

TEST REPORT

REPORT NUMBER: B18W50650-MPE-Rev1

ON

Type of Equipment: LTE CAT-M1(eMTC) and NB-IoT Modle

Type of Designation: SIM7000A

Manufacturer: Shanghai SIMCom Wireless Solutions Limited.

FCC ID: 2AJYU-SIM7000A

ACCORDING TO

FCC CFR 47 Part 2.1091 《Radiofrequency radiation exposure evaluation: mobile devices》

FCC CFR 47 Part1.1310 《Radiofrequency radiation exposure limits》

Chongqing Academy of Information and Communication Technology

Month date, year

Dec 29, 2018

Signature



Zhang Yan

Director

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of Chongqing Academy of Information and Communications Technology.

Chongqing Academy of Information and Communications Technology

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Revision Version

Report Number	Revision	Date	Memo
B18W50650-MPE	00	2018-12-28	Initial creation of test report
B18W50650-MPE-Rev1	01	2018-12-29	Revision of test report

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Chongqing Academy of Information and Communications Technology

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1. Test Laboratory

1.1. Testing Location

Company Name:	Chongqing Academy of Information and Communications Technology
Address:	No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China
Postal Code:	401336
Telephone:	0086-23-88069965
Fax:	0086-23-88608777

1.2. Testing Environment

Normal Temperature:	15-35℃
Relative Humidity:	20-75%

1.3. Project Data

Testing Start Date:	2018-12-27
Testing End Date:	2018-12-27

1.4. Signature



2018-12-29

Ang Xinyu
(Prepared this test report)

Date



2018-12-29

Wang Lili
(Reviewed this test report)

Date



2018-12-29

Zhang Yan
Director of the laboratory
(Approved this test report)

Date

2. Client Information

2.1. Applicant Information

Company Name:	Shanghai SIMCom Wireless Solutions Limited.
Address /Post:	Bldg. B, SIM Technology Bldg.,No.633, Jinzhong Rd, Changning Dist., Shanghai, P.R.China,
Telephone:	--
Fax:	--
Email:	--
Contact Person:	Haisheng Zeng

2.2. Manufacturer Information

Company Name:	--
Address /Post:	--
Telephone:	--
Fax:	--
Email:	--
Contact Person:	--

3. Equipment Under Test (EUT) and Ancillary Equipment (AE)**3.1. About EUT**

Description:	LTE CAT-M1(eMTC) and NB-IoT Modle
Model name:	SIM7000A
GSM Frequency Band	--
UMTS Frequency Band	--
E-UTRA Frequency Band	Band2/4/12/13
GPRS Multislot Class	--
EGPRS Multislot Class	--
Note: Photographs of EUT are shown in ANNEX A 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
S3	SN:P206180916ACA12	SIM7000A_V1.02	SIM7000A R1529	2018-12-17

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

3.3. Internal Identification of AE used during the test

EUT ID*	SN	Description
NA	NA	NA

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

4. Reference Documents

4.1. Applicable Standards

The MPE report was carried out on a sample equipment to demonstrate limited compliance with FCC CFR 47 Part 2.1091.

FCC CFR 47 Part 2.1091: Radiofrequency radiation exposure evaluation: mobile devices

4.2. Test Limits

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2m normally can be maintained between the user and the device.

MPE for the upper tier (people in controlled environments)

Frequency Range [MHz]	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f ²)*	6
30-300	61.4	0.163	1.0	6
300-1500	--	--	f/300	6
1500-100000	--	--	5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f ²)*	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	f/1500	30
1500-100000	--	--	1.0	30

Note: f=frequency in MHz; *Plane-wave equivalent power density

For the DUT, the limits for the general public when an RF safety program is unavailable.

