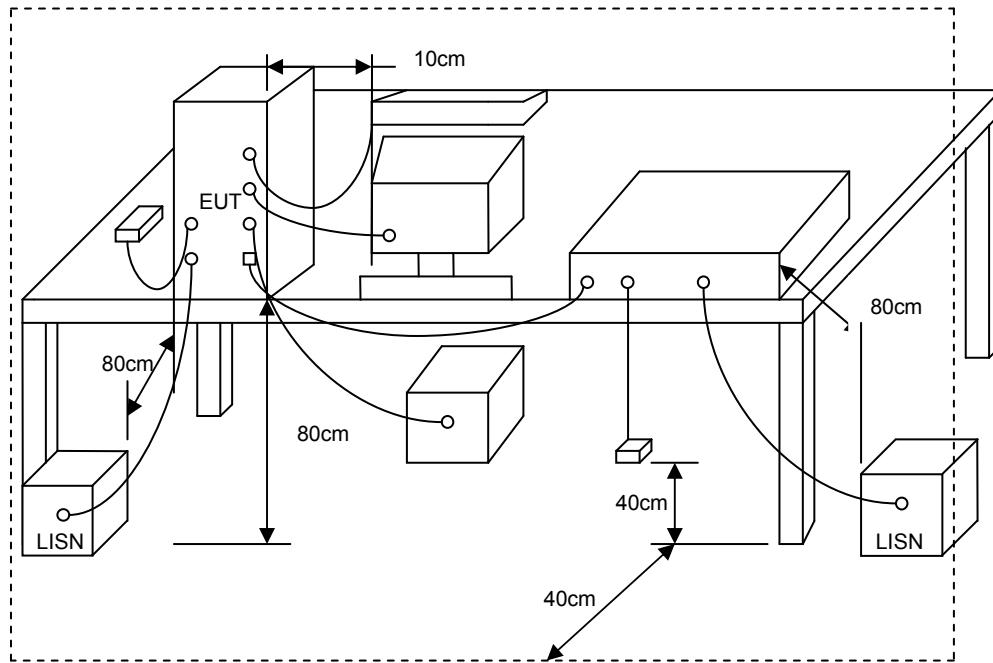
Frequency (MHz)	Quasi Peak (dB $\mu$ V)	Average (dB $\mu$ V)
0.15 – 0.5	66-56*	56-46*
0.5 – 5.0	56	46
5.0 – 30.0	60	50

#### 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



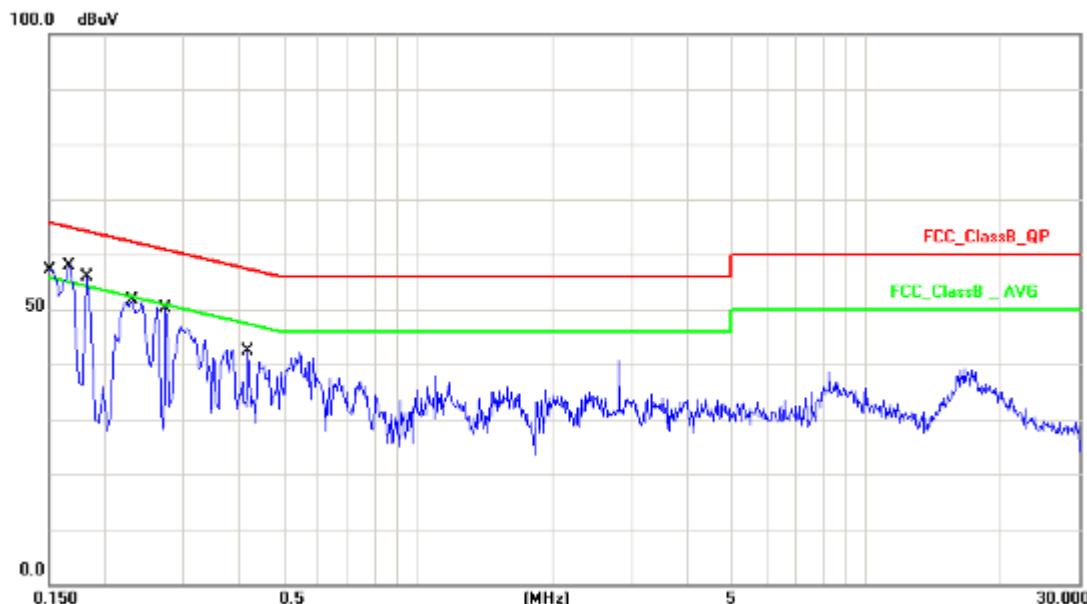
### 3.4. Measurement Equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date.
Test Receiver	R&S	ESCI	100565	2017.07.07	2018.07.06
AMN	R&S	ESH2-Z5	100182	2016.08.31	2017.08.30
Two-Line V-Network	R&S	ENV216	100325	/	/
ISN	FCC	FCC-TLISN-T2-02	20379	2017.03.22	2018.03.21
ISN	FCC	FCC-TLISN-T4-02	20380	2017.06.24	2018.06.23
ISN	FCC	FCC-TLISN-T8-02	20381	2016.11.29	2017.11.28
ISN	TESEQ	ISN ST08	30175	2016.08.31	2017.08.30
LISN	FCC	FCC-LISN-50-200-2-02	112087	2016.08.31	2017.08.30
Current Probe	R&S	EZ-17	100303	2017.03.22	2018.03.21
Passive Voltage Probe	R&S	ESH2-Z3	100026	2017.03.22	2018.03.21
Pulse Limiter	R&S	ESH3-Z2	100529	2017.03.22	2018.03.21
Temperature/ Humidity Meter	Zhicheng	ZC1-11	CEP-TH-004	2017.03.28	2018.03.27
EZ-EMC	Fala	Ver CT3A1	N/A	N/A	N/A



### 3.5. Test Result and Data

Test Mode :	Mode 1: Full system		
AC Power :	AC 120V/60Hz	Phase :	LINE
Temperature :	24°C	Humidity :	55%
Pressure(mbar) :	1001	Date:	2017/07/13

