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RADIO TEST REPORT

Report ID

REP040788

Project ID

PRJ0042471

Type of assessment:

MPE Calculation report

Manufacturer:

EXFO Oy

Hardware Version Identification Number (HVIN):

FXm-Bmax

Product Marketing Name (PMN):

Transportable Base Station System

FCC identifier:

FCC ID: 2A7IGEXCBTSBMAX

ISED certification number:

IC: 28799-EXCBTSBMAX

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: May 28, 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

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Test site identifier	Organization	Ottawa	Montreal	Cambridge
	FCC:	CA2040	CA2041	CA0101
	ISED:	2040A-4	2040G-5	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.

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)

Notes

- All the calculation in this report is based on test data captured in test reports [REP019861 \(Cellular FCC-ISED\)](#) and [REP020724 \(Cellular FCC-ISED\)](#).

1.1.2 EUT technical information, GSM

Prediction frequency	888.6 MHz
Antenna type	Huber+Suhner SENCITY® Antenna
Antenna gain	6 dBi
Number of antennas	1
Maximum transmitter power	45.7 dBm (conducted)
Prediction distance (declared)	210 cm

1.1.3 MPE calculation, GSM

Fundamental transmit (prediction) frequency:	888.6 MHz	
Maximum measured conducted peak output power:	45.7 dBm	
Cable and/or jumper loss:	0.5 dB	
Maximum peak power at antenna input terminal:	45.2 dBm	
Duty cycle:	100 %	
Maximum calculated average power at antenna input terminal:	33113.11215 mW	
Single Antenna gain (typical):	6 dBi	
Number of antennae:	1	
Total system gain:	6.00 dBi	
FCC limit:		
MPE limit for <u>uncontrolled</u> exposure at prediction frequency:	0.592400 mW/cm ²	0.271195 mW/cm ²
	5.924000 W/m ²	2.711948 W/m ²
MPE limit for <u>controlled</u> exposure at prediction frequency:	2.962000 mW/cm ²	1.924196 mW/cm ²
	29.620000 W/m ²	19.241964 W/m ²
Minimum calculated prediction distance for compliance:	133 cm	197 cm
Typical (declared) distance:	200 cm	200 cm
Average power density at prediction frequency:		
	0.262259 mW/cm ²	0.262259 mW/cm ²
	2.622588 W/m ²	2.622588 W/m ²
Margin of Compliance for uncontrolled environment:	3.54 dB	0.15 dB
with Maximum permitted antenna gain:	9.54 dBi	6.15 dBi
Margin of Compliance for controlled environment:	10.53 dB	8.66 dB
with Maximum permitted antenna gain:	61.73 dBi	59.86 dBi

1.1.4 Verdict, GSM

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, WCDMA

Prediction frequency	886 MHz
Antenna type	Huber+Suhner SENCITY® Antenna
Antenna gain	6 dBi
Number of antennas	1
Maximum transmitter power	45.3 dBm (conducted)
Prediction distance (declared)	200 cm

1.1.6 MPE calculation, WCDMA

Fundamental transmit (prediction) frequency:	886 MHz	
Maximum measured conducted peak output power:	45.3 dBm	
Cable and/or jumper loss:	0.5 dB	
Maximum peak power at antenna input terminal:	44.8 dBm	
Duty cycle:	100 %	
Maximum calculated average power at antenna input terminal:	30199.5172 mW	
Single Antenna gain (typical):	6 dBi	
Number of antennae:	1	
Total system gain:	6.00 dBi	
MPE limit for <u>uncontrolled</u> exposure at prediction frequency:	FCC limit: 0.590667 mW/cm ² 5.906667 W/m ²	ISED limit: 0.270652 mW/cm ² 2.706523 W/m ²
MPE limit for <u>controlled</u> exposure at prediction frequency:	2.953333 mW/cm² 29.533333 W/m ²	1.921379 mW/cm² 19.213793 W/m ²
Minimum calculated prediction distance for compliance:	127 cm	188 cm
Typical (declared) distance:	200 cm	200 cm
Average power density at prediction frequency:	0.239183 mW/cm² 2.391829 W/m ²	0.239183 mW/cm² 2.391829 W/m ²
Margin of Compliance for <u>uncontrolled</u> environment:	3.93 dB	0.54 dB
with Maximum permitted antenna gain:	9.93 dBi	6.54 dBi
Margin of Compliance for <u>controlled</u> environment:	10.92 dB	9.05 dB
with Maximum permitted antenna gain:	61.72 dBi	59.85 dBi

