



FCC Report

Applicant: Shanghai Sunmi Technology Co.,Ltd.

Address of Applicant: Room 605, Block 7, KIC Plaza, No.388 Song Hu Road Yang Pu District, Shanghai 200433, China

Equipment Under Test (EUT)

Product Name: POS System

Model No.: W1403

FCC ID: 2AH25W1403

Applicable standards: FCC CFR Title 47 Part 15 Subpart B:2015

Date of sample receipt: September 19, 2016

Date of Test: September 20-October 13, 2016

Date of report issue: October 17, 2016

Test Result : PASS *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Robinson Lo

Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the GTS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

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2 Version

Version No.	Date	Description
00	October 17, 2016	Original

Prepared By:

Edward.Pan

Date:

October 17, 2016

Project Engineer

Check By:

Andy.Wu

Date:

October 17, 2016

Reviewer

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4 Test Summary

Test Item	Section in CFR 47	Result
Conducted Emission	Part15.107	PASS
Radiated Emissions	Part15.109	PASS

PASS: The EUT complies with the essential requirements in the standard.

Remark: Test according to ANSI C63.4:2014

Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	9kHz ~ 30MHz	± 4.34dB	(1)
Radiated Emission	30MHz ~ 1000MHz	± 4.24dB	(1)
Radiated Emission	1GHz ~ 26.5GHz	± 4.68dB	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	± 3.45dB	(1)

Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.

5 General Information

5.1 Client Information

Applicant:	Shanghai Sunmi Technology Co.,Ltd.
Address of Applicant:	Room 605, Block 7, KIC Plaza, No.388 Song Hu Road Yang Pu District, Shanghai 200433, China
Manufacturer:	Shanghai Sunmi Technology Co.,Ltd.
Address of Manufacturer:	Room 605, Block 7, KIC Plaza, No.388 Song Hu Road Yang Pu District, Shanghai 200433, China
Factory:	Huizhou BYD Electronics Co.,Ltd.
Address of Factory:	Xiangshui River, Economic Development Zone, Daya Bay, Huizhou, Guangdong, P.R.China

5.2 General Description of EUT

Product Name:	POS System
Model No.:	W1401
Power supply:	AC Adaptor Model No.:EA10681P-240 Input: AC 100-240V, 50/60Hz, 2.0A Output: DC 24V, 2.5A

5.3 Test mode

Test mode:	
LAN mode	Keep the EUT in Ping with PC mode
TF card Playing mode	Keep the EUT in TF card playing mode
Print mode	Keep the EUT in print status
USB mode	Keep the EUT in storage data in USB flash disk mode.

5.4 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **FCC —Registration No.: 600491**

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 600491, June 22, 2016.

- **Industry Canada (IC) —Registration No.: 9079A-2**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-2, August 15, 2016.

5.5 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

Address: No. 301-309, 3/F., Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102

Tel: 0755-27798480

Fax: 0755-27798960

5.6 Description of Support Units

Manufacturer	Description	Model	Serial Number	FCC Approval
Apple	PC	A1278	C1MN99ERDTY3	FCC DoC
DELL	KEYBOARD	SK-8115	N/A	FCC DoC
DELL	MOUSE	MOC5UO	N/A	FCC DoC
DELTA	ADAPTER	ADP-60ADT	N/A	FCC DoC

5.7 Deviation from Standards

Biconical, log.per. antenna and horn antenna were used instead of dipole antenna.

Semi-anechoic Chamber was used as alternation of open air test sites, and all test suites were performed with radiated method in it.

5.8 Abnormalities from Standard Conditions

None.

5.9 Other Information Requested by the Customer

None.

6 Test Instruments list

Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.0(L)*6.0(W)* 6.0(H)	GTS250	July. 03 2015	July. 02 2020
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	ESU EMI Test Receiver	R&S	ESU26	GTS203	June 29 2016	June 28 2017
4	BiConiLog Antenna	SCHWARZBECK	VULB9163	GTS214	June 29 2016	June 28 2017
5	Double -ridged waveguide horn	SCHWARZBECK	9120D	GTS208	June 29 2016	June 28 2017
6	RF Amplifier	HP	8347A	GTS204	June 29 2016	June 28 2017
7	Broadband Preamplifier	SCHWARZBECK	BBV9718	GTS535	June 29 2016	June 28 2017
8	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
9	Coaxial cable	GTS	N/A	GTS210	June 29 2016	June 28 2017
10	Coaxial Cable	GTS	N/A	GTS211	June 29 2016	June 28 2017
11	Thermo meter	N/A	N/A	GTS256	June 29 2016	June 28 2017

