

RADIO TEST REPORT

Report ID

REP029562

Project ID

PRJ52103466

Type of assessment:

MPE Calculation report

Manufacturer:

Eleven-X Inc.

Hardware Version Identification Number (HVIN):

PRK002001 rev A

Product Marketing Name (PMN):

SPS-X

HVIN/Model variant:

PRK001002 rev A

FCC identifier:

FCC ID: 2AOX5PRK002001

ISED certification number:

IC: 22369-PRK002001

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 5 Amendment 1, (February 2021)

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: April 7, 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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Test site identifier	Organization	Ottawa	Montreal
	FCC:	CA2040	CA2041
	ISED:	2040A-4	2040G-5
Website	www.nemko.com		

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 standalone 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 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
300–1500			f / 300	<6
1500–100000			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
300–1500			f / 1500	<30
1500–100000			1.0	<30

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

RSS-102, Section 4

For the purpose of this standard, Industry 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 4 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 ²)	Reference Period (minutes)
Limits for Controlled Environment				
10–20	61.4	0.163	10	6
20–48	129.8 / f ^{0.25}	0.3444 / f ^{0.25}	44.72 / f ^{0.5}	6
48–100	49.33	0.1309	6.455	6
100–6000	15.60 f ^{0.25}	0.04138 f ^{0.25}	0.6455 f ^{0.5}	6
6000–15000	137	0.364	50	6
Limits for Uncontrolled Environment				
10–20	27.46	0.0728	2	6
20–48	58.07 / f ^{0.25}	0.1540 / f ^{0.25}	8.944 / f ^{0.5}	6
48–300	22.06	0.05852	1.291	6
300–6000	3.142 f ^{0.3417}	0.008335 f ^{0.3417}	0.02619 f ^{0.6834}	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/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)

1.1.2 EUT technical information, LoRA

Prediction frequency	908.7 MHz
Antenna type	Monopole antenna
Antenna gain	2.4 dBi
Number of antennas	1
Maximum transmitter power	21.5 dBm (conducted)
Prediction distance (declared)	20 cm

1.1.3 MPE calculation

Fundamental transmit (prediction) frequency:	<u>908.7</u> MHz	
Maximum measured conducted peak output power:	<u>21.5</u> dBm	
Cable and/or jumper loss:	<u>0</u> dB	
Maximum peak power at antenna input terminal:	<u>21.5</u> dBm	
Duty cycle:	<u>100</u> %	
Maximum calculated average power at antenna input terminal:	<u>141.25375</u> mW	
Single Antenna gain (typical):	<u>2.4</u> dBi	
Number of antennae:	<u>1</u>	
Total system gain:	<u>2.40</u> dBi	
MPE limit for <u>uncontrolled</u> exposure at prediction frequency:	FCC limit: <u>0.605800</u> mW/cm ² <u>6.058000</u> W/m ²	ISED limit: <u>0.275372</u> mW/cm ² <u>2.753722</u> W/m ²
MPE limit for <u>controlled</u> exposure at prediction frequency:	3.029000 mW/cm ² <u>30.290000</u> W/m ²	1.945837 mW/cm ² <u>19.458372</u> W/m ²
Minimum calculated prediction distance for compliance:	<u>20</u> cm	<u>20</u> cm
Typical (declared) distance:	<u>20</u> cm	<u>20</u> cm
Average power density at prediction frequency:	0.048835 mW/cm ² <u>0.488349</u> W/m ²	0.048835 mW/cm ² <u>0.488349</u> W/m ²
Margin of Compliance for <u>uncontrolled</u> environment:	10.94 dB	7.51 dB
with Maximum permitted antenna gain:	<u>13.34</u> dBi	<u>9.91</u> dBi
Margin of Compliance for <u>controlled</u> environment:	17.93 dB	16.00 dB
with Maximum permitted antenna gain:	<u>41.83</u> dBi	<u>39.90</u> dBi

1.1.4 Verdict

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

1.1.5 EUT technical information, BLE

Prediction frequency	2402 MHz
Antenna type	Monopole antenna
Antenna gain	4.1 dBi
Number of antennas	1
Maximum transmitter power	7.1 dBm (conducted)
Prediction distance (declared)	20 cm

1.1.6 MPE calculation

Fundamental transmit (prediction) frequency:	2402 MHz	
Maximum measured conducted peak output power:	7.1 dBm	
Cable and/or jumper loss:	0 dB	
Maximum peak power at antenna input terminal:	7.1 dBm	
Duty cycle:	100 %	
Maximum calculated average power at antenna input terminal:	5.1286138 mW	
Single Antenna gain (typical):	4.1 dBi	
Number of antennae:	1	
Total system gain:	4.10 dBi	
	FCC limit:	ISED limit:
MPE limit for <u>uncontrolled</u> exposure at prediction frequency:	1.000000 mW/cm ²	0.535080 mW/cm ²
	10.000000 W/m ²	5.350805 W/m ²
MPE limit for <u>controlled</u> exposure at prediction frequency:	5.000000 mW/cm ²	3.163609 mW/cm ²
	50.000000 W/m ²	31.636086 W/m ²
Minimum calculated prediction distance for compliance:	20 cm	20 cm
Typical (declared) distance:	20 cm	20 cm
Average power density at prediction frequency:	0.002623 mW/cm ²	0.002623 mW/cm ²
	0.026226 W/m ²	0.026226 W/m ²
Margin of Compliance for uncontrolled environment:	25.81 dB	23.10 dB
with Maximum permitted antenna gain:	29.91 dBi	27.20 dBi
Margin of Compliance for controlled environment:	32.80 dB	30.81 dB
with Maximum permitted antenna gain:	44.00 dBi	42.01 dBi

1.1.7 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