



RF EXPOSURE EVALUATION REPORT

FCC ID : PKRISGFX31001
Equipment : Indoor Router
Brand Name : Inseego
Model Name : FX3100-1
Marketing Name : FX3100
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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1. Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT Type	Indoor Router
Brand Name	Inseego
Model Name	FX3100-1
FCC ID	PKRISGFX31001
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 25: 1850 MHz ~ 1915 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 38: 2570 MHz ~ 2620 MHz LTE Band 41: 2496 MHz ~ 2690 MHz LTE Band 48: 3550 MHz ~ 3700 MHz LTE Band 66: 1710 MHz ~ 1780 MHz LTE Band 71: 663 MHz ~ 698 MHz 5G FR1 n2 : 1850 MHz ~ 1910 MHz 5G FR1 n5 : 824 MHz ~ 849 MHz 5G FR1 n7 : 2500 MHz ~ 2570 MHz 5G FR1 n12 : 699 MHz ~ 716 MHz 5G FR1 n25 : 1850 MHz ~ 1915 MHz 5G FR1 n26 : 814 MHz ~ 849 MHz 5G FR1 n38 : 2570 MHz ~ 2620 MHz 5G FR1 n41 : 2496 MHz ~ 2690 MHz 5G FR1 n48 : 3550 MHz ~ 3700 MHz 5G FR1 n66 : 1710 MHz ~ 1780 MHz 5G FR1 n71 : 663 MHz ~ 698 MHz 5G FR1 n77: 3450 MHz ~ 3550 MHz, 3700 MHz ~ 3980 MHz WLAN 2.4 GHz Band: 2400 MHz ~ 2483.5 MHz WLAN 5.2 GHz Band: 5150 MHz ~ 5250 MHz WLAN 5.8 GHz Band: 5725 MHz ~ 5850 MHz
Mode	LTE: QPSK, 16QAM, 64QAM, 256QAM 5G FR1: DFT-s-OFDM/CP-OFDM, Pi/2 BPSK/QPSK/16QAM/64QAM/256QAM WLAN: 802.11a/b/g/n/ac/ax HT20/HT40/VHT20/VHT40/VHT80/HE20/HE40/HE80
HW Version	Production Representative
EUT Stage	Production Unit

Reviewed by: Jason Wang

Report Producer: Daisy Peng

2. Device Maximum RF Output Power Specification

Mode		Maximum Average power(dBm)
LTE	Band 2	24.5
	Band 4	24.5
	Band 5	24.5
	Band 7	24.0
	Band 12	24.0
	Band 13	24.5
	Band 25	24.5
	Band 26	24.5
	Band 38	24.0
	Band 41	24.5
	Band 41_HPUE	27.5
	Band 48	21.5
	Band 66	24.5
	Band 71	24.0
5G FR1	n2	24.5
	n5	24.5
	n7	24.0
	n12	24.0
	n25	24.5
	n26	24.5
	n38	24.0
	n41	24.5
	n41_HPUE	27.5
	n48	21.5
	n66	24.5
	n71	24.0
	n77	24.5
	n77_HPUE	26.5

Mode	Maximum Average Power (dBm)
2.4GHz WLAN	21.0
5.2 GHz WLAN	16.0
5.8 GHz WLAN	19.0

3. Determination of exemption

Per 1.1307(b)(3), (i) For single RF sources (i.e., any single fixed RF source, mobile device, or portable device, as defined in paragraph (b)(2) of this section): A single RF source is exempt if:

- (A) The available maximum time-averaged power is no more than 1 mW, regardless of separation distance. This exemption may not be used in conjunction with other exemption criteria other than those in paragraph (b)(3)(ii)(A) of this section. Medical implant devices may only use this exemption and that in paragraph (b)(3)(ii)(A);
- (B) Or the available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold Pth (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). Pth is given by:

$$P_{th} \text{ (mW)} = ERP_{20cm} (d / 20)^x \text{ for distance } d \leq 20\text{cm}$$

$$P_{th} \text{ (mW)} = ERP_{20cm} \text{ for distance } 20\text{cm} < d \leq 40\text{cm}$$

$$x = -\log_{10} \left(\frac{60}{ERP_{20cm} \sqrt{f}} \right)$$

$ERP_{20cm} \text{ (mW)}$	$0.3 \text{ GHz} \leq f < 1.5 \text{ GHz}:$	$2040 f$
	$1.5 \text{ GHz} \leq f \leq 6 \text{ GHz}:$	3060

- (C) Or using Table 1 and the minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. For the exemption in Table 1 to apply, R must be at least $\lambda/2\pi$, where λ is the free-space operating wavelength in meters. If the ERP of a single RF source is not easily obtained, then the available maximum time-averaged power may be used in lieu of ERP if the physical dimensions of the radiating structure(s) do not exceed the electrical length of $\lambda/4$ or if the antenna gain is less than that of a half-wave dipole (1.64 linear value).

