

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

EMC TEST REPORT

PRODUCT	Wireless data POS System
BRAND	SUNMI
MODEL	T5820
APPLICANT	Shanghai Sunmi Technology Co.,Ltd.
FCC ID	2AH25T5820C
IC	22621-T5820C
ISSUE DATE	January 17, 2023
STANDARD(S)	FCC Part 15, Subpart B, ANSI C63.4-2014, ICES-003 Issue 7.

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1 Summary of Test Report

1.1 Test Standard (s)

No.	Test Standard(s)	Title	Version
1	FCC Part 15, Subpart B	Radio frequency devices	2021/10/1
2	ANSI C63.4	Method of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2014
3	ICES-003	Information Technology Equipment (Including Digital Apparatus)-Limits and Methods of Measurement	Issue 7

NOTE:

1. According to customer requirements, test and report using the latest version of the standard.

1.2 Summary of Test Results

No.	Item(s)	Standard(s)	Verdicts for Single Item	Detailed Results
1	Radiated Emission	15.109(a)	Pass	See section 6.1
2	AC Conducted Emission	15.107(a)	Pass	See section 6.2

NOTE:

The T5820, manufactured by Shanghai Sunmi Technology Co.,Ltd. is a new product for testing. Industrial Internet Innovation Center (Shanghai) Co., Ltd. only performed test cases which identified with Pass/Fail/Inc result in section 1.3.

Industrial Internet Innovation Center (Shanghai) Co., Ltd. has verified that the compliance of the tested device specified in section 4 of this test report is successfully evaluated according to the procedure and test methods as defined in type certification requirement listed in section 1 of this test report.

2 General Information of The Laboratory

2.1 Testing Laboratory

Lab Name	Industrial Internet Innovation Center (Shanghai) Co.,Ltd.
Address	Building 4, No. 766, Jingang Road, Pudong, Shanghai, China
Telephone	021-68866880
FCC Registration No.	958356
FCC Designation No.	CN1177
IC designation No.	CN0067

2.2 Laboratory Environmental Requirements

Temperature	15℃~35℃
Relative Humidity	25%RH~75%RH
Atmospheric Pressure	86kPa~106kPa
Supply Voltage	120V/60Hz

2.3 Project Information

Project Manager	Gao Hongning
Test Date	October 31, 2022 to November 24, 2022

3 General Information of The Customer

3.1 Applicant

Company	Shanghai Sunmi Technology Co.,Ltd.
Address	Room 505, No.388, Song Hu Road, Yang Pu District, Shanghai, China
Telephone	13510126210

3.2 Manufacturer

Company	Shanghai Sunmi Technology Co.,Ltd.
Address	Room 505, No.388, Song Hu Road, Yang Pu District, Shanghai, China
Telephone	13510126210

3.3 Factory

Company	N/A
Address	N/A

4 General Information of The Product

4.1 Product Description for Equipment under Test (EUT)

Product	Wireless data POS System
Model	T5820
Date of Receipt	October 24, 2022
EUT ID*	S06aa
SN/IMEI	860450060018740'860450060018757
Supported Radio Technology and Bands	GSM850/GSM900/GSM1800/GSM1900 WCDMA Band I/II/ IV/V/VIII LTE Band 1/2/3/4/5/7/12/17/28/38/41 BT 5.1 WLAN 802.11b,g,n WLAN 802.11a,n,ac NFC Wireless Charging GPS GLONASS BDS
Hardware Version	V01
Software Version	XQT530_V004_20220923
NOTE1: EUT ID is the internal identification code of the laboratory.	
NOTE2: Photographs of EUT are shown in ANNEX A of this test report.	

4.2 Description for Auxiliary Equipment (AE)

AE ID*	Description	Model	SN/Remark
CA01	Adapter	UC13US	N/A
CB01	Adapter	TPA-23A050200UU01	N/A
UA01	USB Cable	N/A	N/A
AE1	Notebook PC	DELL Latitude E6510	N/A
AE2	Desktop PC	OptiPlex 790 DT	X8RP1 A01 APCC
AE3	LAN Cable	N/A	N/A
AE4	VGA Cable	N/A	N/A
AE5	RS232 Cable	N/A	N/A
AE6	Keyboard	KB212-B	CN-0Y88XT-65890-12I-005Q-A00

AE7	Mouse	MS111-P	CN-011D3V-71581-19J-1A64
AE8	Monitor	Dell E1709Wc	N/A
AE9	Micro SD card	Kingston SDC4/4GB 77	N/A
NOTE: *AE ID is the internal identification code of the laboratory.			

