



# FCC TEST REPORT

According to

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

Applicant : Suzhou Switek Electronics&Technology Co, Ltd.  
Address : No.86, South WuSong Road, Luzhi Town, Wuzhong District, Suzhou City.  
Equipment : KMV SWITCH  
Model No. : AS-9104DU, AS-9108DU, AS-9116DU, AS-3104DU, AS-3108DU, AS-3116DU

**I HEREBY CERTIFY THAT :**

The sample was received on Mar 01, 2017 and the testing was carried out on Mar 05, 2017 at CerpPASS Technology Corp. The test result refers exclusively to the test presented test model / sample. Without written approval of CerpPASS Technology Corp., the test report shall not be reproduced except in full.

Approved by:

Miro Chueh

EMC/RF B.U. Manager



# FCC TEST REPORT

Issued by:

**CerpPASS Technology (Suzhou) 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:

CerpPASS Technology Corporation Test Laboratory

<b>NVLAP LAB Code:</b>	<b>200954-0</b>
<b>TAF LAB Code:</b>	<b>1439</b>

CerpPASS Technology(SuZhou) Co., Ltd.

<b>NVLAP LAB Code:</b>	<b>200814-0</b>
<b>CNAS LAB Code:</b>	<b>L5515</b>



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### History of this test report

■ ORIGINAL.

Additional attachment as following record:

Report No	Version	Date	Description
SEFD1610112	Rev 01	Mar 24, 2017	Initial Issue



## 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	PASS	Meets Class B Limit Minimum passing margin(AVG) is -4.42 dB at 0.6820 MHz
Radiated Emission	ANSI C63.4-2014 FCC Part 15 Subpart B	PASS	Meets Class B Limit Minimum passing margin(QP) is -4.30 dB at 52.1480 MHz



## 2. Test Configuration of Equipment under Test

### 2.1. Feature of Equipment under Test

<b>Product Name:</b>	KMV SWITCH	
<b>Model Name:</b>	AS-9104DU, AS-9108DU, AS-9116DU, AS-3104DU, AS-3108DU, AS-3116DU	
<b>Remark:</b>	<b>AS-9116DU</b> was selected as the test model and its data have been recorded in this report. They are identical except the market.	
<b>Adapter</b>	Model:	ZPP300700000
	Input:	100-240V~ 50/60Hz 0.4A Max
	Output:	9V, 1000mA

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 PC, USB Keyboard, USB Mouse, PS/2 Keyboard, PS/2 Mouse and EUT for EMI test.
- d. The test mode as follow:
  - Mode 1 Full system for AS-9116DU (USB MODE)
  - Mode 2 Full system for AS-9116DU (PS/2 MODE)The "Test Mode 1" were reported as final data.

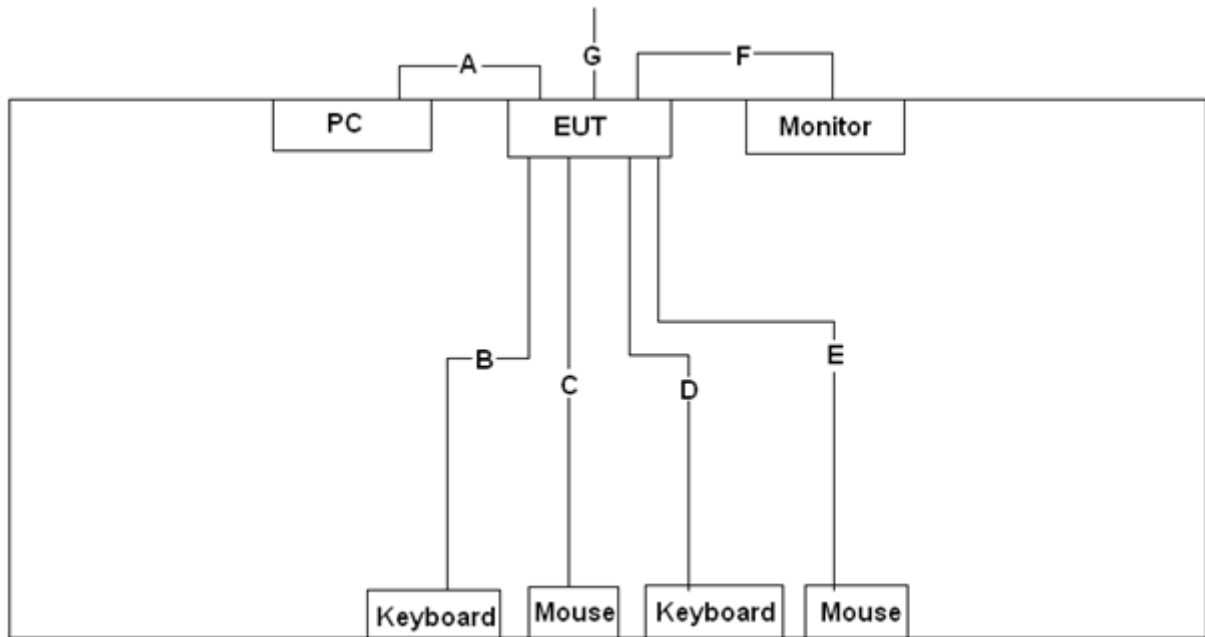


### 2.3. Description of Test System

No.	Device	Manufacturer	Model No.	Description
1	PC	HP	HP Compaq Elite 8200 MTPC	Non-Shielded ,1.8m
2	USB Keyboard	DELL	SK-8115	N/A
3	USB Mouse	N/A	N/A	N/A
4	PS/2 Keyboard	ASUS	PK1100	N/A
5	PS/2 Mouse	LG	SN-03	N/A



### 2.4. Connection Diagram of Test System



No.	Cable	Quantity	Description
A	VGA Cable	1	Shielded, 1.7m
B	PS/2 Cable	1	Shielded, 1.5m
C	PS/2 Cable	1	Shielded, 1.2m
D	USB Cable	1	Shielded, 1.5m
E	USB Cable	1	Shielded, 1.2m
F	VGA Cable	1	Shielded, 1.7m
G	VGA Cable	15	Shielded, 1.7m





2.5. General Information of Test

Test Site :	<b>CerpPASS Technology (Suzhou) Co.,Ltd</b> Address: No.66,Tangzhuang Road, Suzhou Industrial Park, Jiangsu 215006, China Tel: +86-512-6917-5888 Fax: +86-512-6917-5666
FCC Registration Number :	331395
IC Registration Number :	7290A-1, 7290A-2
VCCI	T-1945 for Telecommunication Test C-2919 for Conducted emission test R-2670 for Radiated emission test G-227 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

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Test results and Measurement uncertainty without any relationship in the test report.

Measurement	Frequency	Uncertainty
Conducted emissions(LINE)	9KHz-30MHz	+/- 0.7738 dB
Conducted emissions(NEUTRAL)	9KHz-30MHz	+/- 0.7886 dB

Measurement	Polarity	Frequency	Uncertainty
Radiated emissions (below 1GHz)	H	30MHz ~ 200MHz	+/- 3.8909dB
		200MHz ~1000MHz	+/- 3.6555dB
	V	30MHz ~ 200MHz	+/- 3.8948dB
		200MHz ~1000MHz	+/- 3.6538dB
Radiated emissions (above 1GHz)	H	1000MHz ~18000MHz	+/- 3.8948 dB
		18000MHz ~40000MHz	+/-3.8844dB
	V	1000MHz ~18000MHz	+/- 3.8906dB
		18000MHz ~40000MHz	+/- 3.8744dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Consistent with industry standard (e.g. CISPR 22: 2008, clause 11, Measurement Uncertainty) determining compliance with the limits shall be base on the results of the compliance measurement. Consequently the measure emissions being less than the maximum allowed emission result in this be a compliant test or passing test.



