User Manual

ATBM6461 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	2024-12-12		Formal release

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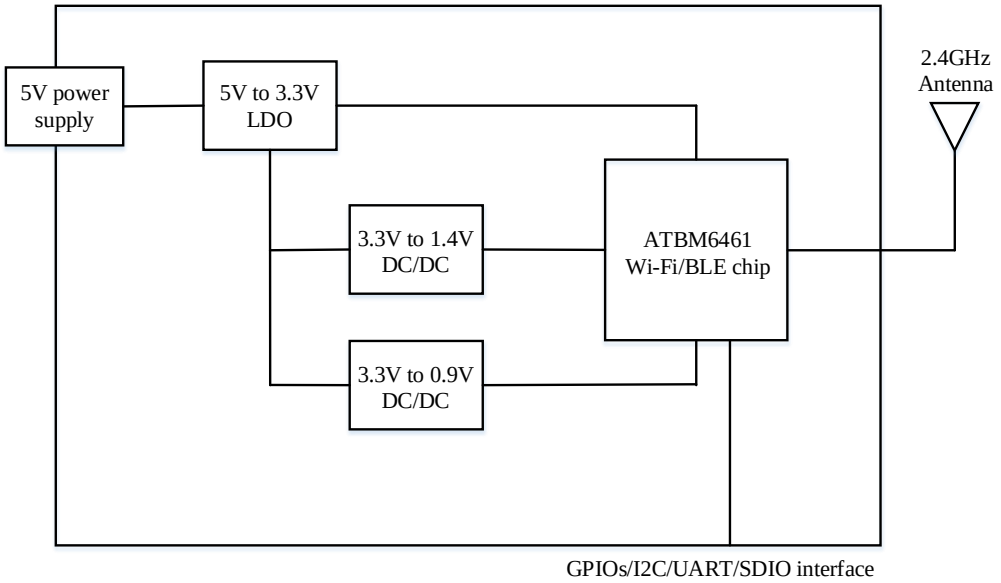
1 Overview

ATBM6461 module is a highly integrated 1T1R 802.11b/g/n/ax and Bluetooth LE v5.0 device with SDIO interface SDIO 2.0 compliant), based on AltoBeam's ATBM6461 Wi-Fi/BLE chip.



