

# 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.: W1401

**FCC ID:** 2AH25W1403

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

**Date of sample receipt:** December 28, 2016

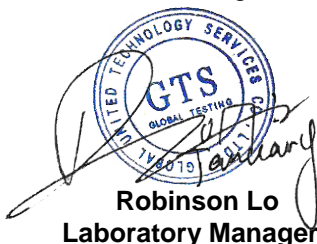
**Date of Test:** December 28, 2016-January 03, 2017

**Date of report issue:** January 06, 2017

**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	January 06, 2017	Original

Prepared By:

*Edward. Pan*

Date:

January 06, 2017

**Project Engineer**

Check By:

*Andy. Wu*

Date:

January 06, 2017

**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	$\pm 4.34\text{dB}$	(1)
Radiated Emission	30MHz ~ 1000MHz	$\pm 4.24\text{dB}$	(1)
Radiated Emission	1GHz ~ 26.5GHz	$\pm 4.68\text{dB}$	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	$\pm 3.45\text{dB}$	(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

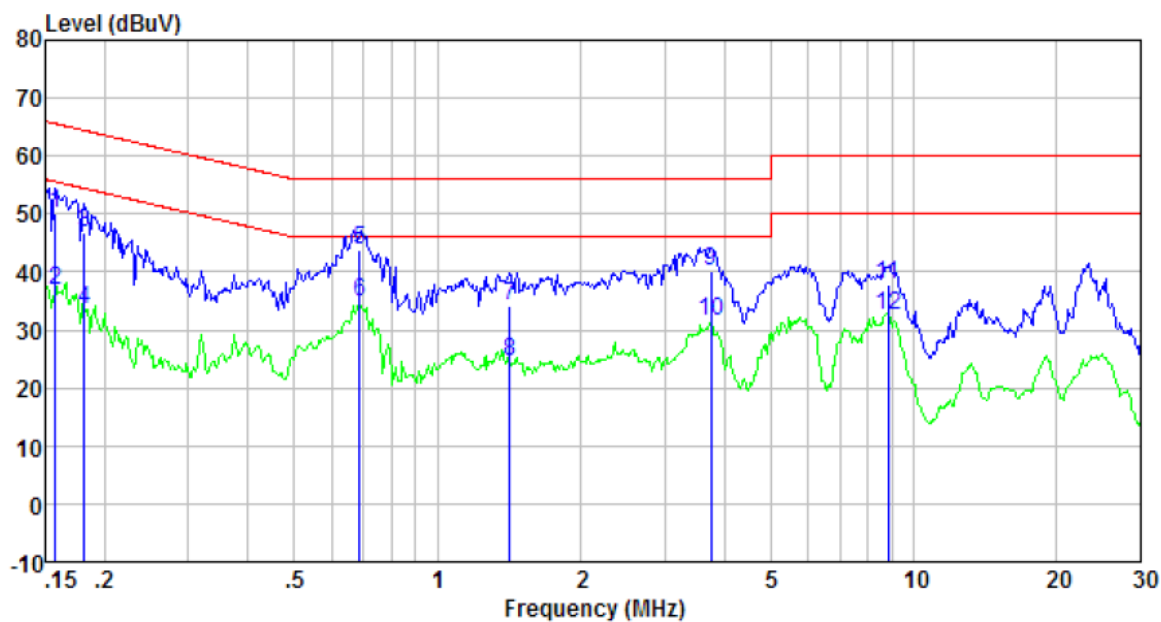
### 7.1 Conducted Emissions

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><tr><th rowspan="2">Frequency range (MHz)</th><th colspan="2">Limit (dBuV)</th></tr><tr><th>Quasi-peak</th><th>Average</th></tr><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></table> <p>* Decreases with the logarithm of the frequency.</p>			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															
Test setup:	<div><p style="text-align: center;"><b>Reference Plane</b></p><p style="text-align: center;">Test table/Insulation plane</p><p><i>Remark: E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</i></p></div>																
Test procedure:	<ol style="list-style-type: none"><li>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.</li><li>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).</li><li>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.</li></ol>																
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																



