TEST REPORT

REPORT NUMBER: B18W50279-MPE

ON

Type of Equipment:	LTE CAT-M1/NB-IOT/GPRS/EDGE/GNSS MODULE
Type of Designation:	SIM7000G
Manufacturer:	Shanghai SIMCom Wireless Solutions Limited.
FCC ID:	2AJYU-SIM7000G

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

Aug 28, 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

Revision Version

Report Number	Revision	Date	Memo
B18W50279-MPE	00	2018-08-28	Initial creation of test report

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1. Test Laboratory

1.1. Testing Location

Company Name:	Chongqing Academy of Information andCommunications 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:	2018-08-28
Testing End Date:	2018-08-28

1.4. Signature

	2018-08-28
Ang Xinyu **(Prepared this test report)**	**Date**
	2018-08-28
Wang Lili **(Reviewed this test report)**	**Date**
	2018-08-28
Zhang Yan **Director of the laboratory** **(Approved this test report)**	**Date**

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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:	+86 21 3157 5182
Fax:	--
Email:	--
Contact Person:	Yongsheng Li

2.2. Manufacturer 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:	+86 21 3157 5182
Fax:	--
Email:	--
Contact Person:	Yongsheng Li

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

3.1. About EUT

Description:	LTE CAT-M1/NB-IOT/GPRS/EDGE/GNSS MODULE
Model name:	SIM7000G
GSM Frequency Band	GSM850/1900
NB-IOT Band	Band2/5/12/13/17/26
CAT-M1 Band	Band2/4/5/12/13/26
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
S2	869951030001246	SIM7000G_V1.03	SIM7000G R1529	2018-07-03

*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
B1	NA	NA

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

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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 mannerthat ensures that the public is not exposed to radio frequency energy level in excesslimit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2Subpart J, section 2.1091 this device has been defined as a mobile device whereby adistance 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.

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5. Test Results

5.1. RF Power Output

Frequency Band	Highest Power Output(dBm)	Highest Frame-Averaged Output Power (dBm)	Antenna Gain(dBi)
GSM 850	35.0	25.97	6.0
GSM 1900	32.0	22.97	10.0
NB-IOT Band2	25.7	25.7	10.0
NB-IOT Band5	25.7	25.7	6.0
NB-IOT Band12	25.7	25.7	6.0
NB-IOT Band13	25.7	25.7	6.0
NB-IOT Band17	25.7	25.7	6.0
NB-IOT Band26	25.7	25.7	6.0
CAT-M1 Band2	25.7	25.7	10.0
CAT-M1 Band4	25.7	25.7	10.0
CAT-M1 Band5	25.7	25.7	6.0
CAT-M1 Band12	25.7	25.7	6.0
CAT-M1 Band13	25.7	25.7	6.0
CAT-M1 Band26	25.7	25.7	6.0

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

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5.3. Results

Frequency range	Limit(W/m²)	Results(W/m²)	Verdict
GSM 850	0.549	0.313	Pass
GSM 1900	1.0	0.394	Pass
NB-IOT Band2	1.0	0.739	Pass
NB-IOT Band5	0.549	0.294	Pass
NB-IOT Band12	0.466	0.294	Pass
NB-IOT Band13	0.497	0.294	Pass
NB-IOT Band17	0.469	0.294	Pass
NB-IOT Band26	0.543	0.294	Pass
CAT-M1 Band2	1.0	0.739	Pass
CAT-M1 Band4	1.0	0.739	Pass
CAT-M1 Band5	0.549	0.294	Pass
CAT-M1 Band12	0.466	0.294	Pass
CAT-M1 Band13	0.497	0.294	Pass
CAT-M1 Band26	0.543	0.294	Pass

5.4. Result of GSM850

Test Results: MPE Limit Calculation: the EUT'S operating frequencies @ 824.2～848.8 MHz; The maximum conducted is 25.97 dBm. The maximum gain is 6.0 dBi. Therefore, maximum limit for general public RF exposure: 824.2/1500=0.549 mW/cm².

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

P= input power of the antenna（395 mW）

G = antenna gain（3.981 numeric）

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

S=(395*3.981)/(4 π*20²)=0.313 mW/cm²

Therefore, at 20 cm the spectral power density is less than the 0.549 mW/cm² limit for uncontrolled exposure.

5.5. Result of GSM1900

Test Results: MPE Limit Calculation: the EUT'S operating frequencies @ 1850.2～1909.8 MHz; The maximum conducted is 22.97 dBm. The maximum gain is 10.0 dBi. Therefore, maximum limit for general public RF exposure: 1.0 mW/cm².

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

P= input power of the antenna（198 mW）

G = antenna gain （10.0 numeric）

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

S=(198*10.0)/(4 π*20^2)=0.394 mW/cm^2

Therefore, at 20 cm the spectral power density is less than the 1.0 mW/cm^2 limit for uncontrolled exposure.

5.6. Result of NB-IOT 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 10.0 dBi. Therefore, maximum limit for general public RF exposure: 1.0 mW/cm^2.

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

P= input power of the antenna（372 mW）

G = antenna gain （10.0 numeric）

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

S=(372*10.0)/(4 π*20^2)=0.739 mW/cm^2

Therefore, at 20 cm the spectral power density is less than the 1.0 mW/cm^2 limit for uncontrolled exposure.

5.7. Result of NB-IOT Band5

Test Results: MPE Limit Calculation: the EUT'S operating frequencies @ 824.0～848.9 MHz; The maximum conducted is 25.7 dBm. The maximum gain is 6.0 dBi. Therefore, maximum limit for general public RF exposure: 824.0/1500=0.549 mW/cm^2.

