TEST REPORT

REPORT NUMBER: B19W50074-MPE-Rev4

ON

Type of Equipment:	LTE /HSPA/GSM/GNSS MODULE
Type of Designation:	SIM7600SA-H, SIM7600SA-H miniPCIE
Manufacturer:	SIMCom Wireless Solutions Limited
FCC ID:	2AJYU-8PYA002

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

May, 07, 2019

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.

Revision Version

Report Number	Revision	Date	Memo
B19W50074-MPE	00	2019-4-1	Initial creation of test report
B19W50074-MPE-Rev1	01	2019-4-17	First Revision of test report
B19W50074-MPE-Rev2	02	2019-4-30	Second Revision of test report
B19W50074-MPE-Rev3	03	2019-5-6	Third Revision of test report
B19W50074-MPE-Rev4	04	2019-5-7	Fourth Revision of test report

CONTENTS

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:	2019-05-05
Testing End Date:	2019-05-07

1.4. Signature

2019-05-07

Ang Xinyu
(Prepared this test report)

Date

2019-05-07

Wang Lili
(Reviewed this test report)

Date

2019-05-07

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

Date

2. Client Information

2.1. Applicant Information

Company Name:	SIMCom Wireless Solutions Limited
Address /Post:	SIM Technology Building.,No.633, Jinzhong Rd,Changning District, Shanghai, P.R.China
Telephone:	021-32523020
Fax:	021-32523423
Email:	--
Contact Person:	weixing.li

2.2. Manufacturer Information

Company Name:	SIMCom Wireless Solutions Limited
Address /Post:	SIM Technology Building.,No.633, Jinzhong Rd,Changning District, Shanghai, P.R.China
Telephone:	021-32523020
Fax:	021-32523423
Email:	--
Contact Person:	weixing.li

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

3.1. About EUT

Description:	LTE /HSPA/GSM/GNSS MODULE
Model name:	SIM7600SA-H, SIM7600SA-H miniPCIE
GSM Frequency Band	GSM850/1900
UMTS Frequency Band	Band2/5
E-UTRA Frequency Band	Band2/4/5/28/66
GPRS Multislot Class	--
EGPRS Multislot Class	12
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**
S5	SN: MP0619052B6DADE	V1.01	SIM7600M22_V2.2	2019-2-27

*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 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.

5. Test Results

5.1. RF Power Output

Frequency Band	Highest Averaged Power Output(dBm)	Highest Frame-Averaged Output Power (dBm)	Antenna Gain(dBi)
GSM850	35	25.97	0.91
GSM1900	32	22.97	1.87
GPRS 850 4TS	35	31.99	0.91
GPRS 1900 4TS	32	28.99	1.87
WCDMA Band2	25	25	1.87
WCDMA Band5	25	25	0.91
LTE Band2	25.7	25.7	1.87
LTE Band4	25.7	25.7	3.12
LTE Band5	25.7	25.7	0.91
LTE Band28	25.7	25.7	0.95
LTE Band66	25.7	25.7	3.12

Notes:

1) Division Factors

To average the power, the division factor is as follows:

1TX-slot = 1 transmit time slot out of 8 time slots=> conducted power divided by (8/1) => -9.03dB

2TX-slots = 2 transmit time slots out of 8 time slots=> conducted power divided by (8/2) => -6.02dB

3TX-slots = 3 transmit time slots out of 8 time slots=> conducted power divided by (8/3) => -4.26dB

4TX-slots = 4 transmit time slots out of 8 time slots=> conducted power divided by (8/4) => -3.01dB

2) According to the conducted power as above, the measurements are performed with 1Txslots for 850MHz and 1900MHz.

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(mW/m^2)	Results(mW/m^2)	Verdict
GSM850	0.55	0.097	Pass
GSM1900	1.0	0.061	Pass
GPRS 850 4TS	0.55	0.388	Pass
GPRS 1900 4TS	1.0	0.194	Pass
WCDMA Band2	1.0	0.097	Pass
WCDMA Band5	0.55	0.078	Pass
LTE Band2	1.0	0.114	Pass
LTE Band4	1.0	0.152	Pass
LTE Band5	0.55	0.091	Pass
LTE Band28	0.47	0.092	Pass
LTE Band66	1.0	0.152	Pass

5.4. Result of GSM 850

Test Results: MPE Limit Calculation: the EUT'S operating frequencies @ 824.2～848.8MHz; The maximum conducted is 25.97 dBm. The maximum gain is 0.91dBi. Therefore, maximum limit for general public RF exposure: 824.2/1500=0.55mW/cm^2.

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

P= input power of the antenna（395.4mW）
G = antenna gain（1.233 numeric）
r = distance to the center of radiation of antenna (in meter)=20 cm

S=(395.4*1.233)/(4 π*20^2)=0.097mW/cm^2

Therefore, at 20 cm the spectral power density is less than the 0.55 mW/cm^2 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 22.97dBm. The maximum gain is 1.87dBi. 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（198.15 mW）
G = antenna gain（1.538numeric）
r = distance to the center of radiation of antenna (in meter)=20 cm

S=(198.15*1.538)/(4 π*20^2)=0.061 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 GPRS 850 4TS

Test Results: MPE Limit Calculation: the EUT'S operating frequencies @ 824.2～848.8MHz; The maximum conducted is 31.99 dBm. The maximum gain is 0.91dBi. Therefore, maximum limit for general public RF exposure: 824.2/1500=0.55mW/cm^2.