5 Test Configuration Information

5.1 Laboratory Environmental Conditions

5.1.1 Permanent Facilities

Semi-anechoic chamber SAC3-1 (9 m*8m*6.2m) & SAC3-2 (9.8m*6.7m*6.7m)	
Shielding effectiveness	0.014MHz ~1MHz, >60dB; 1MHz~1000MHz, >90dB.
Electrical insulation	> 2MΩ
Ground system resistance	< 4Ω
Normalised site attenuation (NSA)	< ± 4 dB, 3m distance, from 30 to 1000 MHz
Site voltage standing-wave ratio (SVSWR)	Between 0 and 6 dB, from 1GHz to 18GHz
Uniformity of field strength	Between 0 and 6 dB, from 80 to 6000 MHz

Shielded room	
Shielding effectiveness	0.014MHz~1MHz, >60dB; 1MHz~1000MHz, >90dB.
Electrical insulation	> 2 MΩ
Ground system resistance	< 4Ω

5.2 Decision of final test mode

The EUT was tested in conjunction with the accessories in Section 4.2. We tested all of the following test modes and selected the worst mode from the test results and recorded them in the report.

The test configuration modes are as the following:

Test Item	Test setup and operating modes
Radiated emission	30MHz-18GHz frequency range: Mode 1: Rear camera+ LTE band 4 receiver mode+ CA01+ UA01 Mode 2: Rear camera + LTE band 2 receiver mode+ CB01+ UA01 Mode 3: Data Link mode+ UA01 Mode 4: GPS mode + CA01+ UA01 Mode 5: GLONASS mode + CB01+ UA01 Mode 6: Galileo mode + CA01+ UA01 Mode 7: BDS mode + CB01+ UA01 Mode 8: Print mode + CA01+ UA01
AC Conducted emission	Mode 1: Rear camera+ LTE band 4 receiver mode+ CA01+ UA01 Mode 2: Rear camera + LTE band 2 receiver mode+ CB01+ UA01 Mode 3: Data Link mode+ UA01 Mode 4: GPS mode + CA01+ UA01 Mode 5: GLONASS mode + CB01+ UA01 Mode 6: Galileo mode + CA01+ UA01 Mode 7: BDS mode + CB01+ UA01 Mode 8: Print mode + CA01+ UA01
Note: 1. All test modes are performed, only the worst cases test data are recorded in this report. 2. After laboratory verification, LTE band 2/4 is the worst mode among all receiving modes of 2G/3G/4G and is recorded in the report. 3. The worst case of radiated emission for 30MHz-1GHz is Mode 3 and for 1GHz -18GHz is Mode 3. 4. The worst case for conducted emission is mode 3.	

5.3 EUT System Operation

1. Connect the EUT with AE.
2. Setup the EUT according to the standard.
3. Start testing and monitoring the function.
4. Data Link with PC means data application transferred mode between EUT and PC.
5. EUT and GNSS simulator (SMBV100A) connection is established.
6. The EUT remains in print mode.

