

# RADIO TEST REPORT – 454335-2APFWL

Type of assessment:

**MPE Calculation report**

Manufacturer:

**Cysca Technologies Inc**

Product Marketing Name (PMN):

**WG4 – MOBILE GATEWAY**

Hardware Version Identification Number (HVIN):

**WG4-PM**

FCC ID:

**2A2IF-WG4PM**

ISED certification number:

**IC: 27492-WG4PM**

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: February 7, 2023

Fahar Abdul Sukkoor, EMC/RF Specialist

Prepared by



Signature



Nemko Canada Inc., a testing laboratory, is accredited by the Standards Council of Canada.  
The tests included in this report are within the scope of this accreditation.

The SCC Accreditation Symbol is an official symbol of the Standards Council of Canada, used under licence.

SCC File Number: 15064 (Ottawa/Almonte); 151100 (Montreal); 151097 (Cambridge)

FCC and RSS-102 Annex C – MPE Calculation; Date: May 2021

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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
	Tel: +1 613 737 9680 Fax: +1 613 737 9691	Tel: +1 514 694 2684 Fax: +1 514 694 3528	Tel: +1 519 650 4811	Tel: +1 613 256-9117
Test site identifier	<b>Organization</b> FCC: ISED:	<b>Ottawa/Almonte</b> CA2040 2040A-4	<b>Montreal</b> CA2041 2040G-5	<b>Cambridge</b> CA0101 24676
Website	<a href="http://www.nemko.com">www.nemko.com</a>			

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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

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### 1.1 MPE calculation for standalone transmission

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#### 1.1.1 References, definitions and limits

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**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 <sup>2</sup> )	Averaging time (minutes)
<b>(i) Limits for Occupational/Controlled Exposure</b>				
0.3–3.0	614	1.63	*(100)	≤6
3.0–30	1842 / f	4.89 / f	*(900 / f <sup>2</sup> )	<6
30–300	61.4	0.163	1.0	<6
300–1500			f / 300	<6
1500–100000			5	<6
<b>(ii) Limits for General Population/Uncontrolled Exposure</b>				
0.3–1.34	614	1.63	*(100)	<30
1.34–30	824 / f	2.19 / f	*(180 / f <sup>2</sup> )	<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 <sup>2</sup> )	Reference Period (minutes)
<b>Limits for Controlled Environment</b>				
10–20	61.4	0.163	10	6
20–48	129.8 / f <sup>0.25</sup>	0.3444 / f <sup>0.25</sup>	44.72 / f <sup>0.5</sup>	6
48–100	49.33	0.1309	6.455	6
100–6000	15.60 f <sup>0.25</sup>	0.04138 f <sup>0.25</sup>	0.6455 f <sup>0.5</sup>	6
6000–15000	137	0.364	50	6
<b>Limits for Uncontrolled Environment</b>				
10–20	27.46	0.0728	2	6
20–48	58.07 / f <sup>0.25</sup>	0.1540 / f <sup>0.25</sup>	8.944 / f <sup>0.5</sup>	6
48–300	22.06	0.05852	1.291	6
300–6000	3.142 f <sup>0.3417</sup>	0.008335 f <sup>0.3417</sup>	0.02619 f <sup>0.6834</sup>	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<sup>2</sup> or W/m<sup>2</sup>)

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

Transmitter	900 MHz	Bluetooth
Prediction frequency	902.22	2440 MHz
Antenna type	Omnidirectional antenna- Flexible dipole antenna	Printed trace antenna
Antenna gain	1.2 dBi	-0.8 dB
Maximum transmitter conducted power	16.93 dBm (conducted)	4.22 dBm
Prediction distance (declared)	20 cm	20 cm

