

FCC Report (GSM&WCDMA)

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 2: 2015
FCC CFR Title 47 Part22 Subpart H: 2015
FCC CFR Title 47 Part24 Subpart E: 2015

Date of sample receipt: September 19, 2016

Date of Test: September 20-October 13, 2016

Date of report issued: January 06, 2017

Test Result : PASS *

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

Authorized Signature:

A circular logo for GTS (Global United Technology Services Co., Ltd.) is visible. The logo contains the text "GTS" in the center, "GLOBAL TESTING" below it, and "UNITED TECHNOLOGY SERVICES CO., LTD." around the perimeter. A handwritten signature in black ink is written over the logo.

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.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of GTS or testing done by GTS in connection with, distribution or use of the product described in this report must be approved by GTS in writing.

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2 Version

Version No.	Date	Description
00	October 17, 2016	Original
01	January 06, 2017	Change model number and update LED screen.

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
RF Exposure (SAR)	Part 1.1307 Part 2.1093	N/A
RF Output Power	Part 2.1046 Part 22.913 (a)(2) Part 24.232 (c)	N/A
Peak-to-Average Ratio	Part 2.1046 Part 24.232 (d)	N/A
Modulation Characteristics	Part 2.1047	N/A
99% & -26 dB Occupied Bandwidth	Part 2.1049 Part 22.917 Part 24.238	N/A
Spurious Emissions at Antenna Terminal	Part 2.1051 Part 22.917 (a) Part 24.238 (a)	N/A
Field Strength of Spurious Radiation	Part 2.1053 Part 22.917 (a) Part 24.238 (a)	Pass
Out of band emission, Band Edge	Part 22.917 (a) Part 24.238 (a)	N/A
Frequency stability vs. temperature	Part 2.1055(a)(1)(b)	N/A
Frequency stability vs. voltage	Part 2.1055(d)(1)(2)	N/A

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

N/A: Not applicable

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
Support Networks:	GSM, GPRS, EGPRS, WCDMA
Support Bands:	GSM850, PCS1900, WCDMA Band V, WCDMA Band II
TX Frequency:	GSM850: 824.20MHz-848.80MHz PCS1900: 1850.20MHz-1909.80MHz WCDMA Band V: 826.40MHz -846.60MHz WCDMA Band II: 1852.40MHz -1907.60MHz
GPRS Class:	12
EGPRS Class	12
Modulation type:	GSM/GPRS: GMSK EGPRS: GMSK/8PSK WCDMA Band II/V: QPSK
Antenna type:	Integral antenna
Antenna gain:	-2.6dBi(Max Gain)
Power supply:	AC Adaptor Model No.:EA10681P-240 Input: AC 100-240V, 50/60Hz, 2.0A Output: DC 24V, 2.5A

Operation Frequency List:

GSM 850		PCS1900		WCDMA Band V		WCDMA Band II	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
128	824.20	512	1850.20	4132	826.40	9262	1852.40
129	824.40	513	1850.40	4133	826.60	9263	1852.60
· ∴	· ∴	· ∴	· ∴	· ∴	· ∴	· ∴	· ∴
189	836.40	660	1879.80	4181	836.20	9399	1879.80
190	836.60	661	1880.00	4182	836.40	9400	1880.00
191	836.80	662	1880.20	4183	836.60	9401	1880.20
· ∴	· ∴	· ∴	· ∴	· ∴	· ∴	· ∴	· ∴
250	848.60	809	1909.60	4232	846.40	9537	1907.40
251	848.80	810	1909.80	4233	846.60	9538	1907.60

Regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Final test channel:

GSM 850		PCS1900		WCDMA Band V		WCDMA Band II	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
128	824.20	512	1850.20	4132	826.40	9262	1852.40
190	836.60	661	1880.00	4183	836.60	9400	1880.00
251	848.80	810	1909.80	4233	846.60	9538	1907.60

5.3 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is filing to comply with Section Part 22 subpart H and Part 24 subpart E of the FCC CFR 47 Rules.

5.4 Test Methodology

Both conducted and radiated testing were performed according to the procedures document on TIA/EIA 603 and FCC CFR 47.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055 and 2.1057

5.5 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.