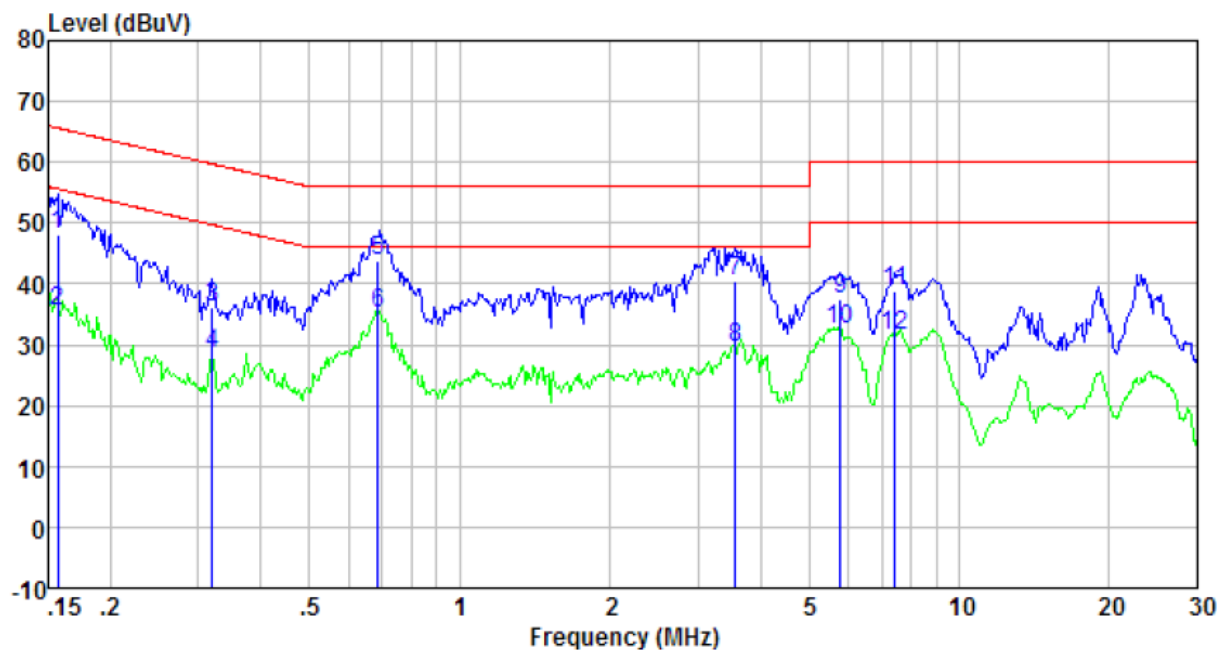
## Measurement Data

Line:



Freq MHz	Reading level dBuV	lISN/ISN factor dB	Cable loss dB	level dBuV	Limit level dBuV	Over limit dB	Remark
0.157	49.55	0.42	0.12	50.09	65.60	-15.51	QP
0.157	36.38	0.42	0.12	36.92	55.60	-18.68	Average
0.182	46.40	0.42	0.13	46.95	64.42	-17.47	QP
0.182	33.04	0.42	0.13	33.59	54.42	-20.83	Average
0.686	43.38	0.29	0.13	43.80	56.00	-12.20	QP
0.686	34.39	0.29	0.13	34.81	46.00	-11.19	Average
1.418	33.80	0.22	0.13	34.15	56.00	-21.85	QP
1.418	24.06	0.22	0.13	24.41	46.00	-21.59	Average
3.759	39.65	0.21	0.15	40.01	56.00	-15.99	QP
3.759	31.07	0.21	0.15	31.43	46.00	-14.57	Average
8.822	37.52	0.22	0.19	37.93	60.00	-22.07	QP
8.822	32.09	0.22	0.19	32.50	50.00	-17.50	Average

