



# Datasheet

Vela IF310

*Version 0.1*

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Revision History

| Version | Date        | Notes               | Contributors | Approver    |
|---------|-------------|---------------------|--------------|-------------|
| 1.0     | 25 Oct 2025 | Preliminary release | Jacky Kuo    | Andrew Chen |
|         |             |                     |              |             |
|         |             |                     |              |             |
|         |             |                     |              |             |
|         |             |                     |              |             |

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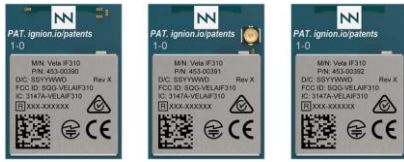
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## 1 Scope

This document describes the key hardware aspects of the Ezurio Vela IF310 Series wireless modules providing high-speed 4-wire UART interface for Bluetooth® / Bluetooth® LE connections. This document is intended to assist device manufacturers and related parties with the integration of this radio into their host devices. Data in this document is drawn from several sources and includes information found in the Infineon CYW55310 data sheet issued on February 21, 2023, along with other documents provided by Infineon.

**Note:** The information in this document is subject to change. Please contact Ezurio to obtain the most recent version of this document.



## 2 General Description

Built on Infineon's AIROC™ CYW55310, the Vela IF310 brings together Bluetooth Classic (BR/EDR) and the full Bluetooth 6.0 LE feature set—including LE Audio with LC3, Isochronous Channels, Auracast, LE Coded & 2 MPHY and Advertising Extensions—so you can refresh legacy Classic designs and embrace the latest LE Audio opportunities with one module.

A 192 MHz ARM® Cortex-M33, integrated audio interfaces, up to +10 dBm output power and a very flexible HCI UART interface for a variety of hosted/hostless SW architecture options deliver a low-risk, fast-to-market platform for demanding medical or industrial audio and data applications.

Engineered for high-reliability environments, the Vela IF310 is the answer to connectivity challenges where failure is not an option. Whether it's minimizing downtime in clinical settings or ensuring interference-resistant audio in industrial spaces, this module is built to perform. Its rugged -40 °C to +85 °C operation, robust security features including TrustZone® and CryptoCell-312, and versatile footprint options reflect Ezurio's commitment to dependable, application-ready solutions. Combined with our personal, hands-on support through every stage of development, the Vela IF310 doesn't just deliver technology—it delivers peace of mind.

**Table 1: Product ordering information**

| Part         | Description                                             |
|--------------|---------------------------------------------------------|
| 453-00390R   | Module, Vela IF310, Integrated Antenna, Tape and Reel   |
| 453-00390C   | Module, Vela IF310, Integrated Antenna, Cut Tape        |
| 453-00391R   | Module, Vela IF310, MHF4, Tape and Reel                 |
| 453-00391C   | Module, Vela IF310, MHF4, Cut Tape                      |
| 453-00392R   | Module, Vela IF310, Trace Pin, Tape and Reel            |
| 453-00392C   | Module, Vela IF310, Trace Pin, Cut Tape                 |
| 453-00390-K1 | Development Kit, Module, Vela IF310, Integrated Antenna |
| 453-00391-K1 | Development Kit, Module, Vela IF310, MHF4               |

### 3 Features Summary

The Ezurio Vela IF310 series device features are described in [Table 2](#).

**Table 2: Vela IF310 series wireless module features**

| Feature                      | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Variants</b>              | <ul style="list-style-type: none"> <li>Integrated Ignition antenna variant</li> <li>MHF4 connector variant</li> <li>Trace Pin variant</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Bluetooth subsystem</b>   | <ul style="list-style-type: none"> <li>Complies with Bluetooth® core specification version 6.0</li> <li>Includes support for basic data rate (BR), EDR 2 Mbps and 3 Mbps, extended synchronous connection-oriented</li> <li>Bluetooth® LE 1 Mbps, 2 Mbps and LE Long Range (LE-LR)</li> <li>Up to 10dBm EIRP output power</li> <li>Excellent receiver sensitivity (-108 dBm for Bluetooth® LE-LR-S8 125 Kbps)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Microcontroller (MCU)</b> | <ul style="list-style-type: none"> <li>Powerful Arm® Cortex®-M33 core</li> <li>Bluetooth® stack in ROM allowing standalone operation without any external MCU</li> <li>2-MB on-chip ROM memory for program storage and boot ROM</li> <li>768-KB on-chip RAM memory for data scratch-pad and patch RAM code</li> <li>AES-128 security system</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Peripherals</b>           | <ul style="list-style-type: none"> <li>Up to 22 GPIOs</li> <li>TDM, I2S, PCM and UART interfaces</li> <li>I2C<sup>1</sup> and Wi-Fi coexistence<sup>1</sup> supports</li> <li>HFP codec interface controller: <ul style="list-style-type: none"> <li>Supported by PCM and I2S transports and bidirectional operations.</li> <li>Supported by PCM <ul style="list-style-type: none"> <li>Sample rates 8k for NBS and 16k for wideband speech (WBS) supported.</li> <li>Sample width is limited to 16-bits.</li> <li>Synchronization clock width of 1 or 3 (short or long).</li> <li>Bit clocks of 128k, 256k, 512k, 1024k and 2048k.</li> </ul> </li> <li>Support by I2S <ul style="list-style-type: none"> <li>Support bit clocks of 256k (NBS) and 512k (WBS).</li> </ul> </li> </ul> </li> <li>A2DP codec controller: <ul style="list-style-type: none"> <li>Supported by I2S transport in a single direction, either in or out but not both.</li> <li>Two channels, left and right. Mono is not support.</li> <li>Sample rate: 44.1k or 48k.</li> <li>Sample width is limited to 16-bits.</li> <li>Supports bit clocks of 32 times the sample rate, 1.4112M (44.1k) or 1.536M (48k) and not adjustable.</li> </ul> </li> </ul> |
| <b>Power management</b>      | <ul style="list-style-type: none"> <li>On-chip power-on reset (POR)</li> <li>Integrated buck (DC-DC) and low drop out (LDO) regulators</li> <li>On-chip software-controlled power management unit</li> <li>On-chip 32 kHz low power oscillator (LPO) with optional external 32 kHz crystal oscillator support</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

**Note<sup>1</sup>,** The I<sup>2</sup>C interface and the Wi-Fi coexistence pins are multiplexed with the BT\_GPIO pins. In the default firmware configuration, both functions cannot be supported.

## 4 Specifications

Table 3: Vela IF310 Specifications

| Feature                                                 | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Physical Interface                                      | 84-pin LGA package (Including 4 thermal ground pads under the package)                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Bluetooth/BLE Interface                                 | Host Controller Interface (HCI) using high speed UART                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Main Chip                                               | Infineon CYW55310UBGT<br>143-pin WLBGA package (Including 4 thermal ground pads under the package)                                                                                                                                                                                                                                                                                                                                                                                                                |
| Input Voltage Requirements                              | 3.3V Typ., 3.0V Min., 4.8V Max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| I/O Signalling Voltage                                  | Set to 1.8V only, by the power domains connected to VDDIO                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Operating Temperature                                   | -40° to +85°C (-40° to +185°F)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Operating Humidity                                      | Less than 85% RH (non-condensing)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Storage Temperature                                     | -40° to +125°C (-40° to +257°F)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Storage Humidity                                        | Less than 60% RH (non-condensing)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| MSL (Moisture Sensitivity Level)                        | 4 (module), N/A (DVK)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Maximum Electrostatic Discharge                         | 4kV Indirect application (In compliance with EN 301489)                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Size – mm                                               | All variants: 16mm x 12mm x 1.9 mm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Weight – g (oz.)                                        | 0.00059g (Integrated Antenna)<br>0.00060g (MHF4)<br>0.00059g (Trace Pin)                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Bluetooth Media                                         | Frequency Hopping Spread Spectrum (FHSS)                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Bluetooth Standards                                     | Bluetooth Core 6.0 (at point of launch)                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Bluetooth Data Rates Supported                          | 1, 2, 3 Mbps, 500 Kbps, 125 Kbps                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Bluetooth Modulation                                    | GFSK @ 1 Mbps (BR)<br>$\pi/4$ -DQPSK @ 2 Mbps (EDR)<br>8-DPSK @ 3 Mbps (EDR)<br>GFSK @ LE-1 Mbps, LE-2 Mbps, LE-LR-500 Kbps, LE-LR-125 Kbps                                                                                                                                                                                                                                                                                                                                                                       |
| Regulatory Certifications                               | FCC, IC, CE, UKCA, RCM, Japan, and Korea, Bluetooth SIG                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Compliance                                              | <div> <b>ACMA</b><br/>AS/NZS 2772.2:2016 Amd 1:2018<br/>AS/NZS 4268:2017+Amd 1:2021 </div> <div> <b>CE</b><br/>EN 62479:2010<br/>EN 50663:2017<br/>EN 300 328 V2.2.2<br/>EN 62368-1 </div> <div> <b>EMC</b><br/>ICES-003 Issue 7, Class B<br/>EN 301 489-1 V2.2.3<br/>EN 301 489-17 V3.2.4 </div> <div> <b>FCC</b><br/>FCC Part 15, Subpart B, Class B<br/>47 CFR FCC Part 2.1091<br/>47 CFR FCC Part 15.247 </div> <div> <b>Japan</b><br/>Article 2 Paragraph 1 Item 19 </div> <div> <b>Korea</b><br/>TBD </div> |
| Certifications                                          | Bluetooth® SIG Qualification                                                                                                                                                                                                                                                                                                                                                                                                   |
| Warranty                                                | One Year Warranty                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| All specifications are subject to change without notice |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

已註解 [JK1]: @Jacky Kuo this reads like the chipset itself, rather than the module?

已註解 [JK2R1]: This is indeed describing the pinout of the Vela IF310 module; please refer to page 26 of that specification. The CYW55310 chip uses a 143-pin WLBGA (Wafer-Level Ball Grid Array) package, not an LGA (Land Grid Array) package.

已註解 [JK3R1]: @Dave Drogowski please move this text to inside the main Chip row and then delete this row.

已註解 [DD4R1]: So it sounds like, based on the above description, the module should bbe an 84-pin LGA package and the chip should be a 143-pin WLBGA package? Let me know if I'm understanding this correctly. I can remove the physical interface row but I figure better to have something there...

## 5 Frequency Reference

The Vela IF310 module **requires** a 32.768 KHz reference oscillator for the sleep clock. An external 32.768 KHz precision oscillator which meets the requirements listed in **Table 4** **must be used**.

**Table 4: External 32.768 KHz sleep clock specification**

| Parameter                             | LPO clock                | Unit    |
|---------------------------------------|--------------------------|---------|
| Nominal input frequency               | 32.768                   | KHz     |
| Frequency accuracy                    | ±250                     | ppm     |
| Duty cycle                            | 30-70                    | %       |
| Input signal amplitude                | 200-3300                 | mV, p-p |
| Signal type                           | Square-wave or sine-wave | -       |
| Input impedance                       | > 100 K                  | Ω       |
|                                       | < 5                      | pF      |
| Clock jitter (during initial startup) | < 10000                  | ppm     |

## 6 Block Diagram

The Vela IF310 uses Infineon's CYW55310 chipset, which is highly integrated. The module provides three types of RF connectivity options: RF connector type (, PCB printed antenna type, and Trace pin type , to accommodate different application needs. In addition, its simplified external circuitry helps reduce overall product size. The module only requires two power inputs, 3.3V and 1.8V, a 32.768 kHz signal, and a "BT\_REG\_ON" control signal. Vela IF310 provides a wide range of comprehensive interfaces to meet customer application requirements and achieves a highly integrated module in an ultra-compact size (12 mm x 16 mm).

Figure 1 shows the block diagram of the Vela IF310 module.

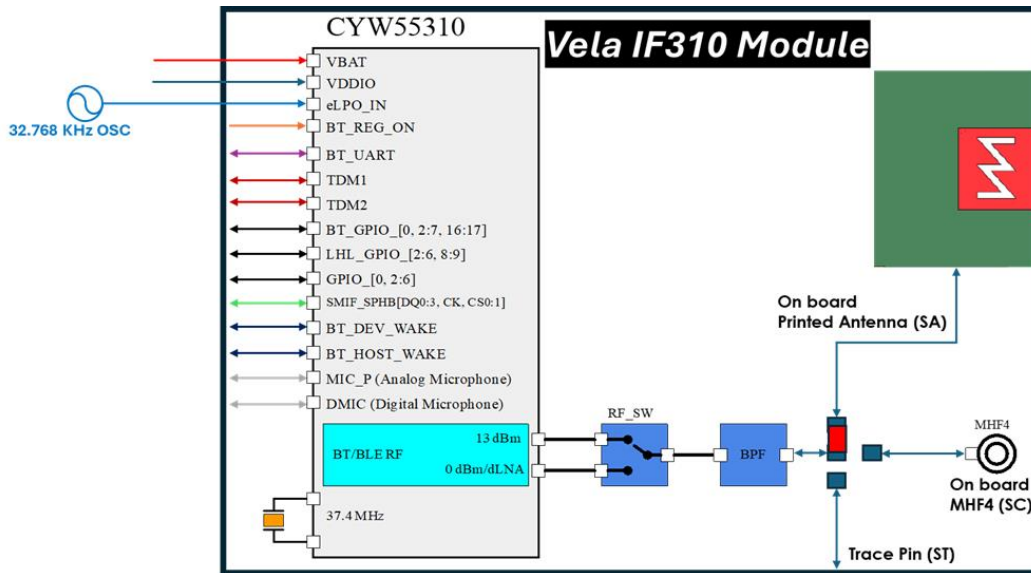


Figure 1: Vela IF310 Module Block diagram

## 7 Electrical Characteristics

### 7.1 Absolute Maximum Ratings

Table 5 summarizes the absolute maximum ratings, and Table 6 lists the recommended operating conditions for the Vela IF310 series wireless module. Absolute maximum ratings are the values beyond which permanent damage to the device may occur. Operating the device outside the specified maximum ratings or recommended operating conditions may cause damage and void the warranty.

