



# AXON AIR BLE Module User Manual



## Features:

Bluetooth® 5, IEEE 802.15.4-2006, 2.4 GHz transceiver.

Buttons and LEDs for user interaction.

I/O interface and NFC interface for user to expand.

Support backup battery power supply.

Support SEGGER J-Link debug interface.

CE/FCC/IC compliant.



## Hardware Specifications:

<p><b>Bluetooth 5.0 Low Energy Standard:</b> IEEE 802.15.4</p> <p><b>Frequency Band:</b> 2.402GHz to 2.480GHz CH: 0~39 Frequency Spacing: 2MHz</p> <p><b>Supported data rates:</b> 1 Mbps</p> <p><b>Power:</b> DC 3.3V from mini PCIe interface (backup battery 225mAh)</p>	<p><b>Receiver Sensitivity:</b> -95 dBm sensitivity in 1 Mbps Bluetooth® low energy mode</p> <p><b>Antenna:</b> MMCX connector *2</p> <p><b>CPU:</b> ARM® Cortex®-M4 32-bit processor with FPU, 64 MHz</p> <p><b>Working Temperature:</b> -20 ~ 70°C</p> <p><b>Storage Humidity :</b> 10% ~ 90%</p>
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## Software Specifications:



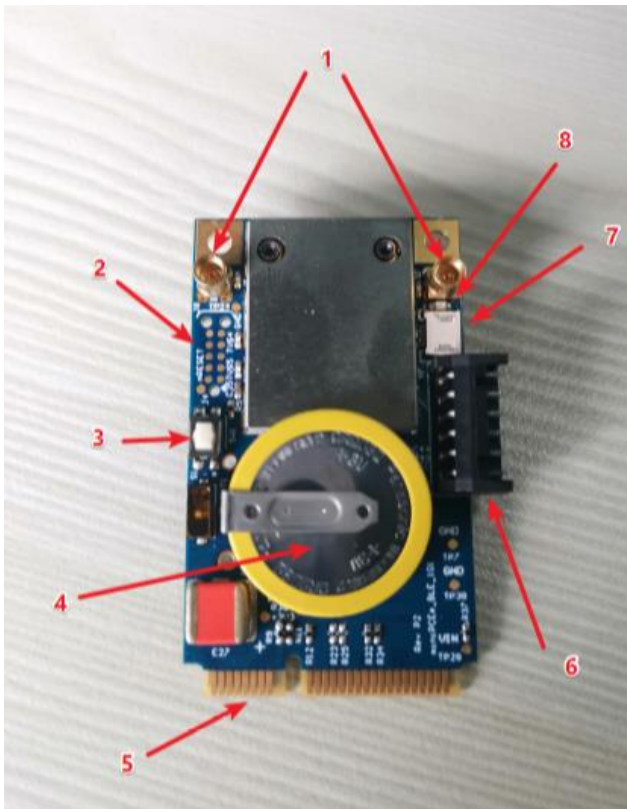
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<p><b>RF Work Mode:</b></p> <p>TX: Bypass Mode/Low Power Mode/High Power Mode</p> <p>RX: Bypass Mode/LNA Mode</p> <p><b>Antenna Select:</b></p> <p>Can select ANT1/ANT2/Sleep Mode</p>	<p><b>Beacon Transmit Configuration:</b></p> <p>Configure iBeacon/Eddy stone / customized Beacon.</p> <p><b>Beacon Scan</b></p> <p>Scan and receive BLE beacons.</p>
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## Specification Table

