



RF Exposure Evaluation Report

Application No.:	ZR/2020/60028
Applicant:	Fibocom Wireless Inc.
Address of Applicant:	5/F, Tower A, Technology Building II, 1057 Nanhai Avenue, Shenzhen, China
Manufacturer:	Fibocom Wireless Inc.
Address of Manufacturer:	5/F, Tower A, Technology Building II, 1057 Nanhai Avenue, Shenzhen, China
Factory:	LTE Module
Address of Factory:	SQ808-NA
EUT Description:	Fibocom
Model No.:	ZMOSQ808NA
Trade Mark:	ZR/2020/60028
FCC ID:	Fibocom Wireless Inc.
Standards:	47 CFR Part 2. 1091
FCC KDB:	447498 D01 v06
Date of Receipt:	2020/6/24
Date of Test:	2020/6/24 to 2020/7/13
Date of Issue:	2020/7/31

Test Result:	PASS*
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* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Derek Yang
Wireless Laboratory Manager



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1 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2020/7/31		Original

Authorized for issue by:			
			
		Mike Hu /Project Engineer	
			
		David Chen /Reviewer	



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2 General Information

2.1 Client Information

Applicant:	Fibocom Wireless Inc.
Address of Applicant:	5/F, Tower A, Technology Building II, 1057 Nanhai Avenue, Shenzhen, China
Manufacturer:	Fibocom Wireless Inc.
Address of Manufacturer:	5/F, Tower A, Technology Building II, 1057 Nanhai Avenue, Shenzhen, China

2.2 Test Location

Company:	SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch
Address:	No. 1 Workshop, M-10, Middle section, Science & Technology Park, Shenzhen, Guangdong, China
Post code:	518057
Telephone:	+86 (0) 755 2601 2053
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E-mail:	ee.shenzhen@sgs.com

2.3 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• CNAS (No. CNAS L2929)

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

• A2LA (Certificate No. 3816.01)

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

• VCCI

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

• FCC -Designation Number: CN1178

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

• Industry Canada (IC)

Two 3m Semi-anechoic chambers and the 10m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1, 4620C-2, 4620C-3.

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2.4 General Description of EUT

EUT Description::	LTE Module
Model No.:	SQ808-NA
Trade Mark:	Fibocom
Hardware Version:	V1.0.4
Software Version:	SQ808-NA-Q62.01.001
Antenna Gain:	GSM850: 0.5dBi; GSM1900:1.0dBi; WCDMA Band II:1.0dBi; WCDMA Band IV:1.0dBi; WCDMA Band V:0.5dBi; LTE Band 2:1.0dBi; LTE Band 4:1.0dBi; LTE Band 5:0.5dBi; LTE Band 7: 2.0dBi LTE Band 12:0.5dBi; LTE Band 13:0.5dBi; LTE Band 17:0.5dBi; LTE Band 25:1.0dBi; LTE Band 26:0.5dBi; LTE Band 41:2.0dBi; LTE Band 66:1.0dBi; 2.4G WiFi:2.0dBi; 5G WiFi:2.5dBi; BT:2.0dBi;

2.5 Test Mode

Test Mode	Test Modes Description
LTE/TM1	LTE system, QPSK modulation
LTE/TM2	LTE system, 16QAM modulation

REMARK: The test mode(s) are selected according to relevant radio technology specifications.

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3 RF Exposure Evaluation

3.1 RF Exposure Compliance Requirement

3.1.1 Limits

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 Exposures				
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
1500-100,000	/	/	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
1500-100,000	/	/	1.0	30

F=frequency in MHz

*=Plane-wave equivalent power density

RF exposure compliance will need to be determined with respect to 1.1307(c) and (d) of the FCC rules. The emissions should be within the limits at 300kHz in Table 1 of 1.1310(use the 300kHz limits for 150kHz:614V/m,1.63A/m).

