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RADIO TEST REPORT – 454930APFWL

Type of assessment:

MPE Calculation report

Manufacturer:

Stratosfy

Hardware Version Identification Number (HVIN):

STSFY-BRDG-05

Product Marketing Name (PMN):

Stratosfy Bluetooth Wi-Fi Bridge

FCC ID:

2A3CA-STSFYBRDG05

IC certification number:

27758-STSFYBRDG05

Contains FCC ID:

2AC7Z-ESPWROOM32D

Contains IC certification number:

21098-ESPWROOM32D

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: January 31, 2022

Andrey Adelberg, Senior EMC/RF Specialist

Prepared by

Signature

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The tests included in this report are within the scope of this accreditation.
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SCC File Number: 15064 (Ottawa/Almonte); 151100 (Montreal); 151097 (Cambridge)

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

www.nemko.com



Lab locations

Company name	Nemko Canada Inc.			
Facilities	<i>Ottawa site:</i> 303 River Road Ottawa, Ontario Canada K1V 1H2 Tel: +1 613 737 9680 Fax: +1 613 737 9691	<i>Montréal site:</i> 292 Labrosse Avenue Pointe-Claire, Québec Canada H9R 5L8 Tel: +1 514 694 2684 Fax: +1 514 694 3528	<i>Cambridge site:</i> 1-130 Saltsman Drive Cambridge, Ontario Canada N3E 0B2 Tel: +1 519 650 4811	<i>Almonte site:</i> 1500 Peter Robinson Road West Carleton, Ontario Canada K0A 1L0 Tel: +1 613 256-9117
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.

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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 f 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 f 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/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

	Transmitter 1 (BLE)	Transmitter 2 (Wi-Fi)
Prediction frequency	2402 GHz	GHz
Antenna type	Chip Antenna (PIFA)	Printed antenna
Antenna gain	1.1 dBi	3.7 dBi
Maximum transmitter conducted power	2.64 dBm	18.01 dBm
Prediction distance	20 cm	20 cm

1.1.3 MPE calculation

	Transmitter BLE		Transmitter Wi-Fi	
Fundamental transmit (prediction) frequency:	2402 MHz		2437 MHz	
Maximum measured conducted peak output power:	2.64 dBm		18.01 dBm	
Cable and/or jumper loss:	0 dB		0 dB	
Maximum peak power at antenna input terminal:	2.64 dBm		18.01 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:	1.8365383 mW		63.241185 mW	
Single Antenna gain (typical):	1.1 dBi		3.7 dBi	
Number of antennae:	1		1	
Total system gain:	1.10 dBi		3.70 dBi	
MPE limit for uncontrolled exposure at prediction frequency:	ISED limit	FCC limit	ISED limit	FCC limit
	0.535080 mW/cm ²	1.000000 mW/cm ²	0.540397 mW/cm ²	1.000000 mW/cm ²
Minimum calculated prediction distance for compliance:	5.350805 W/m ²	10.000000 W/m ²	5.403965 W/m ²	10.000000 W/m ²
	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:	0.000471 mW/cm ²	0.000471 mW/cm ²	0.029494 mW/cm ²	0.029494 mW/cm ²
	0.004707 W/m ²	0.004707 W/m ²	0.294938 W/m ²	0.294938 W/m ²
Combined MPE compliance:				
Margin of Compliance:	30.56 dB	33.27 dB	12.63 dB	15.30 dB
Maximum allowable antenna gain:	31.66 dBi	33.27 dBi	16.33 dBi	15.30 dBi
Average power density to MPE limit ratio:	0.001	0.00047	0.055	0.029
Total sum of ratios for FCC:	0.030			
Total sum of ratios for ISED:	0.055			
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	27758-STSFYBRDG05		
Product marketing name (PMN)	Stratosfy Bluetooth Wi-Fi Bridge		
Hardware version identification number (HVIN)	STSFY-BRDG-05		
Firmware version identification number (FVIN)	N/A		
Host marketing name (HMN)	N/A		
Applicant company number	27758		
Applicant name	Stratosfy		
SAR/RF exposure test laboratory	2040A-4 (3 m semi anechoic chamber)		
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 type="checkbox"/> RF Exposure Evaluation <input type="checkbox"/> Nerve Stimulation Exposure Evaluation (SPR-002)		
SAR evaluation	Multiple transmitters: <input type="checkbox"/> Yes <input 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"/> Arm	<input type="checkbox"/> Leg <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:	2437	MHz
	Standard used for evaluation:	Safety Code 6	
	Measurement distance:	0.2	m
	RF value:	0.29	<input checked="" type="checkbox"/> W/m ² <input type="checkbox"/> V/m <input type="checkbox"/> A/m <input type="checkbox"/> Measured <input type="checkbox"/> Computed <input type="checkbox"/> Calculated

End of the test report