5.4 EUT Connection Diagram of Test System

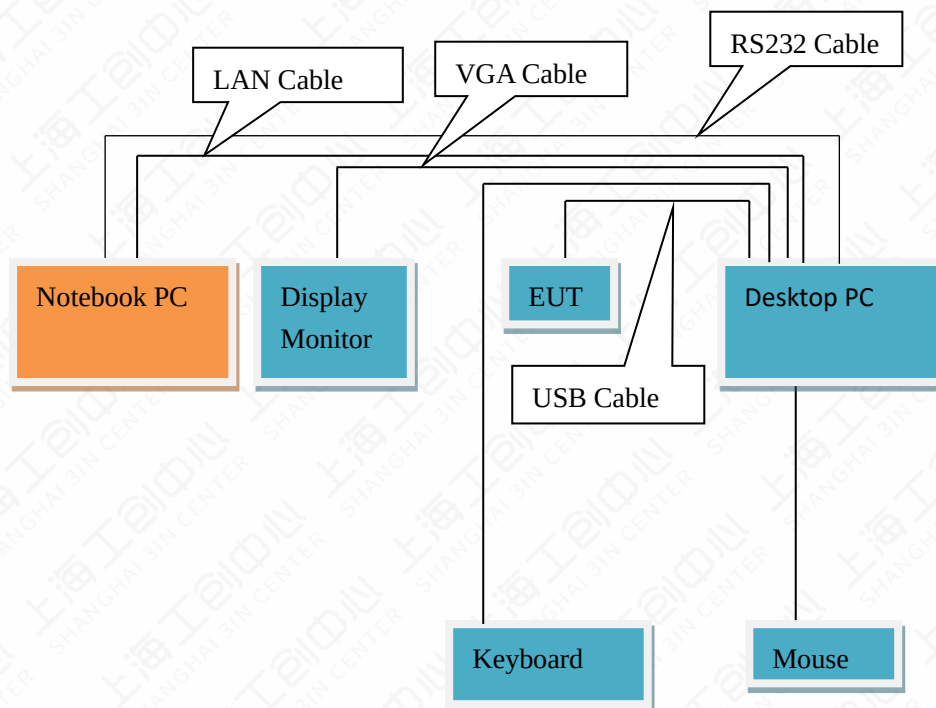


Figure 5.4-1 Mode 3

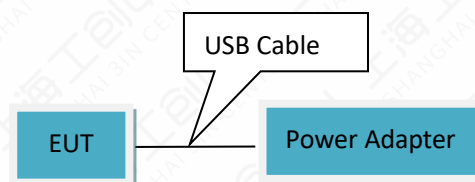


Figure 5.4-2 Mode 1~2, 4~8

5.5 Test Equipment Utilized

No.	Name	Model	S/N	Manufacturer	Cal. Date	Cal. Interval
1	Universal Radio Communication Tester	CMW500	104178	R&S	2022-10-17	1 year
2	Test Receiver	ESCI	101235	R&S	2022-02-23	1 year
3	Test Receiver	ESU40	100307	R&S	2022-02-23	1 year
4	Trilog Antenna	VULB9163	VULB9163-515	Schwarzbeck	2022-03-11	1 year
5	Double Ridged Guide Antenna	ETS-3117	00135890	ETS	2022-03-09	2 years
6	2-Line V-Network	ENV216	101380	R&S	2022-02-21	1 year
7	EMI Test Software	EMC32 V9.15	N/A	R&S	N/A	N/A
8	GNSS simulator	SMBV100A	257904	R&S	2022-02-21	1 year
9	Universal Radio Communication Tester	CMU200	123102	R&S	2022-10-17	1 year

5.6 Measurement Uncertainty

Item (s)	Uncertainty
Radiated Emission 30MHz-1000MHz	4.94 dB
Radiated Emission 1000MHz-18000MHz	5.02 dB
Conducted Emission	3.56 dB

Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

6 Test Results

6.1 Radiated Emission

6.1.1 Method of Measurement

- a. For 30MHz -1000MHz, the EUT was placed on the top of a rotating 0.8m table above the ground at a semi-anechoic chamber. The distance between the EUT and the received antenna was 3 meters. The table was rotated 360 degree and the received antenna mounted on a variable-height antenna tower was varied from 1m to 4m to find the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna were set during the measurement.
- b. For 1000MHz -18000MHz, the EUT was placed on the top of a 0.8m table above the ground at a 3m fully anechoic chamber. The maximal emission value was acquired by adjusting the antenna height, The table was rotated 360 degree to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna were set during the measurement

