ATBM603X Wi-Fi Module User Manual
Ver. 0.1

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1. Overview

ATBM603X module is a highly integrated and excellent performance 802.11/b/g/n Wireless LAN (WLAN) 1T1R device with USB interface (USB 1.0/1.1/2.0 compliant). ATBM603X module is based on AltoBeam's ATBM603X chip. ATBM603X module supports all data rates of IEEE 802.11b, 802.11g, and 802.11n. Features includes one spatial stream transmission, short guard interval (400ns GI), and transmission over 20MHz and 40MHz bandwidth.

ATBM603X module WLAN MAC supports 802.11e for multimedia applications, 802.11i security, and 802.11n for enhanced MAC protocol efficiency. Frame aggregation techniques such as A-MPDU are also supported for improving throughput performance. Power saving mechanisms such as Legacy Power Save, and U-APSD are implemented to reduce power consumption. ATBM603X module is fully compatible with WiFi- Alliance, WMM, WPS and P2P specifications.

The ATBM603X module can be used in TV sets, Set-top boxes, Wireless cameras, Smart home and other devices that need to connect Wi-Fi networks. In order to allow you to install and use the product easier, please read this manual carefully.

2. Product characteristics

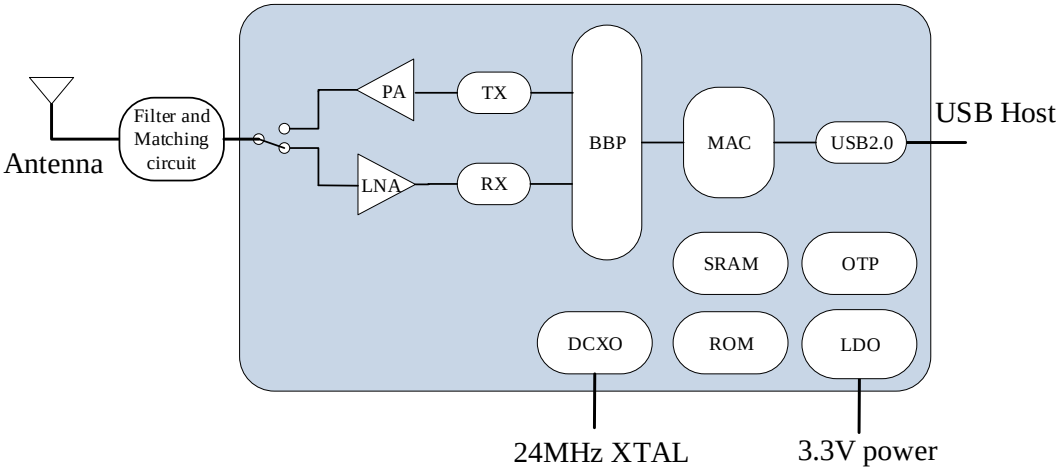
1) Support Wi-Fi 2.4GHz IEEE 802.11b/g/n, 1T1R
2) Operating frequency: 2.412 ~ 2.462GHz
3) Modulation
   - 802.11b: CCK (11, 5.5Mbps), QPSK (2Mbps), BPSK (1Mbps)
   - 802.11g/n: OFDM
4) PHY data rates
   - 802.11b: 11, 5.5, 2, 1Mbps
   - 802.11g: 54, 48, 36, 24, 18, 12, 9, 6Mbps
   - 802.11n: up to 150Mbps
5) USB 2.0 interface
6) RF output power(Average)
   - 802.11b: 17dBm +/- 1dB
   - 802.11g: 17dBm +/- 1dB
   - 802.11n HT20: 15dBm +/- 1dB
   - 802.11n HT20: 13dBm +/- 1dB