### 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:

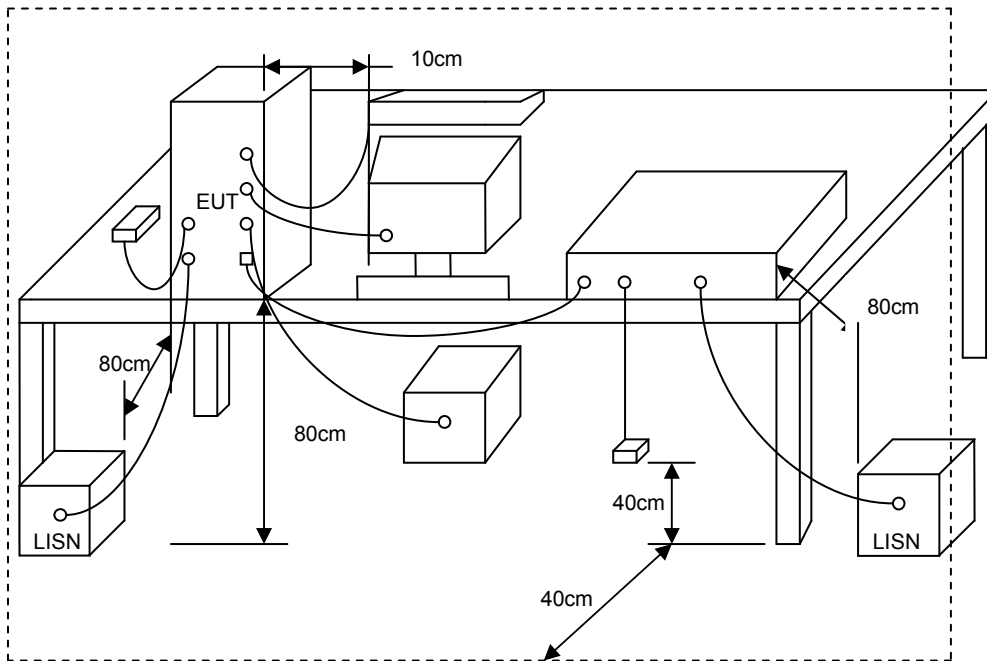
Frequency (MHz)	Quasi Peak (dB $\mu$ V)	Average (dB $\mu$ V)
0.15 – 0.5	66-56*	56-46*
0.5 – 5.0	56	46
5.0 – 30.0	60	50

#### 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



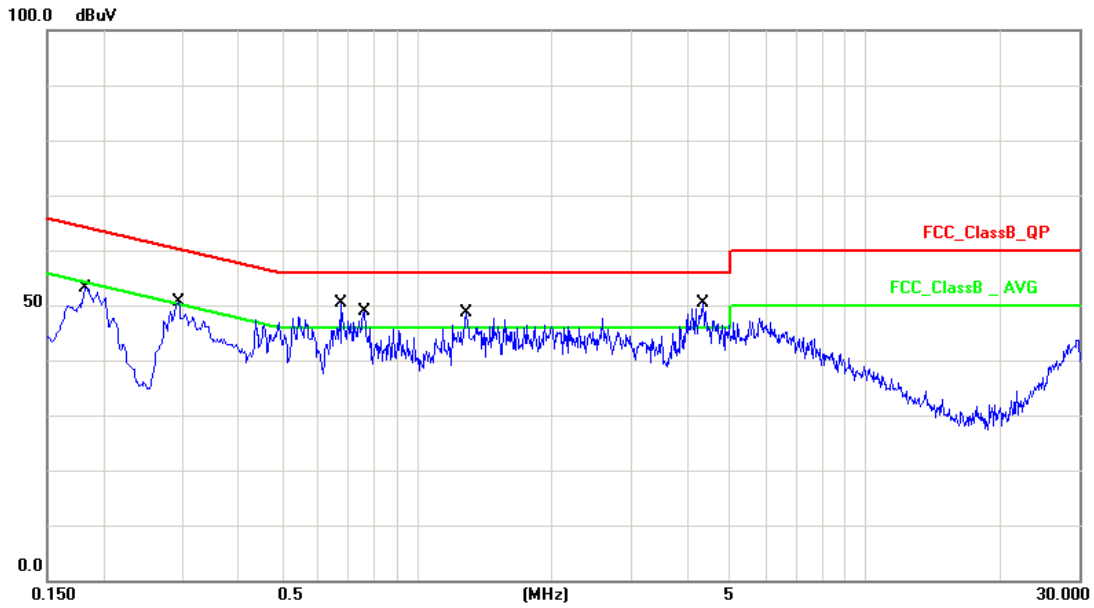
### 3.4. Measurement Equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date.
Test Receiver	R&S	ESCI	100565	2016.07.07	2017.07.06
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	2016.03.26	2017.03.25
ISN	FCC	FCC-TLISN-T4-02	20380	2016.06.24	2017.06.24
ISN	FCC	FCC-TLISN-T8-02	20381	2016.03.26	2017.03.25
ISN	TESEQ	ISN ST08	30175	2016.03.26	2017.03.25
Current Probe	R&S	EZ-17	100303	2016.03.26	2017.03.25
Passive Voltage Probe	R&S	ESH2-Z3	100026	2016.03.26	2017.03.25
Pulse Limiter	R&S	ESH3-Z2	100529	2016.03.26	2017.03.25
Temperature/ Humidity Meter	Zhicheng	ZC1-11	CEP-TH-004	2016.03.29	2017.03.28
EZ-EMC	Fala	Ver CT3A1	N/A	N/A	N/A