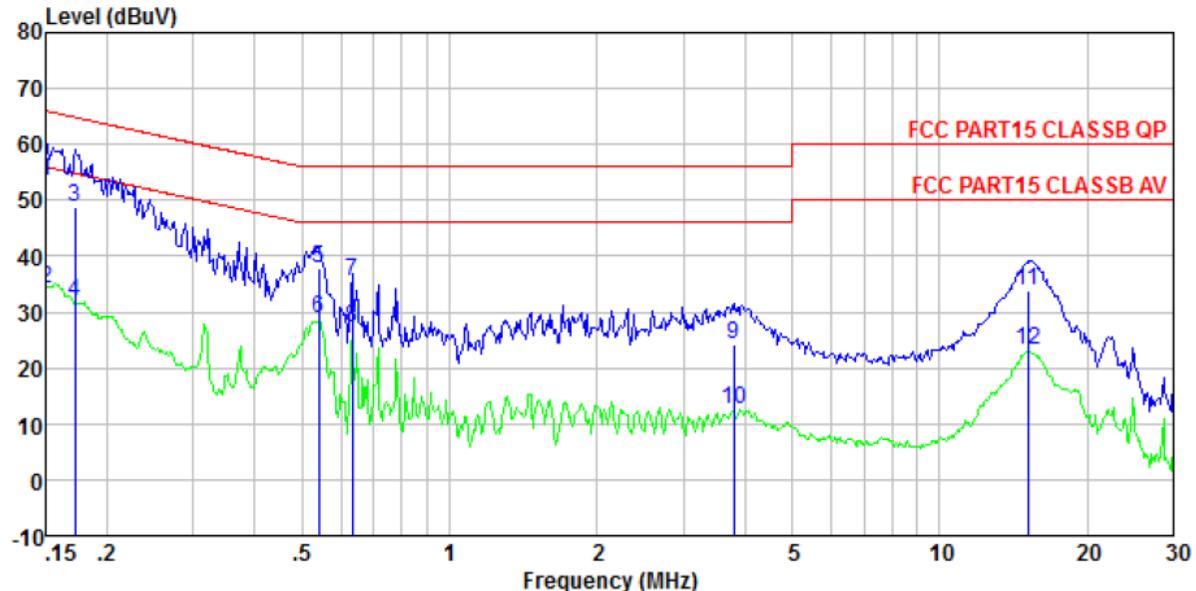
Conducted Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	May. 16 2014	May. 15 2019
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June 29 2016	June 28 2017
3	Pulse Limiter	R&S	ESH3-Z2	GTS224	June 29 2016	June 28 2017
4	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	June 29 2016	June 28 2017
5	Artificial Mains Network	SCHWARZBECK MESS	NSLK8127	GTS226	June 29 2016	June 28 2017
6	Coaxial Cable	GTS	N/A	GTS227	June 29 2016	June 28 2017
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Thermo meter	KTJ	TA328	GTS233	June 29 2016	June 28 2017

General used equipment:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Barometer	ChangChun	DYM3	GTS257	June 29 2016	June 28 2017

7 Test Results and Measurement Data

7.1 Conducted Emissions

Test Requirement:	FCC Part15 B Section 15.107																
Test Method:	ANSI C63.4:2014																
Test Frequency Range:	150KHz to 30MHz																
Class / Severity:	Class B																
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto																
Limit:	<table border="1"> <thead> <tr> <th rowspan="2">Frequency range (MHz)</th> <th colspan="2">Limit (dBuV)</th> </tr> <tr> <th>Quasi-peak</th> <th>Average</th> </tr> </thead> <tbody> <tr> <td>0.15-0.5</td> <td>66 to 56*</td> <td>56 to 46*</td> </tr> <tr> <td>0.5-5</td> <td>56</td> <td>46</td> </tr> <tr> <td>5-30</td> <td>60</td> <td>50</td> </tr> </tbody> </table>			Frequency range (MHz)	Limit (dBuV)		Quasi-peak	Average	0.15-0.5	66 to 56*	56 to 46*	0.5-5	56	46	5-30	60	50
Frequency range (MHz)	Limit (dBuV)																
	Quasi-peak	Average															
0.15-0.5	66 to 56*	56 to 46*															
0.5-5	56	46															
5-30	60	50															
	<p>* Decreases with the logarithm of the frequency.</p>																
Test setup:	<p>Reference Plane</p> <p>LISN</p> <p>40cm</p> <p>80cm</p> <p>AUX Equipment</p> <p>E.U.T</p> <p>Test table/Insulation plane</p> <p>LISN</p> <p>Filter</p> <p>AC power</p> <p>EMI Receiver</p> <p>Remark E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</p>																
Test procedure:	<ol style="list-style-type: none"> 1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4:2014 on conducted measurement. 																
Test Instruments:	Refer to section 6 for details																
Test mode:	Pre-scan all modes in section 5.3, and found the PC mode which is the worst mode, so only the data of worst mode was show on the test report.																
Test results:	Pass																

