Manuals+ — User Manuals Simplified.

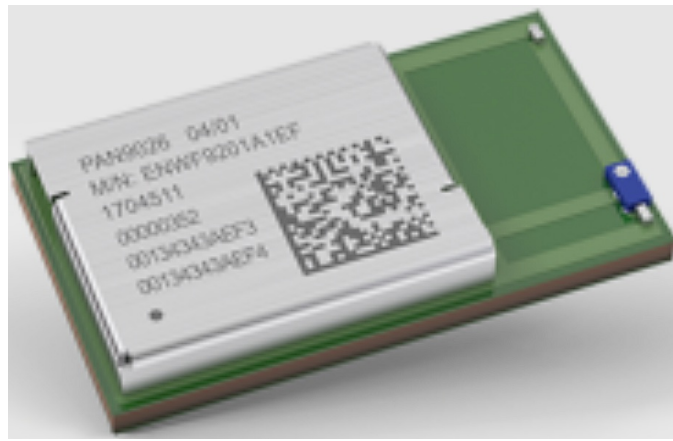# M Smart MM3SB3350N3 Bluetooth Wi-Fi dual-band Communication Module User Manual

Contents

M Smart MM3SB3350N3 Bluetooth Wi-Fi dual-band Communication Module
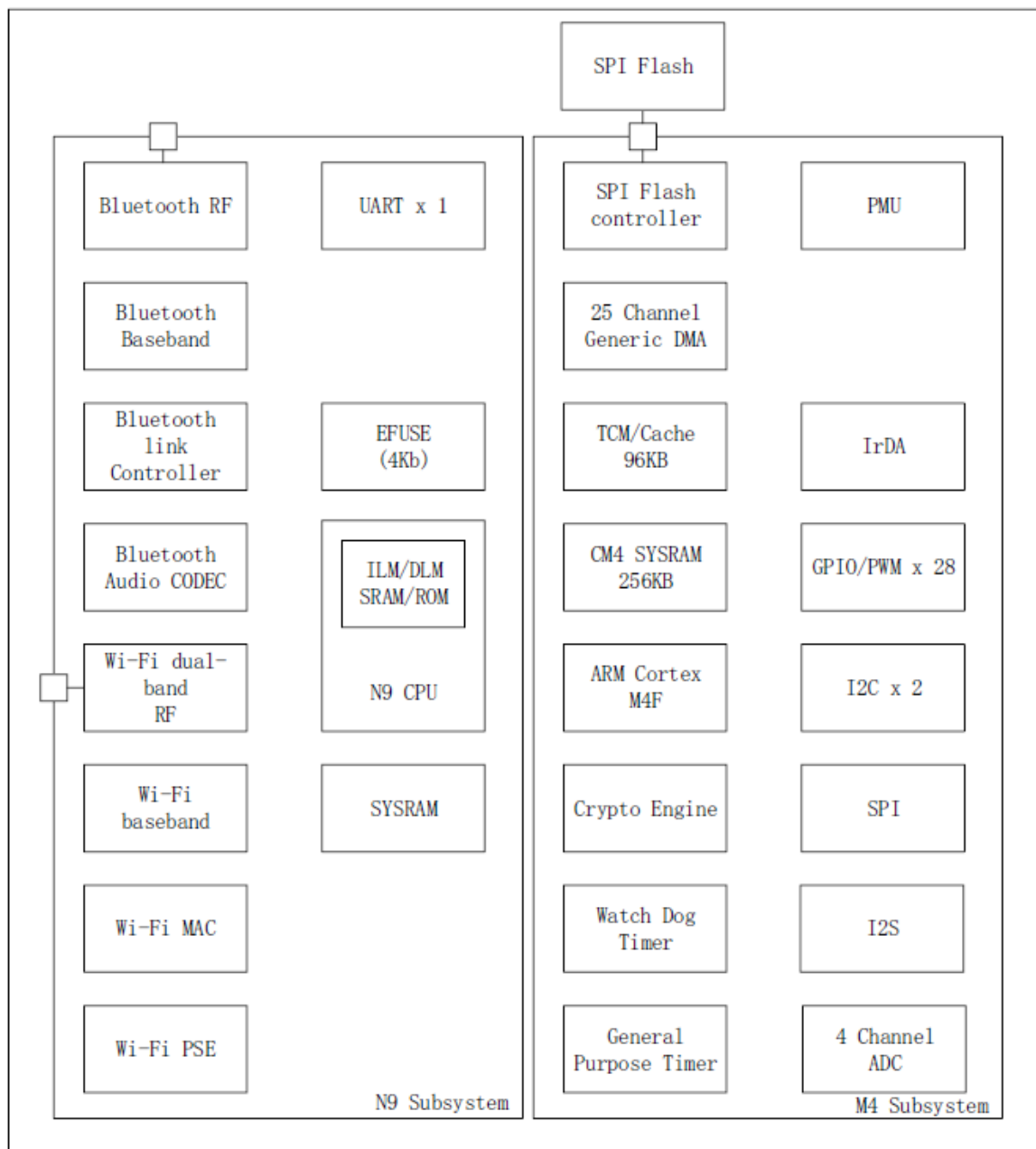
Product Overview

