



RF Exposure Evaluation Report

FOR:
Telular Corporation

Brand:
SkyBitz

Marketing Name:
Kinnect-M Tether

Model Number:
SHB6500

Product Description:
Wireless Telematics Hub LTE-M/5G Tether

FCC ID: MTFSH6500
IC: 2175D-SHB6500

Per:
CFR Part Part1 (1.1307), Part 2 (2.1091)
ISED RSS-102 Issue 5

Report number: EMC_TELUL_115_23001_FCC_ISED_RF_Exposure

DATE: 5/16/2024



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IC recognized #
3462B

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1 Assessment

This RF Exposure evaluation report provides evidence for compliance of the equipment (as identified in section 3 of this test report) with the RF Exposure limits for mobile devices as defined in FCC CFR Part 1 1.1307, Part 2 (2.1091) and ISED standard RSS-102 issue 5 under worst case conditions (measured or rated RF output power including tune-up tolerance, antenna gain, the distance towards the human body, multiple transmitter information as presented by the applicant).

In addition, maximum antenna gain or minimum distance towards the human body is calculated respectively, where relevant.

The device meets the limits stipulated by the above given FCC and ISED rule parts based on available specifications for worst-case conditions at a separation distance greater than 20cm to the body.

Company	Description	Model #
Telular Corporation	Wireless Telematics Hub LTE-M/5G Tether	SHB6500

Responsible for the Report:

5/16/2024	Compliance	Ghanma, Issa (Lab Manager)	
Date	Section	Name	Signature

2 Administrative Data

2.1 Identification of the Testing Laboratory Issuing the Test Report

Company Name:	CETECOM Inc.
Department:	Compliance
Street Address:	411 Dixon Landing Road
City/Zip Code	Milpitas, CA 95035
Country	USA
Telephone:	+1 (408) 586 6200
Fax:	+1 (408) 586 6299
EMC Lab Manager:	Ghanma, Issa
Responsible Project Leader:	Sivaraman, Sangeetha

2.2 Identification of the Client / Manufacturer

Applicant's Name:	Telular Corporation
Street Address:	3225 Cumberland Blvd. Suite 300
City/Zip Code	Atlanta, GA, 30339
Country	USA

2.3 Identification of the Manufacturer

Manufacturer's Name:	Same as Client /-----
Manufacturers Address:	-----
City/Zip Code	-----
Country	-----

3 Equipment under Assessment

Brand:	SkyBitz
Model No:	SHB6500
Marketing name:	Kinnect-M Tether
FCC-ID :	MTF6500
IC:	2175D-SHB6500
HW Version :	A
SW Version :	EM.00.03.1011,BM.00.01.0109
HVIN:	SHB6500
PMN:	Kinnect-M Tether
Product Description:	Wireless Telematics Hub LTE-M/5G Tether
Frequency Range/number of channels:	<ul style="list-style-type: none"> ❖ Cellular: <ul style="list-style-type: none"> • CAT-M1 2, 4, 12 ❖ Bluetooth LE: <ul style="list-style-type: none"> • Center to center: 2402 MHz (ch 0) – 2480 MHz (ch 39), 40 Channels
Radio information:	<ul style="list-style-type: none"> ❖ Cellular: Telit ME910G1-W1 <ul style="list-style-type: none"> • FCC ID: RI7ME910G1W1 • IC: 5131A-ME910G1W1 ❖ Bluetooth LE: Larid BL654 <ul style="list-style-type: none"> • FCC ID: SQGBL654 • IC: 3147A-BL654 ❖ GPS: Quectel GNSS L86 (L86s-M3)
Max. Output Power:	<ul style="list-style-type: none"> ❖ Cellular: CAT-M1: 20 dBm ± 2dB Power class 5 ❖ BT LE: +8 dBm
Power Supply/ Rated Operating Voltage Range:	Low: 11 V; Nominal: 12 V; High 30 V;
Operating Temperature Range:	T min: -40 °C / T Nom: 25 °C / T max: +70 °C
Antenna Information as declared:	<ul style="list-style-type: none"> ❖ Cellular LTE antenna: ethertronics <ul style="list-style-type: none"> • Type: Prestta Standard Octa-Band LTE Cellular Embedded antenna 700/750/850/900/1800/1900/2100/2700MHz • Peak Gain <ul style="list-style-type: none"> ▪ 700 – 746 MHz: 1.1 dBi ▪ 746 – 787 MHz: 1.7 dBi ▪ 824 – 869 MHz: 1.8 dBi ▪ 880 – 960 MHz: 2.2 dBi ▪ 1710 – 1800 MHz: 3.9 dBi ▪ 1850 – 1990 MHz: 3.8 dBi ▪ 1920 – 2170 MHz: 3.4 dBi ▪ 2500 – 2700 MHz: 3.6 dBi ❖ Bluetooth LE: Larid BL654 <ul style="list-style-type: none"> • Type: PCB Trace • Peak Gain: 0 dBi
Sample Revision:	<input checked="" type="checkbox"/> Production Unit <input type="checkbox"/> Pre-Production;
Product dimensions [mm]:	<input checked="" type="checkbox"/> < 60 cm; <input type="checkbox"/> Other: _____
Note: The information of the EUT specifications in the table above is provided by the client.	

4 RF Exposure Limits and FCC and ISSED Basic Rules

4.1 FCC

4.1.1 Standalone:

§ 2.1091(c)(1)

Evaluation of compliance with the exposure limits in § 1.1310 of this chapter, and preparation of an EA if the limits are exceeded, is necessary for mobile devices with single RF sources having either more than an available maximum time-averaged power of 1 mW or more than the ERP listed in Table 1 to § 1.1307(b)(3)(i)(C), whichever is greater. For mobile devices not exempt by § 1.1307(b)(3)(i)(C) at distances from 20 centimeters to 40 centimeters and frequencies from 0.3 GHz to 6 GHz, evaluation of compliance with the exposure limits in § 1.1310 of this chapter is necessary if the ERP of the device is greater than ERP_{20cm} in the formula below. If the ERP of a single RF source at distances from 20 centimeters to 40 centimeters and frequencies from 0.3 GHz to 6 GHz is not easily obtained, then the available maximum time-averaged power may be used (i.e., without consideration of ERP) in comparison with the following formula only 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).

$$P_{th}(\text{mW}) = ERP_{20\text{ cm}}(\text{mW}) = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$$

§ 1.1307(b)(3)(i)(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 Source 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	$19.2 R^2$

4.1.2 Multiple RF sources

§ 2.1091(c)(2)

For multiple mobile or portable RF sources within a device operating in the same time averaging period, routine environmental evaluation is required if the formula in § 1.1307(b)(3)(ii)(B) of this chapter is applied to determine the exemption ratio and the result is greater than 1.

§ 1.1307(b)(3)(ii)(B)

in the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation.

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

4.2.1 Clause 2.5.2 Exemption Limits for Routine Evaluation – RF Exposure Evaluation

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;

5 Evaluations

5.1 FCC RF Exposure (Standalone)

Radio	Technology / Band	Frequency [GHz]	Power [W]	Gain [dBi]	ERP [W]	FCC 1.1307(b)(3)(i)(c) Threshold ERP [W]	ERP<Threshold
Cellular	LTE 2	1855.0	0.158	3.8	0.232	0.77	Exempt
	LTE 4	1715.0	0.158	3.9	0.237	0.77	Exempt
	LTE 12	704.0	0.158	1.1	0.125	0.36	Exempt
Bluetooth	LE	2402.0	0.006	0.0	0.004	0.77	Exempt

5.2 ISED RF Exposure (Standalone)

Radio	Technology / Band	Frequency [GHz]	Power [W]	Gain [dBi]	E.I.R.P [W]	Exemption limit for Routine Evaluation [W]	E.I.R.P <Threshold
Cellular	LTE 2	1855.0	0.158	3.8	0.380	2.24	Exempt
	LTE 4	1715.0	0.158	3.9	0.389	2.13	Exempt
	LTE 12	704.0	0.158	1.1	0.204	1.16	Exempt
Bluetooth	LE	2402.0	0.006	0.0	0.006	2.68	Exempt

5.3 Multiple RF sources

The worst case of simultaneous transmission is:

$$\text{FCC: LTE 12 + Bluetooth LE } (0.125/0.36) + (0.006/0.77) = 0.45 \leq 1$$

$$\text{ISED: LTE 4 + Bluetooth LE } (0.389/2.13) + (0.006/2.68) = 0.185 \leq 1$$

The sum of the fractional contributions to the applicable thresholds is less than or equal to 1, hence the multiple RF sources are exempt

6 Revision History

Date	Report Name	Changes to report	Prepared by
5/16/2024	EMC_TELUL_115_23001_FCC_ISED_RF_Exposure	Initial Version	Ghanma, Issa

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