TEST REPORT

Report Number: C21T00125-SRD05-V00

Applicant	Shanghai Sunmi Technology Co.,Ltd.
Product Name	Wireless data POS System
Model Name	T5930
Brand Name	SUNMI
FCC ID	2AH25T5930

Industrial Internet Innovation Center (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in FCC Part15, ANSI C63.10, KDB 789033, KDB 905462.

Prepared by	范宇航	Reviewed by	王长青
Approved by		Issue Date	2022-01-17

Industrial Internet Innovation Center (Shanghai) Co., Ltd.

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10. The measurement uncertainty is not taken into account when deciding conformity, and the results of measurement (or the average of measurement results) are directly used as the criterion for the stating conformity.

Test Laboratory:
Industrial Internet Innovation Center (Shanghai) Co., Ltd.
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Tel: +86 21 6886880

Revision Version

Report Number	Revision	Date	Memo
C21T00125-SRD05-V00	00	2022-01-17	Initial creation of test report

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1. Test Laboratory

1.1. Testing Location

Company Name	Industrial Internet Innovation Center (Shanghai) Co., Ltd.
Address	Building 4, No. 766 Jingang Rd, Pudong, Shanghai, China
FCC Registration No.	CN1177

1.2. Testing Environment

Normal Temperature	15℃~35℃
Relative Humidity	30%RH~60%RH
Supply Voltage	120V/60Hz

1.3. Project Information

Project Leader	Wang Wenwen
Testing Start Date	2021-10-22
Testing End Date	2022-01-17

2. Client Information

2.1. Applicant Information

Company Name	Shanghai Sunmi Technology Co.,Ltd.
Address	Room 505, KIC Plaza, No.388 Song Hu Road, Yang Pu District, Shanghai, China
Telephone	+86 18501703215

2.2. Manufacturer Information

Company Name	Shanghai Sunmi Technology Co.,Ltd.
Address	Room 505, KIC Plaza, No.388 Song Hu Road, Yang Pu District, Shanghai, China
Telephone	+86 18501703215

3. Equipment under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

Product Name	Wireless data POS System
Model name	T5930
Supported Radio Technology and Bands	GSM850/GSM900/GSM1800/GSM1900 WCDMA Band I/II/IV/V LTE Band FDD2/3/4/7/17/28 BT4.0, BLE WLAN 802.11b,g,n WLAN 802.11a,n GPS/GLONASS
Hardware Version	V3
Software Version	ZAP1522_769_DEV_dailybuild_20181205071714_userdebug_DCC
WLAN Frequency	UNII 3: 5725MHz-5850MHz
WLAN type of modulation	OFDM
FCC ID	2AH25T5930
Extreme Temperature	-15℃~55℃
Nominal Voltage	7.60V
Extreme High Voltage	8.70V
Extreme Low Voltage	6.80V

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version	Date of Receipt
N01	N/A	V3	ZAP1522_769_DEV_dailybuild_20181205071714_userdebug_DCC	2021-10-22

*EUT ID: is internally used to identify the test sample in the lab.

3.3. Internal Identification of AE used during the test

AE ID*	Description	Model	SN/Remark
AE1	RF cable	N/A	N/A

*AE ID: is internally used to identify the test sample in the lab.

4. Reference Documents

4.1. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part15	Title 47 of the Code of Federal Regulations; Chapter I Part 15 - Radio frequency devices	2020
ANSI 63.10	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2013
KDB 789033	Information Infrastructure (U-NII) Devices - Part 15, Subpart E	2017
KDB 905462 D02	COMPLIANCE MEASUREMENT PROCEDURES FOR UNLICENSED-NATIONAL INFORMATION INFRASTRUCTURE DEVICES OPERATING IN THE 5250-5350 MHz AND 5470-5725 MHz BANDS INCORPORATING DYNAMIC FREQUENCY SELECTION	2016

4.2. Reference Information from client

Information of the test sample provided by the client.

