

TEST REPORT

Applicant: SIMCom Wireless Solutions Limited
Address: SIMCom Headquarters Building, Building 3, No.289
Linhong Road, Changning District, Shanghai, China
Equipment Type: SIMCom LTE Cat12 Module
Model Name: SIM7912G-M2
Brand Name: SIMCom
FCC ID: 2AJYU-8XM0003
Test Standard: 47 CFR Part 2.1091
KDB 447498 D04 v01
Sample Arrival Date: Sep. 21, 2022
Test Date: Sep. 21, 2022 - Oct. 26, 2022
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ISSUED BY:

Shenzhen BALUN Technology Co., Ltd.

Tested by: Xiong Lining

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(Chief Engineer)



Revision History		
Version	Issue Date	Revisions Content
<u>Rev. 01</u>	<u>Dec. 22, 2022</u>	<u>Initial Issue</u>

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1 GENERAL INFORMATION

1.1 Test Laboratory

Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Phone Number	+86 755 6685 0100

1.2 Test Location

Name	Shenzhen BALUN Technology Co., Ltd.
Location	<input checked="" type="checkbox"/> Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
	<input type="checkbox"/> 1/F, Building B, Ganghongji High-tech Intelligent Industrial Park, No. 1008, Songbai Road, Yangguang Community, Xili Sub-district, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Accreditation Certificate	The laboratory is a testing organization accredited by FCC as a accredited testing laboratory. The designation number is CN1196.

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	SIMCom Wireless Solutions Limited
Address	SIMCom Headquarters Building, Building 3, No.289 Linhong Road, Changning District, Shanghai, China

2.2 Manufacturer Information

Manufacturer	SIMCom Wireless Solutions Limited
Address	SIMCom Headquarters Building, Building 3, No.289 Linhong Road, Changning District, Shanghai, China

2.3 Factory Information

Factory	N/A
Address	N/A

2.4 General Description for Equipment under Test (EUT)

EUT Name	SIMCom LTE Cat12 Module
Model Name Under Test	SIM7912G-M2
Series Model Name	N/A
Description of Model name differentiation	N/A
Hardware Version	N/A
Software Version	N/A
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

2.5 Ancillary Equipment

Not applicable.

2.6 Technical Information

Network and Wireless connectivity	3G Network WCDMA/HSDPA/HSUPA Band 2/4/5 4G Network FDD LTE Band 2/4/5/7/12/13/14/17/18/19/25/26/30/66 TDD LTE Band 38/40/41/48 GPS, GLONASS, BeiDou, Galileo
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The requirement for the following technical information of the EUT was tested in this report:

Operating Mode	WCDMA, LTE		
Frequency Range	WCDMA Band 2	TX: 1850 MHz ~ 1910 MHz	RX: 1930 MHz ~ 1990 MHz
	WCDMA Band 4	TX: 1710 MHz ~ 1755 MHz	RX: 2110 MHz ~ 2155 MHz
	WCDMA Band 5	TX: 824 MHz ~ 849 MHz	RX: 869 MHz ~ 894 MHz
	LTE Band 2	TX: 1850 MHz ~ 1910 MHz	RX: 1930 MHz ~ 1990 MHz
	LTE Band 4	TX: 1710 MHz ~ 1755 MHz	RX: 2110 MHz ~ 2155 MHz
	LTE Band 5	TX: 824 MHz ~ 849 MHz	RX: 869 MHz ~ 894 MHz
	LTE Band 7	TX: 2500 MHz ~ 2570 MHz	RX: 2620 MHz ~ 2690 MHz
	LTE Band 12	TX: 699 MHz ~ 716 MHz	RX: 729 MHz ~ 746 MHz
	LTE Band 13	TX: 777 MHz ~ 787 MHz	RX: 746 MHz ~ 756 MHz
	LTE Band 14	TX: 788 MHz ~ 798 MHz	RX: 758 MHz ~ 768 MHz
	LTE Band 17	TX: 704 MHz ~ 716 MHz	RX: 734 MHz ~ 746 MHz
	LTE Band 18	TX: 815 MHz ~ 824 MHz	RX: 860 MHz ~ 869 MHz
		TX: 824 MHz ~ 830 MHz	RX: 869 MHz ~ 875 MHz
	LTE Band 19	TX: 830 MHz ~ 845 MHz	RX: 875 MHz ~ 890 MHz
	LTE Band 25	TX: 1850 MHz ~ 1915 MHz	RX: 1930 MHz ~ 1995 MHz
	LTE Band 26	TX: 814 MHz ~ 824 MHz	RX: 859 MHz ~ 869 MHz
		TX: 824 MHz ~ 849 MHz	RX: 869 MHz ~ 894 MHz
	LTE Band 30	TX: 2305 MHz ~ 2315 MHz	RX: 2350 MHz ~ 2360 MHz
	LTE Band 66	TX: 1710 MHz ~ 1780 MHz	RX: 2110 MHz ~ 2180 MHz
	LTE Band 38	TX: 2570 MHz ~ 2620 MHz	RX: 2570 MHz ~ 2620 MHz
LTE Band 40	TX: 2305 MHz ~ 2315 MHz	RX: 2305 MHz ~ 2315 MHz	
	TX: 2350 MHz ~ 2360 MHz	RX: 2350 MHz ~ 2360 MHz	
LTE Band 41	TX: 2496 MHz ~ 2690 MHz	RX: 2496 MHz ~ 2690 MHz	
LTE Band 48	TX: 3550 MHz ~ 3700 MHz	RX: 3550 MHz ~ 3700 MHz	
Antenna Type	Rubber Duck Antenna		
Exposure Category	General Population/Uncontrolled Exposure		
EUT Stage	Mobile Device		