MM3SB3350N3 wireless module is a fully functional, highly integrated, low power consumption dedicated Wi-Fi & Bluetooth module for the Internet of things. It supports IEEE802.11a/b/g/n protocol, also embedded IPV4, TCP, UDP, DNS, HTTP and other complete network protocol, so that the terminal in the Internet of things applications more reliable, convenient and easy to use. MM3SB3350N3 core chip adopts the MT7697D single chip scheme of Media corp. The chip is highly integrated with CPU, PMU, RAM, T/R SW, LNA, PA and other major parts, thus greatly reducing the power consumption of the whole machine. The module adopts the integrated three-dimensional metal antenna design, which can not only reduce the cost of the antenna for customers, but also save the assembly space of the antenna, greatly reduce the area of the board, and make the product more competitive. At present, the module provides a complete serial port interface function to communicate with the device, and can connect the cloud and the device through the serial port and the mobile client.
The module has the following characteristics:

- Support IEEE 802.11a/b/g/n protocol
- Supports 20MHz and 40MHz bandwidth in the 2.4ghz band and 5GHz band
- Support bluetooth BLE 4.2
- The module has a built-in dual-mode metal antenna
- Low power listening mode
- Both up and down theoretically support a connection rate of 150Mbps
- Support encryption protocols: WFA, WPA, WPA2, WPS2.0
- Support IPV4, TCP, UDP, DNS, HTTP and other network protocols
  The block diagram of the module is as follows:

```
┌─────────────────────────────────────────────────────────────────────┐
│                        ┌──────────────┐                               │
│                        │  SPI Flash   │                               │
│                        └──────┬───────┘                               │
│   ┌──────────────────────────┐│ ┌──────────────────────────────┐     │
│   │ ┌─────────┐  ┌─────────┐ ││ │┌─────────────┐ ┌───────────┐ │     │
│   │ │Bluetooth│  │ UART x 1│ └┼─┤│  SPI Flash  │ │    PMU    │ │     │
│   │ │   RF    │  └─────────┘ │ ││ controller  │ └───────────┘ │     │
│   │ └─────────┘              │ │└─────────────┘                │     │
```

		SPI Flash
Bluetooth RF	UART x 1	SPI Flash controller	PMU
Bluetooth Baseband		25 Channel Generic DMA	
Bluetooth link Controller	EFUSE (4Kb)	TCM/Cache 96KB	IrDA
Bluetooth Audio CODEC	ILM/DLM SRAM/ROM	CM4 SYSRAM 256KB	GPIO/PWM x 28
Wi-Fi dual-band RF	N9 CPU	ARM Cortex M4F	I2C x 2
Wi-Fi baseband	SYSRAM	Crypto Engine	SPI
Wi-Fi MAC		Watch Dog Timer	I2S
Wi-Fi PSE		General Purpose Timer	4 Channel ADC
	N9 Subsystem		M4 Subsystem

Note/FCC warning:

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. Because the working frequency of the device is in 5150-5250 MHZ, so this module is suitable for indoor use of the equipment. This equipment must be installed to provide a separation distance of at least 20cm from all persons.

