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Assessment Report

REP011029-1ARWL

Type of assessment:

MPE Calculation report

Manufacturer:

Maven Wireless, Inc.

Model:

RHN00030

Product Marketing Name (PMN):

20W Exo Repeater

FCC ID:

2BE5B-RHN00030

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

Date of issue: May 13, 2024

James Cunningham, EMC/WL Manager
Prepared by

Signature

Lab locations=

Company name	Nemko USA Inc.
Address	2210 Faraday Ave, Suite 150
City	Carlsbad
State	California
Postal code	92008
Country	USA
Telephone	+1 760 444 3500
Website	www.nemko.com
FCC Site Number	Test Firm Registration Number: 392943 Designation Number: US5058
ISED Test Site	2040B-3

Prepared by	James Cunningham, EMC/WL Manager
Date	May 13, 2024
Signature	

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 contain in this report are within Nemko USA'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 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.

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 (Band 25)	Transmitter 2 (Band 66)
Prediction frequency	1995 GHz	2150 GHz
Antenna type	None	None
Antenna gain	0 dBi	0 dBi
Maximum transmitter conducted power	43 dBm (19,953 mW)	43 dBm (19,953 mW)
Prediction distance	80 cm (FCC)	80 cm (FCC)

Notes:
As a worst-case assessment, it is assumed that the EUT can transmit a single carrier on both supported bands simultaneously in a non-correlated manner. The EUT is a repeater and, as such, is not provided with antenna. The calculations below are based on the rated output power and illustrate compliance assuming a 0 dBi antenna gain. The EUT will be professionally installed.

1.1.3 MPE calculation

	Transmitter 1		Transmitter 2	
Fundamental transmit (prediction) frequency:	1995	MHz	2150	MHz
Maximum measured conducted peak output power:	43	dBm	43	dBm
Cable and/or jumper loss:	0	dB	0	dB
Maximum peak power at antenna input terminal:	43	dBm	43	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:	19952.62	mW	19952.62	mW
Single Antenna gain (typical):	0	dBi	0	dBi
Number of antennae:	1		1	
Total system gain:	0.00	dBi	0.00	dBi
MPE limit for uncontrolled exposure at prediction frequency:	**1.00**	**mW/cm²**	**1.00**	**mW/cm²**
	10.00	W/m²	10.00	W/m²
Minimum calculated prediction distance for compliance:	80	cm	80	cm
Typical (declared) distance:	80	cm	80	cm
Average power density at prediction frequency:	**0.248**	**mW/cm²**	**0.248**	**mW/cm²**
	2.481	W/m²	2.481	W/m²
Combined MPE compliance:				
Margin of Compliance:	**6.05**	**dB**	**6.05**	**dB**
Maximum allowable antenna gain:	6.05	dBi	6.05	dBi
Average power density to MPE limit ratio:	0.248		0.248	
Total sum of ratios:	0.496			
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.

End of the test report