3 SUMMARY OF TEST RESULT

3.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 2.1091	Radiofrequency radiation exposure evaluation: mobile devices
2	KDB 447498 D04 v01	447498 D04 Interim General RF Exposure Guidance v01

4 DEVICE CATEGORY AND LEVELS LIMITS

Mobile Device:

CFR Title 47 §2.1091(b)

(b) For purposes of this section, a mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons.

FCC KDB 447498 D04 General RF Exposure Guidance v01 Limit

Evaluation of compliance with the exposure limits in § 1.1310 is necessary if the ERP of the device is greater than ERP_{20cm} in Formula (B.1) [repeated from § 2.1091(c)(1) and § 1.1307(b)(1)(i)(B)].

$$P_{th} \text{ (mW)} = ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases} \quad (\text{B.1})$$

If the ERP is not easily obtained, then the available maximum time-averaged power may be used (i. e., without consideration of ERP only if the physical dimensions of the radiating structure(s) do not exceed the electrical length of $\lambda/4$ or if the antenna gain is less than that of a half-wave dipole.

SAR-based exemptions are constant at separation distances between 20 cm and 40 cm to avoid discontinuities in the threshold when transitioning between SAR-based and MPE-based exemption criteria at 40 cm, considering the importance of reflections.

The SAR-based exemption formula of § 1.1307(b)(3)(i)(B), repeated here as Formula (B.2), applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power or effective radiated power (ERP), whichever is greater, of less than or equal to the threshold P_{th} (mW).

This method shall only be used at separation distances from 0.5 cm to 40 cm and at frequencies from 0.3 GHz to 6 GHz (inclusive). P_{th} is given by Formula (B.2).

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases} \quad \text{(B.2)}$$

where

$$x = -\log_{10} \left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right)$$

and f is in GHz, d is the separation distance (cm), and $ERP_{20 \text{ cm}}$ is per Formula (B.1). The example values shown in Table B.2 are for illustration only.

Table B.2—Example Power Thresholds (mW)

Frequency (MHz)	Distance (mm)									
	5	10	15	20	25	30	35	40	45	50
300	39	65	88	110	129	148	166	184	201	217
450	22	44	67	89	112	135	158	180	203	226
835	9	25	44	66	90	116	145	175	207	240
1900	3	12	26	44	66	92	122	157	195	236
2450	3	10	22	38	59	83	111	143	179	219
3600	2	8	18	32	49	71	96	125	158	195
5800	1	6	14	25	40	58	80	106	136	169

5 ASSESSMENT RESULT

5.1 Output Power

WCDMA			
Mode	Band 2	Band 4	Band 5
Conducted Power (dBm)	22.49	22.55	22.76
Antenna Gain (dBi)	1.5	1.5	0.5
ERP/EIRP(dBm)	23.99	24.05	23.26

Note: This report listed the worst case power value, please refer to BL-SZ2290772-501 report for more details.

LTE						
Mode	Band 2	Band 4	Band 5	Band 7	Band 12	Band 13
Conducted Power (dBm)	22.79	22.72	23.38	22.55	23.22	22.84
Antenna Gain (dBi)	1.5	1.5	0.5	1	0	0
ERP/EIRP(dBm)	24.29	24.22	23.88	23.55	23.22	22.84
Mode	Band 14	Band 17	Band 18	Band 19	Band 25	Band 26
Conducted Power (dBm)	22.93	23.45	23.9	23.63	22.9	23.69
Antenna Gain (dBi)	0	0	0.5	0.5	1.5	0.5
ERP/EIRP(dBm)	22.93	23.45	24.4	24.13	24.4	24.19
Mode	Band 30	Band 38	Band 40	Band 41	Band 48	Band 66
Conducted Power (dBm)	22.65	23.03	22.52	23.47	21.24	22.61
Antenna Gain (dBi)	1	1	1	1	1	1
ERP/EIRP(dBm)	23.65	24.03	23.52	24.47	22.24	23.61

Note: This report listed the worst case power value, please refer to BL-SZ2290772-501 report for more details.