Top view
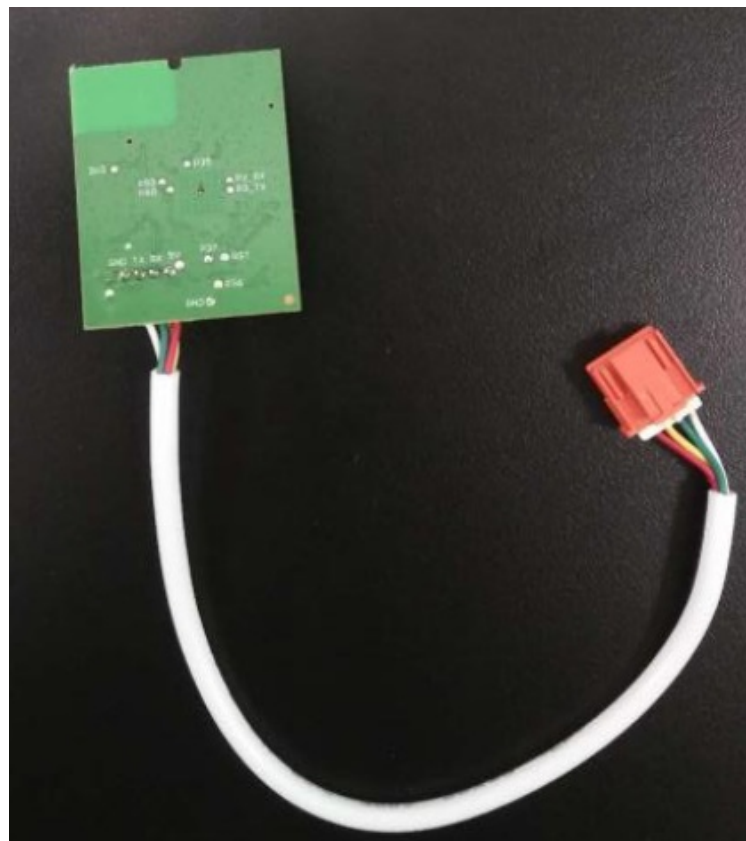
Radio frequency characteristics

transmission and reception characteristics

Support IEEE 802.11a/b/g/n standard; For parameters such as transmitting power, receiving sensitivity, EVM and distribution, a more stringent standard than the IEEE specification is sought. Please refer to the attached table for the specifications.

Wi-Fi 2.4ghz Band RF Specifications

TX Characteristics	Min.	Typ.	Max.	The Unit	
1. The Frequency range	2400	–	2483.5	MHz	
2. The Output power					
1 Mbps CCK	16			dBm	
11 Mbps CCK	16			dBm	
6 Mbps OFDM	15			dBm	
54 Mbps OFDM	13			dBm	
HT20, MCS0	15			dBm	
HT20, MCS7	13			dBm	
HT40, MCS0	15			dBm	
HT40, MCS7	13			dBm	
3. The TX EVM entry					
6 Mbps OFDM			− 5	The dB	
54 Mbps OFDM			− 25	The dB	
HT20, MCS 0			− 5	The dB	
HT20, MCS 7			27 −	The dB	
HT40, MCS 0			− 5	The dB	
HT40, MCS 7			27 −	The dB	
RX Characteristics	**Min.**	**Typ.**	**Max.**	**The Unit**	

	Min.	Typ.	Max.	The Unit	
1. The Frequency range	2400	–	2483.5	MHz	
2. Minimum Input Level Sensitivity					
1) 1 MBPS (FER) ≦ 8% CCK		− 82.		dBm	
2) 2 MBPS (FER) ≦ 8% CCK		− 80.		dBm	
3) 5.5 Mbps (FER) ≦ 8% CCK		− 78.		dBm	
4) 11 MBPS (FER) ≦ 8% CCK		− 76.		dBm	
5) BPSK rate 1/2, 6 Mbps OFDM		− 82.		dBm	
6) BPSK rate 3/4, 9 Mbps OFDM		− 81.		dBm	
7) QPSK rate 1/2, 12 Mbps OFDM		− 79.		dBm	

