



TEST REPORT

No. I19D00119-SAR01

For

Client: Inseego Corp.

**Production: Industrial Cellular Gateway with
Ethernet,WiFi,Bluetooth,GPS/GLNSS and
USB Connectivity**

Model Name: SKG1EM7455

FCC ID: PKRISGSKG1EM7455

IC ID: 3229A-SKG1EM7455

Hardware Version: P2

Software Version: 2.110.1.2

Issued date: 2019-11-07

NOTE

1. The test results in this test report relate only to the devices specified in this report.
2. This report shall not be reproduced except in full without the written approval of East China Institute of Telecommunications.
3. For the test results, the uncertainty of measurement is not taken into account when judging the compliance with specification, and the results of measurement or the average value of measurement results are taken as the criterion of the compliance with specification directly.
4. It has been confirmed with the customer that the Highest Frame-Averaged Output Power and Antenna gain information provided by the customer may affect the validity of the measurement results in this report, and the impact and consequences will be borne by the customer.

Test Laboratory:

East China Institute of Telecommunications

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Revision Version

Report Number	Revision	Date	Memo
I19D00119-SAR01	00	2019-10-14	Initial creation of test report
I19D00119-SAR01	01	2019-11-07	Second creation of test report

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1. Test Laboratory

1.1. Testing Location

Company Name	East China Institute of Telecommunications
Address	7-8/F., Area G, No.668, Beijing East Road, Shanghai, China
Postal Code	200001
Telephone	+86 21 63843300
Fax	+86 21 63843301
FCC designation No.	CN1177
IC designation No.	10766A-1

1.2. Testing Environment

Normal Temperature	18℃-25℃
Relative Humidity	25%-75%

1.3. Project Data

Project Leader	Chen Minfei
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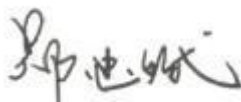
1.4. Signature



Yan Hang
(Prepared this test report)



Fu Erliang
(Reviewed this test report)



Zheng Zhongbin
(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name	Inseego Corp.
Address	9605 Scranton Road, Suite 300, San Diego, CA 92121, USA
Telephone	+1 858-812-0606
Postcode	/

2.2. Manufacturer Information

Company Name	Inseego Corp.
Address	9605 Scranton Road, Suite 300, San Diego, CA 92121, USA
Telephone	+1 858-812-0606
Postcode	/

3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

Product Name	Industrial Cellular Gateway with Ethernet,WiFi,Bluetooth,GPS/GLNSS and USB Connectivity
Model Name	SKG1EM7455
UMTS Frequency Band:	WCDMA Band II/ Band IV/ Band V
LTE Frequency Band	LTE 2/4/5/7/12/13/25/26/30/41
Additional Communication Function	BLE; WiFi 802.11a/b/g/n/ac

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version	Date of receipt
N01	N/A	P2	2.110.1.2	2019-07-10

*EUT ID: is used to identify the test sample in the lab internally.

3.3. Internal Identification of AE used during the test

AE ID*	Description	Type	Manufacturer
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*AE ID: is used to identify the test sample in the lab internally.

4. Reference Documents for FCC

4.1. Documents supplied by applicant

All technical documents are supplied by the client or manufacturer, which is the basis of evaluation.

4.2. Reference Documents

The following documents listed in this section are referred for evaluation.

Reference	Title	Version
FCC CFR 47	Part 2 FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS. Oct 1,2011 Section 2.1091 Radiofrequency radiation exposure evaluation: mobile devices, June 23, 2015	2015

4.3. Criteria

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure. In accordance with the reference this device has been defined as a mobile device whereby a distance of 0.2m normally can be maintained between the user and the device.

Limits for Occupational / Controlled Exposure				
Frequency (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Times E ² , H ² or S (minutes)
0.3 – 3.0	614	1.63	(100)*	6
3.0 – 30	1824/f	4.89/f	(900/f)*	6
30 – 300	61.4	0.163	1	6
300 – 1500	--	--	F/300	6
1500 - 100000	--	--	5	6
Limits for General Population / Uncontrolled Exposure				
Frequency (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Times E ² , H ² or S (minutes)
0.3 – 1.34	614	1.63	(100)*	30
1.34 – 30	824/f	2.19/f	(180/f)*	30
30 – 300	27.5	0.073	0.2	30
300 – 1500	--	--	F/1500	30
1500 - 100000	--	--	1	30
Note:				
f = frequency in MHz; * Plane-wave equivalent power density.				
For the DUT, the limits for General Population / Uncontrolled Exposure are applicable.				

4.4. Calculation

For conservative evaluation consideration, only maximum power of each frequency band based on the tighter limits respectively are used to calculate the boundary power density.

Based on the FCC KDB 447498 D01 and 47 CFR §2.1091, the DUT is evaluated as a mobile device.

$$S = \frac{P \times G}{4\pi d^2}$$

Where

P = Power in Watts

G = Numeric antenna gain

d = Distance in meters

S = Power density in milliwatts / square centimeter

5. Evaluation Summary and Statement of Compliance

5.1. RF Power Output

Band	Max power(dBm)	Highest Frame-Averaged Output Power (dBm)	Antenna Gain (dBi)
WCDMA Band II	24	24	2.4
WCDMA Band IV	24	24	2.4
WCDMA Band V	24	24	1.8
LTE Band 2	24	24	2.4
LTE Band 4	24	24	2.4
LTE Band 5	24	24	1.8
LTE Band 7	23	23	1
LTE Band 12	24	24	1.8
LTE Band 13	24	24	1.8
LTE Band 25	24	24	2.4
LTE Band 26	24	24	1.8
LTE Band 30	23	23	1
LTE Band 41	23	23	1
WLAN 2.4G 802.11b	16	16	4
WLAN 2.4G 802.11g	13	13	4
WLAN 2.4G 802.11 n20	13	13	4
WLAN 5G UNII 1 802.11 a	15	15	5
WLAN 5G UNII 1 802.11 n20	14	14	5
WLAN 5G UNII 1 802.11 n40	14	14	5
WLAN 5G UNII 1 802.11 ac20	13	13	5
WLAN 5G UNII 3 802.11 a	15	15	5
WLAN 5G UNII 3 802.11 n20	14	14	5
WLAN 5G UNII 3 802.11 n40	14	14	5
WLAN 5G UNII 3 802.11 ac20	13	13	5
BLE	8	8	3

5.2. Evaluation Summary

Band	Frequency	Highest Output Power (dBm)	Highest Output Power (mW)	Antenna Gain(dBi)	Numeric antenna gain	Power density at 20cm	MPE limit (mW/cm ²)	Power density /Limit
WCDMA Band 2	1852.4	24	251.19	2.4	1.738	0.087	1.000	0.087
WCDMA Band 4	1712.4	24	251.19	2.4	1.738	0.087	1.000	0.087
WCDMA Band 5	826.4	24	251.19	1.8	1.514	0.076	0.551	0.137
LTE Band 2	1850.7	24	251.19	2.4	1.738	0.087	1.000	0.087
LTE Band 4	1710.7	24	251.19	2.4	1.738	0.087	1.000	0.087
LTE Band 5	824.7	24	251.19	1.8	1.514	0.076	0.550	0.138
LTE Band 7	2502.5	23	199.53	1	1.259	0.050	1.000	0.050
LTE Band 12	699.7	24	251.19	1.8	1.514	0.076	0.466	0.162
LTE Band 13	779.5	24	251.19	1.8	1.514	0.076	0.520	0.146
LTE Band 25	1850.7	24	251.19	2.4	1.738	0.087	1.000	0.087
LTE Band 26	819	24	251.19	1.8	1.514	0.076	0.546	0.139
LTE Band 30	2305	23	199.53	1	1.259	0.050	1.000	0.050
LTE Band 41	2498.5	23	199.53	1	1.259	0.050	1.000	0.050
BLE	2402	8	6.31	3	1.995	0.003	1.000	0.003
WIFI 2.4G 802.11b	2412	16	39.81	4	2.512	0.020	1.000	0.020
WIFI 2.4G 802.11g/n	2412	13	19.95	4	2.512	0.010	1.000	0.010
WIFI 5G 802.11a	5180	15	31.62	5	3.162	0.020	1.000	0.020
WIFI 5G 802.11n	5180	14	25.12	5	3.162	0.016	1.000	0.016
WIFI 5G 802.11ac	5180	13	19.95	5	3.162	0.013	1.000	0.013

The product is under the MPE limits. All is pass.

5.3. Simultaneous SAR Evaluation

Power density /Limit				Σ (Power density /Limit) of
1	2	3	4	
WWAN	2.4G WiFi	5GHz WiFi	Bluetooth	1+2+3+4
0.162	0.003	0.020	0.020	0.204

Note:

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 WWAN+2.4GHz WiFi+5GHz WiFi +Bluetooth.
2. Considering the WWAN collocation with the 2.4GHz WiFi or 5GHz WiFi or Bluetooth transmitter of the Highest output power performance listed in the table above, the aggregated (Power density /Limit) is smaller than1, and MPE of 2 and 3 collocated transmitters is compliant.

6. Reference Documents for IC

6.1. Documents supplied by applicant

All technical documents are supplied by the client or manufacturer, which is the basis of evaluation.

6.2. Reference Documents

The following documents listed in this section are referred for testing.

Reference	Title	Version
RSS 102 Issue 5	Radio Frequency (RF) Exposure Compliance of Radio communication Apparatus (All Frequency Bands)	2015

6.3. Criteria

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

Frequency (MHz)	Base	Maximum e.i.r.p (w)
< 20	Source	1
20 – 48	Source	$22.48/f^{0.5}$
48 – 300	Source	0.6
300 – 6000	Source	$1.31 \times 10^{-2} \times f^{0.6834}$
> 6000	Source	5

Note:

f = frequency in MHz;

The result should be adjusted for tune-up tolerance.

