

RF Exposure Evaluation Report

APPLICANT : Fibocom Wireless Inc.
EQUIPMENT : 5G Module
BRAND NAME : Fibocom
MODEL NAME : FG370-NA
FCC ID : ZMOFG370NA
STANDARD : 47 CFR Part 2.1091
FCC KDB 447498 D01 v06

The product evaluation date was started from Apr. 18, 2024 and completed on Apr. 18, 2024. We, Sporton International Inc. (Shenzhen), would like to declare that the device has been evaluated in accordance with 47 CFR Part 2.1091 and FCC KDB 447498 D01 v06, and pass the limit. Without written approval of Sporton International Inc. (Shenzhen), the test report shall not be reproduced except in full.



Approved by: Si Zhang

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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA3D1101	Rev. 01	Initial issue of report.	May 13, 2024



1. Administration Data

1.1. Testing Laboratory

Sporton International Inc. (Shenzhen) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

Testing Laboratory			
Test Firm	Sporton International Inc. (Shenzhen)		
Test Site Location	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055 People's Republic of China TEL: +86-755-86379589 FAX: +86-755-86379595		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	SAR01-SZ	CN1256	421272

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

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



2. Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT Type	5G Module
Brand Name	Fibocom
Model Name	FG370-NA
FCC ID	ZMOFG370NA
Wireless Technology and Frequency Range	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 : 699 MHz ~ 716 MHz LTE Band 13 : 777 MHz ~ 787 MHz LTE Band 14: 788 MHz ~ 798 MHz LTE Band 17: 704 MHz ~ 716 MHz LTE Band 25 : 1850 MHz ~ 1915 MHz LTE Band 26 : 814 MHz ~ 849 MHz LTE Band 30: 2305 MHz ~ 2315 MHz LTE Band 38: 2570 MHz ~ 2620 MHz LTE Band 41: 2496 MHz ~ 2690 MHz LTE Band 42: 3550 MHz ~ 3600 MHz LTE Band 43: 3600 MHz ~ 3700MHz LTE Band 48: 3550 MHz ~ 3700 MHz LTE Band 66 : 1710 MHz ~ 1780 MHz LTE Band 71: 663 MHz ~ 698 MHz 5G NR n2 : 1850 MHz ~ 1910 MHz 5G NR n5 : 824 MHz ~ 849 MHz 5G NR n7 : 2500 MHz ~ 2570 MHz 5G NR n12 : 699 MHz ~ 716 MHz 5G NR n14 : 788 MHz ~ 798 MHz 5G NR n25 : 1850 MHz ~1915 MHz 5G NR n26 : 814 MHz ~ 849 MHz 5G NR n30 : 2305 MHz ~ 2315 MHz 5G NR n38 : 2570 MHz ~ 2620 MHz 5G NR n41 : 2496 MHz ~ 2690 MHz 5G NR n48 : 3550 MHz ~ 3700 MHz 5G NR n66 : 1710 MHz ~ 1780 MHz 5G NR n70 : 1695 MHz ~ 1710 MHz 5G NR n71 : 663 MHz ~ 698 MHz 5G NR n77 : 3450 MHz ~ 3550 MHz, 3700 MHz ~ 3980 MHz 5G NR n78 : 3450 MHz ~ 3550 MHz, 3700 MHz ~ 3800 MHz
Mode	LTE: QPSK, 16QAM, 64QAM, 256QAM 5G NR : CP-OFDM / DFT-s-OFDM, PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM
Antenna Gain	Ant3: LTE Band 2 : 0.98 dBi LTE Band 4 : 1.5 dBi LTE Band 5 : 1.32 dBi LTE Band 7 : 1.05 dBi LTE Band 25 : 0.98 dBi LTE Band 30 : -1.0 dBi LTE Band 38 : -0.5 dBi LTE Band 41 : -0.5 dBi LTE Band 42 : -4.5 dBi LTE Band 43 : -4.5 dBi LTE Band 48 : -4.5 dBi LTE Band 66: 1.5 dBi LTE Band 71: 1.39 dBi 5G NR n2 : 0.98 dBi 5G NR n5 : 1.32 dBi 5G NR n7 : 1.05 dBi 5G NR n25 : 0.98 dBi 5G NR n30 : -1.0 dBi



