



FCC TITLE 47 PART 25  
ISED C RSS-170 ISSUE 4

TEST AND MEASUREMENT REPORT

For

**Somewear Labs, Inc.**

350 Brannan Street, Suite 350,  
San Francisco, CA 94107, USA

**FCC ID: 2AQYN-SWL2**  
**IC: 24246-SWL2**

|  |  |  |
|--|--|--|
| <b>Report Type:</b><br>Original Report   | <b>Product Type:</b><br>Satellite Communication Device |  |
| <b>Prepared By</b>   | Will Hu<br>Test Engineer                               |  |
| <b>Report Number</b>   | R2403043-25  |  |
| <b>Report Date</b>   | 2024-05-07   |  |
| <b>Reviewed By</b>   | Christian McCaig<br>RF Lead Engineer                   |  |
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**Note:** This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. This report **must not** be used by the customer to claim product certification, approval, or endorsement by A2LA\*, NIST, or any agency of the Federal Government.

\* This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk "\*" (Rev.2)

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**DOCUMENT REVISION HISTORY**

| <b>Revision Number</b> | <b>Report Number</b> | <b>Description of Revision</b> | <b>Date of Revision</b> |
|------------------------|----------------------|--------------------------------|-------------------------|
| 0                      | R2403043-25          | Original report                | 2024-05-07              |

# 1 General Description

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## 1.1 Product Description for Equipment Under Test (EUT)

This test and measurement report was prepared on behalf of *Somewear Labs, Inc.*, and their product model: Somewear Labs Node with FCC ID: 2AQYN-SWL2 and IC: 24246-SWL2, a Satellite Communication Device with Iridium radio module, or the “EUT” as referred to in this report.

Original results are used in cases of leveraging original module certification. After spot checking to ensure the power is consistent with original certifications, it was determined that original test reports accurately represent test results under the new conditions.

## 1.2 Mechanical Description of EUT

**Dimensions:** 13.4 cm (Length), 6.2 cm (Width), 2.5 cm (High), and weighs approximately 0.20 kg  
**Serial Number:** NFBBJEXC4744 and NFBBJEXC5978 assigned by Somewear Labs, Inc.

## 1.3 Objective

This report is prepared on behalf of *Somewear Labs, Inc.*, in accordance with Title 47, Part 25 of the Federal Communication Commission’s rules and ISEDC RSS 170.

The objective was to verify output power with FCC Part 25 and ISEDC RSS-170 for the Iridium Module used in the device

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product maybe which result in lowering the immunity should be checked to ensure compliance has been maintained (i.e., printed circuit board layout changes, different line filter, different power supply, harnessing and/or I/O cable changes, etc.).

## 1.4 Related Submittal(s)/Grant(s)

FCC Part 15.247, RSS-247, Equipment Class: DTS with FCC ID: 2AQYN-SWL2, IC: 24246-SWL2.

## 1.5 Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47, Chapter I, Sub-part B, Part 25 and ISEDC RSS 170.

Applicable Standards ANSI C63.26-2015:

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratory, Corp. The radiated testing was performed at an antenna-to-EUT distance of 3 or 1 meters.

## 1.6 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

| Parameter                         | Measurement uncertainty |
|-----------------------------------|-------------------------|
| Occupied Channel Bandwidth        | ±5 %                    |
| RF output power, conducted        | ±0.57 dB                |
| Power Spectral Density, conducted | ±1.48dB                 |
| Unwanted Emissions, conducted     | ±1.57dB                 |
| All emissions, radiated           | ±4.0 dB                 |
| AC power line Conducted Emission  | ±2.0 dB                 |
| Temperature                       | ±2 ° C                  |
| Humidity                          | ±5 %                    |
| DC and low frequency voltages     | ±1.0 %                  |
| Time                              | ±2 %                    |
| Duty Cycle                        | ±3 %                    |

## 1.7 Test Facility Registrations

BACLs test facilities that are used to perform Radiated and Conducted Emissions tests are currently recognized by the Federal Communications Commission as Accredited with NIST Designation Number US1129.

