

RF EXPOSURE EVALUATION REPORT

FCC ID : PKRISGRM4210
Equipment : WWAN LGA Radio Module
Brand Name : Inseego
Model Name : RM4210
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.

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 3786) and the FCC designation No. TW3786 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC evaluation.

The results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. Laboratory, the test report shall not be reproduced except in full.



Approved by: Cona Huang / Deputy Manager



SPORTON INTERNATIONAL INC. Wensan Laboratory

No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan



Table of Contents

1. DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)	4
2. MAXIMUM RF AVERAGE OUTPUT POWER AMONG PRODUCTION UNITS	5
3. RF EXPOSURE LIMIT INTRODUCTION	6
4. RADIO FREQUENCY RADIATION EXPOSURE EVALUATION	7
4.1. Standalone Power Density Calculation	7
4.2. Collocated Power Density Calculation.....	8



History of this test report

Report No.	Version	Description	Issued Date
FA4N2547	Rev. 01	Initial issue of report	May 06, 2025
FA4N2547	Rev. 02	Update section 2, 4	May 12, 2025

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

Product Feature & Specification	
EUT Type	WWAN LGA Radio Module
Brand Name	Inseego
Model Name	RM4210
FCC ID	PKRISGRM4210
Wireless Technology and Frequency Range	WCDMA Band II: 1850 MHz ~ 1910 MHz WCDMA Band IV: 1710 MHz ~ 1755 MHz WCDMA Band V: 824 MHz ~ 849 MHz 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 17: 704 MHz ~ 716 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 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 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 n71 : 663 MHz ~ 698 MHz 5G NR n77: 3700 MHz ~ 3980 MHz, 3450MHz ~ 3550MHz 5G NR n78: 3700 MHz ~ 3800 MHz, 3450MHz ~ 3550MHz
Mode	RMC 12.2Kbps HSDPA HSUPA DC-HSDPA LTE: QPSK, 16QAM, 64QAM, 256QAM 5G NR: DFT-s-OFDM/CP-OFDM, Pi/2 BPSK/QPSK/16QAM/64QAM/256QAM

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

2. Maximum RF average output power among production units

Technology	Band	Maximum Power (dBm)
UMTS	UMTS B2	25.0
	UMTS B4	25.0
	UMTS B5	25.0
LTE	LTE Band 2	25.5
	LTE Band 4	25.5
	LTE Band 5	26.0
	LTE Band 12	26.0
	LTE Band 17	26.0
	LTE Band 25	25.5
	LTE Band 26	26.0
	LTE Band 38	25.0
	LTE Band 41_PC3	25.0
	LTE Band 41_PC2	27.0
	LTE Band 48	20.0
	LTE Band 66	25.5
	LTE Band 71	26.0
NR	NR Band 2_PC3	25.5
	NR Band 2_PC2_UL MIMO	26.5
	NR Band 5	25.5
	NR Band 12	26.0
	NR Band 25_PC3	25.5
	NR Band 25_PC2_UL MIMO	26.5
	NR Band 26	26.0
	NR Band 38	25.0
	NR Band 38_ULMIMO	23.5
	NR Band 41_PC3	25.0
	NR Band 41_PC2	27.0
	NR Band 41_PC1.5_UL MIMO	27.5
	NR Band 48	20.0
	NR Band 48_UL MIMO	20.0
	NR Band 66_PC3	25.5
	NR Band 66_PC2_UL MIMO	26.5
	NR Band 71_PC3	26.0
	NR Band 71_PC2_UL MIMO	26.5
	NR Band 77_PC3	25.0
	NR Band 77_PC2/UL MIMO	27.0
	NR Band 78_PC3	25.0
	NR Band 78_PC2/UL MIMO	27.0

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 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