5. Test Summary

5.1. Summary of Test Results

Measurement Items	Sub-clause of Part15	Verdict
Maximum Output Power	15.407(a)	N/A
Power Spectral Density	15.407(a)	N/A
6dB Occupied Bandwidth	15.407(e)	N/A
99% Occupied Bandwidth	N/A	N/A
Band edge compliance	15.407(b)	Pass
Transmitter Spurious Emission-Conducted	15.407	N/A
Transmitter Spurious Emission - Radiated	15.407,15.205,15.209	Pass

Note:All the test data for each data were verified, but only the worst case was reported.

Test Conditions

Tnom	Normal Temperature
Tmin	Low Temperature
Tmax	High Temperature
Vnom	Normal Voltage
Vmin	Low Voltage
Vmax	High Voltage
Hnom	Norm Humidity
Anom	Norm Air Pressure

For this report, all the test case listed above are tested under Normal Temperature and Normal Voltage, and also under norm humidity, the specific conditions as following:

Temperature	Tnom	25℃
Voltage	Vnom	7.60 V
Humidity	Hnom	48%
Air Pressure	Anom	1010hPa

5.2. Statements

The T5930, manufactured by Shanghai Sunmi Technology Co., Ltd. is a variant product for testing.

This project is a variant project based on the original report C21T00009-SRD05-V01, We tested the worst case radiation data, and the test data of the worst mode was recorded in the report. The rest of the data are reference prototype report data.

Industrial Internet Innovation Center (Shanghai) Co., Ltd. only performed test cases which identified with Pass/Fail/Inc result in section 5.1.

Industrial Internet Innovation Center (Shanghai) Co., Ltd. has verified that the compliance of the tested device specified in section 3 of this test report is successfully evaluated according to the procedure and test methods as defined in type certification requirement listed in section 4 of this test report.

6. Measurement Results

Control room did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 35 ℃
Relative humidity	Min. =30 %, Max. = 60 %
Shielding effectiveness	> 100 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω

Fully-anechoic chamber1 (6.9 meters×10.9 meters×5.4 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 35 ℃
Relative humidity	Min. = 25 %, Max. = 75 %
Shielding effectiveness	> 100 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω
VSWR	Between 0 and 6 dB, from 1GHz to 18GHz
Site Attenuation Deviation	Between -4 and 4 dB,30MHz to 1GHz
Uniformity of field strength	Between 0 and 6 dB, from 80MHz to 3000 MHz

6.1. Transmitter Spurious Emission

Measurement Limit:

Standard	Frequency (MHz)	Limit (dBm/MHz)
FCC 47 CFR Part 15.407	5725MHz~5850MHz	< -27

The measurement is made according to ANSI C63.10.

In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

Frequency of emission (MHz)	Field strength(uV/m)	Field strength(dBuV/m)
0.009-0.490	2400/F(kHz)	/
0.490-1.705	24000/F(kHz)	/
1.705-30	30	/
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

6.1.1 Transmitter Spurious Emission - Radiated

Modulation type and data rate tested (Only worst case result is given below):

Mode	Data rate	Channel
802.11n-HT40	MCS0	159(5795MHz)

A “reference path loss” is established and A_{Rpi} is the attenuation of “reference path loss”, and including the gain of receive antenna, the gain of the preamplifier, the cable loss.

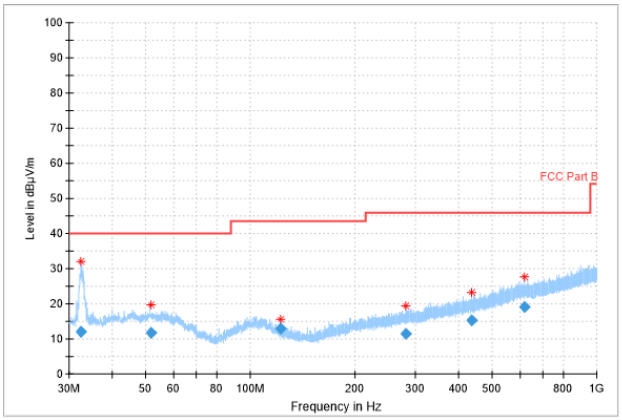
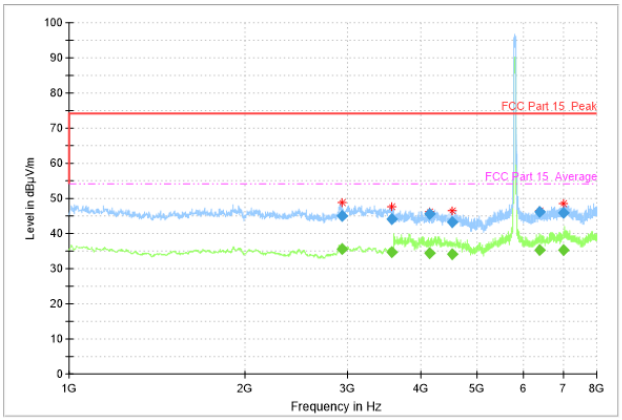
The measurement results are obtained as described below:

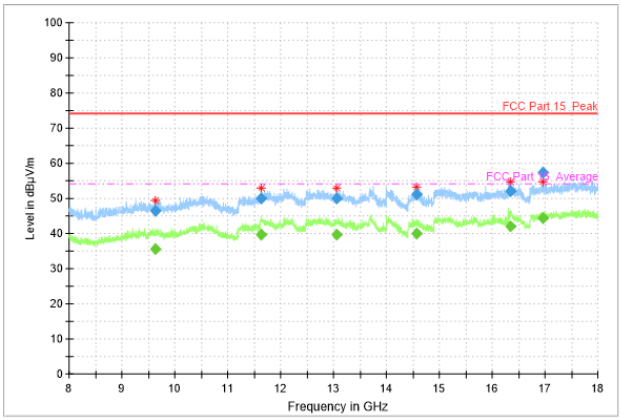
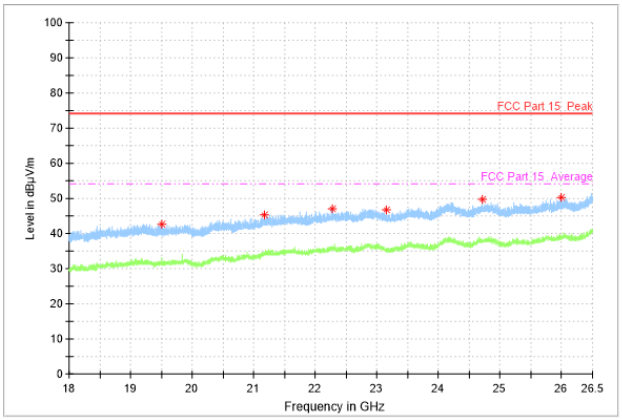
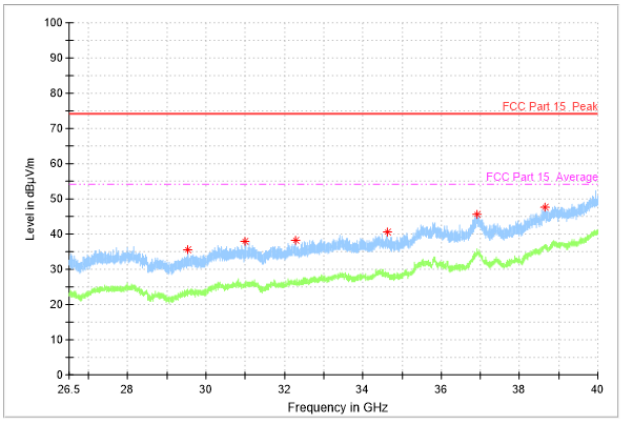
A_{Rpi} = Cable loss + Antenna Factor-Preamplifier gain

Result=P_{Mea} + A_{Rpi}

Tests results:

Mainly Supply

Radiated Spurious Emission (802.11n-HT40, ch159, 30 MHz-1 GHz)	Radiated Spurious Emission (802.11n-HT40, ch159, 1GHz-8GHz)
	

Radiated Spurious Emission (802.11n-HT40, ch159, 8GHz-18GHz)	Radiated Spurious Emission (802.11n-HT40, ch159, 18GHz-26.5GHz)
	