3. Product parameters

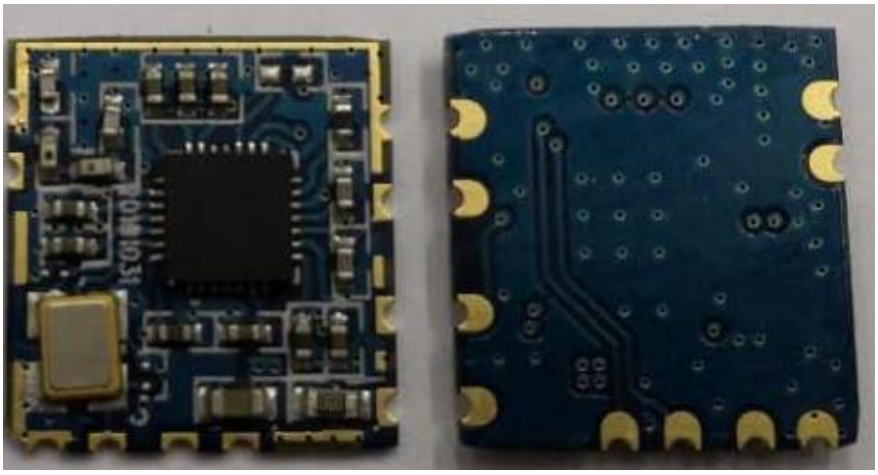
1) Operation voltage: 3.3VDC
2) USB 1.0/1.1/2.0 compliant
3) Security: WEP, TKIP, AES, WPA, WPA2
4) OS support: Linux/Android/RTOS
5) Power consumption: 3.3VDC 250mA@802.11n Max
6) Operating temperature: -20 to +70℃
7) Storage temperature: -40 to +70℃

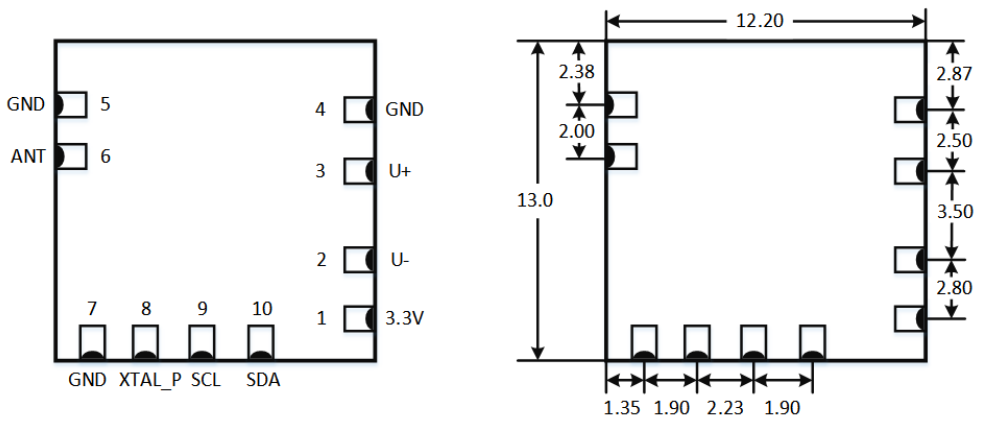
8) Humidity: 5% to 90% maximum
9) Dimension: 13mm*12.2mm (L*W)

4. Block diagram



5. Outline drawing and pin definition





<Top view>

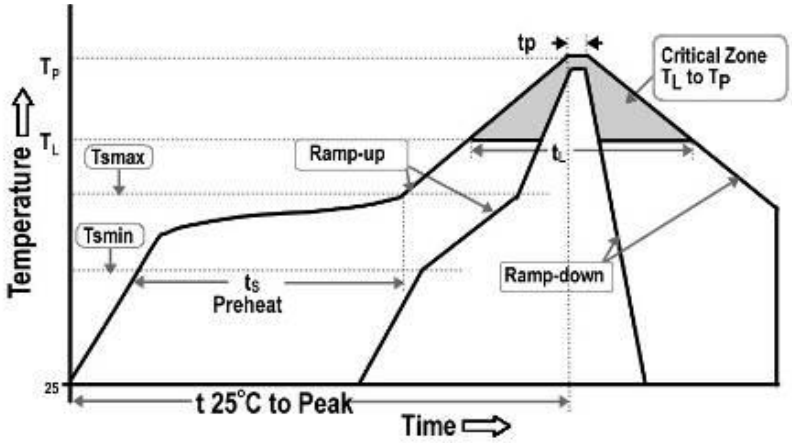
Pin Number	Pin Name	Pin Description
1	3.3V	3.3V DC power supply input
2	U-	USB Data DN
3	U+	USB Data DP
4	GND	Ground
5	RF GND	RF ground
6	ANT	External Antenna (2.4GHz 50ohm)
7	GND	Ground
8	XTAL_P	24MHz XTAL input for Wi-Fi chip
9	SCL	I2C SDA/UART TXD
10	SDA	I2C SDA/UART RXD

6. Solder reflow profile

Referred to IPC/JEDEC standard.