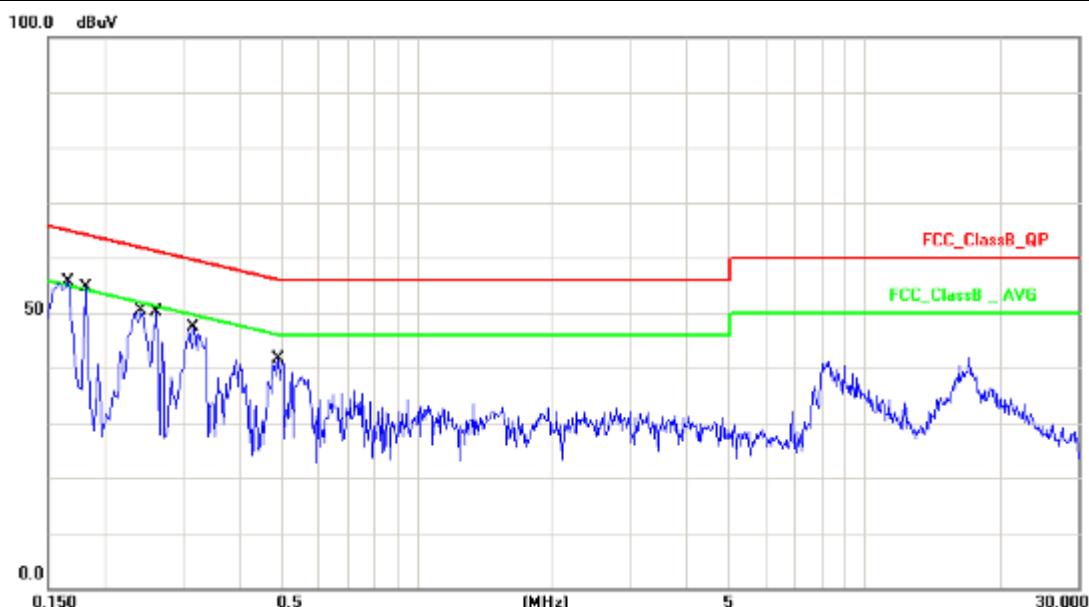


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1500	10.13	45.38	55.51	65.99	-10.48	QP
2	0.1500	10.13	32.32	42.45	55.99	-13.54	AVG
3	0.1660	10.13	42.28	52.41	65.15	-12.74	QP
4	0.1660	10.13	23.12	33.25	55.15	-21.90	AVG
5	0.1819	10.12	41.17	51.29	64.39	-13.10	QP
6	0.1819	10.12	14.83	24.95	54.39	-29.44	AVG
7	0.2300	10.12	38.11	48.23	62.45	-14.22	QP
8	0.2300	10.12	23.65	33.77	52.45	-18.68	AVG
9	0.2740	10.13	34.27	44.40	60.99	-16.59	QP
10	0.2740	10.13	9.64	19.77	50.99	-31.22	AVG
11	0.4180	10.15	24.84	34.99	57.49	-22.50	QP
12	0.4180	10.15	6.70	16.85	47.49	-30.64	AVG

Note: Measurement Level = Reading Level + Correct Factor



Test Mode :	Mode 1: Full system		
AC Power :	AC 120V/60Hz	Phase :	NEUTRAL
Temperature :	24°C	Humidity :	55%
Pressure(mbar) :	1001	Date:	2017/07/13



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1660	10.13	42.97	53.10	65.15	-12.05	QP
2	0.1660	10.13	27.08	37.21	55.15	-17.94	AVG
3	0.1819	10.13	26.95	37.08	64.39	-27.31	QP
4	0.1819	10.13	9.10	19.23	54.39	-35.16	AVG
5	0.2420	10.13	37.55	47.68	62.02	-14.34	QP
6	0.2420	10.13	22.57	32.70	52.02	-19.32	AVG
7	0.2620	10.13	23.63	33.76	61.36	-27.60	QP
8	0.2620	10.13	5.22	15.35	51.36	-36.01	AVG
9	0.3180	10.14	32.99	43.13	59.76	-16.63	QP
10	0.3180	10.14	18.31	28.45	49.76	-21.31	AVG
11	0.4900	10.15	25.03	35.18	56.17	-20.99	QP
12	0.4900	10.15	12.83	22.98	46.17	-23.19	AVG

