



Radio Frequency Exposure Evaluation Report

For:
Praesidium

Brand:
Praesidium

Marketing Name:
BioFi

Model:
2001BIO1

Product Description:
Contactless Vital Sign Detection Sensor

FCC ID: 217ZX2001BIO1
IC ID: 28837-2001BIO1

Applied Rules and Standards:
CFR Part1 (1.1307 & 1.1310), Part 2 (2.1091),
FCC KDB 447498 D01 General RF Exposure Guidance v06

Report #: EMC_PRAES_002-23001_MPE_FCC_ISED

DATE: 2023-08-24



A2LA Accredited

IC recognized #
3462B

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1 Assessment

This RF Exposure evaluation report, provides evidence for compliance of the below identified device, with the RF Exposure limits for mobile devices, as defined in FCC CFR Part1 (1.1307 & 1.1310), Part 2 (2.1091), under worst case conditions (measured or rated RF output power, antenna gain, distance towards human body. Multiple transmitter information as presented by the applicant).

In addition, maximum antenna gain, or minimum distance towards the human body calculated respectively where relevant.

The device meets the limits as stipulated by the above given FCC and IC rule parts based on available specifications for worst case conditions at 20 cm distance to the body.

Company	Description	Model #
Praesidium	Contactless vital sign detection sensor	2001BIO1

Responsible for Testing Laboratory:

Stoecker, Arndt

2023-08-24

Compliance

(Director of Regulatory Services)

Date	Section	Name	Signature
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Responsible for the Report:

Art Thammanavarat

2023-08-24

Compliance

(Senior EMC Engineer)

Date	Section	Name	Signature
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2 Administrative Data

2.1 Identification of the Testing Laboratory Issuing the Test Report

Company Name:	CETECOM Inc.
Department:	Compliance
Street Address:	411 Dixon Landing Road
City/Zip Code	Milpitas, CA 95035
Country	USA
Telephone:	+1 (408) 586 6200
Fax:	+1 (408) 586 6299
Director of Regulatory Services:	Stoecker, Arndt
Responsible Project Leader:	Saman, Rami

2.2 Identification of the Client / Manufacturer

Applicant's Name:	Praesidium Inc.
Street Address:	150 N 200 E
City/Zip Code	St. George, Utah 84770
Country	USA

2.3 Identification of the Manufacturer

Manufacturer's Name:	Same as client.
Manufacturers Address:	
City/Zip Code	
Country	

3 Equipment under Assessment

Brand:	Praesidium
Marketing Name:	BioFi
Product Description:	Contactless Vital Sign Detection Sensor
Model Name :	2001BIO1
Contains FCC-ID :	217ZX2001BIO1
Contains IC:	28837-2001BIO1
HW Version :	2001BIO1A
SW Version :	V1.0.0
FVIN	N/A
HVIN	2001BIO1A
PMN	RemWave Sleep
Frequency Range/ Number of Channels	WiFi : 2400 MHz – 2483.5 MHz; Center to center: 2412 MHz (ch 1) – 2462 MHz (ch 11), 11 channels Radar: 60-64 GHz
Other Radios included in the device	<u>WLAN (WiFi Pre-certified)</u> <u>WIZnet H.K. LTD.</u> <u>Model: WizFi360CON</u> <u>FCC ID: 2ATUB-WIZFI360PA</u> <u>ISED: 20560-WIZFI360CON</u> <u>-Radar IWR6843 Chip</u>
Antenna Information as declared	<u>Main Antenna:</u> 2.4 GHz Wi-Fi antenna Flexible Planar Antenna, Laird Connectivity MPN: EMF2471A3S-10MHF1 Gain (2.45 GHz): 2.4 dBi PCB embedded 60-64 GHz Radar antenna, 15 dBi gain
Power Supply/ Rated Operating Voltage Range	Vmin: 4.75 VDC/ Vnom: 5V VDC / Vmax: 5.25
Operating Temperature Range	0°C to 40°C
Sample Revision	<input type="checkbox"/> Production <input checked="" type="checkbox"/> Pre-Production
EUT Dimensions	1.64in x 4.25in x 4.25in
Weight	450g
EUT Diameter	<input checked="" type="checkbox"/> < 60 cm <input type="checkbox"/> Other _____