5.2 Tune-up power

Mode		Conducted Power Range (dBm)	EIRP Range (dBm)	ERP Range (dBm)
WCDMA	Band 2	[22.00,23.00]	[23.50,24.50]	[21.35,22.35]
	Band 4	[22.00,23.00]	[23.50,24.50]	[21.35,22.35]
	Band 5	[22.00,23.00]	[23.50,24.00]	[21.35,22.35]
LTE	Band 2	[22.00,23.00]	[24.00,25.00]	[21.85,22.85]
	Band 4	[22.00,23.00]	[24.00,25.00]	[21.85,22.85]
	Band 5	[23.00,24.00]	[23.00,24.00]	[20.85,21.85]
	Band 7	[22.00,23.00]	[23.00,24.00]	[20.85,21.85]
	Band 12	[23.00,24.00]	[23.00,24.00]	[20.85,21.85]
	Band 13	[22.00,23.00]	[22.00,23.00]	[19.85,20.85]
	Band 14	[22.00,23.00]	[22.00,23.00]	[19.85,20.85]
	Band 17	[23.00,24.00]	[22.00,23.00]	[19.85,20.85]
	Band 18	[23.00,24.00]	[24.00,25.00]	[21.85,22.85]
	Band 19	[23.00,24.00]	[24.00,25.00]	[21.85,22.85]
	Band 25	[22.00,23.00]	[24.00,25.00]	[21.85,22.85]
	Band 26	[23.00,24.00]	[24.00,25.00]	[21.85,22.85]
	Band 30	[22.00,23.00]	[23.00,24.00]	[20.85,21.85]
	Band 38	[23.00,24.00]	[24.00,25.00]	[21.85,22.85]
	Band 40	[22.00,23.00]	[23.00,24.00]	[20.85,21.85]
Band 41	[23.00,24.00]	[24.00,25.00]	[21.85,22.85]	
Band 48	[21.00,22.00]	[22.00,23.00]	[19.85,20.85]	
Band 66	[22.00,23.00]	[23.00,24.00]	[20.85,21.85]	

Note1: ERP= EIRP -2.15dB.

Note2: According KDB 447498 D04, used the greater of maximum conducted power and ERP to compare with the threshold value Pth.

5.3 RF Exposure Evaluation Result

Evolution mode		Maximum power (dBm)	Maximum power (mw)	Distance (mm)	Threshold Power (mW)	Power / Limit	Verdict
WCDMA	Band 2	23.00	199.53	200	3060.00	0.07	Pass
	Band 4	23.00	199.53	200	3060.00	0.07	Pass
	Band 5	23.00	199.53	200	1731.96	0.12	Pass
LTE	Band 2	23.00	199.53	200	3060.00	0.07	Pass
	Band 4	23.00	199.53	200	3060.00	0.07	Pass
	Band 5	24.00	251.19	200	1731.96	0.15	Pass
	Band 7	23.00	199.53	200	3060.00	0.07	Pass
	Band 12	24.00	251.19	200	1460.64	0.17	Pass
	Band 13	23.00	199.53	200	1605.48	0.12	Pass
	Band 14	23.00	199.53	200	1627.92	0.12	Pass
	Band 17	24.00	251.19	200	1460.64	0.17	Pass
	Band 18	24.00	251.19	200	1693.20	0.15	Pass
	Band 19	24.00	251.19	200	1723.80	0.15	Pass
	Band 25	23.00	199.53	200	3060.00	0.07	Pass
	Band 26	24.00	251.19	200	1731.96	0.15	Pass
	Band 30	23.00	199.53	200	3060.00	0.07	Pass
	Band 38	24.00	251.19	200	3060.00	0.08	Pass
	Band 40	23.00	199.53	200	3060.00	0.07	Pass
Band 41	24.00	251.19	200	3060.00	0.08	Pass	
Band 48	22.00	158.49	200	3060.00	0.05	Pass	
Band 66	23.00	199.53	200	3060.00	0.07	Pass	

5.4 Conclusion

This EUT is deemed to comply with the reference level limits, therefore the basic restrictions are compliant with human exposure limits.

Statement

1. The laboratory guarantees the scientificity, accuracy and impartiality of the test, and is responsible for all the information in the report, except the information provided by the customer. The customer is responsible for the impact of the information provided on the validity of the results.
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--END OF REPORT--