FCC RADIO TEST REPORT

FCC ID	:	**PKRISGMD2000**
Equipment	:	**Wireless Module**
Brand Name	:	**Inseego**
Model Name	:	**MD2000**
Applicant	:	**Inseego Corporation** **9710 Scranton Road Suite 200, San Diego, CA 92121**
Manufacturer	:	**Inseego Corporation** **9710 Scranton Road Suite 200, San Diego, CA 92121**
Standard	:	**FCC 47 CFR Part 2, 96**

The product was received on Dec. 28, 2020 and testing was started from Jan. 05 , 2021 and completed on Jan. 08 , 2021. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI / TIA-603-E and has been in compliance with the applicable technical standards.

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

Louis Wu

Approved by: Louis Wu

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History of this test report

Report No.	Version	Description	Issued Date
FG090125-02A	01	Initial issue of report	Feb. 05, 2021

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.3	§2.1046	Conducted Output Power	Reporting only	-
3.4	§96.41	Effective Isotropic Radiated Power	Pass	-
-	§2.1049 §96.41	Occupied Bandwidth	Not Required	-
-	§2.1051 §96.41	Conducted Band Edge Measurement	Not Required	-
-	§2.1051 §96.41	Conducted Spurious Emission	Not Required	
-	§2.1055	Frequency Stability for Temperature & Voltage	Not Required	-
-	§2.1051 §96.41	Radiated Spurious Emission	Not Required	-

Note:

1. Not required means after assessing, test items are not necessary to carry out.
2. This is a variant report by changing SW. All the test cases were performed on original report which can be referred to Sporton Report Number FG090125-01C.

Declaration of Conformity:
The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
Comments and Explanations:
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.

Reviewed by: Wii Chang

Report Producer: Tina Chuang

1 General Description

1.1 Product Feature of Equipment Under Test

WCDMA/LTE/5G NR, Wi-Fi 2.4GHz 802.11b/g/n/ac/ax, Wi-Fi 5GHz 802.11a/n/ac/ax, and GNSS.

Product Specification subjective to this standard	
Antenna Type	WWAN: **<Primary Ant.>:** Monopole Antenna **<Diversity Ant.>:** Monopole Antenna WLAN: <Ant. 0>: Monopole Antenna <Ant. 1>: Monopole Antenna GPS/BDS/Galileo/GLONASS: Monopole Antenna

<Primary Antenna>

Radio Tech	Band Number	Antenna name	Gain
LTE	B43	ANT4	3.5
LTE	B48	ANT4	3.5

Remark: The above EUT's information was declared by manufacturer. Please refer to Comments and Explanations in report summary.

1.2 Modification of EUT

No modifications are made to the EUT during all test items.

1.3 Testing Location

Test Site	SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
Test Site Location	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978
Test Site No.	**Sporton Site No.**
	TH05-HY
Test Engineer	Richard Qiu
Temperature	22~25℃
Relative Humidity	54~59%

Note: The test site complies with ANSI C63.4 2014 requirement.

FCC Designation No.: TW1190

1.4 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ANSI C63.26-2015
- ANSI / TIA-603-E
- FCC 47 CFR Part 2, 96
- FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- FCC KDB 940660 D01 Part 96 CBRS Eqpt v02
- FCC KDB 412172 D01 Determining ERP and EIRP v01r01

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. The TAF code is not including all the FCC KDB listed without accreditation.

2 Test Configuration of Equipment Under Test

2.1 Test Mode

Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas. License Digital Systems v03r01 with maximum output power.