Measurement Data
Line:


Site : Shielded room

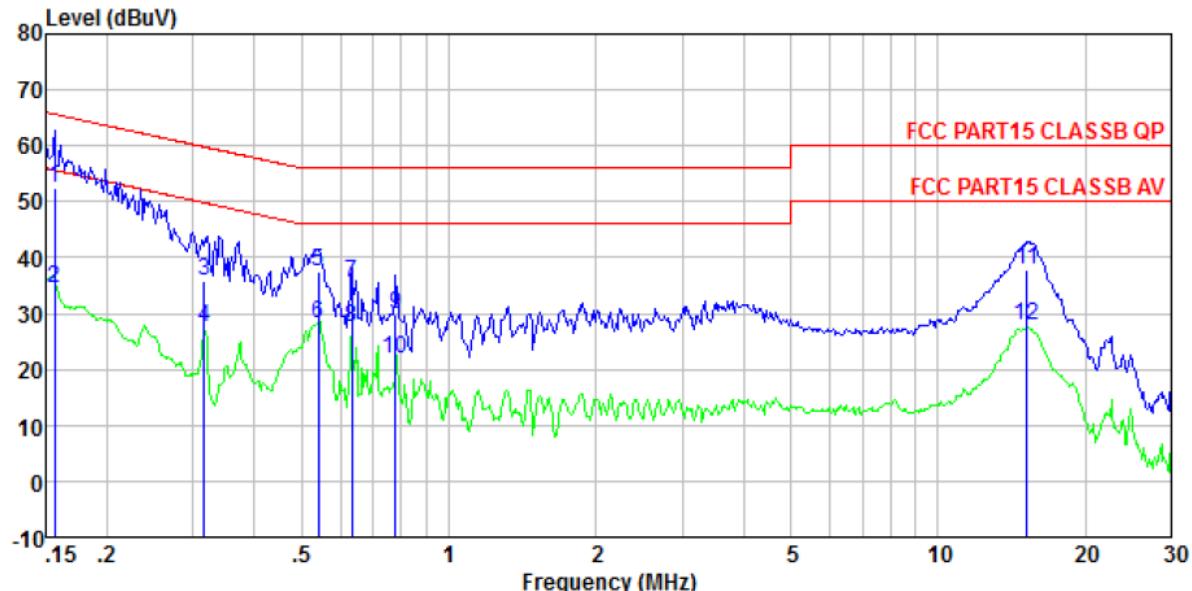
Condition : FCC PART15 CLASSB QP LINE

Job No. : 0124

Test mode : LAN mode

Test Engineer: Boy

	Read Freq	LISN Level	Cable Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB
1	0.150	52.89	0.42	0.12	53.43	66.00	-12.57 QP
2	0.150	33.65	0.42	0.12	34.19	56.00	-21.81 Average
3	0.172	48.28	0.42	0.12	48.82	64.86	-16.04 QP
4	0.172	31.14	0.42	0.12	31.68	54.86	-23.18 Average
5	0.541	37.21	0.35	0.11	37.67	56.00	-18.33 QP
6	0.541	28.35	0.35	0.11	28.81	46.00	-17.19 Average
7	0.634	35.10	0.30	0.13	35.53	56.00	-20.47 QP
8	0.634	26.68	0.30	0.13	27.11	46.00	-18.89 Average
9	3.799	23.87	0.21	0.15	24.23	56.00	-31.77 QP
10	3.799	12.33	0.21	0.15	12.69	46.00	-33.31 Average
11	15.146	33.47	0.22	0.22	33.91	60.00	-26.09 QP
12	15.146	22.66	0.22	0.22	23.10	50.00	-26.90 Average

Neutral:


Site : Shielded room
 Condition : FCC PART15 CLASSB QP NEUTRAL
 Job No. : 0124
 Test mode : LAN mode
 Test Engineer: Boy

