



RF EXPOSURE EVALUATION REPORT

APPLICANT : Fibocom Wireless Inc.
PRODUCT NAME : LTE Module
MODEL NAME : SC218-NA
BRAND NAME : Fibocom
FCC ID : ZMOSC218NA
STANDARD(S) : FCC 47 CFR Part 2(2.1091)
RECEIPT DATE : 2023-08-29
TEST DATE : 2023-09-12
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Change History		
Version	Date	Reason for Change
1.0	2023-10-23	First edition



1. Technical Information

Note: Provide by applicant.

1.1 Applicant and Manufacturer Information

Applicant:	Fibocom Wireless Inc.
Applicant Address:	1101,Tower A, Building 6, Shenzhen International Innovation Valley, Dashi 1st Rd, Nanshan, Shenzhen, China
Manufacturer:	Fibocom Wireless Inc.
Manufacturer Address:	1101,Tower A, Building 6, Shenzhen International Innovation Valley, Dashi 1st Rd, Nanshan, Shenzhen, China

1.2 Equipment under Test (EUT) Description

Product Name:	LTE Module
Product Serial No.:	4#
Hardware Version:	V1.1
Software Version:	SC218-T6.00.03
Frequency Bands:	LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 7: 2500 MHz ~ 2570 MHz LTE Band 12: 669 MHz ~ 716 MHz LTE Band 13: 777 MHz ~ 787 MHz LTE Band 17: 704 MHz ~ 716 MHz LTE Band 25: 1850 MHz ~ 1915 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 41: 2496 MHz ~ 2690 MHz LTE Band 66: 1710 MHz ~ 1780 MHz LTE Band 71: 663 MHz ~ 698 MHz WLAN 2.4GHz: 2412 MHz ~ 2472 MHz WLAN 5.2GHz: 5180 MHz ~ 5240 MHz WLAN 5.3GHz: 5260 MHz ~ 5320 MHz WLAN 5.5GHz: 5500 MHz ~ 5720 MHz WLAN 5.8GHz: 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz
Modulation Mode:	LTE: QPSK, 16QAM, 64QAM 802.11b: DSSS 802.11a/g/n-HT20/40: OFDM



	802.11ac-VHT20/40/80: OFDM BR+EDR: GFSK(1Mbps), $\pi/4$ -DQPSK(2Mbps), 8-DPSK(3Mbps) Bluetooth LE: GFSK(1Mbps, 2Mbps)	
Antenna Type:	WWAN: Fixed External Antenna WLAN: Fixed External Antenna Bluetooth: Fixed External Antenna	
Antenna Gain:	Frequency Bands	Antenna Gain (dBi)
	LTE Band 2	1.0
	LTE Band 4	1.0
	LTE Band 5	0.5
	LTE Band 7	2.0
	LTE Band 12	0.5
	LTE Band 13	0.5
	LTE Band 17	0.5
	LTE Band 25	1.0
	LTE Band 26	0.5
	LTE Band 41	2.0
	LTE Band 66	1.0
	LTE Band 71	0.5
	WLAN 2.4GHz	2.0
	WLAN 5GHz	2.0
	Bluetooth	2.0

Note:

1. When the test result is a critical value, we will use the measurement uncertainty give the judgment result based on the 95% confidence intervals.
2. For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.



1.3 Applied Reference Documents

Leading reference documents for testing:

Identity	Document Title	Method determination /Remark
FCC 47 CFR Part 2(2.1091)	Radio Frequency Radiation Exposure Assessment: mobile devices	No deviation
KDB 447498 D01v06	General RF Exposure Guidance	No deviation
Note: Additions to, deviation, or exclusions from the method shall be judged in the "method determination" column of add, deviate or exclude from the specific method shall be explained in the "Remark" of the above table.		



2. Device Category and RF Exposure Limit

Per user manual, Based on 47CFR 2.1091, this device belongs to mobile device category with General Population/Uncontrolled exposure.

Mobile Devices:

47CFR 2.1091(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. In this context, the term "fixed location" means that the device is physically secured at one location and is not able to be easily moved to another location. Transmitting devices designed to be used by consumers or workers that can be easily re-located, such as wireless devices associated with a personal computer, are considered to be mobile devices if they meet the 20 centimeter separation requirement.

General Population/Uncontrolled Exposure:

The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity. Warning labels placed on low-power consumer devices such as cellular telephones are not considered sufficient to allow the device to be considered under the occupational/controlled category, and the general population/uncontrolled exposure limits apply to these devices.

Table 1—Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(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



3. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
Anritsu	Network Emulator	MT8820C	6201091290	2023.02.09	2024.02.08
Anritsu	Network Emulator	MT8821C	6261830572	2023.02.09	2024.02.08

Note:

The EUT was connected to Base Station Anritsu MT8820C referred to the Setup Configuration. For the maximum power, it was established between EUT and Base Station with following setting: For LTE testing, the frequency band, channel bandwidth, RB allocation configuration, modulation type are set in the base station simulator to configure EUT transmitting at maximum power and different configurations which are requested to be reported to FCC.