### 3.5. Test Result and Data

Test Mode :	Mode 1: Full system for AS-9116DU (USB MODE)		
AC Power :	AC 120V/60Hz	Phase :	LINE
Temperature :	22°C	Humidity :	54%
Pressure(mbar) :	1001	Date:	2017/03/05

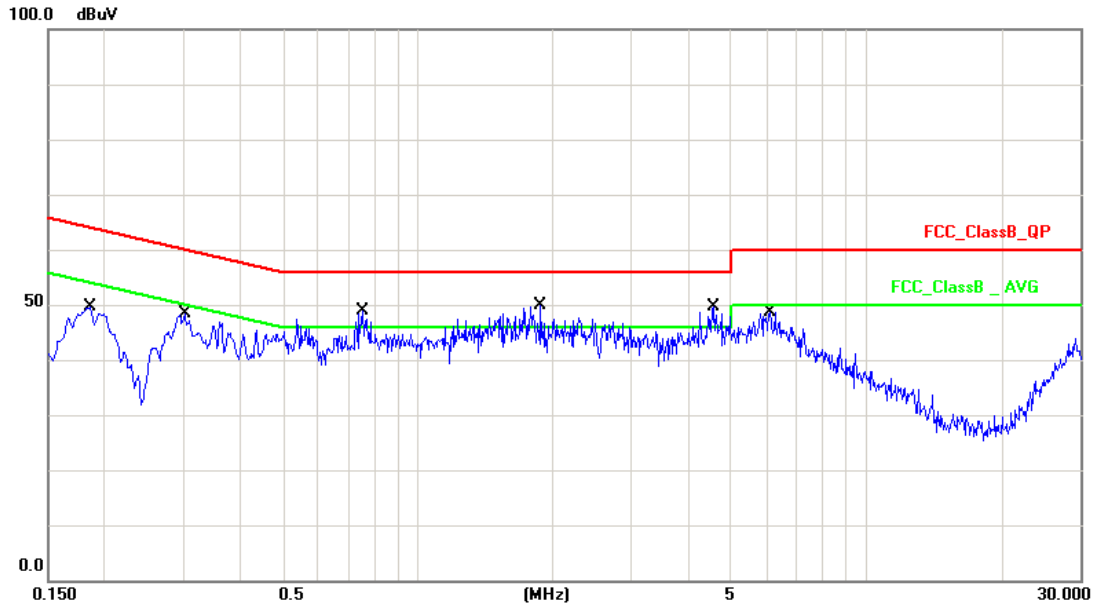


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1819	10.12	38.28	48.40	64.39	-15.99	QP
2	0.1819	10.12	33.40	43.52	54.39	-10.87	AVG
3	0.2940	10.14	35.33	45.47	60.41	-14.94	QP
4	0.2940	10.14	28.60	38.74	50.41	-11.67	AVG
5	0.6820	10.15	38.50	48.65	56.00	-7.35	QP
6	0.6820	10.15	31.43	41.58	46.00	-4.42	AVG
7	0.7660	10.14	40.29	50.43	56.00	-5.57	QP
8	0.7660	10.14	31.14	41.28	46.00	-4.72	AVG
9	1.2940	10.16	35.91	46.07	56.00	-9.93	QP
10	1.2940	10.16	26.94	37.10	46.00	-8.90	AVG
11	4.3500	10.22	33.81	44.03	56.00	-11.97	QP
12	4.3500	10.22	24.79	35.01	46.00	-10.99	AVG

Note: Measurement Level = Reading Level + Correct Factor



Test Mode :	Mode 1: Full system for AS-9116DU (USB MODE)		
AC Power :	AC 120V/60Hz	Phase :	NEUTRAL
Temperature :	22°C	Humidity :	54%
Pressure(mbar) :	1001	Date:	2017/03/05



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1853	10.13	34.48	44.61	64.24	-19.63	QP
2	0.1853	10.13	27.83	37.96	54.24	-16.28	AVG
3	0.3019	10.14	31.43	41.57	60.19	-18.62	QP
4	0.3019	10.14	24.31	34.45	50.19	-15.74	AVG
5	0.7549	10.16	39.51	49.67	56.00	-6.33	QP
6	0.7549	10.16	27.51	37.67	46.00	-8.33	AVG
7	1.8779	10.18	30.89	41.07	56.00	-14.93	QP
8	1.8779	10.18	21.77	31.95	46.00	-14.05	AVG
9	4.5736	10.24	29.25	39.49	56.00	-16.51	QP
10	4.5736	10.24	20.23	30.47	46.00	-15.53	AVG
11	6.0885	10.27	29.65	39.92	60.00	-20.08	QP
12	6.0885	10.27	21.36	31.63	50.00	-18.37	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:  $L2 = L1 (d1/d2)$ , 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.