Note: Measurement Level = Reading Level + Correct Factor

Test engineer: Sun. Zhang



## 4. Test of Radiated Emission

### 4.1. Test Limit

#### Below 1GHz (for digital device)

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)	dBuV/m (At 10m)	
	Class A	Class B
30 ~ 230	40	30
230 ~ 1000	47	37

#### Limit tables for non-digital device:

#### Class A Radiated Emission limit at 10m (for others)

Frequency (MHz)	Field Strength Limit (uV/m)Q.P.	Field Strength Limit (dBuV/m)Q.P.
30 - 88	90	39
88 - 216	150	43.5
216 - 960	210	46.4
Above 960	300	49.5

#### Class B Radiated Emission limit at 3m (for others)

Frequency (MHz)	Field Strength Limit (uV/m)Q.P.	Field Strength Limit (dBuV/m)Q.P.
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

#### Above 1GHz(for all device)

Frequency (MHz)	Class A (dBuV/m) (At 10m)		Class B (dBuV/m) (At 3m)	
	Average	Peak	Average	Peak
Above 1000	49.5	69.5	54	74

**NOTE:** (1) The lower limit shall apply at the transition frequencies.

(2) Emission level (dBuV/m) = 20 log Emission level (uV/m).

(3) The measurement above 1GHz is at close-in distances 3m, and determine the limit L2 corresponding to the close-in distance d2 by applying the following relation:  $L2 = L1 \left( \frac{d1}{d2} \right)$ , where L1 is the specified limit in microvolts per metre (uV/m) at the distance d1 (10m), L2 is the new limit for distance d2 (3m).

