



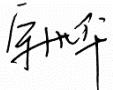


TEST REPORT

Report Number: C21T00135-EMC01-V01

Applicant	SIMCom Wireless Solutions Limited
Product Name	4G Wireless Smart Module
Model Name	SIM8905A-R2
Brand Name	SIMCom
FCC ID	2AJYU-8PSA302

Industrial Internet Innovation Center (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in FCC Part 15, Subpart B, ANSI C63.4-2014.

Prepared by		Reviewed by	
Approved by		Issue Date	2022-01-26

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.

Add: Building 4, No. 766 Jingang Rd, Pudong, Shanghai, China

Tel: +86 21 68866880



Revision Version

Report Number	Revision	Date	Memo
C21T00135-EMC01-V00	00	2022-01-10	Initial creation of test report
C21T00135-EMC01-V01	01	2022-01-26	Secondary creation of test report



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1. Test Laboratory

1.1. Testing Location

Primary Lab:

Company Name	Industrial Internet Innovation Center (Shanghai) Co., Ltd.
Address	Building 4, No. 766 Jingang Rd, Pudong, Shanghai, China
FCC Registration No.	958356
FCC Designation No.	CN1177

Subcontracting Lab #1:

Company Name	N/A
Address	N/A

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	Xu Yuting
Testing Start Date	2021-12-13
Testing End Date	2021-12-14



2. Client Information

2.1. Applicant Information

Company Name	SIMCom Wireless Solutions Limited
Address	Building 3, No.289 Linhong Road, ChangNing District, Shanghai, China
Telephone	15102196457

2.2. Manufacturer Information

Company Name	SIMCom
Address	8F, Bldg3 No.289 Linhong Rd, ChangNing District Shanghai, PRC China
Telephone	15102196457

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

3.1. About EUT

Product Name	4G Wireless Smart Module
Model name	SIM8905A-R2
Supported Radio Technology and Bands	LTE 2/4/5/7/12/13/17/25/26/41 GPS GLONASS BDS
Hardware Version	V1.03
Software Version	R2148.01

Note: Photographs of EUT are shown in ANNEX B of this test report.

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version	Date of Receipt
N11	P106214767D27E3	V1.03	R2148.01	2021/12/07

*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
CA08	Adapter	P-050B-050200 EU	N/A
EC08	Mainboard	N/A	MP0619422B7F240
EA20	Antenna	N/A	N/A
EA21	Antenna	N/A	N/A
EA22	Antenna	N/A	N/A
EB02	RF cable	N/A	N/A
EB03	RF cable	N/A	N/A
EB04	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 Part 15, Subpart B	Radio frequency devices	2020/10/1
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

5. Test Summary

5.1. Summary of Test Results

Items	Test List	Standard	Verdict
1	Radiated Emission	15.109(a)	Pass
2	AC Conducted Emission	15.107(a)	Pass

5.2. Statements

The SIM8905A-R2, manufactured by SIMCom 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 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.

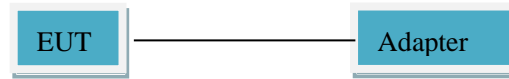
5.3. Decision of final test mode

The EUT was tested together with the above additional components, and a configuration, which produced the worst emission levels, was selected and recorded in this report.

The test configuration modes are as the following:

Test Item	Test setup and operating modes
Radiated emission	Mode 1: Adapter charging+ LTE2 receiver mode+ CA08+ EC08+ EA20+ EB03 Mode 2: GPS mode Mode 3: GLONASS mode Mode 4: BDS mode
AC Conducted Emission	Mode 1: Adapter charging+ LTE2 receiver mode+ CA08+ EC08+ EA20+ EB03 Mode 2: GPS mode Mode 3: GLONASS mode Mode 4: BDS mode
Remark: 1. All test modes are performed, only the worst cases test data are recorded in this report. 2. After laboratory verification, LTE2 is the worst mode among all receiving modes of 4G and is recorded in the report. 3. EUT and GNSS simulator (SMBV100A) connection is established.	

5.4. EUT Connection Diagram of Test System



<Figure 1> Mode 1~4

6. Measurement Results

6.1. Radiated Emission

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 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.