Peak Temperature: <250℃

Number of Times: ≤2 times



Profile Feature		Specification
Average ramp-up rate (t_{smax} to t_P)		2℃/second max.
Pre-heat	Minimal temperature (T_{smin})	150℃
	Maximal temperature (T_{smax})	200℃
	Time (t_s)	60~120 seconds
Time maintained above	Temperature (T_L)	217℃
	Time (t_L)	40~60 seconds
Peak/Classification temperature (T_P)		250℃
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.

Regulatory Module Integration Instructions

2.2 List of applicable FCC rules

This device complies with part 15.247 of the FCC Rules.

2.3 Summarize the specific operational use conditions

This module can be used in household electrical appliances as well as TV and IP camera. The input voltage of module should be 3.0~3.6VDC.

2.4 Limited module procedures

This module can be used in TV, IP camera and household electrical appliances. Normally host device should provide a power supply in the range of 3.0-3.6V, typically 3.3V for this module. The limited module manufacturer will reviews detailed test data or host designs prior to giving the host manufacturer approval.

2.5 Trace antenna designs

Not applicable

2.6 RF exposure considerations

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. If the device built into a host as a portable usage, the additional RF exposure evaluation may be required as specified by §2.1093.

2.7 Antennas

Dipole Antenna, 2.0dBi

2.8 Label and compliance information

The outside of final products that contains this module device must display a label referring to the enclosed module. This exterior label can use wording such as: "Contains Transmitter Module FCC ID: 2AOXX-ATBM603X", or "Contains FCC ID: 2AOXX-ATBM603X",any similar wording that expresses the same meaning may be used.

2.9 Information on test modes and additional testing requirements

a) The modular transmitter has been fully tested by the module grantee on the required number of channels, modulation types, and modes, it should not be necessary for the host installer to re-test all the available transmitter modes or settings. It is recommended that the host product manufacturer, installing the modular transmitter, perform some investigative measurements to confirm that the resulting composite system does not exceed the spurious emissions limits or band edge limits (e.g., where a different antenna may be causing additional emissions).

b) The testing should check for emissions that may occur due to the intermixing of emissions with the other transmitters, digital circuitry, or due to physical properties of the host product (enclosure). This investigation is especially important when integrating multiple modular

transmitters where the certification is based on testing each of them in a stand-alone configuration. It is important to note that host product manufacturers should not assume that because the modular transmitter is certified that they do not have any responsibility for final product compliance.

c) If the investigation indicates a compliance concern the host product manufacturer is obligated to mitigate the issue. Host products using a modular transmitter are subject to all the applicable individual technical rules as well as to the general conditions of operation in Sections 15.5, 15.15, and 15.29 to not cause interference. The operator of the host product will be obligated to stop operating the device until the interference has been corrected

2.10 Additional testing, Part 15 subpart B disclaimer

The final host / module combination 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.

The host integrator installing this module into their product must ensure that the final composite product complies with the FCC requirements by a technical assessment or evaluation to the FCC rules, including the transmitter operation and should refer to guidance in KDB 996369.

Frequency spectrum to be investigated

For host products with certified modular transmitter, the frequency range of investigation of the composite system is specified by rule in Sections 15.33(a)(1) through (a)(3), or the range applicable to the digital device, as shown in Section 15.33(b)(1), whichever is the higher frequency range of investigation.

Operating the host product

When testing the host product, all the transmitters must be operating. The transmitters can be enabled by using publicly-available drivers and turned on, so the transmitters are active. In certain conditions it might be appropriate to use a technology-specific call box (test set) where accessory devices or drivers are not available.

When testing for emissions from the unintentional radiator, the transmitter shall be placed in the receive mode or idle mode, if possible. If receive mode only is not possible then, the radio shall be passive (preferred) and/or active scanning. In these cases, this would need to enable activity on the communication BUS (i.e. SDIO, USB) to ensure the unintentional radiator circuitry is enabled. Testing laboratories may need to add attenuation or filters depending on the signal strength of any active beacons (if applicable) from the enabled radio(s). See ANSI C63.4, ANSI C63.10 and ANSI C63.26 for further general testing details.

The product under test is set into a link/association with a partnering WLAN device, as per the normal intended use of the product. To ease testing, the product under test is set to transmit at a high duty cycle, such as by sending a file or streaming some media content.

FCC Statement

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.