

# Midea IoT

## Module Specification

**Name of manufacturer:** Midea IoT

**Module name:** Bluetooth & 2.4GHz Wi-Fi dual band Communication Module

**Model:** MWB-S-WB01-2

This document is confidential, and all information contained herein is subject to the final interpretation of Midea IoT. Any unauthorized reproduction of this document without permission is not acceptable and shall be prohibited.

Midea IoT

**Address:** Midea Global Innovation Center, Shunde District, Foshan, Guangdong Province, China

**Tel:**

# Table of Contents

1. Product overview .....	3
2. Top view.....	3
3. Radio frequency (RF) characteristics .....	4
3.1. Basic RF parameters .....	4
3.2. RF output power .....	5
3.3. RF receiver sensitivity .....	5
3.4. Module antenna characteristics .....	5
4. Product structure diagram.....	7
4.1. Interface schematics.....	7
4.2. Label requirements .....	8
4.3. Shield cover size.....	10
4.4. Pin drawing .....	11
5. Power consumption.....	12
6. Electrical parameters .....	12
6.1. Absolute electrical parameters .....	12
6.2. Operating conditions.....	13
7. Compliance standards and certifications .....	13
8. Precautions .....	13

## 1. Product overview

MWB-S-WB01-2 is a fully functional, highly integrated and low-power consumption WIFI+BLE module dedicated for the Internet of Things, which is developed by Midea. The module adopts a built-in PCB antenna design, whose master chip is highly integrated with memory, flash, WIFI baseband, Bluetooth baseband, etc. Meanwhile, it supports IEEE802.11 b/g/n protocol and provides UART communication interface to communicate with the host device, which can be widely used in smart home equipment, remote monitoring equipment, medical machinery and other fields.

The module has the following features:

- Ø Main frequency supports 320MHz, SRAM 384KB, ROM 128KB and 4M Flash
- Ø Support IEEE 802.11b/g/n protocol
- Ø Support 20MHz bandwidth in the 2.4GHz frequency band
- Ø Support Bluetooth BLE 5.0
- Ø Support encryption protocol: WEP, WPA, WPA2, WPA3, TKIP
- Ø On-board PCB antenna
- Ø Operating temperature: -20°C to 85°C

Figure 1.1. Block diagram of the MWB-S-WB01-2 module scheme

## 2. Top view

Front view



Rear view



### 3. Radio frequency (RF) characteristics

#### 3.1. Basic RF parameters

Frequency range	WIFI: 2.4GHz-2.4835GHz Bluetooth: 2.4GHz-2.4835GHz
Wireless standard	WIFI: 802.11b/g/n, Bluetooth: BLE 5.0
Antenna type	PCB antenna
Antenna Gain	0dBi
Transmission rate	11b: 1Mbps, 2Mbps, 5.5Mbps, 11Mbps  11g: 6Mbps, 9Mbps, 12Mbps, 18Mbps, 24Mbps, 36Mbps, 48Mbps, 54Mbps  11n: MCS0, MCS1, MCS2, MCS3, MCS4, MCS5, MCS5, MCS6, MCS7  Bluetooth: 1Mbps
Protocol stack supports	WIFI: IPV4, TCP/UDP/HTTP/MQTT/Websocket/ARP/ICMP  Bluetooth: GATT/ATT/SMP/L2CAP/GAP/HCI/LL
Security supports	Encryption standard: WEP/WPA/WPA2/WPA3  Encryption algorithm: WEP64/WEP128/TKIP/AES

### 3.2. RF output power

Rate	Minimum	Typical	Maximum	Unit
1Mbps	15	17	19	dBm
11Mbps	15	17	19	dBm
54Mbps	12	14	16	dBm
HT20-MCS7	12	14	16	dBm
Bluetooth 1Mbps	4	6	8	dBm
Frequency error	-10	0	10	ppm