## Neutral:



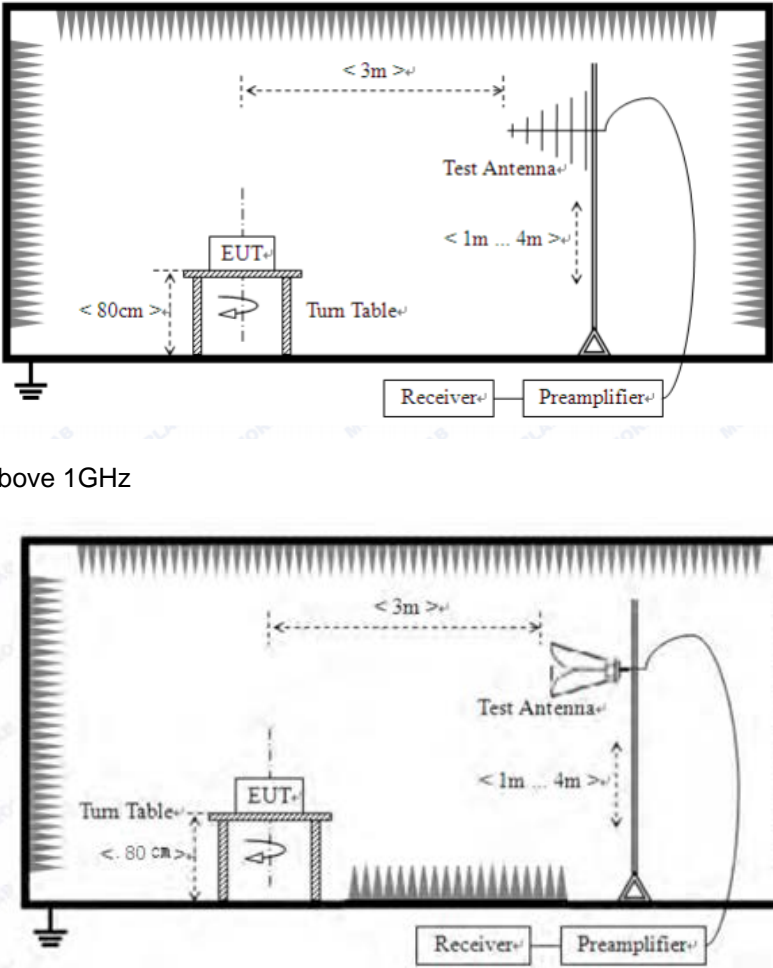
Freq MHz	Reading level dBuV	LISN/ISN factor dB	Cable loss dB	level dBuV	Limit level dBuV	Over limit dB	Remark
0.156	47.71	0.41	0.12	48.24	65.65	-17.41	QP
0.156	34.85	0.41	0.12	35.38	55.65	-20.27	Average
0.320	35.49	0.42	0.10	36.01	59.71	-23.70	QP
0.320	28.03	0.42	0.10	28.55	49.71	-21.16	Average
0.686	43.47	0.25	0.13	43.85	56.00	-12.15	QP
0.686	34.81	0.25	0.13	35.19	46.00	-10.81	Average
3.565	40.05	0.21	0.15	40.41	56.00	-15.59	QP
3.565	29.13	0.21	0.15	29.49	46.00	-16.51	Average
5.774	37.06	0.21	0.15	37.42	60.00	-22.58	QP
5.774	32.11	0.21	0.15	32.47	50.00	-17.53	Average
7.446	38.31	0.22	0.18	38.71	60.00	-21.29	QP
7.446	31.18	0.22	0.18	31.58	50.00	-18.42	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><tr><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Remark</td></tr><tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>120kHz</td><td>300kHz</td><td>Quasi-peak Value</td></tr><tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr><tr><td>Peak</td><td>1MHz</td><td>10Hz</td><td>Average Value</td></tr></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><tr><td colspan="2">Frequency</td><td>Limit (dBuV/m @3m)</td><td colspan="2">Remark</td></tr><tr><td colspan="2">30MHz-88MHz</td><td>40.00</td><td colspan="2">Quasi-peak Value</td></tr><tr><td colspan="2">88MHz-216MHz</td><td>43.50</td><td colspan="2">Quasi-peak Value</td></tr><tr><td colspan="2">216MHz-960MHz</td><td>46.00</td><td colspan="2">Quasi-peak Value</td></tr><tr><td colspan="2">960MHz-1GHz</td><td>54.00</td><td colspan="2">Quasi-peak Value</td></tr><tr><td colspan="2" rowspan="2">Above 1GHz</td><td>54.00</td><td colspan="2">Average Value</td></tr><tr><td>74.00</td><td colspan="2">Peak Value</td></tr></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:	<div>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.</div> <div>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.</div> <div>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.</div> <div>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.</div> <div>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</div> <div>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.</div>																																					
Test setup:	Below 1GHz																																					