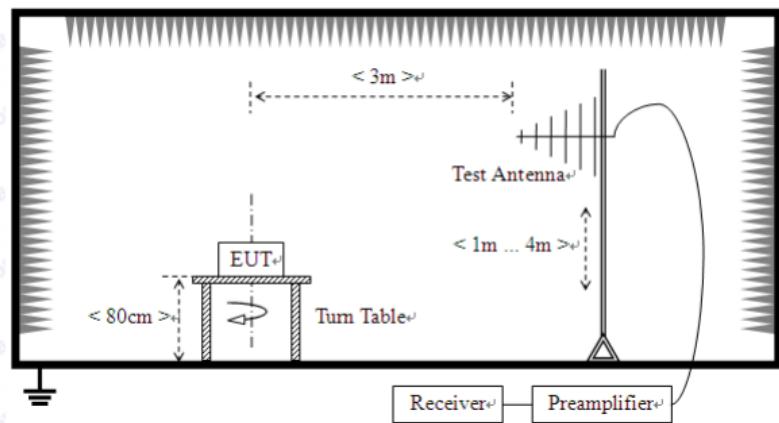
Freq	Read	LISN	Cable	Limit	Over	Remark	
	MHz	dBuV	Factor	Loss	Level	Line	Limit
1	0.156	52.01	0.41	0.12	52.54	65.65	-13.11 QP
2	0.156	34.07	0.41	0.12	34.60	55.65	-21.05 Average
3	0.317	35.37	0.42	0.10	35.89	59.80	-23.91 QP
4	0.317	27.01	0.42	0.10	27.53	49.80	-22.27 Average
5	0.541	37.01	0.32	0.11	37.44	56.00	-18.56 QP
6	0.541	27.89	0.32	0.11	28.32	46.00	-17.68 Average
7	0.634	35.17	0.26	0.13	35.56	56.00	-20.44 QP
8	0.634	27.01	0.26	0.13	27.40	46.00	-18.60 Average
9	0.779	29.51	0.23	0.13	29.87	56.00	-26.13 QP
10	0.779	21.63	0.23	0.13	21.99	46.00	-24.01 Average
11	15.226	37.21	0.23	0.22	37.66	60.00	-22.34 QP
12	15.226	27.26	0.23	0.22	27.71	50.00	-22.29 Average

Notes:

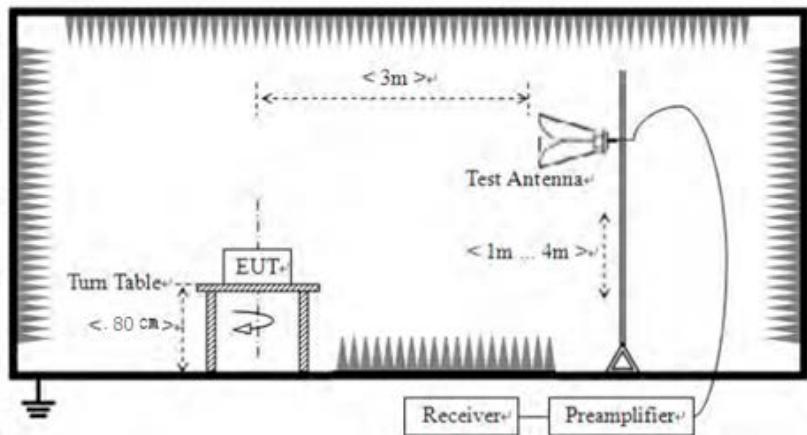
1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level =Receiver Read level + LISN Factor + Cable Loss
4. If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.

7.2 Radiated Emission

Test Requirement:	FCC Part15 B Section 15.109																									
Test Method:	ANSI C63.4:2014																									
Test Frequency Range:	30MHz to 25GHz																									
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)																									
Receiver setup:	<table border="1"> <thead> <tr> <th>Frequency</th><th>Detector</th><th>RBW</th><th>VBW</th><th>Remark</th></tr> </thead> <tbody> <tr> <td>30MHz-1GHz</td><td>Quasi-peak</td><td>120kHz</td><td>300kHz</td><td>Quasi-peak Value</td></tr> <tr> <td>Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr> <tr> <td></td><td>Peak</td><td>1MHz</td><td>10Hz</td><td>Average Value</td></tr> </tbody> </table>					Frequency	Detector	RBW	VBW	Remark	30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value	Above 1GHz	Peak	1MHz	3MHz	Peak Value		Peak	1MHz	10Hz	Average Value	
Frequency	Detector	RBW	VBW	Remark																						
30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value																						
Above 1GHz	Peak	1MHz	3MHz	Peak Value																						
	Peak	1MHz	10Hz	Average Value																						
Limit:	<table border="1"> <thead> <tr> <th>Frequency</th><th>Limit (dBuV/m @3m)</th><th>Remark</th></tr> </thead> <tbody> <tr> <td>30MHz-88MHz</td><td>40.00</td><td>Quasi-peak Value</td></tr> <tr> <td>88MHz-216MHz</td><td>43.50</td><td>Quasi-peak Value</td></tr> <tr> <td>216MHz-960MHz</td><td>46.00</td><td>Quasi-peak Value</td></tr> <tr> <td>960MHz-1GHz</td><td>54.00</td><td>Quasi-peak Value</td></tr> <tr> <td>Above 1GHz</td><td>54.00</td><td>Average Value</td></tr> <tr> <td></td><td>74.00</td><td>Peak Value</td></tr> </tbody> </table>					Frequency	Limit (dBuV/m @3m)	Remark	30MHz-88MHz	40.00	Quasi-peak Value	88MHz-216MHz	43.50	Quasi-peak Value	216MHz-960MHz	46.00	Quasi-peak Value	960MHz-1GHz	54.00	Quasi-peak Value	Above 1GHz	54.00	Average Value		74.00	Peak Value
Frequency	Limit (dBuV/m @3m)	Remark																								
30MHz-88MHz	40.00	Quasi-peak Value																								
88MHz-216MHz	43.50	Quasi-peak Value																								
216MHz-960MHz	46.00	Quasi-peak Value																								
960MHz-1GHz	54.00	Quasi-peak Value																								
Above 1GHz	54.00	Average Value																								
	74.00	Peak Value																								
Test Procedure:	<ol style="list-style-type: none"> 1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. 																									
Test setup:	Below 1GHz																									



Above 1GHz



Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1 012mbar
Measurement Record:	Uncertainty: $\pm 4.5\text{dB}$					
Test Instruments:	Refer to section 6 for details					
Test mode:	Pre-scan all modes in section 5.3, and found the PC mode which is the worst mode, so only the data of worst mode was show on the test report.					
Test results:	Pass					

Note:

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

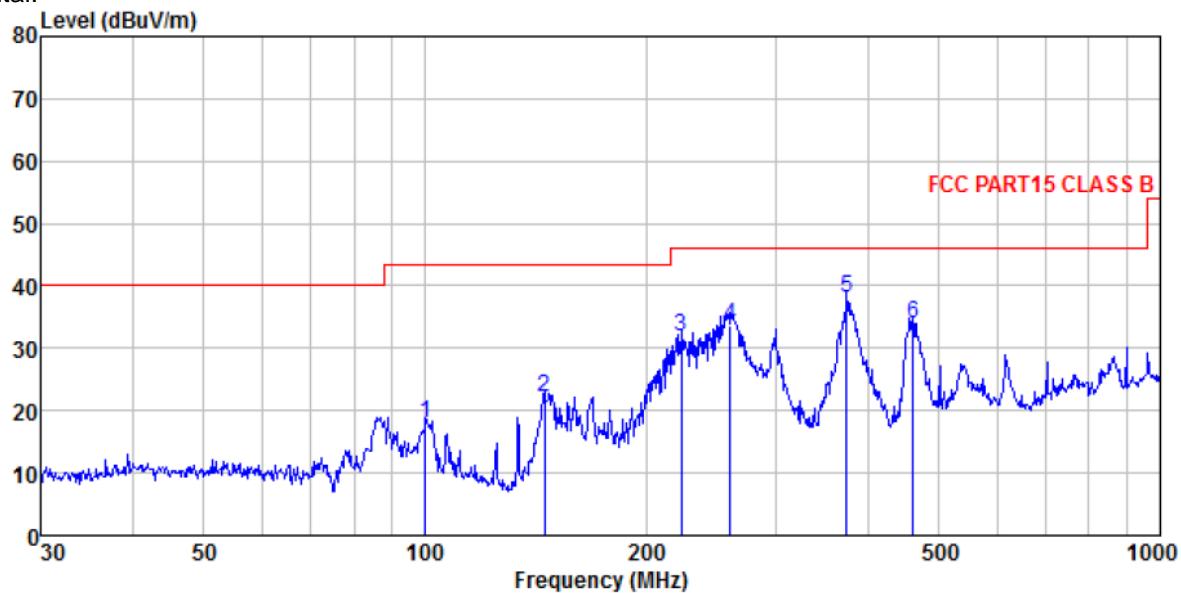
Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

For above 1GHz test, 1GHz to 25GHz all have been tested, only worse case 1GHz to 6GHz is reported, from 6GHz to 25GHz, no emission is found