Limits for Radiated Emission at a measuring distance of 3m

Table 1:

Frequency Range (MHz)	Quasi-Peak (dB μ V/m)
30-88	40
88-216	43.5
216-960	46
Above 960	54

Table 2:

Frequency Range (MHz)	Peak (dB μ V/m)	Average (dB μ V/m)
Above 1000	74	54

Table 3:

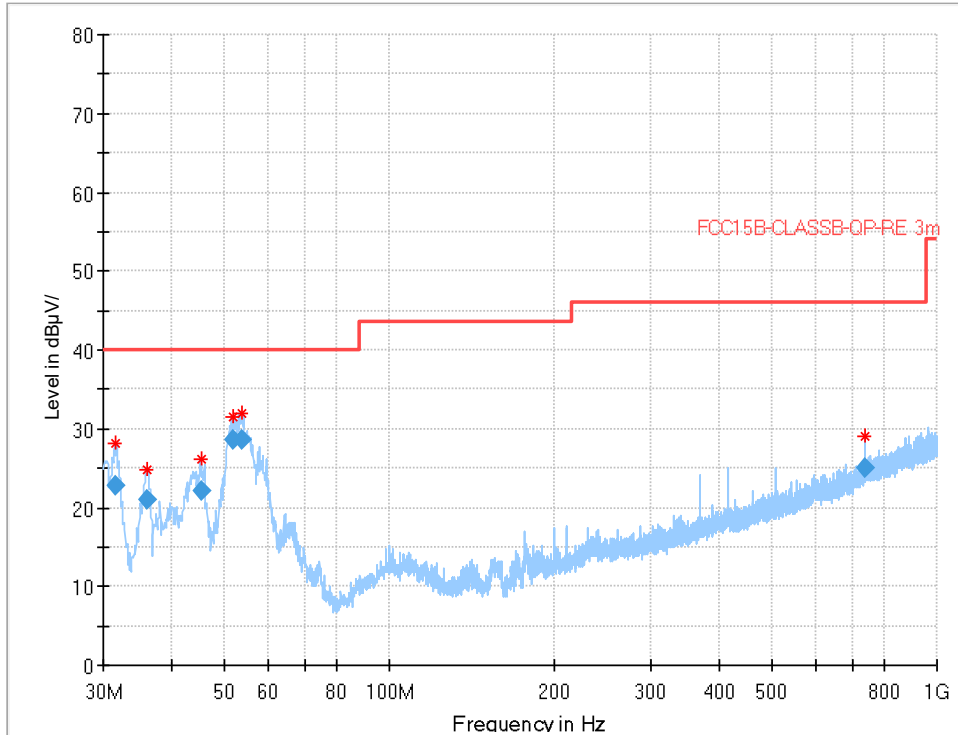
Test conditions

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

Test Results

Sweep the whole frequency band through the range from 30MHz to the 5th harmonic of the carrier, the Emissions in the frequency band 18GHz-40GHz is more than 20dB below the limit are not report.

Mode 1: Adapter charging+ LTE2 receiver mode+ CA08+ EC08+ EA20+ EB03 (30M-1GHz)



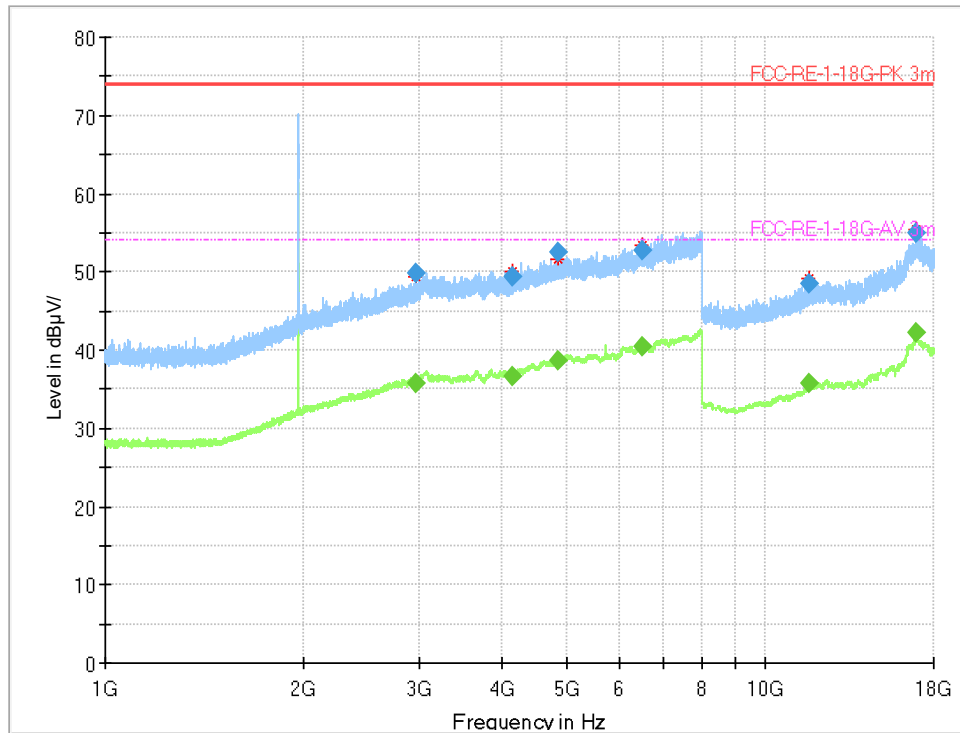
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
31.588920	22.84	40.00	17.16	1000.0	120.000	100.0	V	175.0	-15.2
36.197720	21.09	40.00	18.91	1000.0	120.000	100.0	V	293.0	-14.3
45.337520	22.08	40.00	17.92	1000.0	120.000	100.0	V	0.0	-11.8
51.636560	28.62	40.00	11.38	1000.0	120.000	100.0	V	9.0	-11.7
53.798520	28.59	40.00	11.41	1000.0	120.000	100.0	V	1.0	-12.1
738.719080	24.99	46.00	21.01	1000.0	120.000	100.0	H	56.0	-0.8