Friis Formula

Friis transmission formula: $P_d = (P_{out} * G) / (4 * \pi * R^2)$

Where

Pd = power density in mW/cm²

Pout = output power to antenna in mW

G = gain of antenna in linear scale

$\pi = 3.1416$

R = distance between observation point and center of the radiator in cm

Pd is the limit of MPE, 1 mW/cm². If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

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3.1.2 Test Procedure

Software provided by client enabled the EUT to transmit data at lowest, middle and highest channel individually.

3.1.3 EUT RF Exposure Evaluation

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2.0 / 2.0 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Operating Band	Frequency (MHz)	Antenna Gain (dBi)	Max Conducted Average Output Power (dBm)	Output Power to Antenna (dBm)	EIRP(ERP) Limit (dBm)	Output Power to Antenna (mw)	Power Density at R = 20 cm (m W/cm ²)	Limit (m W/cm ²)	Gain according to EIRP (dBi)	Gain according to Pd (dBi)	Max Gain Allowed (dBi)	Conclusion
GSM850	824.2	0.50	24.31	22.66	38.45	269.7739	0.0602	0.5495	16.29	10.10	10.10	Pass
GSM1900	1850.2	1.00	21.31	22.31	33.00	135.2073	0.0339	1.0000	11.69	15.70	11.69	Pass
WCDMA B2	1852.4	1.00	24.50	25.50	33.00	281.8383	0.0706	1.0000	8.50	12.51	8.50	Pass
WCDMA B4	1712.4	1.00	24.50	25.50	30.00	281.8383	0.0706	1.0000	5.50	12.51	5.50	Pass
WCDMA B5	826.4	0.50	24.50	22.85	38.45	281.8383	0.0629	0.5509	16.10	9.92	9.92	Pass
LTE B2	1880	1.00	24.00	25.00	33.00	251.1886	0.0629	1.0000	9.00	13.01	9.00	Pass
LTE B4	1710.7	1.00	24.00	25.00	30.00	251.1886	0.0629	1.0000	6.00	13.01	6.00	Pass
LTE B5	824.70	0.50	24.00	22.35	38.45	251.1886	0.0561	0.5498	16.60	10.41	10.41	Pass
LTE B7	2502.50	2.00	24.00	26.00	33.00	251.1886	0.0792	1.0000	9.00	13.01	9.00	Pass
LTE B12	699.70	0.50	24.00	22.35	34.77	251.1886	0.0561	0.4665	12.92	9.70	9.70	Pass
LTE B13	779.50	0.50	24.00	22.35	34.77	251.1886	0.0561	0.5197	12.92	10.16	10.16	Pass
LTE B17	706.5	0.50	24.00	22.35	34.77	251.1886	0.0561	0.4710	12.92	9.74	9.74	Pass
LTE B25	1850.7	1.00	24.00	25.00	33.00	251.1886	0.0629	1.0000	9.00	13.01	9.00	Pass
LTE B26(814-824)	814.7	0.50	24.00	22.35	50.00	251.1886	0.0561	0.5431	28.15	10.36	10.36	Pass
LTE B26(824-849)	824.7	0.50	24.00	22.35	38.45	251.1886	0.0561	0.5498	16.60	10.41	10.41	Pass
LTE B41	2498.5	2.00	24.00	26.00	33.00	251.1886	0.0792	1.0000	9.00	13.01	9.00	Pass
LTE B66	1710.7	1.00	24.00	25.00	30.00	251.1886	0.0629	1.0000	6.00	13.01	6.00	Pass
Bluetooth	2402	2.00	12.50	14.50	20.97	17.7828	0.0056	1.0000	—	—	—	Pass
2.4G WiFi	2412	2.00	20.00	22.00	20.97	100.0000	0.0315	1.0000	—	—	—	Pass
5G WiFi	5180	2.50	22.00	24.50	20.97	158.4893	0.0561	1.0000	—	—	—	Pass

All of the WWAN WLAN and Bluetooth can transmit simultaneously, the formula of the calculated the MPE is:

CPD1/ LPD1+ CPD2/ LPD2+.....etc.<1

CPD=Calculation power density

LPD= Limit of power density

Therefore, the worst-case situation is $0.1202+0.0056+0.0561=0.1258$, which is less than “1”, this confirmed that the device comply with MPE limit.

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