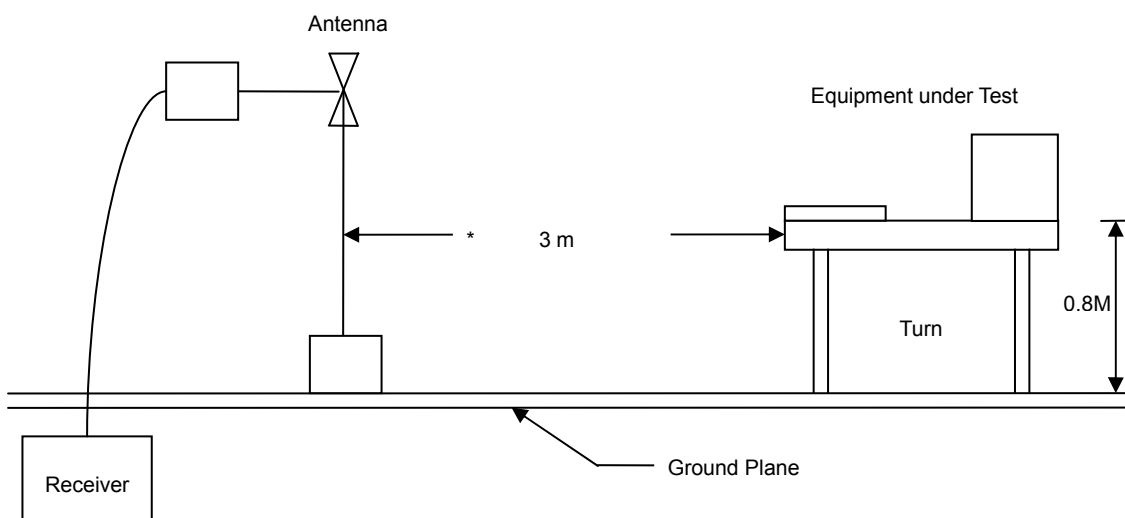
- Set the spectrum analyzer/ Receiver in the following setting as:  
Below 1GHz:  
RBW=120KHz / VBW=300KHz / Sweep=AUTO  
Above 1GHz:  
Peak: RBW=1MHz, VBW=3MHz / Sweep=AUTO  
Average: RBW=1MHz / VBW=10Hz / Sweep=AUTO
- The worst configuration of EUT and cable of the above highest emission level were 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.

