User Manual

ATBM6062 Wi-Fi and BLE Module

WRITTEN	CHECKED	APPROVED

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AltoBeam Inc.

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REVISION HISTORY

Revision Number	Revision Date	Changes	
		Item	Description
1.0	2023-03-06		Formal release

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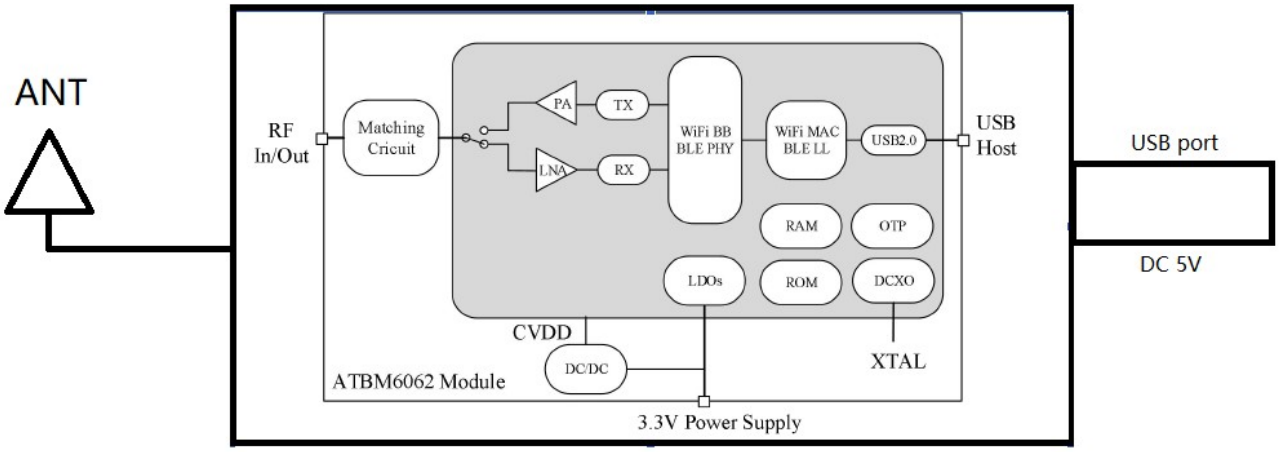
1 Overview

ATBM6062 module is a highly integrated 1T1R 802.11/b/g/n/ax and Bluetooth LE v5.0 device with USB interface (USB 2.0 compliant), based on AltoBeam's ATBM6062-U IC chip.



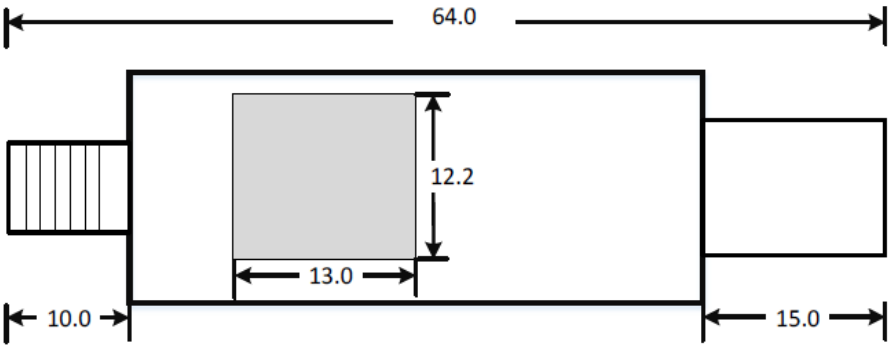
Main chipset	AltoBeam ATBM6062-U Wi-Fi and BLE chip
Operating frequency	2.412 ~ 2.472 GHz
Wi-Fi Standard	IEEE 802.11b/g/n/ax 1T1R
BLE Standard	Bluetooth LE v5.0
Wi-Fi Modulation	802.11b: CCK (11, 5.5Mbps), QPSK (2Mbps), BPSK (1Mbps) 802.11g/n/ax: OFDM
Wi-Fi Bandwidth	802.11b/g/n/ax 20MHz: ≤20MHz 802.11n/ax 40MHz: ≤40MHz
Wi-Fi PHY data rates	802.11b: 1, 2, 5, 11Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54Mbps 802.11n: MSC0~7, up to 150Mbps 802.11ax: MSC0~11, up to 286.8Mbps
Wi-Fi sensitivity	802.11b 1Mbps: -97.5dBm; 802.11b 11Mbps: -90.0dBm; 802.11g 6Mbps: -93.5dBm; 802.11g 54Mbps: -76.5dBm; 802.11n MSC7 HT20: -74.0dBm; 802.11n MSC7 HT40: -71.0dBm 802.11ax MSC11 HE20: -64.0dBm; 802.11ax MSC11 HE40: -60.5dBm
Wi-Fi transmitting power	802.11b 1Mbps: 18dBm; 802.11b 11Mbps: 18dBm; 802.11g 6Mbps: 17dBm; 802.11g 54Mbps: 15dBm; 802.11n HT20 MSC7: 14dBm; 802.11n HT40 MCS7: 14dBm; 802.11ax HT20 MSC11: 13dBm; 802.11ax HT40 MSC11: 13dBm
BLE transmitting power	10dBm

