

RF EXPOSURE EVALUATION REPORT

FCC ID : PKRISGFW3000
Equipment : FW3000
Brand Name : Inseego
Model Name : FW3000
Applicant : Inseego Corp.
9710 Scranton Road Suite 200, San Diego, CA 92121
Manufacturer : Inseego Corp.
9710 Scranton Road Suite 200, San Diego, CA 92121
Standard : 47 CFR Part 2.1091

We, SPORTON INTERNATIONAL INC has been evaluated this product in accordance with 47 CFR Part2.1091 and it complies with applicable limit.

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 1190) and the FCC designation No. TW1190 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC evaluation.

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Approved by: Cona Huang / Deputy Manager



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History of this test report

Report No.	Version	Description	Issued Date
FA320711	Rev. 01	Initial issue of report	Oct. 04, 2023

**1. Description of Equipment Under Test (EUT)**

Product Feature & Specification	
EUT Type	FW3000
Brand Name	Inseego
Model Name	FW3000
FCC ID	PKRISGFW3000
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 12: 699 MHz ~ 716 MHz LTE Band 13: 777 MHz ~ 787 MHz LTE Band 25: 1850 MHz ~ 1915 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 41: 2496 MHz ~ 2690 MHz LTE Band 48: 3550 MHz ~ 3700 MHz LTE Band 66: 1710 MHz ~ 1755 MHz LTE Band 71: 663 MHz ~ 698 MHz 5G NR n2 : 1850 MHz ~ 1910 MHz 5G NR n5 : 824 MHz ~ 849 MHz 5G NR n12 : 699 MHz ~ 716 MHz 5G NR n25 : 1850 MHz ~ 1915 MHz 5G NR n26 : 814 MHz ~ 849 MHz 5G NR n41 : 2496 MHz ~ 2690 MHz 5G NR n48 : 3550 MHz ~ 3700 MHz 5G NR n66 : 1710 MHz ~ 1755 MHz 5G NR n71 : 663 MHz ~ 698 MHz 5G NR n77: 3700 MHz ~ 3980 MHz, 3450MHz ~ 3550MHz Bluetooth: 2400 MHz ~ 2483.5 MHz
Mode	LTE: QPSK, 16QAM, 64QAM, 256QAM 5G NR: DFT-s-OFDM/CP-OFDM, Pi/2 BPSK/QPSK/16QAM/64QAM/256QAM Bluetooth LE

Reviewed by: Jason Wang**Report Producer: Paula Chen**



2. Maximum RF Average Output Power Among Production Units

Antenna	Band	Maximum Average Power (dBm)
Antenna 0	LTE Band 5	25
	LTE Band 12	25
	LTE Band 13	25
	LTE Band 26	25
	LTE Band 71	25
	5G FR1 n5	25
	5G FR1 n12	25
	5G FR1 n26	25
	5G FR1 n71	25
Antenna 1	LTE Band 5	25
	5G FR1 n5	25
Antenna 4	LTE Band 48	25
	5G FR1 n48	25
	5G FR1 n77	25
	5G FR1 n77 HPUE	27
Antenna 6	LTE Band 48	25
	5G FR1 n48	25
	5G FR1 n77	25
	5G FR1 n77 HPUE	27
Antenna 12	LTE Band 2	25
	LTE Band 4	25
	LTE Band 41	24.5
	LTE Band 41 HPUE	27
	LTE Band 66	25
	5G FR1 n2	25
	5G FR1 n25	25
	5G FR1 n41	24.5
	5G FR1 n41 HPUE	27
	5G FR1 n66	25
Antenna 13	LTE Band 2	25
	LTE Band 4	25
	LTE Band 25	25
	LTE Band 66	25
	5G FR1 n2	25
	5G FR1 n25	25
	5G FR1 n41	24.5
	5G FR1 n41 HPUE	27
	5G FR1 n66	25
Bluetooth		16.5



3. 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 28.5 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