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

P= input power of the antenna（372 mW）

G = antenna gain （3.981 numeric）

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

S=(372*3.981)/(4 π*20^2)=0.294 mW/cm^2

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Therefore, at 20 cm the spectral power density is less than the 0.549 mW/cm^2 limit for uncontrolled exposure.

5.8. Result of NB-IOT 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 6.0 dBi. Therefore, maximum limit for general public RF exposure: 699.0/1500=0.466 mW/cm^2.

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

P= input power of the antenna（372 mW）

G = antenna gain（3.981 numeric）

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

S=(372*3.981)/(4 π*20^2)=0.294 mW/cm^2

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

5.9. Result of NB-IOT Band13

Test Results: MPE Limit Calculation: the EUT'S operating frequencies @ 746.0～755.9 MHz; The maximum conducted is 25.7 dBm. The maximum gain is 6.0 dBi. Therefore, maximum limit for general public RF exposure: 746.0/1500=0.497 mW/cm^2.

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

P= input power of the antenna（372 mW）

G = antenna gain（3.981 numeric）

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

S=(372*3.981)/(4 π*20^2)=0.294 mW/cm^2

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

5.10.   Result of NB-IOT Band17

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Test Results: MPE Limit Calculation: the EUT'S operating frequencies @ 704.0~715.9 MHz; The maximum conducted is 25.7 dBm. The maximum gain is 6.0 dBi. Therefore, maximum limit for general public RF exposure: 704.0/1500=0.469 mW/cm^2.

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

P= input power of the antenna（372 mW）

G = antenna gain（3.981 numeric）

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

S=(372*3.981)/(4 π*20^2)=0.294 mW/cm^2

Therefore, at 20 cm the spectral power density is less than the 0.469 mW/cm^2 limit for uncontrolled exposure.

5.11.   Result of NB-IOT Band26

Test Results: MPE Limit Calculation: the EUT'S operating frequencies @ 814.0~848.9 MHz; The maximum conducted is 25.7 dBm. The maximum gain is 6.0 dBi. Therefore, maximum limit for general public RF exposure: 814.0/1500=0.543 mW/cm^2.

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

P= input power of the antenna（372 mW）

G = antenna gain（3.981 numeric）

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

S=(372*3.981)/(4 π*20^2)=0.294 mW/cm^2

Therefore, at 20 cm the spectral power density is less than the 0.543 mW/cm^2 limit for uncontrolled exposure.

5.12.   Result of CAT-M1 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 10.0 dBi. Therefore, maximum limit for general public RF exposure: 1.0 mW/cm^2.

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

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P= input power of the antenna（372 mW）

G = antenna gain（10.0 numeric）

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

S=(372*10.0)/(4 π*20^2)=0.739 mW/cm^2

Therefore, at 20 cm the spectral power density is less than the 1.0 mW/cm^2 limit for uncontrolled exposure.

5.13.　　Result of CAT-M1 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 10.0 dBi. Therefore, maximum limit for general public RF exposure: 1.0 mW/cm^2.

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

P= input power of the antenna（372 mW）

G = antenna gain （10.0 numeric）

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

S=(372*10.0)/(4 π*20^2)=0.739 mW/cm^2

Therefore, at 20 cm the spectral power density is less than the 1.0 mW/cm^2 limit for uncontrolled exposure.

5.14.　　Result of CAT-M1 Band5

Test Results: MPE Limit Calculation: the EUT'S operating frequencies @ 824.0～848.9 MHz; The maximum conducted is 25.7 dBm. The maximum gain is 6.0 dBi. Therefore, maximum limit for general public RF exposure: 824.0/1500=0.549 mW/cm^2.

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

P= input power of the antenna（372 mW）

G = antenna gain （3.981 numeric）

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

S=(372*3.981)/(4 π*20^2)=0.294 mW/cm^2

Therefore, at 20 cm the spectral power density is less than the 0.549 mW/cm^2 limit for uncontrolled exposure.

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5.15. Result of CAT-M1 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 6.0 dBi. Therefore, maximum limit for general public RF exposure: 699.0/1500=0.466 mW/cm^2.

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

P= input power of the antenna（372 mW）

G = antenna gain（3.981 numeric）

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

S=(372*3.981)/(4 π*20^2)=0.294 mW/cm^2

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

5.16. Result of CAT-M1 Band13

Test Results: MPE Limit Calculation: the EUT'S operating frequencies @ 746.0～755.9 MHz; The maximum conducted is 25.7 dBm. The maximum gain is 6.0 dBi. Therefore, maximum limit for general public RF exposure: 746.0/1500=0.497 mW/cm^2.

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

P= input power of the antenna（372 mW）

G = antenna gain（3.981 numeric）

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

S=(372*3.981)/(4 π*20^2)=0.294 mW/cm^2

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

5.17. Result of CAT-M1 Band26

Test Results: MPE Limit Calculation: the EUT'S operating frequencies @ 814.0～848.9 MHz; The maximum conducted is 25.7 dBm. The maximum gain is 6.0 dBi. Therefore, maximum limit for general public RF exposure: 814.0/1500=0.543 mW/cm^2.

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

P= input power of the antenna（372 mW）

G = antenna gain（3.981 numeric）

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

S=(372*3.981)/(4π*20^2)=0.294 mW/cm^2

Therefore, at 20 cm the spectral power density is less than the 0.543 mW/cm^2 limit for uncontrolled exposure.

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ANNEX A: EUT photograph

See the document" SIM7000G -External Photos".

END OF REPORT

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