Test Items	Band	Bandwidth (MHz)						Modulation			RB #			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	64QAM	1	Half	Full	L	M	H
Max. Output Power	43	-	-	v	v	v	v	v	v	v	v	v	v	v	v	v
EIRP	43	-	-	v	v	v	v	v	v	v	Max Power					

2.2 Support Unit used in test configuration and system

Item	Equipment	Brand Name	Model No.	FCC ID	Data Cable	Power Cord
1.	System Simulator	Anritsu	MT8821C	N/A	N/A	Unshielded, 1.8 m

2.3 Frequency List of Low/Middle/High Channels

LTE Band 43 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
20	Channel	44190	44215	44240
	Frequency	3660.0	3662.5	3665.0
15	Channel	44165	44215	44265
	Frequency	3657.5	3662.5	3667.5
10	Channel	44140	44215	44290
	Frequency	3655.0	3662.5	3670.0
5	Channel	44115	44215	44315
	Frequency	3652.5	3662.5	3672.5

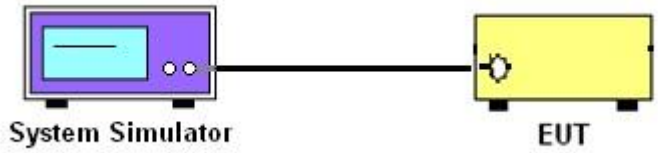
3 Conducted Test Items

3.1 Measuring Instruments

See list of measuring instruments of this test report.

3.2 Test Setup

3.2.1 Conducted Output Power and EIRP



3.2.2 Test Result of Conducted Test

Please refer to Appendix A.

3.3 Conducted Output Power

3.3.1 Description of the Conducted Output Power Measurement

A system simulator was used to establish communication with the EUT. Its parameters were set to force the EUT transmitting at maximum output power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

3.3.2 Test Procedures

1. The transmitter output port was connected to the system simulator.
2. Set EUT at maximum power through the system simulator.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Measure and record the power level from the system simulator.

3.4 EIRP

3.4.1 Description of the EIRP Measurement

The EIRP of mobile transmitters must not exceed 23 dBm /10 megahertz for LTE Band 48.

The testing follows ANSI C63.26-2015 Section 5.2.5.5

According to KDB 412172 D01 Power Approach,

EIRP = $P_T + G_T – L_C$, where

P_T = transmitter output power in dBm

G_T = gain of the transmitting antenna in dBi

L_C = signal attenuation in the connecting cable between the transmitter and antenna in dB

Device	Maximum EIRP (dBm/10 MHz)
End User Device	23

3.4.2 Test Procedures

The testing follows procedure in Section 5.2 of ANSI C63.26-2015 and KDB 940660 D01 Part 96 Eqpt v02 Section 3.2(b)(2)

Determine the EIRP by adding the effective antenna gain to the measured average conducted power level.

4 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Base Station (Measure)	Anritsu	MT8821C	6262025280	GSM / GPRS /WCDMA / LTE FDD/TDD with 44) /LTE-3CC DLCA,2CC ULCA	Oct. 05, 2020	Jan. 05, 2021~ Jan. 08, 2021	Oct. 04, 2021	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSV40	101908	10Hz~40GHz	May 13, 2020	Jan. 05, 2021~ Jan. 08, 2021	May 12, 2021	Conducted (TH05-HY)
Coupler	Warison	20dB 25W SMA Directional Coupler	#A	1-18GHz	Jan. 13, 2020	Jan. 05, 2021~ Jan. 08, 2021	Jan. 12, 2021	Conducted (TH05-HY)

Appendix A. Test Results of Conducted Test

Conducted Output Power(Average power & EIRP)

LTE Band 43 Maximum Average Power [dBm] (GT - LC = 3.5 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP (W)
20	1	0	QPSK	**19.35**	19.02	18.48	22.85	0.1928
20	1	49		19.32	18.93	18.47		
20	1	99		19.24	18.87	18.41		
20	50	0		18.46	18.22	17.74		
20	50	24		18.46	18.21	17.63		
20	50	50		18.49	18.07	17.60		
20	100	0		18.44	18.18	17.63		
20	1	0	16-QAM	18.43	18.30	17.90	21.93	0.1560
20	1	49		18.32	18.28	17.80		
20	1	99		18.30	18.20	17.82		
20	50	0		17.45	17.21	16.78		
20	50	24		17.45	17.22	16.70		
20	50	50		17.32	17.10	16.65		
20	100	0		17.37	17.19	16.66		
20	1	0	64-QAM	17.36	17.13	16.69	20.86	0.1219
20	1	49		17.27	17.05	16.65		
20	1	99		17.17	17.01	16.56		
20	50	0		16.15	16.23	15.81		
20	50	24		16.27	16.23	15.67		
20	50	50		16.30	16.11	15.65		
20	100	0		16.14	16.24	15.68		
Limit	EIRP < 23dBm / 10MHz			Result			Pass	

