



User Manual

ATBM6162 Module

1T1R 2.4&5GHz WiFi6+BLE

WRITTEN	CHECKED	APPROVED

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AltoBeam Inc.

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REVISION HISTORY

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		Item	Description
1.0	2025-08-04		Formal release

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1 Overview

ATBM6162 module is a highly integrated 2.4&5GHz dual band, WiFi 4/5/6 (802.11 a/b/g/n/ac/ax), 20MHz and 40MHz bandwidth Wireless LAN (WLAN) device with USB 2.0 interface, based on AltoBeam's ATBM6162 chip. ATBM6162 supports Bluetooth LE v5.0, Long range (Coded PHY), and WiFi pairing via BLE.

2 General specifications

Main chip	AltoBeam ATBM6162
Host interface	USB 2.0
RF antenna	External 2.4&5GHz dual band antenna
Security	WPA, WPA2, WPA3 personal
Power supply requirement	3.3VDC 600mA
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*H1.90mm (±0.2mm)

3 RF specifications

3.1 2.4GHz WiFi specifications

General specification	
Operating frequency	2412~2462MHz, 2422~2452MHz
Standard	IEEE 802.11b/g/n/ax 1T1R
Modulation	DSSS, OFDM, OFDMA
Bandwidth	802.11b/g: ≤20MHz 802.11n/ax: ≤40MHz
PHY data rates	802.11b: 1, 2, 5.5, 11Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54Mbps 802.11n: MCS0~7, up to 150Mbps 802.11ax: MCS0~11, up to 286.8Mbps
Frequency offset	≤±10ppm

3.2 5GHz WiFi specifications

General specification	
Operating frequency	5.15 ~ 5.25GHz; 5.25 ~ 5.35GHz; 5.47~5.725GHz; 5.725~5.850GHz
Standard	IEEE 802.11a/n/ac/ax 1T1R
Modulation	802.11a/n/ac/ax (OFDM, OFDMA): BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM
Bandwidth	802.11a: $\leq 20\text{MHz}$ 802.11n/ac/ax: $\leq 40\text{MHz}$
PHY data rates	802.11a: 6, 9, 12, 18, 24, 36, 48, 54Mbps 802.11n: MCS0~7, up to 150Mbps 802.11ac: MCS0~9, up to 200Mbps 802.11ax: MCS0~11, up to 286.8Mbps
Frequency offset	$\leq \pm 10\text{ppm}$

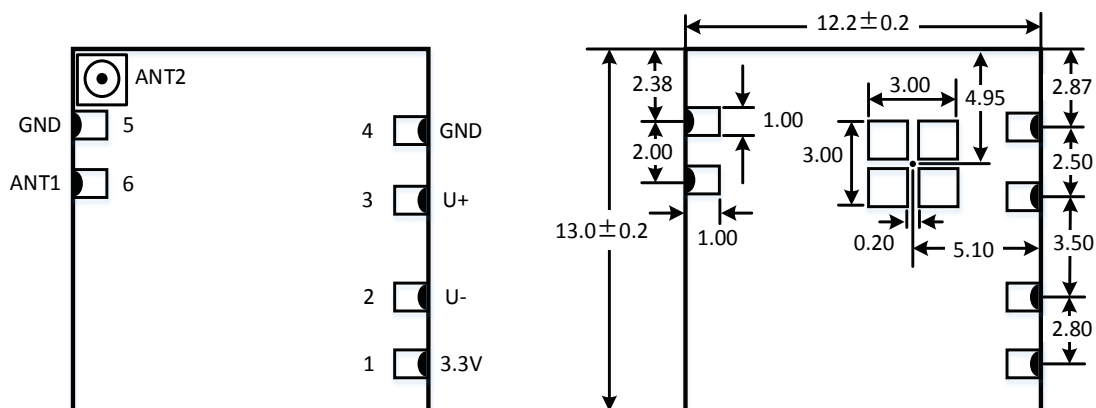
3.3 BLE RF specifications

Operating frequency	2.402 ~ 2.480GHz
Modulation	GFSK
PHY data rates	1Mbps, 2Mbps

4 Mechanical Specification

4.1 Outline drawing

The typical module size of ATBM6162 module is L13.00*W12.20*H1.90mm (± 0.2 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	ANT1 (NC)	NC as default. Connect to external 2.4&5GHz dual band antenna for another model of module.
-	ANT2	IPEX connector to external 2.4&5GHz dual band antenna