Table 1 to § 1.1307(b)(3)(i)(C) - Single RF Sources Subject to Routine Environmental Evaluation

RF Source frequency (MHz)	Threshold ERP (watts)
0.3-1.34	$1,920 R^2.$
1.34-30	$3,450 R^2/f^2.$
30-300	$3.83 R^2.$
300-1,500	$0.0128 R^2 f.$
1,500-100,000	$19.2 R^2.$



4. RF Exposure Evaluation

4.1. Standalone assessment

General Note:

- 1. Pi is mean the available maximum time-averaged power or the ERP, whichever is greater, for fixed, mobile, or portable RF source i at a distance between 0.5 cm and 40 cm
2. Pth is mean the exemption threshold power (Pth) according to the § 1.1307(b)(3)(i)(B) formula for fixed, mobile, or portable RF source i.
3. In this report was used Part1.1307(b)(3)(i)(B) perfrom RF Exposure evaluation
4. The distance of 20cm is for this device

<WWAN>

Ant 0

Table with 11 columns: Band, Antenna Gain (dBi), Maximum Conducted Power (dBm), Maximum EIRP (dBm), Maximum ERP (dBm), Maximum EIRP (mW), Maximum ERP (mW), Pi (dBm), Pi (mW), Part1.1307 option(b) Threshold (mW), Part1.1307 option(b) Pi/Pth. Rows include LTE Bands 2, 4, 5, 7, 12, 13, 25, 26, 38, 66, 71 and 5G FR1 bands n2, n5, n7, n12, n25, n26, n38, n66, n71.

Ant 1

Table with 11 columns: Band, Antenna Gain (dBi), Maximum Conducted Power (dBm), Maximum EIRP (dBm), Maximum ERP (dBm), Maximum EIRP (mW), Maximum ERP (mW), Pi (dBm), Pi (mW), Part1.1307 option(b) Threshold (mW), Part1.1307 option(b) Pi/Pth. Rows include LTE Band 5 and 5G FR1 n5.

Ant 3

Table with 11 columns: Band, Antenna Gain (dBi), Maximum Conducted Power (dBm), Maximum EIRP (dBm), Maximum ERP (dBm), Maximum EIRP (mW), Maximum ERP (mW), Pi (dBm), Pi (mW), Part1.1307 option(b) Threshold (mW), Part1.1307 option(b) Pi/Pth. Rows include 5G FR1 n41_PC3 and 5G FR1 n41_PC2.



Ant 4

Band	Antenna Gain (dBi)	Maximum Conducted Power (dBm)	Maximum EIRP (dBm)	Maximum ERP (dBm)	Maximum EIRP (mW)	Maximum ERP (mW)	Pi (dBm)	Pi (mW)	Part1.1307 option(b) Threshold (mW)	Part1.1307 option(b) Pi/Pth
LTE Band 48	1.50	21.50	23.0	20.85	199.53	121.62	21.50	141.25	3060.000	0.046
5G NR n48	1.50	21.50	23.0	20.85	199.53	121.62	21.50	141.25	3060.000	0.046
5G NR n77 Part27Q_PC3	1.50	24.50	26.0	23.85	398.11	242.66	24.50	281.84	3060.000	0.092
5G NR n77 Part27Q_PC2	1.50	26.50	28.0	25.85	630.96	384.59	26.50	446.68	3060.000	0.146
5G NR n77 Part27O_PC3	2.60	24.50	27.1	24.95	512.86	312.61	24.95	312.61	3060.000	0.102
5G NR n77 Part27O_PC2	2.60	26.50	29.1	26.95	812.83	495.45	26.95	495.45	3060.000	0.162

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Band	Antenna Gain (dBi)	Maximum Conducted Power (dBm)	Maximum EIRP (dBm)	Maximum ERP (dBm)	Maximum EIRP (mW)	Maximum ERP (mW)	Pi (dBm)	Pi (mW)	Part1.1307 option(b) Threshold (mW)	Part1.1307 option(b) Pi/Pth
5G NR n48	3.40	21.50	24.9	22.75	309.03	188.36	22.75	188.36	3060.000	0.062
5G NR n77 Part 27Q_PC3	3.50	24.50	28.0	25.85	630.96	384.59	25.85	384.59	3060.000	0.126
5G NR n77 Part 27Q_PC2	3.50	26.50	30.0	27.85	1000.00	609.54	27.85	609.54	3060.000	0.199
5G NR n77 Part 27O_PC3	4.10	24.50	28.6	26.45	724.44	441.57	26.45	441.57	3060.000	0.144
5G NR n77 Part 27O_PC2	4.10	26.50	30.6	28.45	1148.15	699.84	28.45	699.84	3060.000	0.229

