



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 : LCD KVM
Model No. : AS-7100ULS, AS-7104ULS, AS-7108ULS,
AS-7116ULS, AS-9100ULS, AS-9104ULS,
AS-9108ULS, AS-9116ULS
FCC ID : ZQXAS-7100ULS

I HEREBY CERTIFY THAT :

The sample was received on May 01, 2017 and the testing was carried out on May 09, 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:

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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

NVLAP LAB Code:	200954-0
TAF LAB Code:	1439

CerpPASS Technology(SuZhou) Co., Ltd.

NVLAP LAB Code:	200814-0
CNAS LAB Code:	L5515



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History of this test report

ORIGINAL.

Additional attachment as following record:

Report No	Version	Date	Description
SEFD1610113	Rev 01	May 10, 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 -5.16 dB at 0.5500 MHz
Radiated Emission	ANSI C63.4-2014 FCC Part 15 Subpart B	PASS	Meets Class B Limit Minimum passing margin(QP) is -5.67 dB at 82.3600 MHz



2. Test Configuration of Equipment under Test

2.1. Feature of Equipment under Test

Product Name:	LCD KVM	
Model Name:	AS-7100ULS, AS-7104ULS, AS-7108ULS,AS-7116ULS, AS-9100ULS, AS-9104ULS,AS-9108ULS, AS-9116ULS	
Remark:	AS-7116ULS and AS-9116ULS was selected as the test model and its data have been recorded in this report. They are identical except the market.	
Adapter	Model:	FJ-SW1204000
	Input:	100-240V~ 50/60Hz 1.5A MAX
	Output:	12V, 4000mA

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 and EUT for EMI test.
- d. The test mode as follow:
 - Mode 1 Full system for AS-7116ULS
 - Mode 2 Full system for AS-9116ULSThe "Test Mode 1" were reported as final data.