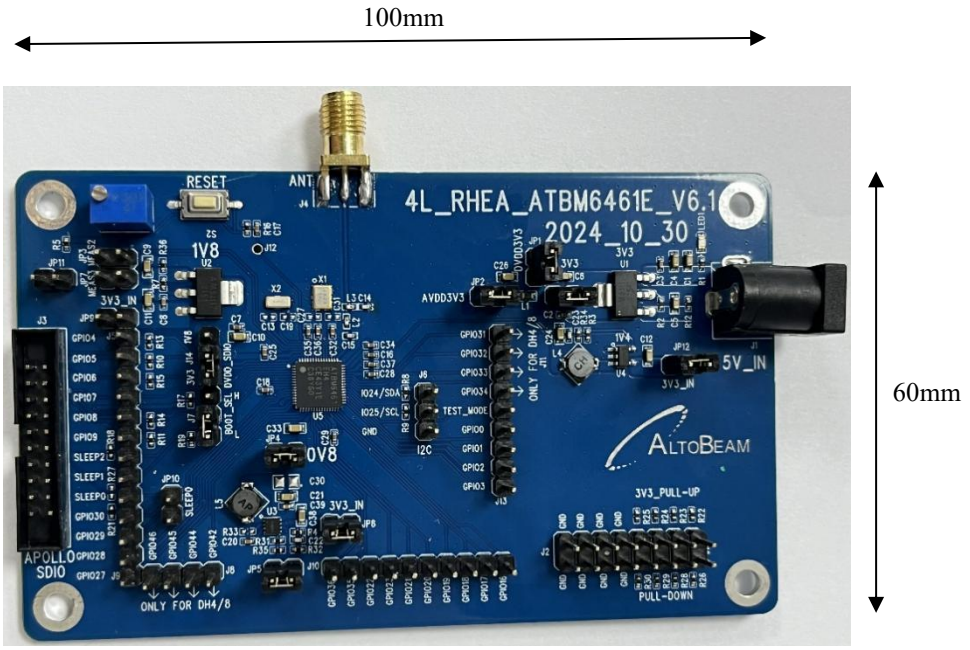
Main chipset	AltoBeam ATBM6461 Wi-Fi and BLE chip
Operating frequency	2.412 ~ 2.472 GHz
Wi-Fi standard	IEEE 802.11b/g/n/ax 1T1R
BLE standard	Bluetooth LE v5.0
Wi-Fi modulation	802.11b: CCK (11, 5.5Mbps), QPSK (2Mbps), BPSK (1Mbps) 802.11g/n/ax: OFDM
Wi-Fi bandwidth	802.11b/g/n/ax 20MHz: ≤20MHz
Wi-Fi PHY data rates	802.11b: 1, 2, 5, 11Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54Mbps 802.11n: MCS0~7, up to 72.2Mbps 802.11ax: MCS0~11, up to 143.4Mbps
Wi-Fi sensitivity	802.11b 1Mbps: -98.5dBm; 802.11b 11Mbps: -90.0dBm; 802.11g 6Mbps: -94.5dBm; 802.11g 54Mbps: -77.0dBm; 802.11n MCS0 HT20: -95.0dBm;802.11n MCS7 HT20: -76.0dBm; 802.11ax MCS0 HE20: -95.5dBm;802.11ax MCS11 HE20: -64.0dBm
Wi-Fi transmitting power	802.11b 1Mbps: 19dBm; 802.11b 11Mbps: 19dBm; 802.11g 6Mbps: 17dBm; 802.11g 54Mbps: 17dBm; 802.11n HT20 MCS7: 16dBm 802.11ax HT20 MCS11: 15dBm
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	SDIO 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 consumption	DC5.0V Max.500mA
Operating temperature	-40 ~ +85℃ ambient temperature
Storage temperature	-50~ +125℃ ambient temperature
Humidity	5% to 90% maximum (non-condensing)
Dimension	Typical L100.0*W60.0mm

2 Mechanical Specification

2.1 Outline drawing

The module size is L100.0*W60.0mm.



Outline drawing

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	19	19	19
	11Mbps		19	19	19
802.11g	6Mbps		17	17	17
	54Mbps		17	17	17
802.11n	MCS0_HT20		16	16	16
	MCS7_HT20		16	16	16
802.11ax	MCS0_HE20		15	15	15
	MCS9_HE20		15	15	15
	MCS11_HE20		15	15	15

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	MCS0_HT20		-25	-25	-25
	MCS7_HT20		-30	-30	-30
802.11ax	MCS0_HE20		-25	-25	-25
	MCS9_HE20		-35	-35	-35
	MCS11_HE20		-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	MCS7		-10	±2	+10
802.11ax	MCS11		-10	±2	+10

3.4 Receiver sensitivity

Mode	Data Rate	Unit	Channel 1	Channel 6	Channel 11
802.11b	1Mbps	dBm	-98.5	-98.5	-98.5
	11Mbps		-90.0	-90.0	-90.0
802.11g	6Mbps		-94.5	-94.5	-94.5
	54Mbps		-77.0	-77.0	-77.0
802.11n	MCS0_HT20		-95.0	-95.0	-95.0
	MCS7_HT20		-76.0	-76.0	-76.0
802.11ax	MCS0_HE20		-95.5	-95.5	-95.5
	MCS9_HE20		-70.0	-70.0	-70.0
	MCS11_HE20		-64.0	-64.0	-64.0

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 FCC warning statement

1. 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.

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

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.

2. 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 20cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter