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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

Tarek Elkholy
Signature

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.

Copyright notification

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/cm^2 or W/m^2)
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:		**ISED limit:**	
MPE limit for uncontrolled exposure at prediction frequency:	**0.592400**	**mW/cm²**	**0.271195**	**mW/cm²**
	5.924000	W/m²	2.711948	W/m²
MPE limit for controlled exposure at prediction frequency:	**2.962000**	**mW/cm²**	**1.924196**	**mW/cm²**
	29.620000	W/m²	19.241964	W/m²
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/cm²**	**0.262259**	**mW/cm²**
	2.622588	W/m²	2.622588	W/m²
Margin of Compliance for **uncontrolled** envirenment:	**3.54**	**dB**	**0.15**	**dB**
with Maximum premitted antenna gain:	9.54	dBi	6.15	dBi
Margin of Compliance for **controlled** envirenment:	**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		
	FCC limit:		**ISED limit:**	
MPE limit for uncontrolled exposure at prediction frequency:	**0.590667**	**mW/cm^2**	**0.270652**	**mW/cm^2**
	5.906667	W/m^2	2.706523	W/m^2
MPE limit for controlled exposure at prediction frequency:	**2.953333**	**mW/cm^2**	**1.921379**	**mW/cm^2**
	29.533333	W/m^2	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/cm^2**	**0.239183**	**mW/cm^2**
	2.391829	W/m^2	2.391829	W/m^2
Margin of Compliance for **uncontrolled** envirenment:	**3.93**	**dB**	**0.54**	**dB**
with Maximum premitted antenna gain:	9.93	dBi	6.54	dBi
Margin of Compliance for **controlled** envirenment:	**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

	FCC limit:		ISED limit:	
MPE limit for uncontrolled exposure at prediction frequency:	**1.000000**	**mW/cm^2**	**0.466060**	**mW/cm^2**
	10.000000	W/m^2	4.660598	W/m^2
MPE limit for controlled exposure at prediction frequency:	**5.000000**	**mW/cm^2**	**2.859572**	**mW/cm^2**
	50.000000	W/m^2	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/cm^2**	**0.256289**	**mW/cm^2**
	2.562891	W/m^2	2.562891	W/m^2
Margin of Compliance for **uncontrolled** envirenment:	**5.91**	**dB**	**2.60**	**dB**
with Maximum premitted antenna gain:	12.91	dBi	9.60	dBi
Margin of Compliance for **controlled** envirenment:	**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

	FCC limit:		ISED limit:	
MPE limit for uncontrolled exposure at prediction frequency:	**1.000000**	**mW/cm^2**	**0.496836**	**mW/cm^2**
	10.000000	W/m^2	4.968364	W/m^2
MPE limit for controlled exposure at prediction frequency:	**5.000000**	**mW/cm^2**	**2.996539**	**mW/cm^2**
	50.000000	W/m^2	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/cm^2**	**0.379079**	**mW/cm^2**
	3.790794	W/m^2	3.790794	W/m^2
Margin of Compliance for **uncontrolled** envirenment:	**4.21**	**dB**	**1.17**	**dB**
with Maximum premitted antenna gain:	11.71	dBi	8.67	dBi
Margin of Compliance for **controlled** envirenment:	**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