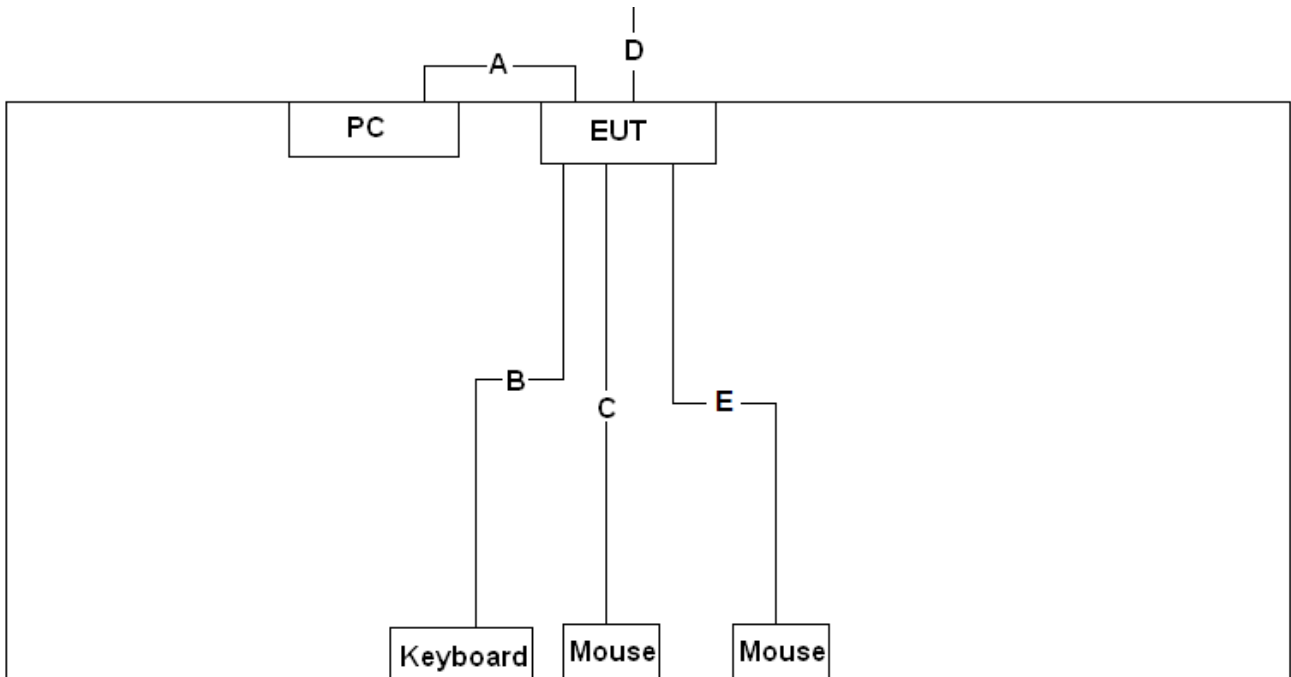


2.3. Description of Test System

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	DELL	G0K02XYK	N/A
4	USB Mouse	DELL	G0K02XYK	N/A



2.4. Connection Diagram of Test System



No.	Cable	Quantity	Description
A	VGA to VGA + USB + PS/2 Cable	1	Shielded, 1.7m
B	USB Cable	1	Shielded, 1.8m, with one ferrite core bonded
C	USB Cable	1	Shielded, 1.5m
D	VGA to VGA + USB + PS/2 Cable	15	Shielded, 1.7m
E	USB Cable	1	Shielded, 1.5m



2.5. General Information of Test

Test Site :	Cerpass Technology Corporation Test Laboratory 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

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:

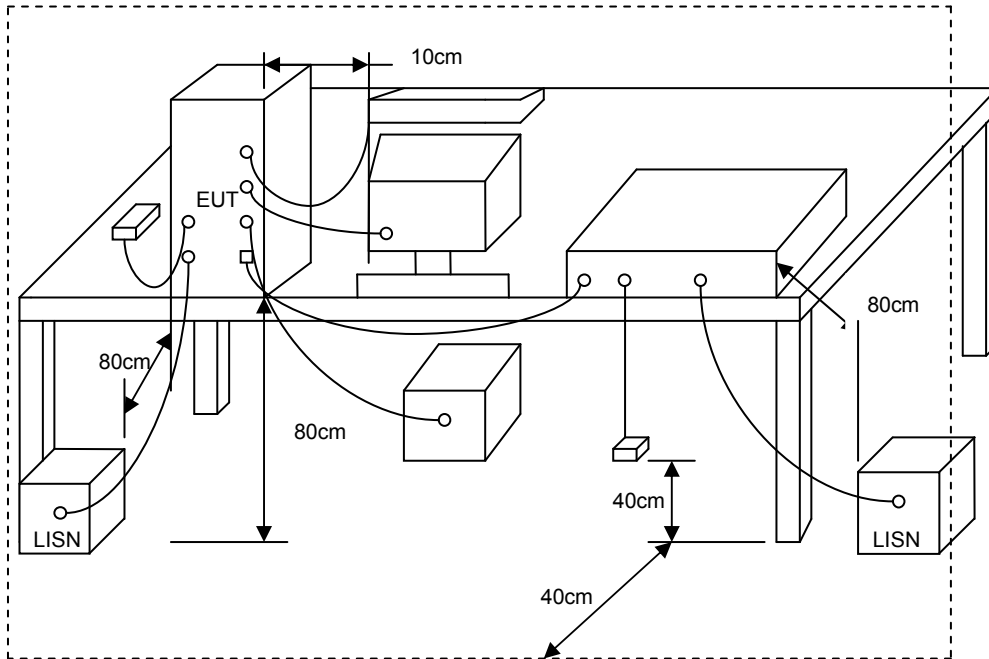
Frequency (MHz)	Quasi Peak (dB μ V)	Average (dB μ V)
0.15 – 0.5	66-56*	56-46*
0.5 – 5.0	56	46
5.0 – 30.0	60	50

