



# ATBM6132 Wi-Fi + BLE Module User Manual

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AltoBeam Inc.

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#### **REVISION HISTORY**

Revision Number	Revision Date	Changes	
		Item	Description
V1.0	2024-03-15		Official release version

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# 1 Overview

ATBM6132 module is a highly integrated 2.4&5GHz dual band 802.11a/b/g/n and BLE v4.2 WLAN transceiver with USB interface (USB 2.0 compliant). The ATBM6132 provides a complete solution for wireless LAN application with remarkable performance and reliability.

## 2 General specifications

Wi-Fi chip	AltoBeam ATBM6132-BU
Host interface	USB 2.0
Operation range	More than 150 meters in open space
RF antenna	External antenna (2.4GHz 50Ohm Resistance)
Security	WPA, WPA2, WPA3 personal
Power supply requirement	3.3VDC 800mA
Operating temperature	-40 ~ +85°C ambient temperature
Storage temperature	-50~ +125°C ambient temperature
Humidity	5% to 90% maximum (non-condensing)
Dimension	Typical L13.00*W12.20*H1.75mm ( $\pm 0.2\text{mm}$ )

## 3 RF specifications

### 3.1 2.4GHz Wi-Fi Specification

General Specification	
Operating frequency	2.4 to 2.4835 GHz
Standard	IEEE 802.11b/g/n 1T1R
Operation mode	STA (Station)
Modulation	802.11b (DSSS): DBPSK, DQPSK, CCK 802.11g/n (OFDM): BPSK, QPSK, 16QAM, 64QAM
Bandwidth	802.11b/g/n HT20: $\leq 20\text{MHz}$ 802.11n HT40: $\leq 40\text{MHz}$
PHY data rates	802.11b: 1, 2, 5.5, 11Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54Mbps 802.11n HT20: MCS0 to MCS7, 6.5 to 72.2Mbps 802.11n HT40: MCS0 to MCS7, 13.5 to 150Mbps
Frequency offset	$\leq \pm 10\text{ppm}$

### 3.2 5GHz Wi-Fi Specification

General specification	
Operating frequency	5.15 ~ 5.25GHz; 5.25 ~ 5.35GHz; 5.47~5.725GHz; 5.725~5.85GHz
Standard	IEEE 802.11a/n 1T1R
Modulation	802.11a/n (OFDM): BPSK, QPSK, 16QAM, 64QAM
Bandwidth	802.11a/n HT20: $\leq 20\text{MHz}$ 802.11n HT40: $\leq 40\text{MHz}$
PHY data rates	802.11a: 6, 9, 12, 18, 24, 36, 48, 54Mbps 802.11n HT20: MCS0~7, 6.5 ~ 72.2Mbps 802.11n HT40: MCS0~7, 13.5 ~ 150Mbps
Frequency offset	$\leq \pm 10\text{ppm}$

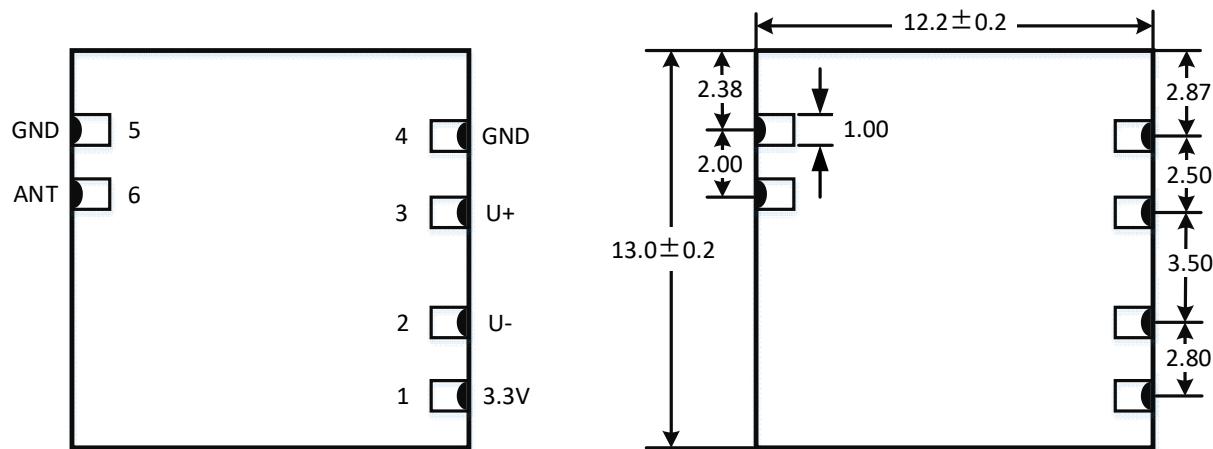
### 3.3 BLE Specification

Standard	Bluetooth LE v4.2
Operating frequency	2.4 to 2.4835GHz
Modulation	GFSK
PHY data rates	1Mbps

## 4 Mechanical Specification

### 4.1 Outline drawing

The typical dimension of module is 12.2mm(L)x13.0mm(W)x1.7mm(H) ( $\pm 0.2\text{mm}$ )