4. Radio Frequency Radiation Exposure Evaluation

4.1. Standalone Power Density Calculation

Band	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum ERP (dBm)	Maximum ERP (W)	Maximum EIRP (dBm)	Maximum EIRP (W)	Maximum ERP/EIRP Limit (W)	Maximum PG (mW)	Power Density at 20cm (mW/cm ²)	Limit (mW/cm ²)
WCDMA Band 2	7.5	25.00	30.350	1.084	32.500	1.778	2.00	1778.279	0.354	1.000
WCDMA Band 4	4.5	25.00	27.350	0.543	29.500	0.891	1.00	891.251	0.177	1.000
WCDMA Band 5	8.4	25.00	31.250	1.334	33.400	2.188	7.00	2187.762	0.435	0.549
LTE Band 2	7.5	25.50	30.850	1.216	33.000	1.995	2.00	1995.262	0.397	1.000
LTE Band 4	4.5	25.50	27.850	0.610	30.000	1.000	1.00	1000.000	0.199	1.000
LTE Band 5	8.4	26.00	32.250	1.679	34.400	2.754	7.00	2754.229	0.548	0.549
LTE Band 12	7.6	26.00	31.450	1.396	33.600	2.291	3.00	2290.868	0.456	0.466
LTE Band 17	7.6	26.00	31.450	1.396	33.600	2.291	3.00	2290.868	0.456	0.469
LTE Band 25	7.5	25.50	30.850	1.216	33.000	1.995	2.00	1995.262	0.397	1.000
LTE Band 26	8.4	26.00	32.250	1.679	34.400	2.754	7.00	2754.229	0.548	0.549
LTE Band 38	8.0	25.00	30.850	1.216	33.000	1.995	2.00	1995.262	0.397	1.000
LTE Band 41_PC3	8.0	25.00	30.850	1.216	33.000	1.995	2.00	1995.262	0.397	1.000
LTE Band 41_PC2	6.0	27.00	30.850	1.216	33.000	1.995	2.00	1995.262	0.397	1.000
LTE Band 48	3.0	20.00	20.850	0.122	23.000	0.200	0.20	199.526	0.040	1.000
LTE Band 66	4.5	25.50	27.850	0.610	30.000	1.000	1.00	1000.000	0.199	1.000
LTE Band 71	7.4	26.00	31.250	1.334	33.400	2.188	3.00	2187.762	0.435	0.442
NR Band 2_PC3	7.5	25.50	30.850	1.216	33.000	1.995	2.00	1995.262	0.397	1.000
NR Band 2_PC2_UL MIMO	6.5	26.50	30.850	1.216	33.000	1.995	2.00	1995.262	0.397	1.000
NR Band 5	8.4	25.50	31.750	1.496	33.900	2.455	7.00	2454.709	0.489	0.549
NR Band 12	7.6	26.00	31.450	1.396	33.600	2.291	3.00	2290.868	0.456	0.466
NR Band 25_PC3	7.5	25.50	30.850	1.216	33.000	1.995	2.00	1995.262	0.397	1.000
NR Band 25_PC2_UL MIMO	6.5	26.50	30.850	1.216	33.000	1.995	2.00	1995.262	0.397	1.000
NR Band 26	8.4	26.00	32.250	1.679	34.400	2.754	7.00	2754.229	0.548	0.549
NR Band 38	8.0	25.00	30.850	1.216	33.000	1.995	2.00	1995.262	0.397	1.000
NR Band 38_ULMIMO	9.5	23.50	30.850	1.216	33.000	1.995	2.00	1995.262	0.397	1.000
NR Band 41_PC3	8.0	25.00	30.850	1.216	33.000	1.995	2.00	1995.262	0.397	1.000
NR Band 41_PC2	6.0	27.00	30.850	1.216	33.000	1.995	2.00	1995.262	0.397	1.000
NR Band 41_PC1.5_UL MIMO	5.5	27.50	30.850	1.216	33.000	1.995	2.00	1995.262	0.397	1.000
NR Band 48	3.0	20.00	20.850	0.122	23.000	0.200	0.20	199.526	0.040	1.000
NR Band 48_UL MIMO	3.0	20.00	20.850	0.122	23.000	0.200	0.20	199.526	0.040	1.000
NR Band 66_PC3	4.5	25.50	27.850	0.610	30.000	1.000	1.00	1000.000	0.199	1.000
NR Band 66_PC2_UL MIMO	3.5	26.50	27.850	0.610	30.000	1.000	1.00	1000.000	0.199	1.000
NR Band 71_PC3	7.4	26.00	31.250	1.334	33.400	2.188	3.00	2187.762	0.435	0.442
NR Band 71_PC2_UL MIMO	6.9	26.50	31.250	1.334	33.400	2.188	3.00	2187.762	0.435	0.442
NR Band 77_PC3	5.0	25.00	27.850	0.610	30.000	1.000	1.00	1000.000	0.199	1.000
NR Band 77_PC2/UL MIMO	3.0	27.00	27.850	0.610	30.000	1.000	1.00	1000.000	0.199	1.000
NR Band 78_PC3	5.0	25.00	27.850	0.610	30.000	1.000	1.00	1000.000	0.199	1.000
NR Band 78_PC2/UL MIMO	3.0	27.00	27.850	0.610	30.000	1.000	1.00	1000.000	0.199	1.000

4.2. Collocated Power Density Calculation

Note:

1. This MPE analysis is applicable to any collocated transmitters, with the maximum EIRP for WLAN assumed to be 30 dBm and the maximum EIRP for BT assumed to be 20 dBm.

