



TEST REPORT

Report Number: C21T00009-SRD01-V01

Applicant	Shanghai Sunmi Technology Co.,Ltd.
Product Name	Wireless data POS System
Model Name	T5930
Brand Name	SUNMI
FCC ID	2AH25V2

Industrial Internet Innovation Center (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in FCC Part15, ANSI C63.10, KDB 558074.

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Issue Date

2021-04-14

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



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11. Report No.: C21T00009-SRD01-V01 is the replacement of Report No.: C21T00009-SRD01-V00, and the previous Report No.: C21T00009-SRD01-V00 has been invalid.

Test Laboratory:

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

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Revision Version

Report Number	Revision	Date	Memo
C21T00009-SRD01-V00	00	2021-04-06	Initial creation of test report
C21T00009-SRD01-V01	01	2021-04-14	The contents, statements and summary have been modified



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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°C~35°C
Relative Humidity	30%RH~60%RH
Supply Voltage	120V/60Hz

1.3. Project Information

Project Leader	Lu Fang
Testing Start Date	2021-03-09
Testing End Date	2021-03-29



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 18721763396

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 18721763396

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 2/3/4/7/17/28 BT4.0,BLE WLAN 802.11b/g/n WLAN 802.11a/n GPS L1
Hardware Version	V3
Software Version	ZAP1522_769_DEV_dailybuild_20181205071714_userdebug_DCC
BT Frequency	2402MHz-2480MHz
BT Channel	Ch0-78
BT type of modulation	GFSK/π/4 DQPSK/8DPSK
FCC ID	2AH25V2
Extreme Temperature	-15°C~55°C
Nominal Voltage	7.60 V
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
N08(Main supply)	861741048621921	V3	ZAP1522_769_DEV_dailybuild_20181205071714_userdebug_DCC	2020-01-29
N05(Secondary supply)	861741048621863	V3	ZAP1522_769_DEV_dailybuild_20181205071714_userdebug_DCC	2020-01-29

*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	---	AE1

*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	FCC CFR 47, Part 15, Subpart C: 15.205 Restricted bands of operation; 15.209 Radiated emission limits, general requirements; 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz.	2018-10-01
ANSI C63.10	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices	2013
KDB 558074	Guidance for Performing Compliance Measurements on Frequency Hopping Spread Spectrum systems (DSS) Operating Under §15.247	v05r02

4.2. Reference Information from client

Antenna gain Information of the test sample provided by Shanghai Sunmi Technology Co., Ltd.

Maximum of Antenna Gain: 0.41 dBi

5. Test Summary

5.1. Summary of Test Results

Measurement Items	Sub-clause of Part15C	Verdict
Maximum Peak Output Power	15.247(b)	Pass
20dB Occupied Bandwidth	15.247(a)	Pass
Band Edges Compliance	15.247(b)	Pass
Time Of Occupancy (Dwell Time)	15.247(a)	Pass
Carrier Frequency Separation	15.247(a)	Pass
Number Of Hopping Channels	15.247(a)	Pass
Transmitter Spurious Emission-Conducted	15.247	Pass
Transmitter Spurious Emission-Radiated	15.209/15.247	Pass
AC Powerline Conducted Emission	15.107/15.207	Pass

Note: please refer to Annex A in this test report for the detailed test results.

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°C
Voltage	Vnom	7.60 V
Humidity	Hnom	48%
Air Pressure	Anom	1010hPa

Note:

- All the test data for each data were verified, but only the worst case was reported.
- The GFSK, $\pi/4$ DQPSK and 8DPSK were set in DH1 for GFSK, 2-DH1 for $\pi/4$ DQPSK, 3-DH1 for 8DPSK.
- The DC and low frequency voltages' measurement uncertainty is $\pm 2\%$.



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 I18D00236-SRD01, 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 °C, Max. = 35 °C
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 °C, Max. = 35 °C
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. Radiated Emission

6.1.1 Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247, 15.205, 15.209	20dB below peak output power

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)).