### 3.3. RF receiver sensitivity

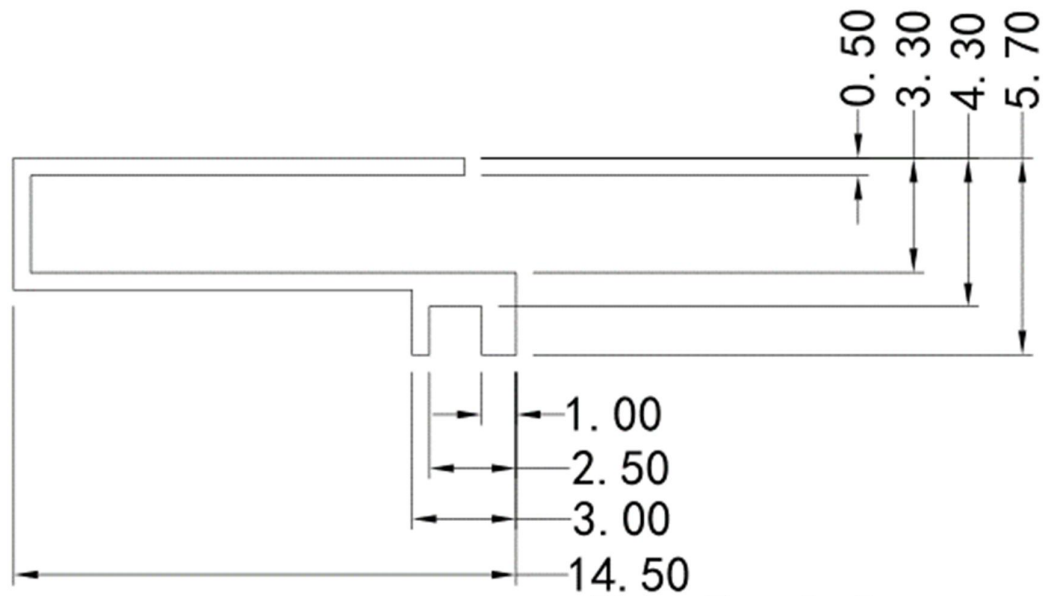
Rate	Minimum	Typical	Maximum	Unit
1Mbps	-84		-95	dBm
11Mbps	-78		-89	dBm
54Mbps	-65		-74	dBm
HT20-MCS7	-64		-71	dBm
Bluetooth 1Mbps	-70		-90	dBm

### 3.4. Module antenna characteristics

Ø The passive performance of the antenna for this module shall meet the following requirements:

Parameter	Operating frequency range: 2.4GHz-2.4835GHz
S11	<-10dB
Efficiency	>40%

Ø The antenna drawing of the module is as follows:



Ø It is necessary to pay attention to the following points when the module antenna is placed:

1. The module is recommended to be placed at the edge of the electronic control board, with the antenna facing outward, away from metal parts and high-frequency signal lines.
2. Routing under the PCB antenna is forbidden, and do clearance processing. Routing of high-speed signals around and below the module shall be avoided. If the module cannot be avoided during routing, it is recommended to strictly follow the high-frequency signal routing rules, and perform signal packaging processing on the high-speed signals.
3. During installation, the front of the antenna shall avoid the metal shell or parts, so as not to shield the signal. Plastic shelter is allowed, but any interference between any object and the antenna is prohibited.