6.1.2 EUT Connection Diagram of Test System

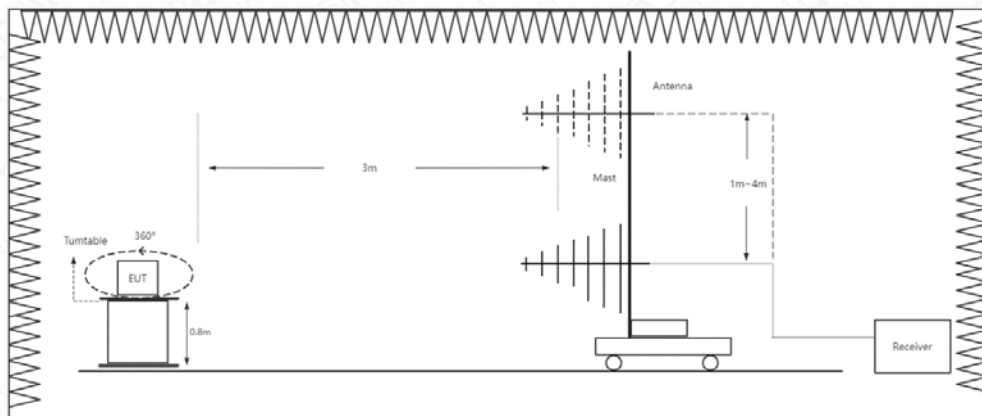


Figure 6.1.2-1 RE 30MHz-1GHz Connection Diagram

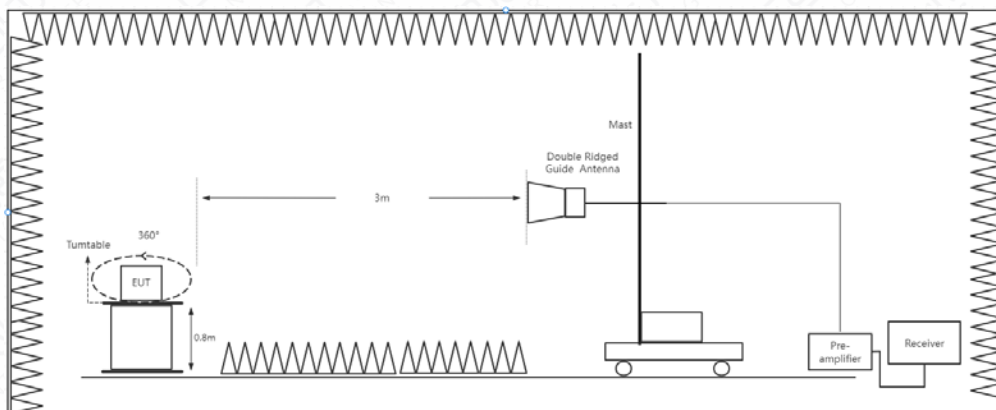


Figure 6.1.2-2 RE Above 1GHz Connection Diagram

6.1.3 Test Condition

Frequency Range (MHz)	RBW/VBW	Sweep Time (s)
30-1000	120kHz/300kHz	AUTO
1000-18000	1MHz/3MHz	AUTO

6.1.4 Limit/Criterion

Frequency Range (MHz)	Quasi-Peak (dBμV/m)	Peak (dBμV/m)	Average (dBμV/m)
30-88	40	N/A	N/A
88-216	43.5	N/A	N/A
216-960	46	N/A	N/A
Above 960	54	N/A	N/A
Above 1000	N/A	74	54

6.1.5 Test environmental conditions

Temperature	23.3℃
Relative Humidity	47.3%RH
Atmospheric Pressure	101.7 kPa

6.1.6 Test Results

Mode	Frequency (MHz)	Test Results	Verdicts
Mode 3: Data Link mode+ UA01	30-1000	See Annex A.1-1	Pass
Mode 3: Data Link mode+ UA01	1000-18000	See Annex A.1-2 &A.1-3	Pass
NOTE Abbreviations used in this clause: Pass—P; Fail—F; Not applicable—N/A			

6.2 Conducted Emission

6.2.1 Method of Measurement

The EUT was placed on a 0.8m height table with EUT being connected to the power mains through a line impedance stabilization network (LISN). Both lines of the power mains connected to the EUT were checked for maximum conducted interference. The frequency range from 150 kHz to 30 MHz was searched.