Note:

1. Emission level(QP)=Raw value by receiver + Corr(Antenna factor + cable loss - preamplifier gain)
2. The raw value is used to calculate by software which is not shown in the sheet.
3. Margin=limit value – emission level.

Mode 1: Adapter charging+ LTE2 receiver mode+ CA08+ EC08+ EA20+ EB03 (1GHz-18GHz)

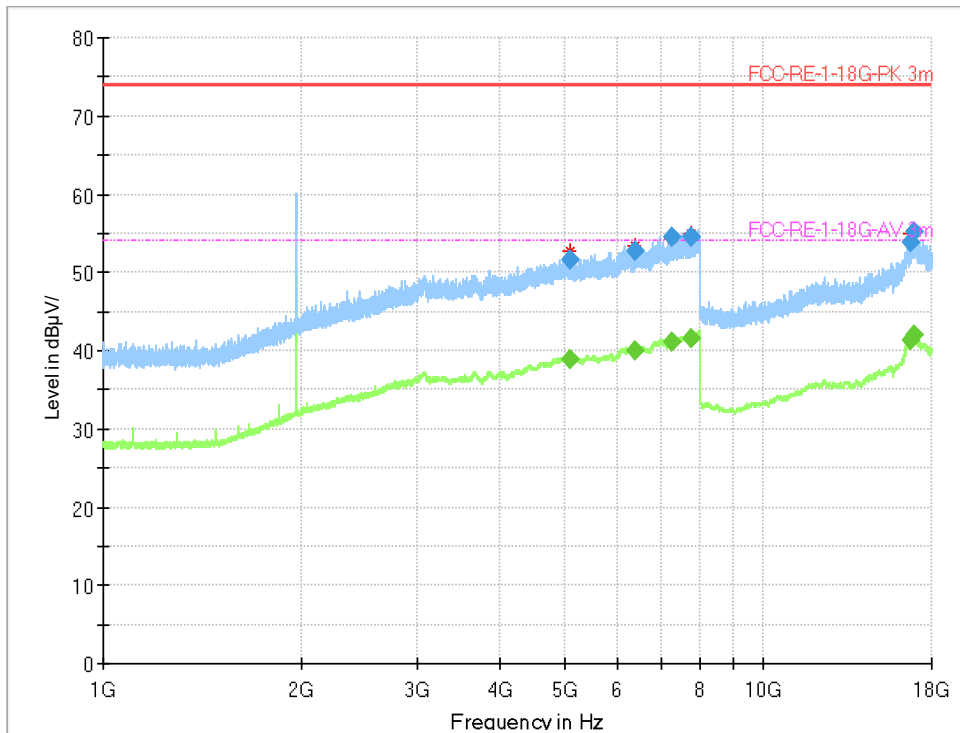


Final Result 1

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)
2957.135000	49.85	---	74.00	24.15	500.0	1000.000	206.0	H	141.0	11.4
2957.135000	---	35.86	54.00	18.14	500.0	1000.000	206.0	H	141.0	11.4
4132.156250	49.41	---	74.00	24.59	500.0	1000.000	115.0	H	254.0	13.4
4132.156250	---	36.68	54.00	17.32	500.0	1000.000	115.0	H	254.0	13.4
4855.831250	---	38.63	54.00	15.37	500.0	1000.000	115.0	H	56.0	15.4
4855.831250	52.41	---	74.00	21.59	500.0	1000.000	115.0	H	56.0	15.4
6507.220000	---	40.37	54.00	13.63	500.0	1000.000	215.0	H	1.0	18.6
6507.220000	52.76	---	74.00	21.24	500.0	1000.000	215.0	H	1.0	18.6
11687.902500	---	35.78	54.00	18.22	500.0	1000.000	215.0	H	124.0	13.4
11687.902500	48.48	---	74.00	25.52	500.0	1000.000	215.0	H	124.0	13.4
16892.552500	---	42.18	54.00	11.82	500.0	1000.000	111.0	H	109.0	22.4
16892.552500	54.86	---	74.00	19.14	500.0	1000.000	111.0	H	109.0	22.4

Note:

1. Emission level (peak or average)=Raw value by receiver + Corr (Antenna factor+ cable loss- preamplifier gain)
2. The raw value is used to calculate by software which is not shown in the sheet.
3. Margin=limit value – emission level.
4. The frequency over the limits is the main signal frequency.



Final Result 1

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Band width (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
