



TEST REPORT

REPORT NUMBER: I22W00053-MPE-Rev3

ON

Type of Equipment: LTE /HSPA/GSM/GNSS MODULE
Type of Designation: A7608SA-H /A7608SA-H miniPCIE
Manufacturer: SIMCom Wireless Solutions Limited
Brand Name: SIMCom
FCC ID: 2AJYU-8BAE006

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

Oct,17,2022

Signature

Xiang Luoyong

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
I22W00053-MPE	00	2022-9-20	Initial creation of test report
I22W00053-MPE-Rev1	01	2022-10-13	First change of test report
I22W00053-MPE-Rev2	02	2022-10-14	Second change of test report
I22W00053-MPE-Rev3	03	2022-10-17	Third change of test report
Note: This version has changed antenna gain for LTE band4/5/41/66 , and recalculated Power density.			



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1. Test Laboratory

1.1. Testing Location

Company Name:	Chongqing Academy of Information and Communications Technology
Address:	Building C, Technology Innovation Center, No.8, Yuma Road, Chayuan New Area, Nan'an District, Chongqing, People's Republic of China
Postal Code:	401336
Telephone:	0086-23-88069965
Fax:	0086-23-88608777

1.2. Testing Environment

Normal Temperature:	21.3°C
Relative Humidity:	65.0%

1.3. Project Data

Testing Start Date:	2022-9-15
Testing End Date:	2022-9-15

1.4. Signature



2022-10-17

Fu Bohao
(Prepared this test report)

Date



2022-10-17

Wang Lili
(Reviewed this test report)

Date



2022-10-17

Xiang Luoyong
Director of the laboratory
(Approved this test report)

Date

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2. Client Information

2.1. Applicant Information

Company Name:	SIMCom Wireless Solutions Limited
Address /Post:	Building 3, No.289 Linhong Road, Changning District, Shanghai, China
Country:	CHINA
Telephone:	15902149520
Fax:	--
Email:	yue.hai@simcom.com
Contact Person:	Haiyue

2.2. Manufacturer Information

Company Name:	SIMCom Wireless Solutions Limited
Address /Post:	Building 3, No.289 Linhong Road, Changning District, Shanghai, China
Country:	CHINA
Telephone:	15902149520
Fax:	--
Email:	yue.hai@simcom.com
Contact Person:	Haiyue

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

3.1. About EUT

EUT Description:	LTE /HSPA/GSM/GNSS MODULE
Model name:	A7608SA-H /A7608SA-H miniPCIE
GSM Frequency Band:	GSM850/1900
WCDMA Frequency Band:	Band 2/5
LTE Frequency Band:	Band 2/4/5/41/66
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	862733060027151	V1.02	A7600M7_V5.0	2022-7-5

*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. Tune Up Power and Antenna Gain

Frequency Band	Highest Averaged Tune Up Power(dBm)	Highest Frame-Averaged Tune Up Power (dBm)	Antenna Gain(dBi)
GSM850	32.6	23.57	2
GSM1900	29	19.97	3
GPRS850 1TS	32.6	23.57	2
GPRS1900 1TS	29	19.97	3
GPRS850 2TS	32.6	26.58	2
GPRS1900 2TS	29	22.98	3
GPRS850 3TS	32.6	28.34	2
GPRS1900 3TS	29	24.74	3
GPRS850 4TS	30	26.99	2
GPRS1900 4TS	26	22.99	3
EGPRS850 1TS	28	18.97	2
EGPRS1900 1TS	26	16.97	3
EGPRS850 2TS	25	18.98	2
EGPRS1900 2TS	24	17.98	3
EGPRS850 3TS	25	20.74	2
EGPRS1900 3TS	24	19.74	3
EGPRS850 4TS	23	19.99	2
EGPRS1900 4TS	20	16.99	3
WCDMA Band 2	24	24	3
WCDMA Band 5	24	24	2
LTE Band2	22.7	22.7	3
LTE Band4	22.9	22.9	6
LTE Band5	23	23	2
LTE Band41	22	22	9
LTE Band66	24	24	6