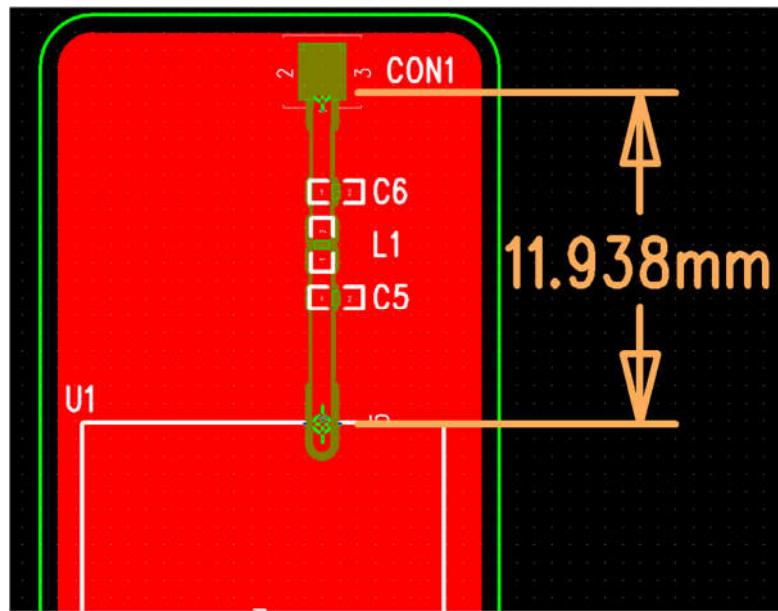
Outline drawing (Top View)

### 4.2 Pin definition

Pin Number	Pin Name	Pin Description
1	3.3V	3.3V DC power supply input
2	U-	USB Data DN
3	U+	USB Data DP
4	GND	Ground
5	RF GND	RF ground
6	ANT	Wi-Fi antenna interface (2.4GHz/5GHz 50ohm)

## 5 Wi-Fi Antenna

This module needs to connect with an external Wi-Fi antenna supporting both 2.4GHz and 5GHz bands. The following figure is the PCB layout reference design of microstrip line between the module's antenna pin and IPEX antenna connector, the length of the microstrip line is required to be less than 20mm, and it should be as straight as possible. If there must be a corner, the angle is required to be greater than 120 degrees. The impedance of the microstrip line must be 50ohm for both 2.4GHz and 5GHz, and there is a complete reference ground plane under microstrip line. In order to optimize RF performance, the ground under IPEX antenna connector needs to be removed.



Antenna microstrip line PCB layout

## 6 FCC warning statement

### Important Notice to OEM integrators

1. This module is limited to OEM installation ONLY.
2. This module is limited to installation in mobile or fixed applications, according to Part 2.1091(b).
3. The separate approval is required for all other operating configurations, including portable configurations with respect to Part 2.1093 and different antenna configurations
4. For FCC Part 15.31 (h) and (k): The host manufacturer is responsible for additional testing to verify compliance as a composite system. When testing the host device for compliance with Part 15 Subpart B, the host manufacturer is required to show compliance with Part 15 Subpart B while the transmitter module(s) are installed and operating. The modules should be transmitting and the evaluation should confirm that the module's intentional emissions are compliant (i.e. fundamental and out of band emissions). The host manufacturer must verify that there are no additional unintentional emissions other than what is permitted in Part 15 Subpart B or emissions are complaint with the transmitter(s) rule(s).

The Grantee will provide guidance to the host manufacturer for Part 15 B requirements if needed.

### Important Note

notice that any deviation(s) from the defined parameters of the antenna trace, as described by the instructions, require that the host product manufacturer must notify to AltoBeam that they wish to change the antenna trace design. In this case, a Class II permissive change application is required to be filed by the USI, or the host manufacturer can take responsibility through the change in FCC ID (new application) procedure followed by a Class II permissive change application.

### End Product Labeling

When the module is installed in the host device, the FCC ID label must be visible through a window on the final device or it must be visible when an access panel, door or cover is easily re-moved. If not, a second label must be placed on the outside of the final device that contains the following text: "Contains FCC ID: 2BAVSATBM6132" The FCC ID can be used only when all FCC compliance requirements are met.

### Antenna Installation

- (1) The antenna must be installed such that 20 cm is maintained between the antenna and users,
- (2) The transmitter module may not be co-located with any other transmitter or antenna.
- (3) Only antennas of the same type and with equal or less gains as shown below may be used with this module. Other types of antennas and/or higher gain antennas may require additional authorization for operation.

Antenna type	2.4GHz band Peak Gain (dBi)	5.2GHz band Peak Gain (dBi)	5.3GHz band Peak Gain (dBi)	5.5GHz band Peak Gain (dBi)	5.8GHz band Peak Gain (dBi)
Rod antenna	2.52	3.40	2.88	3.67	2.88

In the event that these conditions cannot 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 cannot 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.

## **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.

## **Federal Communication Commission 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 undesired operation.

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.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

## **List of applicable FCC rules**

This module has been tested and found to comply with part 15.247 and 15.407 requirements for Modular Approval. The modular transmitter is only FCC authorized for the specific rule parts (i.e., FCC transmitter rules) 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. If the grantee markets their product as being Part 15 Subpart B compliant (when it also contains unintentional-radiator digital circuitry), then the grantee shall provide a notice stating that the final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.

## **This device is intended only for OEM integrators under the following conditions: (For**

## **module device use)**

- 1) The antenna must be installed such that 20 cm is maintained between the antenna and users, and
- 2) The transmitter module may not be co-located with any other transmitter or antenna.

As long as 2 conditions 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.

## **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 20 cm between the radiator & your body.