

# RADIO TEST REPORT

Report ID

REP052225

Project ID

PRJ0061485

Type of assessment:

MPE Calculation report

Manufacturer:

ORBCOMM License Corp.

Description of product:

Industrial Assets Tracking &  
Management System

Model number (HVIN):

GT12G1

Model names (PMNs):

GT1220, GT1230

FCC identifiers:

FCC ID: XGS-GT12BT

FCC ID: XMR202212EG21GL

ISED certification numbers:

IC: 11881A-GT12BT

IC: 10224A-2022EG21GL

Specification:

- ◆ FCC 47 CFR Part 1 Subpart I, §§1.1307, 1.1310
- ◆ FCC 47 CFR Part 2 Subpart J, §2.1091
- ◆ FCC KDB 447498 D01 General RF Exposure Guidance v06
- ◆ ISED Canada RSS-102 Issue 6, December 2023

## RSS-102 Annex B - Declaration of RF Exposure Compliance

ATTESTATION: I attest that the information provided in Annex A is correct; that the Technical Brief was prepared and the information contained therein is correct; that the device evaluation was performed or supervised by me; that applicable measurement methods and evaluation methodologies have been followed; and that the device meets the SAR and/or RF field strength limits of RSS-102.

Date of issue: September 13, 2024

Tarek Elkholy, EMC/RF Specialist

Prepared by



Signature

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ANAB File Number: AT-3195 (Ottawa); AT-3193 (Pointe-Claire); AT-3194 (Cambridge)



## Lab locations

Company name	Nemko Canada Inc.			
Facilities	<i>Ottawa site:</i>	<i>Montréal site:</i>	<i>Cambridge site:</i>	
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	Tel: +1 613 737 9680 Fax: +1 613 737 9691	Tel: +1 514 694 2684 Fax: +1 514 694 3528	Tel: +1 519 650 4811	
Test site identifier	<b>Organization</b>	<b>Ottawa</b>	<b>Montreal</b>	<b>Cambridge</b>
	FCC:	CA2040	CA2041	CA0101
	ISED:	2040A-4	2040G-5	24676
Website	<a href="http://www.nemko.com">www.nemko.com</a>			

## Limits of responsibility

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

This test report has been completed in accordance with the requirements of ISO/IEC 17025. All results contained in this report are within Nemko Canada's ISO/IEC 17025 accreditation.

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## Section 1 Evaluation summary

### 1.1 MPE calculation for simultaneous transmission

#### 1.1.1 References, definitions and limits

##### FCC §2.1091(d)

- (2) (2) For operations within the frequency range of 300 kHz and 6 GHz (inclusive), the limits for maximum permissible exposure (MPE), derived from whole-body SAR limits and listed in Table 1 in paragraph (e)(1) of this section, may be used instead of whole-body SAR limits as set forth in paragraphs (a) through (c) of this section to evaluate the environmental impact of human exposure to RF radiation as specified in §1.1307(b) of this part, except for portable devices as defined in §2.1093 of this chapter as these evaluations shall be performed according to the SAR provisions in §2.1093.

**Table 1.1-1: 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 <sup>2</sup> )	Averaging time (minutes)
<b>(i) Limits for Occupational/Controlled Exposure</b>				
0.3–3.0	614	1.63	*(100)	≤6
3.0–30	1842 / f	4.89 / f	*(900 / f <sup>2</sup> )	<6
30–300	61.4	0.163	1.0	<6
300–1500			f / 300	<6
1500–100000			5	<6
<b>(ii) Limits for General Population/Uncontrolled Exposure</b>				
0.3–1.34	614	1.63	*(100)	<30
1.34–30	824 / f	2.19 / f	*(180 / f <sup>2</sup> )	<30
30–300	27.5	0.073	0.2	<30
300–1500			f / 1500	<30
1500–100000			1.0	<30

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

##### RSS-102, Section 5.3.2

For the purpose of this standard, ISED Canada has adopted the SAR and RF field strength limits established in Health Canada's RF exposure guideline, Safety Code 6:

**Table 1.1-2: Table 7 and 8 to RSS-102 — RF Field Strength Limits**

Frequency range (MHz)	Electric field strength (V/m rms)	Magnetic field strength (A/m rms)	Power density (W/m <sup>2</sup> )	Reference Period (minutes)
<b>Limits for Controlled Environment</b>				
10–20	61.4	0.163	10	6
20–48	129.8 / f <sup>0.25</sup>	0.3444 / f <sup>0.25</sup>	44.72 / f <sup>0.5</sup>	6
48–100	49.33	0.1309	6.455	6
100–6000	15.60 f <sup>0.25</sup>	0.04138 f <sup>0.25</sup>	0.6455 f <sup>0.5</sup>	6
6000–15000	137	0.364	50	6
<b>Limits for Uncontrolled Environment</b>				
10–20	27.46	0.0728	2	6
20–48	58.07 / f <sup>0.25</sup>	0.1540 / f <sup>0.25</sup>	8.944 / f <sup>0.5</sup>	6
48–300	22.06	0.05852	1.291	6
300–6000	3.142 f <sup>0.3417</sup>	0.008335 f <sup>0.3417</sup>	0.02619 f <sup>0.6834</sup>	6
6000–15000	61.4	0.163	10	6

Notes: f = frequency in MHz

## References, definitions and limits, continued

Equation from page 18 of OET Bulletin 65, Edition 97-01

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

where: S = power density (mW/cm<sup>2</sup> or W/m<sup>2</sup>)

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)

### 1.1.2 EUT technical information

	Transmitter 1 (LTE B13)	Transmitter 2 (BLE)
Prediction frequency	787 MHz	2480 MHz
Antenna type	Dipole	Monopole
Antenna gain	3.98 dBi	4.2 dBi
Maximum transmitter conducted power	25 dBm	9.1 dBm
Prediction distance (declared)	20 cm	20 cm

### 1.1.3 MPE calculation

	Transmitter 1	Transmitter 2
Fundamental transmit (prediction) frequency:	787 MHz	2480 MHz
Maximum measured conducted peak output power:	25 dBm	9.1 dBm
Cable and/or jumper loss:	0 dB	0 dB
Maximum peak power at antenna input terminal:	25 dBm	9.1 dBm
Duty cycle:	100 %	100 %
Maximum calculated average power at antenna input terminal:	316.22777 mW	8.1283052 mW
Single Antenna gain (typical):	3.98 dBi	4.2 dBi
Number of antennae:	1	1
Total system gain:	3.98 dBi	4.20 dBi

	FCC limit	ISSED limit	FCC limit
MPE limit for <u>uncontrolled</u> exposure at prediction frequency:	0.24960 mW/cm <sup>2</sup>	0.52467 mW/cm <sup>2</sup>	0.54689 mW/cm <sup>2</sup>
	2.496000 W/m <sup>2</sup>	5.24667 W/m <sup>2</sup>	5.468948 W/m <sup>2</sup>
MPE limit for <u>controlled</u> exposure at prediction frequency:	1.81085 mW/cm <sup>2</sup>	2.62333 mW/cm <sup>2</sup>	3.21456 mW/cm <sup>2</sup>
	18.10855 W/m <sup>2</sup>	26.23333 W/m <sup>2</sup>	32.14564 W/m <sup>2</sup>
Minimum calculated prediction distance for compliance:	20 cm	20 cm	20 cm
Typical (declared) distance:	20 cm	20 cm	20 cm
Average power density at prediction frequency:	0.157301 mW/cm <sup>2</sup>	0.157301 mW/cm <sup>2</sup>	0.004253 mW/cm <sup>2</sup>
	1.573005 W/m <sup>2</sup>	1.573005 W/m <sup>2</sup>	0.042533 W/m <sup>2</sup>
MPE compliance for simultaneous operation:			
Margin of Compliance for <u>controlled</u> environment:	10.61 dB	12.22 dB	28.78 dB
with Maximum permitted antenna gain:	14.59 dBi	16.20 dBi	32.98 dBi
Margin of Compliance for <u>uncontrolled</u> environment:	2.01 dB	5.23 dB	21.09 dB
with Maximum permitted antenna gain:	5.99 dBi	5.23 dBi	25.29 dBi
Average power density to MPE limit ratio ( <u>uncontrolled</u> ):	0.630	0.300	0.008
Average power density to MPE limit ratio ( <u>controlled</u> ):	0.087	0.060	0.001

Total sum of ratios for FCC (uncontrolled):	0.304 <1	Total sum of ratios for FCC (controlled):	0.061 <1	Total RF value for ISSED:	1.6155 W/m <sup>2</sup>
Total sum of ratios for ISSED (uncontrolled):	0.638 <1	Total sum of ratios for ISSED (controlled):	0.088 <1		
Maximum allowed sum of ratios:	1				

### 1.1.4 Verdict

The calculation is below the limit; therefore, the product is passing the RF Exposure requirements for the declared distance.

End of the test report