	 <p>Above 1GHz</p>
Test environment:	Temp.: 25 °C    Humid.: 52%    Press.: 1 012mbar
Measurement Record:	Uncertainty: ± 4.5dB
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:

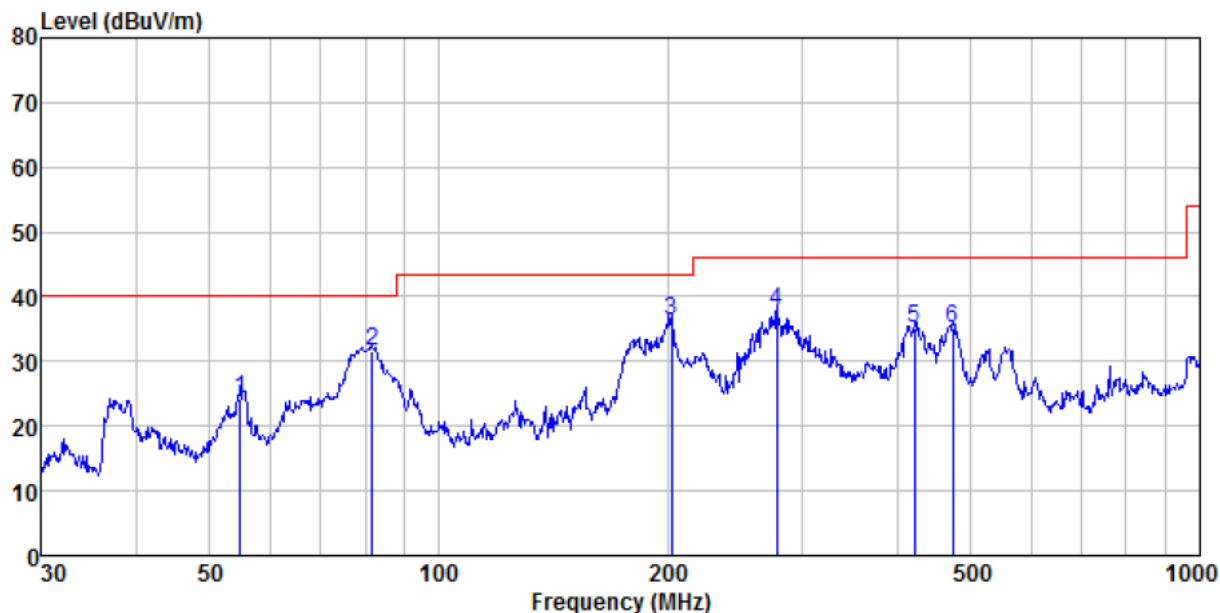
$$\text{Final Test Level} = \text{Receiver Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Preamplifier Factor}$$