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



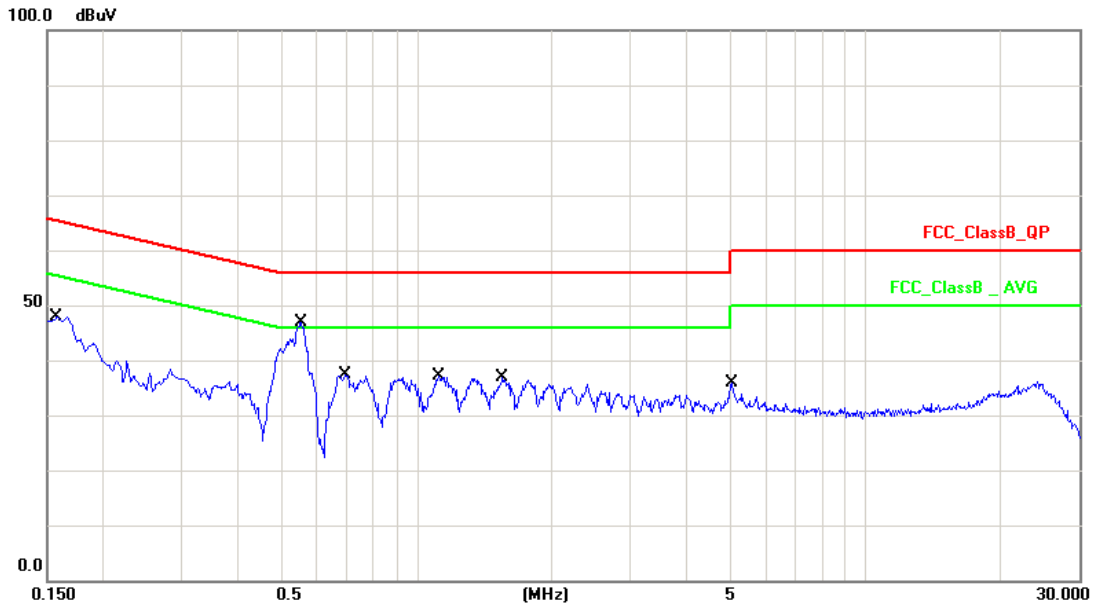
3.4. Measurement Equipment

Instrument/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	2017.03.22	2018.03.21
ISN	FCC	FCC-TLISN-T4-02	20380	2016.06.24	2017.06.23
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 for AS-7116ULS		
AC Power :	AC 120V/60Hz	Phase :	LINE
Temperature :	24°C	Humidity :	55%
Pressure(mbar) :	1001	Date:	2017/05/09