## 4. Product structure diagram

### 4.1. Interface schematics

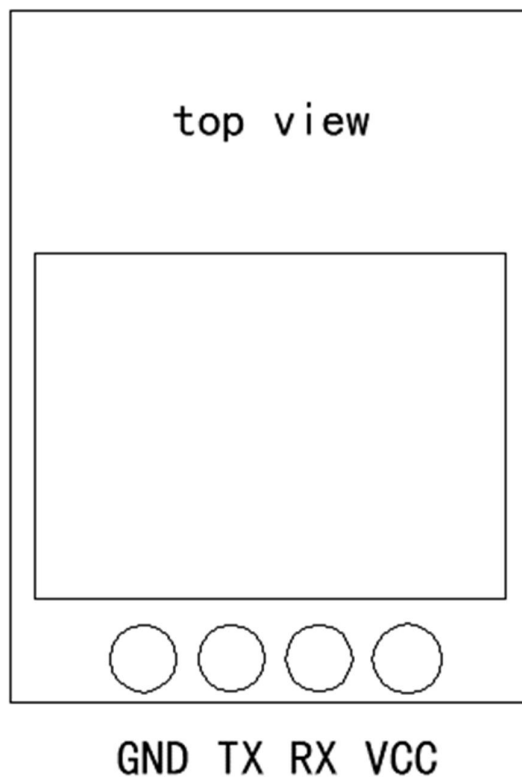


Figure 2.1. Terminal interface

Table 2.1. Description of terminal interface

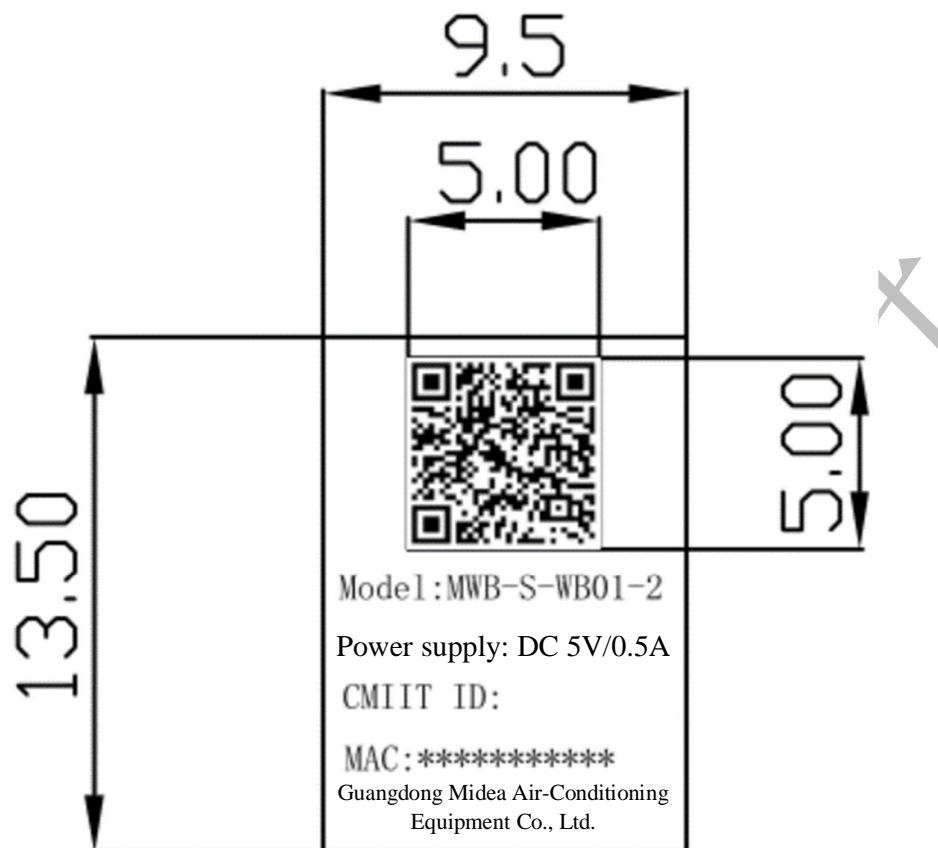
No.	Mark	Description of Wi-Fi module terminal pin
1	V	VCC (Power supply)
2	R	RX module receiving
3	T	TX module transmitting
4	G	GND (Ground)

Wiring instructions:

The RXD and TXD pins of the Wi-Fi Bluetooth module are connected to the TXD and RXD pins at the communication end, and the VCC is connected to 5V level. GND refers to the grounding. After the module is

powered on, RX terminal is used for receiving and TX terminal is used for transmitting.

## 4.2. Label requirements



Label printing requirements:

The label size is 13.5\*9.5mm, which is white, in standard typeface of Chinese; the size of the two-dimensional code is 5\*5mm.

Content of the two-dimensional code:

The content of the two-dimensional barcode is described in the following table.

Content of the two-dimensional code		
Field	Character length	Remarks
CMIITID	10	Printed after ID confirmation
MAC address	12	



Production information S/N	26	If the content is less than 26 characters, complete the content with the character "X" in front of the characters Processing factory code (2 digits) + job number (8 digits) + production date (6 digits) + software minor version number (6 digits) + enterprise code (4 digits), for example:
Software version number	12	050509011835
Power supply	4	The content is fixed as "5.0V"
Current	5	500mA

Note:

Production information (26 digits): 02 XXXXXXXXX 170608 000003 0000

Digits 1-2: represent the production factory

Digits 3-10: represent the operation number of the factory.

Digits 11-16: represent production date. For example, June 8, 2017 is marked as 170608.

Digits 17- 22: reserved.

Digits 23-26: enterprise code. The internal division in Midea is "0000".

Non-Midea enterprise code is based on the software code.