In these cases, the information contained in the RF exposure technical brief may be limited to information that demonstrates how the e.i.r.p. was derived.

6.4. Calculation

At or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2} f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz;

7. Evaluation Summary and Statement of Compliance

7.1. RF Power Output

Band	Max power(dBm)	Highest Frame-Averaged Output Power (dBm)	Antenna Gain (dBi)
WCDMA Band II	24	24	2.4
WCDMA Band IV	24	24	2.4
WCDMA Band V	24	24	1.8
LTE Band 2	24	24	2.4
LTE Band 4	24	24	2.4
LTE Band 5	24	24	1.8
LTE Band 7	23	23	1
LTE Band 12	24	24	1.8
LTE Band 13	24	24	1.8
LTE Band 25	24	24	2.4
LTE Band 26	24	24	1.8
LTE Band 30	23	23	1
LTE Band 41	23	23	1
BLE	8	8	3
WLAN 2.4G 802.11b	16	16	4
WLAN 2.4G 802.11g	13	13	4
WLAN 2.4G 802.11 n20	13	13	4
WLAN 5G UNII 1 802.11 a	15	15	5
WLAN 5G UNII 1 802.11 n20	14	14	5
WLAN 5G UNII 1 802.11 n40	14	14	5
WLAN 5G UNII 1 802.11 ac20	13	13	5
WLAN 5G UNII 3 802.11 a	15	15	5
WLAN 5G UNII 3 802.11 n20	14	14	5
WLAN 5G UNII 3 802.11 n40	14	14	5
WLAN 5G UNII 3 802.11 ac20	13	13	5

7.2. Evaluation Summary

Band	Frequency	Highest Output Power (dBm)	Highest Output Power (mW)	Antenna Gain(dBi)	Numeric antenna gain	EIRP/EIP (W)	MPE limit (mW/cm ²)	(EIRP/EIP)/Limit
WCDMA Band 2	1852.4	24	251.19	2.4	1.738	0.437	2.241	0.195
WCDMA Band 4	1712.4	24	251.19	2.4	1.738	0.437	2.124	0.206
WCDMA Band 5	826.4	24	251.19	1.8	1.514	0.380	1.291	0.295
LTE Band 2	1850.7	24	251.19	2.4	1.738	0.437	2.240	0.195
LTE Band 4	1710.7	24	251.19	2.4	1.738	0.437	2.122	0.206
LTE Band 5	824.7	24	251.19	1.8	1.514	0.380	1.289	0.295
LTE Band 7	2502.5	23	199.53	1	1.259	0.251	2.752	0.091
LTE Band 12	699.7	24	251.19	1.8	1.514	0.380	1.152	0.330
LTE Band 13	779.5	24	251.19	1.8	1.514	0.380	1.240	0.307
LTE Band 25	1850.7	24	251.19	2.4	1.738	0.437	2.240	0.195
LTE Band 26	819	24	251.19	1.8	1.514	0.380	1.283	0.296
LTE Band 30	2305	23	199.53	1	1.259	0.251	2.602	0.097
LTE Band 41	2498.5	23	199.53	1	1.259	0.251	2.749	0.091
BLE	2402	8	6.31	3	1.995	0.013	2.676	0.005
WIFI 2.4G 802.11b	2412	16	39.81	4	2.512	0.100	2.684	0.037
WIFI 2.4G 802.11g/n	2412	13	19.95	4	2.512	0.050	2.684	0.019
WIFI 5G 802.11a	5180	15	31.62	5	3.162	0.100	4.525	0.022
WIFI 5G 802.11n	5180	14	25.12	5	3.162	0.079	4.525	0.018
WIFI 5G 802.11ac	5180	13	19.95	5	3.162	0.063	4.525	0.014

The product is under the MPE limits. All is pass.

7.3. Simultaneous SAR Evaluation

(EIRP/ERP) /Limit				$\Sigma [(EIRP/ERP) /Limit]$ of
1	2	3	4	
WWAN	2.4G WiFi	5GHz WiFi	Bluetooth	1+2+3+4
0.330	0.005	0.037	0.022	0.394

Note:

Considering the WWAN collocation with the 2.4GHz WiFi or 5GHz WiFi or Bluetooth transmitter of the Highest output power performance listed in the table above, the aggregated (Power density /Limit) is smaller than1, and MPE of 2 and 3 collocated transmitters is compliant.

7.4. Statement of Compliance

The **SKG1EM7455**, **Skyus 160NE** manufactured by **Inseego** is a parent model for evaluation.

ECIT has verified that the compliance of the tested device specified in section 5 and 7 of this test report is successfully evaluated according to the procedure and test methods as defined in type certification requirement listed in section 4 and section 6 of this test report.

*******End of the Report*******