

Bureau Veritas Consumer Product Services, Inc.	Test Report Number:
One Distribution Center Circle #1, Littleton, MA 01460	EY0476-4 Issue 2



CFR Title 47 FCC Parts

1.1307, 1.1310, 2.1091

RF Exposure Exhibit

Prepared for RSAE Labs, Inc.

Product Name: TGU-1 and MGU-1

Hardware Version: 03-2004-01

Prepared by Yunus Faziloglu Sr. Wireless Engineer	Approved by Ahmed Ait Ahmed EMC Manager
	
Issue Date: Jan 15, 2025	Issue Number: 2



This test result relates only to the described test object.

This document shall not be reproduced, except in full, without the written approval of Bureau Veritas Test Lab.

Customer must not use this test report as the product certification of each accreditation body or each national organization.

The test is traceable to national standard or related international standard

Bureau Veritas Consumer Product Services, Inc.	Test Report Number:
One Distribution Center Circle #1, Littleton, MA 01460	EY0476-4 Issue 2

Contents

- 1 Device Under Test3
- 2 Test Laboratory Information5
- 3 RF Exposure Limit:6
- 4 RF Exposure – MPE Evaluation7
- 5 Conclusion7

Bureau Veritas Consumer Product Services, Inc.	Test Report Number:
One Distribution Center Circle #1, Littleton, MA 01460	EY0476-4 Issue 2

1 Device Under Test

1.1 Product Information

Project Number:	EY0476	
Applicant Information:	RSAE Labs, Inc.	
	1002 Arthur Drive Suite 200, Lynn Haven, FL 32444	
Product Marketing Name:	TGU-1 and MGU-1	
Hardware Version	03-2004-01	
Additional Versions	Product Marketing Name	Hardware Version Identification Number
	TGU-1	03-2001-05
	TGU-1	03-2001-06
	TGU-1	03-2001-07
	TGU-1	03-2001-08
	TGU-1	03-2001-09
	MGU-1	03-2004-01
	MGU-1	03-2004-02
	MGU-1	03-2004-03
	MGU-1	03-2004-04
	MGU-1	03-2004-05
	MGU-1	03-2004-06
	Version variants are for marketing purposes only. All versions are electrically identical to the tested version indicated in bold above.	
Separation Distance:	20cm	
Exposure Category of DUT:	Mobile	
Multiple Simultaneous RF Sources:	Yes	
Type of Evaluation:	MPE Calculation	
Evaluation Method:	447498 D01 General RF Exposure Guidance v06	
Deviations from Standard:	None	

1.2 Technical Information

Radio 1 (Built into EUT)	2.4GHz 802.15.4
FCC ID:	2ASIM-TGU1
Exposure Category of Transmitter:	Mobile
Maximum Conducted Output Power (mW):	2.61mW (Average)
Maximum Tune-up Tolerance (dB):	N/A
Maximum Antenna Gain (dBi):	2.62dBi Peak Customer supplied information

Bureau Veritas Consumer Product Services, Inc.	Test Report Number:
One Distribution Center Circle #1, Littleton, MA 01460	EY0476-4 Issue 2

Radio 2 (Integrated Module into EUT)	LTE CAT-M1
FCC ID:	XPYUBX19KM01
Exposure Category of Transmitter:	Mobile
Maximum Conducted Output Power (mW):	(From the RF Exposure exhibit of the original filing on FCC database) Band 2: 316.23mW Band 4: 316.23mW Band 12: 316.23mW
Maximum Tune-up Tolerance (dB):	(From the RF Exposure exhibit of the original filing on FCC database) Not listed
Maximum Antenna Gain (dBi):	4.6dBi Peak (for all LTE Bands) Customer supplied information

Bureau Veritas Consumer Product Services, Inc.	Test Report Number:
One Distribution Center Circle #1, Littleton, MA 01460	EY0476-4 Issue 2

2 Test Laboratory Information

Location of Test Lab:	One Distribution Center Circle #1 Littleton, MA 01460 (978) 486-8880
Key Contact:	Yunus Faziloglu Yunus.faziloglu@bureauveritas.com
Laboratory Accreditations:	BUREAU VERITAS CONSUMER PRODUCTS SERVICES, INC is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories.
ISO/IEC 17025:2017:	1627-01
FCC Test Site Number:	US1028

Bureau Veritas Consumer Product Services, Inc.	Test Report Number:
One Distribution Center Circle #1, Littleton, MA 01460	EY0476-4 Issue 2

3 RF Exposure Limit:

According to CFR Title 47 FCC section 1.1310, the criteria listed in the following table shall be used to evaluate Maximum Permissible Exposure (MPE) to radiofrequency electromagnetic fields.

TABLE 1 TO § 1.1310(E)(1)—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(i) LIMITS FOR OCCUPATIONAL/CONTROLLED EXPOSURE				
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
300-1,500			f/300	<6
1,500-100,000			5	<6
(ii) 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
300-1,500			f/1500	<30
1,500-100,000			1.0	<30

f = frequency in MHz. * = Plane-wave equivalent power density.

Bureau Veritas Consumer Product Services, Inc.	Test Report Number:
One Distribution Center Circle #1, Littleton, MA 01460	EY0476-4 Issue 2

4 RF Exposure – MPE Evaluation

Power density can be calculated as follows

$$S = EIRP / 4\pi r^2$$

where,

S Power Density in mW/cm^2

EIRP Effective Isotropic Radiated Power in mW

r Separation Distance from Antenna in cm

Power densities for each radio and their ratio to corresponding limits are as follows:

Radio	f(MHz)	Distance (cm)	AntGain (dBi)	Power (dBm)	EIRP (dBm)	EIRP (mW)	Power Density (mW/cm2)	Limit (mW/cm2)	Power Density / Limit Ratio
802.15.4	2440	20	2.62	4.163	6.783	4.767602	0.0009	1	0.0009
LTE Band 2	1850.7	20	4.6	25	29.6	912.0108	0.1814	1	0.1814
LTE Band 4	1710.7	20	4.6	25	29.6	912.0108	0.1814	1	0.1814
LTE Band 12	699.7	20	4.6	25	29.6	912.0108	0.1814	0.4665	0.3889

Simultaneous transmission configurations:

802.15.4 Radio can simultaneously transmit with any of the LTE bands listed above. Since Band 12 has the highest ratio to its limit, worst-case combination would be with LTE Band 12.

Sum of power density to limit ratios

802.15.4 0.0009

LTE Band 12 0.3889

Sum 0.3898 < 1

Result: Pass

5 Conclusion

Therefore device complies with 1.1307, 1.1310 and 2.1091 of the FCC rules for RF radiation exposure limits for general population as a mobile device (d>20cm).

Document Revisions

Issue No.	Summary of Changes	Date Issued	Prepared by	Approved by
1	Original Release	Nov 27, 2024	YF	AA
2	Updated applicant address	Jan 15, 2025	YF	AA

End of Report