**Note:** Maximum rating for signals follows the supply domain of the signals.

Table 5: Absolute maximum ratings

| Symbol | Parameter                            | Minimum | Typical | Maximum | Unit |
|--------|--------------------------------------|---------|---------|---------|------|
| VBAT   | Power supply for Internal Regulators | -0.5    |         | 6.0     | V    |
| VDDIO  | DC supply voltage for digital I/O    | -0.5    |         | 2.2     | V    |

### 7.2 Recommended Operating Conditions

Table 6: Recommended operating conditions

| Symbol (Domain) | Parameter                            | Min              | Typ | Max  | Unit |
|-----------------|--------------------------------------|------------------|-----|------|------|
| VBAT            | Power supply for Internal Regulators | 3.0 <sup>2</sup> | 3.3 | 4.8  | V    |
| VDDIO           | DC supply voltage for digital I/O    | 1.71             | 1.8 | 1.89 | V    |
| T-ambient       | Ambient temperature                  | -40              | 25  | 85   | °C   |

**Note<sup>2</sup>:** IF310 is functional across this range of voltage. Optimal RF performance specified in the data sheet, however, is guaranteed only for 3.13 V < VBAT < 3.5 V.

### 7.3 General DC Electrical Characteristics

Table 7 list the general DC electrical characteristics over recommended operating conditions (unless otherwise specified).

Table 7: General DC electrical characteristics (VDDIO supply voltage operating range is defined in Table 6)

| Symbol                        | Parameter                        | Min          | Typ | Max          | Unit |
|-------------------------------|----------------------------------|--------------|-----|--------------|------|
| Digital I/O pins <sup>3</sup> | Input high voltage (VIH)         | 0.65 x VDDIO | —   | —            | V    |
|                               | Input low voltage (VIL)          | —            | —   | 0.35 x VDDIO |      |
|                               | Output high voltage @ 2 mA (VOH) | VDDIO-0.4V   | —   | —            |      |
|                               | Output low voltage @ 2 mA (VOL)  | —            | —   | 0.45         |      |
| BT_REG_ON pins                | Input high voltage               | 1.2          | —   | VBAT         | V    |
|                               | Input low voltage                | —            | —   | 0.3          |      |

**Note<sup>3</sup>:** Programmable 2 mA to 16 mA drive strength. Default is 10 mA.



## 8 RF Characteristics

### 8.1 Bluetooth Radio Characteristics

Table 8 through Table 11 describe the Bluetooth Basic Rate (BR) / EDR / BLE transmitter performance and receiver performance, and current consumption conditions at 25°C.

Table 8: Basic Rate (BR) and EDR transmitter performance (VBAT = 3.3V, VDDIO = 1.8V)

| Test Parameter                                           | Conditions | Min  | Typ | Max  | Bluetooth Spec.         | Unit |
|----------------------------------------------------------|------------|------|-----|------|-------------------------|------|
| Frequency Range                                          | —          | 2402 | —   | 2480 | $2400 \leq f \leq 2480$ | MHz  |
| TX Output Power <sup>4</sup><br>(Test at MHF4 connector) | BR         | —    | 5   | 6.5  | ~ +20                   | dBm  |
|                                                          | EDR 2M     | —    | 2.5 | 4    |                         |      |
|                                                          | EDR 3M     | —    | 2.5 | 4    |                         |      |
| Max EIRP                                                 | —          | —    | —   | 10   | —                       | dBm  |

Table 9: Basic Rate (BR) receiver performance (VBAT = 3.3V, VDDIO = 1.8V)

| Test Parameter                | Conditions                      | Min  | Typ | Max   | Bluetooth Spec.         | Unit |
|-------------------------------|---------------------------------|------|-----|-------|-------------------------|------|
| Frequency Range               | —                               | 2402 | —   | 2480  | $2400 \leq f \leq 2480$ | MHz  |
| RX Sensitivity <sup>5,6</sup> | GFSK, BER $\leq 0.1\%$ , 1 Mbps | —    | -91 | -89.5 | $\leq -70$              | dBm  |
| Maximum Input                 | —                               | —    | —   | -20   | $\geq -20$              | dBm  |

Table 10: Enhanced Data Rate (EDR) receiver performance (VBAT = 3.3V, VDDIO = 1.8V)

| Test Parameter                | Conditions                                 | Min  | Typ   | Max  | Bluetooth Spec.         | Unit |
|-------------------------------|--------------------------------------------|------|-------|------|-------------------------|------|
| Frequency Range               | —                                          | 2402 | —     | 2480 | $2400 \leq f \leq 2480$ | MHz  |
| RX Sensitivity <sup>5,6</sup> | $\pi/4$ -DQPSK, BER $\leq 0.01\%$ , 2 Mbps | —    | -93.5 | -92  | $\leq -70$              | dBm  |
|                               | 8-DPSK, BER $\leq 0.01\%$ , 3 Mbps         | —    | -87.5 | -86  | $\leq -70$              | dBm  |

Table 11: Bluetooth LE RF Specifications (VBAT = 3.3V, VDDIO = 1.8V)

| Parameter                                                | Conditions                        | Min  | Typ   | Max    | Unit |
|----------------------------------------------------------|-----------------------------------|------|-------|--------|------|
| Frequency range                                          | —                                 | 2402 | —     | 2480   | MHz  |
| Rx sensitivity <sup>5,6</sup>                            | GFSK, 30.8% PER, 1 Mbps           | —    | -97   | -95.5  | dBm  |
|                                                          | GFSK, 30.8% PER, 2 Mbps           | —    | -93.5 | -92    |      |
|                                                          | GFSK, 30.8% PER, 500 Kbps (S = 2) | —    | -102  | -100.5 |      |
|                                                          | GFSK, 30.8% PER, 125 Kbps (S = 8) | —    | -107  | -105.5 |      |
| TX Output Power <sup>4</sup><br>(Test at MHF4 connector) | 1 Mbps                            | —    | 5     | 6.5    | dBm  |
|                                                          | 2 Mbps                            | —    | 5     | 6.5    |      |
|                                                          | 500 Kbps (S = 2)                  | —    | 5     | 6.5    |      |
|                                                          | 125 Kbps (S = 8)                  | —    | 5     | 6.5    |      |
| Max EIRP                                                 | —                                 | —    | —     | 10     | dBm  |

**Note<sup>4</sup>:** The Bluetooth LE TX power cannot exceed 10 dBm EIRP specification limit. The front-end losses and antenna gain/loss must be factored in so as not to exceed the limit.

**Note<sup>5</sup>:** Dirty TX is off.

**Note<sup>6</sup>:** Tolerance could be up to +/- 2.5 dB across operating temperature.

### 8.2 Transmitter and Receiver Current Consumption

All measured current consumption values are based on the specifications in Section 8.1:

- BR/EDR TX current consumption is measured at the “Max” output power defined in Table 8.
- BR/EDR RX current consumption measurement is performed with the DUT in continuous receiving mode.

已註解 [JK5]: @Jonathan Kays Since the PCB printed antenna designed by Ignition has a gain greater than 3 dBi, the transmit power for BR and LE must not exceed 6 dBm in order to avoid adaptivity testing.

已註解 [JK6R5]: @Jonathan Kays @Dave Drogowski Update the BR/LE/LE-LR Tx power specifications to a maximum of 6.5 dBm. Increase the maximum allowable output power by 0.5 dB to provide additional margin, and the total remains within 10 dBm even when combined with the maximum antenna gain.

- LE and LE-LR TX current consumption is measured at the "Max" output power defined in [Table 11](#).
- LE and LE-LR RX current consumption measurement is performed with the DUT in continuous receiving mode.

Table 12: Bluetooth and Bluetooth LE current consumption

| Operating Mode | Data Rate      | VBAT = 3.3V | VDDIO = 1.8V | Unit |
|----------------|----------------|-------------|--------------|------|
| Transmitter    | DH5            | 19.31       | 0.1          | mA   |
|                | 2DH5           | 19.67       | 0.1          |      |
|                | 3DH5           | 19.67       | 0.1          |      |
|                | LE 1 Mbps      | 17.36       | 0.1          |      |
|                | LE 2 Mbps      | 15.34       | 0.1          |      |
|                | LE-LR 500 Kbps | 15.14       | 0.1          |      |
|                | LE-LR 125 Kbps | 20.14       | 0.1          |      |
| Receiver       | DH5            | 9.26        | 0.1          | mA   |
|                | 2DH5           | 9.34        | 0.1          |      |
|                | 3DH5           | 9.35        | 0.1          |      |
|                | LE 1 Mbps      | 9.91        | 0.1          |      |
|                | LE 2 Mbps      | 10.25       | 0.1          |      |
|                | LE-LR 500 Kbps | 10.89       | 0.1          |      |
|                | LE-LR 125 Kbps | 10.89       | 0.1          |      |

**Note:** Current consumption is measured at average of the TX-on time

## 9 Host Interface Specifications

### 9.1 High-Speed UART Specifications

The Vela IF310 UART is a standard 4-wire interface (RX, TX, RTS, and CTS) with adjustable baud rates from 9600 bps to 4.0 Mbps. The UART supports the Bluetooth® HCI UART specification. The default baud rate is 115.2 Kbaud.

Table 13: UART timing specifications

| Reference | Characteristics                                            | Min | Typ | Max | Units       |
|-----------|------------------------------------------------------------|-----|-----|-----|-------------|
| 1         | Delay time, BT_UART_CTS_N low to BT_UART_TXD valid         | —   | —   | 1.5 | Bit periods |
| 2         | Setup time, BT_UART_CTS_N high before midpoint of stop bit | —   | —   | 0.5 |             |
| 3         | Delay time, midpoint of stop bit to BT_UART_RTS_N high     | —   | —   | 0.5 |             |

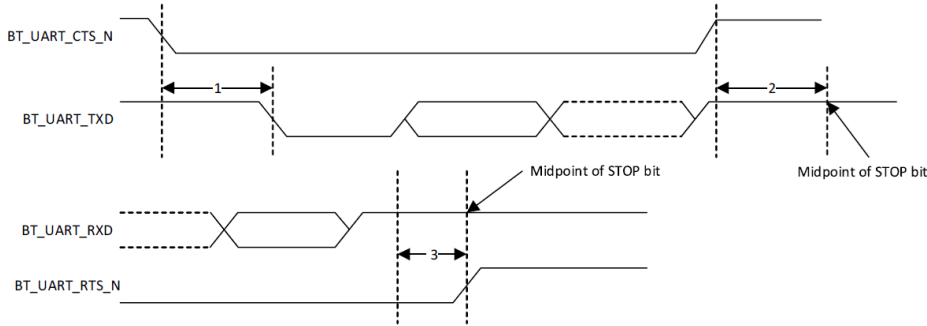


Figure 2: UART timing diagram

### 9.2 PCM Interface

The Vela IF310 supports two independent PCM interfaces that share the pins with the I2S interfaces. The PCM interface can connect to linear PCM codec devices in master/slave mode. In master mode, IF310 generates the BT\_PCM\_CLK and BT\_PCM\_SYNC signals, and in slave mode, these signals are provided by another master on the PCM interface and are inputs to IF310.

Figure 3 and Table 13 show the PCM timing diagram and specifications in the Master mode, while Figure 4 and Table 14 show the PCM timing and specifications in the Slave mode.