BACL's test facilities that are used to perform Radiated and Conducted Emissions tests are currently registered with Industry Canada under Registration Numbers: 3062A-1, 3062A-2, and 3062A-3.

BACL is a Chinese Taipei Bureau of Standards Metrology and Inspection (BSMI) validated Conformity Assessment Body (CAB), under Appendix B, Phase I Procedures of the APEC Mutual Recognition Arrangement (MRA). BACL's BSMI Lab Code Number is: SL2-IN-E-1002R

BACL's test facilities that are used to perform AC Line Conducted Emissions, Telecommunications Line Conducted Emissions, Radiated Emissions from 30 MHz to 1 GHz, and Radiated Emissions from 1 GHz to 6 GHz are currently recognized as Accredited in accordance with the Voluntary Control Council for Interference [VCCI] Article 15 procedures under Registration Number A-0027.

## 1.8 Test Facility Accreditations

Bay Area Compliance Laboratories Corp. (BACL) is:

**A- An independent, 3<sup>rd</sup>-Party, Commercial Test Laboratory accredited to ISO/IEC 17025:2017 by A2LA (Test Laboratory Accreditation Certificate Number 3297.02)**, in the fields of: Electromagnetic Compatibility and Telecommunications. Unless noted by an Asterisk (\*) in the Compliance Matrix (See Section 3 of this Test Report), BACL's ISO/IEC 17025:2017 Scope of Accreditation includes all of the Test Method Standards and/or the Product Family Standards detailed in this Test Report.

BACL's ISO/IEC 17025:2017 Scope of Accreditation includes a comprehensive suite of EMC Emissions, EMC Immunity, Radio, RF Exposure, Safety and wireline Telecommunications test methods applicable to a wide range of product categories. These product categories include Central Office Telecommunications Equipment [including NEBS - Network Equipment Building Systems], Unlicensed and Licensed Wireless and RF devices, Information Technology Equipment (ITE); Telecommunications Terminal Equipment (TTE); Medical Electrical Equipment; Industrial, Scientific and Medical Test Equipment; Professional Audio and Video Equipment;

Industrial and Scientific Instruments and Laboratory Apparatus; Cable Distribution Systems, and Energy Efficient Lighting.

**B- A Product Certification Body accredited to ISO/IEC 17065:2012 by A2LA (Product Certification Body Accreditation Certificate Number 3297.03) to certify**

- For the USA (Federal Communications Commission):
  - 1- All Unlicensed radio frequency devices within FCC Scopes A1, A2, A3, and A4;
  - 2- All Licensed radio frequency devices within FCC Scopes B1, B2, B3, and B4;
  - 3- All Telephone Terminal Equipment within FCC Scope C.
- For the Canada (Industry Canada):
  - 1 All Scope 1-Licence-Exempt Radio Frequency Devices;
  - 2 All Scope 2-Licensed Personal Mobile Radio Services;
  - 3 All Scope 3-Licensed General Mobile & Fixed Radio Services;
  - 4 All Scope 4-Licensed Maritime & Aviation Radio Services;
  - 5 All Scope 5-Licensed Fixed Microwave Radio Services
  - 6 All Broadcasting Technical Standards (BETS) in the Category I Equipment Standards List.
- For Singapore (Info-Communications Development Authority (IDA)):
  - 1 All Line Terminal Equipment: All Technical Specifications for Line Terminal Equipment – Table 1 of IDA MRA Recognition Scheme: 2011, Annex 2
  2. All Radio-Communication Equipment: All Technical Specifications for Radio-Communication Equipment – Table 2 of IDA MRA Recognition Scheme: 2011, Annex 2
- For the Hong Kong Special Administrative Region:
  - 1 All Radio Equipment, per KHCA 10XX-series Specifications;
  - 2 All GMDSS Marine Radio Equipment, per HKCA 12XX-series Specifications;
  - 3 All Fixed Network Equipment, per HKCA 20XX-series Specifications.
- For Japan:
  - 1 MIC Telecommunication Business Law (Terminal Equipment):
    - All Scope A1 - Terminal Equipment for the Purpose of Calls;
    - All Scope A2 - Other Terminal Equipment
  - 2 Radio Law (Radio Equipment):
    - All Scope B1 - Specified Radio Equipment specified in Article 38-2-2, paragraph 1, item 1 of the Radio Law
    - All Scope B2 - Specified Radio Equipment specified in Article 38-2-2, paragraph 1, item 2 of the Radio Law
    - All Scope B3 - Specified Radio Equipment specified in Article 38-2-2, paragraph 1, item 3 of the Radio Law