Limit in restricted band:

Frequency of emission	Field strength (uV/m)	Field strength (dBuV/m)
30~88	100	40
88~216	150	43.5
216~960	200	46
Above 960	500	54

6.1.2 Test Method

Portable, small, lightweight, or modular devices that may be handheld, worn on the body, or placed on a table during operation shall be positioned on a non-conducting platform, the top of which is 80 cm above the reference ground plane. The preferred area occupied by the EUT arrangement is 1 m by 1.5 m. For emissions testing at or below 1 GHz, the table height shall be 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height shall be 1.5 m. but it may be larger or smaller to accommodate various sized EUTs. For testing purposes, ceiling- and wall-mounted devices also shall be positioned on a tabletop (see also ANSI C63.10-2013 section 6.3.4 and 6.3.5). In making any tests involving handheld, body-worn, or ceiling-mounted equipment, it is essential to recognize that the measured levels may be dependent on the orientation (attitude) of the three orthogonal axes of the EUT. Thus, exploratory tests as specified in 8.3.1 shall be carried out for various axes orientations to determine the attitude having maximum or near-maximum emission level.

The EUT was placed on a non-conductive table. The measurement antenna was placed at a distance of 3 meters from the EUT. 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.

Frequency of emission	RBW/VBW	Sweep Time (s)
30~1000	100KHz/300KHz	5
1000~4000	1MHz/3MHz	15
4000~18000	1MHz/3MHz	40
18000~26500	1MHz/3MHz	20

6.1.3 Measurement Results:

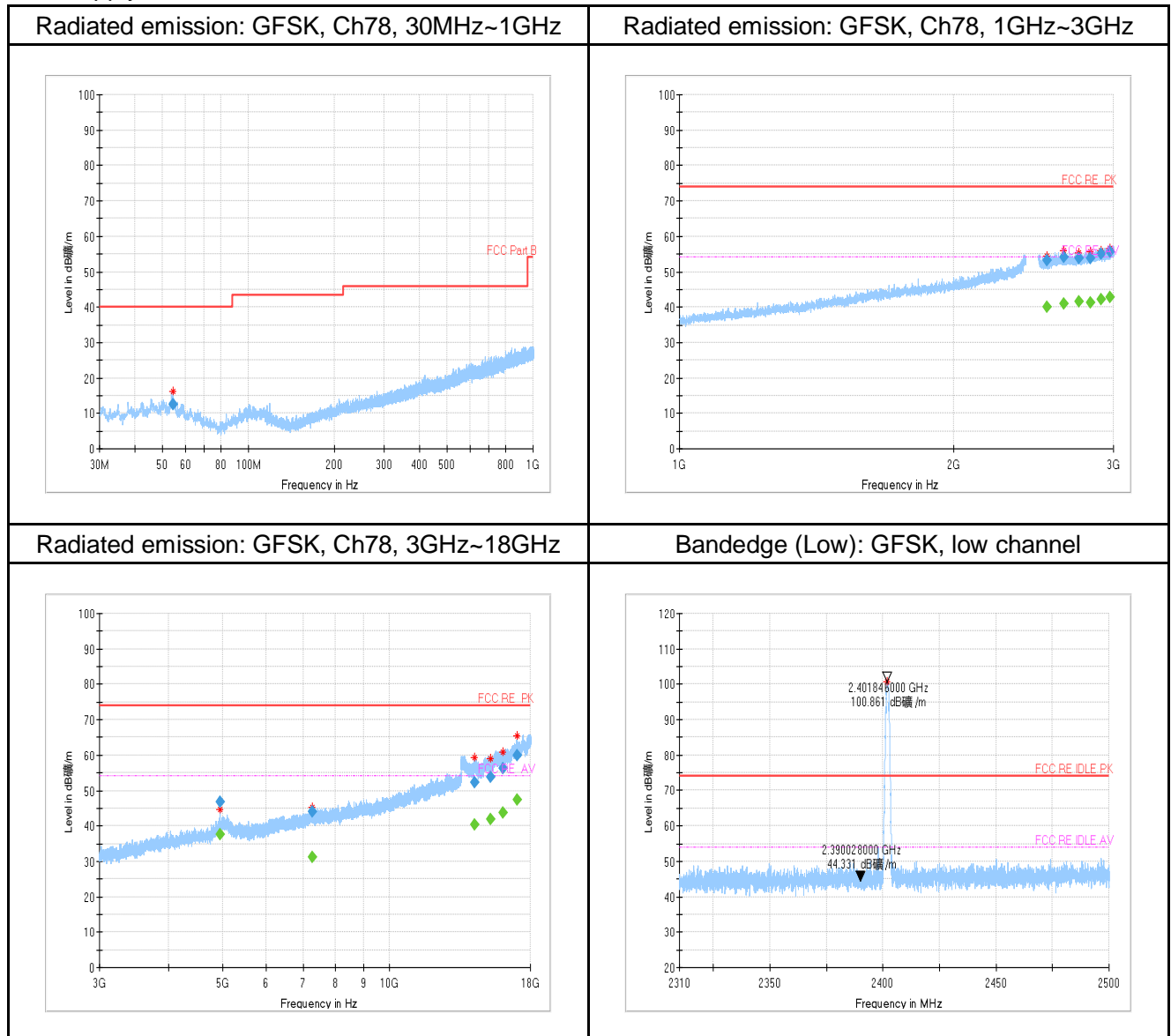
A “reference path loss” is established and A_{Rpi} is the attenuation of “reference path loss”, and including the gain of receive antenna, the gain of the preamplifier, the cable loss.