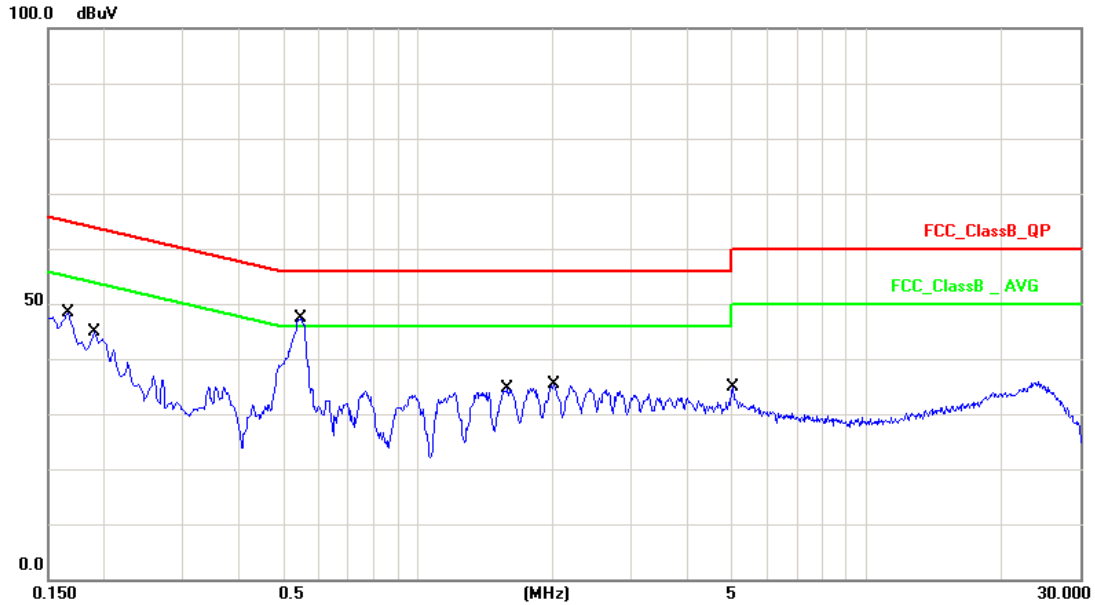


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1580	10.13	30.67	40.80	65.56	-24.76	QP
2	0.1580	10.13	18.84	28.97	55.56	-26.59	AVG
3	0.5540	10.16	34.64	44.80	56.00	-11.20	QP
4	0.5540	10.16	30.49	40.65	46.00	-5.35	AVG
5	0.6900	10.15	24.88	35.03	56.00	-20.97	QP
6	0.6900	10.15	20.71	30.86	46.00	-15.14	AVG
7	1.1220	10.16	24.48	34.64	56.00	-21.36	QP
8	1.1220	10.16	20.44	30.60	46.00	-15.40	AVG
9	1.5580	10.17	23.90	34.07	56.00	-21.93	QP
10	1.5580	10.17	19.75	29.92	46.00	-16.08	AVG
11	5.0420	10.24	23.51	33.75	60.00	-26.25	QP
12	5.0420	10.24	19.36	29.60	50.00	-20.40	AVG

Note: Measurement Level = Reading Level + Correct Factor



Test Mode :	Mode 1: Full system for AS-7116ULS		
AC Power :	AC 120V/60Hz	Phase :	NEUTRAL
Temperature :	24°C	Humidity :	55%
Pressure(mbar) :	1001	Date:	2017/05/09



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1660	10.13	34.58	44.71	65.15	-20.44	QP
2	0.1660	10.13	21.74	31.87	55.15	-23.28	AVG
3	0.1900	10.13	29.78	39.91	64.03	-24.12	QP
4	0.1900	10.13	17.12	27.25	54.03	-26.78	AVG
5	0.5500	10.15	34.92	45.07	56.00	-10.93	QP
6	0.5500	10.15	30.69	40.84	46.00	-5.16	AVG
7	1.5859	10.18	20.78	30.96	56.00	-25.04	QP
8	1.5859	10.18	16.31	26.49	46.00	-19.51	AVG
9	2.0180	10.18	21.74	31.92	56.00	-24.08	QP
10	2.0180	10.18	16.87	27.05	46.00	-18.95	AVG
11	5.0420	10.26	21.79	32.05	60.00	-27.95	QP
12	5.0420	10.26	17.39	27.65	50.00	-22.35	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 th 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.