BLE sensitivity	1Mbps: -99.5dBm; 2Mbps: -96.0dBm; Coded-PHY, S=2: -101.5dBm; Coded-PHY, S=8: -106.0dBm
Host interface	USB 2.0
Operation range	More than 150 meters in open space
RF antenna	External antenna (2.4GHz 50Ohm Resistance)
Security	WEP, WPA, WPA2, WPA3 personal
Power consumption	DC3.3V Max.330mA
Operating temperature	-40 ~ +85℃ ambient temperature
Storage temperature	-50~ +125℃ ambient temperature
Humidity	5% to 90% maximum (non-condensing)
Dimension	Typical L13.00*W12.20*H1.70mm

2 Mechanical Specification

2.1 Outline drawing

The typical dongle size is L64.0*W16.0*H7.0mm.



Outline drawing (Top View)

3 Wi-Fi RF Performance

3.1 Typical RF output power

Mode	Data Rate	Unit	Channel 1	Channel 6	Channel 11
802.11b	1Mbps	dBm	18	18	18
	11Mbps		18	18	18
802.11g	6Mbps		17	17	17
	54Mbps		15	15	15
802.11n	MSC7_HT20		14	14	14
	MSC7_HT40		14	14	14
802.11ax	MSC0_HE20		17	17	17
	MSC0_HE40		17	17	17
	MSC11_HE20		13	13	13
	MSC11_HE40		13	13	13

3.2 Typical EVM

Mode	Data Rate	Unit	Channel 1	Channel 6	Channel 11
802.11b	1Mbps	dB	-25	-25	-25
	11Mbps		-25	-25	-25
802.11g	6Mbps		-25	-25	-25
	54Mbps		-30	-30	-30
802.11n	MSC7_HT20		-30	-30	-30
	MSC7_HT40		-30	-30	-30
802.11ax	MSC0_HE20		-25	-25	-25
	MSC0_HE40		-25	-25	-25
	MSC11_HE20		-35	-35	-35
	MSC11_HE40		-35	-35	-35

3.3 Center frequency tolerance

Mode	Data Rate	Unit	MIN	TYP	MAX
802.11b	11Mbps	ppm	-10	±2	+10
802.11g	54Mbps		-10	±2	+10
802.11n	MSC7		-10	±2	+10

802.11ax	MSC11		-10	±2	+10

3.4 Receiver sensitivity

Mode	Data Rate	Unit	Channel 1	Channel 6	Channel 11
802.11b	1Mbps	dBm	-97.5	-97.5	-97.5
	11Mbps		-90.0	-90.0	-90.0
802.11g	6Mbps		-93.5	-93.5	-93.5
	54Mbps		-76.5	-76.5	-76.5
802.11n	MSC7_HT20		-74.0	-74.0	-74.0
	MSC7_HT40		-71.0	-71.0	-71.0
802.11ax	MSC11_HE20		-64.0	-64.0	-64.0
	MSC11_HE40		-60.5	-60.5	-60.5