**C- A Product Certification Body accredited to ISO/IEC 17065:2012 by A2LA (Product Certification Body Accreditation Certificate Number 3297.01) to certify Products to USA's Environmental Protection Agency (EPA) ENERGY STAR Product Specifications for:**

- 1 Electronics and Office Equipment:
  - for Telephony (ver. 3.0)
  - for Audio/Video (ver. 3.0)
  - for Battery Charging Systems (ver. 1.1)
  - for Set-top Boxes & Cable Boxes (ver. 4.1)
  - for Televisions (ver. 6.1)
  - for Computers (ver. 6.0)
  - for Displays (ver. 6.0)
  - for Imaging Equipment (ver. 2.0)
  - for Computer Servers (ver. 2.0)
- 2 Commercial Food Service Equipment
  - for Commercial Dishwashers (ver. 2.0)
  - for Commercial Ice Machines (ver. 2.0)
  - for Commercial Ovens (ver. 2.1)
  - for Commercial Refrigerators and Freezers

- 3 Lighting Products
  - For Decorative Light Strings (ver. 1.5)
  - For Luminaires (including sub-components) and Lamps (ver. 1.2)
  - For Compact Fluorescent Lamps (CFLs) (ver. 4.3)
  - For Integral LED Lamps (ver. 1.4)
- 4 Heating, Ventilation, and AC Products
  - for Residential Ceiling Fans (ver. 3.0)
  - for Residential Ventilating Fans (ver. 3.2)
- 5 Other
  - For Water Coolers (ver. 3.0)

**D- A NIST Designated Phase-I and Phase-II Conformity Assessment Body (CAB) for the following economies and regulatory authorities under the terms of the stated MRAs/Treaties:**

- Australia: ACMA (Australian Communication and Media Authority) – APEC Tel MRA -Phase I;
- Canada: (Innovation, Science and Economic development Canada - ISEDC) Foreign Certification Body – FCB – APEC Tel MRA -Phase I & Phase II;
- Chinese Taipei (Republic of China – Taiwan):
  - o BSMI (Bureau of Standards, Metrology and Inspection) APEC Tel MRA -Phase I;
  - o NCC (National Communications Commission) APEC Tel MRA -Phase I;
- European Union:
  - o EMC Directive 2014/30/EU US-EU EMC & Telecom MRA CAB (NB)
  - o Radio Equipment (RE) Directive 2014/53/EU US-EU EMC & Telecom MRA CAB (NB)
  - o Low Voltage Directive (LVD) 2014/35/EU
- Hong Kong Special Administrative Region: (Office of the Telecommunications Authority – OFTA) APEC Tel MRA -Phase I & Phase II
- Israel – US-Israel MRA Phase I
- Republic of Korea (Ministry of Communications - Radio Research Laboratory) APEC Tel MRA -Phase I
- Singapore: (Infocomm Media Development Authority - IMDA) APEC Tel MRA -Phase I & Phase II;
- Japan: VCCI - Voluntary Control Council for Interference US-Japan Telecom Treaty VCCI Side Letter-
- USA:
  - o ENERGY STAR Recognized Test Laboratory – US EPA
  - o Telecommunications Certification Body (TCB) – US FCC;
  - o Nationally Recognized Test Laboratory (NRTL) – US OSHA
- Vietnam: APEC Tel MRA -Phase I;

## 2 System Test Configuration

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### 2.1 Justification

The EUT was configured for testing according to ANSI C63.26-2015:

### 2.2 EUT Exercise Software

The EUT was transmitting using TeraTerm.

TX:

| Frequency<br>(MHz) | Power   |
|--------------------|---------|
| 1616.02            | Default |



### 2.3 Equipment Modifications

None.