Software version (12 digits): XXXXXXXXXXXXX

Power supply (4 digits): module working voltage

Current (5 digits) : 500mA

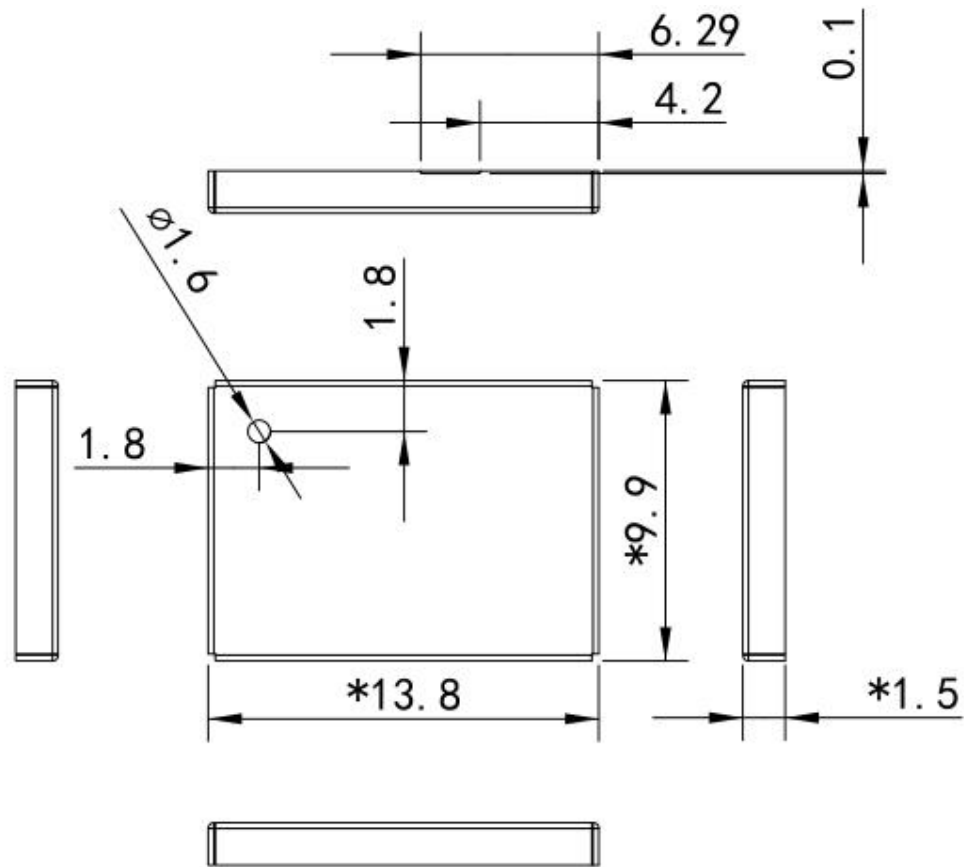
Others: fill-in as required;

CMIIT ID: fill-in as required;

Code: It is the code prepared for the module by the centralized purchasing department of Midea;

Digit segments are separated by ",";