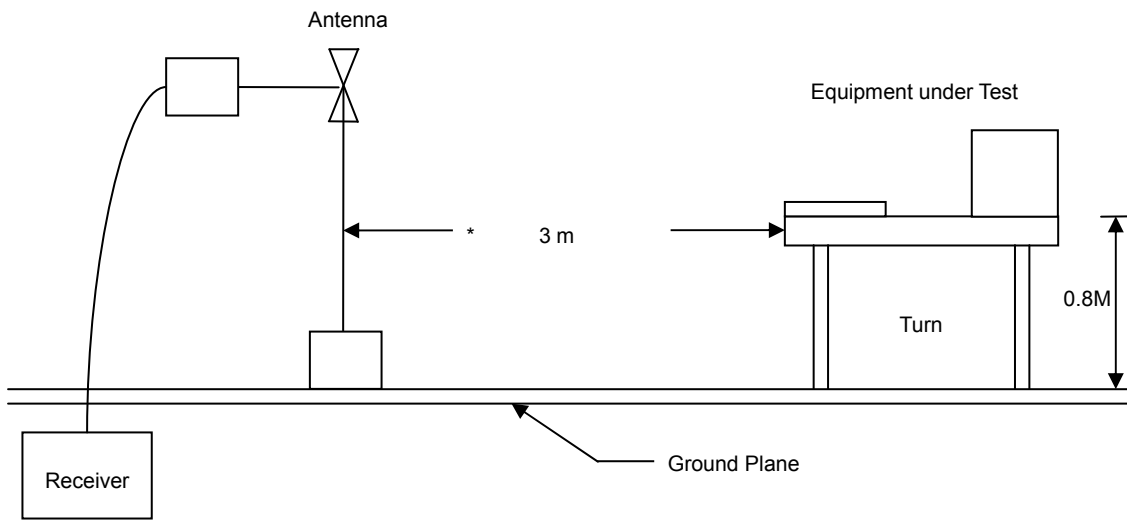
Procedure of Final Test

- 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.