4 RF Exposure Limits and FCC Basic Rules

4.1 FCC

4.1.1 § 2.1093(c)(1)

Evaluation of compliance with the exposure limits in § 1.1310 of this chapter, and preparation of an EA if the limits are exceeded, is necessary for mobile devices with single RF sources having either more than an available maximum time-averaged power of 1 mW or more than the ERP listed in Table 1 to § 1.1307(b)(3)(i)(C), whichever is greater. For mobile devices not exempt by § 1.1307(b)(3)(i)(C) at distances from 20 centimeters to 40 centimeters and frequencies from 0.3 GHz to 6 GHz, evaluation of compliance with the exposure limits in § 1.1310 of this chapter is necessary if the ERP of the device is greater than ERP_{20cm} in the formula below. If the ERP of a single RF source at distances from 20 centimeters to 40 centimeters and frequencies from 0.3 GHz to 6 GHz is not easily obtained, then the available maximum time-averaged power may be used (i.e., without consideration of ERP) in comparison with the following formula only if the physical dimensions of the radiating structure(s) do not exceed the electrical length of $\lambda/4$ or if the antenna gain is less than that of a half-wave dipole (1.64 linear value).

$$P_{th}(\text{mW}) = ERP_{20\text{ cm}}(\text{mW}) = \begin{cases} 2040f & 0.3\text{ GHz} \leq f < 1.5\text{ GHz} \\ 3060 & 1.5\text{ GHz} \leq f \leq 6\text{ GHz} \end{cases}$$

4.1.2 § 2.1093(c)(2)

For multiple mobile or portable RF sources within a device operating in the same time averaging period, routine environmental evaluation is required if the formula in § 1.1307(b)(3)(ii)(B) of this chapter is applied to determine the exemption ratio and the result is greater than 1.

4.1.3 § 1.1307(b)(3)(ii)(B)

in the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation.

$$\sum_{i=1}^a \frac{P_i}{P_{th,i}} + \sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^c \frac{Evaluated_k}{Exposure\ Limit_k} \leq 1$$

4.2 ISED RSS 102

4.2.1 RSS-102 2.5.2 Exemption Limits for Routine Evaluation — RF Exposure Evaluation

- 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 $1.31 \times 10^{-2} f^{0.6834}$ 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).

5 Evaluation

5.1 Analysis to Exclude Routine RF Exposure evaluation for Co-transmission Operation

Compliance with FCC Table 1 of § 1.1307(b)(3)(i)(C) and RSS-102 2.5.2 exemption limits												
Band	Frequency (MHz)	Output Power		Antenna Gain (dBi)	E.I.R.P		Separation Distances (cm)	FCC Pth Threshold (mW)	ISED Threshold EIRP (mW)	FCC ERP/PTH Ratio	ISED EIRP / Limit Ratio	MPE Exempt No evaluation required Ratios < 1
		dBm	mW		dBm	mW						
WiFi 2.4GHz	2412.0	20.00	100.00	2.4	22.40	173.780	20	768.00	2686.12	0.1302	0.065	Exempt
Radar 60-64GHz	62000.0	-10.00	0.10	15	5.00	3.162	20	768.00	24709.90	0.0001	0.0001	Exempt
Multiple RF sources										0.1303	0.0648	Exempt

Conclusion:

- The worst-case simultaneous transmission mode Wi-Fi 2.4 GHz 802.11g and Radar radio is using 13.03% of the FCC limit and 5.91% of the ISED limit passing RF exposure requirements for 20 cm distance.

6 Revision History

Date	Changes to report	Report prepared by
2023-08-24	Initial Version	Art Thammanavarat

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