

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

EMC TEST REPORT

PRODUCT	SIMCom Module
BRAND	SIMCom
MODEL	SIM8262A-M2
APPLICANT	SIMCom Wireless Solutions Limited
FCC ID	2AJYU-8XN0003
ISSUE DATE	June 2, 2023
STANDARD(S)	FCC Part 15, Subpart B, ANSI C63.4-2014

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张旻

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CONTENTS

1	SUMMARY OF TEST REPORT	3
1.1	TEST STANDARD (S)	3
1.2	SUMMARY OF TEST RESULTS	3
2	GENERAL INFORMATION OF THE LABORATORY	4
2.1	TESTING LABORATORY	4
2.2	LABORATORY ENVIRONMENTAL REQUIREMENTS	4
2.3	PROJECT INFORMATION	4
3	GENERAL INFORMATION OF THE CUSTOMER	5
3.1	APPLICANT	5
3.2	MANUFACTURER	5
3.3	FACTORY	5
4	GENERAL INFORMATION OF THE PRODUCT	6
4.1	PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)	6
4.2	DESCRIPTION FOR AUXILIARY EQUIPMENT (AE)	6
5	TEST CONFIGURATION INFORMATION	7
5.1	LABORATORY ENVIRONMENTAL CONDITIONS	7
5.2	DECISION OF FINAL TEST MODE	8
5.3	EUT SYSTEM OPERATION	9
5.4	EUT CONNECTION DIAGRAM OF TEST SYSTEM	9
5.5	TEST EQUIPMENT UTILIZED	9
5.6	MEASUREMENT UNCERTAINTY	10
6	TEST RESULTS	11
6.1	RADIATED EMISSION	11
6.2	AC CONDUCTED EMISSION	13
	ANNEX A: MEASUREMENT DATA	15
	ANNEX B: REVISED HISTORY	19
	ANNEX C: ACCREDITATION CERTIFICATE	20

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

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 SIM8262A-M2, manufactured by SIMCom Wireless Solutions Limited 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

2.2 Laboratory Environmental Requirements

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

2.3 Project Information

Project Manager	Zhang Heng
Test Date	August 30, 2022 to December 30, 2022

3 General Information of The Customer

3.1 Applicant

Company	SIMCom Wireless Solutions Limited
Address	SIMCom Headquarters Building, Building 3, No.289 Linhong Road, Changning District, Shanghai, China
Telephone	86 21 3157 5100

3.2 Manufacturer

Company	SIMCom Wireless Solutions Limited
Address	SIMCom Headquarters Building, Building 3, No.289 Linhong Road, Changning District, Shanghai, China
Telephone	86 21 3157 5100

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	SIMCom Module
Model	SIM8262A-M2
Date of Receipt	August 30, 2022
EUT ID*	S01aa
SN/IMEI	866713060007243
Supported Radio Technology and Bands	WCDMA Band II/IV/V LTE Band 2/4/5/7/12/13/14/17/25/26/30/41/42/43/48/66/71 5G NR n2/n5/n7/n12/n13/n14/n25/n26/n30/n38/n41/n66/n71/n77/n78
Hardware Version	V1.02
Software Version	2212B03V03X62M44A-M2
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	P-050B-050200 EU	N/A
EA03	Auxiliary Board	S2-10B5L	N/A
EB10	Antenna	SW19073EB56	N/A
EB17	Antenna	SW19073EB56	N/A
EC18	RF Cable	N/A	N/A
EC20	RF Cable	N/A	N/A

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:

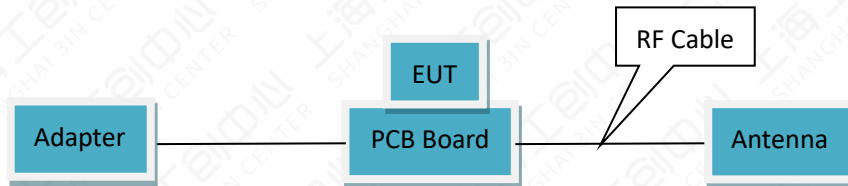
Test Item	Test setup and operating modes
Radiated emission	30MHz-18GHz frequency range: Mode 1: 5G NR NSA 2A-n66A receiver mode+ CA01 + EA03+ EB10+ EB17+ EC18+ EC20 Mode 2: 5G NR NSA 5A-n78A receiver mode+ CA01 + EA03+ EB10+ EB17+ EC18+ EC20 Mode 3: 5G NR SA n77 receiver mode+ CA01 + EA03+ EB10+ EB17+ EC18+ EC20 Mode 4: LTE Band 2 receiver mode+ CA01 + EA03+ EB10+ EB17+ EC18+ EC20 Mode 5: LTE Band 5 receiver mode+ CA01 + EA03+ EB10+ EB17+ EC18+ EC20 Mode 6: LTE Band 41 receiver mode+ CA01 + EA03+ EB10+ EB17+ EC18+ EC20 Mode 7: WCDMA Band II receiver mode+ CA01 + EA03+ EB10+ EB17+ EC18+ EC20
AC Conducted emission	Mode 1: 5G NR NSA 2A-n66A receiver mode+ CA01 + EA03+ EB10+ EB17+ EC18+ EC20 Mode 2: 5G NR NSA 5A-n78A receiver mode+ CA01 + EA03+ EB10+ EB17+ EC18+ EC20 Mode 3: 5G NR SA n77 receiver mode+ CA01 + EA03+ EB10+ EB17+ EC18+ EC20 Mode 4: LTE Band 2 receiver mode+ CA01 + EA03+ EB10+ EB17+ EC18+ EC20 Mode 5: LTE Band 5 receiver mode+ CA01 + EA03+ EB10+ EB17+ EC18+ EC20 Mode 6: LTE Band 41 receiver mode+ CA01 + EA03+ EB10+ EB17+ EC18+ EC20 Mode 7: WCDMA Band II receiver mode+ CA01 + EA03+ EB10+ EB17+ EC18+ EC20
Note: 1. All test modes are performed, only the worst cases test data are recorded in this report. 2. After laboratory verification, 5G NR NSA 2A-n66A/5A-n78A is the worst mode among all receiving modes of 5G NSA and is recorded in the report. 3. After laboratory verification, 5G NR SA n77 is the worst mode among all receiving modes of 5G SA and is recorded in the report. 4. After laboratory verification, LTE Band 2/5/41 is the worst mode among all receiving modes of LTE FDD/TDD and is recorded in the report. 5. After laboratory verification, WCDMA Band II is the worst mode among all receiving modes of 3G and is recorded in the report.	

6. The worst case of radiated emission for 30MHz-1GHz is Mode 1 and for 1GHz -18GHz is Mode 1.
7. The worst case for conducted emission is mode 2.

5.3 EUT System Operation

1. Connect the EUT with AE.
2. Setup the EUT according to the standard, connect the EUT with Universal Radio Communication.
3. Start testing and monitoring the function.

5.4 EUT Connection Diagram of Test System



<Figure 5.4-1> Mode 1~7

5.5 Test Equipment Utilized

No.	Name	Model	S/N	Manufacturer	Cal. Date	Cal. Interval
1	Universal Radio Communication Tester	CMW500	104178	R&S	2021-05-10	1.5 year
					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	Universal Radio Communication Tester	SP9500	20357	StarPoint	2021-05-10	1.5 year
					2022-11-21	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 degrees to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna were set during the the measurement