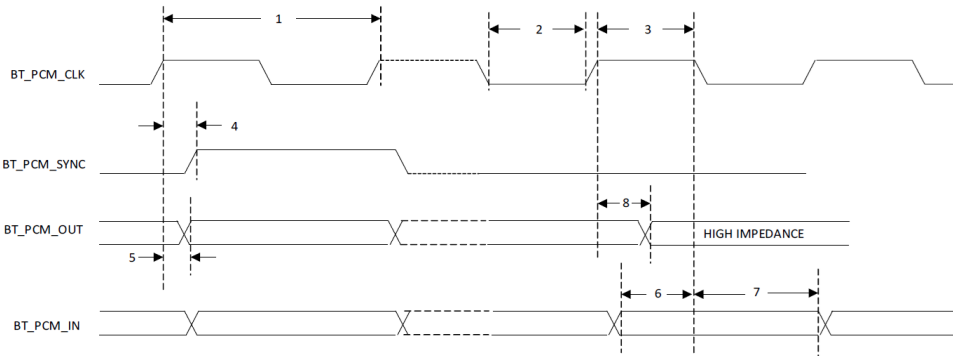


Figure 3: PCM timing diagram (Short frame sync, master mode)

Table 14: PCM interface timing specifications (Short frame sync, master mode)

| Reference | Characteristics                                                                                   | Min | Typ | Max  | Units |
|-----------|---------------------------------------------------------------------------------------------------|-----|-----|------|-------|
| 1         | PCM bit clock frequency                                                                           | —   |     | 12.0 | MHz   |
| 2         | PCM bit clock LOW                                                                                 | 41  |     | —    |       |
| 3         | PCM bit clock HIGH                                                                                | 41  |     | —    |       |
| 4         | BT_PCM_SYNC delay                                                                                 | 0   |     | 25.0 |       |
| 5         | BT_PCM_OUT delay                                                                                  | 0   | —   | 25.0 | ns    |
| 6         | BT_PCM_IN setup                                                                                   | 8.0 |     | —    |       |
| 7         | BT_PCM_IN hold                                                                                    | 8.0 |     | —    |       |
| 8         | Delay from rising edge of BT_PCM_CLK during last bit period to BT_PCM_OUT becoming high impedance | 0   |     | 25.0 |       |

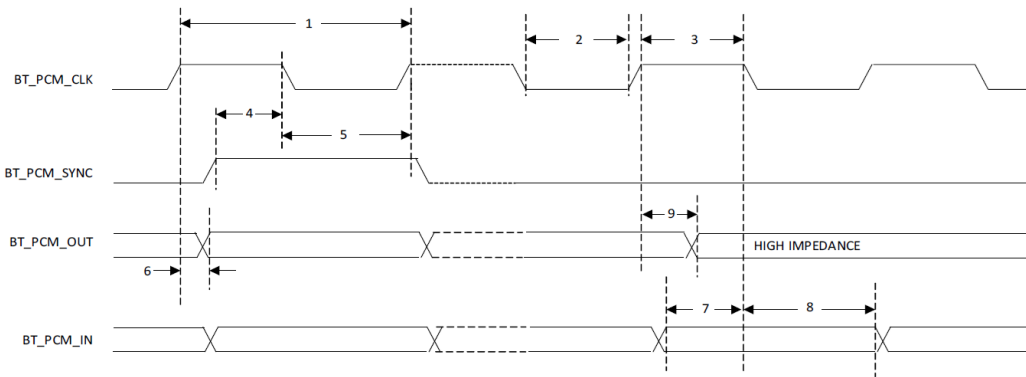


Figure 2: PCM timing diagram (Short frame sync, slave mode)

Table 15: PCM interface timing specifications (Short frame sync, slave mode)

| Reference | Characteristics                                                                                   | Min  | Typ | Max  | Units |
|-----------|---------------------------------------------------------------------------------------------------|------|-----|------|-------|
| 1         | PCM bit clock frequency                                                                           | —    |     | 12.0 | MHz   |
| 2         | PCM bit clock LOW                                                                                 | 41.0 |     | —    |       |
| 3         | PCM bit clock HIGH                                                                                | 41.1 |     | —    |       |
| 4         | BT_PCM_SYNC setup                                                                                 | 8.0  |     | —    |       |
| 5         | BT_PCM_SYNC hold                                                                                  | 8.0  |     | —    |       |
| 6         | BT_PCM_OUT delay                                                                                  | 0    | —   | 25.0 | ns    |
| 7         | BT_PCM_IN setup                                                                                   | 8.0  |     | —    |       |
| 8         | BT_PCM_IN hold                                                                                    | 8.0  |     | —    |       |
| 9         | Delay from rising edge of BT_PCM_CLK during last bit period to BT_PCM_OUT becoming high impedance | 0    |     | 25.0 |       |

## 10 Power-up sequence and timing

The Vela IF310 has a signal- “BT\_REG\_ON” that allows the host to control power consumption by enabling or disabling the internal regulator blocks. Figure 5 indicates proper sequencing of the signals for various operational states. The timing values indicated are minimum required values; longer delays are also acceptable.

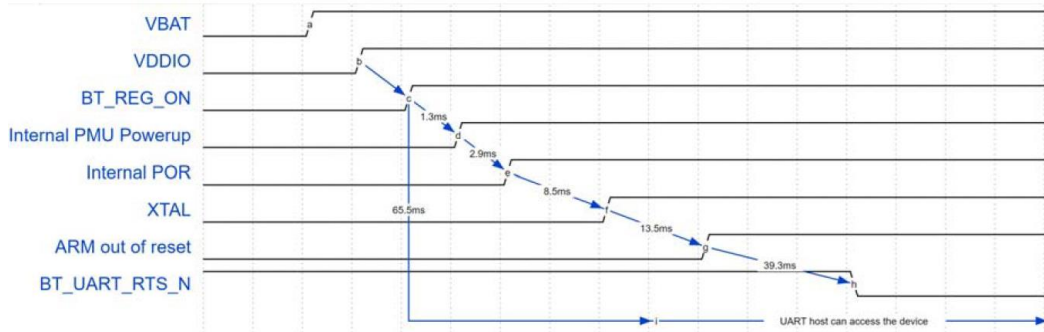


Figure 5: Vela IF310 bootup sequence

## 11 Module Mechanical and PCB Footprint

**Note:** There are three module variants: Integrated Antenna, MHF4 connector, and Trace Pin. It is important to ensure you are using the correct version on your design.

### 11.1 Integrated Antenna Variant Mechanical Definition

The module dimensions of integrated antenna variant module is 12 x 16 x 1.9 mm. Detail drawings are shown in Figure 6.

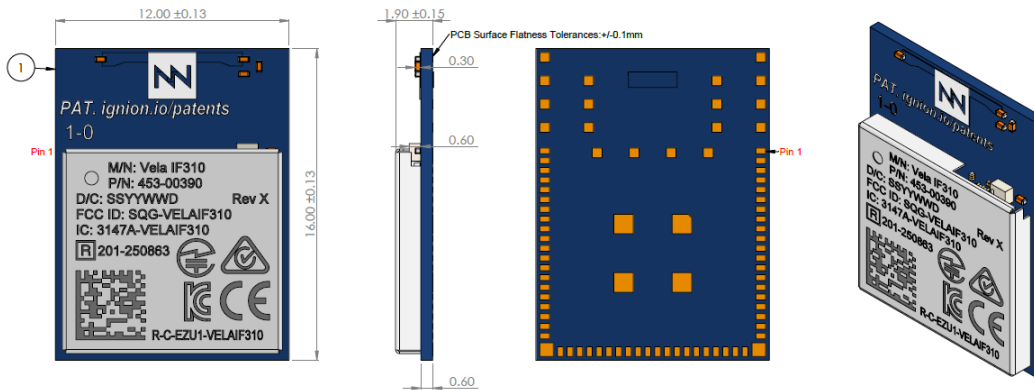


Figure 6: Mechanical Details – Integrated Antenna Variant (453-00390)

### 11.2 MHF4 Connector Variant Mechanical Definition

The module dimensions of MHF4 connector variant module is 12 x 16 x 1.9 mm. Detail drawings are shown in Figure 7.

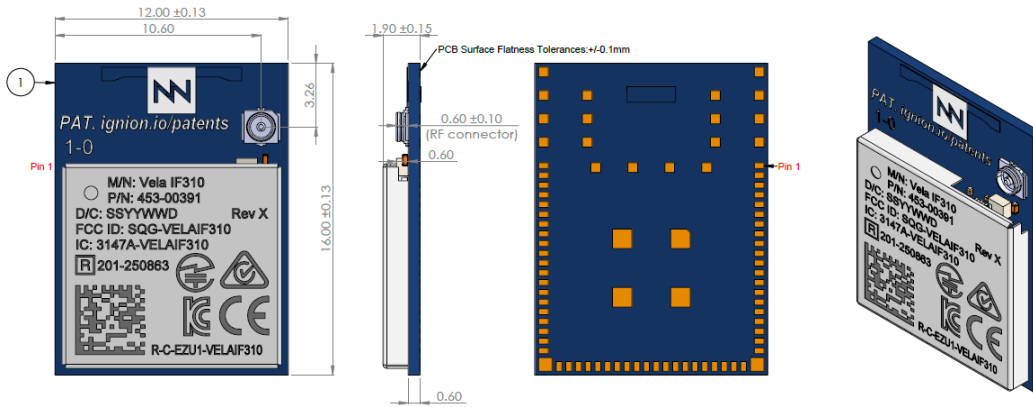


Figure 7: Mechanical Details – MHF4 Connector Variant (453-00391)

### 11.3 Trace Pin Variant Mechanical Definition

The module dimensions of Trace Pin variant module is 12 x 16 x 1.9 mm. Detail drawings are shown in Figure 8.

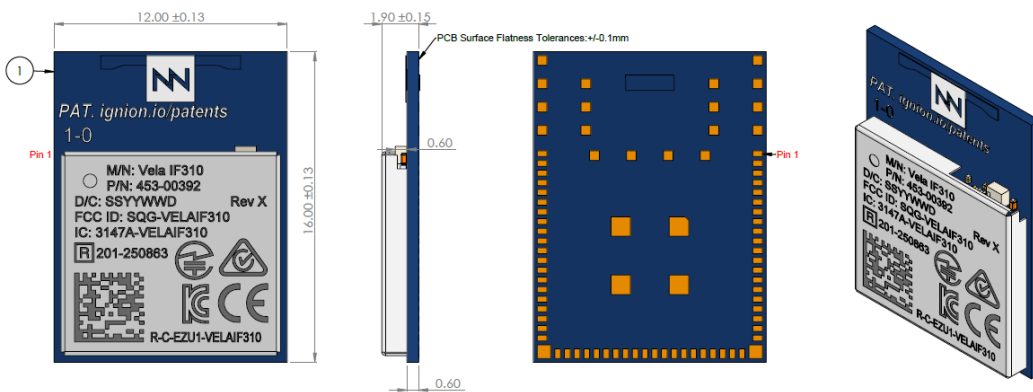


Figure 8: Mechanical Details – Trace Pin Connector Variant (453-00392)

## 11.4 Module PCB Footprint

The PCB footprint dimensions apply to all module variants, including the Integrated Antenna, MHF4 Connector, and Trace Pin variants.

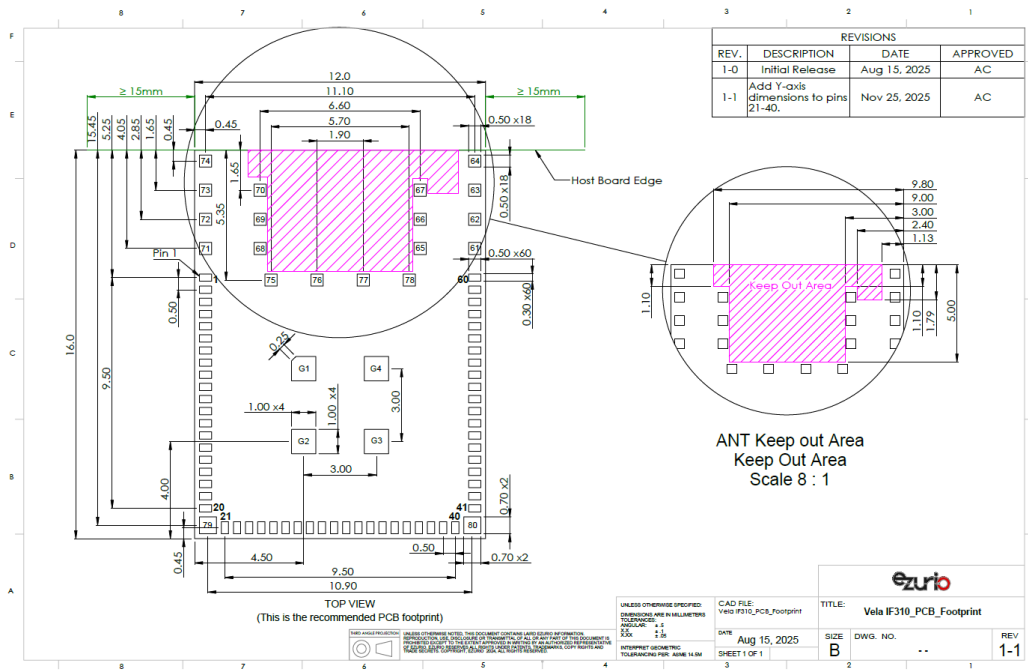


Figure 9: Vela IF310 module PCB footprint (Top view)

## 12 Module Pin Definition

The pin definitions apply to all module variants, including the Integrated Antenna, MHF4 Connector, and Trace Pin variants.