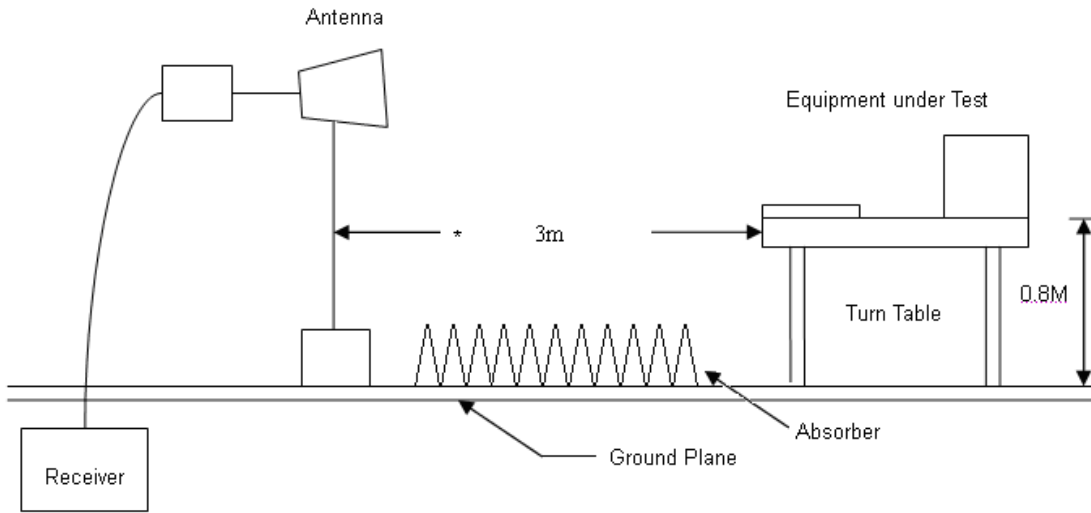
### 4.3. Typical test Setup

#### Below 1GHz Test Setup





Above 1GHz Test Setup



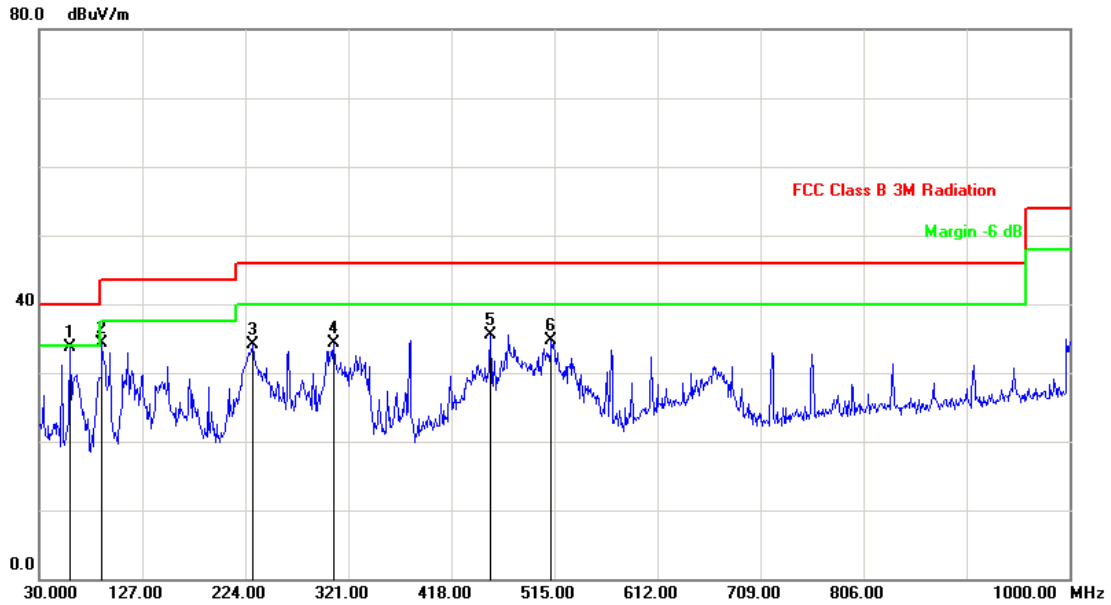
4.4. Measurement Equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date.
EMI Test Receiver	R&S	ESCI	101183	2016.06.29	2017.06.28
Preamplifier	songyi	EM330	60618	2016.03.26	2017.03.25
Preamplifier	Agilent	8449B	3008A02342	2016.03.26	2017.03.25
Bilog Antenna	Sunol Science	JB1	A072414-1	2016.04.16	2017.04.15
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	9120D-618	2016.04.16	2017.04.15
Broad-Band Horn Antenna	Schwarzbeck	BBHA9170	9170-347	2016.04.16	2017.04.15
Preamplifier	COM-POWER	PA-840	711885	2016.03.26	2017.03.25
Spectrum Analyzer	R&S	FSP40	100324	2016.08.02	2017.08.01
Temperature/ Humidity Meter	Zhicheng	ZC1-11	CEP-TH-002	2016.03.29	2017.03.28
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 for AS-9116DU (USB MODE)		
AC Power :	AC 120V/60Hz	Ant. Polarization:	Horizontal
Temperature :	22°C	Humidity :	54%
Pressure(mbar) :	1001	Date:	2017/03/05