Radiated Spurious Emission (802.11n-HT40, ch159, 26.5GHz-40GHz)	/
	/

RSE-11N(40M)-CH159-30M-1G

Frequency (MHz)	Result (dBµV/m)	ARpl (dB)	PMea (dBµV/m)	Polarity
32.6	11.94	-14.2	26.14	V
51.6	11.73	-12	23.73	H
122.7	12.82	-15.3	28.12	V
280.3	11.55	-10.9	22.45	V
436.8	15.3	-7.7	23	V
618.6	19.22	-3	22.22	H

RSE-11N(40M)-CH159-1G-8G

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
2931.2	45.07	1.7	43.37	V
3563.4	44.18	1.1	43.08	V
4139.8	45.52	1.2	44.32	V
4526.0	43.32	1.3	42.02	V
6386.2	46.08	2.8	43.28	V
7006.8	45.98	4.2	41.78	V

RSE-11N(40M)-CH159-8G-18G

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
9624.6	46.61	5.8	40.81	V
11628.6	50.11	9.8	40.31	V
13056.8	49.88	10.7	39.18	V
14572.6	51.19	12.6	38.59	V
16343.8	51.97	16.3	35.67	V
16951.4	57.36	17.4	39.96	V

RSE-11N(40M)-CH159-8G-18G (Average)

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
16951.4	44.33	17.4	26.93	V

RSE-11N(40M)-CH159-18G-26.5G

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
19515.6	42.68	-4.9	47.58	V
21172.2	45.34	-3.1	48.44	H
22276.4	47.01	-1.8	48.81	H
23154.4	46.81	-1.6	48.41	H
24705.6	49.67	0.4	49.27	V
25998.5	50.2	-0.9	51.1	H

RSE-11N(40M)-CH159-26.5G-40G

Frequency (MHz)	Result (dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Polarity
29538.8	35.44	0	35.44	H
30990.1	38.05	1.6	36.45	H
32280.7	38.23	2.7	35.53	H
34628.4	40.7	4.5	36.2	V
36919.3	45.47	8.4	37.07	V
38640.6	47.53	10.6	36.93	H

6.2. Band Edges Compliance

Band Edges - Radiated

Measurement Limit:

(1) All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

(2) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(3) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(4) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(5) In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
[1]0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	([2])
13.36-13.41			

Set the spectrum analyzer in the following:

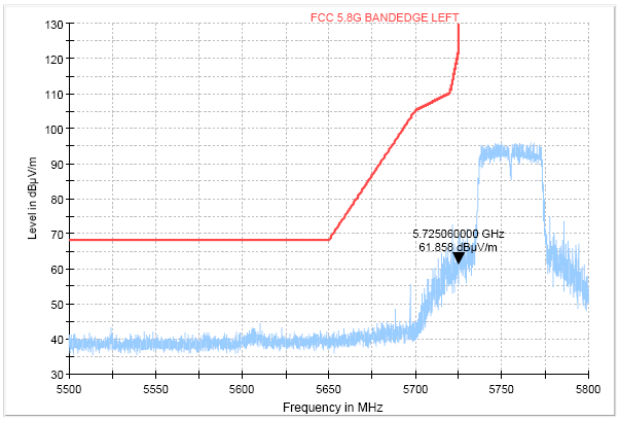
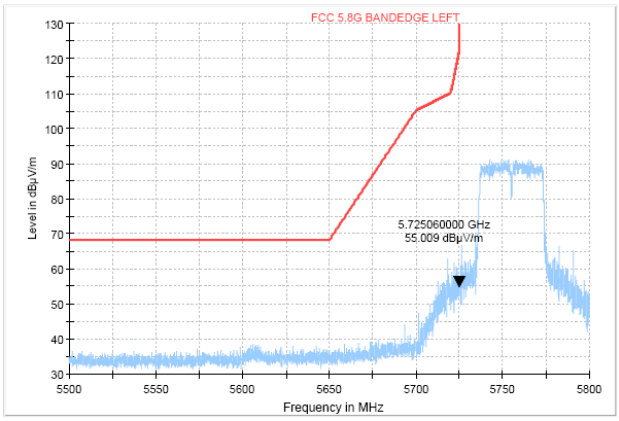
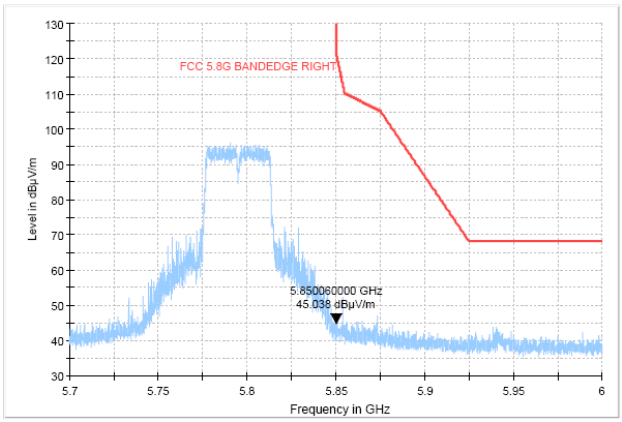
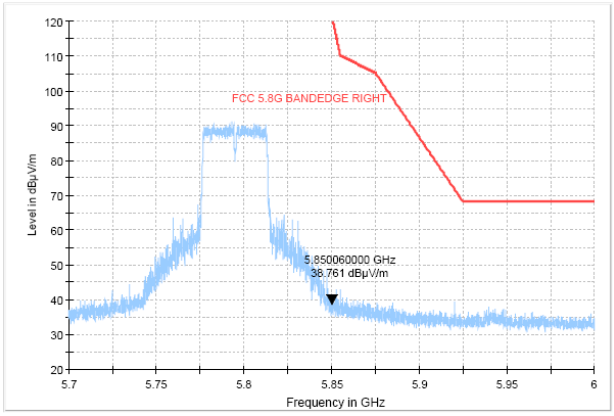
(a) Sweep mode: SweepAnalyzer6db.

(b) PEAK: RBW=1MHz / VBW=3MHz / Sweep=2.5ms，Sweep point;5001

(c) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=2.5ms，Sweep point;5001

Measurement Result:

Mainly Supply

Band Edges (802.11n-HT40, 5755MHz)	
Peak detector	AV detector
	
Band Edges (802.11n-HT40, 5795MHz)	
Peak detector	AV detector
	

7. Test Equipment List

7.1. Radiated Emission Test System

Item	Equipment Name	Type	Serial Number	Manufacturer	Cal. Date	Cal. interval
1	Universal Radio Communication Tester	CMU200	123123	R&S	2021-05-10	1 year
2	EMI Test Receiver	ESU40	100307	R&S	2021-05-10	1 year
3	TRILOG Broadband Antenna	VULB9163	VULB9163-515	Schwarzbeck	2020-02-28	2 years
4	Double- ridged Waveguide Antenna	ETS-3117	00135890	ETS	2020-02-28	2 years
5	2-Line V-Network	ENV216	101380	R&S	2021-05-10	1 year
6	EMI Test Software	EMC32 V 9.15.00	N/A	R&S	N/A	N/A

Anechoic chamber

Fully anechoic chamber by ETS.

Annex A: Measurement Uncertainty

Measurement uncertainty for all the testing in this report are within the limit specified in 3IN documents .
The detailed measurement uncertainty is defined in 3IN documents.

Measurement Items	Range	Confidence Level	Calculated Uncertainty
Transmitter Spurious Emission-Radiated	9KHz-30MHz	95%	5.66dB
Transmitter Spurious Emission-Radiated	30MHz-1000MHz	95%	4.98dB
Transmitter Spurious Emission-Radiated	1000MHz -18000MHz	95%	5.06dB
Transmitter Spurious Emission-Radiated	18000MHz -40000MHz	95%	5.20dB

Annex B: Accreditation Certificate

Accredited Laboratory

A2LA has accredited

INDUSTRIAL INTERNET INNOVATION CENTER (SHANGHAI) CO., LTD.

Shanghai, People's Republic of China

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated April 2017*).

Presented this 12th day of April 2021.

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 3682.01
Valid to February 28, 2023

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.

**********END OF REPORT**********