5102.78000	---	38.89	54.00	15.11	500.0	1000.000	215.0	V	225.0	16.1
5102.78000	51.72	---	74.00	22.28	500.0	1000.000	215.0	V	225.0	16.1
6403.31875	---	39.96	54.00	14.04	500.0	1000.000	215.0	V	160.0	18.3
6403.31875	52.83	---	74.00	21.17	500.0	1000.000	215.0	V	160.0	18.3
7265.79500	---	41.02	54.00	12.98	500.0	1000.000	115.0	V	258.0	19.9
7265.79500	54.54	---	74.00	19.46	500.0	1000.000	115.0	V	258.0	19.9
7775.40000	54.57	---	74.00	19.43	500.0	1000.000	185.0	V	30.0	20.7
7775.40000	---	41.51	54.00	12.49	500.0	1000.000	185.0	V	30.0	20.7
16715.5575	53.77	---	74.00	20.23	500.0	1000.000	215.0	V	4.0	22.2
16715.5575	---	41.35	54.00	12.65	500.0	1000.000	215.0	V	4.0	22.2
16925.3275	---	42.02	54.00	11.98	500.0	1000.000	215.0	V	358.0	22.5
16925.3275	55.23	---	74.00	18.77	500.0	1000.000	215.0	V	358.0	22.5

Note:

1. Emission level (peak or average) = Raw value by receiver + Corr (Antenna factor+ cable loss- preamplifier gain)
2. The raw value is used to calculate by software which is not shown in the sheet.
3. Margin=limit value – emission level.
4. The frequency over the limits is the main signal frequency.

6.2. AC Conducted Emission

Method of Measurement

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies with the band 150 kHz to 30MHz shall not exceed the limits. Both lines of the power mains connected to the EUT were checked for maximum conducted interference. Tested in accordance with the procedures of ANSI C63.4-2014, section 7.3

Limit of AC Conducted Emission

Frequency Range (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

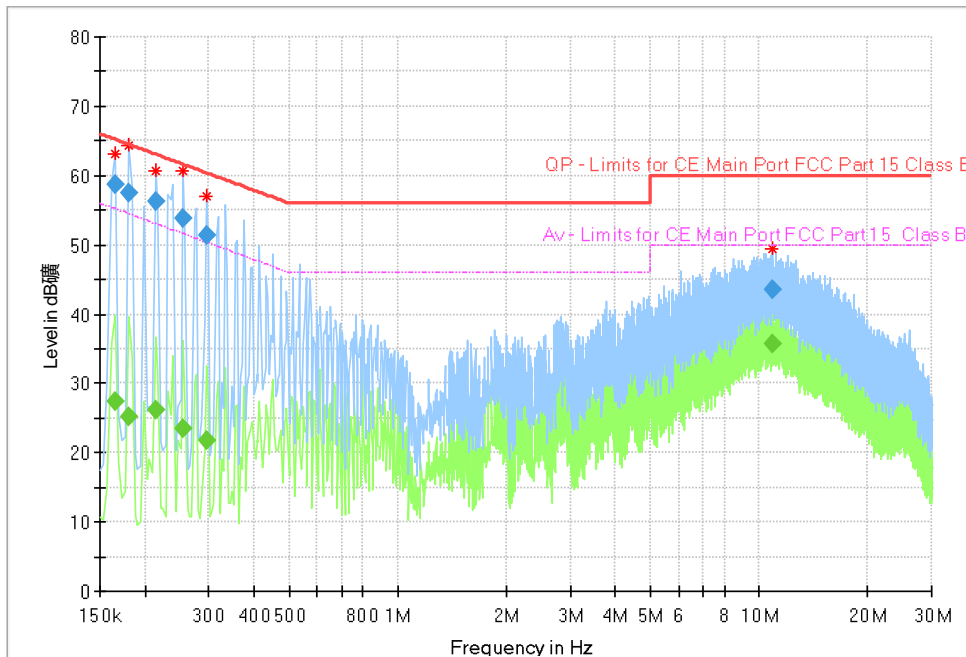
*Decreases with the logarithm of the frequency