Table 16: Vela IF310 module pin definitions

| Pin # | Name         | Type | Voltage Ref. | Function                                                                                                                                                                                                                                                                                                    | If Not Used |
|-------|--------------|------|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| 1     | GND          | -    | -            | GROUND                                                                                                                                                                                                                                                                                                      | GND         |
| 2     | GPIO_3       | I/O  | VDDIO        | General-purpose input / output pin                                                                                                                                                                                                                                                                          | NC          |
| 3     | GPIO_2       | I/O  | VDDIO        | General-purpose input / output pin                                                                                                                                                                                                                                                                          | NC          |
| 4     | GPIO_0       | I/O  | VDDIO        | General-purpose input / output pin                                                                                                                                                                                                                                                                          | NC          |
| 5     | GPIO_4       | I/O  | VDDIO        | General-purpose input / output pin                                                                                                                                                                                                                                                                          | NC          |
| 6     | GPIO_6       | I/O  | VDDIO        | General-purpose input / output pin                                                                                                                                                                                                                                                                          | NC          |
| 7     | GPIO_5       | I/O  | VDDIO        | General-purpose input / output pin                                                                                                                                                                                                                                                                          | NC          |
| 8     | BT_UART_RXD  | I    | VDDIO        | UART Serial Input. Serial data input for the HCI UART interface                                                                                                                                                                                                                                             | NC          |
| 9     | BT_UART_RTSn | O    | VDDIO        | UART request-to-send. Active-low request-to-send signal for the HCI UART interface.                                                                                                                                                                                                                         | NC          |
| 10    | BT_UART_TXD  | O    | VDDIO        | UART Serial Output. Serial data output for the HCI UART interface.                                                                                                                                                                                                                                          | NC          |
| 11    | BT_UART_CTSn | I    | VDDIO        | UART clear-to-send. Active-low clear-to-send signal for the HCI UART interface                                                                                                                                                                                                                              | NC          |
| 12    | GND          | -    | -            | GROUND                                                                                                                                                                                                                                                                                                      | GND         |
| 13    | VDDIO        | PWR  | 1.8V         | DC voltage supply for all I/O pins                                                                                                                                                                                                                                                                          | NC          |
| 14    | BT_GPIO_6    | I/O  | VDDIO        | Bluetooth general purpose input / output pin <ul style="list-style-type: none"> <li>This pin can be configured as the I2C_SDA function, but additional firmware support is required.</li> <li>This pin combines with pin 24 to form an I2C bus.</li> </ul>                                                  | NC          |
| 15    | BT_GPIO_5    | I/O  | VDDIO        | Bluetooth general-purpose input / output pin                                                                                                                                                                                                                                                                | NC          |
| 16    | BT_GPIO_4    | I/O  | VDDIO        | Bluetooth general-purpose input / output pin <ul style="list-style-type: none"> <li>This pin can be configured as the WLAN_ACTIVE function for 3-wire coexistence, but additional firmware support is required.</li> <li>This pin works with pin 17 and pin 18 to form a 3-wire coexistence bus.</li> </ul> | NC          |
| 17    | BT_GPIO_3    | I/O  | VDDIO        | Bluetooth general-purpose input / output pin <ul style="list-style-type: none"> <li>This pin can be configured as the BT_PRIORITY function for 3-wire coexistence, but additional firmware support is required.</li> <li>This pin works with pin 16 and pin 18 to form a 3-wire coexistence bus.</li> </ul> | NC          |
| 18    | BT_GPIO_2    | I/O  | VDDIO        | Bluetooth general-purpose input / output pin <ul style="list-style-type: none"> <li>This pin can be configured as the BT_ACTIVE function for 3-wire coexistence, but additional firmware support is required.</li> <li>This pin works with pin 16 and pin 17 to form a 3-wire coexistence bus.</li> </ul>   | NC          |
| 19    | VBAT         | PWR  | 3.3V         | DC supply for module. <ul style="list-style-type: none"> <li>This pin can accept voltage ranges from 3.0 V to 4.8 V.</li> <li>Optimal RF performance is guaranteed between 3.13 V and 3.5 V.</li> </ul>                                                                                                     | -           |

| Pin # | Name               | Type | Voltage Ref. | Function                                                                                                                                                                                                                                                   | If Not Used |
|-------|--------------------|------|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| 20    | VBAT               | PWR  | 3.3V         | DC supply for module. <ul style="list-style-type: none"> <li>This pin can accept voltage ranges from 3.0 V to 4.8 V.</li> <li>Optimal RF performance is guaranteed between 3.13 V and 3.5 V.</li> </ul>                                                    | -           |
| 21    | BT_REG_ON          | I    | VDDIO        | Enable IF310 module.<br>There is an internal 50 KOhm pull down resistor on this signal                                                                                                                                                                     | -           |
| 22    | BT_GPIO_17         | I/O  | VDDIO        | Bluetooth general-purpose input / output pin                                                                                                                                                                                                               | NC          |
| 23    | BT_GPIO_16         | I/O  | VDDIO        | Bluetooth general-purpose input / output pin                                                                                                                                                                                                               | NC          |
| 24    | BT_GPIO_7          | I/O  | VDDIO        | Bluetooth general purpose input / output pin <ul style="list-style-type: none"> <li>This pin can be configured as the I2C_CLK function, but additional firmware support is required.</li> <li>This pin combines with pin 14 to form an I2C bus.</li> </ul> | NC          |
| 25    | BT_GPIO_0          | I/O  | VDDIO        | Bluetooth general-purpose input / output pin                                                                                                                                                                                                               | NC          |
| 26    | GND                | -    | -            | GROUND                                                                                                                                                                                                                                                     | GND         |
| 27    | MIC_P              | I    | VDDIO        | ADC microphone positive input                                                                                                                                                                                                                              | NC          |
| 28    | GND                | -    | -            | GROUND                                                                                                                                                                                                                                                     | GND         |
| 29    | TDM2_SCK           | I/O  | VDDIO        | TDM2 interface slave clock                                                                                                                                                                                                                                 | NC          |
| 30    | TDM2_WS            | I/O  | VDDIO        | TDM2 interface word select                                                                                                                                                                                                                                 | NC          |
| 31    | TDM2_MCK           | I/O  | VDDIO        | TDM2 interface master clock                                                                                                                                                                                                                                | NC          |
| 32    | TDM2_DO            | I/O  | VDDIO        | TDM2 interface data out                                                                                                                                                                                                                                    | NC          |
| 33    | TDM2_DI            | I/O  | VDDIO        | TDM2 interface data in                                                                                                                                                                                                                                     | NC          |
| 34    | SMIF_SPHB_CS0_N_34 | O    | VDDIO        | SMIF chip select 0, active-low output                                                                                                                                                                                                                      | NC          |
| 35    | SMIF_SPHB_DQ3_35   | I/O  | VDDIO        | SMIF data line 3                                                                                                                                                                                                                                           | NC          |
| 36    | SMIF_SPHB_DQ2_36   | I/O  | VDDIO        | SMIF data line 2                                                                                                                                                                                                                                           | NC          |
| 37    | SMIF_SPHB_CK_37    | O    | VDDIO        | SMIF clock output                                                                                                                                                                                                                                          | NC          |
| 38    | SMIF_SPHB_DQ1_38   | I/O  | VDDIO        | SMIF data line 1                                                                                                                                                                                                                                           | NC          |
| 39    | SMIF_SPHB_DQ0_39   | I/O  | VDDIO        | SMIF data line 0                                                                                                                                                                                                                                           | NC          |
| 40    | SMIF_SPHB_CS1_N_40 | O    | VDDIO        | SMIF chip select 1, active-low output                                                                                                                                                                                                                      | NC          |
| 41    | DMIC_CK            | I/O  | VDDIO        | Digital microphone clock                                                                                                                                                                                                                                   | NC          |
| 42    | DMIC_DQ            | I/O  | VDDIO        | Digital microphone data                                                                                                                                                                                                                                    | NC          |
| 43    | TDM1_DI            | I/O  | VDDIO        | TDM1 interface data in                                                                                                                                                                                                                                     | NC          |
| 44    | TDM1_WS            | I/O  | VDDIO        | TDM1 interface word select                                                                                                                                                                                                                                 | NC          |
| 45    | TDM1_MCK           | I/O  | VDDIO        | TDM1 interface master clock                                                                                                                                                                                                                                | NC          |
| 46    | TDM1_SCK           | I/O  | VDDIO        | TDM1 interface slave clock                                                                                                                                                                                                                                 | NC          |
| 47    | TDM1_DO            | I/O  | VDDIO        | TDM1 interface data out                                                                                                                                                                                                                                    | NC          |
| 48    | LHL_GPIO_9         | I/O  | VDDIO        | Miscellaneous general-purpose input / output                                                                                                                                                                                                               | NC          |
| 49    | LHL_GPIO_3         | I/O  | VDDIO        | Miscellaneous general-purpose input / output                                                                                                                                                                                                               | NC          |
| 50    | LHL_GPIO_2         | I/O  | VDDIO        | Miscellaneous general-purpose input / output                                                                                                                                                                                                               | NC          |
| 51    | LHL_GPIO_6         | I/O  | VDDIO        | Miscellaneous general-purpose input / output                                                                                                                                                                                                               | NC          |
| 52    | LHL_GPIO_8         | I/O  | VDDIO        | Miscellaneous general-purpose input / output                                                                                                                                                                                                               | NC          |

| Pin # | Name         | Type | Voltage Ref. | Function                                                                                                        | If Not Used |
|-------|--------------|------|--------------|-----------------------------------------------------------------------------------------------------------------|-------------|
| 53    | LHL_GPIO_5   | I/O  | VDDIO        | Miscellaneous general-purpose input / output                                                                    | NC          |
| 54    | LHL_GPIO_4   | I/O  | VDDIO        | Miscellaneous general-purpose input / output                                                                    | NC          |
| 55    | eLPO_IN      | I    | VDDIO        | External sleep clock input (32.768 KHz)                                                                         | -           |
| 56    | BT_HOST_WAKE | O    | VDDIO        | Host Wake-up <ul style="list-style-type: none"> <li>The signal from IF310 module to host</li> </ul>             | NC          |
| 57    | BT_DEV_WAKE  | I    | VDDIO        | Bluetooth Device Wake-up <ul style="list-style-type: none"> <li>The signal from host to IF310 module</li> </ul> | NC          |
| 58    | GND          | -    | -            | GROUND                                                                                                          | GND         |
| 59    | BT_ST        | O    | -            | RF port for the Trace Pin type                                                                                  | NC          |
| 60~80 | GND          | -    | -            | GROUND                                                                                                          | GND         |
| G1~G4 | GND          | -    | -            | GROUND                                                                                                          | GND         |



## 14 Flashing Firmware

Vela IF310 firmware programming is done via the HCI UART.

There are two tools to flash a Vela IF310 module detailed in the following link:

**TBD**

**ifx\_flasher\_cli.exe** is a command line tool for flashing Vela IF310 DVK and loose modules. It will auto detect a DVK, but you can also specify a com port for a loose module. When specifying a com port, the cli bypasses the DVK probe auto detect. You can use the -c option with the cli to specify a com port.

When flashing a loose module via a particular com port the following should be noted:

- Flashing uses BT\_UART\_TXD, BT\_UART\_RXD, BT\_UART\_CTS, BT\_UART\_RTS
- Flow control is mandatory.
- Reset line is also required to be able to enter programming mode.
- UART settings are 115200, 8, N, 1
- CTS needs to be low during a reset to enter programming mode.

## 15 RF Layout Design Guidelines

### 15.1 General Consideration

The following is a list of RF layout design guidelines and recommendations when installing an Ezurio radio into your device.

- Do not run the antenna cables directly above or directly below the radio.
- Do not place any parts or run any high-speed digital lines below the radio.
- If there are other radios or transmitters located on the device (such as a Bluetooth radio), place the devices as far apart from each other as possible. Also, make sure there is at least 25 dB insulation between these two antennas.
- Ensure that there is the maximum allowable spacing by separating the antenna connectors on the Ezurio radio from the antenna. In addition, do not place antennas directly above or directly below the radio.
- Be sure to put a 10uF capacitor on EACH power pin. Also, place that capacitor to the pin as close as possible to make sure the internal PMU working correctly.

Use proper electro-static-discharge (ESD) procedures when installing the Ezurio radio module. To avoid negatively impacting Tx power and receiver sensitivity, do not cover the antennas with metallic objects or components.

### 15.2 Layout Recommendations for Integrated Antenna Variant

The following are recommended for layout of the integrated antenna variant of the Vela IF310:

1. Align module edge with PCB edge.
2. To maintain antenna radiation efficiency, you should reserve a keep-out area on all PCB routing layers, as shown in [Figure 11](#). For detailed dimensions, refer to [Figure 9](#).