5. Test Results

5.1. RF Power Output

Frequency Band	Highest Power Output(dBm)	Antenna Gain(dBi)
LTE Band2	25.7	1.87
LTE Band4	25.7	3.36
LTE Band12	25.7	1.57
LTE Band13	25.7	2.23

5.2. Calculation Information

For conservative evaluation consideration, only maximum power of each frequency band based on the tighter limits respectively are used to calculate the boundary power density.

Based on the FCC KDB 447498 D01 and 47 CFR §2.1091, the DUT is evaluated as a mobile device.

$$S = \frac{PG}{4\pi d^2}$$

Where

P = Power in Watts

G = Numeric antenna gain

d = Distance in meters

S = Power density in milliwatts / square centimeter

5.3. Results

Frequency range	Limit(W/m ²)	Results(W/m ²)	Verdict
LTE Band2	1.0	0.114	Pass
LTE Band4	1.0	0.160	Pass
LTE Band12	0.466	0.106	Pass
LTE Band13	0.497	0.124	Pass

5.4. Result of LTE Band2

Test Results: MPE Limit Calculation: the EUT'S operating frequencies @ 1850.0~1909.9 MHz; The maximum conducted is 25.7 dBm. The maximum gain is 1.87dBi. Therefore, maximum limit for general public RF exposure: 1.0mW/cm².

$$S = \frac{PG}{4\pi d^2}$$

P= input power of the antenna (371 mW)

G = antenna gain (1.54 numeric)

r = distance to the center of radiation of antenna (in meter)=20 cm

$$S=(371*1.54)/(4\pi*20^2)=0.114\text{mW/cm}^2$$

Therefore, at 20 cm the spectral power density is less than the 1.0 mW/cm² limit for uncontrolled exposure.

5.5. Result of LTE Band4

Test Results: MPE Limit Calculation: the EUT'S operating frequencies @ 1710.0~1754.9 MHz; The maximum conducted is 25.7 dBm. The maximum gain is 3.36dBi. Therefore, maximum limit for general public RF exposure:1.0 mW/cm².

$$S = \frac{PG}{4\pi d^2}$$

P= input power of the antenna (371 mW)

G = antenna gain (2.17numeric)

r = distance to the center of radiation of antenna (in meter)=20 cm

$$S=(371*2.17)/(4\pi*20^2)=0.160\text{ mW/cm}^2$$

Therefore, at 20 cm the spectral power density is less than the 1.0 mW/cm² limit for uncontrolled exposure.

5.6. Result of LTE Band12

Test Results: MPE Limit Calculation: the EUT'S operating frequencies @ 699.0~715.9 MHz; The maximum conducted is 25.7 dBm. The maximum gain is 1.57dBi. Therefore, maximum limit for general public RF exposure: $699.0/1500=0.466 \text{ mW/cm}^2$.

$$S = \frac{PG}{4\pi d^2}$$

P= input power of the antenna (371mW)

G = antenna gain (1.43numeric)

r = distance to the center of radiation of antenna (in meter)=20 cm

$$S=(371*1.43)/(4\pi*20^2)=0.106\text{mW/cm}^2$$

Therefore, at 20 cm the spectral power density is less than the 0.466 mW/cm^2 limit for uncontrolled exposure.

5.7. Result of LTE Band13

Test Results: MPE Limit Calculation: the EUT'S operating frequencies @ 746.0~755.9 MHz; The maximum conducted is 25.7dBm. The maximum gain is 2.23 dBi. Therefore, maximum limit for general public RF exposure: $746.0/1500=0.497 \text{ mW/cm}^2$.

$$S = \frac{PG}{4\pi d^2}$$

P= input power of the antenna (371mW)

G = antenna gain (1.67numeric)

r = distance to the center of radiation of antenna (in meter)=20 cm

$$S=(371*1.67)/(4\pi*20^2)=0.124\text{mW/cm}^2$$

Therefore, at 20 cm the spectral power density is less than the 0.497mW/cm^2 limit for uncontrolled exposure.

ANNEX A: EUT photograph

See the document” SIM7000A -External Photos”.

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