4 BLE RF performance

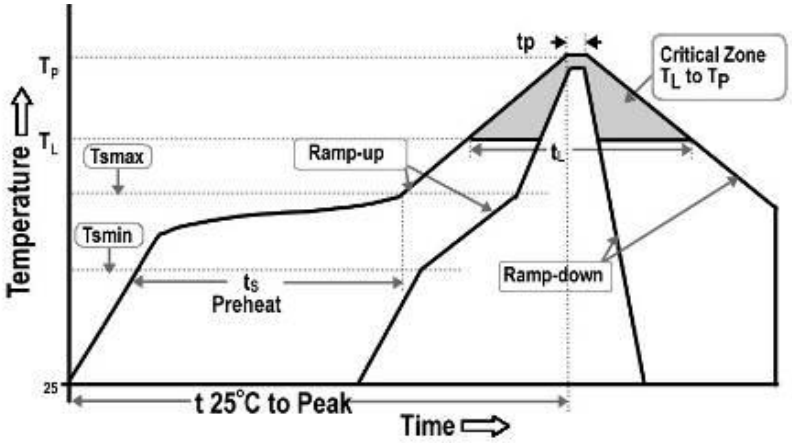
Item	Description	MIN	TYP	MAX	Unit
Frequency range		2402		2480	MHz
Output Power	Default output power level		10		dBm
Receiver Sensitivity	1Mbps		-99.5		dBm
	2Mbps		-96.0		dBm
	Coded-PHY, S=2		-101.5		dBm
	Coded-PHY, S=8		-106.0		dBm

5 Solder Reflow Profile

Referred to IPC/JEDEC standard.

Peak Temperature: <260℃

Number of Times: ≤2 times



Profile Feature		Specification
Average ramp-up rate (Tsmax to T_P)		2℃/second max.
Pre-heat	Minimal temperature (Tsmin)	150℃
	Maximal temperature (Tsmax)	200℃
	Time (ts)	60~120 seconds
Time maintained above	Temperature (T_L)	217℃
	Time (t_L)	40~60 seconds
Peak/Classification temperature (T_P)		260℃
Time within 5℃ of actual peak temperature (t_P)		10~20 seconds
Ramp-down rate		2.5℃/second max.
Time 25℃ to peak temperature		8 minutes max.

6 Packing Information

Packing: Tape and Reel

MPQ (Minimum Packing Quantity): 1,700pcs

7 Warning

1. Do not use this product under humid or hot conditions.

2. Do not use overloaded.

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

#List of applicable FCC Rules:
47 CFR Part 15,Subpart C 15.203
47 CFR Part 15,Subpart C 15.205
47 CFR Part 15,Subpart C 15.207
47 CFR Part 15,Subpart C 15.209
47 CFR Part 15,Subpart C 15.247
47 CFR Part 2.1091

#Summarize the specific operational use conditions
This module can be used in IOT devices, the input voltage to the module is nominally 5V.

#Limited module procedures
This module is not a limited module.

#Trace antenna designs
The antenna is not a trace antenna.

#RF Exposure compliance statement

This Module complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

#Labelling Instruction for Host Product Integrator

Please notice that if the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: "Contains FCC ID: 2BAVSATBM6062" any similar wording that expresses the same meaning may be used.

§ 15.19 Labelling requirements shall be complied on end user device.
Labelling rules for special device, please refer to §2.925, § 15.19 (a)(5) and relevant KDB publications. For E-label, please refer to §2.935

Information on test modes and additional testing requirements
Please see the last page

The OEM integrator is responsible for ensuring that the end-user has no manual instruction to remove or install module.
The module is limited to installation in mobile application, a separate approval is required for all other operating configurations, including portable configurations with respect to §2.1093 and difference antenna configurations.

Antenna Change Notice to Host manufacturer
If you desire to increase antenna gain and either change antenna type or use same antenna type certified, a Class II permissive change application is required to be filed by us, or you (host manufacturer) can take responsibility through the change in FCC ID (new application) procedure followed by a Class II permissive change application.