6.2.2 EUT Connection Diagram of Test System

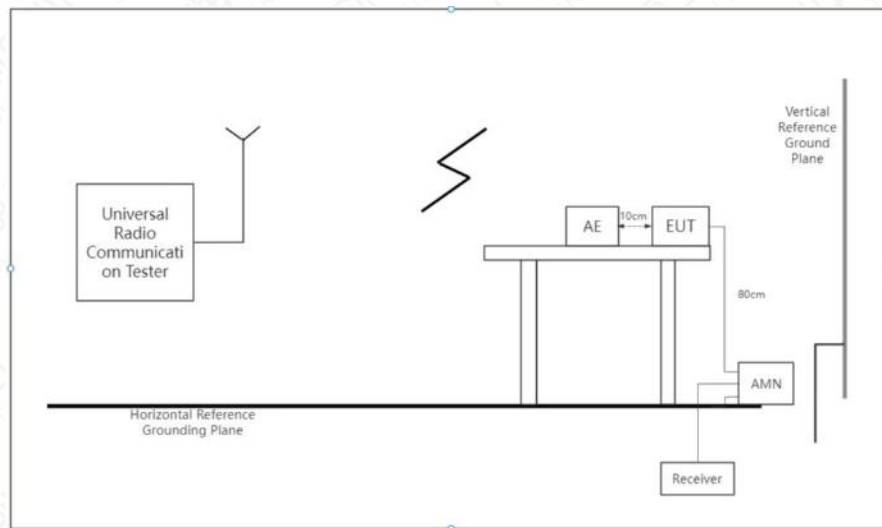


Figure 6.2.2-1 CE Connection Diagram

6.2.3 Test Condition

Test Condition in Charging Mode

Voltage (V)	Frequency (Hz)	RBW	Sweep Time (s)
120	60	9 kHz	AUTO

6.2.4 Limit

Frequency Range (MHz)	Conducted Limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50
*Decreases with the logarithm of the frequency		

6.2.5 Testing environmental conditions

Temperature	23.2°C
Relative Humidity	44.9%RH
Atmospheric Pressure	101.2 kPa

6.2.6 Test Results

Mode	Frequency (MHz)	Test Results	Verdicts
Mode 3: Data Link mode+ UA01	0.15-30	See Annex A.2-1	Pass
NOTE Abbreviations used in this clause: Pass—P; Fail—F; Not applicable—N/A			

Annex A: Measurement Data

A.1 Radiated Emission

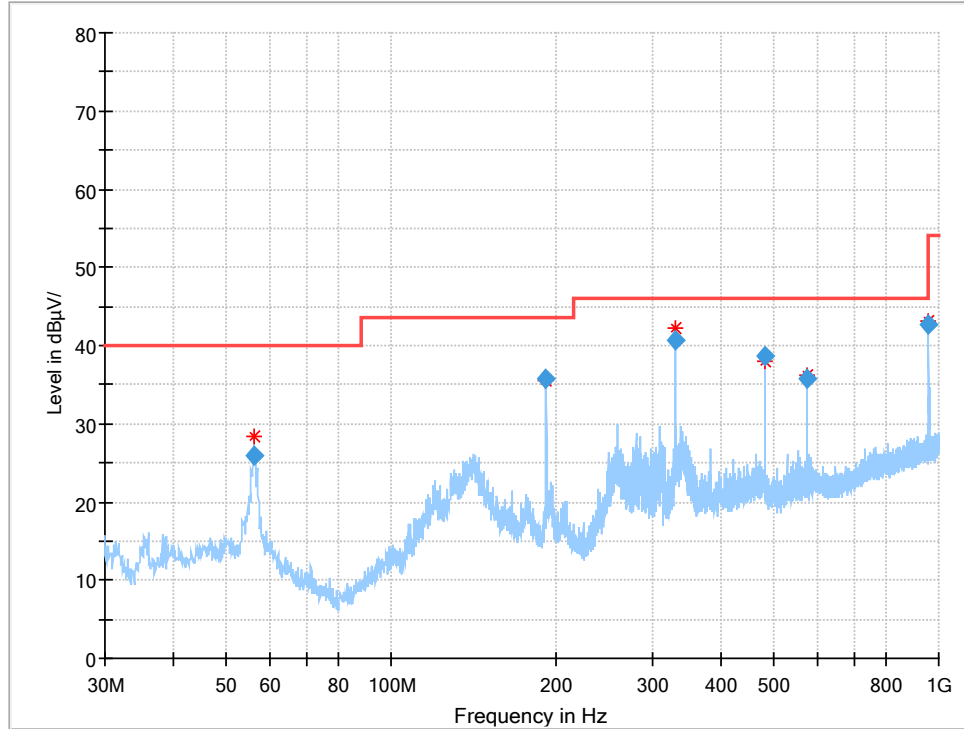


Figure A.1-1 Mode 3 (30M-1GHz)