6.1.2 EUT Connection Diagram of Test System

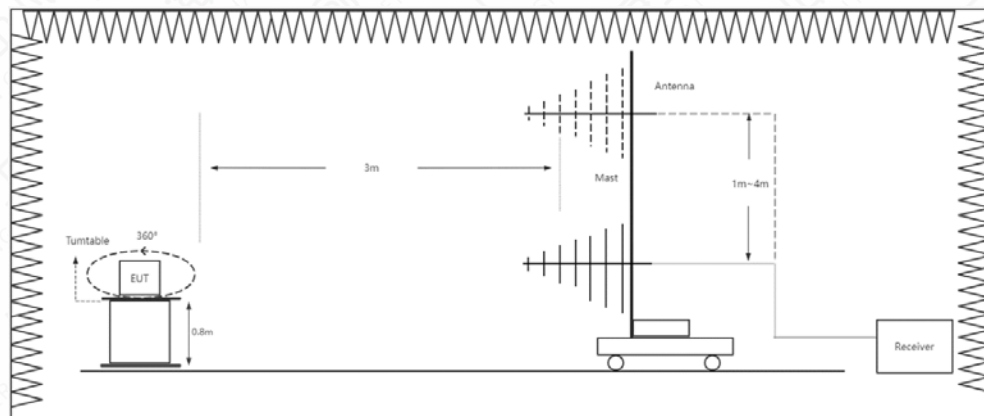


Figure 6.1.2-1 RE 30MHz-1GHz Connection Diagram

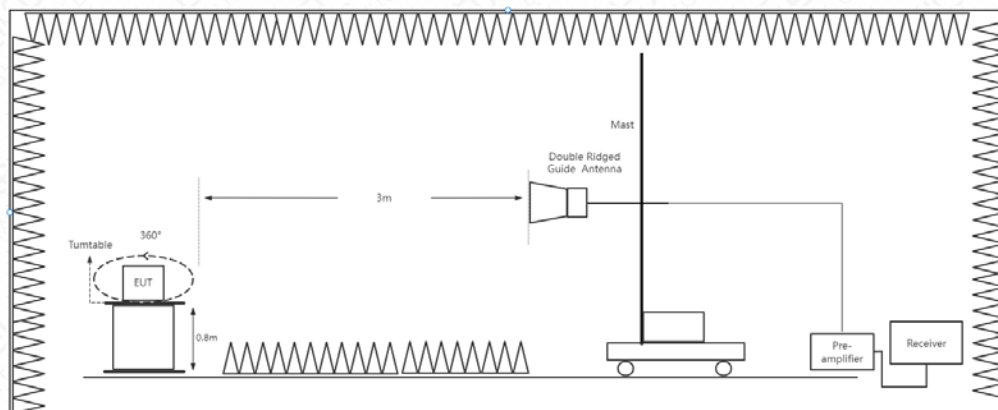


Figure 6.1.2-2 RE Above 1GHz Connection Diagram

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 (dB μ V/m)	Peak (dB μ V/m)	Average (dB μ V/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	21.3°C
Relative Humidity	44.8%RH
Atmospheric Pressure	102.3 kPa

6.1.6 Test Results

Mode	Frequency (MHz)	Test Results	Verdicts
Mode 1: 5G NR NSA 2A-n66A receiver mode+ CA01 + EA03+ EB10+ EB17+ EC18+ EC20	30-1000	See Annex A.1-1	Pass
Mode 1: 5G NR NSA 2A-n66A receiver mode+ CA01 + EA03+ EB10+ EB17+ EC18+ EC20	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 AC 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