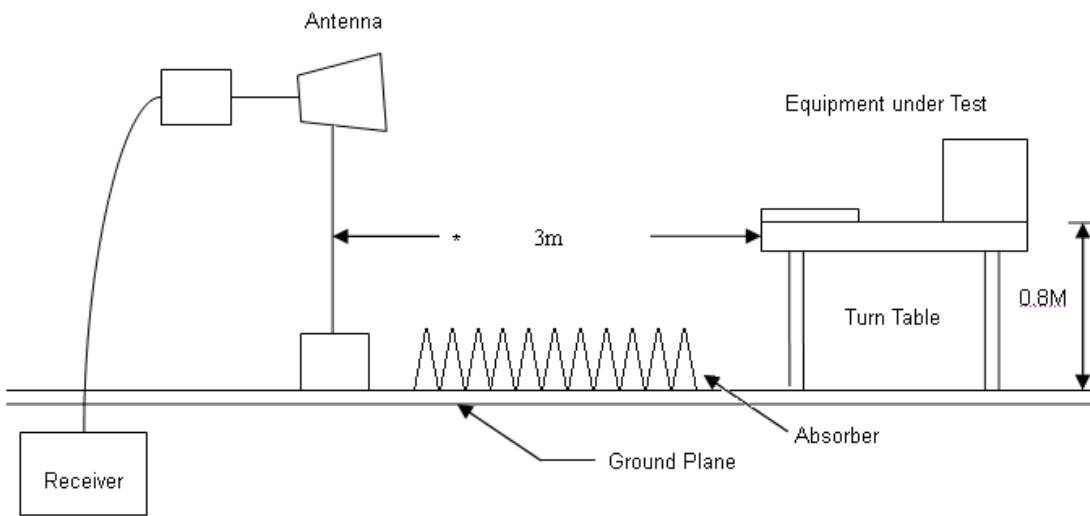


4.3. Typical test Setup

Below 1GHz Test Setup



Above 1GHz Test Setup



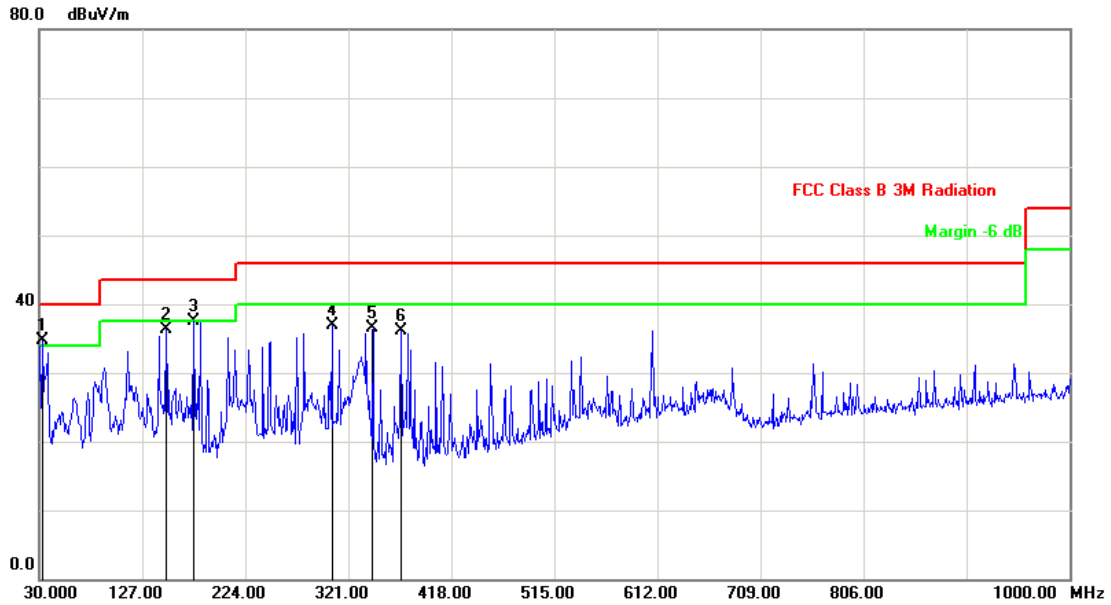
**4.4. Measurement Equipment**

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date.
EMI Test Receiver	R&S	ESCI	101183	2016.06.29	2017.06.28
Pre-amplifier	songyi	EM330	60618	2017.03.22	2018.03.21
Pre-amplifier	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
Pre-amplifier	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 for AS-7116ULS		
AC Power :	AC 120V/60Hz	Ant. Polarization:	Horizontal
Temperature :	24°C	Humidity :	55%
Pressure(mbar) :	1001	Date:	2017/05/09