## 1.1.3 MPE calculation

900 MHz		Bluetooth	
Fundamental transmit (prediction) frequency:	902.22 MHz	2440 MHz	2440 MHz
Maximum measured conducted peak output power:	16.93 dBm	4.22 dBm	4.22 dBm
Cable and/or jumper loss:	0 dB	1 dB	1 dB
Maximum peak power at antenna input terminal:	16.93 dBm	3.22 dBm	3.22 dBm
Duty cycle:	100 %	100 %	100 %
Maximum calculated average power at antenna input terminal:	49.3174 mW	2.09894 mW	2.09894 mW
Single Antenna gain (typical):	1 dBi	-0.8 dBi	-0.8 dBi
Number of antennae:	1	1	1
Total system gain:	1.00 dBi	-0.80 dBi	-0.80 dBi
MPE limit for <u>uncontrolled</u> exposure at prediction frequency:		ISED limit	FCC limit
0.27403 mW/cm <sup>2</sup>	1.00000 mW/cm <sup>2</sup>	0.54085 mW/cm <sup>2</sup>	1.00000 mW/cm <sup>2</sup>
2.740287 W/m <sup>2</sup>	10.00000 W/m <sup>2</sup>	5.408511 W/m <sup>2</sup>	10.00000 W/m <sup>2</sup>
MPE limit for <u>controlled</u> exposure at prediction frequency:		ISED limit	FCC limit
1.93889 mW/cm <sup>2</sup>	3.00740 mW/cm <sup>2</sup>	3.18853 mW/cm <sup>2</sup>	5.00000 mW/cm <sup>2</sup>
19.38887 W/m <sup>2</sup>	30.07400 W/m <sup>2</sup>	31.88535 W/m <sup>2</sup>	50.00000 W/m <sup>2</sup>
Minimum calculated prediction distance for compliance:	20 cm	20 cm	20 cm
Typical (declared) distance:	20 cm	20 cm	20 cm
Average power density at prediction frequency:		ISED limit	FCC limit
0.012352 mW/cm <sup>2</sup>	0.012352 mW/cm <sup>2</sup>	0.000347 mW/cm <sup>2</sup>	0.000347 mW/cm <sup>2</sup>
0.123518 W/m <sup>2</sup>	0.123518 W/m <sup>2</sup>	0.003473 W/m <sup>2</sup>	0.003473 W/m <sup>2</sup>
MPE compliance for simultaneous operation:			
Margin of Compliance for <u>controlled</u> environment:	21.96 dB	23.86 dB	39.63 dB
with Maximum permitted antenna gain:	22.96 dBi	24.86 dBi	38.83 dBi
Margin of Compliance for <u>uncontrolled</u> environment:	13.46 dB	19.08 dB	31.92 dB
with Maximum permitted antenna gain:	14.46 dBi	19.08 dBi	31.12 dBi
Average power density to MPE limit ratio ( <u>uncontrolled</u> ):	0.045	0.012	0.001
Average power density to MPE limit ratio ( <u>controlled</u> ):	0.006	0.004	0.000
Total sum of ratios for FCC (uncontrolled):	0.013 <1	Total sum of ratios for FCC (controlled):	
Total sum of ratios for ISED (uncontrolled):	0.046 <1	Total sum of ratios for ISED (controlled):	0.006 <1
Maximum allowed sum of ratios:	1	Total RF value for ISED	
			0.1270 W/m <sup>2</sup>

## 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 RSS-102, Annex A - RF technical brief cover sheet**

ISED certification number	IC: 27492-WG4PM		
Product marketing name (PMN)	WG4 Mobile Gateway		
Hardware version identification number (HVIN)	WG4-PM		
Firmware version identification number (FVIN)	N/A		
Host marketing name (HMN)	N/A		
Applicant name	Cysca Technologies Inc		
SAR/RF exposure test laboratory	2040G-5 (3 m semi anechoic chamber - Montréal)		
Type of evaluation	<input type="checkbox"/> SAR Evaluation: Device Used in the Vicinity of the Human Head <input type="checkbox"/> SAR Evaluation: Body-Worn Device and Body-Supported Device <input type="checkbox"/> SAR Evaluation: Limb-Worn Device <input checked="" type="checkbox"/> RF Exposure Evaluation <input type="checkbox"/> Nerve Stimulation Exposure Evaluation (SPR-002)		
SAR evaluation	Multiple transmitters: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Evaluated against exposure limits: <input type="checkbox"/> General Public Use <input type="checkbox"/> 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 <input type="checkbox"/> Measured <input type="checkbox"/> Computed <input type="checkbox"/> Calculated		
Nerve Stimulation Evaluation (SPR-002)	Evaluated against exposure limits: <input type="checkbox"/> General Public Use <input type="checkbox"/> Controlled Use Measurement distance: N/A m Field Strength: N/A <input type="checkbox"/> V/m (electric) <input type="checkbox"/> A/m (magnetic) <input type="checkbox"/> Measured <input type="checkbox"/> Computed <input type="checkbox"/> Calculated Exposure condition: <input type="checkbox"/> Whole body/Torso/Head <input type="checkbox"/> Leg <input type="checkbox"/> Arm <input type="checkbox"/> Hand/Foot		
RF exposure evaluation	Evaluated against exposure limits: <input checked="" type="checkbox"/> General Public Use <input type="checkbox"/> Controlled Use Duty cycle used in evaluation: 100 % Operational frequency: 902–928 2400–2483.5 MHz Standard used for evaluation: Safety Code 6 Measurement distance: 0.2 m RF value: 0.127 <input checked="" type="checkbox"/> W/m <sup>2</sup> <input type="checkbox"/> V/m <input type="checkbox"/> A/m <input type="checkbox"/> Measured <input type="checkbox"/> Computed <input checked="" type="checkbox"/> Calculated		

**End of the test report**