### 2.4 Power Supply

None.

### 2.5 Local Support Equipment

| Manufacturers | Descriptions | Models          | Serial Numbers |
|---------------|--------------|-----------------|----------------|
| Dell          | Laptop       | Latitude E6440A | -              |

### 2.6 Remote Support Equipment

None.

### 2.7 Interface Ports and Cabling

| Cable Description | Length (m) | From | To     |
|-------------------|------------|------|--------|
| USB Cable         | <1m        | EUT  | Laptop |

### 3 Summary of Test Results

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Results reported relate only to the product tested.

| Rules   | Description of Test | Results   |
|---|---------------------|-----------|
| FCC CFR 47 Part 25, Clause 25.204,<br>ISED RSS-170 Clause 5.5 | Output Power        | Compliant |

Note: for original conducted data, please refer to original certification for FCC ID: Q639603N, IC: 4629A-9603N, Report No: 75926443 Report 05 Issue 2.

*BACL is responsible for all the information provided in this report, except when information is provided by the customer as identified in this report. Information provided by the customer, e.g., antenna gain, can affect the validity of results.*

## 4 FCC 47 CFR §25.204, ISEDC RSS-170 §5.5– Power Limits for earth stations

### 4.1 Applicable Standards

As per FCC 25.204:

In bands shared coequally with terrestrial radio communication services, the equivalent isotropically radiated power transmitted in any direction towards the horizon by an earth station, other than an ESV, operating in frequency bands between 1 and 15 GHz, shall not exceed the following limits except as provided for in paragraph (c) of this section:

+ 40 dBW in any 4 kHz band for  $\theta \leq 0^\circ$

+ 40 + 30 dBW in any 4 kHz band for  $0^\circ < \theta \leq 5^\circ$

As per ISEDC RSS-170 Clause 5.3:

The application for MES certification shall state the e.i.r.p. that the MES must have for satisfactory communication. The maximum permissible e.i.r.p. will be the stated e.i.r.p. plus a 2 dB margin. If a detachable antenna is used, the application for certification shall state the recommended antenna type and manufacturer, the antenna gain, and the maximum transmitter output power at the antenna terminal.

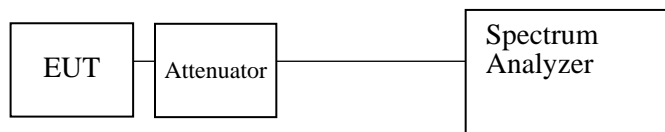
### 4.2 Test Procedure

For conducted power, the EUT was connected to a spectrum analyzer via a cable and attenuator. The path loss was measured using a spectrum analyzer and added as an offset to the measurement.

The spectrum analyzer was configured with an RBW of 3 kHz and VBW of 10 kHz.  $10\text{Log}(4/3) = 1.25$  dB was added to the reference level offset to make the result relative to a 4 kHz band as per the requirement in 25.204(a).

The transmit power was measured over the active part of the burst using a peak detector, the spectrum analyzer was set to max hold and the peak result recorded.

### 4.3 Test Setup Diagram



### 4.4 Test Environmental Conditions

|                           |           |
|---------------------------|-----------|
| <b>Temperature:</b>       | 25 °C     |
| <b>Relative Humidity:</b> | 43 %      |
| <b>ATM Pressure:</b>      | 101.8 kPa |

The testing was performed by Will Hu on 2024-05-03 at RF area.

### 4.5 Test Equipment List and Details

| BACL Number | Manufacturer | Description       | Model  | Serial Number | Calibration Date       | Calibration Interval |
|-------------|--------------|-------------------|--------|---------------|------------------------|----------------------|
| 624         | Agilent      | Spectrum Analyzer | E4446A | MY48250238    | 2023-05-12             | 1 year               |
| -           | -            | 20dB attenuator   | -      | -             | Each time <sup>1</sup> | N/A                  |
| -           | -            | RF cable          | -      | -             | Each time <sup>1</sup> | N/A                  |