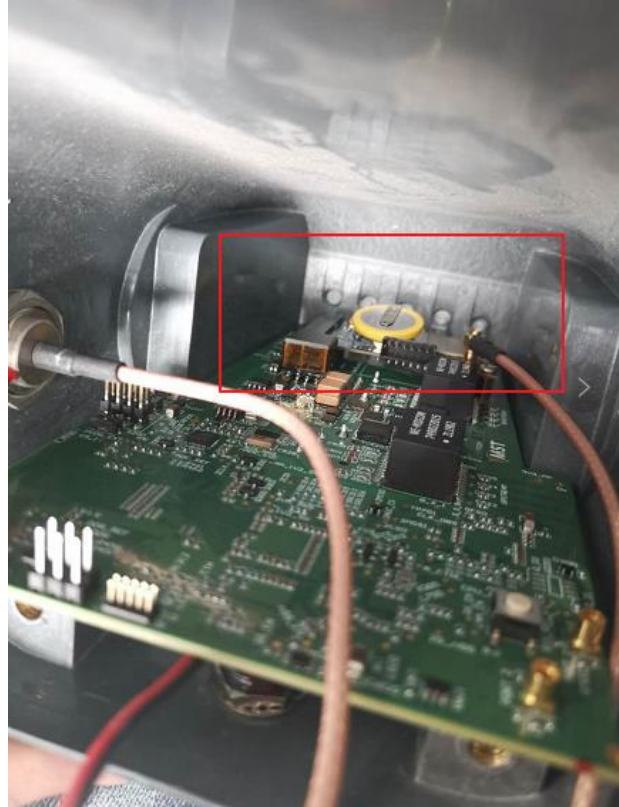
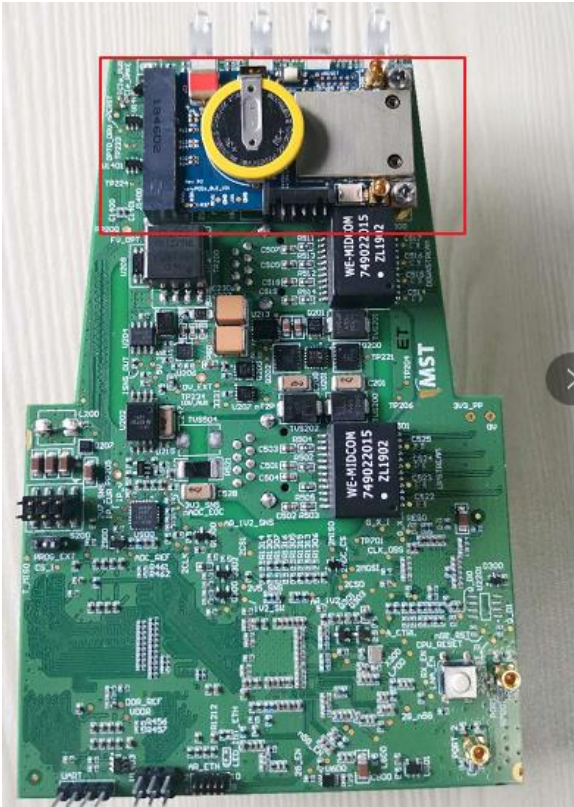
Item	Description
Type	BLE Module
Size (mm)	30 mm * 51mm
Weight (g)	9.7 g
Control Port	Mini PCIe
Power Supply	DC 3.3V
Antenna	2 external antennas
Bluetooth Port	Bluetooth 5.0 Low Energy
User interface	J-Link/NFC/IO Expansion
Battery Capacity (mAh)	225 mAh
Working Temperature	-20 C ~ 70 °C

## BLE Module Outward



Number	Description
1	Antenna Connectors
2	J-Link Interface
3	Button
4	Battery
5	Mini PCIe Interface
6	IO Expansion Interface
7	NFC Interface
8	LED

## Final Product Sample Example





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## **Federal Communications Commission (FCC) 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 generate, 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.

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.

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.

### **RF exposure warning**

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.





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**Industry Canada (IC)**

CAN ICES-3 (B)/NMB-3(B)

This device complies with Industry Canada's licence-exempt RSSs. 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.

Cet appareil est conforme à la norme RSS d'Industrie Canada. Son fonctionnement est sujet aux deux conditions suivantes:

- (1) le dispositif ne doit pas produire de brouillage préjudiciable, et
- (2) le dispositif doit accepter tout brouillage reçu, y compris un brouillage susceptible de provoquer un fonctionnement indésirable.

**IMPORTANT NOTE:**

Radiation Exposure Statement:

This equipment complies with IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.

Déclaration d'exposition aux radiations:

Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20cm de distance entre la source de rayonnement et votre corps.

## Federal Communications Commission (FCC) Interference Statement

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 UNDESIRE OPERATION.

NOTE: THE GRANTEE IS NOT RESPONSIBLE FOR ANY CHANGES OR MODIFICATIONS NOT EXPRESSLY APPROVED BY THE PARTY RESPONSIBLE FOR COMPLIANCE. SUCH MODIFICATIONS COULD VOID THE USER'S AUTHORITY TO OPERATE THE EQUIPMENT.