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
56.249400	25.83	40.00	14.17	100.0	V	51.0	-12.3
191.995400	35.83	43.50	7.67	100.0	V	87.0	-13.2
329.766120	40.57	46.00	5.43	100.0	H	139.0	-9.2
480.009400	38.73	46.00	7.27	100.0	H	92.0	-5.7
575.994520	35.70	46.00	10.30	200.0	H	134.0	-3.9
959.988240	42.65	46.00	3.35	100.0	H	210.0	2.2

Note:

1.Horizontal and vertical polarity is all have been tested, the result of them is synthesized in the above data diagram.

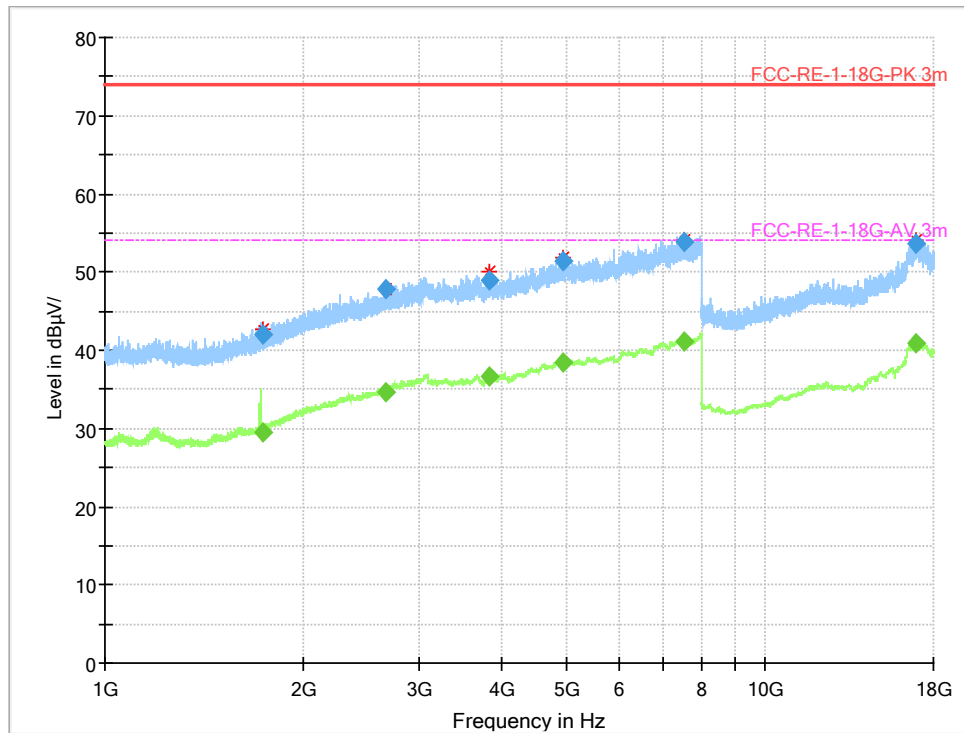


Figure A.1-2 Mode 3 (1GHz-18GHz)-H

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwi dth (kHz)	Height (cm)	Pol	Azim uth (deg)	Corr. (dB)
1731.3025	41.99	---	74.00	32.01	500.0	1000.0	115.0	H	50.0	4.4
1731.3025	---	29.56	54.00	24.44	500.0	1000.0	115.0	H	50.0	4.4
2671.8862	47.90	---	74.00	26.10	500.0	1000.0	215.0	H	289.0	10.1
2671.8862	---	34.66	54.00	19.34	500.0	1000.0	215.0	H	289.0	10.1
3824.6875	49.03	---	74.00	24.97	500.0	1000.0	215.0	H	1.0	13.0
3824.6875	---	36.60	54.00	17.40	500.0	1000.0	215.0	H	1.0	13.0
4944.6337	---	38.41	54.00	15.59	500.0	1000.0	187.0	H	228.0	15.8
4944.6337	51.30	---	74.00	22.70	500.0	1000.0	187.0	H	228.0	15.8
7525.3450	53.76	---	74.00	20.24	500.0	1000.0	111.0	H	359.0	20.7
7525.3450	---	41.06	54.00	12.94	500.0	1000.0	111.0	H	359.0	20.7
16886.750	53.74	---	74.00	20.26	500.0	1000.0	115.0	H	238.0	22.4
16886.750	---	40.89	54.00	13.11	500.0	1000.0	115.0	H	238.0	22.4