	5G NR n66 : 1.5 dBi 5G NR n70 : 1.16 dBi 5G NR n71 : 1.39 dBi 5G NR n38 : -0.5 dBi 5G NR n41 : -0.5 dBi 5G NR n48 : -4.5 dBi 5G NR n77 : -4.5 dBi 5G NR n78 : -4.5 dBi Ant5: LTE Band 42 : -4.5 dBi LTE Band 43 : -4.5 dBi LTE Band 48 : -4.5 dBi 5G NR n48 : -4.5 dBi 5G NR n77 : -4.5 dBi 5G NR n78 : -4.5 dBi Ant8: LTE Band 2 : 0.98 dBi LTE Band 4 : 1.5 dBi LTE Band 5 : 1.32 dBi LTE Band 12 : 1.58 dBi LTE Band 13 : 1.94 dBi LTE Band 14 : 1.94 dBi LTE Band 17 : 1.58 dBi LTE Band 25 : 0.98 dBi LTE Band 26 : 1.32 dBi LTE Band 41 : -0.5 dBi LTE Band 66: 1.5 dBi LTE Band 71: 1.39 dBi 5G NR n2 : 0.98 dBi 5G NR n5 : 1.32 dBi 5G NR n12 : 1.58 dBi 5G NR n14 : 1.94 dBi 5G NR n25 : 0.98 dBi 5G NR n26 : 1.32 dBi 5G NR n66 : 1.5 dBi 5G NR n70 : 1.16 dBi 5G NR n71 : 1.39 dBi 5G NR n38 : -0.5 dBi 5G NR n41 : -0.5 dBi n41 <Ant 1/6/8>: -0.5 dBi n77/78 <Ant 1/5/6>: -4.5 dBi
Antenna Type	WWAN: Dipole Antenna
HW Version	V1.0
SW Version	81140.7000.00.11.01.14
EUT Stage	Production Unit

Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. The intra-band/inter-band ULCA, UL MIMO and EN-DC mode combination could be referred to the product spec.
3. This device supports intra-band ULCA, due to intra-band ULCA and non-CA power is same, so non-CA MPE analysis can represent ULCA MPE analysis.
4. 5GNR n2/5/7/12/14/25/26/30/38/41/48/66/70/71/77/78 supports SA mode.
5. 5GNR n2/5/7/12/25/38/41/48/66/71/77/78 supports NSA mode.
6. This device supports HPUE mode for LTE Band 41 and 5GNR n41/77/78 with class 2 power level, so HPUE has been performed to do MPE analysis.
7. 5GNR n2/n25/38/n41/n48/n66/n71/n77/n78 support SISO/MIMO mode, only MIMO tune up power was chosen to perform MPE calculation conservatively for MIMO power is higher.
8. The device supports HPUE (power class 2) under SISO mode and HPUE (power class 1.5) under UL MIMO mode for 5G NR n41/n77, so HPUE (power class 1.5) has been performed MPE calculation.
9. 5GNR n41 ant 1/6/8 and 5GNR n77/78 ant 1/5/6 only supports SRS (Sounding Reference Signal) functionality.

Comments and Explanations:

1. The declared of product specification for EUT presented in the report are provided by the manufacturer, and the



manufacturer takes all the responsibilities for the accuracy of product specification.

2. The maximum RF output tune up power, antenna gain also the safe distance used for evaluate RF exposure were declared by manufacturer.