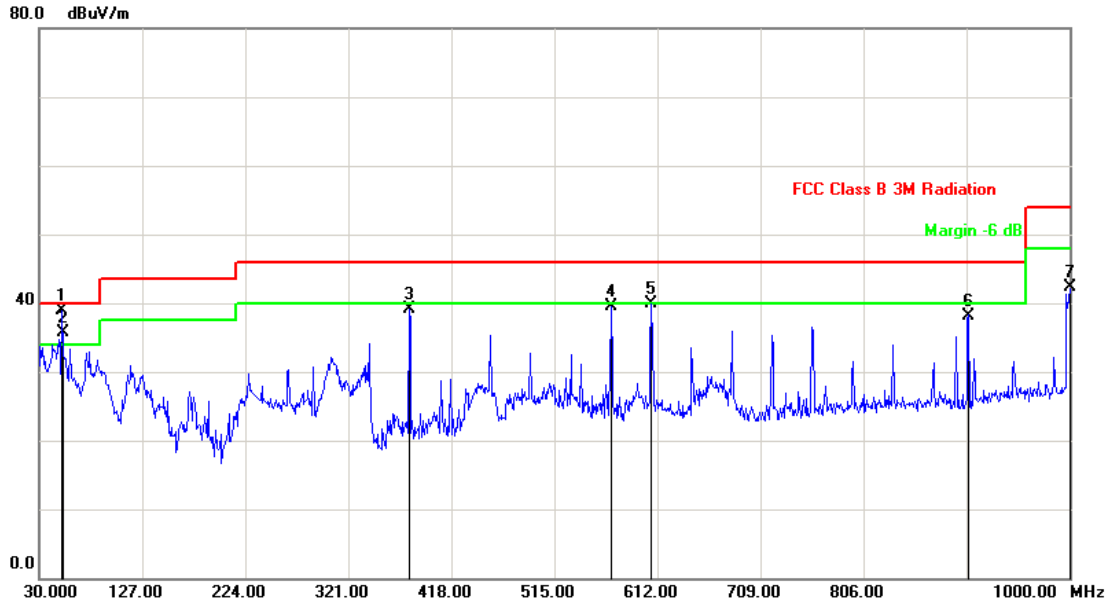


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	59.1000	-13.84	47.52	33.68	40.00	-6.32	peak	200	182
2	89.1700	-17.58	51.86	34.28	43.50	-9.22	peak	200	339
3	230.7898	-13.41	47.47	34.06	46.00	-11.94	peak	200	0
4	307.4200	-10.79	45.07	34.28	46.00	-11.72	peak	200	62
5	454.8600	-8.22	43.81	35.59	46.00	-10.41	peak	100	17
6	512.0900	-6.51	41.28	34.77	46.00	-11.23	peak	200	215

Note: Measurement Level = Reading Level + Correct Factor



Test Mode :	Mode 1: Full system for AS-9116DU (USB MODE)		
AC Power :	AC 120V/60Hz	Ant. Polarization:	Vertical
Temperature :	22°C	Humidity :	54%
Pressure(mbar) :	1001	Date:	2017/03/05



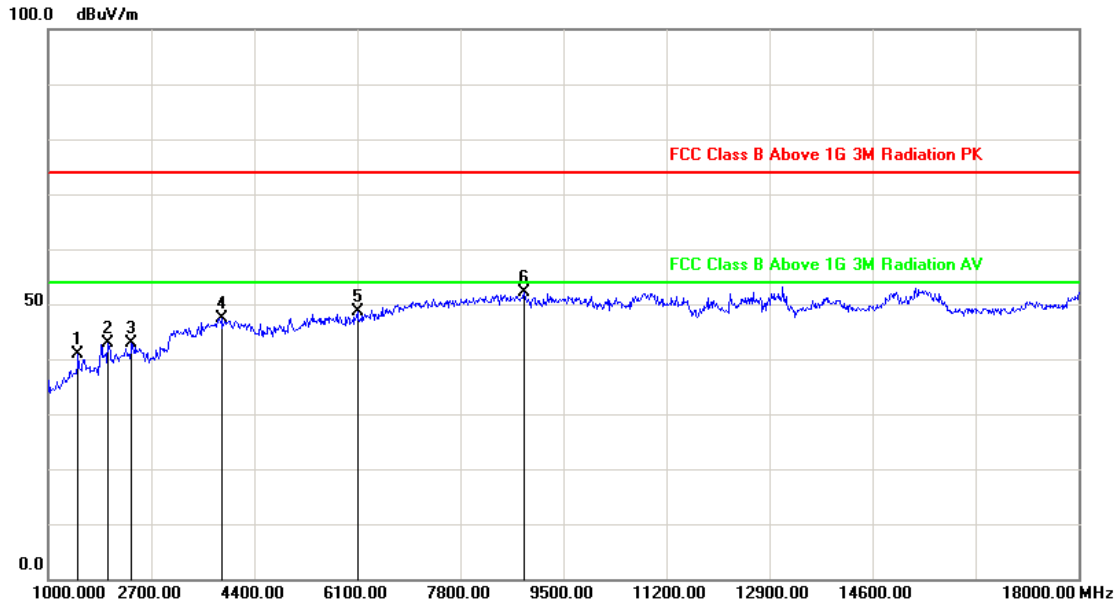
No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	51.3400	-13.54	52.42	38.88	40.00	-1.12	peak	200	20
2	52.1480	-13.57	49.27	35.70	40.00	-4.30	QP	200	20
3	378.2300	-10.17	49.27	39.10	46.00	-6.90	peak	100	157
4	568.3500	-5.30	44.82	39.52	46.00	-6.48	peak	200	228
5	606.1798	-4.68	44.63	39.95	46.00	-6.05	peak	200	263
6	904.9400	0.38	37.82	38.20	46.00	-7.80	peak	100	41
7	1000.0000	1.71	40.60	42.31	54.00	-11.69	peak	100	0

