Nemko

RADIO TEST REPORT

Report ID

REP057150

Project ID

PRJ0061410

Type of assessment:

MPE Calculation report

Manufacturer:

Xtract One Technologies Inc

Description of product:

RF SYNC module

Product Marketing Name (PMN):

X1-SYNC

Model/HVIN:

C02-XOG-02000

FCC identifier:

FCC ID: 2BH2H-C02XOG02000

ISED certification number:

IC: 32822-C02XOG02000

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 A

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 applicable RF exposure limits set forth in RSS-102.

Date of issue: August 29, 2024

Fahar Abdul Sukkoor, EMC/RF Specialist

Prepared by

Signature

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Test site registration	**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

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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)   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/cm²)	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 / f²)	<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 / f²)	<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 5.1

Through this standard, ISED adopts Health Canada's RF exposure guideline entitled Limits of Human Exposure to Radiofrequency Electromagnetic Energy in the Frequency Range from 3 kHz to 300 GHz (Safety Code 6) and its Notice: Localized human exposure limits for radiofrequency fields in the range of 6 GHz to 300 GHz.

Table 1.1-2: Table 7&8 to 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/m²)	Reference Period (minutes)
Limits for controlled-use devices (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
15000–150000	137	0.364	50	$616000 / f^{1.2}$
150000–300000	$0.354\, f^{0.5}$	$9.40 \times 10^{-4}\, f^{0.5}$	$3.33 \times 10^{-4}\, f$	$616000 / f^{1.2}$
Limits for r devices used by the general public (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
15000–150000	61.4	0.163	10	$616000 / f^{1.2}$
150000–300000	$0.158\, f^{0.5}$	$4.21 \times 10^{-4}\, f^{0.5}$	$6.67 \times 10^{-5}\, f$	$616000 / f^{1.2}$

Notes: f = frequency in MHz

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	902.325 MHz
Antenna type	Rugged Puck Antenna
Antenna gain	3 dBi
Number of antennas	1
Maximum transmitter power	19.05 dBm (conducted)
Prediction distance (declared)	20 cm

Note: Three types of antenna are used by manufacturer. The Antenna with max. gain is used for MPE calculation.

1.1.3   MPE calculation

For conducted measurement

Fundamental transmit (prediction) frequency:	902	MHz
Maximum measured conducted peak output power:	19.05	dBm
Cable and/or jumper loss:	0	dB
Maximum peak power at antenna input terminal:	19.05	dBm
Duty cycle:	100	%
Maximum calculated average power at antenna input terminal:	80.352612	mW
Single Antenna gain (typical):	3	dBi
Number of antennae:	1	
Total system gain:	3.00	dBi

	FCC limit:		ISED limit:	
MPE limit for <u>uncontrolled</u> exposure at prediction frequency:	**0.601333**	**mW/cm²**	**0.273983**	**mW/cm²**
	6.013333	W/m²	2.739830	W/m²
MPE limit for <u>controlled</u> exposure at prediction frequency:	**3.006667**	**mW/cm²**	**1.938650**	**mW/cm²**
	30.066667	W/m²	19.386505	W/m²
Minimum calculated prediction distance for compliance:	20	cm	20	cm
Typical (declared) distance:	20	cm	20	cm
Average power density at prediction frequency:	**0.031896**	**mW/cm²**	**0.031896**	**mW/cm²**
	0.318956	W/m²	0.318956	W/m²
Margin of Compliance for **uncontrolled** envirenment:	**12.75**	**dB**	**9.34**	**dB**
with Maximum premitted antenna gain:	15.75	dBi	12.34	dBi
Margin of Compliance for **controlled** envirenment:	**19.74**	**dB**	**17.84**	**dB**
with Maximum permitted antenna gain:	41.79	dBi	39.89	dBi

1.1.4   Verdict

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

1.2   RSS-102, Annex A – RF technical brief cover sheet

ISED certification number	IC: 32822-C02XOG02000
Product marketing name (PMN)	X1-SYNC
Hardware version identification number (HVIN)	C02-XOG-02000
Firmware version identification number (FVIN)	0.2
Host marketing name (HMN)	S00-XOG-02000
Applicant name	Xtract One Technologies Inc
SAR/RF exposure test laboratory	24676 (3 m semi anechoic chamber - Cambridge)
Type of evaluation	☐ SAR Evaluation: Device Used in the Vicinity of the Human Head ☐ SAR Evaluation: Body-Worn Device and Body-Supported Device ☐ SAR Evaluation: Limb-Worn Device ☒ RF Exposure Evaluation ☐ Nerve Stimulation Exposure Evaluation (SPR-002)
Multiple transmitters:	☐ Yes ☒ No
SAR evaluation	Evaluated against exposure limits: ☐ General Public Use ☐ Controlled Use Duty cycle used in evaluation: N/A % Separation distance: N/A mm Standard used for evaluation: N/A SAR value: N/A W/kg ☐ Measured ☐ Computed ☐ Calculated
Nerve Stimulation Evaluation (SPR-002)	Evaluated against exposure limits: ☐ General Public Use ☐ Controlled Use Measurement distance: N/A m Field Strength: N/A ☐ V/m (electric) ☐ A/m (magnetic) ☐ Measured ☐ Computed ☐ Calculated Exposure condition: ☐ Whole body/Torso/Head ☐ Leg ☐ Arm ☐ Hand/Foot
RF exposure evaluation	Evaluated against exposure limits: ☒ General Public Use ☐ Controlled Use Duty cycle used in evaluation: **100** % Operational frequency: **902** MHz Standard used for evaluation: **Safety Code 6** Measurement distance: **0.2** m RF value: **0.32** ☒ W/m² ☐ V/m ☐ A/m ☐ Measured ☐ Computed ☒ Calculated

End of the test report