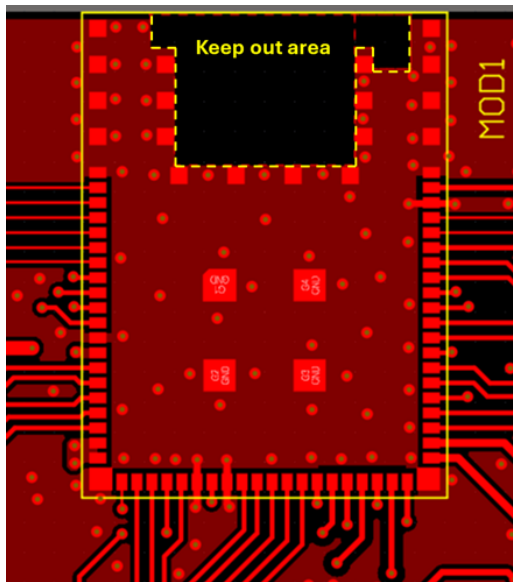


Figure 11: Integrated antenna variant layout keep out area

## 16 Application Note for Surface Mount Modules

### 16.1 Introduction

Ezurio's surface mount modules are designed to conform to all major manufacturing guidelines. This application note is intended to provide additional guidance beyond the information that is presented in the user manual. This application note is considered a living document and will be updated as new information is presented.

The modules are designed to meet the needs of several commercial and industrial applications. They are easy to manufacture and conform to current automated manufacturing processes.

Vela IF310 part numbers – 453-00171R and 453-00172R are shipped as Tape / Reel, with a reel containing 1,000 pcs.

### 16.2 Module Packaging Configuration

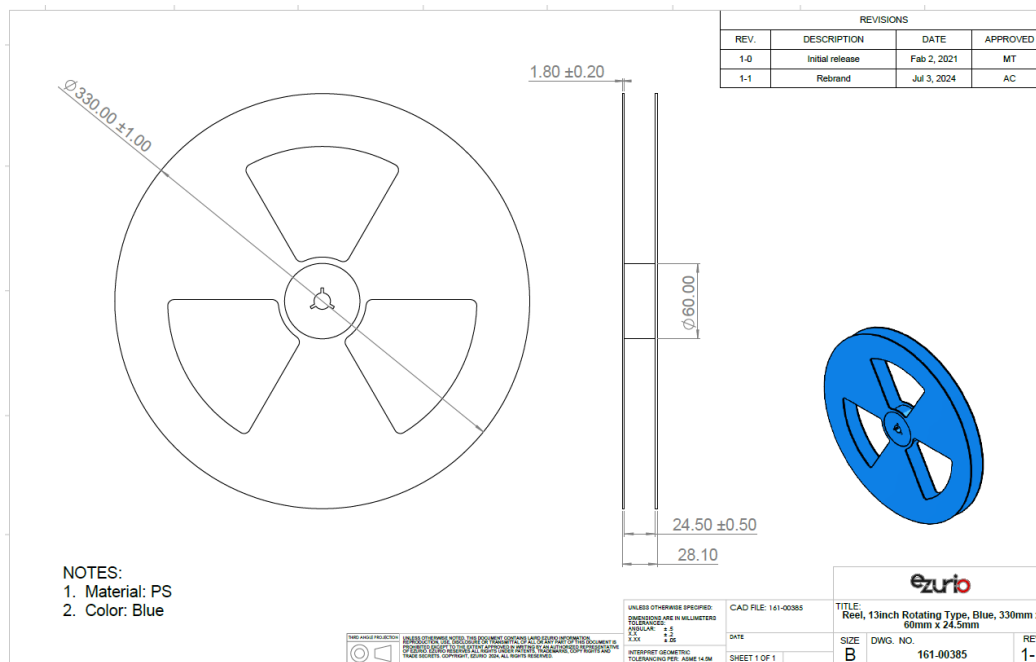


Figure 3: Reel specifications – 1,000 pieces per reel

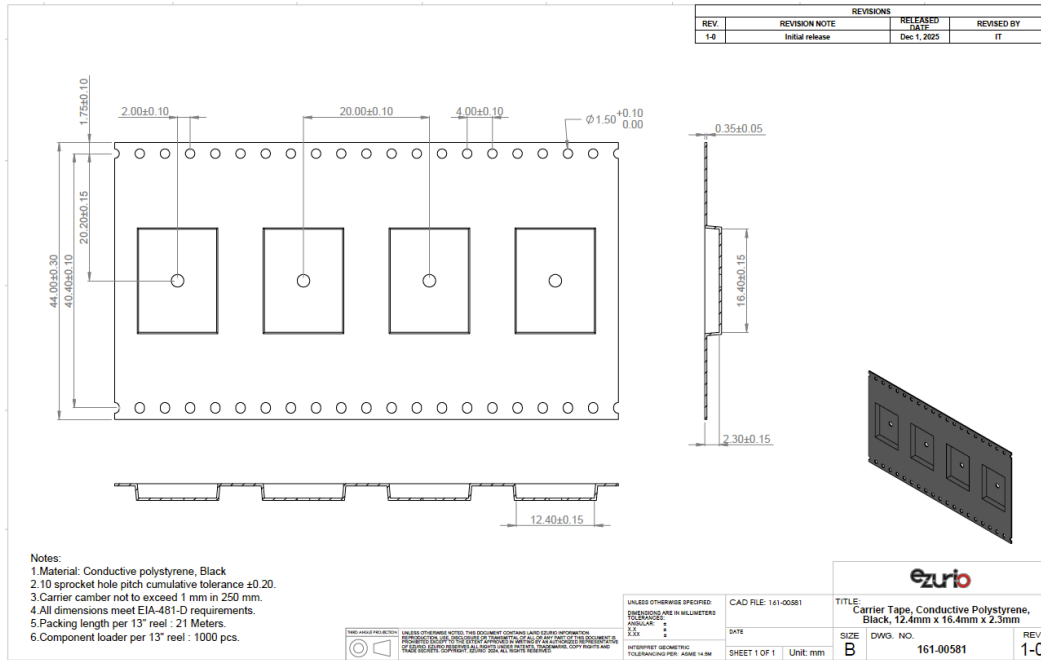


Figure 4: Carrier Tape specifications for Integrated Antenna Variant

| NO. | ITEM NUMBER | REV. | DESCRIPTION                                                                | QTY. |
|-----|-------------|------|----------------------------------------------------------------------------|------|
| 1   | 453-00390   | 0-2  | Module, Vela IF310, Integrated Antenna                                     | 1000 |
| 2   | 161-00373   | 1-1  | Bag, ESD and Moisture Barrier, Silver, 520mm x 420mm x 15.10mm             | 1    |
| 3   | 161-00374   | 1-1  | Box, Single-Wall Corrugated E Flute, 330mm x 343mm x 60mm                  | 1    |
| 4   | 161-00375   | 1-1  | Carton, Double-Wall, AB Flute, 368mm x 354mm x 80mm                        | 1    |
| 5   | 161-00385   | 1-1  | Reel, 13inch Rotating Type, Blue, 330mm x 60mm x 24.5mm                    | 1    |
| 6   | 161-00387   | 1-1  | Humidity Indicator Card, Minimum 60% RH, Six Spot Indication, 38mm x 105mm | 1    |
| 7   | 161-00320   | 1-0  | Desiccant, Silica Gel, 66g, 125mm x 60mm                                   | 1    |
| 8   | 160-00580   | 1-0  | Label, Bag and Reel, Product Identifier, Vela IF310, 80mm x 57mm           | 3    |
| 9   | 160-02045   | 2-4  | Label, Standard Shipping Box, CE Mark, 4in x 2.5in                         | 2    |
| 10  | 161-00019   | 1-0  | Cover Tape, Anti-static Polyester, 37.5mm x 0.025mm                        | 1    |
| 11  | 161-00581   | 1-0  | Carrier Tape, Conductive Polyimide, Black, 12.4mm x 16.4mm x 2.5mm         | 1    |
| 12  | 160-01816   | 1-1  | Label, Blank Moisture Sensitivity Level, 55mm x 60mm                       | 1    |
| 13  | 160-02075   | 1-1  | Label, Caution ESD, Yellow, 51mm x 51mm                                    | 1    |

| REVISIONS |                 |               |            |
|-----------|-----------------|---------------|------------|
| REV.      | REVISION NOTE   | RELEASED DATE | REVISED BY |
| 1-0       | Initial release | Dec 3, 2023   | IT         |

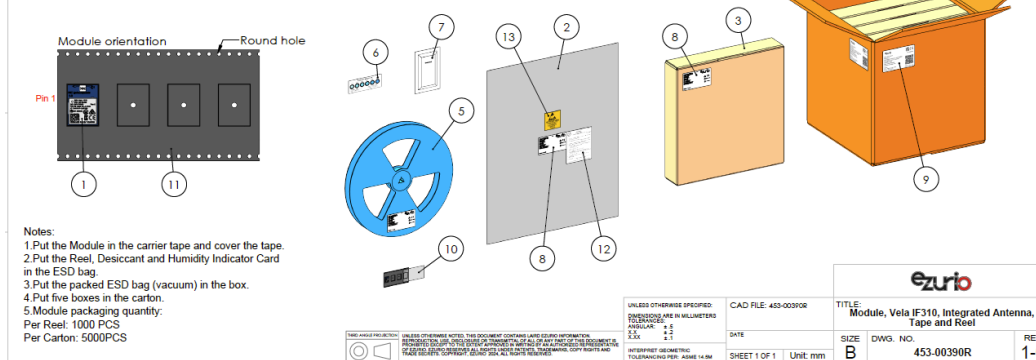


Figure 5: Vela IF310 Packaging Process for Integrated Antenna Variant

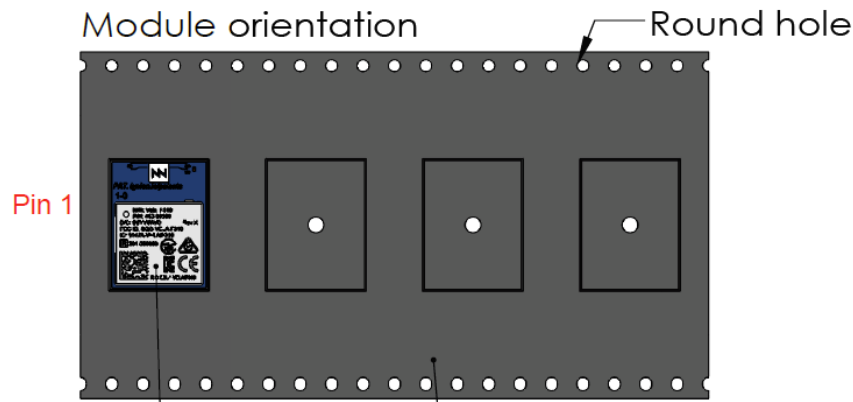
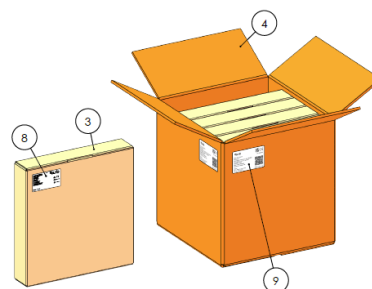


Figure 6: Module Orientation in Carrier Tape Pocket, Integrated Antenna Variant

| REVISIONS |                 |               |            |
|-----------|-----------------|---------------|------------|
| REV.      | REVISION NOTE   | RELEASED DATE | REVISED BY |
| 1-0       | Initial release | Dec 3, 2025   | IT         |



|                                                                                                                          |                       |                                                   |                        |     |
|--------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------------------------------------------|------------------------|-----|
| UNLESS OTHERWISE SPECIFIED:<br>DIMENSIONS ARE IN MILLIMETERS<br>TOLERANCES:<br>ANGULAR: ± 5<br>X.Y: ± 0.2<br>X.XX: ± 0.1 | CAD FILE: 453-00391R  | TITLE:<br>Module, Vela IF310, MHF4, Tape and Reel |                        | REV |
| INTERNET GEOMETRIC<br>TOLERANCING: ASME Y14.5                                                                            | DATE                  | SIZE<br>B                                         | DWG. NO.<br>453-00391R | 1-  |
|                                                                                                                          | SHEET 1 OF 1 Unit: mm |                                                   |                        |     |

**Figure 7: Vela IF310 Packaging Process for MHF4 Variant**



已註解 [CL9R7]: Yes, Ivy is working on the CADs. I will complete this section once the drawings are available, hopefully within this week.