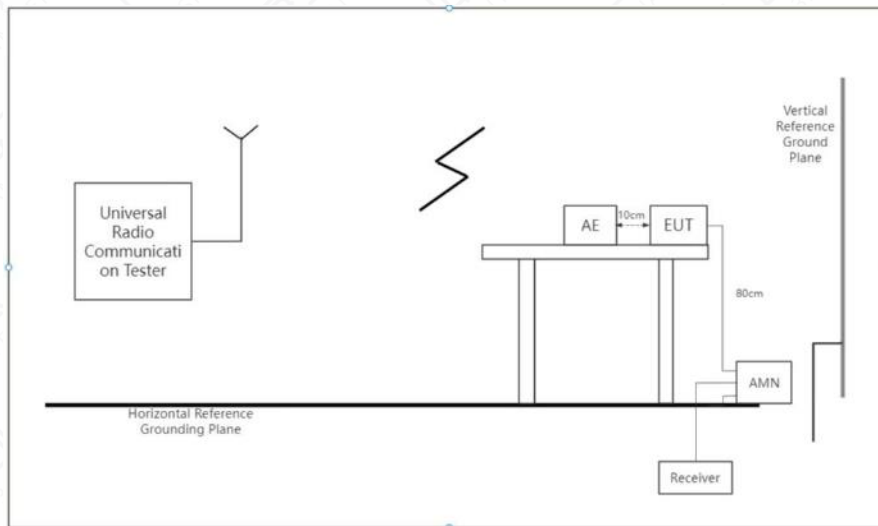


Figure 6.2.2-1 CE Connection Diagram

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 (dB μ V)	
	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	20.9°C
Relative Humidity	37.0%RH
Atmospheric Pressure	101.4 kPa

6.2.6 Test Results

Mode	Frequency (MHz)	Test Results	Verdicts
Mode 2: 5G NR NSA 5A-n78A receiver mode+ CA01+ EA03+ EB10+ EB17+ EC18+ EC20	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

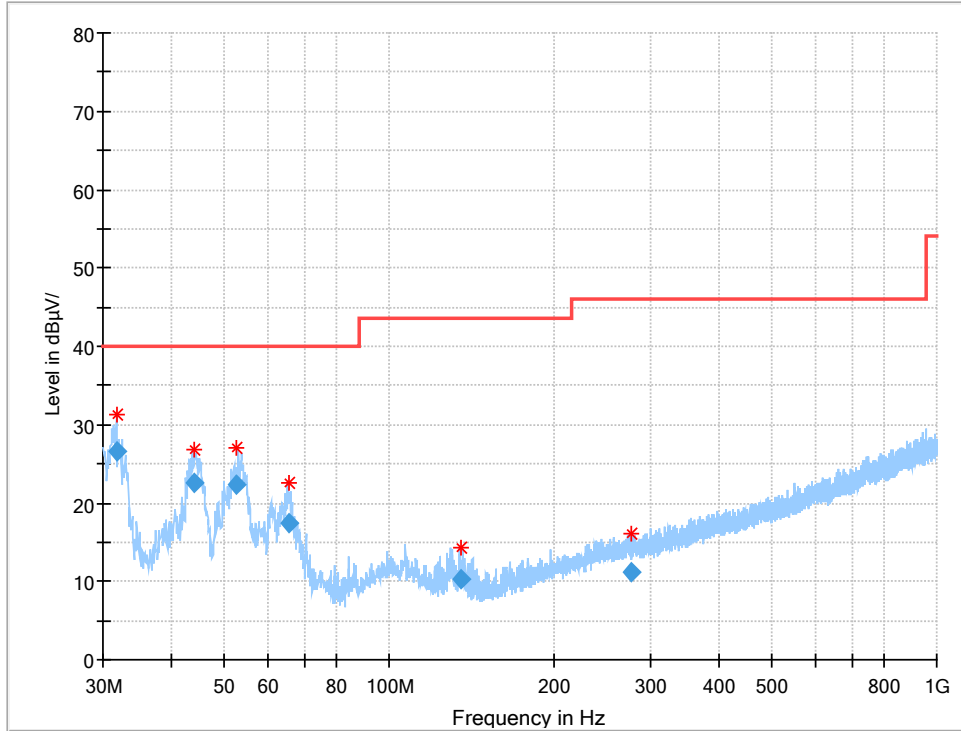


Figure A.1-1 Mode 1 (30M-1GHz)

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
31.794960	26.49	40.00	13.51	100.0	V	307.0	-15.2
44.124600	22.57	40.00	17.43	100.0	V	28.0	-12.1
52.556800	22.31	40.00	17.69	100.0	V	39.0	-11.9
65.586920	17.42	40.00	22.58	100.0	V	120.0	-14.4
135.053240	10.39	43.50	33.11	200.0	H	22.0	-16.3
276.415520	11.15	46.00	34.85	100.0	H	0.0	-10.4