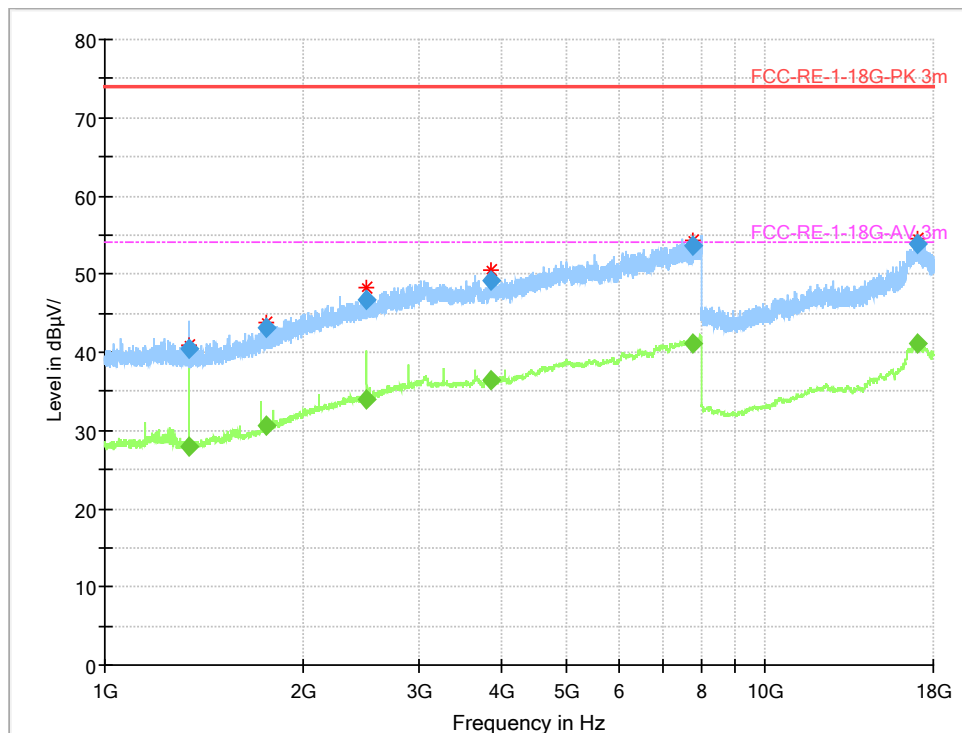


Figure A.1-3 Mode 3 (1GHz-18GHz)-V

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1343.2175	40.36	---	74.00	33.64	500.0	1000.0	100.0	V	299.0	2.1
1343.2175	---	27.93	54.00	26.07	500.0	1000.0	100.0	V	299.0	2.1
1760.3462	43.12	---	74.00	30.88	500.0	1000.0	185.0	V	234.0	4.7
1760.3462	---	30.62	54.00	23.38	500.0	1000.0	185.0	V	234.0	4.7
2491.4287	46.69	---	74.00	27.31	500.0	1000.0	115.0	V	270.0	9.1
2491.4287	---	34.04	54.00	19.96	500.0	1000.0	115.0	V	270.0	9.1
3857.2975	---	36.47	54.00	17.53	500.0	1000.0	115.0	V	129.0	13.0
3857.2975	49.19	---	74.00	24.81	500.0	1000.0	115.0	V	129.0	13.0
7767.7450	---	41.11	54.00	12.89	500.0	1000.0	115.0	V	359.0	20.7
7767.7450	53.59	---	74.00	20.41	500.0	1000.0	115.0	V	359.0	20.7
17074.402	53.91	---	74.00	20.09	500.0	1000.0	185.0	V	123.0	22.5
17074.402	---	41.19	54.00	12.81	500.0	1000.0	185.0	V	123.0	22.5

