Radio Frequency Exposure Evaluation Report

FOR:
Telular AMETEK

Model Number:
SHB6510

Product Description:
Asset tracking.

FCC ID: MTFSHB6510
IC ID: 2175D-SHB6510

Per:
CFR Part Part1 (1.1307 &1.1310), Part 2 (2.1091),
FCC KDB 447498 D01 General RF Exposure Guidance v06
ISEDC RSS-102 Issue 5

Report number: EMC_TELUL-101-21001_FCC_ISED_MPE

DATE: 2022-01-12

***CETECOM* Inc.**
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1 Assessment

This RF Exposure evaluation report provides evidence for compliance of the below identified device with the RF Exposure limits for mobile devices as defined in FCC CFR Part 1 (1.1307 &1.1310), Part 2 (2.1091) and IC standard RSS-102 issue 5 under worst case conditions (measured or rated RF output power, antenna gain, distance towards 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 as stipulated by the above given FCC and IC rule parts based on available specifications for worst case conditions at 20cm distance to the body.

Company	Description	Model #
Telular AMETEK	Asset tracking	SHB6510

Report reviewed by: TCB Evaluator

Date	Section	Name	Signature
2022-01-12	Compliance	Kevin Wang (EMC Lab Manager)	kevin.wang@cetecom.com Digitally signed by: kevin.wang@cetecom.com DN: CN = kevin.wang@cetecom.com Date: 2022.01.31 10:51:44 -08'00'

Responsible for the Report:

Date	Section	Name	Signature
2022-01-12	Compliance	Cheng Song (EMC Engineer)	cheng.song@cetecom.com Digitally signed by: cheng.song@cetecom.com DN: CN = cheng.song@cetecom.com Date: 2022.01.12 11:45:29 -08'00'

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
Lab Manager:	Kevin Wang
Responsible Project Leader:	Cathy Palacios

2.2 Identification of the Client / Manufacturer

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

Identification of the Manufacturer

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

3 Equipment under Assessment

Model No:	SHB6510
HW Version :	A
SW Version :	EM.00.01.1096,BM.00.01.0061,CM.00.01.1026
FCC-ID :	MTFSHB6510
IC-ID:	2175D-SHB6510
PMN:	Kinnect
Product Description:	Asset tracking.
Radio Information:	**Cellular:** • Module: Telit ME910G1-W1 (CAT-M1 only) • FCC ID: RI7ME910G1W1, IC ID: 5131A-ME910G1W1 • Bands: LTE 1, 2, 3, 4, 5, 8, 12, 13, 18, 19, 20, 25, 26, 27, 28, 66, 71, 75 **Bluetooth:** • Module: Laird BL654 (Bluetooth 5 LE) • FCC ID: SQGBL654, IC ID: 3147A-BL654 **ISM:** • Module: EFR32FG1P131F256GM32-C0 • Operating Frequency: 902-928 MHz **GPS / GNSS:** • Module: Quectel GNSS L86
Antenna Information:	**Cellular:** • Type: PCB Trace • Max Gain: LTE 2 (4.4 dBi), LTE 4 (4.4 dBi), LTE 12 (2.6 dBi) **Bluetooth:** • Type: PCB Trace • Max Gain: 0 dBi **ISM:** • Type: Pulse W3113, small helica • Max Gain: 0.8 dBi
Power Supply/ Rated Operating Voltage Range:	Battery Vmin: 6 VDC/ Vnom: 7 VDC / Vmax: 8.2 VDC
Operating Temperature Range	-40 ºC to 70 ºC
Sample Revision	☐Prototype Unit; ■Production Unit; ☐Pre-Production

4 RF Exposure Limits and FCC and IC Basic Rules

For the specific described radio apparatus the following basic limits and rules apply for both, FCC and IC where not indicated differently.

4.1 Power Density Limits acc. to FCC 1.1310(e) / RSS-102 i5, cl. 4:

FCC

Frequency Range (MHz)	Power density (mW/cm²)	Averaging time (minutes)
300 – 1500	f (MHz) /1500	30
1500 – 100000	1.0	30

IC

300 – 6000	0.02619 x f (MHz) $^{0.6834}$	6

4.2 Routine Environmental Evaluation Categorical Exclusion Limits acc. to FCC 2.1091(c) / RSS-102, cl. 2.5 (rounded to 1 decimal point):

FCC
operating frequency < 1.5GHz: excluded if ERP < 1.5W / 31.8dBm (EIRP: 33.9 dBm);
operating frequency > 1.5GHz: excluded if ERP < 3.0W / 34.8dBm (EIRP: 36.9 dBm);

IC
300MHz < = operating frequency < 6 GHz: excluded if EIRP < 0.0131 x f (MHz) $^{0.6834}$ W

4.3 RF Exposure Estimation (MPE Estimation)

Having available the source based average output power and peak antenna gain or the ERP/EIRP of the specified device and for a known minimum distance of its radiating structures from the body of persons according to its use cases (at least 20cm) the power density at that distance can be estimated by the following formula for plane-wave equivalent conditions (far-field conditions), when ground reflection is neglected.

$$S = \frac{PG}{4\pi R^2}$$

where: S = power density (mW/cm² or W/m²)
P = power input to the antenna (mW or W)
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna (cm or m)

5 Evaluations

5.1 Analysis of RF Exposure for simultaneous transmission

- Evaluations are based on worst case power density limits for Canada.
- Calculations are made for 20cm.
- Evaluations are based on ERP/EIRP measured or calculated from known gain and conducted output power.
- Cellular can transmit simultaneously with BLE and ISM.

Radio	freq MHz	MaxPower **W** conducted from module grant	MaxPower from module grant convert to **dBm**	Ant Gain dbi	Ant Gain lin	EIRP W calculated	Canda W/m2	US W/m2	Actual W/m2	How much of limit is used up
LTE 2	1850	0.138	21.399	4.4	2.75	0.380	4.476	10.000	0.756	16.89%
LTE 4	1710	0.131	21.173	4.4	2.75	0.361	4.242	10.000	0.718	16.91%
LTE 12	699	0.145	21.614	2.6	1.82	0.264	2.302	4.660	0.525	22.77%
BT-LE	2402	0.00600	7.782	0	1.00	0.006	5.351	10.000	0.012	0.21%
ISM 900MHz	902	0.10023	20.010	0.8	1.20	0.121	2.740	6.013	0.240	8.73%

Note： The calculation is based on the distance of 20cm

5.2 Conclusion:

The worst-case simultaneous transmission is LTE 12 simultaneous with BLE and ISM 900MHz, which is using 31.71 of a limit of 100%. The equipment is passing RF exposure requirements for 20cm distance.

6 Revision History

Date	Report Name	Changes to report	Prepared by
2022-01-12	EMC_TELUL-101-21001_FCC_ISED_MPE	Initial Release	Cheng Song

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