5.6 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

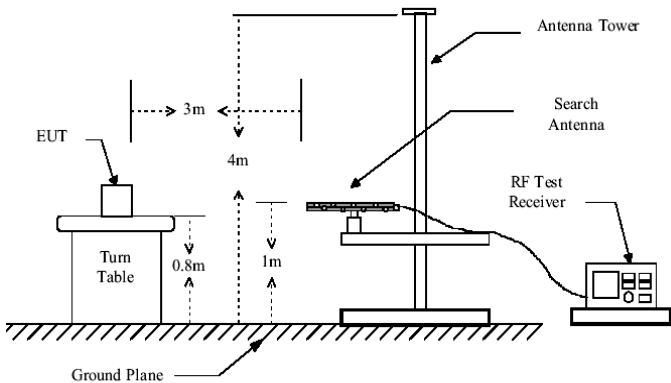
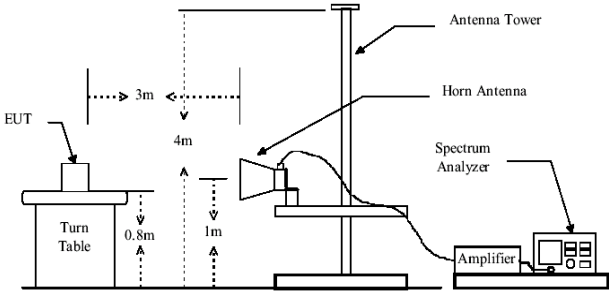
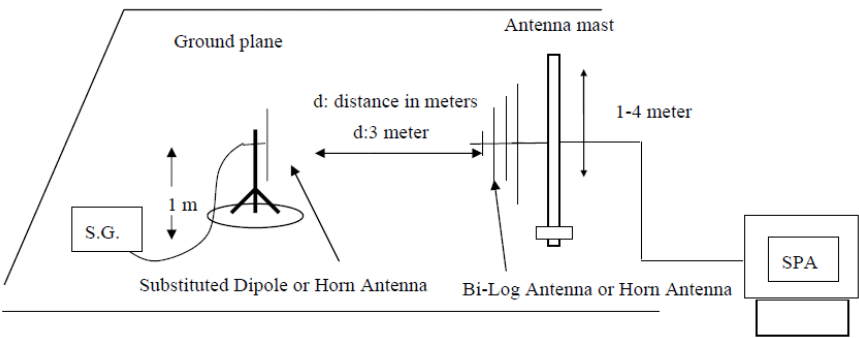
Fax: 0755-27798960

6 Test Instruments list

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	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	June 29 2016	June 28 2017
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June 29 2016	June 28 2017
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	9120D-829	GTS208	June 29 2016	June 28 2017
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June 29 2016	June 28 2017
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	June 29 2016	June 28 2017
9	Coaxial Cable	GTS	N/A	GTS211	June 29 2016	June 28 2017
10	Coaxial cable	GTS	N/A	GTS210	June 29 2016	June 28 2017
11	Coaxial Cable	GTS	N/A	GTS212	June 29 2016	June 28 2017
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June 29 2016	June 28 2017
13	Amplifier(2GHz-20GHz)	HP	8349B	GTS206	June 29 2016	June 28 2017
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June 29 2016	June 28 2017
15	Band filter	Amindeon	82346	GTS219	June 29 2016	June 28 2017
16	Universal radio communication tester	Rohde & Schwarz	CMU200	GTS235	June 29 2016	June 28 2017
17	Signal Generator	Rohde & Schwarz	SML03	GTS236	June 29 2016	June 28 2017
18	Temp. Humidity/ Barometer	Oregon Scientific	BA-888	GTS248	June 29 2016	June 28 2017
19	D.C. Power Supply	Instek	PS-3030	GTS232	June 29 2016	June 28 2017
20	Splitter	Agilent	11636B	GTS237	June 29 2016	June 28 2017
21	Power meter	Anritsu	ML2495A	GTS540	June 29 2016	June 28 2017
22	Power Sensor	Anritsu	MA2411B	GTS541	June 29 2016	June 28 2017
23	Spectrum Analyzer	Agilent	E4440A	GTS533	June 29 2016	June 28 2017
24	Temp.&Humidity chamber	Chuang wei	GDS-225	GTS005-1	June 29 2016	June 28 2017
25	Highpass filter	Micro-Tronics	HPM50108	GTS549	June 29 2016	June 28 2017
26	Highpass filter	Micro-Tronics	HPM50111	GTS550	June 29 2016	June 28 2017

7 Test results

7.1 Field strength of spurious radiation measurement

Test Requirement:	FCC part22.917(a) and FCC part24.238(a)
Test Method:	FCC part2.1053
Limit:	-13dBm
Test setup:	<p>Below 1GHz</p>  <p>Above 1GHz</p>  <p>Substituted method:</p> 

Test Procedure:	<ol style="list-style-type: none"> 1. The EUT was placed on an non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer. 2. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations. 3. The frequency range up to tenth harmonic was investigated for each of three fundamental frequency (low, middle and high channels). Once spurious emission was identified, the power of the emission was determined using the substitution method. 4. The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency. $\text{ERP / EIRP} = \text{S.G. output (dBm)} + \text{Antenna Gain(dB/dBi)} - \text{Cable Loss (dB)}$
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 7.1 for details
Test results:	Pass

Measurement Data

Test mode:	GSM850		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1648.40	Vertical	-35.87	-13.00	Pass
2472.60	V	-38.61		
3296.80	V	-40.88		
4121.00	V	-43.04		
4945.20	V	---		
1648.40	Horizontal	-41.11	-13.00	Pass
2472.60	H	-44.99		
3296.80	H	-46.56		
4121.00	H	-49.30		
4945.20	H	---		
Test mode:	GSM850		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1673.20	Vertical	-37.25	-13.00	Pass
2509.80	V	-39.53		
3346.40	V	-41.42		
4183.00	V	-43.23		
5019.60	V	---		
1673.20	Horizontal	-41.63	-13.00	Pass
2509.80	H	-44.85		
3346.40	H	-46.17		
4183.00	H	-48.45		
5019.60	H	---		
Test mode:	GSM850		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1697.60	Vertical	-37.50	-13.00	Pass
2546.40	V	-39.53		
3395.20	V	-41.20		
4244.00	V	-42.82		
5092.80	V	---		
1697.60	Horizontal	-41.39	-13.00	Pass
2546.40	H	-44.26		
3395.20	H	-45.43		
4244.00	H	-47.45		
5092.80	H	---		

Remark :

1. The emission behaviour belongs to narrowband spurious emission.
2. Remark"---" means that the emission level is too low to be measured
3. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

Test mode:	PCS1900		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3700.40	Vertical	-36.97	-13.00	Pass
5550.60	V	-39.36		
7400.80	V	-41.33		
9251.00	V	-43.23		
11101.20	V	---		
3700.40	Horizontal	-41.55	-13.00	Pass
5550.60	H	-44.93		
7400.80	H	-46.29		
9251.00	H	-48.66		
11101.20	H	---		
Test mode:	PCS1900		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3760.00	Vertical	-34.66	-13.00	Pass
5640.00	V	-37.12		
7520.00	V	-39.16		
9400.00	V	-41.13		
11280.00	V	---		
3760.00	Horizontal	-39.40	-13.00	Pass
5640.00	H	-42.89		
7520.00	H	-44.30		
9400.00	H	-46.76		
11280.00	H	---		
Test mode:	PCS1900		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3819.60	Vertical	-35.85	-13.00	Pass
5729.40	V	-38.24		
7639.20	V	-40.22		
9549.00	V	-42.12		
11458.80	V	---		
3819.60	Horizontal	-40.44	-13.00	Pass
5729.40	H	-43.83		
7639.20	H	-45.19		
9549.00	H	-47.57		
11458.80	H	---		

Remark:

1. The emission behaviour belongs to narrowband spurious emission.
2. Remark"---" means that the emission level is too low to be measured
3. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

Test mode:	WCDMA Band V		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1652.80	Vertical	-37.52	-13.00	Pass
2479.20	V	-41.26		
3305.60	V	-43.99		
4132.00	V	-41.51		
4958.40	V	---		
1652.80	Horizontal	-40.31	-13.00	Pass
2479.20	H	-42.99		
3305.60	H	-48.40		
4132.00	H	-52.02		
4958.40	H	---		
Test mode:	WCDMA Band V		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1672.80	Vertical	-39.52	-13.00	Pass
2509.20	V	-40.83		
3345.60	V	-44.45		
4182.00	V	-46.91		
5018.40	V	---		
1672.80	Horizontal	-41.97	-13.00	Pass
2509.20	H	-43.87		
3345.60	H	-48.56		
4182.00	H	-50.94		
5018.40	H	---		
Test mode:	WCDMA Band V		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1693.20	Vertical	-38.01	-13.00	Pass
2539.80	V	-40.44		
3386.40	V	-43.06		
4233.00	V	-45.95		
5079.60	V	---		
1693.20	Horizontal	-41.35	-13.00	Pass
2539.80	H	-43.76		
3386.40	H	-45.14		
4233.00	H	-51.31		
5079.60	H	---		

Remark :

1. The emission behaviour belongs to narrowband spurious emission.
2. Remark"---" means that the emission level is too low to be measured
3. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

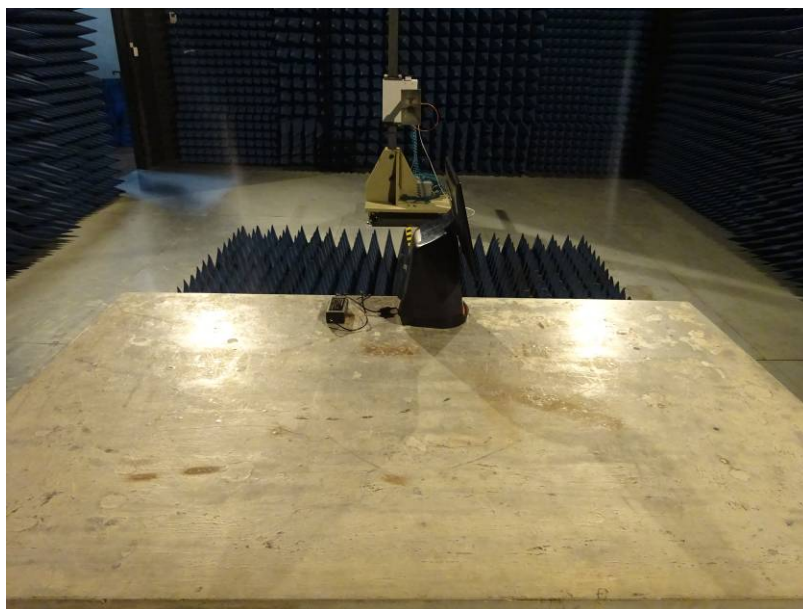
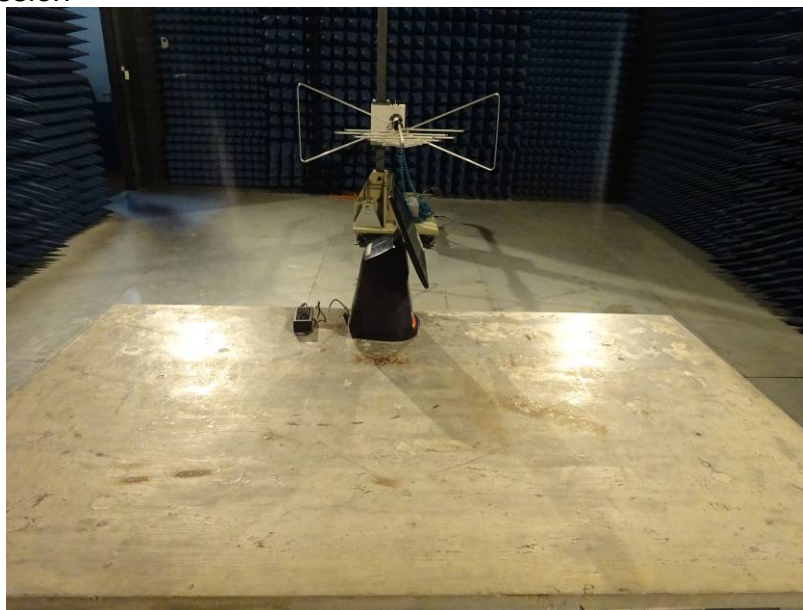
Test mode:	WCDMA Band II		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3704.46	Vertical	-38.64	-13.00	Pass
5556.86	V	-41.73		
7409.26	V	-44.29		
9261.66	V	-46.74		
11114.40	V	---		
3704.46	Horizontal	-44.57	-13.00	Pass
5556.86	H	-48.93		
7409.26	H	-50.70		
9261.66	H	-53.78		
11114.40	H	---		
Test mode:	WCDMA Band II		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3759.83	Vertical	-39.43	-13.00	Pass
5639.83	V	-42.36		
7519.83	V	-44.77		
9399.83	V	-47.10		
11280.00	V	---		
3759.83	Horizontal	-45.05	-13.00	Pass
5639.83	H	-49.19		
7519.83	H	-50.86		
9399.83	H	-53.77		
11280.00	H	---		
Test mode:	WCDMA Band II		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3815.03	Vertical	-38.70	-13.00	Pass
5722.63	V	-41.43		
7630.23	V	-43.67		
9537.83	V	-45.86		
11445.60	V	---		
3815.03	Horizontal	-43.93	-13.00	Pass
5722.63	H	-47.80		
7630.23	H	-49.35		
9537.83	H	-52.06		
11445.60	H	---		

Remark:

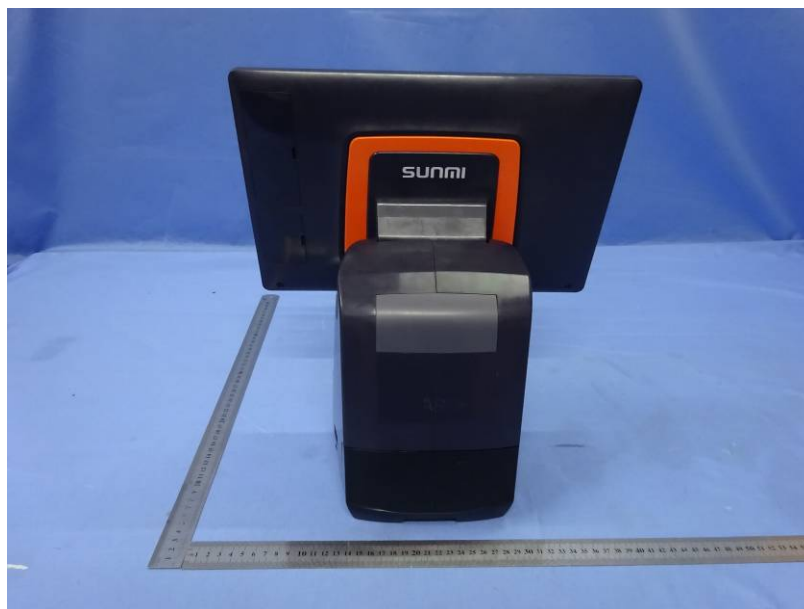
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2. Remark"---" means that the emission level is too low to be measured
3. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

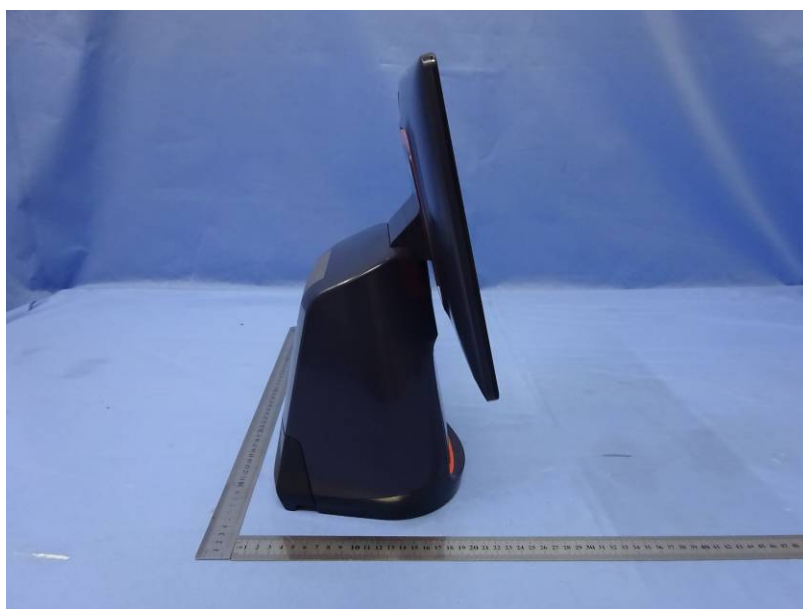
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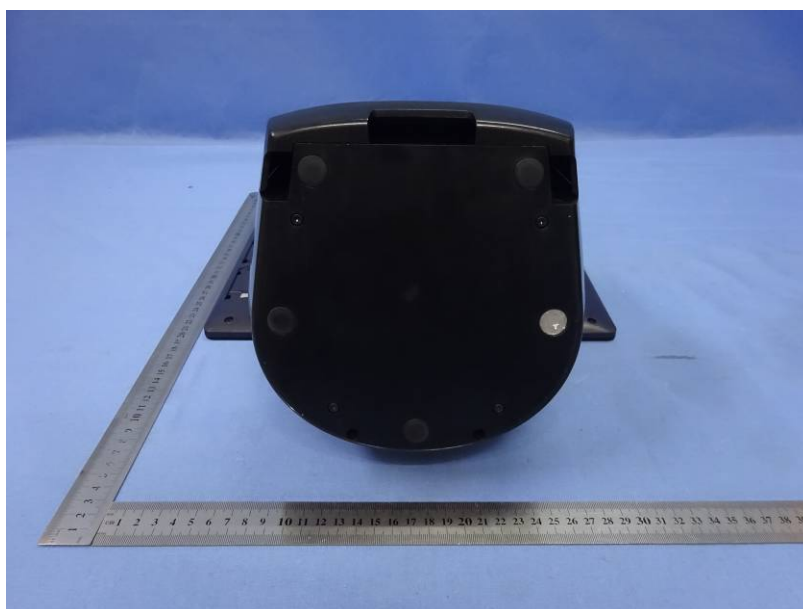
Radiated Emission



9 EUT Constructional Details

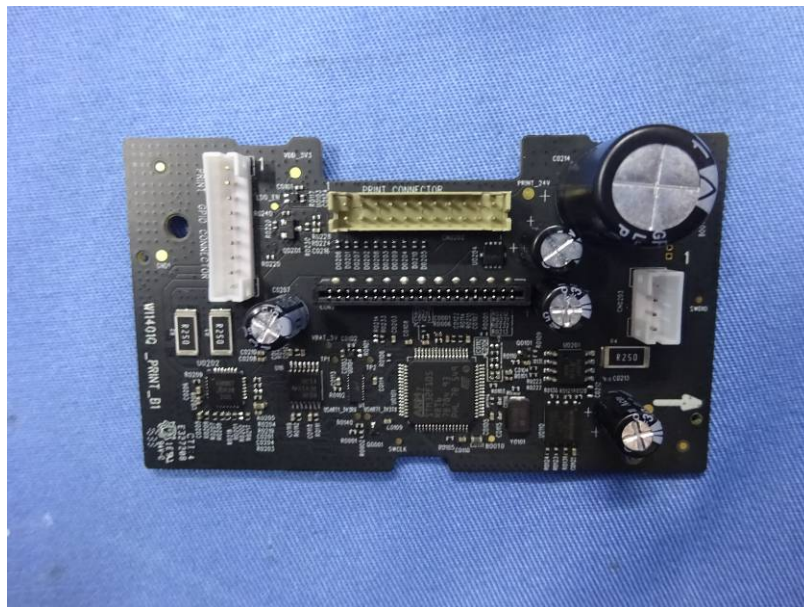
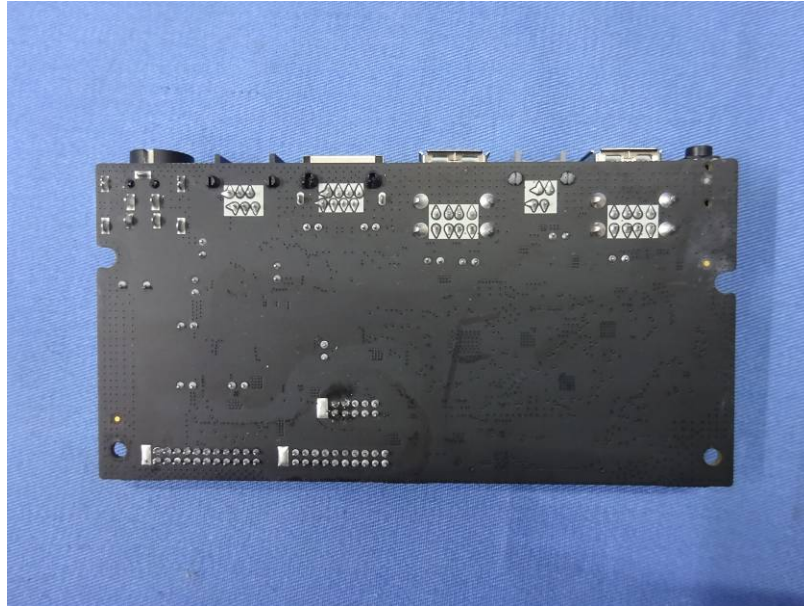


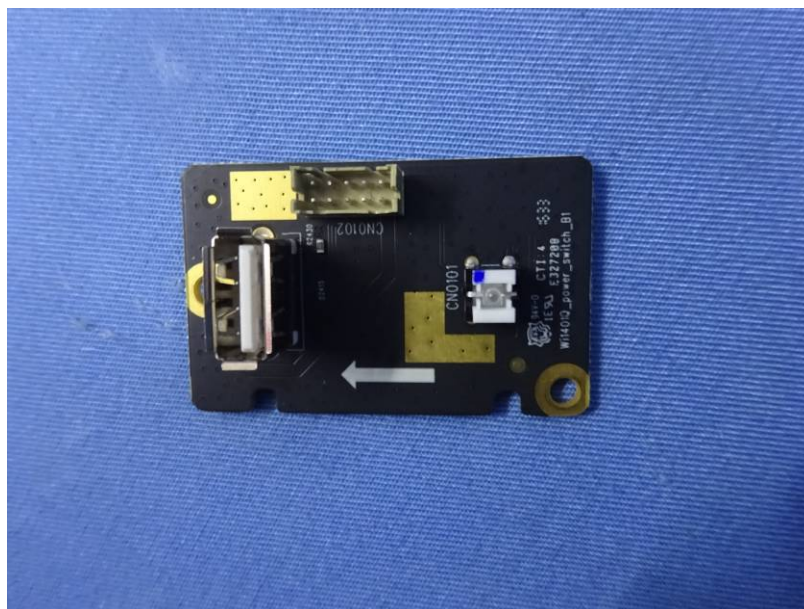
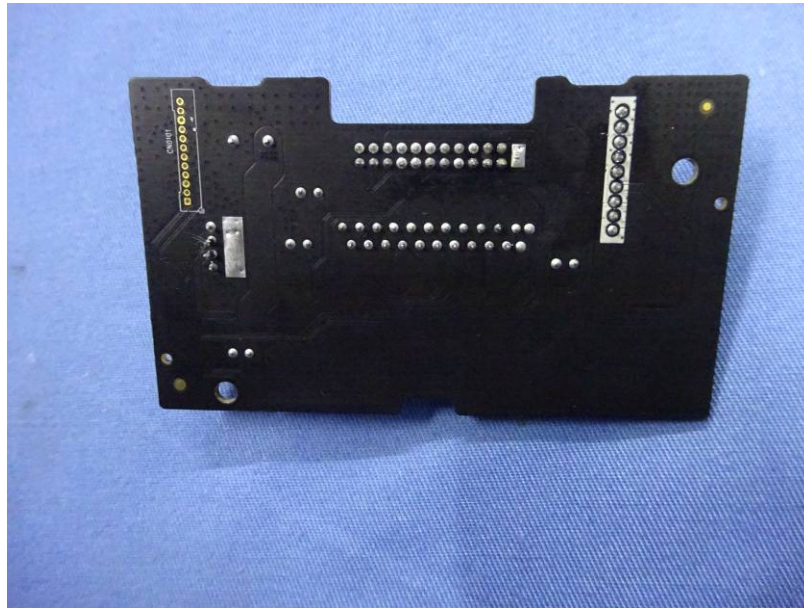


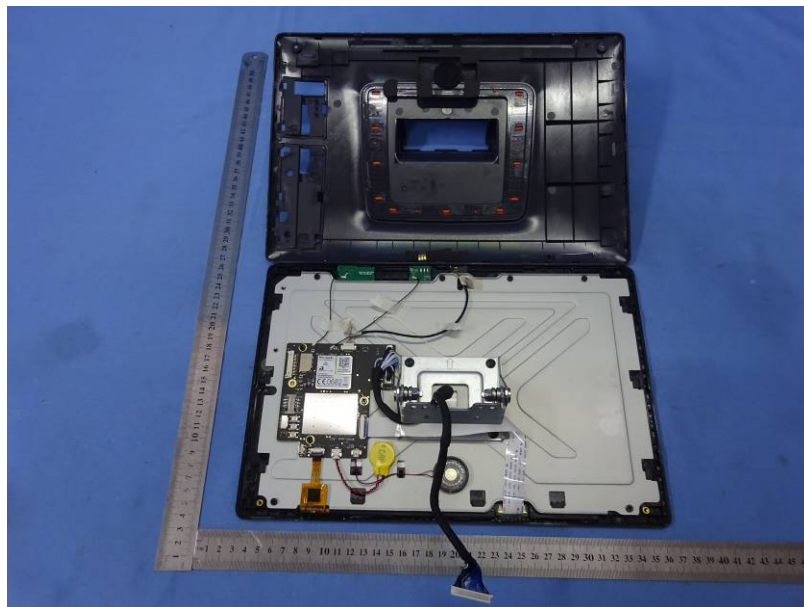
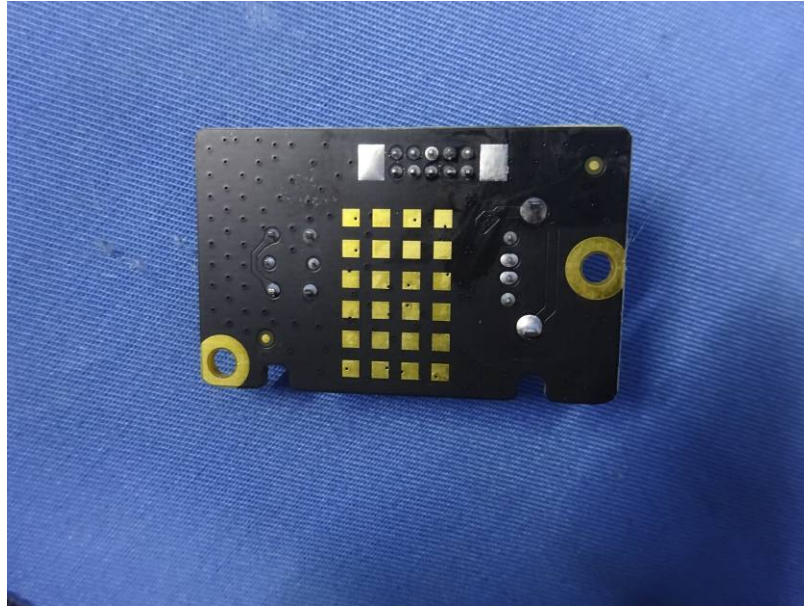