4. Maximum Average Power Summary

➤ Maximum Average Power

Wireless Mode	Channel	Frequency (MHz)	Max. Average Power (dBm)	Tune-up Limit (dBm)
LTE Band 2	CH 18900	1880	24.05	25
LTE Band 4	CH 20175	1732.5	23.71	25
LTE Band 5	CH 20525	836.5	23.69	25
LTE Band 7	CH 21100	2535	23.25	25
LTE Band 12	CH 23130	711	23.68	25
LTE Band 13	CH 23230	782	23.64	25
LTE Band 17	CH 23790	710	23.66	25
LTE Band 25	CH 26365	1882.5	23.76	25
LTE Band 26	CH 26865	831.5	23.69	25
LTE Band 41	CH 41490	2680	24.41	25
LTE Band 66	CH 132322	1745	23.68	25
LTE Band 71	CH 133322	683	23.62	25
WLAN 2.4GHz	CH 13	2472	17.62	18.5
WLAN 5GHz	CH 151	5755	17.03	18
Bluetooth	CH 39	2441	11.49	12

Note:

1. The output power of LTE/WLAN refers to the annex B of this report.
2. The output power of WLAN/Bluetooth is derived from the report SZ23080226W01/02/03/04.

5. RF Exposure Assessment

➤ Standalone Transmission Assessment:

Bands	Frequency (MHz)	Tune-up Power(dBm)	Antenna Gain(dBi)	EIRP (mW)	Power Density (mW/cm ²)	Limit for MPE (mW/cm ²)
LTE Band 2	1880	25	1.0	398.11	0.079	1.0
LTE Band 4	1732.5	25	1.0	398.11	0.079	1.0
LTE Band 5	836.5	25	0.5	354.81	0.071	0.558
LTE Band 7	2535	25	2.0	501.19	0.100	1.0
LTE Band 12	711	25	0.5	354.81	0.071	0.474
LTE Band 13	782	25	0.5	354.81	0.071	0.521
LTE Band 17	710	25	0.5	354.81	0.071	0.473
LTE Band 25	1882.5	25	1.0	398.11	0.079	1.0
LTE Band 26	831.5	25	0.5	354.81	0.071	0.554
LTE Band 41	2680	25	2.0	501.19	0.100	1.0
LTE Band 66	1745	25	1.0	398.11	0.079	1.0
LTE Band 71	683	25	0.5	354.81	0.071	0.455
WLAN 2.4GHz	2472	18.5	2.0	112.20	0.022	1.0
WLAN 5GHz	5755	18	2.0	100.00	0.020	1.0
Bluetooth	2441	12	2.0	25.12	0.005	1.0

Note:

1. According to KDB 447498, SAR test exclusion conditions are based on source-based time-averaged maximum conducted output power of the RF channel requiring assessment, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions.
2. MPE calculate method

$$\text{Power Density} = \text{EIRP}/4\pi R^2$$

Where: EIRP = P+G

P = Output Power (dBm)

G = Antenna Gain (dBi)

R = Separation Distance (20cm)



➤ **Simultaneous Transmission Assessment:**

Multi-Band Simultaneous Transmission Consideration

Simultaneous Transmission Consideration	Applicable Combination
	WWAN + WLAN 2.4GHz/5GHz
	WWAN + Bluetooth
	WWAN + WLAN 2.4GHz/5GHz+Bluetooth

Note:

1. This device contains transmitters that may be operated simultaneously, therefore simultaneous transmission analysis is required.
2. The worst condition for WWAN & WLAN 2.4GHz & Bluetooth will be calculated for transmitting simultaneously.
3. Formula: $Result = Power\ density_1/limit_1 + Power\ density_2/limit_2 + Power\ density_3/limit_3 \leq 1$.

Transmission Bands	Power Density/ SAR	Limit	Simultaneous Transmission Result
WWAN	0.071	0.455	0.183
WLAN 2.4GHz	0.022	1.0	
Bluetooth	0.005	1.0	

➤ **Conclusion:**

According to 47 CFR Part 2.1091, this device complies with human exposure basic restrictions.



Annex A General Information

1. Identification of the Responsible Testing Laboratory

Laboratory Name:	Shenzhen Morlab Communications Technology Co., Ltd.
Laboratory Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, Guangdong Province, P. R. China
Telephone:	+86 755 36698555
Facsimile:	+86 755 36698525

2. Identification of the Responsible Testing Location

Name:	Shenzhen Morlab Communications Technology Co., Ltd.
Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, Guangdong Province, P. R. China

3. Facilities and Accreditations

The FCC designation number is CN1192, the test firm registration number is 226174.

Note:

The main report is end here and the other Annex B will be submitted separately.

————— END OF REPORT —————