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

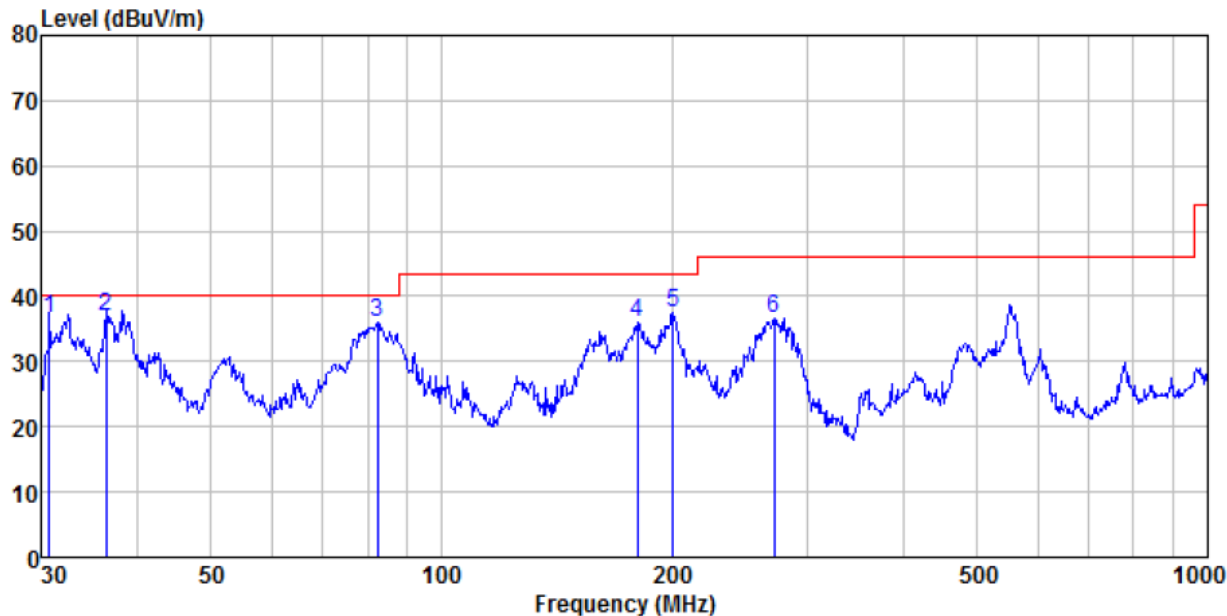
Below 1GHz

Horizontal:



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
54.835	38.47	15.02	0.82	29.96	24.35	40.00	-15.65	QP
81.783	49.03	11.28	1.04	29.79	31.56	40.00	-8.44	QP
202.100	51.12	12.64	1.85	29.22	36.39	43.50	-7.11	QP
278.067	50.63	14.63	2.26	29.85	37.67	46.00	-8.33	QP
422.058	44.13	17.48	2.96	29.45	35.12	46.00	-10.88	QP
473.835	43.42	17.95	3.20	29.35	35.22	46.00	-10.78	QP

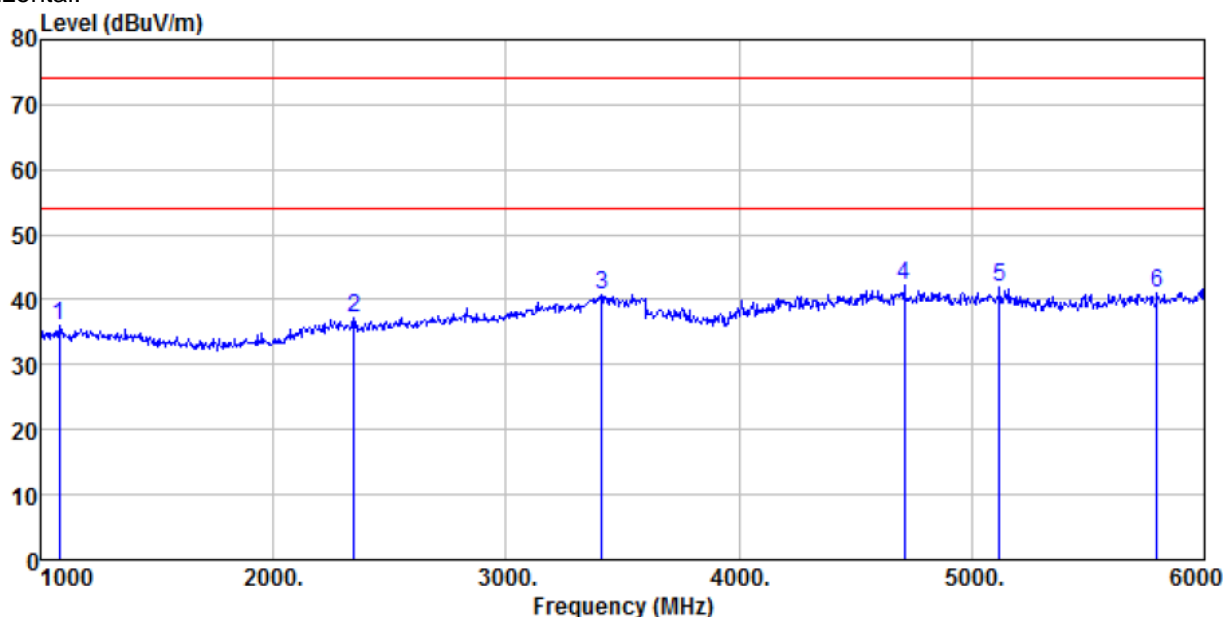
Vertical:



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
30.745	51.84	14.32	0.56	30.10	36.62	40.00	-3.38	QP
36.509	51.57	14.73	0.62	30.06	36.86	40.00	-3.14	QP
82.359	53.19	11.43	1.05	29.78	35.89	40.00	-4.11	QP
180.017	52.00	11.68	1.74	29.27	36.15	43.50	-7.35	QP
200.688	52.21	12.57	1.84	29.21	37.41	43.50	-6.09	QP
271.325	49.79	14.42	2.23	29.81	36.63	46.00	-9.37	QP

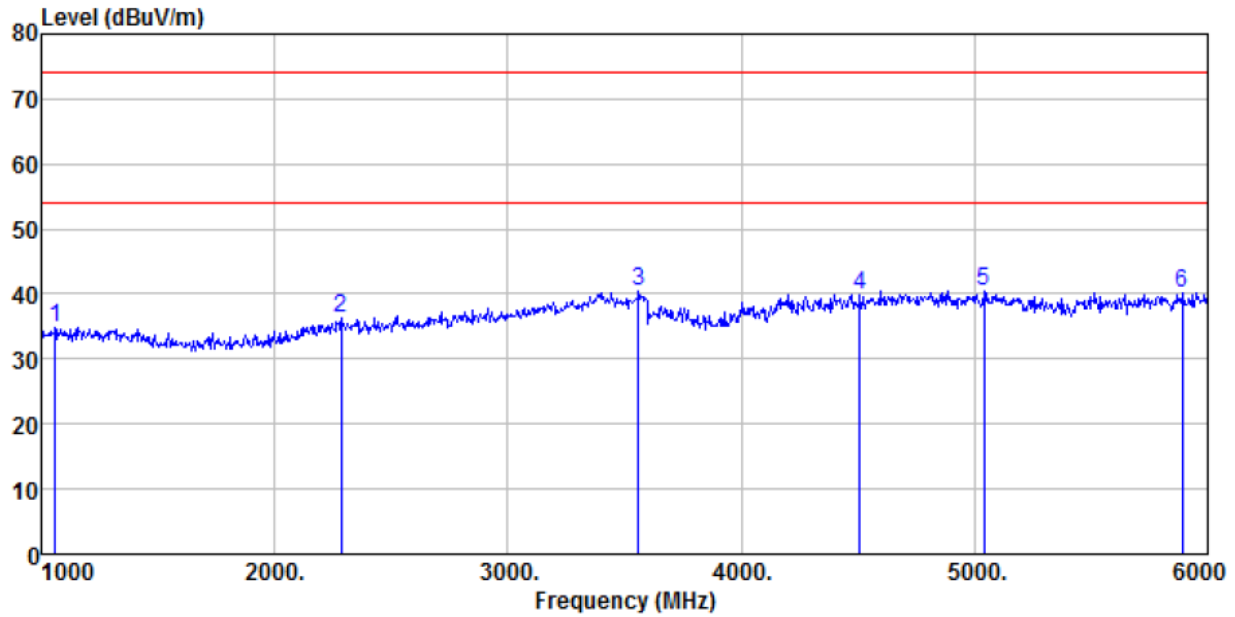
Above 1GHz

Horizontal:



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
1080.000	39.74	24.70	4.37	32.89	35.92	74.00	-38.08	Peak
2345.000	38.07	27.74	5.34	34.07	37.08	74.00	-36.92	Peak
3410.000	38.18	28.64	6.78	32.85	40.75	74.00	-33.25	Peak
4710.000	33.98	31.66	8.52	32.04	42.12	74.00	-31.88	Peak
5120.000	33.23	32.05	8.94	32.24	41.98	74.00	-32.02	Peak
5795.000	30.70	32.63	9.93	32.25	41.01	74.00	-32.99	Peak