So the new Class A limit above 1GHz at 3m is as following table:



Frequency (MHz)	Class A (dBuV/m) (At 3m)	
	Average	Peak
Above 1000	60	80

According to FCC Part 15.33 (b), for an unintentional radiator, including a digital device, the spectrum shall be investigated from the lowest radio frequency signal generated or used in the device, without going below the lowest frequency for which a radiated emission limit is specified, up to the frequency shown in the following table:

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.75	30
1.75-108	1000
108-500	2000
500-1000	5000
Above 1000	5 <sup>th</sup> harmonic of the highest frequency or 40GHz, whichever is lower

## 4.2. Test Procedures

### Procedure of Preliminary Test

- The equipment was set up as per the test configuration to simulate typical usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane. When the EUT is a floor standing equipment, it is placed on the ground plane which has a 15 cm non-conductive covering to insulate the EUT from the ground plane.
- Support equipment, if needed, was placed as per ANSI C63.4.
- All I/O cables were positioned to simulate typical usage as per ANSI C63.4.
- The EUT received AC 120VAC/60Hz power source from the outlet socket under the turntable. All support equipment power received from another socket under the turntable.
- The antenna was placed at 3 or 10 meter away from the EUT as stated in ANSI C63.4. The antenna connected to the Spectrum Analyzer via a cable and at times a pre-amplifier would be used.
- The Analyzer / Receiver quickly scanned from 30MHz to 40GHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.



- Set the spectrum analyzer/ Receiver in the following setting as:  
Below 1GHz:  
RBW=120KHz / VBW=300KHz / Sweep=AUTO  
Above 1GHz:  
Peak: RBW=1MHz, VBW=3MHz / Sweep=AUTO  
Average: RBW=1MHz / VBW=1.6Hz / Sweep=AUTO
- The worst configuration of EUT and cable of the above highest emission level were recorded for reference of the final test.

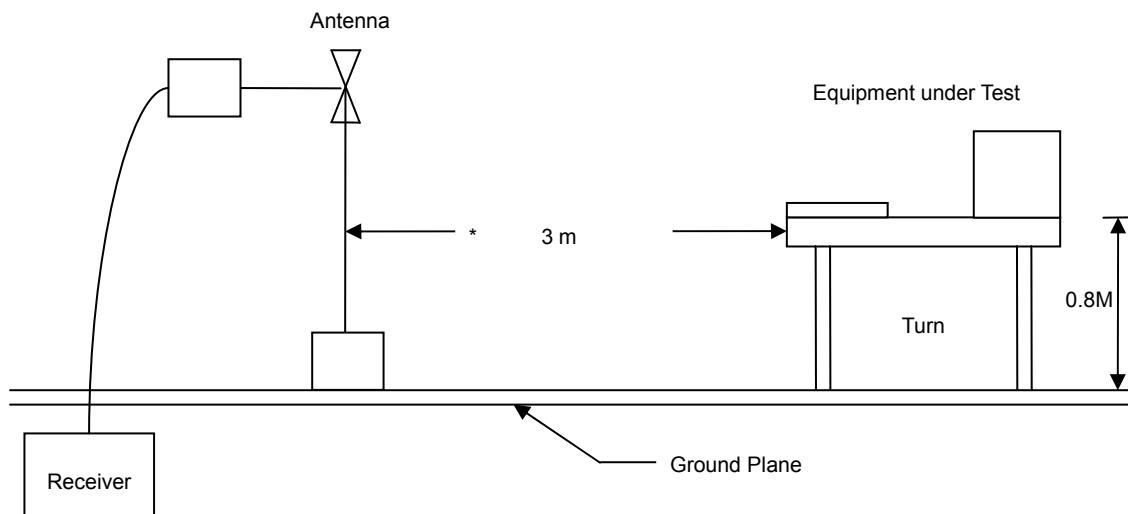
### Procedure of Final Test

- EUT and support equipment were set up on the turntable as per the configuration with highest emission level in the preliminary test.
- The Analyzer / Receiver scanned from 30MHz to 40GHz. Emissions were scanned and measured rotating the EUT to 360 degrees, varying cable placement and positioning the antenna 1 or 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- Recording at least the six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. Below 1GHz the Q.P. reading and above 1GHz the Peak and Average reading are presented.
- The test data of the worst-case condition(s) was recorded.