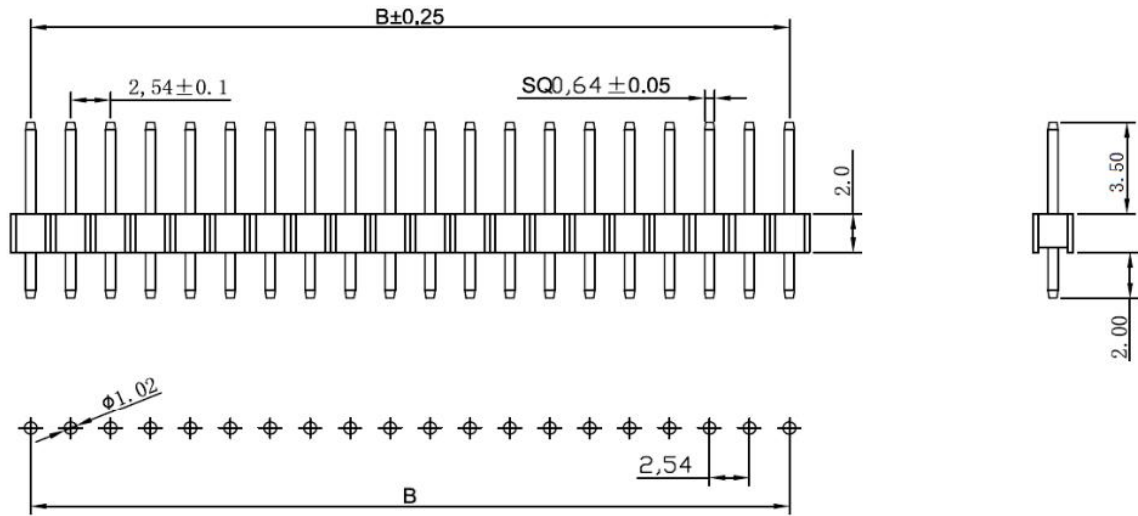
### 4.3. Shield cover size



Technical requirements:

- Ø Material: Copper-Nickel-Zinc Alloy C7701, T=0.2mm, H=1.5mm
- Ø The surface is clean, without burr, flash and other defects
- Ø Unless otherwise indicated, the dimension tolerance is  $\pm 0.1\text{mm}$
- Ø Unless otherwise indicated, the corner angle is R0.2mm, and the bending inner angle is less than R0.2mm

#### 4.4. Pin drawing



Technical requirements:

- Ø Rated current: 3A
- Ø Withstand voltage: AC 500V
- Ø Operating temperature:  $-40^{\circ}\text{C} - +105^{\circ}\text{C}$
- Ø Insulation material: black PA6T
- Ø Material: brass
- Ø Plating: G/F Plated Over Nickel

## 5. Power consumption

**Power consumption in working mode** (based on the 2-minute test results of the proposed version):

Mode	Average current (mA)	Minimum current (mA)	Maximum current (mA)	Average power consumption (mW)
Idle	16.39	14.87	70.09	81.94
AP	51.73	27.03	206.54	258.67
Station idle	44.9	28.78	186.78	224.50
Station data transmission	45.20	22.39	280.73	226.02
Station AP offline	46.30	24.83	277.46	231.50

## 6. Electrical parameters

### 6.1. Absolute electrical parameters

Power parameters: (ripple control within 100mV)

Parameter	Description	Minimum value	Maximum value	Unit
Ts	Storage temperature	-40	105	°C
VCC	Power supply voltage	4.5	5.5	V
Electrostatic discharge voltage (human body model)	TAMB-25°C	-4	4	KV
Electrostatic discharge voltage (machine model)	TAMB-25°C	-0.2	0.2	KV

## 6.2. Operating conditions

The product shall be supplied by ES1/PS1 power source.

Parameter	Description	Minimum value	Typical value	Maximum value	Unit
Ta	Operating temperature	-20	-	85	°C
VCC	Operating voltage	4.5	5	5.5	V
VIL	Low level input	-0.3	-	0.3	V
VIH	High level input	4.5	5	5.5	V
VOH	High level output	4.7	-	5	V
VOL	Low level output	0	-	0.3	V

## 7. Compliance standards and certifications

The Wi-Fi Bluetooth module shall comply with ROHS environmental assessment certification.

## 8. Precautions

The Wi-Fi Bluetooth module exposed in the air (The core board inside the module or the whole that is composed of the core board and the substrate) should at least meet the environmental conditions for ordinary consumer electronics, including but not limited to:

- Ø Operating temperature: -20-85°C
- Ø Storage temperature: -40-85°C
- Ø Operating humidity: 0-95 % RH
- Ø Storage humidity: 0-98 % RH
- Ø The module can withstand the thermal shocks every 2h a cycle in the range of -20°C to +85°C. There should be no function failure or performance degradation in at least 20 cycles of shocks, without significant tin crack.
- Ø The temperature rise of the circuit components should meet the requirements of their own specifications when operation is performed for long periods of time.
- Ø In the simulation of the transportation process and home application scenarios, the module should be

resistant to a certain degree of mechanical shock and drops.

Through certain protection means, the Wi-Fi Bluetooth module can be provided with higher environmental adaptability. In the design of WiFi Bluetooth module, the margin of performance, size and process required for the implementation of protective means shall be reserved.

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 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.

MODIFICATION: Any changes or modifications not expressly approved by the grantee of this device could void the user's authority to operate the device.

To satisfy FCC exterior labeling requirements, the following text must be placed on the exterior of the end product.

"Contains Transmitter module FCC ID: 2ADQOMWBSWB012"

This product must be installed and operated with a minimum distance of 20 cm between the radiator and user body.