| NO. | ITEM NUMBER | REV. | DESCRIPTION                                                                | QTY. |
|-----|-------------|------|----------------------------------------------------------------------------|------|
| 1   | 453-00392   | D-2  | Module, Vela IF310, Trace Pin                                              | 1000 |
| 2   | 161-00373   | 1-1  | Bag, ESD and Moisture Barrier, Silver, 520mm x 420mm x 1.5mm               | 1    |
| 3   | 161-00374   | 1-1  | Box, Single-Wall Corrugated E Flute, 338mm x 343mm x 60mm                  | 1    |
| 4   | 161-00375   | 1-1  | Carton, Double-Wall, AB Flute, 368mm x 304mm x 90mm                        | 1    |
| 5   | 161-00395   | 1-1  | Reel, 13inch Rotating Type, Silver, 330mm x 60mm x 24.5mm                  | 1    |
| 6   | 161-00387   | 1-1  | Humidity Indicator Card, Minimum 92% RH, Six Spot Indication, 38mm x 100mm | 1    |
| 7   | 161-00020   | 1-0  | Desiccant, Silica Gel, 66g, 125mm x 80mm                                   | 1    |
| 8   | 160-00580   | 1-0  | Label, Bag and Reel, Product Identifier, Vela IF310, 80mm x 51mm           | 3    |
| 9   | 160-02045   | 2-4  | Label, Standard Shipping Box, CE Mark, 4in x 2.5in                         | 2    |
| 10  | 161-00019   | 1-0  | Cover Tape, Anti-static Polyester, 37.5mm x 0.025mm                        | 1    |
| 11  | 161-00581   | 1-0  | Carrier Tape, Conductive Polycarbonate, Black, 12.4mm x 18.4mm x 2.5mm     | 1    |
| 12  | 160-01816   | 1-1  | Label, Blank Moisture Sensitivity Level, 56mm x 80mm                       | 1    |
| 13  | 160-02075   | 1-1  | Label, Caution ESD, Yellow, 51mm x 51mm                                    | 1    |

| REVISIONS |                 |               |            |
|-----------|-----------------|---------------|------------|
| REV.      | REVISION NOTE   | RELEASED DATE | REVISED BY |
| 1-0       | Initial release | Dec 3, 2023   | IT         |

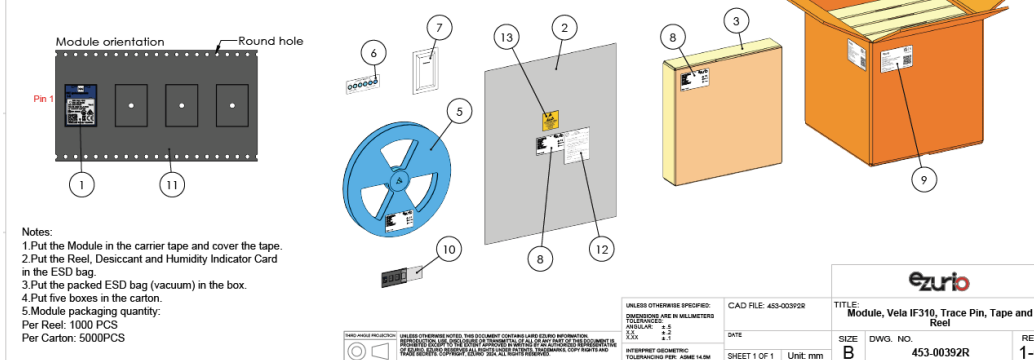


Figure 9: Vela IF310 Packaging Process for Trace Pin Variant

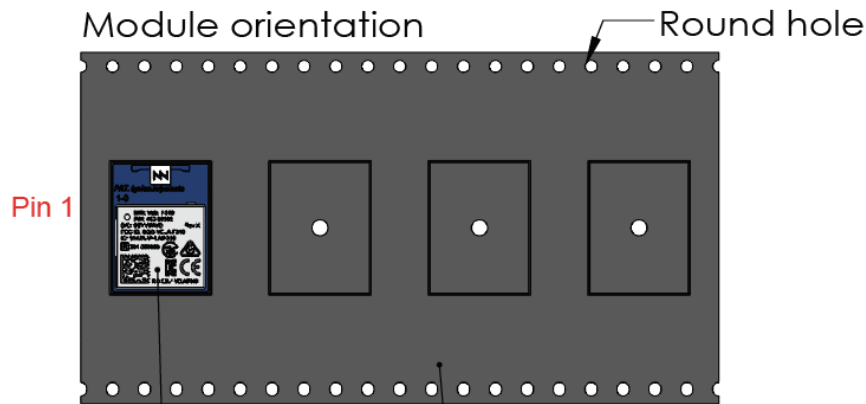


Figure 10: Module Orientation in Carrier Tape Pocket, Trace Pin Variant

### 16.3 Module Shipping

All modules are shipped in tape and reel package and sealed in ESD Bags.

## 16.4 Labeling

The following labels are placed on the anti-static bag. The Vela IF310 solder-down modules are classified as MSL4 devices.

Figure 11: Moisture Sensitivity Level Label



Figure 12: Product Identifier Label

The following labels are placed on the pizza box.



Figure 13: Product Identifier Label

The following labels are placed on the master shipping carton.



Figure 14: Standard Shipping Carton Label

## 16.5 Required Storage Conditions

### 16.5.1 Prior to Opening the Dry Packing

The following are required storage conditions *prior to opening the dry packing*:

- Normal temperature: 5~40°C
- Normal humidity: 80% (Relative humidity) or less
- Storage period: One year or less

**Note:** Humidity means relative humidity.

### 16.5.2 After Opening the Dry Packing

The following are required storage conditions *after opening the dry packing* (to prevent moisture absorption):

- Storage conditions for one-time soldering:
  - Temperature: 5-25°C
  - Humidity: 60% or less
  - Period: 72 hours or less after opening
- Storage conditions for two-time soldering
  - Storage conditions following opening and prior to performing the 1<sup>st</sup> reflow:
    - Temperature: 5-25°C
    - Humidity: 60% or less
    - Period: A hours or less after opening
  - Storage conditions following completion of the 1<sup>st</sup> reflow and prior to performing the 2<sup>nd</sup> reflow
    - Temperature: 5-25°C
    - Humidity: 60% or less
    - Period: B hours or less after completion of the 1<sup>st</sup> reflow

**Note:** Should keep A+B within 72 hours.

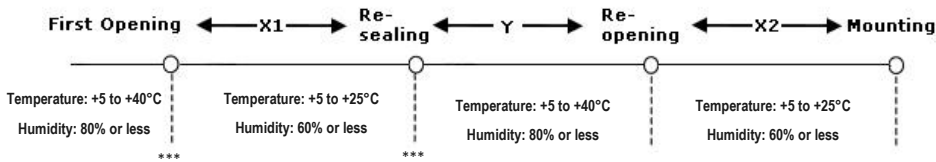
### 16.5.3 Temporary Storage Requirements after Opening

The following are temporary storage requirements after opening:

- Only re-store the devices *once* prior to soldering.
- Use a dry box or place desiccant (with a blue humidity indicator) with the devices and perform dry packing again using vacuumed heat-sealing.

The following indicate the required storage period, temperature, and humidity for this temporary storage:

- Storage temperature and humidity:



\*\*\* - External atmosphere temperature and humidity of the dry packing

- Storage period:
  - X1+X2 – Refer to **After Opening the Dry Packing** storage requirements. Keep is X1+X2 within 72 hours.
  - Y – Keep within two weeks or less.

## 16.6 Baking Conditions

Baking conditions and processes for the module follow the J-STD-033 standard which includes the following:

- The calculated shelf life in a sealed bag is 12 months at <40°C and <80% relative humidity.
- Once the packaging is opened, the SiP must be mounted (per MSL4/Moisture Sensitivity Level 4) within 72 hours at <30°C and <60% relative humidity.
- If the SiP is not mounted within 72 hours or if, when the dry pack is opened, the humidity indicator card displays >10% humidity, then the product must be baked for 48 hours at 125 °C (±5 °C).

## 16.7 Surface Mount Conditions

The following soldering conditions are recommended to ensure device quality.

### 16.7.1 Soldering

**Note:** When soldering, the stencil thickness should be  $\geq 0.1$  mm.

Convection reflow or IR/Convection reflow (one-time soldering or two-time soldering in air or nitrogen environment)

- Measuring point – IC package surface
- Temperature profile:

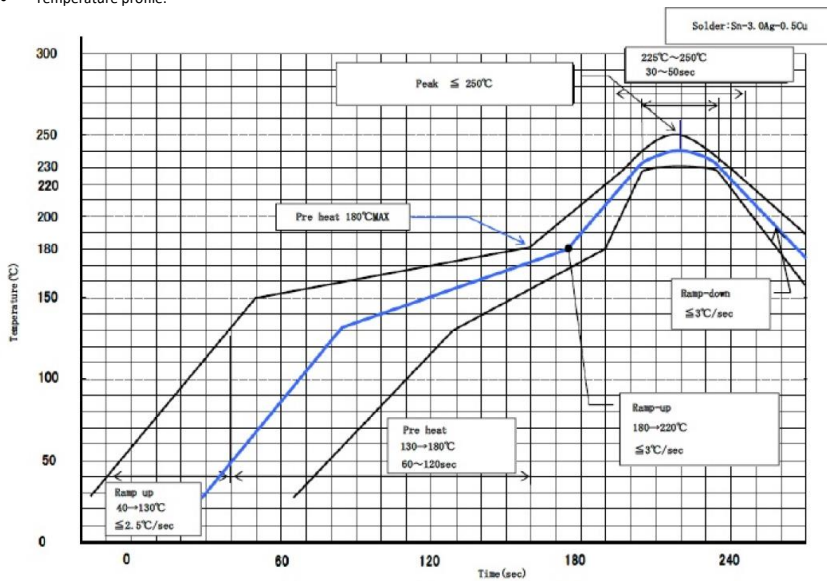


Figure 15: Temperature profile

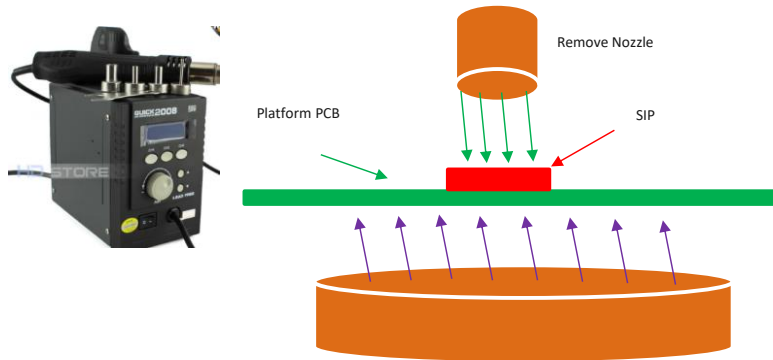
- Ramp-up: 40-130°C. Less than 2.5°C/sec
- Pre heat: 130-180°C 60-120 sec, 180°C MAX
- Ramp-up: 180-220°C. Less than 3°C/sec
- Peak Temperature: MAX 250°C
  - 225°C ~ 250°C, 30 ~ 50 sec
- Ramp-down: Less than 3°C/sec

#### 16.7.2 Cautions When Removing the SIP from the Platform for RMA

- Bake the platform before removing the SIP from the platform. Reference baking conditions.
- Remove the SIP by using a hot air gun. This process should be carried out by a skilled technician.

Suggestion conditions:

- One-side component platform:
  - Set the hot plate at 280° C.
  - Put the platform on the hot plate for 8~10 seconds.
  - Remove the SIP from platform.
- Two-side components platform:
  - Use two hot air guns
  - On the bottom side, use a pre-heated nozzle (temperature setting of 200~250° C) at a suitable distance from the platform PCB.
  - On the top side, apply a remove nozzle (temperature setting of 330° C). Heat the SIP until it can be removed from platform PCB.

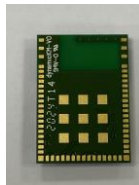


- Remove the residue solder under the bottom side of SIP. (Note: Alternate module pictured as an example)



(Not accepted for RMA)

**Example SIP with residue solder on the bottom**



(Accepted for RMA analysis)

**Example Module, no residue solder**

- Remove and clean the residue flux as needed.

#### 16.7.3 Precautions for Use

- Opening/handling/removing must be done on an anti-ESD treated workbench. All workers must also have undergone anti-ESD treatment.
- The devices should be mounted within one year of the date of delivery.
- The Vela IF310 modules are MSL 4 rated.