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) Disclaimers: The tune up power and antenna gain in the above table are provided by the customer

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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/cm ²)	Results(mW/cm ²)	Verdict
GSM850	0.55	0.07	PASS
GSM1900	1.00	0.04	PASS
GPRS850 3TS	0.55	0.22	PASS
GPRS1900 3TS	1.00	0.12	PASS
EGPRS850 3TS	0.55	0.04	PASS
EGPRS1900 3TS	1.00	0.01	PASS
WCDMA Band 2	1.00	0.10	PASS
WCDMA Band 5	0.55	0.08	PASS
LTE Band2	1.00	0.07	PASS
LTE Band4	1.00	0.15	PASS
LTE Band5	0.55	0.06	PASS
LTE Band41	1.00	0.25	PASS
LTE Band66	1.00	0.20	PASS

5.4. Result of GSM 850

Test Results: MPE Limit Calculation: the EUT'S operating frequencies @ 824.20 MHz~848.80 MHz; The maximum conducted is 23.57 dBm. The maximum gain is 2.00 dBi. Therefore, maximum limit for general public RF exposure: 824.20/1500=0.55 mW/cm².

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

P= input power of the antenna (mW)

G = antenna gain (numeric)

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

S=0.07 mW/cm²

Therefore, at 20 cm the spectral power density is less than the 0.55 mW/cm² limit for uncontrolled exposure.

5.5. Result of GSM 1900

Test Results: MPE Limit Calculation: the EUT'S operating frequencies @ 1850.20 MHz~1909.80MHz; The maximum conducted is 19.97 dBm. The maximum gain is 3.00 dBi. Therefore, maximum limit for general public RF exposure: 1.00 mW/cm².

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

P= input power of the antenna (mW)

G = antenna gain (numeric)

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

S=0.04 mW/cm²

Therefore, at 20 cm the spectral power density is less than the 1.00 mW/cm² limit for uncontrolled exposure.

5.6. Result of GPRS 850 3TS

Test Results: MPE Limit Calculation: the EUT'S operating frequencies @ 824.20 MHz~848.80 MHz; The maximum conducted is 28.34 dBm. The maximum gain is 2.00 dBi. Therefore, maximum limit for general public RF exposure: 824.20/1500=0.55 mW/cm².

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

P= input power of the antenna (mW)

G = antenna gain (numeric)

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

S=0.22 mW/cm²

Therefore, at 20 cm the spectral power density is less than the 0.55 mW/cm² limit for uncontrolled exposure.

5.7. Result of GPRS 1900 3TS

Test Results: MPE Limit Calculation: the EUT'S operating frequencies @ 1850.20 MHz~1909.80MHz; The maximum conducted is 24.74 dBm. The maximum gain is 3.00 dBi. Therefore, maximum limit for general public RF exposure: 1.00 mW/cm².

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

P= input power of the antenna (mW)

G = antenna gain (numeric)

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

S=0.12 mW/cm²

Therefore, at 20 cm the spectral power density is less than the 1.00 mW/cm² limit for uncontrolled exposure.

5.8. Result of EGPRS 850 3TS

Test Results: MPE Limit Calculation: the EUT'S operating frequencies @ 824.20 MHz~848.80 MHz; The maximum conducted is 20.74 dBm. The maximum gain is 2.00 dBi. Therefore, maximum limit for general public RF exposure: 824.20/1500=0.55 mW/cm².

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

P= input power of the antenna (mW)

G = antenna gain (numeric)

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

S=0.04 mW/cm²

Therefore, at 20 cm the spectral power density is less than the 0.55 mW/cm² limit for uncontrolled exposure.

5.9. Result of EGPRS 1900 3TS

Test Results: MPE Limit Calculation: the EUT'S operating frequencies @ 1850.20 MHz~1909.80MHz; The maximum conducted is 19.74 dBm. The maximum gain is 3.00 dBi. Therefore, maximum limit for general public RF exposure: 1.00mW/cm².

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

P= input power of the antenna (mW)

G = antenna gain (numeric)

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

S=0.04 mW/cm²

Therefore, at 20 cm the spectral power density is less than the 1.00 mW/cm² limit for uncontrolled exposure.