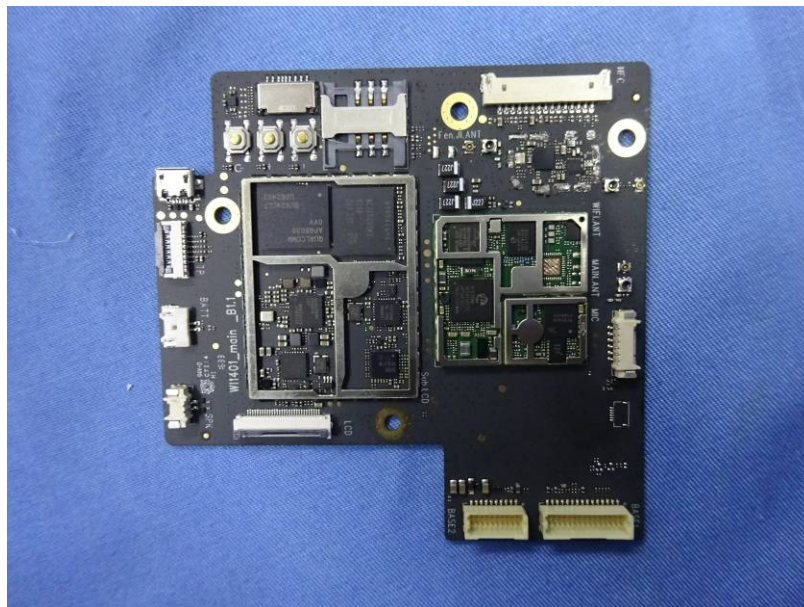


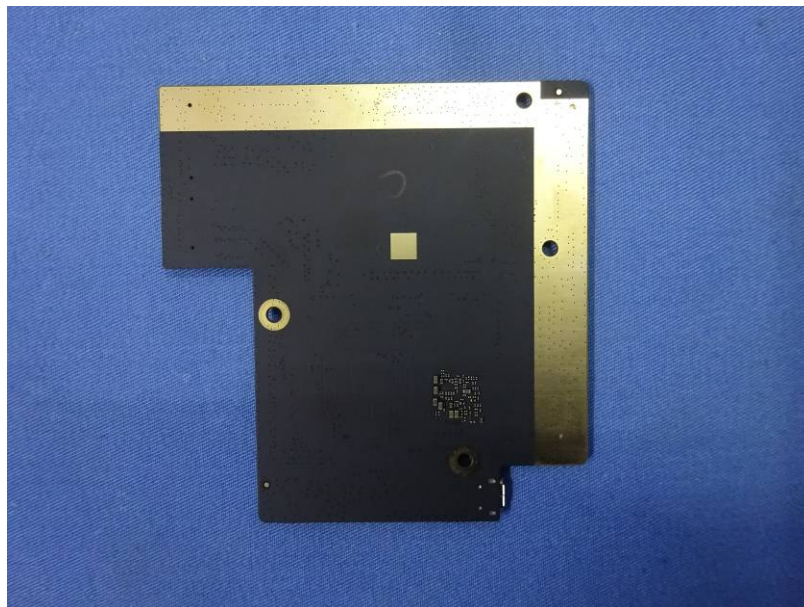
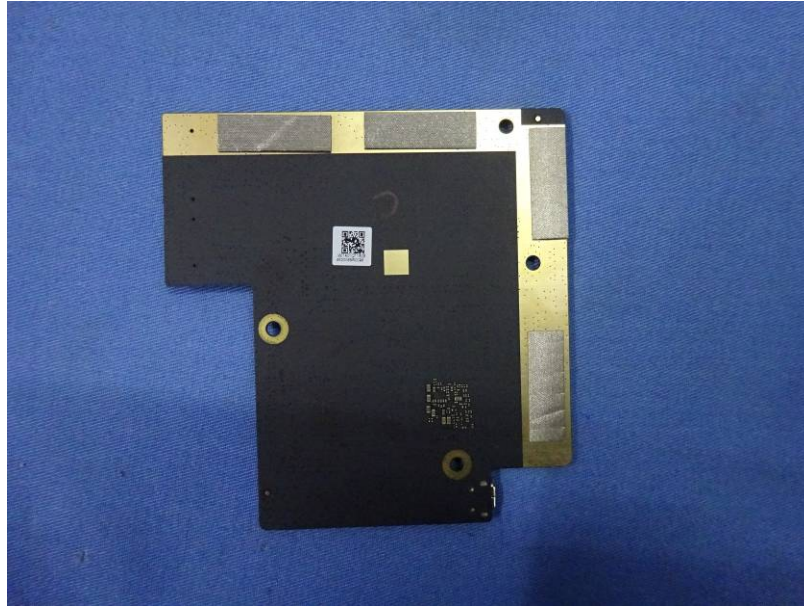


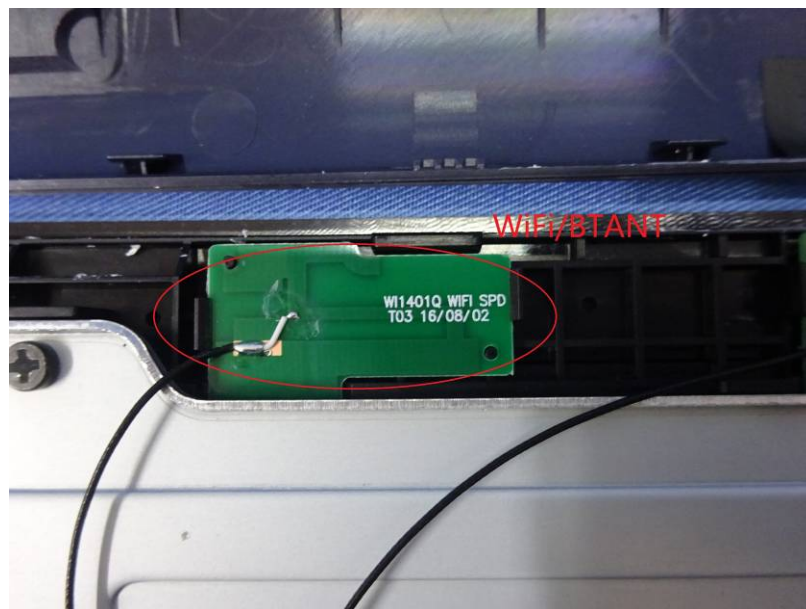














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