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Band	Antenna Gain (dBi)	Maximum Conducted Power (dBm)	Maximum EIRP (dBm)	Maximum ERP (dBm)	Maximum EIRP (mW)	Maximum ERP (mW)	Pi (dBm)	Pi (mW)	Part1.1307 option(b) Threshold (mW)	Part1.1307 option(b) Pi/Pth
LTE Band 2	1.70	24.50	26.2	24.05	416.87	254.10	24.50	281.84	3060.000	0.092
LTE Band 4	1.20	24.50	25.7	23.55	371.54	226.46	24.50	281.84	3060.000	0.092
LTE Band 41_PC3	2.80	24.50	27.3	25.15	537.03	327.34	25.15	327.34	3060.000	0.107
LTE Band 41_PC2	2.80	27.50	30.3	28.15	1071.52	653.13	28.15	653.13	3060.000	0.213
LTE Band 66	1.30	24.50	25.8	23.65	380.19	231.74	24.50	281.84	3060.000	0.092
5G FR1 n2	1.70	24.50	26.2	24.05	416.87	254.10	24.50	281.84	3060.000	0.092
5G FR1 n25	1.70	24.50	26.2	24.05	416.87	254.10	24.50	281.84	3060.000	0.092
5G FR1 n38	2.80	24.00	26.8	24.65	478.63	291.74	24.65	291.74	3060.000	0.095
5G FR1 n41_PC3	2.80	24.50	27.3	25.15	537.03	327.34	25.15	327.34	3060.000	0.107
5G FR1 n41_PC2	2.80	27.50	30.3	28.15	1071.52	653.13	28.15	653.13	3060.000	0.213
5G FR1 n66	1.30	24.50	25.8	23.65	380.19	231.74	24.50	281.84	3060.000	0.092

<WLAN>

Ant 0

Band	Antenna Gain (dBi)	Maximum Conducted Power (dBm)	Maximum EIRP (dBm)	Maximum ERP (dBm)	Maximum EIRP (mW)	Maximum ERP (mW)	Pi (dBm)	Pi (mW)	Part1.1307 option(b) Threshold (mW)	Part1.1307 option(b) Pi/Pth
WLAN2.4GHz Band	1.2	21.00	22.2	20.05	165.96	101.16	21.00	125.89	3060.000	0.041
WLAN5.2GHz Band	3.2	16.00	19.2	17.05	83.18	50.70	17.05	50.70	3060.000	0.017
WLAN5.8GHz Band	3.5	19.00	22.5	20.35	177.83	108.39	20.35	108.39	3060.000	0.035

Ant 1

Band	Antenna Gain (dBi)	Maximum Conducted Power (dBm)	Maximum EIRP (dBm)	Maximum ERP (dBm)	Maximum EIRP (mW)	Maximum ERP (mW)	Pi (dBm)	Pi (mW)	Part1.1307 option(b) Threshold (mW)	Part1.1307 option(b) Pi/Pth
WLAN2.4GHz Band	4.2	21.00	25.2	23.05	331.13	201.84	23.05	201.84	3060.000	0.066
WLAN5.2GHz Band	6.2	16.00	22.2	20.05	165.96	101.16	20.05	101.16	3060.000	0.033
WLAN5.8GHz Band	6.8	19.00	25.8	23.65	380.19	231.74	23.65	231.74	3060.000	0.076

4.2. Collocated assessment

General Note:

1. Either MPE-based exemption may be considered for test exemption for fixed, mobile, or portable device exposure conditions; therefore, the contributions from each exemption in conjunction with the measured SAR (*Evaluated_k* term) shall be used to determine exemption for simultaneous transmission according to Formula (C.1).
2. The sum of the ratios of the applicable terms for MPE-based and MPE shall be less than 1, to determine LTE + FR1 + WLAN simultaneous transmission exposure compliance.

$$\sum_{i=1}^a \frac{P_i}{P_{th,i}} + \sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^c \frac{Evaluated_k}{Exposure\ Limit_k} \leq 1 \quad (C.1)$$

Maximum LTE Pi/Pth Ratio	Maximum 5G FR1 Pi/Pth Ratio	Maximum WLAN Ant 0 Pi/Pth Ratio	Maximum WLAN Ant 1 Pi/Pth Ratio	Σ (P/Pth Ratio) of LTE + 5G FR1 + WLAN
0.213	0.229	0.041	0.076	0.559

Conclusion:

According to 47 CFR §1.1307, the RF exposure analysis concludes that the RF Exposure is FCC compliant.