For additional hosts other than the specific host originally granted with a limited module, a Class II permissive change is required on the module grant to register the additional host as a specific host also approved with the module. The host must meet the necessary requirements to satisfy the module limiting conditions: shield and power supply regulation.

The module is limited to OEM installation ONLY. The OEM integrator is responsible for ensuring the end user has no manual instructions to remove or install module.

## Regulatory Module Integration Instructions

This module has been granted modular approval for mobile applications. OEM integrators for host products may use the module in their final products without additional FCC / IC (Industry Canada) certification if they meet the following conditions. Otherwise, additional FCC / IC approvals must be obtained.

- The host product with the module installed must be evaluated for simultaneous transmission requirements.
- The user manual for the host product must clearly indicate the operating requirements and conditions that must be observed to ensure compliance with current FCC / IC RF exposure guidelines.
- To comply with FCC / IC regulations limiting both maximum RF output power and human exposure to RF radiation, the maximum antenna gain including cable loss in a mobile-only exposure condition must not exceed *the specification as below*.

Antenna Type	Model No.	Manufacturer	Frequency Band (MHz)	Ant 0 Gain (dBi)
Omni Antenna	ANT795-4MX	SIEMENS	2402 ~ 2480	2.5

- A label must be affixed to the outside of the host product with the following statements:

This device contains FCC ID: *N73-AP60-BLE*

This equipment contains equipment certified under IC: *7449B-AP60BLE*

The final host / module combination may also need to be evaluated against the FCC Part 15B criteria for unintentional radiators in order to be properly authorized for operation as a Part 15 digital device.

If the final host / module combination is intended for use as a portable device (see classifications below) the host manufacturer is responsible for separate approvals for the SAR requirements from FCC Part 2.1093 and RSS-102.

## Device Classifications

Since host devices vary widely with design features and configurations module integrators shall follow the guidelines below regarding device classification and simultaneous transmission and seek guidance from their preferred regulatory test lab to determine how regulatory guidelines will impact the device compliance. Proactive management of the regulatory process will minimize unexpected schedule delays and costs due to unplanned testing activities.

The module integrator must determine the minimum distance required between their host device and the user's body. The FCC provides device classification definitions to assist in making the correct determination. Note that these classifications are guidelines only; strict adherence to a device classification may not satisfy the regulatory requirement as near-body device design details may vary widely. Your preferred test lab will be able to assist in determining the appropriate device category for your host product and if a KDB or PBA must be submitted to the FCC.

Note, the module you are using has been granted modular approval for mobile applications. Portable applications may require further RF exposure (SAR) evaluations. It is also likely that the host / module combination will need to undergo testing for FCC Part 15 regardless of the device classification. Your preferred test lab will be able to assist in determining the exact tests which are required on the host / module combination.

## FCC Definitions

**Portable:** (§2.1093) — A portable device is defined as a transmitting device designed to be used so that the radiating structure(s) of the device is / are within 20 centimeters of the body of the user.

**Mobile:** (§2.1091) (b) — A mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons. Per §2.1091d(d)(4) In some cases (for example, modular or desktop transmitters), the potential conditions of use of a device may not allow easy classification of that device as either Mobile or Portable. In these cases, applicants are responsible for determining minimum distances for compliance for the intended use and installation of the device based on evaluation of either specific absorption rate (SAR), field strength, or power density, whichever is most appropriate.

# Simultaneous Transmission Evaluation

This module has **not** been evaluated or approved for simultaneous transmission as it is impossible to determine the exact multi-transmission scenario that a host manufacturer may choose. Any simultaneous transmission condition established through module integration into a host product **must** be evaluated per the requirements in KDB447498D01(8) and KDB616217D01, D03 (for laptop, notebook, netbook, and tablet applications).

These requirements include, but are not limited to:

- Transmitters and modules certified for mobile or portable exposure conditions can be incorporated in mobile host devices without further testing or certification when:
- The closest separation among all simultaneous transmitting antennas is  $\geq 20$  cm,

Or

- Antenna separation distance and MPE compliance requirements for **ALL** simultaneous transmitting antennas have been specified in the application filing of at least one of the certified transmitters within the host device. In addition, when transmitters certified for portable use are incorporated in a mobile host device, the antenna(s) must be  $\geq 5$  cm from all other simultaneous transmitting antennas.
- All antennas in the final product must be at least 20 cm from users and nearby persons.