Measurement Data

Below 1GHz

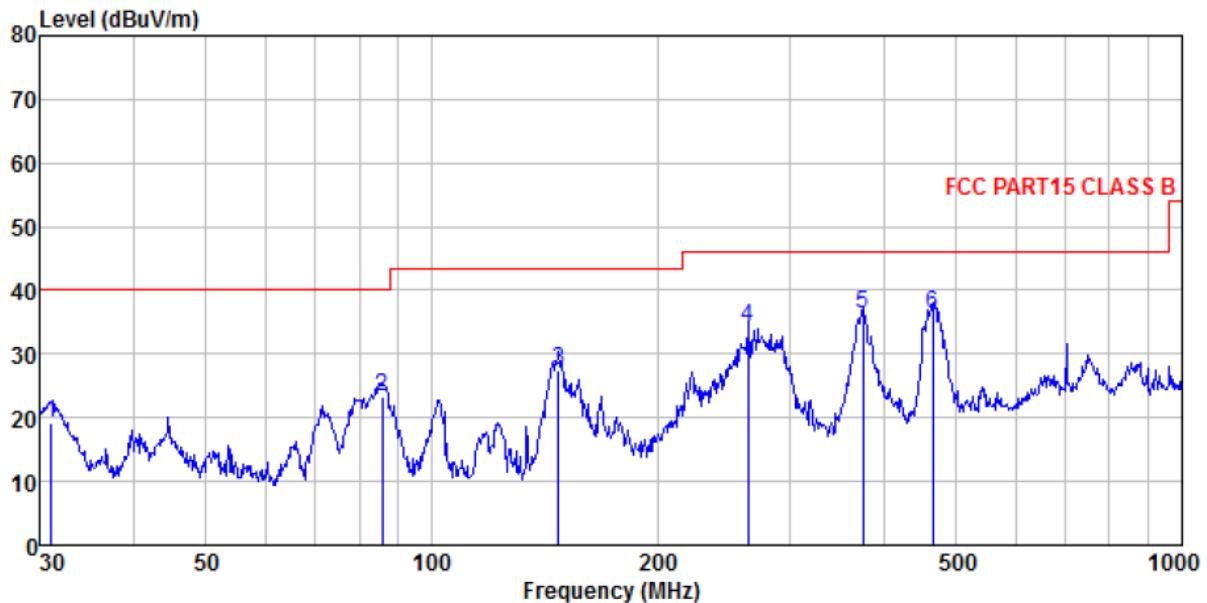
Horizontal:



Site : 3m chamber
 Condition : FCC PART15 CLASS B 3m HORIZONTAL
 Job No. : 0124
 Test Mode : LAN mode
 Test Engineer: Sky

	ReadAntenna	Cable	Preamp	Limit	Over		
Freq	Level	Factor	Loss	Level	Line	Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
1	100.229	31.38	15.11	1.19	29.70	17.98	43.50 -25.52 QP
2	145.351	39.85	10.23	1.54	29.43	22.19	43.50 -21.31 QP
3	222.950	46.11	13.30	1.98	29.41	31.98	46.00 -14.02 QP
4	260.144	47.12	14.09	2.18	29.72	33.67	46.00 -12.33 QP
5	374.623	48.29	16.54	2.74	29.62	37.95	46.00 -8.05 QP
6	460.727	42.71	17.59	3.14	29.37	34.07	46.00 -11.93 QP

Vertical:

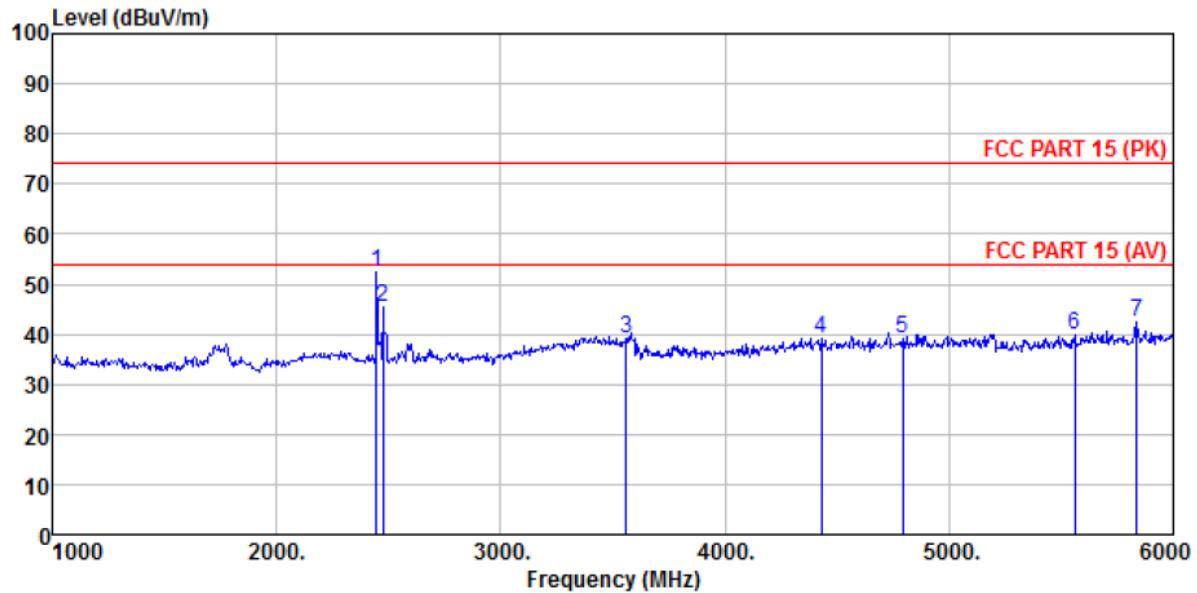


Site : 3m chamber
 Condition : FCC PART15 CLASS B 3m VERTICAL
 Job No. : 0124
 Test Mode : LAN mode
 Test Engineer: Sky

Freq	Read	Antenna	Cable	Preamp	Limit	Over	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	
1	31.071	34.53	14.32	0.56	30.09	19.32	40.00 -20.68 QP
2	85.898	39.52	12.60	1.08	29.77	23.43	40.00 -16.57 QP
3	147.404	44.94	10.24	1.55	29.42	27.31	43.50 -16.19 QP
4	263.819	47.50	14.17	2.19	29.75	34.11	46.00 -11.89 QP
5	375.939	46.51	16.56	2.75	29.61	36.21	46.00 -9.79 QP
6	465.599	44.73	17.71	3.16	29.37	36.23	46.00 -9.77 QP

Above 1GHz

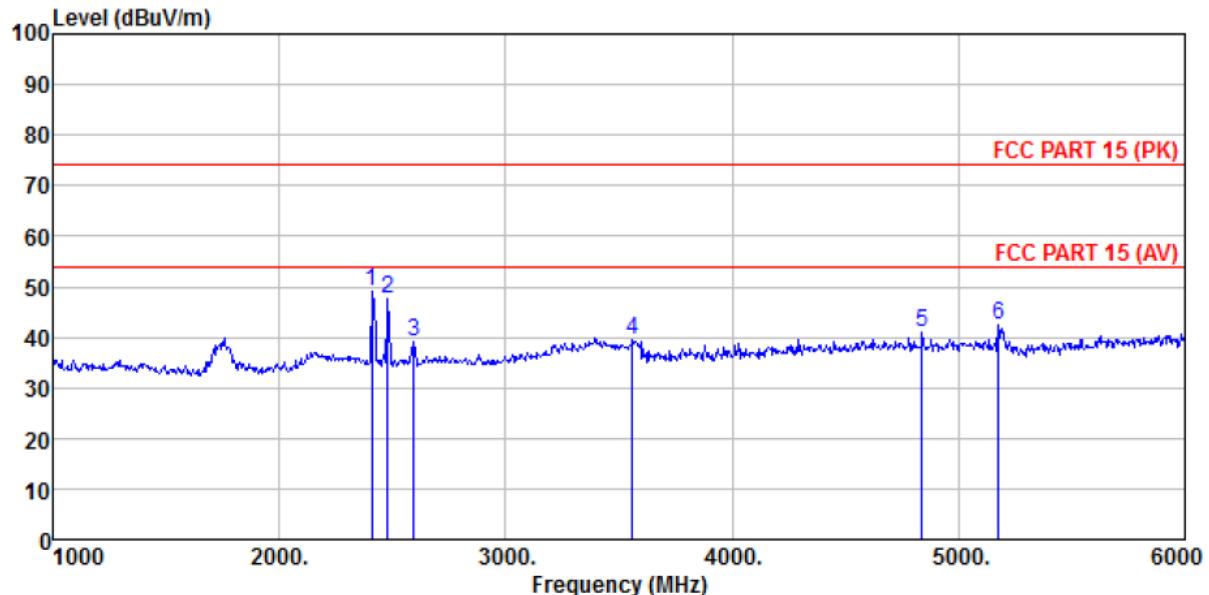
Horizontal:



Site : 3m chamber
 Condition : FCC PART 15 (PK) 3m HORIZONTAL
 Job No. : 0124
 Test Mode : LAN mode
 Test Engineer: Sky

Freq	Read	Antenna	Cable	Preamp	Limit	Over	Remark
	Level	Factor	Loss	Factor	Level	Line	
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
1 2445.000	19.62	27.48	5.43	0.00	52.53	74.00	-21.47 Peak
2 2475.000	12.35	27.52	5.47	0.00	45.34	74.00	-28.66 Peak
3 3560.000	3.07	29.09	7.07	0.00	39.23	74.00	-34.77 Peak
4 4430.000	-0.43	31.16	8.27	0.00	39.00	74.00	-35.00 Peak
5 4795.000	-1.33	31.76	8.59	0.00	39.02	74.00	-34.98 Peak
6 5560.000	-1.82	32.13	9.61	0.00	39.92	74.00	-34.08 Peak
7 5835.000	-0.20	32.70	9.97	0.00	42.47	74.00	-31.53 Peak