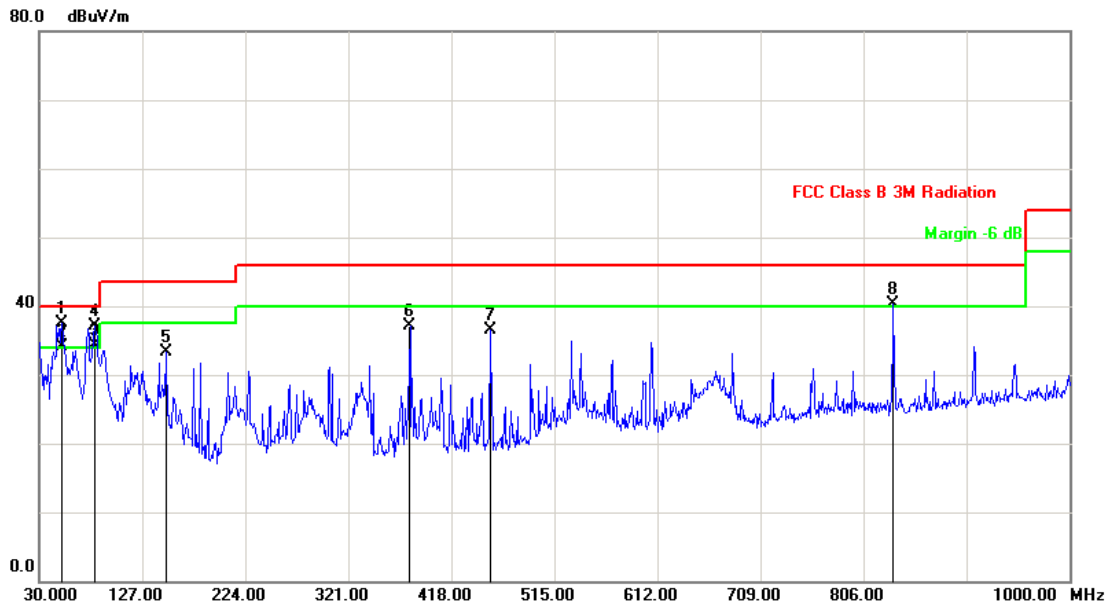


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	32.9099	-5.72	40.39	34.67	40.00	-5.33	peak	200	157
2	149.3100	-12.18	48.57	36.39	43.50	-7.11	peak	200	360
3	175.5000	-12.64	50.06	37.42	43.50	-6.08	peak	200	299
4	305.4800	-10.60	47.53	36.93	46.00	-9.07	peak	100	324
5	344.2798	-11.57	48.15	36.58	46.00	-9.42	peak	200	0
6	370.4700	-10.41	46.58	36.17	46.00	-9.83	peak	100	187

Note: Measurement Level = Reading Level + Correct Factor



Test Mode :	Mode 1: Full system for AS-7116ULS		
AC Power :	AC 120V/60Hz	Ant. Polarization:	Vertical
Temperature :	24°C	Humidity :	55%
Pressure(mbar) :	1001	Date:	2017/05/09



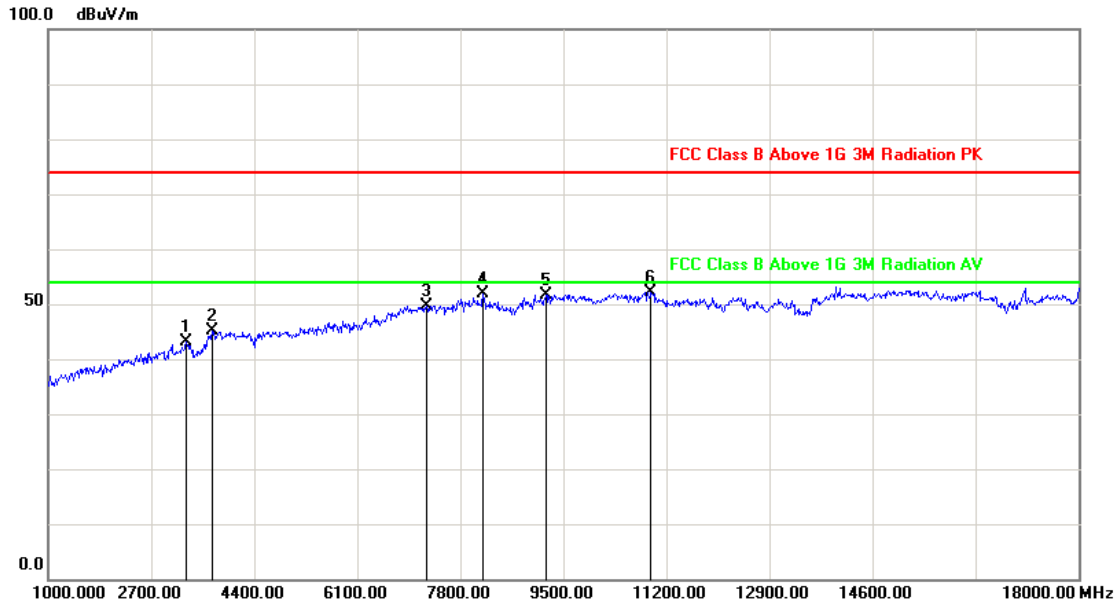
No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	51.3400	-13.54	51.13	37.59	40.00	-2.41	peak	100	261
2	51.7900	-13.56	47.58	34.02	40.00	-5.98	QP	100	14
3	82.3600	-18.14	52.47	34.33	40.00	-5.67	QP	100	286
4	82.3799	-18.14	55.19	37.05	40.00	-2.95	peak	100	113
5	149.3100	-12.18	45.49	33.31	43.50	-10.19	peak	200	0
6	379.1999	-10.14	47.21	37.07	46.00	-8.93	peak	100	153
7	454.8600	-8.22	44.77	36.55	46.00	-9.45	peak	100	41
8	834.1299	-0.79	41.17	40.38	46.00	-5.62	peak	200	269