## 17 Reliability Test

### 17.1 Climatic And Dynamic Reliability Test

Table 4: Climatic and Dynamic Reliability Test Results for Vela IF310 Modules

| Test Item                                           | Specification                                                                                                                                                                                                                                                                            | Standard                                                            | Test Result |
|-----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------|
| Thermal Shock                                       | Temperature: -40 ~ 85°C<br>Ramp time: Less than 10 seconds.<br>Dwell Time: 10 minutes<br>Number of Cycles: 350 times                                                                                                                                                                     | *JESD22-A106<br>*IEC 60068-2-14 for dwell time and number of cycles | Pass        |
| Vibration<br>Non-Operating Unpackaged device        | Vibration Wave Form: Sine Waveform<br>Vibration frequency / Displacement: 20-80 Hz/1.5mm<br>Vibration frequency / Acceleration: 80-2000 Hz/20g<br>Cycle Time: 4 min/cycle<br>Number of Cycles: 4 cycle/axis<br>Vibration Axes: X, Y and Z (Rotate each axis on vertical vibration table) | JEDEC 22-B103B (2016)                                               | Pass        |
| Mechanical Shock<br>Non-Operating Unpackaged device | Pulse shape: Half-sine waveform<br>Impact acceleration: 1500 g<br>Pulse duration: 0.5 ms<br>Number of shocks: 30 shocks (5 shocks for each face)<br>Orientation: Bottom, top, left, right, front, and rear faces                                                                         | JEDEC 22-B110B.01 (2019)                                            | Pass        |

## 17.2 Reliability MTBF Prediction

Table 5: MTBF Predictions for Vela IF310 Modules

| Ezurio Part Number | Environment                 | Standard                         | Test Result 45 °C<br>(Hours) |
|--------------------|-----------------------------|----------------------------------|------------------------------|
| 453-00390R         | Ground, Fixed, Uncontrolled | Telcordia SR-332 Issue 4. (2016) | 37,435,271                   |
| 453-00390C         |                             |                                  |                              |
| 453-00391R         |                             |                                  |                              |
| 453-00391C         |                             |                                  |                              |
| 453-00392R         |                             |                                  |                              |
| 453-00392C         |                             |                                  |                              |
| 453-00390R         | Mobile, Fixed, Uncontrolled | Telcordia SR-332 Issue 4. (2016) | 20,697,500                   |
| 453-00390C         |                             |                                  |                              |
| 453-00391R         |                             |                                  |                              |
| 453-00391C         |                             |                                  |                              |
| 453-00392R         |                             |                                  |                              |
| 453-00392C         |                             |                                  |                              |
| Ezurio Part Number | Environment                 | Standard                         | Test Result 85 °C<br>(Hours) |
| 453-00390R         | Ground, Fixed, Uncontrolled | Telcordia SR-332 Issue 4. (2016) | 9,348,000                    |
| 453-00390C         |                             |                                  |                              |
| 453-00391R         |                             |                                  |                              |
| 453-00391C         |                             |                                  |                              |
| 453-00392R         |                             |                                  |                              |
| 453-00392C         |                             |                                  |                              |
| 453-00390R         | Mobile, Fixed, Uncontrolled | Telcordia SR-332 Issue 4. (2016) | 5,287,698                    |
| 453-00390C         |                             |                                  |                              |
| 453-00391R         |                             |                                  |                              |
| 453-00391C         |                             |                                  |                              |
| 453-00392R         |                             |                                  |                              |
| 453-00392C         |                             |                                  |                              |

## 18 Regulatory

Full regulatory information on the Vela IF310, including the Regulatory Information Guide, grants, and test reports are available on the [Vela IF310 product page](#) (coming soon).

The Vela IF310 holds current certifications in the following countries:

**Table 6: Vela IF310 Certifications**

| Country/Region    | Regulatory ID               |
|-------------------|-----------------------------|
| USA (FCC)         | SQG-VELAIF310               |
| EU (ETSI)         | N/A (No ID Number Required) |
| UKCA              | N/A (No ID Number Required) |
| Canada (ISED)     | 3147A-VELAIF310             |
| Japan (MIC)       | 201-250863                  |
| Australia (RCM)   | N/A                         |
| New Zealand (RCM) | N/A                         |
| Korea             | R-C-EZU1-VELAIF310          |

### 18.1 Certified Antennas for the Vela IF310

**Table 7: Certified Antennas for Vela IF310 Modules**

| Model                    | MPN                                               | Manufacturer                | Type              | Connector  | Peak Gain<br>(2400 – 2500 MHz) |
|--------------------------|---------------------------------------------------|-----------------------------|-------------------|------------|--------------------------------|
| NanoBlue                 | EBL2400A1-10MH4L                                  | Ezurio (Laird Connectivity) | PCB Dipole        | IPEX MHF4  | 2 dBi                          |
| FlexPIFA                 | 001-0022                                          | Ezurio (Laird Connectivity) | FlexPIFA          | IPEX MHF4L | 2 dBi                          |
| EDA-8709-2G4C1-B27-CY    | EDA-8709-2G4C1-B27-CY<br>(Ezurio Part#0600-00057) | MAG.LAYERS                  | Dipole            | IPEX MHF4  | 2.32 dBi                       |
| mFlexPIFA                | EFA2400A3S-10MH4L                                 | Ezurio (Laird Connectivity) | PIFA              | IPEX MHF4L | 2 dBi                          |
| i-FlexPIFA™ Mini Series  | EFG2401A3S-10MH4L                                 | Ezurio (Laird Connectivity) | i-FlexPIFA        | IPEX MHF4L | 2 dBi                          |
| Embedded Virtual Antenna | NN00-101                                          | IGNION                      | PCB Trace Antenna | N/A        | 3.2 dBi                        |

## 19 Ordering Information

Table 8: Vela IF310 Ordering Part Numbers

| Part         | Description                                             |
|--------------|---------------------------------------------------------|
| 453-00390R   | Module, Vela IF310, Integrated Antenna, Tape and Reel   |
| 453-00390C   | Module, Vela IF310, Integrated Antenna, Cut Tape        |
| 453-00391R   | Module, Vela IF310, MHF4, Tape and Reel                 |
| 453-00391C   | Module, Vela IF310, MHF4, Cut Tape                      |
| 453-00392R   | Module, Vela IF310, Trace Pin, Tape and Reel            |
| 453-00392C   | Module, Vela IF310, Trace Pin, Cut Tape                 |
| 453-00390-K1 | Development Kit, Module, Vela IF310, Integrated Antenna |
| 453-00391-K1 | Development Kit, Module, Vela IF310, MHF4               |

### 19.1 General Comments

This is a preliminary datasheet. Please check with Ezurio for the latest information before commencing a design. If in doubt, ask. For additional information visit [Vela IF310 product page](#).

## 20 Bluetooth Qualification Process

### 20.1 Overview

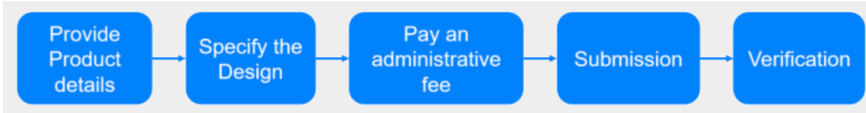
The Bluetooth Qualification Process promotes global product interoperability and reinforces the strength of the Bluetooth® brand and ecosystem to the benefit of all Bluetooth SIG members. The Bluetooth Qualification Process helps member companies ensure their products that incorporate Bluetooth technology comply with the Bluetooth Patent & Copyright License Agreement and the Bluetooth Trademark License Agreement (collectively, the Bluetooth License Agreement) and Bluetooth Specifications.

The Bluetooth Qualification Process is defined by the [Qualification Program Reference Document \(QPRD\) v3](#).

To demonstrate that a product complies with the Bluetooth Specification(s), each member must for each of its products:

- Identify the product, the design included in the product, the Bluetooth Specifications that the design implements, and the features of each implemented specification
- Complete the Bluetooth Qualification Process by submitting the required documentation for the product under a user account belonging to your company

The Bluetooth Qualification Process consists of the phases shown below:



To complete the Qualification Process the company developing a Bluetooth End Product shall be a member of the Bluetooth SIG. To start the application please use the following link: [Apply for Adopter Membership](#)

### 20.2 Scope

This guide is intended to provide guidance on the Bluetooth Qualification Process for End Products that reference multiple existing designs, that have not been modified, (refer to Section 3.2.2.1 of the [Qualification Program Reference Document v3](#)).

For a Product that includes a new Design created by combining two or more unmodified designs that have DNs or QDIDs into one of the permitted combinations in Table 3.1 of the QPRDv3, a Member must also provide the following information:

- DNs or QDIDs for Designs included in the new Design
- The desired Core Configuration of the new Design (if applicable, see Table 3.1 below)
- The active TCRL Package version used for checking the applicable Core Configuration (including transport compatibility) and evaluating test requirements

Any included Design must not implement any Layers using withdrawn specification(s).

When creating a new Design using Option 2a, the Inter-Layer Dependency (ILD) between Layers included in the Design will be checked based on the latest TCRL Package version used among the included Designs.

For the purposes of this document, it is assumed that the member is combining unmodified Core-Controller Configuration and Core-Host Configuration designs, to complete a Core-Complete Configuration.

### 20.3 Qualification Steps When Referencing multiple existing designs, (unmodified) – Option 2a in the QPRDv3

For this qualification option, follow these steps:

1. To start a listing, go to: <https://qualification.bluetooth.com/>
2. Select **Start the Bluetooth Qualification Process**.
3. Product Details to be entered:
  - Project Name (this can be the product name or the Bluetooth Design name).
  - Product Description
  - Model Number
  - Product Publication Date (the product publication date may not be later than 90 days after submission)
  - Product Website (optional)
  - Internal Visibility (this will define if the product will be visible to other users prior to publication)
  - If you have multiple End Products to list then you can select 'Import Multiple Products', firstly downloading and completing the template, then by 'Upload Product List'. This will populate Qualification Workspace with all your products.
4. Specify the Design:

- Do you include any existing Design(s) in your Product? Answer Yes, I do.
  - Enter the multiple DNs or QDIDs used in your, (for Option 2a two or more DNs or QDIDs must be referenced)
  - Select 'I'm finished entering DN's
  - Once the DNs or QDIDs are selected they will appear on the left-hand side, indicating the layers covered by the design (should show Core-Controller and Core Host Layers covered).
  - What do you want to do next? Answer, 'Combine unmodified Designs'.
  - The Qualification Workspace Tool will indicate that a new Design will be created and what type of Core-Complete configuration is selected.
  - An active TCRL will be selected for the design.
  - Perform the Consistency Check, which should result in no inconsistencies
  - If there are any inconsistencies these will need to be resolved before proceeding
  - Save and go to Test Plan and Documentation
5. Test Plan and Documentation
- a. As no modifications have been made to the combined designs the tool should report the following message:  
'No test plan has been generated for your new Design. Test declarations and test reports do not need to be submitted. You can continue to the next step.'
  - b. Save and go to Product Qualification fee
6. Product Qualification Fee:
- It's important to make sure a Prepaid Product Qualification fee is available as it is required at this stage to complete the Qualification Process.
  - Prepaid Product Qualification Fee's will appear in the available list so select one for the listing.
  - If one is not available select 'Pay Product Qualification Fee', payment can be done immediately via credit card, or you can pay via Invoice. Payment via credit will release the number immediately, if paying via invoice the number will not be released until the invoice is paid.
  - Once you have selected the Prepaid Qualification Fee, select 'Save and go to Submission'
7. Submission:
- Some automatic checks occur to ensure all submission requirements are complete.
  - To complete the listing any errors must be corrected
  - Once you have confirmed all design information is correct, tick all of the three check boxes and add your name to the signature page.
  - Now select 'Complete the Submission'.
  - You will be asked a final time to confirm you want to proceed with the submission, select 'Complete the Submission'.
  - Qualification Workspace will confirm the submission has been submitted. The Bluetooth SIG will email confirmation once the submission has been accepted, (normally this takes 1 working day).
8. Download Product and Design Details (SDoC):
- a. You can now download a copy of the confirmed listing from the design listing page and save a copy in your Compliance Folder

For further information, please refer to the following webpage:

<https://www.bluetooth.com/develop-with-bluetooth/qualification-listing/>

## 20.4 Example Design Combinations

The following gives an example of a design possible under option 2a:

Ezurio Controller Subsystem + AIROC™ Bluetooth Host Software Stack (Ezurio Vela IF310-based design)

| Design Name                          | Owner    | Declaration ID | QD ID  | Link to listing on the SIG website                                                                                                |
|--------------------------------------|----------|----------------|--------|-----------------------------------------------------------------------------------------------------------------------------------|
| Vela IF310                           | Ezurio   |                |        |                                                                                                                                   |
| AIROC™ Bluetooth Host Software Stack | Infineon | D065385        | 223736 | <a href="https://qualification.bluetooth.com/ListingDetails/194929">https://qualification.bluetooth.com/ListingDetails/194929</a> |

## 20.5 Qualify More Products

If you develop further products based on the same design in the future, it is possible to add them free of charge. The new product must not modify the existing design i.e add ICS functionality, otherwise a new design listing will be required.

To add more products to your design, select 'Manage Submitted Products' in the **Getting Started** page, Actions, Qualify More Products. The tool will take you through the updating process.

## 21 453-00171 Integrated Printed Antenna Performance

The following are details and plots of the measured radiation performance of the antenna on the Vela IF310 module with integrated printed antenna (part numbers 453-00171R and 453-00171C).