8) QPSK rate 3/4, 18mbps OFDM		– 77.		dBm	
9) 16QAM rate 1/2, 24mbps OFDM		– 74.		dBm	
10) 16QAM rate 3/4, 36 Mbps OFDM		– 70.		dBm	
11) 64QAM rate 1/2,48mbps OFDM		– 66.		dBm	
12) 64QAM rate 3/4, 54mbps OFDM		– 65.		dBm	
3. RX Sensitivity BW=20MHz Mixed mode 800ns Guard Interval non-stbc					
1)MCS 0, BPSK rate 1/2		– 82.		dBm	
2)MCS 1, QPSK rate 1/2		– 79.		dBm	
3)MCS 2, QPSK rate 3/4		– 77.		dBm	
4)MCS 3, 16QAM rate 1/2		– 74.		dBm	
5)MCS 4, 16QAM rate 3/4		– 70.		dBm	
6)MCS 5, 64QAM rate 2/3		– 66.		dBm	
7)MCS 6, 64QAM rate 3/4		– 65.		dBm	
8)MCS 7, 64QAM rate 5/6		– 64.		dBm	
4. RX Sensitivity BW=40MHz Mixed mode 800ns Guard Interval					
1)MCS 0, BPSK rate 1/2		– 79.		dBm	
2)MCS 1, QPSK rate 1/2		– 76.		dBm	
3)MCS 2, QPSK rate 3/4		– 74.		dBm	
4)MCS 3, 16QAM rate 1/2		– 71.		dBm	

5)MCS 4, 16QAM rate 3/4		− 67.		dBm
6)MCS 5, 64QAM rate 2/3		− 63.		dBm
7)MCS 6, 64QAM rate 3/4		− 62.		dBm
8)MCS 7, 64QAM rate 5/6		− 61.		dBm
5. Maximum Input Level (FER = 10%)				
6 Mbps OFDM		− 20		dBm
54 Mbps OFDM		− 20		dBm
The MCS 0		− 20		dBm
The MCS 7		− 20		dBm

Wi-Fi 5GHz Band RF Specifications

TX Characteristics	Min.	Typ.	Max.	The Unit	
1. The Frequency range	5150	–	5850	MHz	
2. The Output power					
6 Mbps OFDM		16		dBm	
54 Mbps OFDM		15		dBm	
HT20, MCS0		16		dBm	
HT20, MCS7		15		dBm	
HT40, MCS0		16		dBm	
HT40, MCS7		15		dBm	
3. The TX EVM entry					
6 Mbps OFDM			− 5	The dB	
54 Mbps OFDM			− 25	The dB	
HT20, MCS 0			− 5	The dB	
HT20, MCS 7			27 −	The dB	
HT40, MCS 0			− 5	The dB	
HT40, MCS 7			27 −	The dB	
RX Characteristics	**Min.**	**Typ.**	**Max.**	**The Unit**	

1. The Frequency range	5150	–	5850	MHz	
2. Minimum Input Level Sensitivity					
1) BPSK rate 1/2, 6 Mbps OFDM		− 82.		dBm	
2) BPSK rate 3/4, 9 Mbps OFDM		− 81.		dBm	
3) QPSK rate 1/2, 12 Mbps OFDM		− 79.		dBm	
4) QPSK rate 3/4, 18mbps OFDM		− 77.		dBm	
5) 16QAM rate 1/2, 24mbps OFDM		− 74.		dBm	
6) 16QAM rate 3/4, 36 Mbps OFDM		− 70.		dBm	
7) 64QAM rate 1/2,48mbps OFDM		− 66.		dBm	
8) 64QAM rate 3/4, 54mbps OFDM		− 65.		dBm	
3. RX Sensitivity BW=20MHz Mixed mode 800ns Guard Interval non-stbc					
1)MCS 0, BPSK rate 1/2		− 82.		dBm	
2)MCS 1, QPSK rate 1/2		− 79.		dBm	
3)MCS 2, QPSK rate 3/4		− 77.		dBm	
4)MCS 3, 16QAM rate 1/2		− 74.		dBm	
5)MCS 4, 16QAM rate 3/4		− 70.		dBm	
6)MCS 5, 64QAM rate 2/3		− 66.		dBm	
7)MCS 6, 64QAM rate 3/4		− 65.		dBm	
8)MCS 7, 64QAM rate 5/6		− 64.		dBm	
4. RX Sensitivity BW=40MHz Mixed mode 800ns Guard Interval					
1)MCS 0, BPSK rate 1/2		− 79.		dBm	
2)MCS 1, QPSK rate 1/2		− 76.		dBm	
3)MCS 2, QPSK rate 3/4		− 74.		dBm	
4)MCS 3, 16QAM rate 1/2		− 71.		dBm	
5)MCS 4, 16QAM rate 3/4		− 67.		dBm	
6)MCS 5, 64QAM rate 2/3		− 63.		dBm	
7)MCS 6, 64QAM rate 3/4		− 62.		dBm	
8)MCS 7, 64QAM rate 5/6		− 61.		dBm	