Test software
AltoBeam WLAN Faciliry SZ 1.0.8

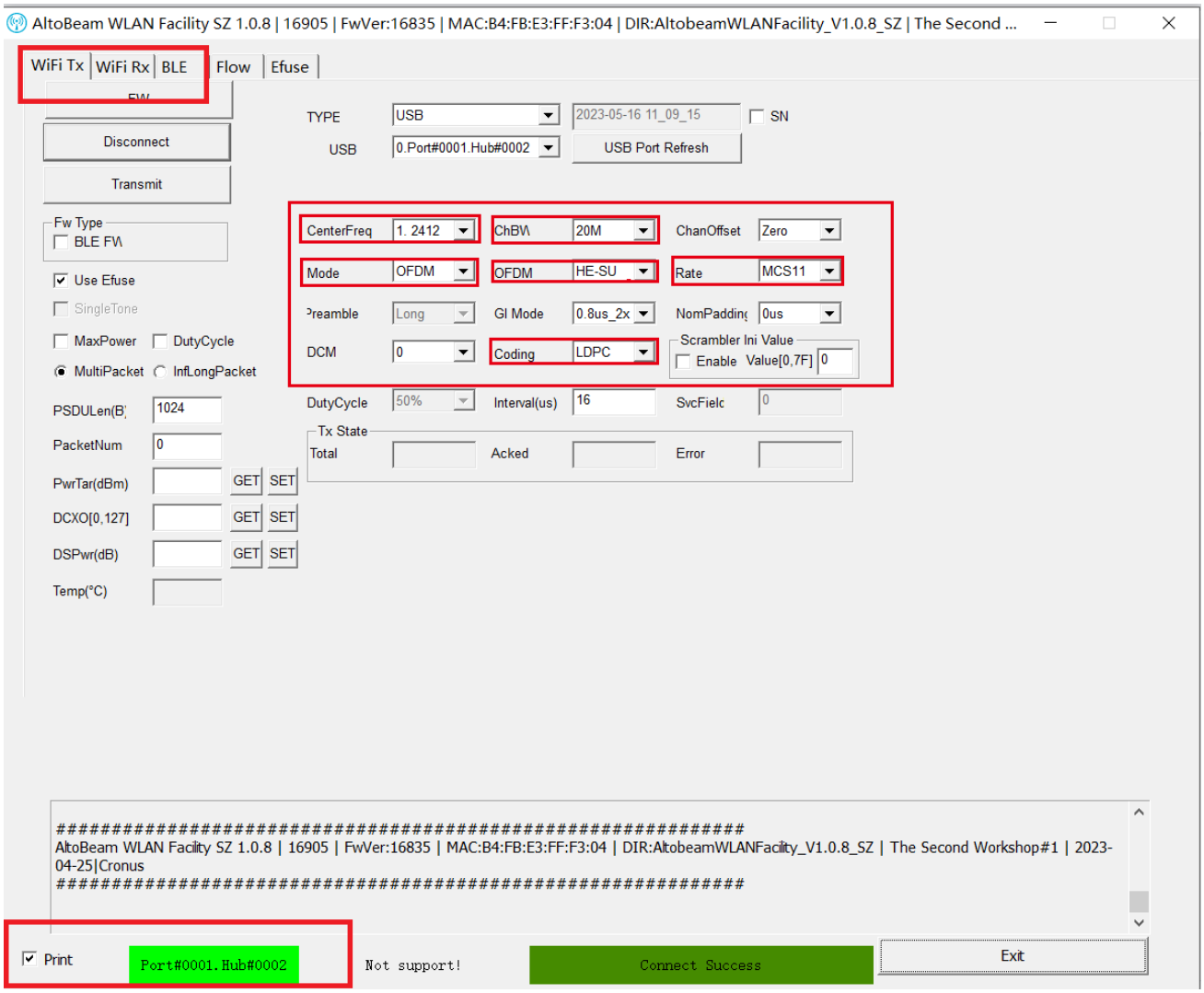
FCC other Parts, Part 15B Compliance Requirements for Host product manufacturer
This modular transmitter is only FCC authorized for the specific rule parts listed on our grant, host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification.
Host manufacturer in any case shall ensure host product which is installed and operating with the module is in compliant with Part 15B requirements.
Please note that For a Class B or Class A digital device or peripheral, the instructions furnished the user manual of the end-user product shall include statement set out in §15.105 Information to the user or such similar statement and place it in a prominent location in the text of host product manual. Original texts as following:
For Class B

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.

For Class A

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Information on test modes and additional testing requirements
Test Software: AltoBeam WLAN Faciliry SZ 1.0.8
Load the chip and select the corresponding channel, mode, bandwidth, etc. for testing.



Frequencies: BLE 2402MHz to 2480MHz; WLAN 802.11b/g/n(HT20)/ax(HEW20): 2412MHz to 2462MHz; 802.11n(HT40)/ax(HEW40): 2422MHz to 2452MHz

Modulation Type: BLE GFSK; WLAN 802.11b: DSSS (CCK, DQPSK, DBPSK); 802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK); 802.11ax: OFDMA(16QAM, 64QAM, 256QAM, 1024QAM, QPSK, BPSK)