Test Condition in Charging Mode

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

Test Results

Mode 1: Adapter charging+ LTE2 receiver mode+ CA08+ EC08+ EA20+ EB03



Final Result 1

Frequency (MHz)	QuasiPeak (dB µ V)	Average (dB µ V)	Limit (dB µ V)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.164925	---	27.28	55.21	27.93	15000.0	9.000	N	ON	9.6
0.164925	58.70	---	65.21	6.51	15000.0	9.000	N	ON	9.6
0.179850	---	25.30	54.49	29.19	15000.0	9.000	N	ON	9.6
0.179850	57.48	---	64.49	7.01	15000.0	9.000	N	ON	9.6
0.213431	---	26.12	53.07	26.95	15000.0	9.000	N	ON	9.6
0.213431	56.27	---	63.07	6.80	15000.0	9.000	N	ON	9.6
0.254475	---	23.37	51.61	28.24	15000.0	9.000	N	ON	9.6
0.254475	53.73	---	61.61	7.88	15000.0	9.000	N	ON	9.6
0.295519	---	21.70	50.37	28.67	15000.0	9.000	N	ON	9.6
0.295519	51.45	---	60.37	8.92	15000.0	9.000	N	ON	9.6
10.862419	---	35.61	50.00	14.39	15000.0	9.000	N	ON	9.9
10.862419	43.46	---	60.00	16.54	15000.0	9.000	N	ON	9.9

Note:

1. Emission level(quasi-peak or Average peak)=Raw value by receiver + Corr(Insertion loss+ cable loss)
2. The raw value is used to calculate by software which is not shown in the sheet.
3. Margin=limit value – emission level.
4. L1 and N line is all have been tested, the result of them is synthesized in the above data diagram.

7. Test Equipment List

7.1. Radiated Emission Equipment list

Item	Equipment Name	Type	Serial Number	Manufacturer	Cal. Date	Cal. interval
1	Test Receiver	ESU40	100307	R&S	2021-03-03	1 year
2	Universal Radio Communication Tester	CMU200	123102	R&S	2021-05-10	1 year
3	Universal Radio Communication Tester	CMW500	104178	R&S	2021-05-10	1 year
4	Trilog Antenna	VULB9163	VULB9163-515	Schwarzbeck	2021-02-03	2 years
5	Double Ridged Guide Antenna	ETS-3117	00135890	ETS	2020-02-28	2 years
6	EMI Test Software	EMC32 V9.15	N/A	R&S	N/A	N/A
7	Signal Generator	SMBV100A	257984	R&S	2021-03-03	1 year

7.2. AC Conducted Emission Equipment list

Item	Equipment Name	Type	Serial Number	Manufacturer	Cal. Date	Cal. interval
1	Test Receiver	ESCI	101235	R&S	2021-05-10	1 year
2	Universal Radio Communication Tester	CMU200	123102	R&S	2021-05-10	1 year
3	Universal Radio Communication Tester	CMW500	104178	R&S	2021-05-10	1 year
4	2-Line V-Network	ENV216	101380	R&S	2021-03-20	1 year
5	EMI Test Software	EMC32 V10.35.02	N/A	R&S	N/A	N/A
6	Signal Generator	SMBV100A	257984	R&S	2021-03-03	1 year



Annex A: Measurement Uncertain

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

Case	Uncertainty
Radiated Emission 30MHz-1000MHz	4.96 dB
Radiated Emission 1000MHz-18000MHz	5.18 dB
AC Conducted Emission	3.66 dB

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*****