A.2 Conducted Emission

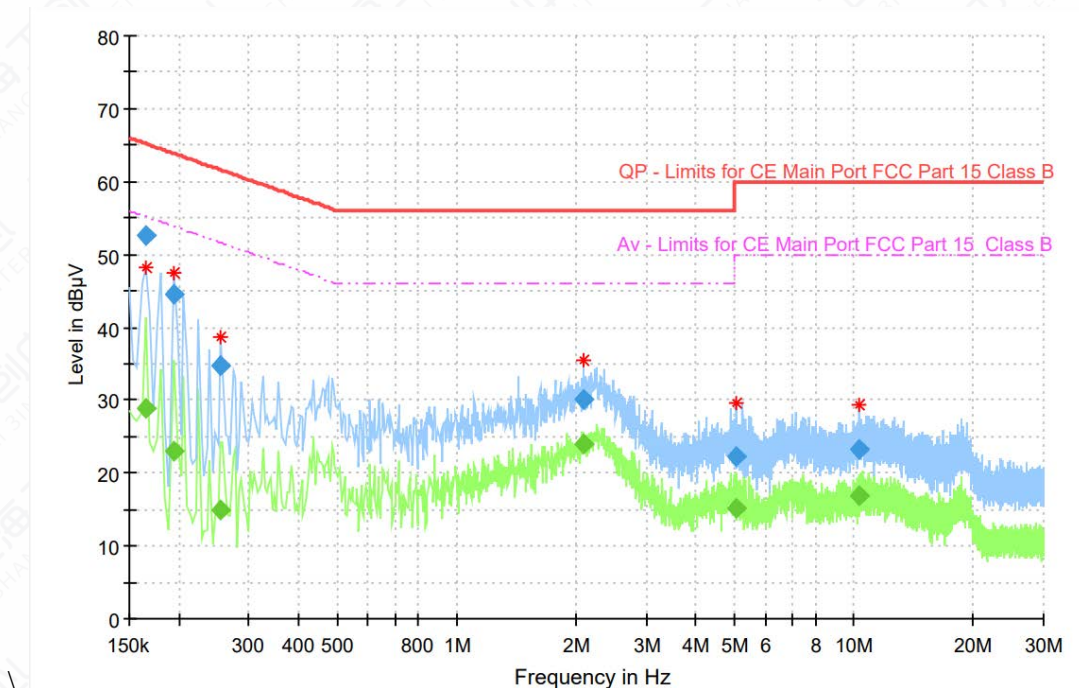


Figure A.2-1 Mode 3 (150kHz-30MHz)

Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.164925	---	28.94	55.21	26.27	15000	9.000	L1	ON	9.6
0.164925	52.71	---	65.21	12.50	15000	9.000	L1	ON	9.6
0.194775	---	23.03	53.83	30.80	15000	9.000	L1	ON	9.6
0.194775	44.44	---	63.83	19.39	15000	9.000	L1	ON	9.6
0.254475	---	14.81	51.61	36.80	15000	9.000	L1	ON	9.6
0.254475	34.81	---	61.61	26.80	15000	9.000	L1	ON	9.6
2.086519	---	23.97	46.00	22.03	15000	9.000	N	ON	9.7
2.086519	30.20	---	56.00	25.80	15000	9.000	N	ON	9.7
5.071519	---	15.20	50.00	34.80	15000	9.000	N	ON	9.8
5.071519	22.29	---	60.00	37.71	15000	9.000	N	ON	9.8
10.343775	---	16.85	50.00	33.15	15000	9.000	N	ON	9.9
10.343775	23.19	---	60.00	36.81	15000	9.000	N	ON	9.9

Note: L1 and N line is all have been tested, the result of them is synthesized in the above data diagram.

Annex B: Revised History

Version	Revised Content
V00	Initial

Annex C: Accreditation Certificate





Accredited Laboratory

A2LA has accredited

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

Shanghai, People's Republic of China

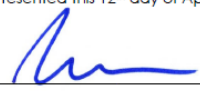
for technical competence in the field of

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.