RF EXPOSURE EVALUATION REPORT

FCC ID	:	**PKRISGFW2000**
Equipment	:	**5G CPE Wireless Solution**
Brand Name	:	**Inseego**
Model Name	:	**FW2000**
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 Part 2.1091 and it complies with applicable limit.

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Cona Huang

Approved by: Cona Huang / Deputy Manager

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History of this test report

Report No.	Version	Description	Issued Date
FA082512	Rev. 01	Initial issue of report	Feb. 10, 2021

1. Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT Type	5G CPE Wireless Solution
Brand Name	Inseego
Model Name	FW2000
FCC ID	PKRISGFW2000
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 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 n12 : 699 MHz ~ 716 MHz 5G NR n25 : 1850 MHz ~ 1915 MHz 5G NR n41 : 2496 MHz ~ 2690 MHz 5G NR n66 : 1710 MHz ~ 1780 MHz 5G NR n71 : 663 MHz ~ 698 MHz 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 BR/EDR/LE

Reviewed by: Jason Wang

Report Producer: Carlie Tsai

2. Maximum RF average output power among production units

Mode		Maximum Average power(dBm)
LTE	Band 2	24.00
	Band 4	22.00
	Band 5	24.00
	Band 7	24.00
	Band 12	24.00
	Band 13	24.00
	Band 14	24.00
	Band 17	24.00
	Band 25	24.00
	Band 26	24.00
	Band 30	21.00
	Band 38	24.00
	Band 41	24.00
	Band 41 (HPUE)	27.00
	Band 42	21.00
	Band 48	22.00
	Band 66	22.00
	Band 71	24.00
5G FR1	n2	24.00
	n5	24.00
	n12	24.00
	n25	24.00
	n41	24.00
	n66	20.00
	n71	24.00
Bluetooth		3.00

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/f2)	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/f2)	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 38 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. Power Density Calculation

Antenna	Band	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 38cm (mW/cm^2)	Limit (mW/cm^2)	Power Density / Limit
Antenna 0	LTE Band 2	9.10	24.00	33.1	2.04	2041.74	0.113	1.000	0.113
	LTE Band 4	8.50	22.00	30.5	1.12	1122.02	0.062	1.000	0.062
	LTE Band 5	2.40	24.00	26.4	0.44	436.52	0.024	0.549	0.044
	LTE Band 7	10.30	24.00	34.3	2.69	2691.53	0.148	1.000	0.148
	LTE Band 12	3.30	24.00	27.3	0.54	537.03	0.030	0.466	0.064
	LTE Band 13	0.40	24.00	24.4	0.28	275.42	0.015	0.518	0.029
	LTE Band 14	0.50	24.00	24.5	0.28	281.84	0.016	0.525	0.030
	LTE Band 17	3.30	24.00	27.3	0.54	537.03	0.030	0.469	0.063
	LTE Band 25	9.10	24.00	33.1	2.04	2041.74	0.113	1.000	0.113
	LTE Band 26	2.40	24.00	26.4	0.44	436.52	0.024	0.543	0.044
	LTE Band 30	4.20	21.00	25.2	0.33	331.13	0.018	1.000	0.018
	LTE Band 38	6.00	24.00	30.0	1.00	1000.00	0.055	1.000	0.055
	LTE Band 41	10.30	24.00	34.3	2.69	2691.53	0.148	1.000	0.148
	LTE Band 41 (HPUE)	10.30	27.00	37.3	5.37	5370.32	0.296	1.000	0.296
	LTE Band 66	8.50	22.00	30.5	1.12	1122.02	0.062	1.000	0.062
	LTE Band 71	3.10	24.00	27.1	0.51	512.86	0.028	0.442	0.064
	5G FR1 n2	9.10	24.00	33.1	2.04	2041.74	0.113	1.000	0.113
	5G FR1 n5	2.40	24.00	26.4	0.44	436.52	0.024	0.549	0.044
	5G FR1 n12	3.30	24.00	27.3	0.54	537.03	0.030	0.466	0.064
	5G FR1 n41	10.30	24.00	34.3	2.69	2691.53	0.148	1.000	0.148
	5G FR1 n66	8.50	20.00	28.5	0.71	707.95	0.039	1.000	0.039
	5G FR1 n71	3.10	24.00	27.1	0.51	512.86	0.028	0.442	0.064
Antenna 4	LTE Band 42	13.30	21.00	34.3	2.69	2691.53	0.148	1.000	0.148
	LTE Band 48	11.70	22.00	33.7	2.34	2344.23	0.129	1.000	0.129
Antenna 8	LTE Band 2	9.10	24.00	33.1	2.04	2041.74	0.113	1.000	0.113
	LTE Band 4	8.50	22.00	30.5	1.12	1122.02	0.062	1.000	0.062
	LTE Band 7	10.30	24.00	34.3	2.69	2691.53	0.148	1.000	0.148
	LTE Band 66	8.50	22.00	30.5	1.12	1122.02	0.062	1.000	0.062
	5G FR1 n2	9.10	24.00	33.1	2.04	2041.74	0.113	1.000	0.113
	5G FR1 n25	9.10	24.00	33.1	2.04	2041.74	0.113	1.000	0.113
	5G FR1 n41	10.30	24.00	34.3	2.69	2691.53	0.148	1.000	0.148
	5G FR1 n66	8.05	20.00	28.1	0.64	638.26	0.035	1.000	0.035
Bluetooth		4.6	3.00	7.6	0.01	5.75	0.000	1.000	0.0003

4.2. Collocated Power Density Calculation

Antenna 0 + 8 + Bluetooth			
Maximum Bluetooth Power Density / Limit	Maximum Antenna 0 Power Density / Limit	Maximum Antenna 8 Power Density / Limit	Σ(Power Density / Limit) of Ant 0+8+Bluetooth
0.0003	0.296	0.148	0.4443

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
0.0003	0.296	0.148	0.4443

Note:

1. ∑(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+8 or 0+4 with Bluetooth
2. Considering the WWAN 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.