Band	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Maximum EIRP (W)	Maximum PG (mW)	Power Density at 20cm (mW/cm ²)	Limit (mW/cm ²)	Power Density / Limit
WCDMA Band 2	7.5	25.00	32.5	1.78	1778.28	0.354	1.000	0.354
WCDMA Band 4	4.5	25.00	29.5	0.89	891.25	0.177	1.000	0.177
WCDMA Band 5	5.1	25.00	30.1	1.02	1023.29	0.204	0.549	0.371
LTE Band 2	7.5	25.50	33.0	2.00	1995.26	0.397	1.000	0.397
LTE Band 4	4.5	25.50	30.0	1.00	1000.00	0.199	1.000	0.199
LTE Band 5	5.1	26.00	31.1	1.29	1288.25	0.256	0.549	0.467
LTE Band 12	5.4	26.00	31.4	1.38	1380.38	0.275	0.466	0.590
LTE Band 17	5.4	26.00	31.4	1.38	1380.38	0.275	0.469	0.585
LTE Band 25	7.5	25.50	33.0	2.00	1995.26	0.397	1.000	0.397
LTE Band 26	5.1	26.00	31.1	1.29	1288.25	0.256	0.549	0.467
LTE Band 38	8.0	25.00	33.0	2.00	1995.26	0.397	1.000	0.397
LTE Band 41_PC3	8.0	25.00	33.0	2.00	1995.26	0.397	1.000	0.397
LTE Band 41_PC2	6.0	27.00	33.0	2.00	1995.26	0.397	1.000	0.397
LTE Band 48	3.0	20.00	23.0	0.20	199.53	0.040	1.000	0.040
LTE Band 66	4.5	25.50	30.0	1.00	1000.00	0.199	1.000	0.199
LTE Band 71	5.2	26.00	31.2	1.32	1318.26	0.262	0.442	0.594
NR Band 2_PC3	7.5	25.50	33.0	2.00	1995.26	0.397	1.000	0.397
NR Band 2_PC2_UL MIMO	6.5	26.50	33.0	2.00	1995.26	0.397	1.000	0.397
NR Band 5	5.1	25.50	30.6	1.15	1148.15	0.229	0.549	0.416
NR Band 12	5.4	26.00	31.4	1.38	1380.38	0.275	0.466	0.590
NR Band 25_PC3	7.5	25.50	33.0	2.00	1995.26	0.397	1.000	0.397
NR Band 25_PC2_UL MIMO	6.5	26.50	33.0	2.00	1995.26	0.397	1.000	0.397
NR Band 26	5.1	26.00	31.1	1.29	1288.25	0.256	0.549	0.467
NR Band 38	8.0	25.00	33.0	2.00	1995.26	0.397	1.000	0.397
NR Band 38_ULMIMO	9.5	23.50	33.0	2.00	1995.26	0.397	1.000	0.397
NR Band 41_PC3	8.0	25.00	33.0	2.00	1995.26	0.397	1.000	0.397
NR Band 41_PC2	6.0	27.00	33.0	2.00	1995.26	0.397	1.000	0.397
NR Band 41_PC1.5_UL MIMO	5.5	27.50	33.0	2.00	1995.26	0.397	1.000	0.397
NR Band 48	3.0	20.00	23.0	0.20	199.53	0.040	1.000	0.040
NR Band 48_UL MIMO	3.0	20.00	23.0	0.20	199.53	0.040	1.000	0.040
NR Band 66_PC3	4.5	25.50	30.0	1.00	1000.00	0.199	1.000	0.199
NR Band 66_PC2_UL MIMO	3.5	26.50	30.0	1.00	1000.00	0.199	1.000	0.199
NR Band 71_PC3	5.2	26.00	31.2	1.32	1318.26	0.262	0.442	0.594
NR Band 71_PC2_UL MIMO	4.7	26.50	31.2	1.32	1318.26	0.262	0.442	0.594
NR Band 77_PC3	5.0	25.00	30.0	1.00	1000.00	0.199	1.000	0.199
NR Band 77_PC2/UL MIMO	3.0	27.00	30.0	1.00	1000.00	0.199	1.000	0.199
NR Band 78_PC3	5.0	25.00	30.0	1.00	1000.00	0.199	1.000	0.199
NR Band 78_PC2/UL MIMO	3.0	27.00	30.0	1.00	1000.00	0.199	1.000	0.199
WLAN2.4GHz Band			30.0	1.00	1000.00	0.199	1.000	0.199
WLAN5/6GHz Band			30.0	1.00	1000.00	0.199	1.000	0.199
Bluetooth			20.0	0.10	100.00	0.020	1.000	0.020