1.1.7 Verdict, WCDMA

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

1.1.8 EUT technical information, LTE

Prediction frequency	1962.5 MHz
Antenna type	Huber+Suhner SENCITY® Antenna
Antenna gain	7 dBi
Number of antennas	1
Maximum transmitter power	44.6 dBm (conducted)
Prediction distance (declared)	200 cm

1.1.9 MPE calculation, LTE

Fundamental transmit (prediction) frequency:	1962.5 MHz	
Maximum measured conducted peak output power:	44.6 dBm	
Cable and/or jumper loss:	0.5 dB	
Maximum peak power at antenna input terminal:	44.1 dBm	
Duty cycle:	100 %	
Maximum calculated average power at antenna input terminal:	25703.95783 mW	
Single Antenna gain (typical):	7 dBi	
Number of antennae:	1	
Total system gain:	7.00 dBi	
MPE limit for <u>uncontrolled</u> exposure at prediction frequency:	FCC limit: 1.000000 mW/cm ² 10.000000 W/m ²	ISED limit: 0.466060 mW/cm ² 4.660598 W/m ²
MPE limit for <u>controlled</u> exposure at prediction frequency:	5.000000 mW/cm² 50.000000 W/m ²	2.859572 mW/cm² 28.595723 W/m ²
Minimum calculated prediction distance for compliance:	101 cm	148 cm
Typical (declared) distance:	200 cm	200 cm
Average power density at prediction frequency:	0.256289 mW/cm² 2.562891 W/m ²	0.256289 mW/cm² 2.562891 W/m ²
Margin of Compliance for <u>uncontrolled</u> environment:	5.91 dB	2.60 dB
with Maximum permitted antenna gain:	12.91 dBi	9.60 dBi
Margin of Compliance for <u>controlled</u> environment:	12.90 dB	10.48 dB
with Maximum permitted antenna gain:	64.00 dBi	61.58 dBi

1.1.10 Verdict, LTE

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

1.1.11 EUT technical information, 5G

Prediction frequency	2155 MHz (n66)
Antenna type	Huber+Suhner SENCITY® Antenna
Antenna gain	7.5 dBi
Number of antennas	1
Maximum transmitter power	45.8 dBm (conducted)
Prediction distance (declared)	200 cm

1.1.12 MPE calculation, 5G

Fundamental transmit (prediction) frequency:	2155 MHz	
Maximum measured conducted peak output power:	45.8 dBm	
Cable and/or jumper loss:	0.5 dB	
Maximum peak power at antenna input terminal:	45.3 dBm	
Duty cycle:	100 %	
Maximum calculated average power at antenna input terminal:	33884.41561 mW	
Single Antenna gain (typical):	7.5 dBi	
Number of antennae:	1	
Total system gain:	7.50 dBi	
MPE limit for <u>uncontrolled</u> exposure at prediction frequency:	FCC limit: 1.000000 mW/cm ² 10.000000 W/m ²	ISED limit: 0.496836 mW/cm ² 4.968364 W/m ²
MPE limit for <u>controlled</u> exposure at prediction frequency:	5.000000 mW/cm² 50.000000 W/m ²	2.996539 mW/cm² 29.965387 W/m ²
Minimum calculated prediction distance for compliance:	123 cm	175 cm
Typical (declared) distance:	200 cm	200 cm
Average power density at prediction frequency:	0.379079 mW/cm² 3.790794 W/m ²	0.379079 mW/cm² 3.790794 W/m ²
Margin of Compliance for <u>uncontrolled</u> environment:	4.21 dB	1.17 dB
with Maximum permitted antenna gain:	11.71 dBi	8.67 dBi
Margin of Compliance for <u>controlled</u> environment:	11.20 dB	8.98 dB
with Maximum permitted antenna gain:	64.00 dBi	61.78 dBi

1.1.13 Verdict, 5G

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

End of the test report