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RADIO TEST REPORT – APFWL

Type of assessment:

MPE Calculation report

Manufacturer:

dormakaba Canada Inc.

Hardware Version Identification Number (HVIN):

RT Plus

Product Marketing Name (PMN):

79 Series

FCC ID:

Q8SRTPLUS

IC certification number:

4652A-RTPLUS

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: June 16, 2022

Andrey Adelberg, Senior EMC/RF Specialist
Prepared by

Adelberg
Signature

Lab locations

Company name	Nemko Canada Inc.			
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Test site identifier	**Organization**	**Ottawa/Almonte**	**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 simultaneous 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 2.5.2

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

- below 20 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);
- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $4.49/f^{0.5}$ W (adjusted for tune-up tolerance), where ƒ is in MHz;
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $0.0131\ f^{0.6834}$ W (adjusted for tune-up tolerance), where ƒ is in MHz;
- at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

In these cases, the information contained in the RF exposure technical brief may be limited to information that demonstrates how the e.i.r.p. was derived.

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)

1.1.2 EUT technical information

	Transmitter 1 (BLE)	Transmitter 2 (FRID)
Prediction frequency	2.4 GHz	13.56 MHz
Antenna type	Non-detachable	Non-detachable
Antenna gain	2.7 dBi	N/A
Maximum transmitter conducted power	0.4 dBm	51.9 dBµV/m @ 3 m
Prediction distance	20 cm	20 cm

1.1.3 MPE calculation

	Transmitter 1		Transmitter 2	
Fundamental transmit (prediction) frequency:	2440	MHz	13.56	MHz
Maximum measured conducted peak output power:	0.4	dBm	-43.33	dBm
Cable and/or jumper loss:	0	dB	0	dB
Maximum peak power at antenna input terminal:	0.4	dBm	-43.33	dBm
Tx On time:	1.000	ms	1.000	ms
Tx period time:	1.000	ms	1.000	ms
Average factor:	100	%	100	%
Maximum calculated average power at antenna input terminal:	1.096478196	mW	4.64515E-05	mW
Single Antenna gain (typical):	2.7	dBi	0	dBi
Number of antennae:	1		1	
Total system gain:	2.70	dBi	0.00	dBi

	ISED limit		FCC limit		ISED limit		FCC limit	
MPE limit for uncontrolled exposure at prediction frequency:	0.540851	mW/cm^2	1.000000	mW/cm^2	0.200000	mW/cm^2	1.000000	mW/cm^2
	5.408511	W/m^2	10.000000	W/m^2	2.000000	W/m^2	10.000000	W/m^2
Minimum calculated prediction distance for compliance:	20	cm	20	cm	20	cm	20	cm
Typical (declared) distance:	20	cm	20	cm	20	cm	20	cm
Average power density at prediction frequency:	0.000406	mW/cm^2	0.000406	mW/cm^2	0.000000	mW/cm^2	0.000000	mW/cm^2
	0.004062	W/m^2	0.004062	W/m^2	0.000000	W/m^2	0.000000	W/m^2
Combined MPE compliance:								
Margin of Compliance:	31.24	dB	33.91	dB	73.35	dB	80.34	dB
Maximum allowable antenna gain:	33.94	dBi	33.91	dBi	73.35	dBi	80.34	dBi
Average power density to MPE limit ratio:	0.001		0.000		0.000		0.000	
Total sum of ratios for FCC:	0.000							
Total sum of ratios for ISED:	0.001							
Maximum allowed sum of ratios:	1							

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

IC Certification Number	4652A-RTPLUS
Product marketing name (PMN)	79 Series
Hardware version identification number (HVIN)	RT Plus
Firmware version identification number (FVIN)	N/A
Host marketing name (HMN)	N/A
Applicant company number	4652A
Applicant name	dormakaba Canada Inc.
SAR/RF exposure test laboratory	2040A-4 (3 m semi anechoic chamber)
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)
SAR evaluation	Multiple transmitters: ☐ Yes ☐ No
	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: **2440** MHz
	Standard used for evaluation: **Safety Code 6**
	Measurement distance: **0.2** m
	RF value: **0.004** ☒ W/m² ☐ V/m ☐ A/m ☐ Measured ☐ Computed ☒ Calculated

End of the test report