### 21.1 Summary of Antenna Performance

| Technical Feature         | 2400 MHz – 2500 MHz      |
|---------------------------|--------------------------|
| Average Efficiency        | >60 %                    |
| Peak Gain                 | 3.2                      |
| VSWR                      | < 3:1                    |
| Radiation Pattern         | Omnidirectional          |
| Polarization              | Linear                   |
| Weight (approx.)          | 0 g.                     |
| Temperature               | -40 to +125°C            |
| Impedance                 | 50 $\Omega$              |
| Dimensions<br>(L x W x H) | 2.5 mm x 2.4 mm x 0.6 mm |

**Note:** The result is measured with Ezurio DVK part # 453-00171-K1.

### 21.2 2.4GHz Radiated Performance and Peak Gain

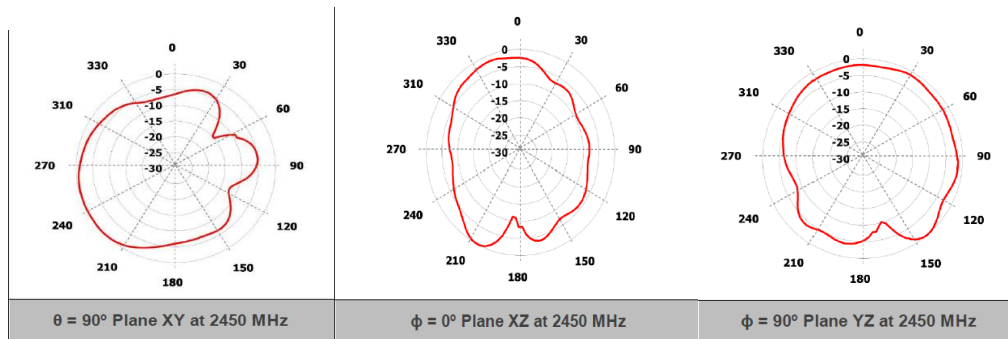


Figure 16: 2450 MHz radiation pattern

已註解 [JK10]: @Jonathan Kaye Correct this description to "Printed" instead of "Chip".

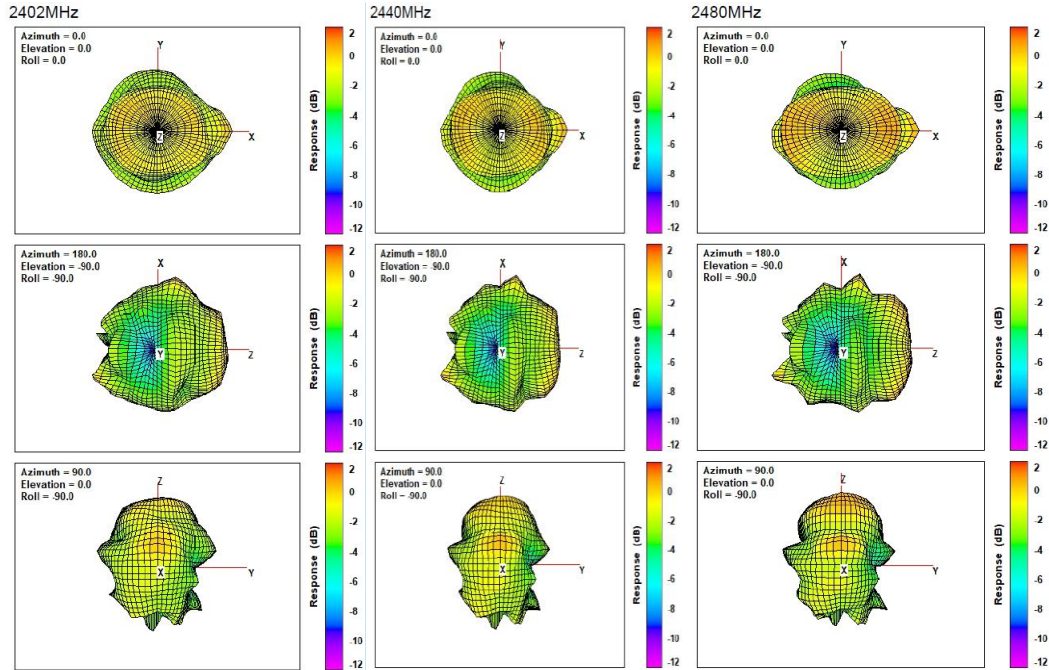


Figure 32: 2402 MHz 3D pattern

Figure 33: 2440 MHz 3D pattern

Figure 34: 2480 MHz 3D pattern

已註解 [JK11]: @Jonathan Kaye The 3D pattern of the Ignition PCB printed antenna used in the Vela IF310 module is shown in Figures 32~34. (PS: Tested by Sporton.)

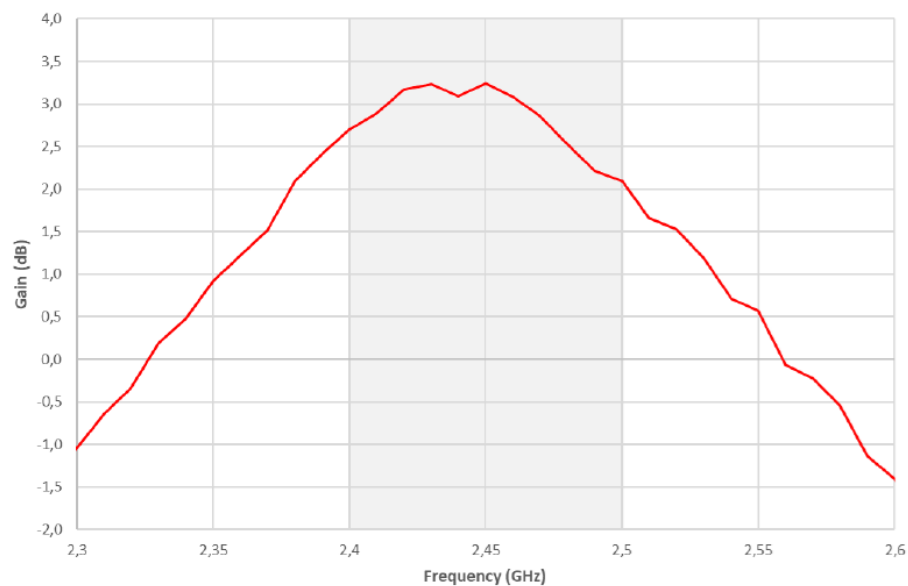


Figure 17: Peak Gain

## 22 Regulatory Statement

### 22.1 Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

**FCC Caution:** Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the

following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

**IMPORTANT NOTE:**

**FCC Radiation Exposure Statement:**

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance **6mm** between the radiator & your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

## 22.2 Integration instructions for host product manufacturers

### Applicable FCC rules to module

FCC Part 15.247

### Summarize the specific operational use conditions

This device is intended only for OEM integrators under the following conditions:

- 1) The transmitter module may not be co-located with any other transmitter or antenna

As long as 1 condition above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

**IMPORTANT NOTE:** In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID can not be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization. The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.

The end user manual shall include all required regulatory information/warning as show in this manual.

### Limited module procedures

Not applicable

### Trace antenna designs

Not applicable

### RF exposure considerations

Co-located issue shall be met as mentioned in "Summarize the specific operational use conditions".

Product manufacturer shall provide below text in end-product manual

"FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance **6mm** between the radiator & your body.

### Antennas

| Module                     | Antenna           | Material   | Distance |
|----------------------------|-------------------|------------|----------|
| Ezurio / EBL2400A1-10MH4L  | PCB Dipole        | IPEX MHF4  | 2        |
| Ezurio / 001-0022          | FlexPIFA          | IPEX MHF4L | 2        |
| Mag.Layers / 0600-00057    | Dipole            | IPEX MHF4  | 2.32     |
| Ezurio / EFA2400A3S-10MH4L | FlexPIFA          | IPEX MHF4L | 2        |
| Ezurio / EFG2401A3S-10MH4L | i-FlexPIFA        | IPEX MHF4L | 2        |
| Ignion / NN00-101          | PCB Trace Antenna | NA         | 3.2      |

### Label and Compliance Information

Product manufacturers need to provide a physical or e-label stating

"Contains FCC ID: [SQG-VELAIF310](#)" with finished product

#### Information on Test Modes and Additional Testing Requirements

Test tool: **AIROC**, Version: **1.2.0.2890** shall be used to set the module to transmit continuously.

### 22.3 Additional Testing, Part 15 Subpart B Disclaimer

The module is only FCC authorized for the specific rule parts listed on the grant, and that the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. The final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed

## 22.4 Industry Canada statement:

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

- (1) This device may not cause interference
- (2) This device must accept any interference, including interference that may cause undesired operation of the device

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

- (1) L'appareil ne doit pas produire de brouillage;
- (2) L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

### Radiation Exposure Statement:

This equipment complies with Canada radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with **minimum distance 15 mm** between the radiator & your body.

### Déclaration d'exposition aux radiations:

Cet équipement est conforme Canada limites d'exposition aux radiations dans un environnement non contrôlé. Cet équipement doit être installé et utilisé à distance **minimum de 15 mm** entre le radiateur et votre corps.

This device is intended only for OEM integrators under the following conditions:

1) The transmitter module may not be co-located with any other transmitter or antenna.

As long as 1 condition above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

Cet appareil est conçu uniquement pour les intégrateurs OEM dans les conditions suivantes:

1) Le module émetteur peut ne pas être coïmplanté avec un autre émetteur ou antenne.

Tant que les 1 condition ci-dessus sont remplies, des essais supplémentaires sur l'émetteur ne seront pas nécessaires. Toutefois, l'intégrateur OEM est toujours responsable des essais sur son produit final pour toutes exigences de conformité supplémentaires requis pour ce module installé.

#### IMPORTANT NOTE:

In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter), then the Canada authorization is no longer considered valid and the IC ID can not be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate Canada authorization.

#### NOTE IMPORTANTE:

Dans le cas où ces conditions ne peuvent être satisfaites (par exemple pour certaines configurations d'ordinateur portable ou de certaines co-localisation avec un autre émetteur), l'autorisation du Canada n'est plus considéré comme valide et l'ID IC ne peut pas être utilisé sur le produit final. Dans ces circonstances, l'intégrateur OEM sera chargé de réévaluer le produit final (y compris l'émetteur) et l'obtention d'une autorisation distincte au Canada.

#### End Product Labeling

The final end product must be labeled in a visible area with the following: "Contains IC:3147A-VELAIF310".

#### Plaque signalétique du produit final

Le produit final doit être étiqueté dans un endroit visible avec l'inscription suivante: "Contient des IC: 3147A-VELAIF310".

#### Manual Information to the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.

The end user manual shall include all required regulatory information/warning as show in this manual.

#### Manuel d'information à l'utilisateur final

L'intégrateur OEM doit être conscient de ne pas fournir des informations à l'utilisateur final quant à la façon d'installer ou de supprimer ce module RF dans le manuel de l'utilisateur du produit final qui intègre ce module.

Le manuel de l'utilisateur final doit inclure toutes les informations réglementaires requises et avertissements comme indiqué dans ce manuel.

This radio transmitter [IC: 3147A-VELAIF310] has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Le présent émetteur radio [IC: 3147A-VELAIF310] a été approuvé par Innovation, Sciences et Développement économique Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal. Les types d'antenne non inclus dans cette liste, et dont le gain est supérieur au gain maximal indiqué pour tout type figurant sur la liste, sont strictement interdits pour l'exploitation de l'émetteur.

#### Antenna

|                            |                   |            |      |
|----------------------------|-------------------|------------|------|
| Ezurio / EBL2400A1-10MH4L  | PCB Dipole        | IPEX MHF4  | 2    |
| Ezurio / 001-0022          | FlexPIFA          | IPEX MHF4L | 2    |
| Mag.Layers / 0600-00057    | Dipole            | IPEX MHF4  | 2.32 |
| Ezurio / EFA2400A3S-10MH4L | FlexPIFA          | IPEX MHF4L | 2    |
| Ezurio / EFG2401A3S-10MH4L | i-FlexPIFA        | IPEX MHF4L | 2    |
| Ignion / NN00-101          | PCB Trace Antenna | NA         | 3.2  |

## 22.5 Europe – EU Declaration of Conformity

This device complies with the essential requirements of the Radio Equipment directive: 2014 / 53 / EU. The following test methods have been applied in order to prove presumption of conformity with the essential requirements of the Radio Equipment directive: **2014 / 53 / EU**:

EN 300 328 V2.2.2  
(BS)EN 50385 2017  
(BS)EN 50665 2017  
(BS)EN 62311 2008  
EN 300 330 V2.1.1  
EN 301 489-1 V2.2.3  
EN 301 489-17 V3.3.1  
IEC 62368-1:2018; and/or  
(BS) EN IEC 62368-1:2020+A11:2020

BT EDR: 9.46 dBm  
BT LE: 9.85 dBm

SW version: CYW55500A1\_001.002.032.0233.0096.hcd

### RF exposure statement

The product comply with the RF exposure limit and is safe for intended operation as described in this manual. The further RF exposure reduction can be achieved if the product can be kept as far as possible from the user body.

## 23 Additional Information

Please contact your local sales representative or our support team for further assistance:

|                   |                                                                                               |
|-------------------|-----------------------------------------------------------------------------------------------|
| Headquarters      | Ezurio<br>50 S. Main St. Suite 1100<br>Akron, OH 44308 USA                                    |
| Website           | <a href="http://www.ezurio.com">http://www.ezurio.com</a>                                     |
| Technical Support | <a href="http://www.ezurio.com/resources/support">http://www.ezurio.com/resources/support</a> |
| Sales Contact     | <a href="http://www.ezurio.com/contact">http://www.ezurio.com/contact</a>                     |

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