Vertical:

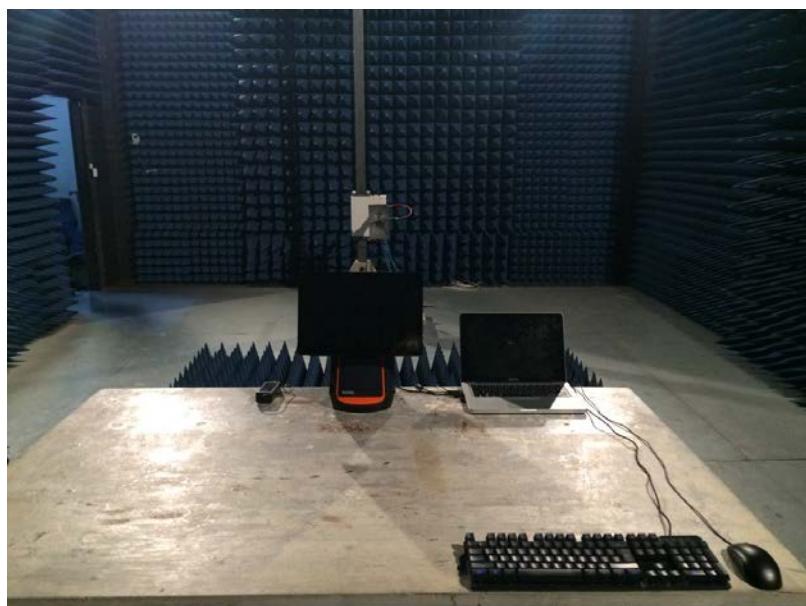
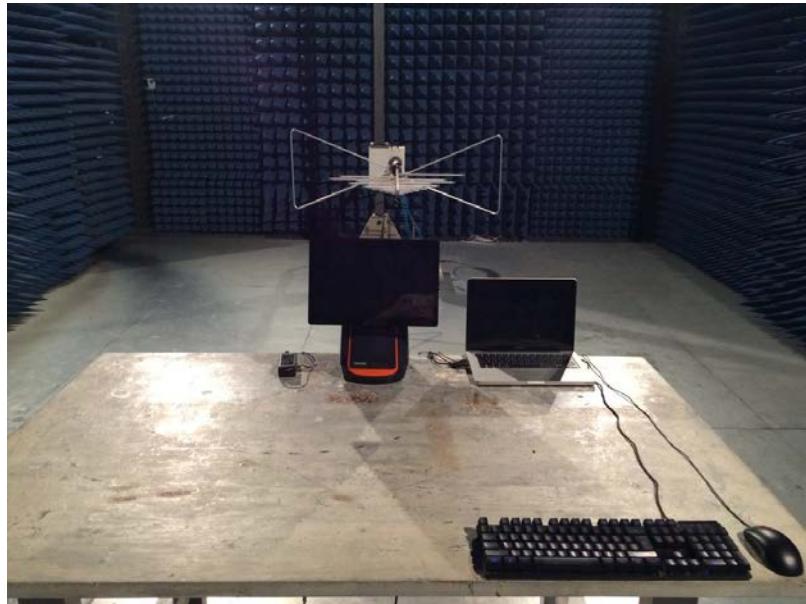


Site : 3m chamber
 Condition : FCC PART 15 (PK) 3m VERTICAL
 Job No. : 0124
 Test Mode : LAN mode
 Test Engineer: Sky

Freq	Read	Antenna	Cable	Preamp	Limit Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB				
1	2410.000	50.83	27.57	5.40	34.59	49.21	74.00	-24.79 Peak
2	2480.000	14.69	27.52	5.47	0.00	47.68	74.00	-26.32 Peak
3	2595.000	5.76	27.80	5.58	0.00	39.14	74.00	-34.86 Peak
4	3560.000	3.49	29.09	7.07	0.00	39.65	74.00	-34.35 Peak
5	4840.000	0.38	31.81	8.63	0.00	40.82	74.00	-33.18 Peak
6	5175.000	1.25	32.04	9.03	0.00	42.32	74.00	-31.68 Peak

8 Test Setup Photo

Radiated Emission



Conducted Emission



9 EUT Constructional Details

Reference to the test report No. GTS201609000124E01

----- end -----