The module requires a stable DC 3.3V ($\pm 10\%$) input and can draw up to 600mA during peak operation. The module includes an on-board voltage regulator, which ensures stable RF performance across the specified input voltage range.

5 WiFi Antenna

This module needs to connect with an external WiFi antenna supporting both 2.4GHz and 5GHz bands. The microstrip line of PCB layout 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.

6 FCC warning statement

Important Note

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the 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.

Note: 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 or more 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.

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 20cm between the radiator& your body.

7 Integration instructions for product manufacturers according to KDB 996369 D03

7.1 List of applicable FCC rules

CFR 47 FCC PART 15 SUBPART C and SUBPART E has been investigated.

7.2 Specific operational use conditions

This module is certified for indoor use only, specifically for 5GHz operations in the 5150-5250 MHz and 5250-5350 MHz bands. The integrator must ensure that the host device does not operate these bands outdoors.

7.3 Limited module procedures

The module does not have its own RF shield.

7.4 Trace antenna designs

Not applicable.

7.5 RF exposure considerations

To maintain compliance with FCC' s RF Exposure guidelines, this equipment should be installed and operated with minimum distance of 20cm from your body , and must not be co-located or operating in conjunction with any other antenna or transmitter. For distances less than 20 cm, SAR testing may be necessary depending on the configuration.

7.6 Antennas

This radio transmitter FCC ID: 2BAVS-ATBM6162 has been approved by Federal Communications Commission to operate with the antenna types listed below, with the maximum permissible gain indicated. The antenna is permanently fixed. It cannot be replaced.

No.	Antenna Type	Frequency Range Antenna Gain
1	Dipole antenna	BLE 1M/2M: 2402-2480MHz: 3.17dBi 2.4G WiFi: 2412 -2462MHz, 2422~2452MHz: 3.17dBi 5150-5250MHz: 2.34dBi; 5250-5350MHz: 2.66dBi 5470-5725MHz: 2.39dBi; 5725-5850MHz: 2.57dBi

7.7 Label and compliance information

The product must be labeled in a visible area with the following "Contains FCC ID: 2BAVS-ATBM6162"

7.8 Host Integration Test Plan:

To ensure the final product remains compliant, the integrator must verify, at a minimum, the following parameters during the initial host evaluation or when seeking a C2PC. If any parameter fails to comply, the host design must be corrected, and the grantee must be contacted.

Test Item	Test Conditions and Guidance	Limit
Conducted Output Power	Measure the maximum power at the module antenna port	Shall not exceed the power recorded in the original module grant by more than $\pm 0.5\text{dB}$.
Radiated Spurious Emissions	Focus on non-harmonic and harmonic spurious from 30 MHz to 25 GHz at the worst case mode	Must comply with limits in CFR 47 Part 15.247 / 15.209 / 15.407.
Band-Edge Compliance	Measure radiated power at the lower and upper band edges at the lowest and highest operating channels.	Must comply with limits in CFR 47 Part 15.247 / 15.209 / 15.407.

Note: All tests shall be performed in accordance with the applicable measurement procedures of ANSI C63.10-2020.

7.9 Additional testing, Part 15 Subpart B disclaimer

Module manufacturer is responsible for compliance of the system with module installed with all other applicable requirements for the system such as Part 15 Subpart B.

7.10 C2PC Responsibility Statement

The grantee, AltoBeam Inc., is solely responsible for filing a Class II Permissive Change (C2PC) application for all new host configurations. The integrator must coordinate with AltoBeam before implementing any such changes.

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