



# Radio Frequency Exposure Evaluation Report

**For:**  
Praesidium Inc.

**Model Name:**  
2002BIO1

**Product Description:**  
Contactless vital sign detection sensor

**FCC ID:** 2A7ZX2002BIO1  
**IC:** 28837-2002BIO1

**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:** 2023-03-30



**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 Name |
|-----------------|---|------------|
| Praesidium Inc. | Contactless vital sign detection sensor | 2002BIO1   |

### Responsible for Testing Laboratory:

Stoecker, Arndt

2023-03-30

Compliance

(Director of Regulatory Services)

| Date | Section | Name | Signature |
|------|---------|------|-----------|
|------|---------|------|-----------|

### Responsible for the Report:

Huang, Guangcheng

2023-03-30

Compliance

(Senior EMC Engineer)

| Date | Section | Name | Signature |
|------|---------|------|-----------|
|------|---------|------|-----------|

## 2 Administrative Data

### 2.1 Identification of the Testing Laboratory Issuing the Test Report

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

### 2.2 Identification of the Client / Manufacturer

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

### 2.3 Identification of the Manufacturer

|                               |                 |
|-------------------------------|-----------------|
| <b>Manufacturer's Name:</b>   | Same as client. |
| <b>Manufacturers Address:</b> | -----           |
| <b>City/Zip Code</b>          | -----           |
| <b>Country</b>                | -----           |

### 3 Equipment under Assessment

|   |  |
|---|--|
| <b>Model No:</b>  | 2002BIO1   |
| <b>Marketing name:</b>                                      | BioFi  |
| <b>FCC ID:</b>  | 2A7ZX2002BIO1  |
| <b>IC:</b>  | 28837-2002BIO1   |
| <b>HW Version :</b>   | 2002BIO1   |
| <b>SW Version :</b>   | V1.0.0   |
| <b>HVIN:</b>  | 2002BIO1   |
| <b>PMN:</b>   | RemWave Sleep  |
| <b>Product description:</b>                                 | Contactless vital sign detection sensor  |
| <b>Power Supply / Rated Operating Voltage Range: (V DC)</b> | Vmin: 4.25 / Vnom: 5 / Vmax: 5.75  |
| <b>Operating Temperature range:</b>                         | 32 °F to 104 °F (0 °C to 40 °C)  |
| <b>Integrated Module Info:</b>                              | <ul style="list-style-type: none"> <li>❖ <b>Radar:</b> <ul style="list-style-type: none"> <li>▪ Manufacturer: Texas Instruments</li> <li>▪ Part Number: IWR6843AQGABL</li> <li>▪ Description: Single-chip 60-64 GHz intelligent mmWave sensor</li> </ul> </li> <li>❖ <b>WLAN (Wi-Fi):</b> 802.11 b/g/n                             <ul style="list-style-type: none"> <li>▪ Manufacturer: WIZnet H.K. LTD</li> <li>▪ Model: WIZFI360PA</li> <li>▪ FCC ID: 2ATUB-WIZFI360PA</li> <li>▪ IC: 20560-WIZI360PA</li> </ul> </li> </ul> |
| <b>Regulatory Band:</b>                                     | <ul style="list-style-type: none"> <li>❖ <b>Radar:</b> 60-64 GHz</li> <li>❖ <b>WLAN (Wi-Fi) 2.4:</b> <ul style="list-style-type: none"> <li>▪ 2.4 GHz: 802.11 b/g/n</li> <li>• 2.412 GHz to 2.462 GHz: Channel 1 – 11</li> </ul> </li> </ul>   |
| <b>Antenna Type and Peak gain:</b>                          | <ul style="list-style-type: none"> <li>❖ <b>Radar:</b> PCB embedded 60-64 GHz antenna array, 15 dBi gain</li> <li>❖ <b>WLAN:</b> PCB embedded 2.4 GHz Wi-Fi antenna, 2 dBi gain</li> </ul>   |
| <b>Maximum Conducted Output Power (dBm):</b>                | <ul style="list-style-type: none"> <li>❖ <b>Radar:</b> -10 dBm</li> <li>❖ <b>WLAN (Wi-Fi) 2.4:</b> 19 dBm ± 1 dB</li> </ul>  |
| <b>Sample Revision:</b>                                     | <input type="checkbox"/> Prototype Unit; <input type="checkbox"/> Production Unit; <input checked="" type="checkbox"/> Pre-Production  |
| <b>Device category:</b>                                     | Fixed installation   |
| <b>Exposure Category:</b>                                   | public/uncontrolled  |

## 4 RF Exposure Limits and FCC Basic Rules

### 4.1 FCC 1.1310((3)(i)(C) Table 1 – Exemption Threshold

Prerequisite: Separation R be at least  $\lambda/2\pi$  ( $R = 20$  cm,  $\lambda/2\pi = \text{ca. } 0.08$  cm)

| RF Source frequency<br>(MHz) | Threshold ERP<br>(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  $1.31 \times 10^{-2} f^{0.6834}$  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).

### 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 20 cm) 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<sup>2</sup> or W/m<sup>2</sup>)

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

| 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 (ERP) |        | Antenna Gain (dBi) | E.I.R.P |         | Separation Distances (cm) | FCC Pth Threshold (mW) | ISED Threshold EIRP (mW) | FCC ERP/PTH Ratio | ISED ERP / Limit Ratio | MPE Exempt<br>No evaluation required<br>Ratios < 1 |
|  |                 | dBm                | mW     |                    | dBm     | mW      |                           |                        |                          |                   |                        |  |
| WiFi 2.4GHz  | 2412,0          | 20,00              | 100,00 | 2                  | 22,00   | 158,489 | 20                        | 768,00                 | 2686,12                  | 0,1302            | 0,059                  | 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            | 0,0591                 | 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 |
|------------|-------------------|--------------------|
| 2023-03-30 | Initial Version   | Guangcheng Huang   |

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