LTE Band 43 Maximum Average Power [dBm] (GT - LC = 3.5 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP (W)
15	1	0	QPSK	19.33	19.07	18.56	22.84	0.1923
15	1	37		19.34	19.03	18.60		
15	1	74		19.31	19.01	18.49		
15	36	0		18.49	18.26	17.78		
15	36	20		18.43	18.24	17.74		
15	36	39		18.36	18.11	17.59		
15	75	0		18.44	18.21	17.72		
15	1	0	16-QAM	18.48	18.38	17.86	21.98	0.1578
15	1	37		18.40	18.35	17.80		
15	1	74		18.33	18.35	17.82		
15	36	0		17.40	17.21	16.77		
15	36	20		17.33	17.21	16.72		
15	36	39		17.29	17.08	16.63		
15	75	0		17.39	17.25	16.77		
15	1	0	64-QAM	17.14	17.20	16.62	20.72	0.1180
15	1	37		17.12	17.17	16.62		
15	1	74		17.22	17.03	16.63		
15	36	0		16.33	16.30	15.79		
15	36	20		16.42	16.25	15.73		
15	36	39		16.42	16.11	15.65		
15	75	0		16.49	16.28	15.74		
Limit	EIRP < 23dBm / 10MHz			Result			Pass	

LTE Band 43 Maximum Average Power [dBm] (GT - LC = 3.5 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP (W)
10	1	0	QPSK	19.20	19.13	18.56	22.70	0.1862
10	1	25		19.06	19.13	18.58		
10	1	49		19.15	19.06	18.53		
10	25	0		18.47	18.30	17.75		
10	25	12		18.46	18.32	17.63		
10	25	25		18.49	18.16	17.63		
10	50	0		18.46	18.27	17.69		
10	1	0	16-QAM	18.47	18.02	17.63	21.98	0.1578
10	1	25		18.48	17.96	17.58		
10	1	49		18.38	17.91	17.58		
10	25	0		17.40	17.28	16.77		
10	25	12		17.40	17.36	16.67		
10	25	25		17.38	17.22	16.62		
10	50	0		17.46	17.35	16.73		
10	1	0	64-QAM	17.36	17.32	16.61	20.96	0.1247
10	1	25		17.38	17.30	16.58		
10	1	49		17.46	17.25	16.60		
10	25	0		16.34	16.43	15.80		
10	25	12		16.44	16.38	15.76		
10	25	25		16.47	16.29	15.76		
10	50	0		16.33	16.34	15.64		
Limit	EIRP < 23dBm / 10MHz			Result			Pass	

LTE Band 43 Maximum Average Power [dBm] (GT - LC = 3.5 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP (W)
5	1	0	QPSK	19.32	19.23	18.67	22.84	0.1923
5	1	12		19.30	19.18	18.61		
5	1	24		19.34	19.21	18.59		
5	12	0		18.46	18.38	17.76		
5	12	7		18.45	18.41	17.79		
5	12	13		18.48	18.34	17.70		
5	25	0		18.42	18.37	17.75		
5	1	0	16-QAM	18.47	17.98	17.63	21.97	0.1574
5	1	12		18.44	17.90	17.27		
5	1	24		18.46	17.92	17.28		
5	12	0		17.40	17.40	16.83		
5	12	7		17.43	17.40	16.79		
5	12	13		17.39	17.39	16.70		
5	25	0		17.43	17.42	16.77		
5	1	0	64-QAM	17.32	17.23	16.55	20.99	0.1256
5	1	12		17.38	17.17	16.52		
5	1	24		17.49	17.16	16.60		
5	12	0		16.34	16.02	15.79		
5	12	7		16.41	16.03	15.85		
5	12	13		16.43	15.95	15.79		
5	25	0		16.36	16.01	15.80		
Limit	EIRP < 23dBm / 10MHz			Result			Pass	

————THE END————