Note:

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

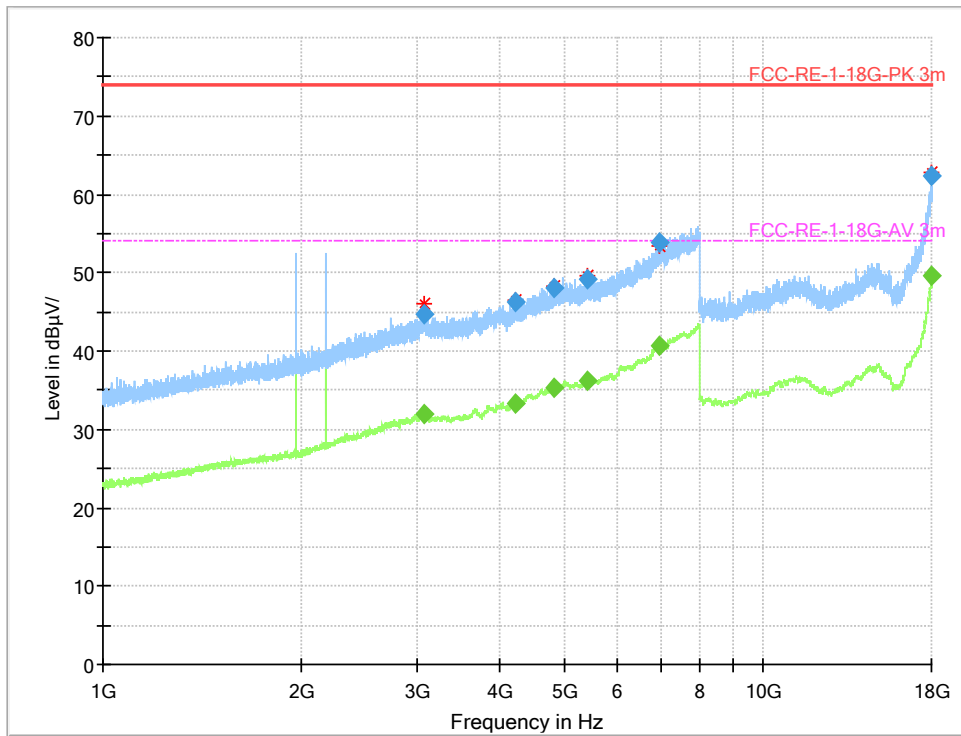


Figure A.1-2 Mode 1 (1GHz-18GHz)-H

Note: The frequency over the limits is the main signal frequency.

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/m)
3068.8225	---	31.96	54.00	22.04	500.0	1000.0	111.0	H	1.0	7.9
3068.8225	44.60	---	74.00	29.40	500.0	1000.0	111.0	H	1.0	7.9
4206.7837	---	33.27	54.00	20.73	500.0	1000.0	115.0	H	1.0	10.0
4206.7837	46.28	---	74.00	27.72	500.0	1000.0	115.0	H	1.0	10.0
4826.8750	48.00	---	74.00	26.00	500.0	1000.0	200.0	H	359.0	12.2
4826.8750	---	35.30	54.00	18.70	500.0	1000.0	200.0	H	359.0	12.2
5420.9537	---	36.31	54.00	17.69	500.0	1000.0	115.0	H	359.0	13.9
5420.9537	49.26	---	74.00	24.74	500.0	1000.0	115.0	H	359.0	13.9
6962.1112	---	40.64	54.00	13.36	500.0	1000.0	215.0	H	326.0	19.4
6962.1112	53.75	---	74.00	20.25	500.0	1000.0	215.0	H	326.0	19.4
17999.824	62.40	---	74.00	11.60	500.0	1000.0	115.0	H	249.0	31.4
17999.824	---	49.56	54.00	4.44	500.0	1000.0	115.0	H	249.0	31.4

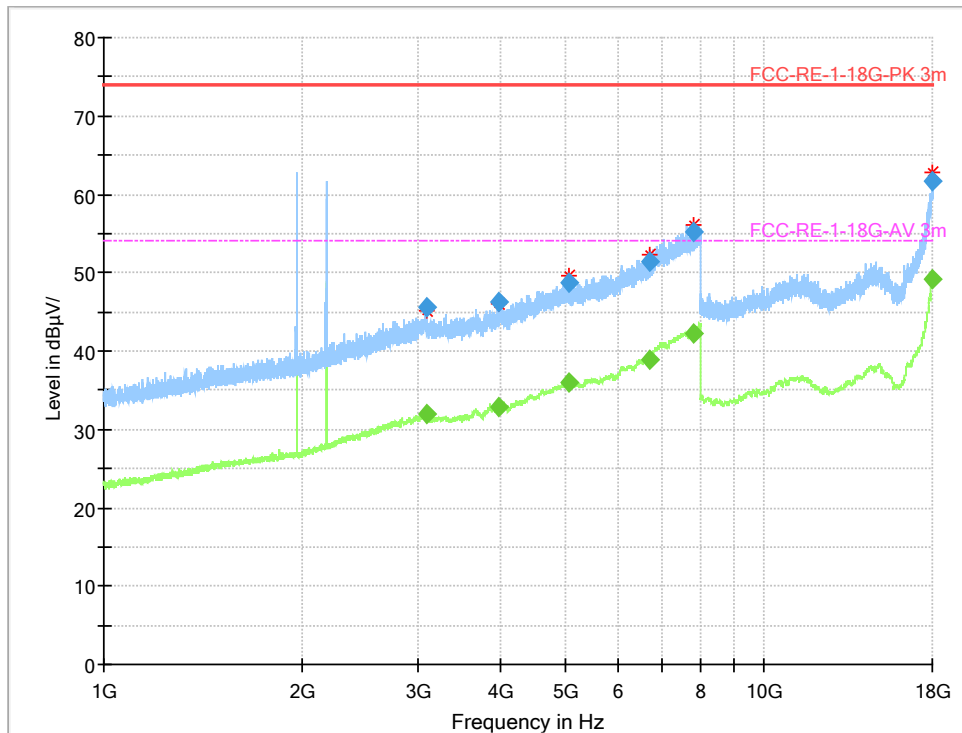


Figure A.1-3 Mode 1 (1GHz-18GHz)-V

Note: The frequency over the limits is the main signal frequency.

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/m)
3076.7350	---	31.98	54.00	22.02	500.0	1000.0	115.0	V	359.0	7.9
3076.7350	45.62	---	74.00	28.38	500.0	1000.0	115.0	V	359.0	7.9
3958.1912	---	32.89	54.00	21.11	500.0	1000.0	115.0	V	326.0	9.5
3958.1912	46.26	---	74.00	27.74	500.0	1000.0	115.0	V	326.0	9.5
5063.2750	---	35.95	54.00	18.05	500.0	1000.0	210.0	V	294.0	13.0
5063.2750	48.62	---	74.00	25.38	500.0	1000.0	210.0	V	294.0	13.0
6707.3625	51.45	---	74.00	22.55	500.0	1000.0	115.0	V	326.0	17.5
6707.3625	---	38.89	54.00	15.11	500.0	1000.0	115.0	V	326.0	17.5
7818.9650	55.24	---	74.00	18.76	500.0	1000.0	115.0	V	196.0	21.8
7818.9650	---	42.21	54.00	11.79	500.0	1000.0	115.0	V	196.0	21.8
17982.406	---	49.08	54.00	4.92	500.0	1000.0	215.0	V	358.0	31.2
17982.406	61.70	---	74.00	12.30	500.0	1000.0	215.0	V	358.0	31.2

A.2 Conducted Emission

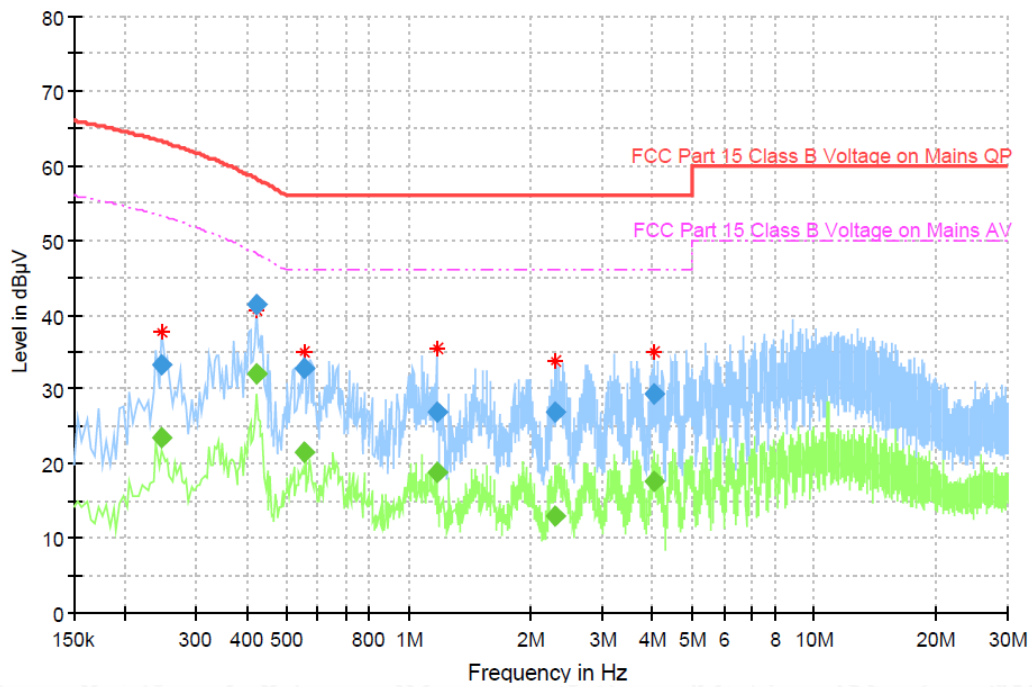


Figure A.2-1 Mode 2 (150kHz-30MHz)

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.247013	33.36	---	63.23	29.87	15000	9.000	N	ON	10.5
0.247013	---	23.43	53.23	29.80	15000	9.000	N	ON	10.5
0.422381	41.25	---	58.22	16.97	15000	9.000	L1	ON	9.9
0.422381	---	32.14	48.22	16.08	15000	9.000	L1	ON	9.9
0.552975	32.86	---	56.00	23.14	15000	9.000	N	ON	10.5
0.552975	---	21.54	46.00	24.46	15000	9.000	N	ON	10.5
1.172363	27.01	---	56.00	28.99	15000	9.000	L1	ON	9.9
1.172363	---	18.72	46.00	27.28	15000	9.000	L1	ON	9.9
2.295469	---	13.02	46.00	32.98	15000	9.000	L1	ON	10.1
2.295469	27.01	---	56.00	28.99	15000	9.000	L1	ON	10.1
4.026769	---	17.70	46.00	28.30	15000	9.000	L1	ON	10.3
4.026769	29.40	---	56.00	26.60	15000	9.000	L1	ON	10.3

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
V01	Update section 4.1 & 5.2 & 5.5 of the report

Annex C: Accreditation Certificate

The certificate features a decorative orange and blue wavy border on the left and right sides. At the top center, it displays the logos for ILAC-MRA and A2LA. Below the logos, the text reads: "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". A paragraph of text explains the accreditation is based on ISO/IEC 17025:2017. A gold seal on the left side of the text area says "CORPORATE SEAL 1978" and "A2LA". A signature and name are on the right, along with the date "Presented this 12th day of April 2021." and details: "Vice President, Accreditation Services For the Accreditation Council Certificate Number 3682.01 Valid to May 31, 2023 Revised February 16, 2023". A footer note states: "For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation."

END OF REPORT