WWAN Power Density / Limit	WLAN Power Density / Limit	Bluetooth Power Density / Limit	Σ (Power Density / Limit) of WWAN+WLAN+Bluetooth
0.594	0.199	0.020	0.813

Note:
General Note:

1. The device support DPS (Dynamic Power Share) function to achieve higher uplink data rate keeping the total power unchanged in 5G NR NSA EN-DC mode according to 3GPP 38.213, when the equipment has a dynamic power sharing capability, it adjusts the LTE or NR transmission power so that the instantaneous total power does not exceed the specified value, when the maximum transmission power of NR (P_{LTE}, P_{NR}) and the specified total power (P_{total}) have been set and the instantaneous calculated total transmission power exceeds P_{total}, the NR transmission power is reduced so that the actual transmission power of the user equipment will not exceed P_{total} power. So, if the LTE and NR standalone SAR is testing at total power level, the EN -DC combine MPE(LTE+NR) will not higher than the each standalone LTE and NR MPE, therefore, the simultaneous transmission analysis is used standalone MPE at total power level to show compliance.
2. Σ (Power Density / Limit): This is a summation of [(power density for each transmitter/antenna included in the simultaneous transmission)/ (corresponding MPE limit)], for WWAN + WLAN + Bluetooth.
3. Considering the WWAN module collocation with the WLAN and 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:

Based on FCC 47 CFR §2.1901, the analysis concludes that this product when transmitting in standalone within a host device, is compliant with the FCC RF exposure requirements in mobile exposure condition, provided the conducted power and antenna gain do not exceed the limits for each given frequency band per wireless technology as follow table:

Device	Technology	Band	Maximum Conducted Power (dBm)	Standalone Maximum Antenna Gain (dBi)	Collocated Maximum Antenna Gain (dBi)
RM4210	UMTS	UMTS B2	25.0	7.5	7.5
		UMTS B4	25.0	4.5	4.5
		UMTS B5	25.0	8.4	5.1
	LTE	LTE Band 2	25.5	7.5	7.5
		LTE Band 4	25.5	4.5	4.5
		LTE Band 5	26.0	8.4	5.1
		LTE Band 12	26.0	7.6	5.4
		LTE Band 17	26.0	7.6	5.4
		LTE Band 25	25.5	7.5	7.5
		LTE Band 26	26.0	8.4	5.1
		LTE Band 38	25.0	8.0	8.0
		LTE Band 41_PC3	25.0	8.0	8.0
		LTE Band 41_PC2	27.0	6.0	6.0
		LTE Band 48	20.0	3.0	3.0
		LTE Band 66	25.5	4.5	4.5
		LTE Band 71	26.0	7.4	5.2
	NR	NR Band 2_PC3	25.5	7.5	7.5
		NR Band 2_PC2_UL MIMO	26.5	6.5	6.5
		NR Band 5	25.5	8.4	5.1
		NR Band 12	26.0	7.6	5.4
		NR Band 25_PC3	25.5	7.5	7.5
		NR Band 25_PC2_UL MIMO	26.5	6.5	6.5
		NR Band 26	26.0	8.4	5.1
		NR Band 38	25.0	8.0	8.0
		NR Band 38_ULMIMO	23.5	9.5	9.5
		NR Band 41_PC3	25.0	8.0	8.0
		NR Band 41_PC2	27.0	6.0	6.0
		NR Band 41_PC1.5_UL MIMO	27.5	5.5	5.5
		NR Band 48	20.0	3.0	3.0
		NR Band 48_UL MIMO	20.0	3.0	3.0
		NR Band 66_PC3	25.5	4.5	4.5
		NR Band 66_PC2_UL MIMO	26.5	3.5	3.5
		NR Band 71_PC3	26.0	7.4	5.2
		NR Band 71_PC2_UL MIMO	26.5	6.9	4.7
		NR Band 77_PC3	25.0	5.0	5.0
		NR Band 77_PC2/UL MIMO	27.0	3.0	3.0
		NR Band 78_PC3	25.0	5.0	5.0
		NR Band 78_PC2/UL MIMO	27.0	3.0	3.0