4. Radio Frequency Radiation Exposure Evaluation

4.1. Standalone Power Density Calculation

Antenna	Band	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 28.5cm (mW/cm ²)	Limit (mW/cm ²)	Power Density / Limit
Antenna 0	LTE Band 5	3.40	25.00	28.4	0.69	691.83	0.068	0.549	0.123
	LTE Band 12	2.40	25.00	27.4	0.55	549.54	0.054	0.466	0.116
	LTE Band 13	3.00	25.00	28.0	0.63	630.96	0.062	0.518	0.119
	LTE Band 26	3.40	25.00	28.4	0.69	691.83	0.068	0.543	0.125
	LTE Band 71	2.20	25.00	27.2	0.52	524.81	0.051	0.442	0.116
	5G FR1 n5	3.40	25.00	28.4	0.69	691.83	0.068	0.549	0.123
	5G FR1 n12	2.40	25.00	27.4	0.55	549.54	0.054	0.466	0.116
	5G FR1 n26	3.40	25.00	28.4	0.69	691.83	0.068	0.543	0.125
	5G FR1 n71	2.20	25.00	27.2	0.52	524.81	0.051	0.442	0.116
Antenna1	LTE Band 5	3.50	25.00	28.5	0.71	707.95	0.069	0.549	0.126
	5G FR1 n5	3.50	25.00	28.5	0.71	707.95	0.069	0.549	0.126
Antenna 4	LTE Band 48	10.10	25.00	35.1	3.24	3235.94	0.317	1.000	0.317
	5G FR1 n48	10.10	25.00	35.1	3.24	3235.94	0.317	1.000	0.317
	5G FR1 n77	10.10	25.00	35.1	3.24	3235.94	0.317	1.000	0.317
	5G FR1 n77 HPUE	10.10	27.00	37.1	5.13	5128.61	0.503	1.000	0.503
Antenna 6	LTE Band 48	9.40	25.00	34.4	2.75	2754.23	0.270	1.000	0.270
	5G FR1 n48	9.40	25.00	34.4	2.75	2754.23	0.270	1.000	0.270
	5G FR1 n77	9.80	25.00	34.8	3.02	3019.95	0.296	1.000	0.296
	5G FR1 n77 HPUE	9.80	27.00	36.8	4.79	4786.30	0.469	1.000	0.469
Antenna 12	LTE Band 2	5.00	25.00	30.0	1.00	1000.00	0.098	1.000	0.098
	LTE Band 4	5.00	25.00	30.0	1.00	1000.00	0.098	1.000	0.098
	LTE Band 41	5.50	24.50	30.0	1.00	1000.00	0.098	1.000	0.098
	LTE Band 41 HPUE	5.50	27.00	32.5	1.78	1778.28	0.174	1.000	0.174
	LTE Band 66	5.00	25.00	30.0	1.00	1000.00	0.098	1.000	0.098
	5G FR1 n2	5.00	25.00	30.0	1.00	1000.00	0.098	1.000	0.098
	5G FR1 n25	5.00	25.00	30.0	1.00	1000.00	0.098	1.000	0.098
	5G FR1 n41	5.50	24.50	30.0	1.00	1000.00	0.098	1.000	0.098
	5G FR1 n41 HPUE	5.50	27.00	32.5	1.78	1778.28	0.174	1.000	0.174
Antenna 13	5G FR1 n66	5.00	25.00	30.0	1.00	1000.00	0.098	1.000	0.098
	LTE Band 2	4.70	25.00	29.7	0.93	933.25	0.091	1.000	0.091
	LTE Band 4	4.90	25.00	29.9	0.98	977.24	0.096	1.000	0.096
	LTE Band 25	4.70	25.00	29.7	0.93	933.25	0.091	1.000	0.091
	LTE Band 66	4.90	25.00	29.9	0.98	977.24	0.096	1.000	0.096
	5G FR1 n2	4.70	25.00	29.7	0.93	933.25	0.091	1.000	0.091
	5G FR1 n25	4.70	25.00	29.7	0.93	933.25	0.091	1.000	0.091
	5G FR1 n41	5.40	24.50	29.9	0.98	977.24	0.096	1.000	0.096
	5G FR1 n41 HPUE	5.40	27.00	32.4	1.74	1737.80	0.170	1.000	0.170
Bluetooth	5G FR1 n66	4.90	25.00	29.9	0.98	977.24	0.096	1.000	0.096
		4.8	16.50	21.3	0.13	134.90	0.013	1.000	0.013

**4.2. Collocated Power Density Calculation**

Antenna 0 + 12 + Bluetooth			
Maximum Bluetooth Power Density / Limit	Maximum Antenna 0 Power Density / Limit	Maximum Antenna 12 Power Density / Limit	Σ (Power Density / Limit) of Ant 0+12+Bluetooth
0.013	0.125	0.174	0.312

Antenna 0 + 4 + Bluetooth			
Maximum Bluetooth Power Density / Limit	Maximum Antenna 0 Power Density / Limit	Maximum Antenna 4 Power Density / Limit	Σ (Power Density / Limit) of Ant 0+4+Bluetooth
0.013	0.125	0.503	0.641

Antenna 1 + 13 + Bluetooth			
Maximum Bluetooth Power Density / Limit	Maximum Antenna 1 Power Density / Limit	Maximum Antenna 13 Power Density / Limit	Σ (Power Density / Limit) of Ant 1+13+Bluetooth
0.013	0.126	0.170	0.309

Antenna 4 + 6 + Bluetooth			
Maximum Bluetooth Power Density / Limit	Maximum Antenna 4 Power Density / Limit	Maximum Antenna 6 Power Density / Limit	Σ (Power Density / Limit) of Ant 4+6+Bluetooth
0.013	0.503	0.469	0.985

Antenna 4 + 13 + Bluetooth			
Maximum Bluetooth Power Density / Limit	Maximum Antenna 4 Power Density / Limit	Maximum Antenna 13 Power Density / Limit	Σ (Power Density / Limit) of Ant 4+13+Bluetooth
0.013	0.503	0.170	0.686

Antenna 12 + 13 + Bluetooth			
Maximum Bluetooth Power Density / Limit	Maximum Antenna 12 Power Density / Limit	Maximum Antenna 13 Power Density / Limit	Σ (Power Density / Limit) of Ant 12+13+Bluetooth
0.013	0.174	0.170	0.357

Note:

1. The MPE ratio summation regardless what the actual EN-DC list, always chose the higher value base on antenna to summed as EN-DC conservatively.
1. Σ (Power Density / Limit): This is a summation of [(power density for each transmitter/antenna included in the simultaneous transmission)/ (corresponding MPE limit)], for Transmit antenna 0+12,0+4,1+13,4+6,4+13,12+13 with Bluetooth.
2. Considering the WWAN module collocation with the Bluetooth transmitter of the EIRP performance listed in the table above, the aggregated (power density /limit) is smaller than 1, and MPE of 3 collocated transmitters is compliant.

Conclusion:

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