Note: Measurement Level = Reading Level + Correct Factor



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

Test Mode :	Mode 1: Full system for AS-7116ULS		
AC Power :	AC 120V/60Hz	Ant. Polarization:	Horizontal
Temperature :	24°C	Humidity :	55%
Pressure(mbar) :	1001	Date:	2017/05/09

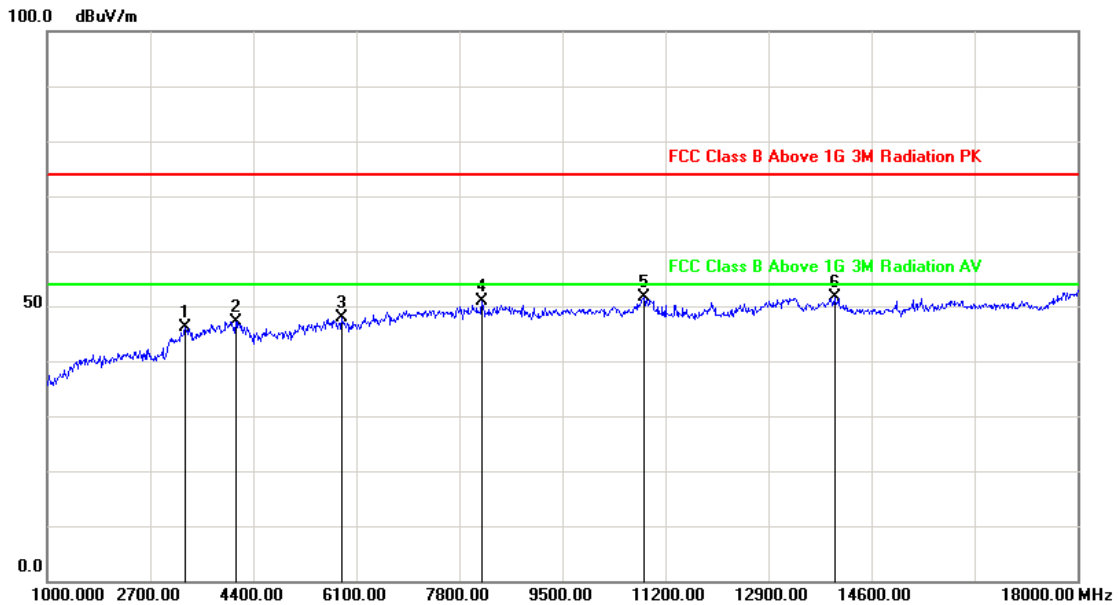


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	3278.000	0.61	42.55	43.16	74.00	-30.84	peak	200	5
2	3703.000	2.33	42.72	45.05	74.00	-28.95	peak	200	339
3	7239.000	8.22	41.48	49.70	74.00	-24.30	peak	100	284
4	8174.000	9.13	42.71	51.84	74.00	-22.16	peak	200	61
5	9211.000	9.19	42.56	51.75	74.00	-22.25	peak	100	24
6	10945.000	12.61	39.49	52.10	74.00	-21.90	peak	100	177

Note: Measurement Level = Reading Level + Correct Factor



Test Mode :	Mode 1: Full system for AS-7116ULS		
AC Power :	AC 120V/60Hz	Ant. Polarization:	Vertical
Temperature :	24°C	Humidity :	55%
Pressure(mbar) :	1001	Date:	2017/05/09



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	3278.000	0.61	45.55	46.16	74.00	-27.84	peak	100	0
2	4111.000	3.29	43.92	47.21	74.00	-26.79	peak	100	84
3	5862.000	5.35	42.44	47.79	74.00	-26.21	peak	100	59
4	8174.000	9.13	41.71	50.84	74.00	-23.16	peak	200	117
5	10843.000	12.47	39.04	51.51	74.00	-22.49	peak	200	253
6	13988.000	21.74	29.86	51.60	74.00	-22.40	peak	100	61

Note: Measurement Level = Reading Level + Correct Factor

Test engineer: Sun. Zhang