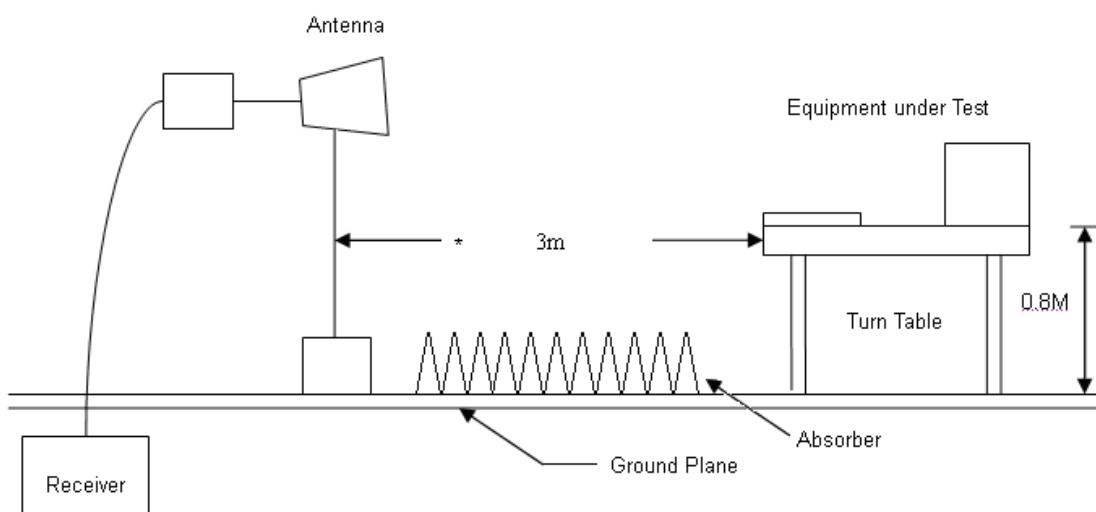


#### 4.3. Typical test Setup

Below 1GHz Test Setup



Above 1GHz Test Setup





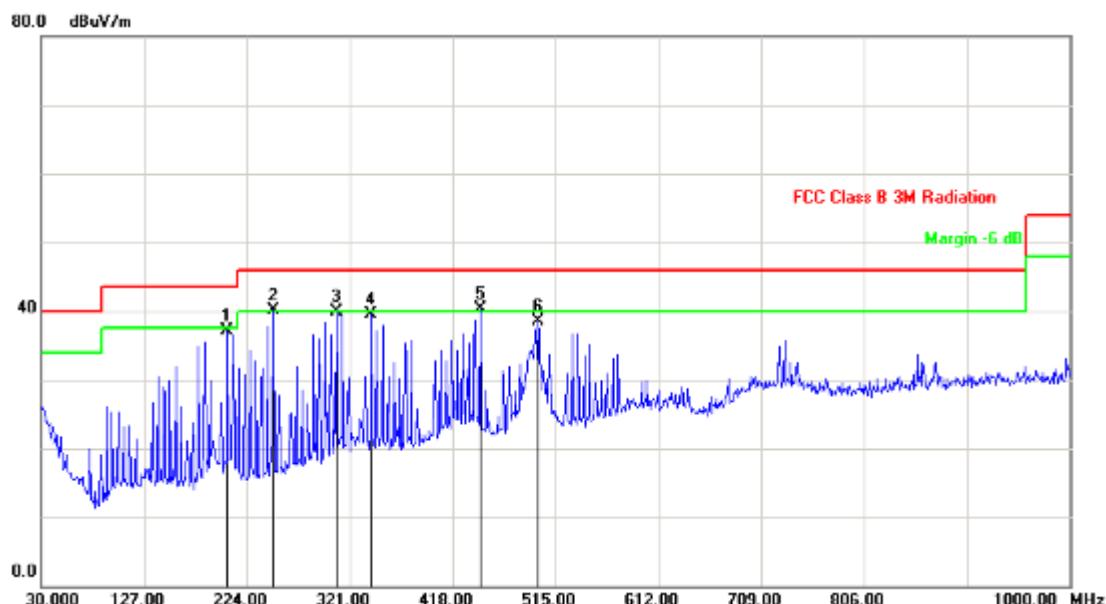
#### 4.4. Measurement Equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date.
EMI Test Receiver	R&S	ESCI	101183	2017.06.29	2018.06.28
Preamplifier	songyi	EM330	60618	2017.03.22	2018.03.21
Preamplifier	Agilent	8449B	3008A02342	2017.03.22	2018.03.21
Bilog Antenna	Sunol Science	JB1	A072414-1	2017.04.16	2018.04.15
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	9120D-618	2017.04.16	2018.04.15
Broad-Band Horn Antenna	Schwarzbeck	BBHA9170	9170-347	2017.04.16	2018.04.15
Preamplifier	COM-POWER	PA-840	711885	2017.03.22	2018.03.21
Spectrum Analyzer	R&S	FSP40	100324	2016.08.02	2017.08.01
Temperature/ Humidity Meter	Zhicheng	ZC1-11	CEP-TH-002	2017.03.28	2018.03.27
EZ-EMC	Fala	Ver CT3A1	N/A	N/A	N/A



#### 4.5. Test Result and Data (30MHz~1GHz)

Test Mode :	Mode 1: Full system		
AC Power :	AC 120V/60Hz	Ant. Polarization:	Horizontal
Temperature :	24°C	Humidity :	55%
Pressure(mbar) :	1001	Date:	2017/07/14

