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RADIO TEST REPORT

Type of assessment:

MPE Calculation report

Applicant:

Cooper Industries (Electrical) Inc.

Model/HVIN:

XPD2400B

Product marketing name (PMN):

XPD2400

FCC identifier:

FCC ID: IA9XPD2400B

ISED certification number:

IC: 1338B-XPD2400B

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 15, 2023

RSS-102 - Declaration of RF Exposure Compliance

ATTESTATION: I attest that, Annex A and the Technical Brief information was prepared by me and is correct; that the device evaluation was performed or supervised by me; that applicable measurement and evaluation methodologies have been followed; and that the device meets the SAR, APD and/or IPD limits of RSS-102.

Date of issue: **May 20, 2025**

Andrey Adelberg, Senior EMC/RF Specialist

Prepared by

Signature

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



Lab locations

Company name	Nemko Canada Inc.			
Facilities	<i>Ottawa site:</i> 303 River Road Ottawa, Ontario Canada K1V 1H2	<i>Montréal site:</i> 292 Labrosse Avenue Pointe-Claire, Québec Canada H9R 5L8	<i>Cambridge site:</i> 1-130 Saltsman Drive Cambridge, Ontario Canada N3E 0B2	<i>Almonte site:</i> 1500 Peter Robinson Road West Carleton, Ontario Canada K0A 1L0
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Test site identifier	Organization FCC: ISED:	Ottawa/Almonte CA2040 2040A-4	Montreal CA2041 2040G-5	Cambridge CA0101 24676
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.

References, definitions and limits, continued

RSS-102, Section 5.3.2

The electric and magnetic field strength reference levels, power density reference levels, and associated reference period for devices employed by the general public (uncontrolled environment) and controlled-use devices (controlled environment) are specified in table below. Note that the power density limits specified in these tables apply to whole body exposure conditions.

Table 1.1-2: RSS-102—RF field strength and power density 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	616000 / $f^{1.2}$
15000–30000	0.354 $f^{0.5}$	9.40×10 ⁻⁴ $f^{0.5}$	3.33×10 ⁻⁴ f	616000 / $f^{1.2}$
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	616000 / $f^{1.2}$
15000–30000	0.158 / $f^{0.5}$	4.21×10 ⁻⁴ / $f^{0.5}$	6.67×10 ⁻⁵ / f	616000 / $f^{1.2}$

Notes: f = frequency in MHz.

The above table refers to Health Canada's Safety Code 6 for relevant notes and additional information.

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

Prediction frequency	2441 MHz
Antenna gain (worst case)	5.4 dBi
Number of antennas	1
Maximum transmitter power	20.91 dBm (conducted)
Prediction distance (declared)	20 cm
Maximum duty cycle	53% (limited by proprietary protocol). For calculations a 100% duty cycle was used.

1.1.3 MPE calculation

Fundamental transmit (prediction) frequency:	2441 MHz
Maximum measured conducted peak output power:	20.91 dBm
Cable and/or jumper loss:	0 dB
Maximum peak power at antenna input terminal:	20.91 dBm
Duty cycle:	100 %
Maximum calculated average power at antenna input terminal:	123.31 mW
Single Antenna gain (typical):	5.4 dBi
Number of antennae:	1
Total system gain:	5.40 dBi

FCC calculations

ISED calculations

Uncontrolled environment	FCC calculations	ISED calculations
Declared distance:	20 cm	20 cm
Average power density at declared distance:	0.085061 mW/cm ² 0.850609 W/m ²	0.085061 mW/cm ² 0.850609 W/m ²
MPE limit at prediction frequency:	1.000000 mW/cm ² 10.000000 W/m ²	0.541003 mW/cm ² 5.410026 W/m ²
Minimum calculated prediction distance for compliance:	20 cm	20 cm
Margin of Compliance:	10.70 dB	8.03 dB
with Maximum premitted antenna gain:	16.10 dBi	13.43 dBi

Controlled environment	FCC calculations	ISED calculations
Declared distance:	20 cm	20 cm
Average power density at declared distance:	0.085061 mW/cm ² 0.850609 W/m ²	0.085061 mW/cm ² 0.850609 W/m ²
MPE limit at prediction frequency:	5.000000 mW/cm ² 50.000000 W/m ²	3.189188 mW/cm ² 31.891881 W/m ²
Minimum calculated prediction distance for compliance:	20 cm	20 cm
Margin of Compliance:	17.69 dB	15.74 dB
with Maximum permitted antenna gain:	23.09 dBi	21.14 dBi

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