5.10. Result of WCDMA Band 2

Test Results: MPE Limit Calculation: the EUT'S operating frequencies @ 1852.40 MHz~1907.60 MHz; The maximum conducted is 24.00 dBm. The maximum gain is 3.00 dBi. Therefore, maximum limit for general public RF exposure: 1.00 mW/cm².

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

P= input power of the antenna (mW)

G = antenna gain (numeric)

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

S=0.10 mW/cm²

Therefore, at 20 cm the spectral power density is less than the 1.00 mW/cm² limit for uncontrolled exposure.

5.11. Result of WCDMA Band 5

Test Results: MPE Limit Calculation: the EUT'S operating frequencies @ 826.4 MHz ~ 846.6 MHz; The maximum conducted is 24.00 dBm. The maximum gain is 2.00 dBi. Therefore, maximum limit for general public RF exposure: 826.4/1500=0.55 mW/cm².

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

P= input power of the antenna (mW)

G = antenna gain (numeric)

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

S=0.08 mW/cm²

Therefore, at 20 cm the spectral power density is less than the 0.55 mW/cm² limit for uncontrolled exposure.

5.12. Result of LTE Band 2

Test Results: MPE Limit Calculation: the EUT'S operating frequencies @ 1850.0 MHz ~ 1909.9MHz; The maximum conducted is 22.70 dBm. The maximum gain is 3.00 dBi. Therefore, maximum limit for general public RF exposure: 1.00 mW/cm².

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

P= input power of the antenna (mW)

G = antenna gain (numeric)

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

S=0.07 mW/cm²

Therefore, at 20 cm the spectral power density is less than the 1.00 mW/cm² limit for uncontrolled exposure.

5.13. Result of LTE Band 4

Test Results: MPE Limit Calculation: the EUT'S operating frequencies @ 1710.0 MHz ~ 1754.9MHz; The maximum conducted is 22.90 dBm. The maximum gain is 6.00 dBi. Therefore, maximum limit for general public RF exposure: 1.00 mW/cm².

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

P= input power of the antenna (mW)

G = antenna gain (numeric)

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

S=0.15 mW/cm²

Therefore, at 20 cm the spectral power density is less than the 1.00 mW/cm² limit for uncontrolled exposure.

5.14. Result of LTE Band 5

Test Results: MPE Limit Calculation: the EUT'S operating frequencies @ 824.0 MHz ~ 848.9 MHz; The maximum conducted is 23.00 dBm. The maximum gain is 2.00 dBi. Therefore, maximum limit for general public RF exposure: 824.00/1500=0.55 mW/cm².

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

P= input power of the antenna (mW)

G = antenna gain (numeric)

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

S=0.06 mW/cm²

Therefore, at 20 cm the spectral power density is less than the 0.55 mW/cm² limit for uncontrolled exposure.



5.15. Result of LTE Band 41

Test Results: MPE Limit Calculation: the EUT'S operating frequencies @ 2496.0 MHz ~ 2689.9MHz; The maximum conducted is 22.00 dBm. The maximum gain is 9.00 dBi. Therefore, maximum limit for general public RF exposure: 1.00mW/cm².

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

P= input power of the antenna (mW)

G = antenna gain (numeric)

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

S=0.25 mW/cm²

Therefore, at 20 cm the spectral power density is less than the 1.00 mW/cm² limit for uncontrolled exposure.

5.16. Result of LTE Band 66

Test Results: MPE Limit Calculation: the EUT'S operating frequencies @ 1710.0 MHz ~ 1779.9MHz; The maximum conducted is 24.00 dBm. The maximum gain is 6.00 dBi. Therefore, maximum limit for general public RF exposure: 1.00 mW/cm².

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

P= input power of the antenna (mW)

G = antenna gain (numeric)

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

S=0.20 mW/cm²

Therefore, at 20 cm the spectral power density is less than the 1.00 mW/cm² limit for uncontrolled exposure.



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ANNEX A: EUT Photograph

See the document "LTE /HSPA/GSM/GNSS MODULE Photos".

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

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