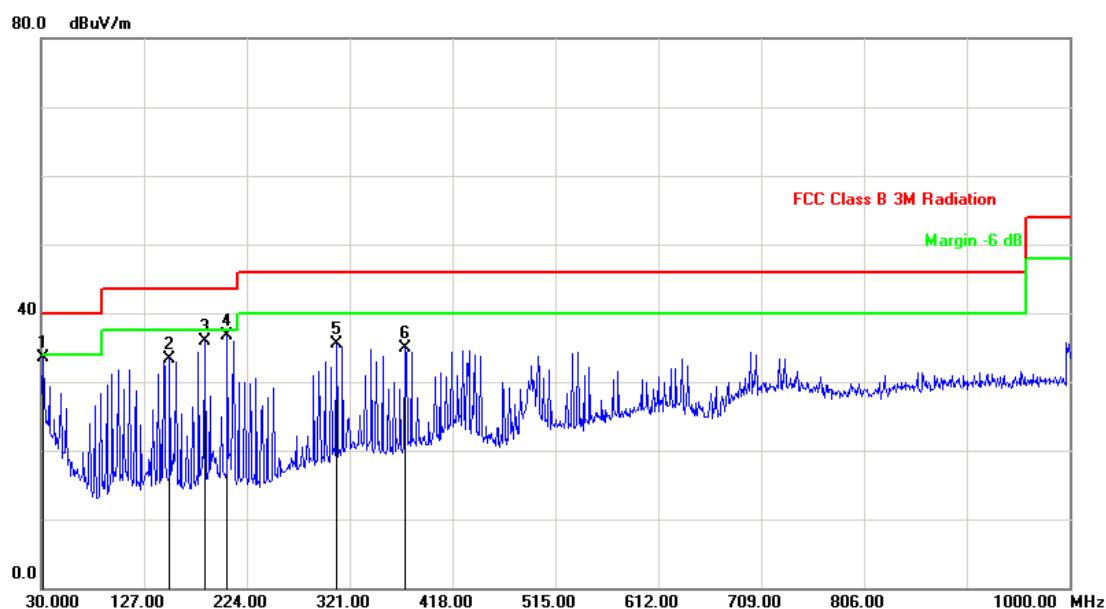


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	205.5699	-12.36	49.44	37.08	43.50	-6.42	peak	200	78
2	249.2199	-11.10	51.15	40.05	46.00	-5.95	peak	200	262
3	308.3899	-7.42	47.28	39.86	46.00	-6.14	peak	200	247
4	341.3700	-6.60	46.08	39.48	46.00	-6.52	peak	200	241
5	444.1899	-5.85	46.25	40.40	46.00	-5.60	peak	200	292
6	498.5099	-4.96	43.52	38.56	46.00	-7.44	peak	100	41

Note: Measurement Level = Reading Level + Correct Factor



Test Mode :	Mode 1: Full system		
AC Power :	AC 120V/60Hz	Ant. Polarization:	Vertical
Temperature :	24°C	Humidity :	55%
Pressure(mbar) :	1001	Date:	2017/07/14



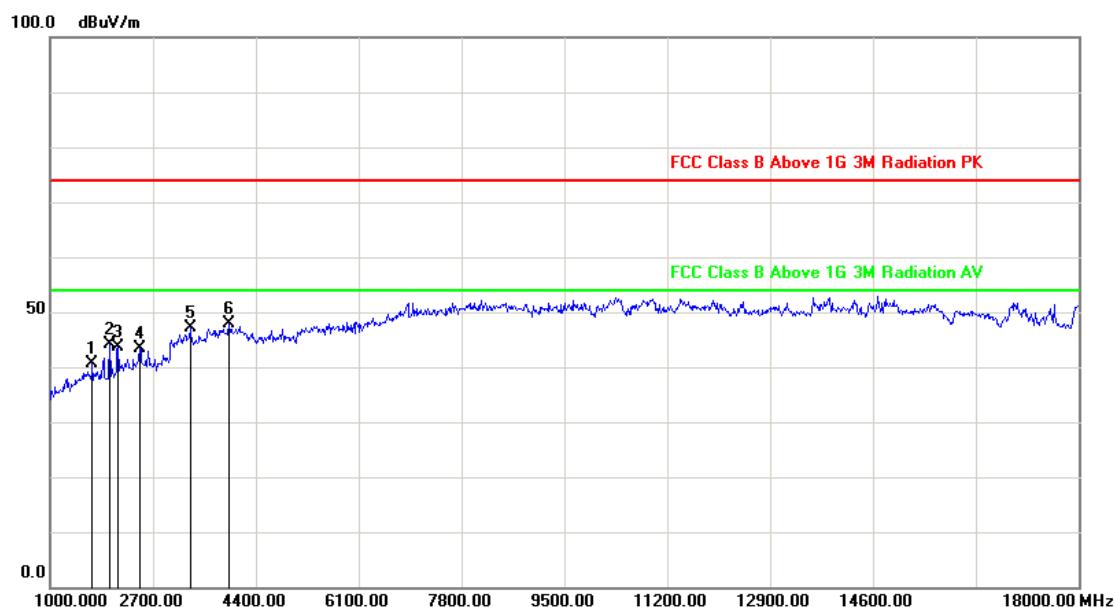
No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	31.9400	-3.21	36.80	33.59	40.00	-6.41	peak	200	1
2	151.2500	-12.63	45.96	33.33	43.50	-10.17	peak	200	60
3	184.2300	-12.61	48.58	35.97	43.50	-7.53	peak	200	157
4	205.5700	-12.36	49.03	36.67	43.50	-6.83	peak	200	33
5	308.3900	-7.42	43.01	35.59	46.00	-10.41	peak	156	0
6	373.3800	-6.96	41.79	34.83	46.00	-11.17	peak	200	324