3. Maximum RF average output tune up power among production units

<LTE>

Mode		Maximum Average power(dBm)
LTE	Band 2	25.00
	Band 4	25.00
	Band 5	25.00
	Band 7	25.00
	Band 12	25.00
	Band 13	25.00
	Band 14	25.00
	Band 17	25.00
	Band 25	25.00
	Band 26	25.00
	Band 30	25.00
	Band 38	25.00
	Band 41	25.00
	Band 41 HPUE	28.00
	Band 42	25.00
	Band 43	25.00
	Band 48	25.00
	Band 66	25.00
	Band 71	25.00

<5G NR>

Mode		Maximum Average power(dBm)
5G NR	n2	25.00
	n5	25.00
	n7	25.00
	n12	25.00
	n14	25.00
	n25	25.00
	n26	25.00
	n30	25.00
	n38	25.00
	n41	25.00
	n41 HPUE	28.00
	n48	22.00
	n66	25.00
	n70	25.00
	n71	25.00
	n77	25.00
	n77 HPUE	28.00
	n78	25.00
	n78 HPUE	28.00

<MIMO>

Mode	Maximum Average power(dBm)
n2	25.00
n25	25.00
n41	25.00
n41 PC1.5	31.00
n48	22.00
n66	25.00
n71	25.00
n77	25.00
n77 PC1.5	31.00
n78	25.00
n78 PC2	28.00

Note: WWAN support SISO/MIMO mode, we only chose MIMO tune up power to perform MPE calculation conservatively for MIMO power is higher.



4. RF Exposure Limit Introduction

According to ANSI/IEEE C95.1-1992, the criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in §1.1310.

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

The MPE was calculated at 20 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

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

Where:

S = Power Density

P = Output Power at Antenna Terminals

G = Gain of Transmit Antenna (linear gain)

R = Distance from Transmitting Antenna



5. Radio Frequency Radiation Exposure Evaluation

5.1. Standalone Power Density Calculation

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Average EIRP (mW)	Power Density at 20cm (mW/cm ²)	Limit (mW/cm ²)	Power Density / Limit
LTE Band 2	1850.0	0.98	25.00	25.980	396.278	0.079	1.000	0.079
LTE Band 4	1710.0	1.50	25.00	26.500	446.684	0.089	1.000	0.089
LTE Band 5	824.0	1.32	25.00	26.320	428.549	0.085	0.549	0.155
LTE Band 7	2500.0	1.05	25.00	26.050	402.717	0.080	1.000	0.080
LTE Band 12	699.0	1.58	25.00	26.580	454.988	0.091	0.466	0.194
LTE Band 13	777.0	1.94	25.00	26.940	494.311	0.098	0.518	0.190
LTE Band 14	788.0	1.94	25.00	26.940	494.311	0.098	0.525	0.187
LTE Band 17	704.0	1.58	25.00	26.580	454.988	0.091	0.469	0.193
LTE Band 25	1850.0	0.98	25.00	25.980	396.278	0.079	1.000	0.079
LTE Band 26	814.0	1.32	25.00	26.320	428.549	0.085	0.543	0.157
LTE Band 30	2305.0	-1.00	25.00	24.000	251.189	0.050	1.000	0.050
LTE Band 38	2570.0	-0.50	25.00	24.500	281.838	0.056	1.000	0.056
LTE Band 41 HPUE	2496.0	-0.50	28.00	27.500	562.341	0.112	1.000	0.112
LTE Band 42	3550.0	-4.50	25.00	20.500	112.202	0.022	1.000	0.022
LTE Band 43	3600.0	-4.50	25.00	20.500	112.202	0.022	1.000	0.022
LTE Band 48	3550.0	-4.50	25.00	20.500	112.202	0.022	1.000	0.022
LTE Band 66	1710.0	1.50	25.00	26.500	446.684	0.089	1.000	0.089
LTE Band 71	663.0	1.39	25.00	26.390	435.512	0.087	0.442	0.196
5G NR n2 MIMO	1850.0	3.99	25.00	28.990	792.501	0.158	1.000	0.158
5G NR n5	824.00	1.32	25.00	26.320	428.549	0.085	0.549	0.155
5G NR n7	2500.00	1.05	25.00	26.050	402.717	0.080	1.000	0.080
5G NR n12	699.00	1.58	25.00	26.580	454.988	0.091	0.466	0.194
5G NR n14	788.00	1.94	25.00	26.940	494.311	0.098	0.525	0.187
5G NR n25 MIMO	1850.00	3.99	25.00	28.990	792.501	0.158	1.000	0.158
5G NR n26	814.00	1.32	25.00	26.320	428.549	0.085	0.543	0.157
5G NR n30	2305.00	-1.00	25.00	24.000	251.189	0.050	1.000	0.050
5G NR n38	2570.00	2.51	25.00	27.510	563.638	0.112	1.000	0.112
5G NR n41	2496.00	-0.50	28.00	27.500	562.341	0.112	1.000	0.112
5G NR n41 MIMO	2496.00	2.51	31.00	33.510	2243.882	0.447	1.000	0.447
5G NR n48 MIMO	3550.00	-1.49	22.00	20.510	112.460	0.022	1.000	0.022
5G NR n66 MIMO	1710.00	4.51	25.00	29.510	893.305	0.178	1.000	0.178
5G NR n70	1695.00	1.16	25.00	26.160	413.048	0.082	1.000	0.082
5G NR n71	663.00	1.39	25.00	26.390	435.512	0.087	0.442	0.196
5G NR n71 MIMO	663.00	4.40	25.00	29.400	870.964	0.173	0.442	0.392
5G NR n77	3450.00	-4.50	28.00	23.500	223.872	0.045	1.000	0.045
5G NR n77 MIMO	3450.00	-1.49	31.00	29.510	893.305	0.178	1.000	0.178
5G NR n78 MIMO	3450.00	-1.49	28.00	26.510	447.713	0.089	1.000	0.089