Vertical:

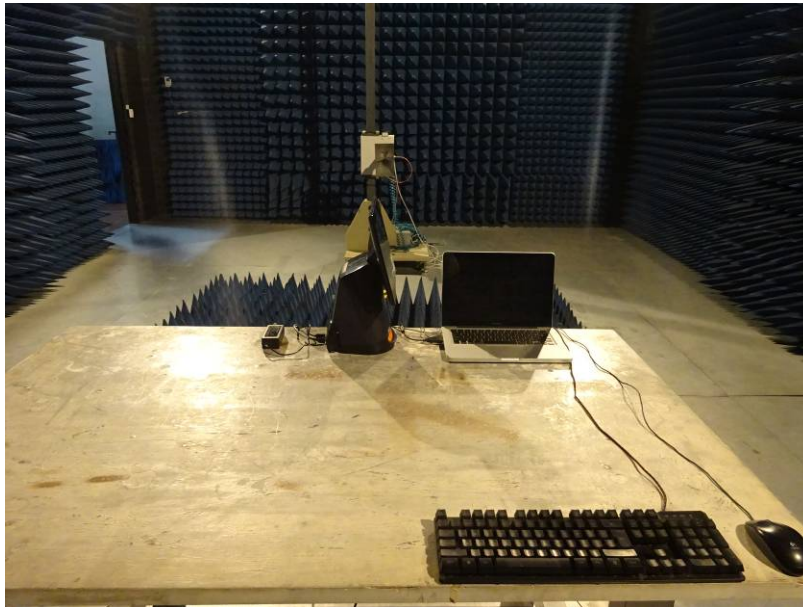
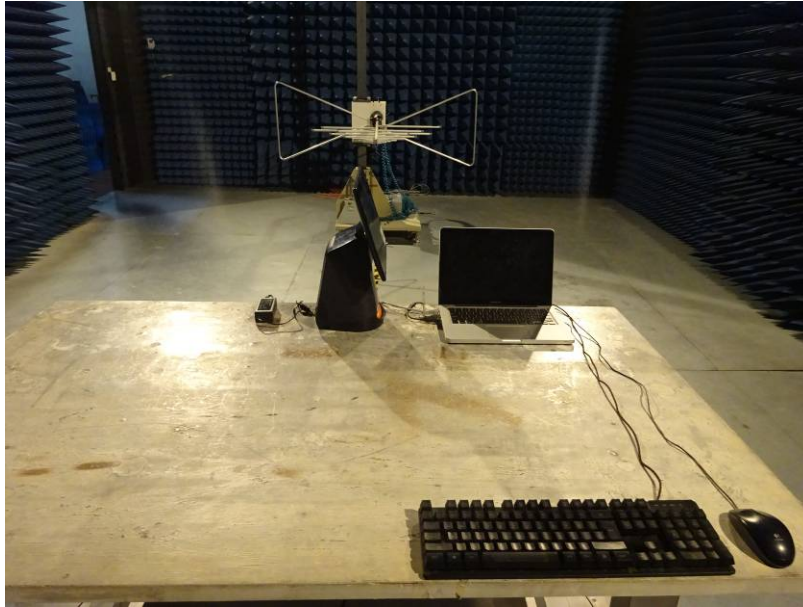


Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
1060.000	38.81	24.65	4.35	32.87	34.94	74.00	-39.06	Peak
2285.000	37.28	27.99	5.28	34.13	36.42	74.00	-37.58	Peak
3560.000	36.88	29.09	7.07	32.67	40.37	74.00	-33.63	Peak
4510.000	32.17	31.34	8.34	31.94	39.91	74.00	-34.09	Peak
5040.000	31.91	31.98	8.83	32.21	40.51	74.00	-33.49	Peak
5890.000	29.43	32.76	10.06	32.19	40.06	74.00	-33.94	Peak



## 8 Test Setup Photo

Radiated Emission



Conducted Emission



## 9 EUT Constructional Details

Reference to the test report No. GTS201609000126E01

----- End-----