Note: Measurement Level = Reading Level + Correct Factor



#### 4.6. Test Result and Data (1GHz ~18GHz)

Test Mode :	Mode 1: Full system		
AC Power :	AC 120V/60Hz	Ant. Polarization:	Horizontal
Temperature :	24°C	Humidity :	55%
Pressure(mbar) :	1001	Date:	2017/07/14

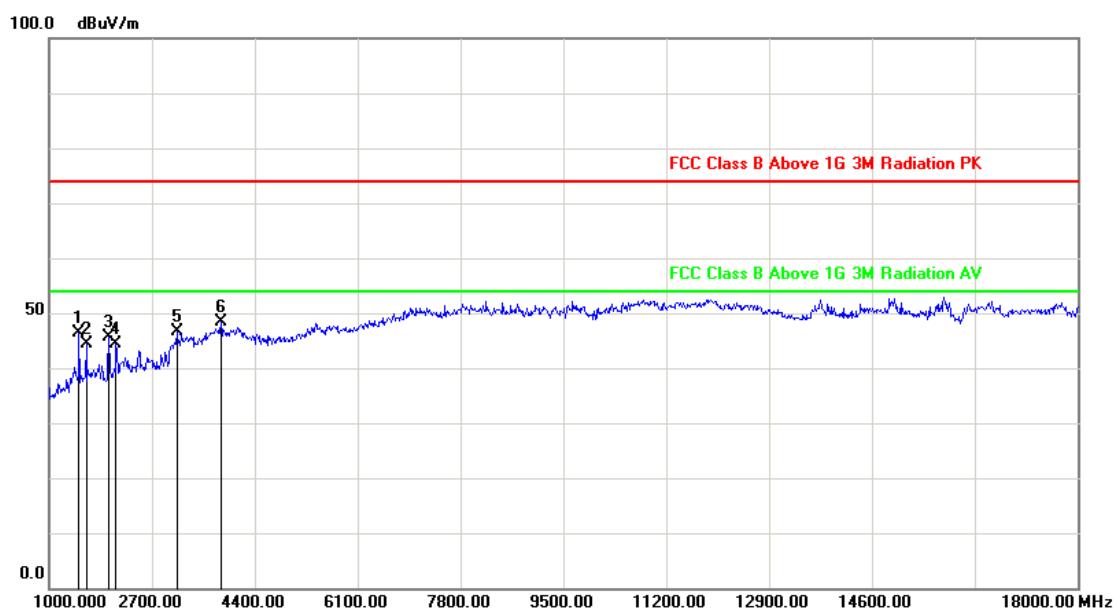


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	1697.000	-4.95	45.63	40.68	74.00	-33.32	peak	200	207
2	1986.000	-3.76	47.87	44.11	74.00	-29.89	peak	200	113
3	2122.000	-3.24	46.88	43.64	74.00	-30.36	peak	100	137
4	2479.000	-1.91	45.33	43.42	74.00	-30.58	peak	200	272
5	3312.000	0.76	46.43	47.19	74.00	-26.81	peak	100	7
6	3958.000	3.30	44.67	47.97	74.00	-26.03	peak	200	178

Note: Measurement Level = Reading Level + Correct Factor



Test Mode :	Mode 1: Full system		
AC Power :	AC 120V/60Hz	Ant. Polarization:	Vertical
Temperature :	24°C	Humidity :	55%
Pressure(mbar) :	1001	Date:	2017/07/14



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	1493.000	-5.83	52.16	46.33	74.00	-27.67	peak	100	162
2	1612.000	-5.31	49.79	44.48	74.00	-29.52	peak	100	0
3	1986.000	-3.76	49.46	45.70	74.00	-28.30	peak	100	244
4	2105.000	-3.31	47.68	44.37	74.00	-29.63	peak	100	51
5	3108.000	-0.10	46.65	46.55	74.00	-27.45	peak	100	139
6	3839.000	2.84	45.66	48.50	74.00	-25.50	peak	100	134

Note: Measurement Level = Reading Level + Correct Factor

Test engineer: Sun. Zhang