Note:

1. For conservativeness, the lowest frequency of each band is used to determine the MPE limit of that band.
2. Chose the maximum RF output tune up power of all antennas among same frequency WWAN bands and the maximum antenna gain to perform MPE calculation conservatively.
3. This device supports HPUE mode for LTE Band 41 and 5G NR n41/77/78 with class 2 power level, so HPUE has been performed to do standalone power density calculation.
4. 5G NR n2/n25/n41/n48/n66/n71/n77/n78 supports MIMO mode, the MIMO mode is correlated, so the gain calculation method of 5G NR UL MIMO mode is referenced to KDB 662911.

**5.2. Collocated Power Density Calculation****<EN-DC>**

LTE Power Density / Limit	5G NR Power Density / Limit	$\Sigma(\text{Power Density / Limit})$ of WWAN + 5G NR
0.196	0.447	0.643

< LTE inter-band ULCA>

LTE Power Density / Limit	LTE Power Density / Limit	$\Sigma(\text{Power Density / Limit})$ of LTE + LTE
0.196	0.196	0.392

< 5G NR inter-band ULCA>

5G NR Power Density / Limit	5G NR Power Density / Limit	$\Sigma(\text{Power Density / Limit})$ of 5G NR + 5G NR
0.196	0.447	0.643

Note:

1. Always chose the worst evaluation value of NR and LTE standalone band to do analysis.
2. $\Sigma(\text{Power Density / Limit})$: This is a summation of [(power density for each transmitter/antenna included in the simultaneous transmission)/ (corresponding MPE limit)], for LTE + 5G NR/ LTE /5G NR inter-band ULCA.
3. Considering all transmitter of the EIRP performance listed in the table above, the aggregated (power density /limit) is smaller than 1, and MPE of 2 collocated transmitters is compliant.

Conclusion:

According to 47 CFR §2.1091, the RF exposure analysis concludes that the RF Exposure is FCC compliant.

-----THE END-----