The measurement results are obtained as described below:

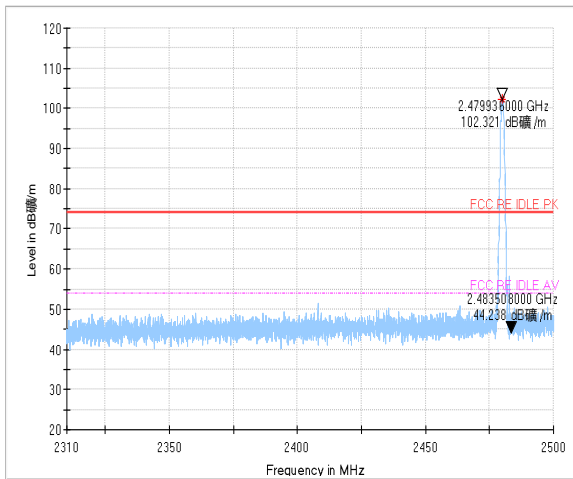
$$A_{Rpi} = \text{Cable loss} + \text{Antenna Gain} - \text{Preamplifier gain}$$

$$\text{Result} = P_{\text{Mea}} + A_{Rpi}$$

Main supply:



Bandedge (High): GFSK, high channel

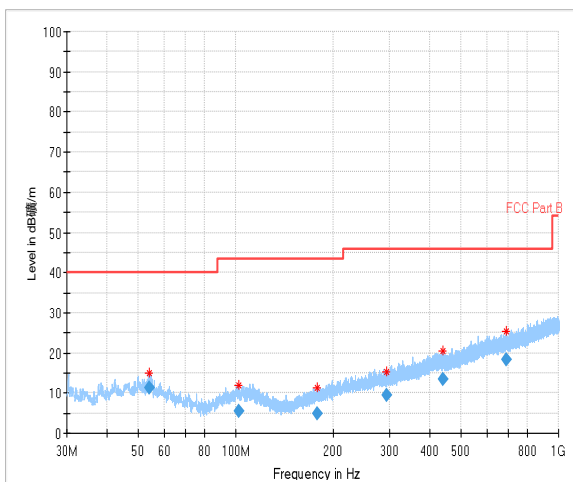


/

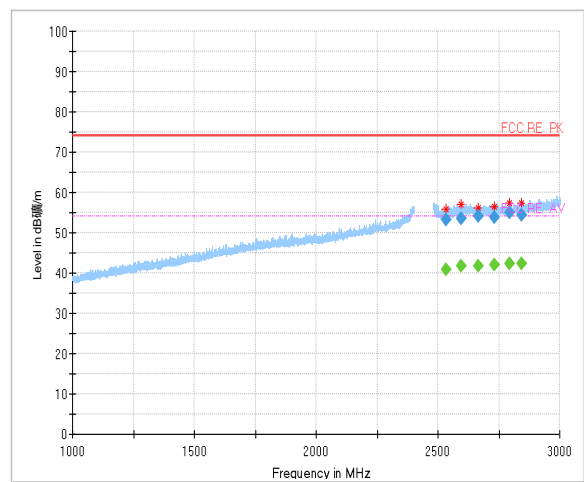
/

Secondary supply:

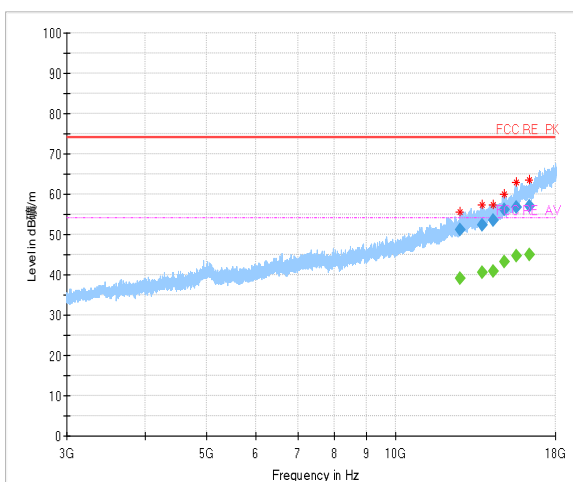
Radiated emission: GFSK, Ch78, 30MHz~1GHz



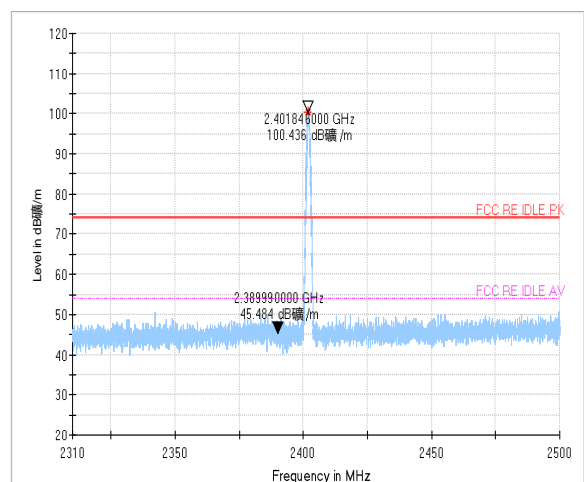
Radiated emission: GFSK, Ch78, 1GHz~3GHz

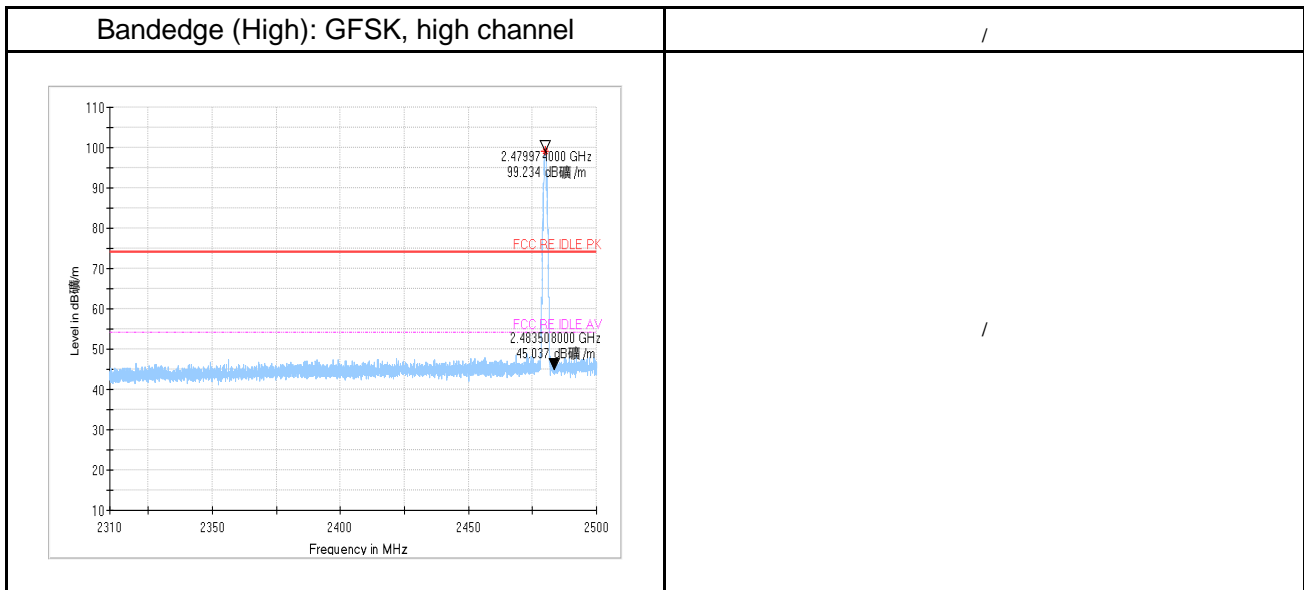


Radiated emission: GFSK, Ch78, 3GHz~18GHz



Bandedge (Low): GFSK, low channel





Main supply:

GFSK Ch0 30MHz-1GHz

Frequency(MHz)	Result(dBuV/m)	ARpl(dB)	PMea(dBuV/m)	Polarity
54.3	9.83	-15.8	25.63	V

GFSK Ch0 1GHz-3GHz (Peak)

Frequency(MHz)	Result(dBuV/m)	ARpl(dB)	PMea(dBuV/m)	Polarity
2548.5	53.82	16.5	37.32	H
2644.4	54.48	17.3	37.18	V
2731.2	54.15	17.4	36.75	H
2803.9	54.98	17.6	37.38	V
2881.2	54.63	18.2	36.43	H
2971.4	55.83	18.9	36.93	V

GFSK Ch0 1GHz-3GHz (Average)

Frequency(MHz)	Result(dBuV/m)	ARpl(dB)	PMea(dBuV/m)	Polarity
2644.4	41.08	17.3	23.78	V
2731.2	41.2	17.4	23.8	H
2803.9	41.5	17.6	23.9	V
2881.2	41.96	18.2	23.76	H
2971.4	42.64	18.9	23.74	V

GFSK Ch0 3GHz-18GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
4804.3	44.74	1.3	43.44	H
7206.1	49.89	6.1	43.79	H



14919.6	54.45	22.2	32.25	H
15644.0	55.68	24.1	31.58	V
16365.1	55.71	25.4	30.31	H
17002.4	59.72	28.3	31.42	H

GFSK Ch0 3GHz-18GHz (Average)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
14919.6	42.1	22.2	19.9	H
15644.0	43.64	24.1	19.54	V
16365.1	43.44	25.4	18.04	H
17002.4	47.54	28.3	19.24	H

Secondary supply:

GFSK Ch0 30MHz-1GHz

Frequency(MHz)	Result(dBuV/m)	ARpl(dB)	PMea(dBuV/m)	Polarity
54.4	11.81	-15.8	27.61	V
112.7	5.36	-16.6	21.96	V
209.1	7.04	-15	22.04	H
348.0	10.85	-11.1	21.95	V
520.4	15.22	-7.1	22.32	V
757.3	19.34	-2.5	21.84	H

GFSK Ch0 1GHz-3GHz

Frequency(MHz)	Result(dBuV/m)	ARpl(dB)	PMea(dBuV/m)	Polarity
2580.2	53.94	17	36.94	H
2693.1	54.02	17.3	36.72	V
2772.1	54.38	17.5	36.88	V
2820.8	54.09	17.7	36.39	V
2872.7	53.93	18.1	35.83	V
2927.1	54.32	18.5	35.82	H

GFSK Ch0 1GHz-3GHz (Average)

Frequency(MHz)	Result(dBuV/m)	ARpl(dB)	PMea(dBuV/m)	Polarity
2693.1	41.24	17.3	23.94	V
2772.1	41.35	17.5	23.85	V
2820.8	41.45	17.7	23.75	V
2927.1	42.07	18.5	23.57	H



GFSK Ch0 3GHz-18GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
4803.6	43.73	1.3	42.43	V
7206.1	47.7	6.1	41.6	V
14345.1	52.87	19.4	33.47	H
15933.3	56.62	25.4	31.22	V
16897.1	58.03	27.2	30.83	V
17538.0	58.07	28.6	29.47	V

GFSK Ch0 3GHz-18GHz (Average)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
15933.3	44.75	25.4	19.35	V
16897.1	45.96	27.2	18.76	V
17538.0	46.28	28.6	17.68	V

Note: Only the worst case is written in the report.

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	2020-05-10	1 year
2	EMI Test Receiver	ESU40	100307	R&S	2020-05-10	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	2020-05-10	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 laboratory also meets the requirements of any additional program requirements in the «field» field. 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 6th day of May 2019.



Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 3682.01
Valid to April 30, 2021
Revised February 17, 2021

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

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