Radio Frequency Exposure Evaluation Report

FOR:
Praesidium Inc.

Model Name:
2001BIO1

Marketing Name:
BioFi

Product Description:
Contactless vital sign detection sensor

FCC ID: 2A7ZX2001BIO1
IC: 2A8837-2001BIO1

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

Report number: EMC_PRAES_001_22001_FCC_MPE_ISED

DATE: 1/13/2023

A2LA Accredited

IC recognized # 3462B

***CETECOM* Inc.**
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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 20cm distance to the body.

Company	Description	Model Name
Praesidium Inc.	Contactless vital sign detection sensor	2001BIO1

Responsible for Testing Laboratory:

Date	Section	Name	Signature
1/13/2023	Compliance	Stoecker, Arndt (Director of Regulatory Services)	Arndt Stoecker Digitally signed by: Arndt Stoecker DN: CN = Arndt Stoecker email = arndt.stoecker@cetecom.com C = US O = CETECOM Inc Date: 2023.01.25 11:10:39 -08'00'

Responsible for the Report:

Date	Section	Name	Signature
1/13/2023	Compliance	Ghanma, Issa (EMC Engineer)	Digitally signed by: Issa Ghanma DN: CN = Issa Ghanma email = Issa.Ghanma@cetecom.com C = US O = CETECOM, Inc. OU = EMC Date: 2023.01.16 09:04:42 -08'00'

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

Model No:	2001BIO1
Marketing name:	BioFi
FCC ID:	2A7ZX2001BIO1
IC:	2A8837-2001BIO1
HW Version :	2001BIO1
SW Version :	V1.0.0
HVIN:	2001BIO1
PMN:	RemWave Sleep
Product description:	Contactless vital sign detection sensor
Power Supply/ Rated Operating Voltage Range: (V DC)	Vmin: 4.75 / Vnom: 5 / Vmax: 5.25
Operating Temperature range:	32° to 104°F (0° to 40°C)
Integrated Module Info:	❖ **Radar:** ■ Manufacturer: Texas Instruments ■ Part Number: IWR6843AQGABL ■ Description: Single-chip 60-64 GHz intelligent mmWave sendor ❖ **WLAN (Wi-Fi):** 802.11 b/g/n ■ Manufacturer: WIZnet H.K. LTD ■ Model: WIZFI360PA ■ FCC ID: 2ATUB-WIZFI360PA ■ IC: 20560-WIZI360PA
Regulatory Band:	❖ **Radar:** 57-71 GHz ❖ **WLAN (Wi-Fi) 2.4:** ■ 2.4 GHz: 802.11 b/g/n • 2.412 GHz to 2.462 GHz: Channel 1 – 11
Antenna Type and Peak gain:	❖ **Radar:** PCB embedded 60-64 GHz Radar antenna, 15 dBi gain ❖ **WLAN:** PCB embedded 2.4 GHz Wi-Fi antenna 2 dBi gain
Maximum Conducted Output Power (dBm):	❖ **Radar:** -10 dBm ❖ **WLAN (Wi-Fi) 2.4:** 19 dBm ± 1 dB
Sample Revision:	☐ Prototype Unit; ☐ Production Unit; ■ Pre-Production
Device category:	Fixed installation
Exposure Category:	Occupational/Controlled

4 RF Exposure Limits and FCC Basic Rules

4.1 FCC 1.1307 – Determination of exemption (C)

RF Source frequency (MHz)	Threshold ERP (Watts)
1,500-100,000	$19.2R^2$

4.2 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 x 10-2 f0.6834 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).

4.3 RF Exposure Estimation (MPE Estimation)

Having available the source, based average output power, and peak antenna gain, or the ERP/EIRP of the specified device, and for a known minimum distance of its radiating structures from the body of persons. According to its use cases (at least 20cm) the power density at that distance can be estimated by the following formula for plane-wave equivalent conditions (far-field conditions), when ground reflection is neglected.

$$S = \frac{PG}{4\pi R^2}$$

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)

5 Evaluation

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

Band	Lowest frequency [GHz]	ERP [W]	EIRP [W]	FCC Threshold [W]	How much of FCC limit is used up	ISED limit [w]	How much of ISED limit is used up
WLAN 2.4	2.412	0.097	0.158	0.768	20.64%	2.68	5.90%
Radar 60-64	60.00	0.002	0.003	0.768	0.41%	5.0	0.06%

Conclusion:

- The worst-case simultaneous transmission mode Wi-Fi 2.4 GHz 802.11g and Radar radio is using 21.05% of 100% FCC limit and 5.97% of 100% ISED limit passing RF exposure requirements for 20cm distance.

6 Revision History

Date	Report Name	Changes to report	Report prepared by
1/13/2023	EMC_PRAES_001_22001_FCC_MPE_ISED	Initial Version	Issa Ghanma

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