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

P= input power of the antenna（1581.2mW）
G = antenna gain（1.233 numeric）
r = distance to the center of radiation of antenna (in meter)=20 cm

S=(1581.2*1.233)/(4 π*20^2)=0.388 mW/cm^2

Therefore, at 20 cm the spectral power density is less than the 0.55 mW/cm^2 limit for uncontrolled exposure.

5.7. Result of GRPS 1900 4TS

Test Results: MPE Limit Calculation: the EUT'S operating frequencies @ 1850.2～1909.8 MHz; The maximum conducted is 28.99dBm. The maximum gain is 1.87dBi. 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（792.5 mW）
G = antenna gain（1.233numeric）
r = distance to the center of radiation of antenna (in meter)=20 cm

S=(792.5*1.233)/(4 π*20^2)=0.194 mW/cm^2

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

5.8. Result of WCDMA Band2

Test Results: MPE Limit Calculation: the EUT'S operating frequencies @ 1852.4～1907.6 MHz; The maximum conducted is 25.0 dBm. The maximum gain is 1.87dBi. 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（316.23 mW）
G = antenna gain（1.538numeric）
r = distance to the center of radiation of antenna (in meter)=20 cm

S=(316.23*1.538)/(4 π*20^2)=0.097mW/cm^2

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

5.9. Result of WCDMA Band5

Test Results: MPE Limit Calculation: the EUT'S operating frequencies @ 826.4~846.6MHz; The maximum conducted is 25.0 dBm. The maximum gain is 0.91dBi. Therefore, maximum limit for general public RF exposure:826.4/1500=0.55 mW/cm^2.

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

P= input power of the antenna（316.23 mW）
G = antenna gain（1.233numeric）
r = distance to the center of radiation of antenna (in meter)=20 cm

S=(316*1.233)/(4 π*20^2)=0.078mW/cm^2

Therefore, at 20 cm the spectral power density is less than the 0.55 mW/cm^2 limit for uncontrolled exposure.

5.10. Result of LTE Band2

Test Results: MPE Limit Calculation: the EUT'S operating frequencies @1850.0～1909.9 MHz; The maximum conducted is 25.7dBm. The maximum gain is 1.87dBi. 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（371.54mW）
G = antenna gain（1.538numeric）
r = distance to the center of radiation of antenna (in meter)=20 cm

S=(371.54*1.538)/(4 π*20^2)=0.114mW/cm^2

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

5.11. Result of LTE Band4

Test Results: MPE Limit Calculation: the EUT'S operating frequencies @ 1710.0～1754.9 MHz; The maximum conducted is 25.7dBm. The maximum gain is 3.12 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（371.54 mW）
G = antenna gain（2.051 numeric）
r = distance to the center of radiation of antenna (in meter)=20 cm

S=(371.54*2.051)/(4 π*20^2)=0.152mW/cm^2

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

5.12. Result of LTE Band5

Test Results: MPE Limit Calculation: the EUT'S operating frequencies @ 824.0～848.9 MHz; The maximum conducted is 25.7dBm. The maximum gain is 0.91 dBi. Therefore, maximum limit for general public RF exposure: 824.0/1500=0.55 mW/cm^2.

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

P= input power of the antenna（371.54mW）
G = antenna gain（1.233numeric）
r = distance to the center of radiation of antenna (in meter)=20 cm

S=(371.54*1.233)/(4 π*20^2)=0.091mW/cm^2

Therefore, at 20 cm the spectral power density is less than the 0.55mW/cm^2 limit for uncontrolled exposure.

5.13. Result of LTE Band28

Test Results: MPE Limit Calculation: the EUT'S operating frequencies @ 703.0～747.9 MHz; The maximum conducted is 25.7dBm. The maximum gain is 0.95 dBi. Therefore, maximum limit for general public RF exposure: 703.0/1500=0.47mW/cm^2.

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

P= input power of the antenna（371.54mW）
G = antenna gain（1.245numeric）
r = distance to the center of radiation of antenna (in meter)=20 cm

S=(317.5*1.245)/(4 π*20^2)=0.092mW/cm^2

Therefore, at 20 cm the spectral power density is less than the 0.47mW/cm^2 limit for uncontrolled exposure.

5.14. Result of LTE Band66

Test Results: MPE Limit Calculation: the EUT'S operating frequencies @ 1710.0～1779.9 MHz; The maximum conducted is 25.7dBm. The maximum gain is 3.12 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（371.54 mW）
G = antenna gain（2.051numeric）
r = distance to the center of radiation of antenna (in meter)=20 cm

S=(371.54*2.051)/(4 π*20^2)=0.152mW/cm^2

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

ANNEX A: EUT photograph

See the document" SIM7600SA-H,SIM7600SA-H miniPCIE -External Photos".

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