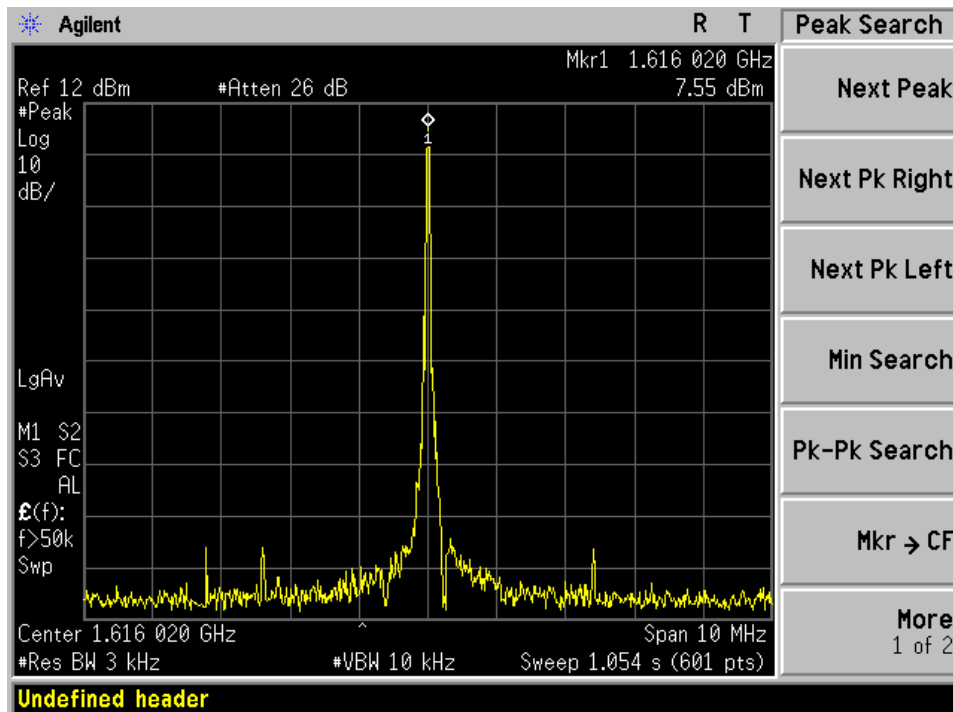
Note<sup>1</sup>: cable and attenuator included in the test set-up will be checked each time before testing.

**Statement of Traceability: BACL Corp.** attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with the latest version of A2LA policy P102 "A2LA Policy on Metrological Traceability".

### 4.6 Test Results

| Frequency (MHz) | Conducted Power (dBW/4kHz) | EIRP (dBW/4kHz) | EIRP Limit (dBW/4kHz) |
|-----------------|----------------------------|-----------------|-----------------------|
| 1616.02         | 1                          | 3.2             | 40                    |

Please refer to below graph for test data:



Note: Offset (dB) = 20.4dB (attenuation) + 1.8dB (cable loss) + 1.25 dB=23.45dB

Power (dBm) = 7.55 dBm/3kHz +23.45dB = 31dBm/4kHz = 1 dBW/4kHz

Note: antenna gain is 2.2dBi per antenna specs provided by client. EIRP is sum of power and antenna gain.

## **5 Annex A - EUT External Photographs**

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Please refer to the attachment

## **6 Annex B - EUT Internal Photographs**

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Please refer to the attachment

# 7 Annex C (Normative) - A2LA Electrical Testing Certificate



## Accredited Laboratory

A2LA has accredited

### BAY AREA COMPLIANCE LABORATORIES CORP.

Sunnyvale, CA

for technical competence in the field of

### Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories. This laboratory also meets A2LA R222 - Specific Requirements EPA ENERGY STAR Accreditation Program. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).

Presented this 21<sup>st</sup> day of December 2022.



Mr. Trace McInturff, Vice President, Accreditation Services  
For the Accreditation Council  
Certificate Number 3297.02  
Valid to September 30, 2024

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.

Please follow the web link below for a full ISO 17025 scope

<https://www.a2la.org/scopepdf/3297-02.pdf>

--- END OF REPORT ---