Note: Measurement Level = Reading Level + Correct Factor



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

Test Mode :	Mode 1: Full system for AS-9116DU (USB MODE)		
AC Power :	AC 120V/60Hz	Ant. Polarization:	Horizontal
Temperature :	22°C	Humidity :	54%
Pressure(mbar) :	1001	Date:	2017/03/05

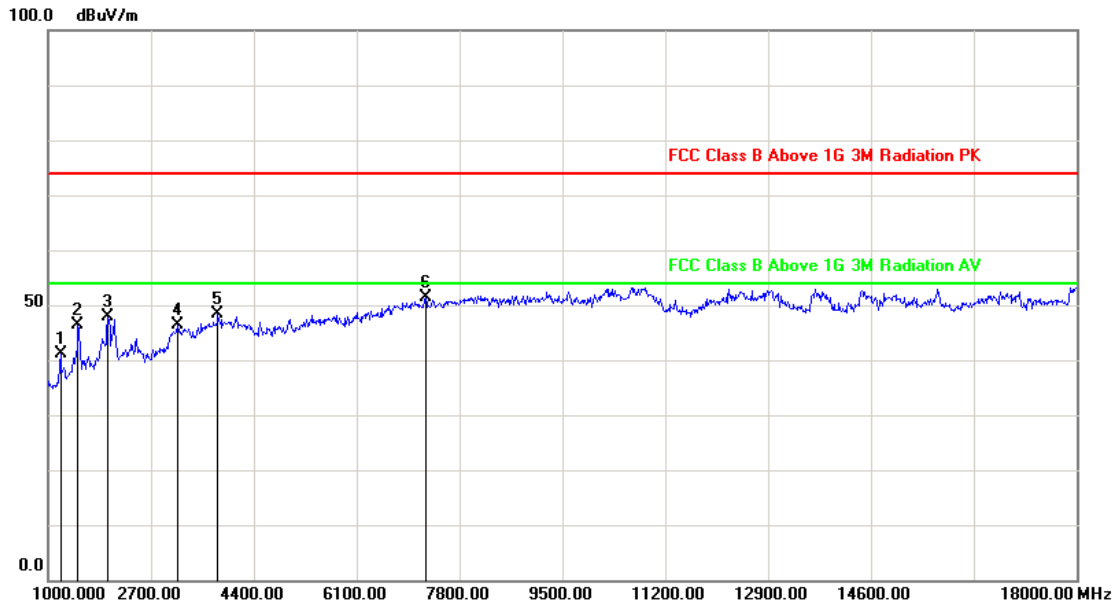


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	1493.000	-5.83	46.66	40.83	74.00	-33.17	peak	200	198
2	1986.000	-3.76	46.67	42.91	74.00	-31.09	peak	100	180
3	2377.000	-2.29	45.27	42.98	74.00	-31.02	peak	200	171
4	3856.000	2.91	44.41	47.32	74.00	-26.68	peak	200	200
5	6100.000	5.65	42.90	48.55	74.00	-25.45	peak	100	227
6	8854.000	8.95	43.11	52.06	74.00	-21.94	peak	200	6

Note: Measurement Level = Reading Level + Correct Factor



Test Mode :	Mode 1: Full system for AS-9116DU (USB MODE)		
AC Power :	AC 120V/60Hz	Ant. Polarization:	Vertical
Temperature :	22°C	Humidity :	54%
Pressure(mbar) :	1001	Date:	2017/03/05



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	1204.000	-8.14	49.33	41.19	74.00	-32.81	peak	100	194
2	1493.000	-5.83	52.17	46.34	74.00	-27.66	peak	100	200
3	1986.000	-3.76	51.76	48.00	74.00	-26.00	peak	100	159
4	3142.000	0.04	46.32	46.36	74.00	-27.64	peak	200	359
5	3805.000	2.72	45.62	48.34	74.00	-25.66	peak	200	167
6	7239.000	8.22	43.14	51.36	74.00	-22.64	peak	200	129

Note: Measurement Level = Reading Level + Correct Factor

Test engineer: Sun. Zhang