5. Maximum Input Level (FER = 10%)				
6 Mbps OFDM		− 20		dBm
54 Mbps OFDM		− 20		dBm
The MCS 0		− 20		dBm
The MCS 7		− 20		dBm

Blutooth LE RF Specifications

TX Characteristic	Min.	Typ.	Max.	The Unit	
1. The Frequency range	2400	–	2483.5	MHz	
2. The Output power	0		10	dBm	
3. Carrier Frequency Offset and Drift					
1) the Frequency Offset	− 150 .		150	KHz	
2) Frequency Drift	− 50		50	KHz	
3) Max Drift Rate	− 20		20	Hz/us	
4. The Modulation Characteristic					
Delta f1avg	225		275	KHz	
Delta f2max	185			KHz	
Delta f1avg/delta f2avg	0.8	0.94		Hz/Hz	
5. The In – band Spurious Emission					
Plus or minus 2 m Offset			− 20	dBm	
> plus or minus 3 MHZ offset			− 30	dBm	

RX Characteristic	Min.	Typ.	Max.	The Unit	
1. The Frequency range	2400	–	2483.5	MHz	
2. The Receiver Sensitivity		− 95.		dBm	
3. The C/I Co – channel		6	21	The dB	
4. The C/I 1 MHZ		7 –	15	The dB	
5. C/I 2 MHZ		− 30	− 17	The dB	

6. The C/I 3 MHZ or higher		− 33	27 −	The dB	
7. C/I Image channel		− 20	9 −	The dB	
8 C/I Image 1 MHZ		− 30	− 15	The dB	
9. Intel – modulation	− 50	− 35		dBm	
10. Out-of-band blocking					
30 MHZ to 2000 MHZ	− 30			dBm	
2001 MHZ to 2339 MHZ	− 35			dBm	
2501 MHZ to 3000 MHZ	− 35			dBm	
3001 MHZ to 12.75 GHz	− 30			dBm	

characteristics of the module antenna

The passive performance of the antenna of the Wi-Fi & Bluetooth module should meet the following requirements (passive performance can only be used as a reference, and the antenna performance test is mainly based on the active throughput test) :

parameter	In 2.4g frequency band: 2400MHz~ 2483.5mhz And 5G frequency band: 5150MHz~5850MHz in the requirements
Return loss	< − 10 db
The efficiency of	> 40%

Product structure diagram

PCB size
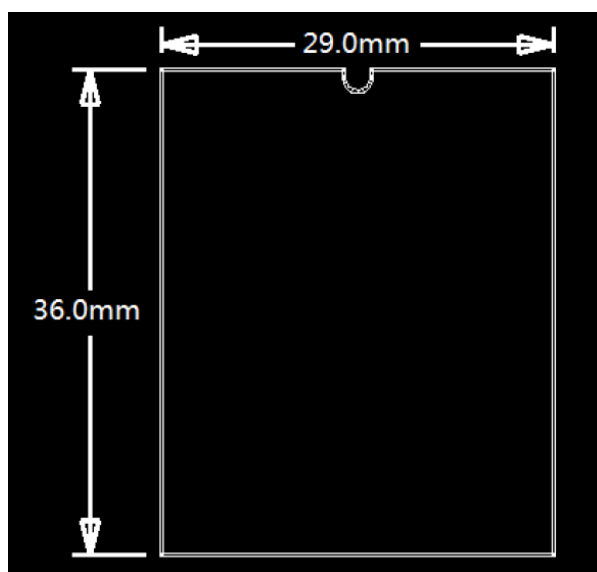
Thickness of module plate:
1.0mm Tolerance: + / − 0.2 mm

line drawings

The serial number	tag	Wi-Fi module end pin description	Home appliance end pin description
1	V	The VCC power supply	The VCC power supply
2	R	RXD module receives	TXD appliance delivery
3	T	TXD module send	Reception of RXD appliances
4	GND symbol	GND to	GND to

4.3 label requirements

Label printing requirements:
Label size is 21*14mm, label material is white, Song typeface; The dimension of the QR code is 8*8mm.

Power:DC 3.3V/500mA

Model:MM3SB3350N3

FCC ID:2ADQ03SB3350N3

MAC:XXXXXXXXXXXX

GD Midea Air-Conditioning
Equipment Co.,Ltd

8mm

8mm

14mm

21mm
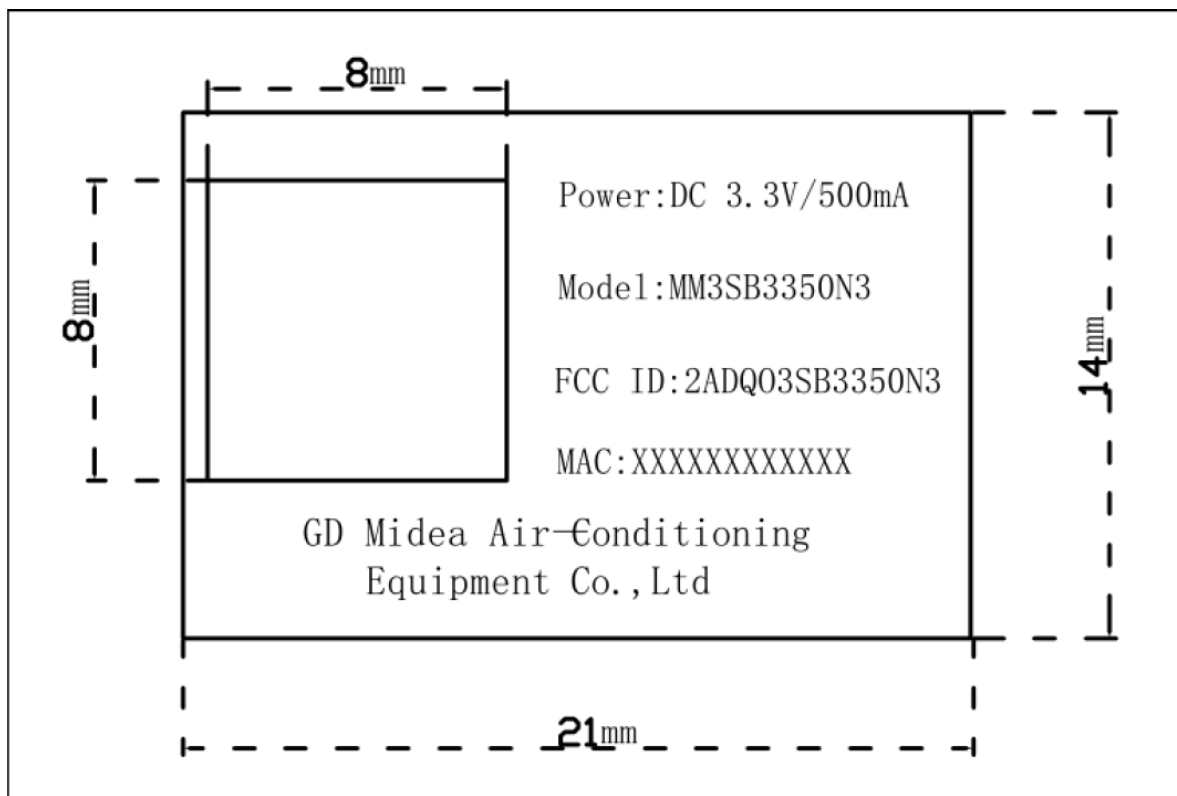
QR code content:
The content of the QR code is shown in the following table.

QR		code content
Field	**Characters in length**	**note**
The initial code	4	Fixed content as "MAC:"
The MAC address	12	Fixed as "XXXXXXXXXXXX"
Production information	26	If the content is less than 26 characters, fill in the front with the character "X" Factory code (2 a) + job number (8) + production date (6th) + small software version number (6) + enterprise code (4 digits) : "01 xxxxxxxx160 8020001090000"
Software version number	12	Fixed as " 050808011944"

The power supply	4	Fixed content as "3.3v" or "5.0v"
current	5	Fixed content as "500mA"

Note:
Starting code (4 bits) :MAC:
MAC address (12 bits) : XXXXXXXXXX
Production information (bit 26) : 01 XXXXXXXX 160919 000109 0000
Position 1 and 2: represent the manufacturing plant
Position 3-10: represents the job number of the manufacturing plant
Bit 11~16: production date, such as September 19, 2016 marked 160919 Bits 17 to 22: software minor version Numbers
No. 23-26: enterprise code, midea's internal business department is "0000"
Non-american enterprise code according to the software code.
Software version (12 bits) : 050808011944
Power supply (4-bit) : working voltage of the module
Current (5 bits) : 500mA

Power consumption description

The State	The Average current in 2 min (mA)	Peak current (mA) in	Max current in 2 min (mA)	Min current in 2 Min (mA)
Idle	80 or less	100 or less	100 or less	80 or less
The STA	100 or less	800 or less	800 or less	80 or less
AP	100 or less	800 or less	800 or less	80 or less

Electrical parameters

Power supply parameters:
Under 5V working power supply:

Symbol	parameter	The minimum value	Typical values	The maximum	unit
VDD	The power input	4.5	5	5.5	V

(ripple control within 100mv) 3.3v Operating Power:

Symbol	parameter	The minimum value	Typical values	The maximum	unit
VDD	The power input	3.135	3.3	3.465	V

(ripple control within 100mv)
Communication serial port level parameters:
Under 5V working power supply:

Symbol	parameter	The minimum value	Typical values	The maximum	unit
VIH	High Level Input Voltage	4.5	5	VDD	V
VIL	Low Level Input Voltage	0.3	–	0.3	V
VOH	High Level Output Voltage	4.5	5.0	VDD	V
VOL	Low Level Output Voltage	0	–	0.4	V

3.3v Operating Power:

Symbol	parameter	The minimum value	Typical values	The maximum	unit
VIH	High Level Input Voltage	3.135	3.3	VDD	V
VIL	Low Level Input Voltage	0.3	–	0.3	V
VOH	High Level Output Voltage	3.135	3.3	VDD	V
VOL	Low Level Output Voltage	0	–	0.4	V

Compliance with standards and certification

The Wi-Fi & Bluetooth module shall be certified by the state radio administration of the ministry of industry and information technology of the People's Republic of China.

Precautions for use

The Wi-Fi & Bluetooth module exposed in the air (the core board inside the module or the whole composed of the core board and the base board) shall at least meet the service environmental conditions of general consumer electronic products, including but not limited to:

- Working temperature: – 20 ~ 75 ℃
- Storage temperature: – 20 ~ 75 ℃
- Working humidity: 0~95 %RH
- Storage humidity: 0~98 %RH
- Tolerance – 20 / + 75 ℃, every 2h a cycle, thermal shock, under the impact of the cycle of at least 20 don't appear dysfunction or performance degradation, no significant tin crack phenomenon.
- When working for a long time, the temperature rise of the circuit components should meet the requirements of their own specifications.
- To simulate the transportation process and home application scenarios, the module should be able to withstand a certain degree of mechanical impact and drop.
  Through certain protective means, Wi-Fi & Bluetooth module can have higher environmental adaptability. When designing a Wi-Fi & Bluetooth module, the performance, size and process margin required for the implementation of protection measures should be reserved.

label 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.

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

   "Contains Transmitter module FCC ID: 2ADQO3SB3350N3".

Documents / Resources

	M Smart MM3SB3350N3 Bluetooth Wi-Fi dual-band Communication Module [pdf] User Manual MM3SB3350N3 Bluetooth Wi-Fi dual-band Communication Module, Bluetooth Wi-Fi dual-band Communication Module, Communication Module