

# **BLE Module**

## **MS52SF3**

### **Datasheet**

V 1.0.0

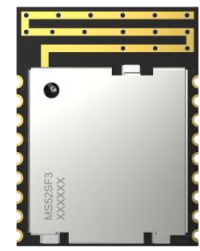
Applicable Product Model
MS52SF3-N32WB031KEQ6-2

# Version Note

Version	Details	Contributor(s)	Date	Notes
1.0.0	First edit	Michelle	2023.12.20	

# MS52SF3-N32WB031KEQ6-2

**Bluetooth Master-Slave Transmission Module with Serial Port Command Configuration, Ultra-Low Power Consumption, and Optional External Antenna Support**



PCB

MS52SF3 is a master/slave module, it can be switched into master/slave mode by command, master and slave can't work at the same time, and only one-to-one connection is allowed. In master mode, the device can be scanned and connected through commands, and the scanning can be set to broadcast name filtering and MAC address filtering, so as to get the relevant device. The MCU sends switching commands to the slave through the UART, and the slave has the broadcast and connection status, and can be connected by the master, and acts as a bridge between the master and the MCU, and carries out the passthrough of data.

## ■ Features

- Support serial command configuration
- Ultra-low power
- Supports optional external antenna
- Supports master-slave switching

## ■ Application

Smart home, smart wearable devices, consumer electronics, smart healthcare, security equipment, automotive equipment, sports and fitness equipment, instruments and meters

## ■ Key parameter

Chip Model	N32WB031KEQ6-2	Antenna	PCB
Module Size	15.8×12×2mm	GPIO	14
Flash	512KB	RAM	48 KB SRAM
Receiver Sensitivity	-96dBm(1Mbps)	Transmitting Power	-20~ +6dBm
Emission Current	0dBm-4.2mA	Receiving Current	3.8mA
Firmware	Transparent Master Slave Firmware		

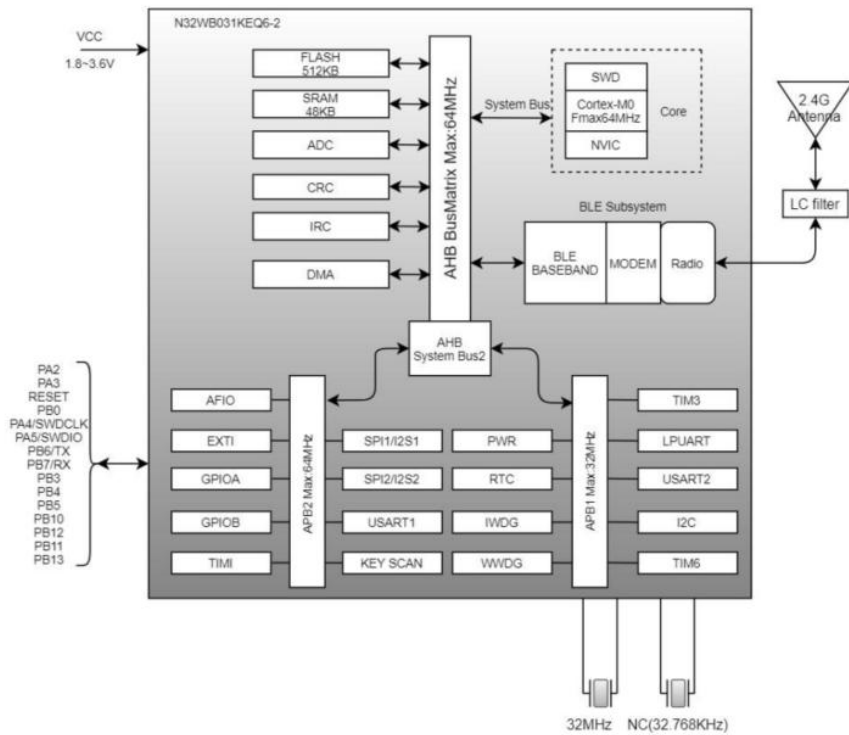
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# 1 Block Diagram



# 2 Electrical Specification

Parameter	Values	Notes
Working Voltage	2.32V-3.6V	To ensure RF work, supply voltage suggest not lower than 3V
Working Temperature	-40°C~+85°C	Storage temperature is -40°C~+105°C
Transmission Power	-20 ~ +6dBm	Configurable
Receiving Current	3.8mA	RF reception current in 1Mbps mode
Emission Current	4.2mA	RF emission current in 0dB mode
Module Dimension	15.8*12*2mm	
Quantity of IO Port	14	

### 3 Current Consumption Characteristics

The following power consumption tests were conducted with a supply voltage of 3.3V and at room temperature. The power consumption is not the same in master mode and slave mode.

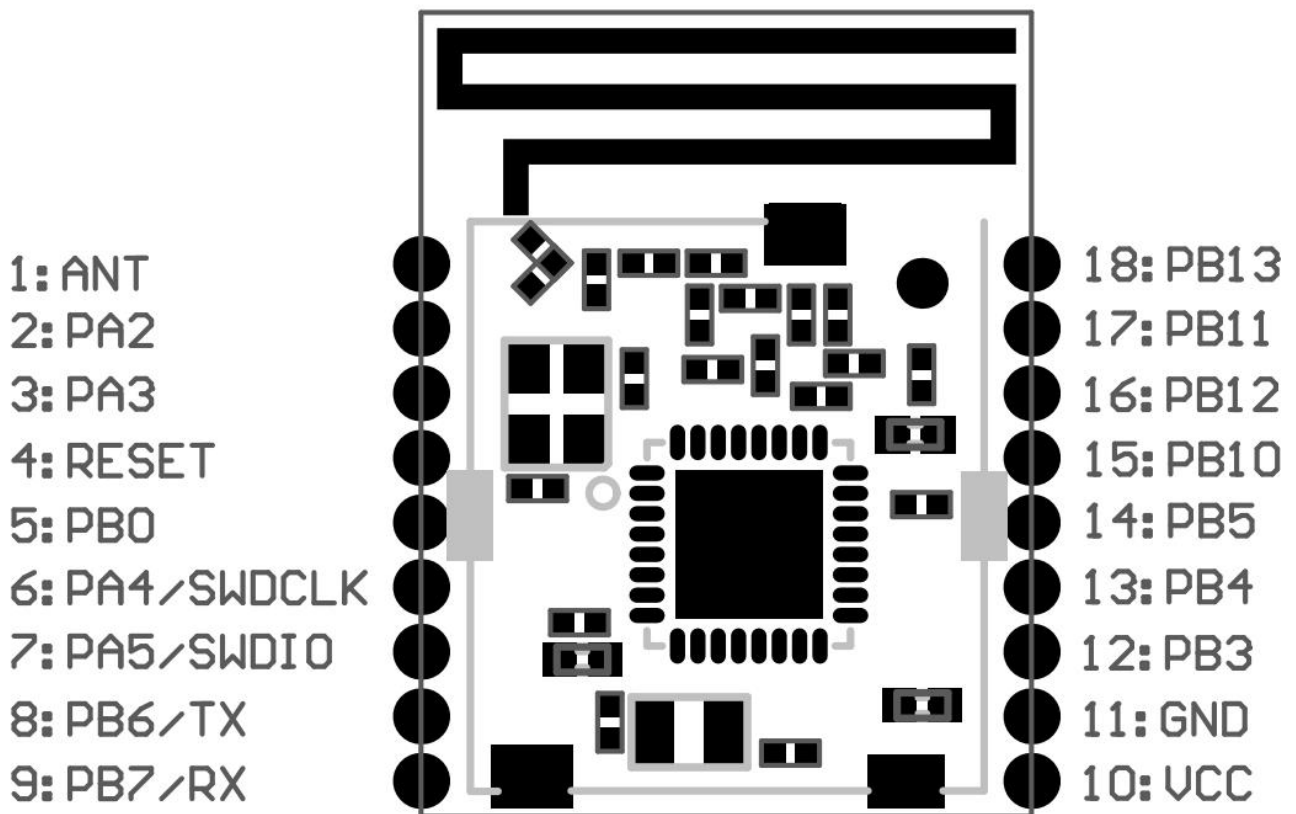
In slave mode, the power consumption is as follows: (broadcast interval is 1s, maximum and minimum connection interval is 20-40ms, and transmit power is 0dBm).

Status	Consumption	Peak(mA)	Avg(mA)
	Average current in sleep state (SLP,BTDATA pulled high)	4.21	5.88μA
	Average current in broadcast state (SLP pin is connected to GND, BTDATA is pulled high)	4.32	43.04μA
	Average current in the connected state ( SLP pin to GND, BTDATA pulled high to connect to cell phone )	4.34	178.30μA
	Passthrough average current (SLP, BTDATA pins are connected to GND, connected to mobile phones)	7.98	2.08

In master mode, the power consumption is as follows: (Maximum minimum connection interval of 20-40ms, transmit power 0dBm)

Status	Consumption	Peak(mA)	Avg(mA)
	Average current in scanning state (all pins are connected) Send command "TTM:SCT-X", X=0, set successfully to keep the main module in infinite scanning state.	8.28	4.98
	Average current under passthrough (SLP, BTDATA pin pulled low)	7.43	2.34

## 4 Pin Description





## 5 Pin Definition

Pin Number	Symbol	Pin Type	Definition
1	ANT	External Antenna Pin	By default, the module comes with an antenna, this pin is directly suspended.  If you don't use the module antenna, you can connect an external antenna through this pin, when connecting an external antenna, the module needs to connect the resistor with the antenna to this pin; <a href="#">you need to explain the configuration requirements with the salesperson.</a>
2-3	PA2/PA3	GPIO	General Purpose IO Port
4	RESET	Asynchronous Reset Pin	Reset, please connect the j-link reset pin to the module when burning.
5	PB0	GPIO	General Purpose IO Port
6	PA4/SWDCLK	SWCLK	For burning firmware
7	PA5/SWDIO	SWDIO	For burning firmware
8	PB6/TX	BTX	TX of Bluetooth Module
9	PB7/RX	BRX	RX of Bluetooth Module
10	VCC	Supply Power	Power supply, 3.0V-3.6V, powered by this pin
11	GND	Negative Power	Ground
12	PB3	Status Connection Indication Pin	Disconnected state: low Connected state: high level
13	PB4	Serial FIFO will be full pin	Judge whether the transmission space is available or not 0: Bluetooth module has available space, can transmit 1: The master stops transmission and waits for the available space to be released.
14	PB5	Sleep Wake Pin	High level: Sleep Low level: wake up
15	PB10	Serial Switch Pins	Serial port on / off to control pin, no floating 0: serial port open, can send and receive serial port data 1: Serial port off
16-18	PB12/PB11/PB13	GPIO	General Purpose IO Port

**Note: PB5 and PB10 have been set up in the software pull-ups, and no more external resistors are recommended in the hardware design.**

## 6 Module Operation Instruction

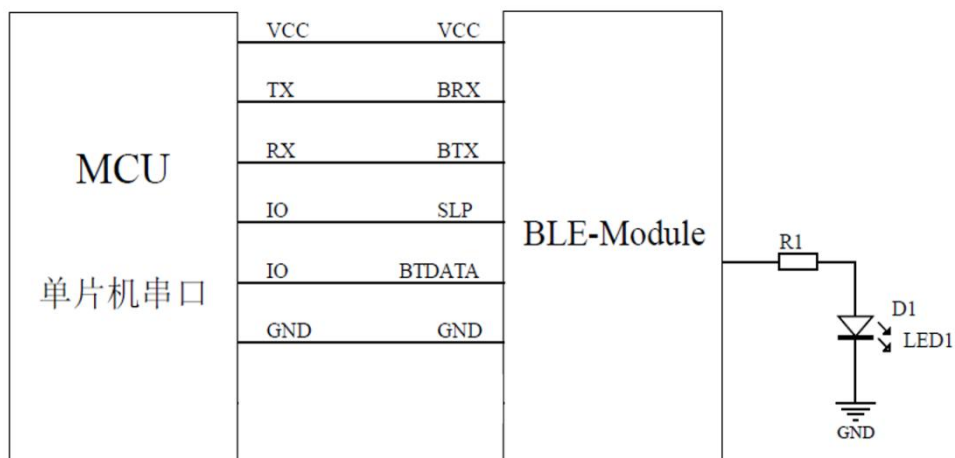
### 6.1 Tool

Mobile APP: Minew serial port assistant, nRF connect (general APP, also called nRF Master Control Panel), when testing BLE products, directly using the system settings comes with Bluetooth can not be used properly, especially the IOS device, the Bluetooth in settings will not show the BLE device.

For IOS device, you can directly download in the APP store.

PC Serial Assistant: Baidu "Friendly Serial Assistant" can be downloaded, PC Serial Assistant is used for debugging module UART interface.

### 6.2 Demonstration of Module Application



### 6.2.1 Power Supply

The SoC working voltage is 2.32V-3.6V, to ensure a stable function, supply voltage should be 3.0V-3.6V.

### 6.2.2 SLP (Sleep/Awake)

When SLP pull down, the module in broadcast mode. BLE device can be found by smartphone APP, Device name: Minew\_Vxxxxx(default) name, module can be connected with smartphone and enters connection mode. When SLP pull up, device will enter sleep mode.

**Note: This pin cannot be left floating to avoid unpredictable errors.**

### 6.2.3 BTDATA(UART control)

The BTDATA pin is only valid when SLP is low. SLP is low, BTDATA is low, when the module is in the broadcast state, all UART data will be considered instructions. When the module is connected, all data is considered passthrough data.

**Note: This pin cannot be left floating to avoid unpredictable errors.**

### 6.2.4 UART interface:TX and RX

When both SLP and BTDATA in low level, UART port will be activated, the module TX and RX should be connected to MCU RX and TX respectively to achieve communicate through UART.

When testing the module, the TX and RX pins can be connected to the USB to UART module, and UART data can be sent and received through the PC Serial Assistant.

**Note: If you do not prepare a USB to UART module, you can reversely connect the TX and RX of the two Bluetooth modules, and connect the modules through two mobile phones to test data passthrough.**

### 6.2.5 CON\_IND

CON\_IND is used to indicate module status, high level in connection mode, low level in sleep or broadcast mode to wake up MCU and save power consumption.

### 6.2.6 FIFO\_FULL

FIFO\_FULL is used to indicate whether the cache is full or not. When sending large amount of data from MCU to module, this pin can be added to judge. If it is high, then the FIFO is full, and you can not continue to send UART data at this time to avoid data loss.

**Note: In slave passthrough mode, FIFO\_FULL (PB2) outputs a high level only after connecting and entering the correct password when the connection password is turned on. In master passthrough mode, FIFO\_FULL (PB2) outputs high only after the connection is made and notify is enabled successfully.**

### 6.2.7 Command Instruction

Connect VCC、GND to power and GND,SLP、BTDATA to GND,module in broadcast mode(not connect with other device),UART interface activated,send command to configure or check parameter.

For all device instructions, the returning result is the same:

54544D3A4F4B0D0A00(TTM:OK\r\n\0) is returned after command sent successfully

54544D3A4552500D0A00 (TTM:ERP\r\n\0) is returned after command failed

After sending the correct setting command, the parameters take effect immediately (the baud rate only takes effect after sending the reset command), and the power outage will not be saved at this time. Only after sending the reset command will it be saved to flash.

Below is the list of setup instructions:

**Note: The first line in the command list should be sent by Hex format, the second line should be sent by ASCII format. When checking the parameter, the returned result are all hexadecimal numbers, so you need to use hexadecimal numbers to parse the command.**

The master-related parameters are scan timeout, scan interval, and connection interval. The Set Connection Interval command is effective for both master and slave modes. Scan Timeout and Scan Interval are valid only under the master module:

Function	Command (hex/ASCII)	Description
Setting the scan timeout	54544D3A5343542D<Para>	Length: 1 Byte, Values: 0-29, Para*5S, 0 means scanning all the time and output scanning result in real time.
	TTM:SCT-<Para>	
Query Scan Timeout	54544D3A5343543F	Return TTM:SCT-<Para>\r\n\0, Para: Hexadecimal
	TTM:SCT?	
Setting the scanning interval	54544D3A5349572D<Para>	Length: 1 Byte, Value: 0-100, Para*10S
	TTM:SIW-<Para>	
Query Scan Interval	54544D3A5349573F	Return TTM:SIW-<Para>\r\n\0, Para: Hexadecimal
	TTM:SIW?	
Setting up RSSI filtering	54544D3A5253492D<Para>	Value: -120 ~ -30dBm, if less than -100dbm, then disable RSSI filtering.
	TTM:RSI-<Para>	
Query RSSI Filtering	54544D3A5253493F	Return TTM:RSI-<Para>\r\n\0, Para: Hexadecimal
	TTM:RSI?	
Setting up broadcast name filtering	54544D3A404E462D<Para>	Length: 16 Byte, Value: ASCII code
	TTM:AVF-<Para>	
Query Broadcast Name Filtering	54544D3A404E463F	Return TTM:ANF-<Para>\r\n\0, Para: Hexadecimal
	TTM:ANF?	
Cancel broadcast name filtering	54544D3A404E462D	Cancel broadcast name filtering
	TTM:ANF-	
Setting up MAC address filtering	54544D3A4D41462D<Para>	Length: 6 Byte, value: hexadecimal number
	TTM:MAF-<Para>	
Query MAC Address Filtering	54544D3A4D41463F	Return TTM:MAF-<Para>\r\n\0, Para: Hexadecimal
	TTM:MAF?	
Cancel MAC address filtering	54544D3A4D41462D	Cancel MAC address filtering
	TTM:MAF-	

Note: 1. RSSI, broadcast name and MAC address filtering are added to make it easier to find the device, only one of MAC address filtering and broadcast name filtering can be effective at the same time, when MAC address filtering is turned on, broadcast name filtering will be turned off automatically, when broadcast name filtering is turned on, MAC address filtering will be turned off automatically.

2. If you modify the scanning parameters (set/query scanning timeout, set/query scanning interval) after scanning has been turned on, the current scanning parameters will not be updated immediately, but the queried results have been updated. So try not to modify the scanning parameters during the scanning process.

When as master, you need to send relevant commands to let the device enter the Bluetooth state, such as scanning and initiating a connection to a certain device, and after connecting, when transmitting data, you will judge all the data whether it is a disconnect command.

Function	Command (hex/ASCII)	Description
Turn on scanning	54544d3a5343414e TTM:SCAN	The command correctly returns: TTM:SCANNING\r\n\0, and incorrectly returns TTM:ERP\r\n\0. After the scanning timeout, the output will be the information of the device that is scanned to a connectable device with a broadcast name, and the output format is as follows: XXXXXXXXXXXX Minew_V5.44H\r\n XXXXXXXXXXXX Minew_V5.43H\r\n XXXXXXXXXXXX Minew_V5.42H\r\n Caution: When the scan timeout is non-zero, the output result RSSI is arranged according to the series of strong to weak, up to 10 device information can be output, if no device is scanned output: 000000000000 \r\n; When scanning timeout is zero or MAC address filtering is enabled, the scanning result is output in real time, and the format of output is: 0xAA+MAC+RSSI+adv_data+0x0D0A
Stop scanning (computing)	54544d3a5343414e2d53544f50 TTM:SCAN-STOP	The instruction returns correctly: TTM:SCAN-STOP\r\n\0, incorrectly returns TTM:ERP\r\n\0
Connect to the specified MAC	54544D3A434F4E4E2D <MAC> TTM:CONN-<MAC>	Command return: TTM:CONNING\r\n\0, indicating connection in progress TTM:CONN-TOUT\r\n\0, connection timeout TTM:NO-DEVICE\r\n\0, device not found TTM:CONN-MAC-XXXXXXXXXXXXXXXX\r\n\0, connected TTM:MAC-DCON-XXXXXXXXXXXXXXXX\r\n\0, Disconnect TTM:ERP\r\n\0, Command Error
Disconnect all connections	54544D3A444953432D414C4C TTM:DISC-ALL	Correctly return TTM:DISC-XXXXXXXXXXXX XXX\r\n\0, incorrectly return TTM:ERP\r\n\0

Note: The above commands are only valid in master mode, sending these commands when the device role is not master will return TTM:ERP\r\n\0. Except for the above four commands, all other device commands, whether in master or slave mode, will return TTM:OK\r\n\0 as long as they fulfill their parameter range requirements, and the parameters will take effect when the corresponding roles are in effect.



A master device can initiate a connection to a slave device with a specified MAC and enter connection mode. When the MAC address of the desired connected device is known, the connection command can be sent directly without scanning.

When the device is switched from master mode to slave mode, it is necessary to first ensure that the device is in the unconnected state, call the set role command, and then call the reset command, which can successfully switch to the slave role, and vice versa.

Function	Command (hex/ASCII)	Description
Setting up the role	54544D3A524F4C2D <Para>	Length: 1 Byte, value: 0-1, 0 is slave mode, 1 is master mode, others are invalid. Note: Reset will take effect after setting.
	TTM:ROL-<Para>	
Query Role	54544d3a524f4c3f	Return to TTM:ROL-<Para>\r\n\0, Para: Hexadecimal
	TTM:ROL?	

When in slave mode, you can set and query many parameters of the broadcast process and connection process as follows:

Function	Command (hex/ASCII)	Description
Setting the broadcast name	54544D3A52454E2D <Para>	Length: 1-16 Byte, Value: ASCII
	TTM:REN-<Para>	
Query broadcast name	54544d3a52454e3f	Return TTM:REN-<Para>\r\n\0, Para is ASCII
	TTM:REN?	
Setting the broadcast interval	54544D3A4144502D <Para>	Length: 1 Byte, value: 1-20, corresponding to broadcast interval 1*100ms. Note: The larger the broadcast interval, the lower the power consumption. Maximum broadcast interval 2S
	TTM:ADP-<Para>	
Query broadcast interval	54544D3A4144503F	Return TTM:ADP-<Para>\r\n\0, Para: Hexadecimal
	TTM:ADP?	
Setting the transmit power	54544D3A54504C2D <Para>	Length: 1 Byte, Values: 0-7, corresponding to -20, , -56, -8, -4, -2, 0, 0, +6(unit: dB) Note: For compatibility with the nRF52 series there are two 0dBm
	TTM:TPL-<Para>	
Query transmit power	54544D3A54504C3F	Return TTM:TPL-<Para>\r\n\0, Para: Hexadecimal
	TTM:TPL?	
Setting the broadcast data	54544D3A4144442D <Para>	Length: 1-16 Byte, value: any hexadecimal number
	TTM:ADD-<Para>	
Query broadcast	54544D3A4144443F	Return TTM:ADD-<Para>\r\n\0, Para: Hexadecimal

Data	TTM:ADD?	
Setting the factory ID	54544D3A5049442D <Para>	Length: 2 Byte, value: any hexadecimal number
	TTM:PID-<Para>	
Query Factory ID	54544D3A5049443F	Return TTM:PID-<Para>\r\n\0, Para: Hexadecimal
	TTM:PID?	
Setting the Service UUID	54544D3A5549442D <Para> TTM:UID-<Para>	Length: 6Byte, (2 Byte service uuid+2 Byte rx UUID+2 Byte tx UUID) Values: Any hexadecimal number, service, rx, tx UUID can't be the same.
Query Service UUID	54544D3A5549443F	Return TTM:UID-<Para>\r\n\0, Para: Hexadecimal
	TTM:UID?	
Setting the broadcast mode	54544D3A4D4F442D <Para>	Set device broadcast packet format: 0: pass-through broadcast packet 1: iBeacon broadcast packet, you can see the specific broadcast packet format instructions
	TTM:MOD-<Para>	
Query broadcast mode	54544d3a4d4f443f	Return TTM:MOD-<Para>\r\n\0, Para: Hexadecimal
	TTM:MOD?	
Setting the UUID	54544D3A4149442D <Para>	Length: 16 bytes, value: any hexadecimal number
	TTM:AID-<Para>	
Query UUID	54544D3A4149443F	Return TTM:AID-<Para>\r\n\0, Para: Hexadecimal
	TTM:AID?	
Set Major	54544D3A4D414A2D<Para>	Length: 2 bytes, value: any hexadecimal number
	TTM:MAJ-<Para>	
Query Major	54544D3A4D414A3F	Return to TTM:MAJ-<Para>\r\n\0, Para: Hexadecimal
	TTM:MAJ?	
Set Minor	54544D3A4D494E2D <Para>	Length: 2 bytes, value: any hexadecimal number
	TTM:MIN-<Para>	
Query Minor	54544d3a4d494e3f	Return TTM:MIN-<Para>\r\n\0, Para: Hexadecimal
	TTM:MIN?	
Setting the connection mode	54544D3A5057452D <Para>	Whether the device requires a password to connect, 0: no password required to connect 1: Connection password required
	TTM:PWE-<Para>	
Query Connection Mode	54544D3A5057453F	Return TTM:PWE-<Para>\r\n\0, Para: Hexadecimal
	TTM:PWE?	
Setting the connection password	54544D3A5057442D <Para>	Length: 1-8 bytes, value: ASCII, the correct password must be entered within 5s on the connection, otherwise the connection will be disconnected
	TTM:PWD-<Para>	
Query connection	54544D3A5057443F	Return to TTM:PWD-<Para>\r\n\0, Para:ASCII

password	TTM:PWD?	
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Whether it is the master mode or the slave mode, all the setting commands need the reset command to take effect. while the query command will return the relevant parameters, and the command error will return TTM:ERP\r\n\0. For the whole device, the baud rate, the connection interval commands take effect regardless of whether it is the master mode or the slave mode.

Function	Command (hex/ASCII)	Description
Setting the baud rate	54544D3A4250532D <Para>	Length: 1 Byte, Values: 0-4, corresponding to 9600/ 19200/38400/57600/115200 (unit: bps) respectively.
	TTM:BPS-<Para>	
Query Baud Rate	54544D3A4250533F	Return TTM:BPS-<Para>\r\n\0, Para: Hexadecimal
	TTM:BPS?	
Setting the connection interval	54544D3A4349542D <Para>	Length: 1 Byte, value: 0x01~0x64, actual connection interval is (X*10~X*10+20) ms.
	TTM:CIT-<Para>	
Query Connection Interval	54544D3A4349543F	Return to TTM:CIT-<Para>\r\n\0, Para: Hexadecimal
	TTM:CIT?	
Retrieve MAC address	54544d3a4d4143(2d)3f	Return TTM:MAC-<Para>\r\n\0, Para: Hexadecimal
	TTM:MAC-? or TTM:MAC?	
Read version information	54544d3a564552(2d)3f	Return to TTM:VER-<Para>\r\n\0, Para:ASCII
	TTM:VER-? or TTM:VER?	
Restore factory equipment	54544d3a5253542d464143	Consistent with the return of the setup command
	TTM:RST-FAC	
reset (a dislocated joint, an electronic device etc)	54544d3a5253542d535953 TTM:RST-SYS	Success will return TTM:OK\r\n\0
Setting the parity bit	54544D3A5041522D <Para>	Length: 1 Byte; Values: 0-1 or 0x00~0x01 0: not on, 1: on After successful reset, the master computer (serial assistant) should also modify the setting to even parity.
	TTM:PAR-<Para>	
Query Check Digits	54544D3A5041523F	Return: TTM:PAR-<Para>\r\n\0, Para: Hexadecimal
	TTM:PAR?	

## 6.3 Example of Operation

### 6.3.1 Factory Default Parameters

#### Factory Default Parameters

Serial baud rate: 9600bps,8N1

Transmit power: 0dBm

Minimum and maximum connection interval: 20ms - 40ms

Device Role: Master

Scanning RSSI filter value: -120dBm

Scanning Broadcast Name Filtering: Not Enabled

Scanning MAC address filtering: not enabled

Serial port parity bit: Not enabled

#### Default parameters related to master mode:

Scan timeout: 10s

Scan interval: 100ms

#### Default parameters related to slave mode:

Broadcast name: Minew\_Vxxxxx

Broadcast interval: 1s

Broadcast Mode: Transmission broadcast packet

Customized data: MinewTech

Connection password enable: not enabled

Connection password: minew123

Major: 0x1234

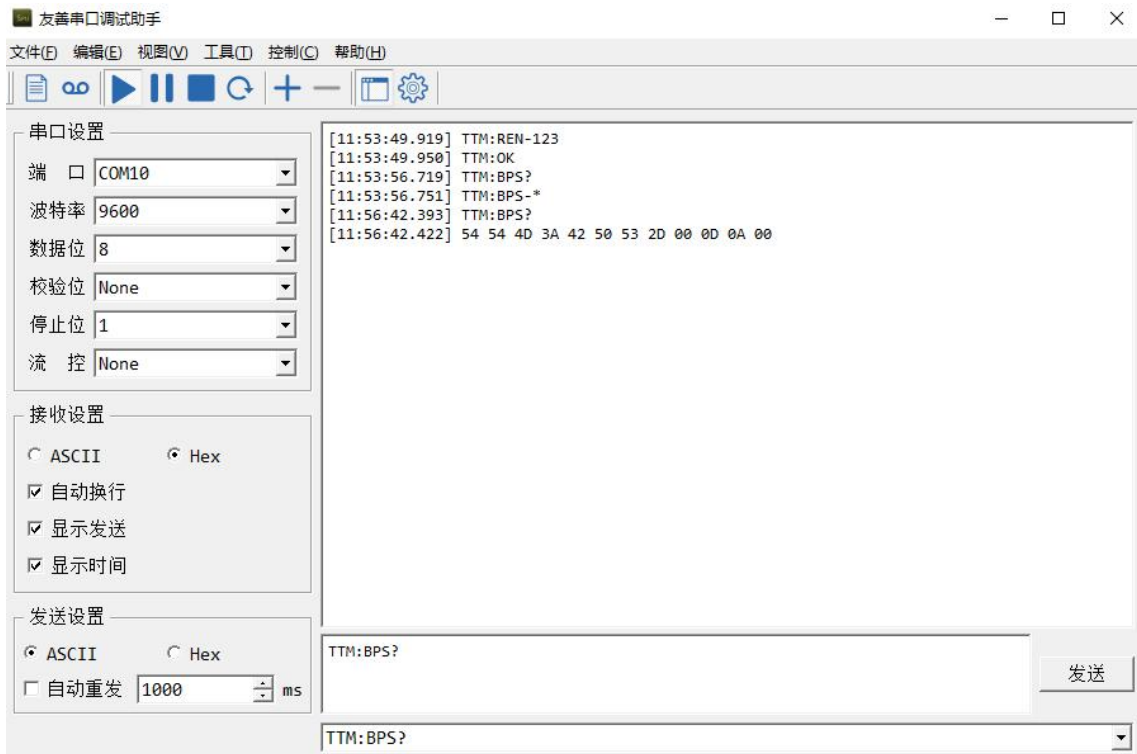
minor: 0x1235

UUID: 74278BDA-B644-4520-8F0C-720EAF059935

### 6.3.2 Example of Modifying Parameters

Connect all pins according to the wiring method, and connect SLP and BTDATA to ground. At this time, you can view the device with the broadcast name Minew\_Vxxxxx through the mobile APP (Minew serial port assistant or nRF connect). In this state, if the serial port sends TTM:REN-123, it will return TTM:OK\r\n\0. The parameters will not take effect until the reset command is sent, and the parameters will be saved after power-off.

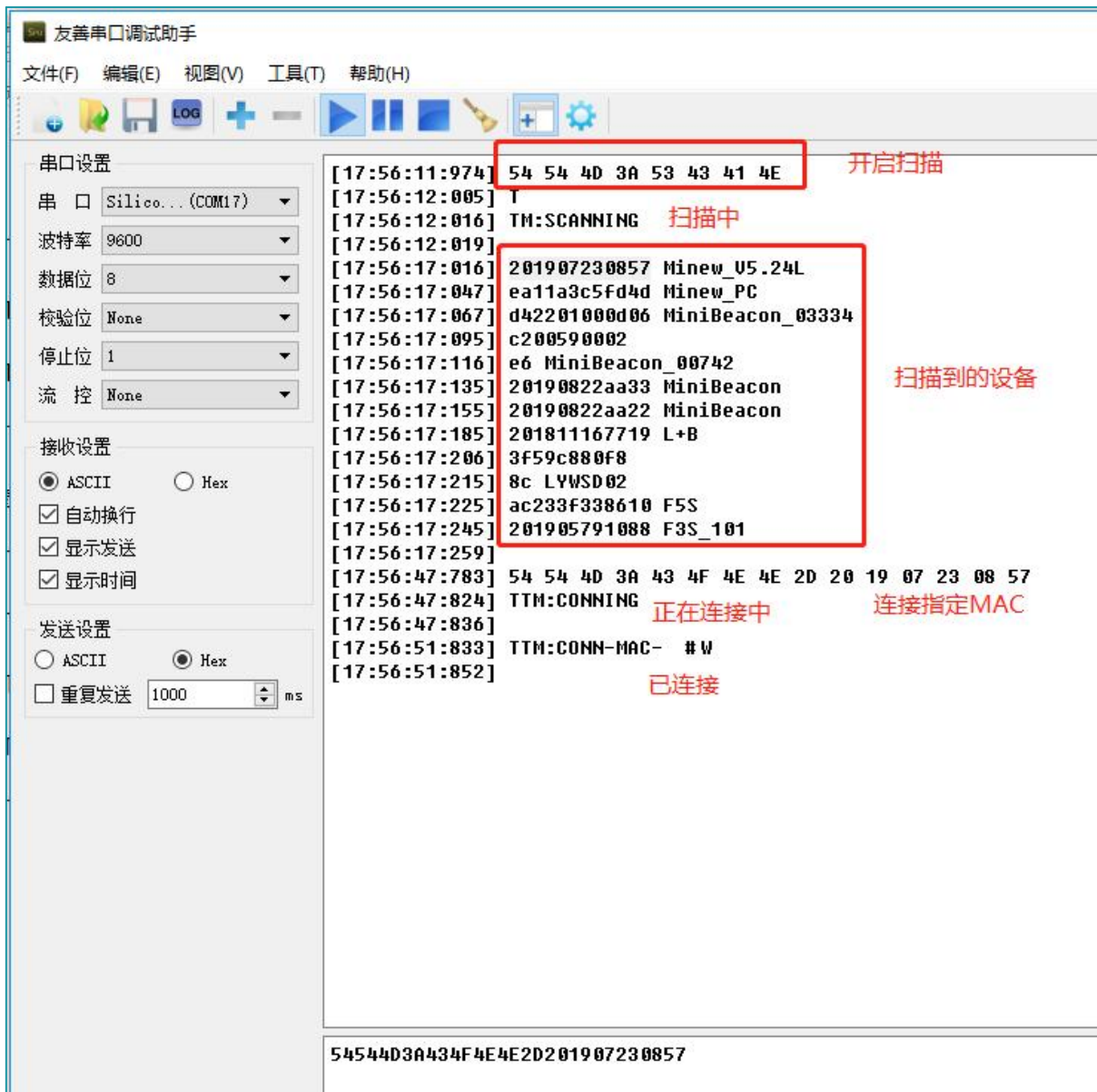
**Note: When you need to modify multiple parameters, you can send all the setting commands first and then send the reset command.**



When querying the device parameters, because the parameters are hexadecimal numbers, when selecting the ASCII display, the parameter position may be garbled, at this time, you need to set to HEX display, the parameters correspond to the position after 2D, see the above figure, query the baud rate, you need to use the HEX display to view the specific parameters.

### 6.3.3 Scanning Devices and Connections

Send the 54544D3A5343414E (TTM:SCAN) command to scan for a device and obtain its MAC address. The scanned device returns MAC + broadcast name information. Send the 54544D3A434F4E4E2D201907230857 command and the module will connect the device with MAC address 20:19:07:23:08:57. The device connected will return TTM:CONN-MAC-XXXXXXXXXXXX\r\n\r\n0. Since MAC is a hexadecimal number, the entire command is sent as a hexadecimal number. Once connected data can be passthrough.



### 6.3.4 Master Passthrough

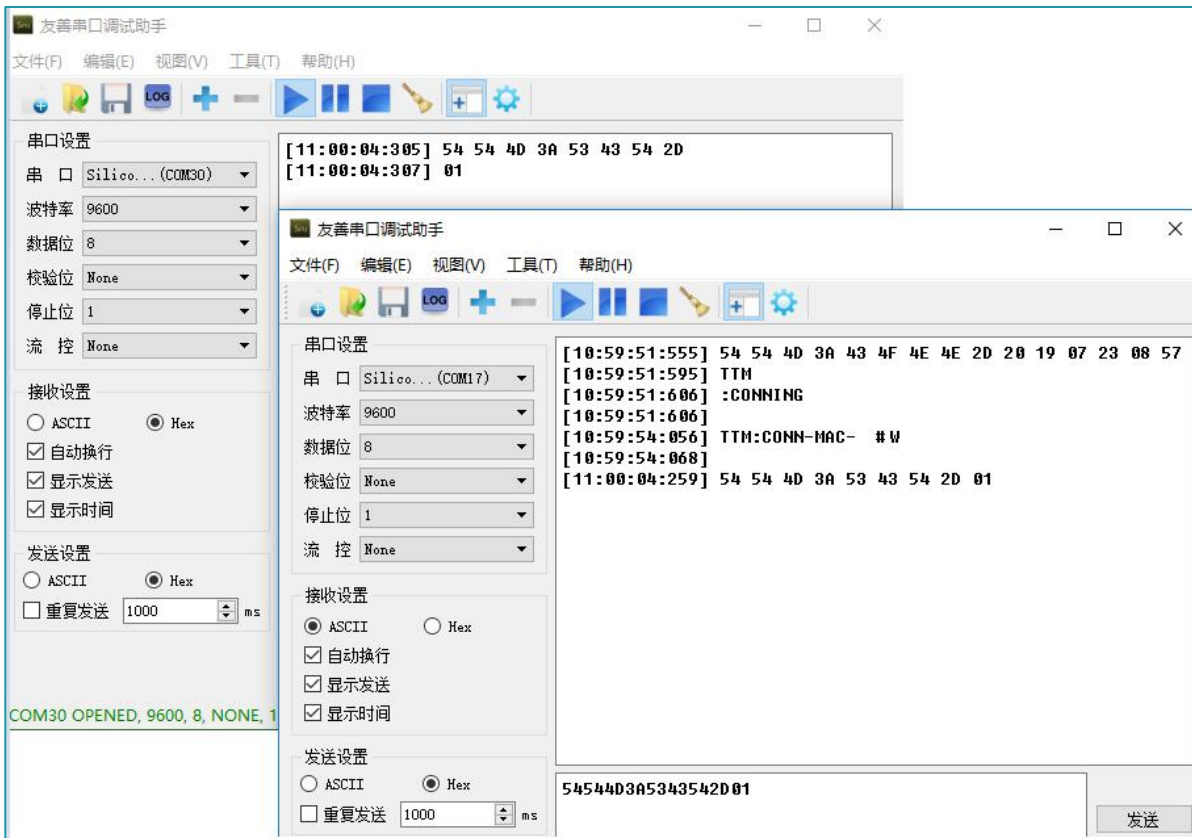
After returning the connected command in step 6.3.3, data passthrough can be performed. The prerequisite for correct communication between the module and the slave device is that the services, characteristics, UUID, and attributes of the slave device must be the same as those of the module.

Relevant information is provided below:

Eigenvalue UUID	Executable Operation	Packet Length	Note
FFF1	notify	244	Module data reception, the data sent from the device to the module shall not exceed 244 Byte per packet.
FFF2	write	244	Module data sending, the module has to do automatic packetization, data more than 244 Byte will be automatically divided into 244 packets sent to the slave device.

Take the master module connecting to the passthrough slave module as an example.

Once connected, data can be sent.

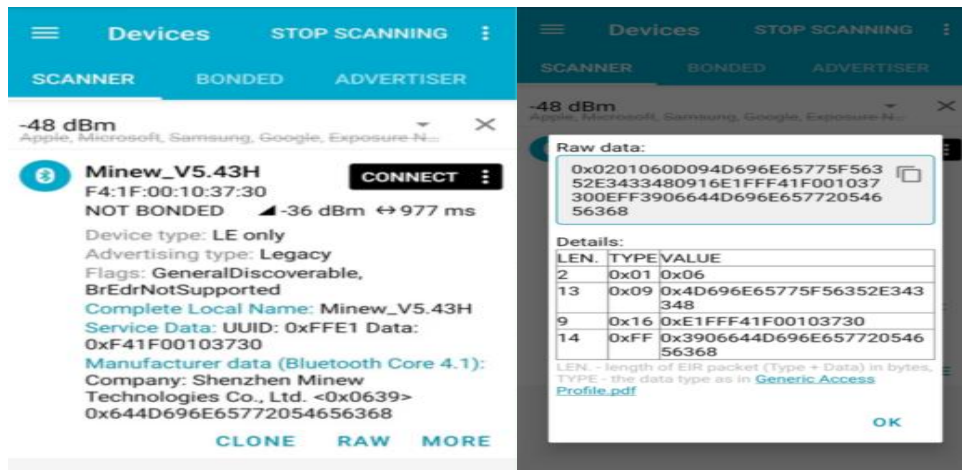


### 6.3.5 Slave Broadcast

After setting the device role to slave mode with the command TTM:ROL-0, data can be transmitted to and from the cell phone. With the SLP pin low, the device is in broadcast state. Use nrf connect to scan the device, click Raw after scanning to the device, Raw data is the unparsed data of the scanned device. After parsing the data according to BLE data type, see Detail section, BLE broadcast data has a certain format: length + type + content.

The content is changeable, the type is fixed and the length is determined by the content. There are two broadcast formats for the device, the pass-through broadcast packet and the iBeacon broadcast packet. Both formats contain four types: flag(0x01), broadcast name(0x09), service data(0x16), and manufacturer data(0xFF).

The following figure shows the transmitting broadcast packet: flag, broadcast name, service data is put in the broadcast packet, manufacturer data is put in the reply packet. The service data content is: service data UUID(E1FF) + MAC address. manufacturer data content consists of company id(3906) + battery level information(1 byte) + custom data.

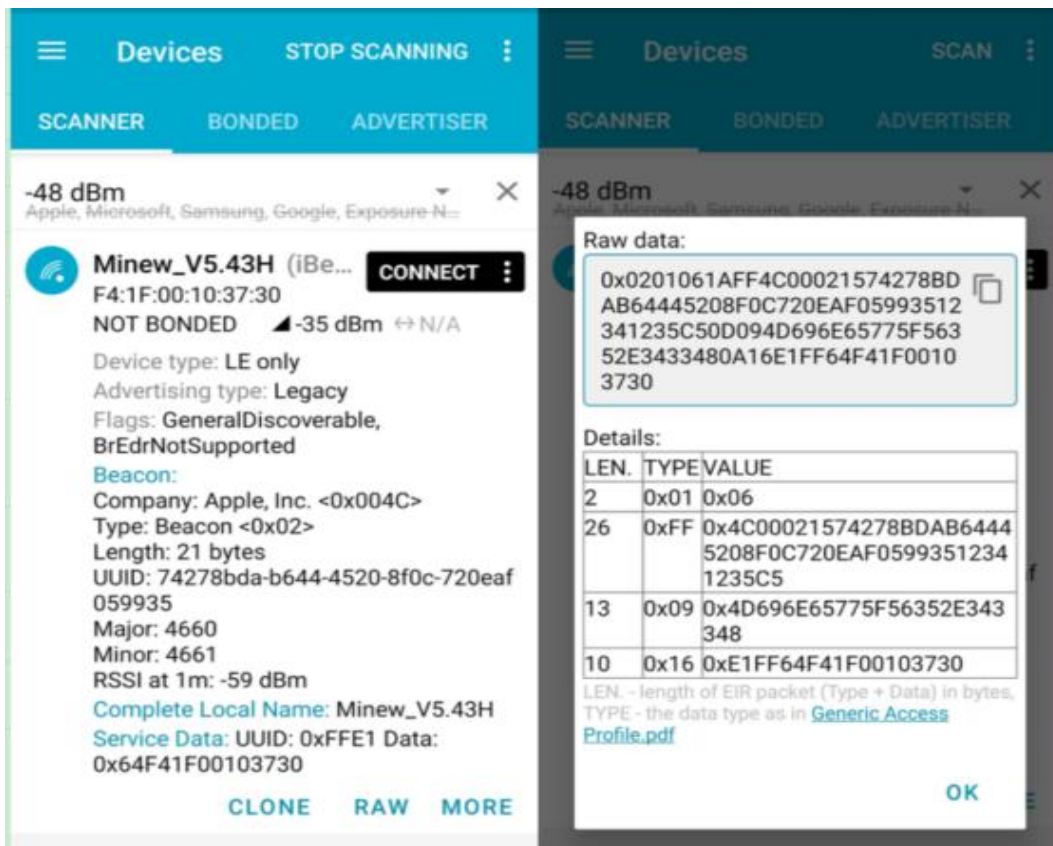


**Note:** The IOS side can not get the content of the MAC address field, so the MAC address is put back into the broadcast packet to ensure that the IOS side can get the device MAC address. In addition, the WeChat applet can't get the reply packet, so the MAC is put into the service data of the broadcast packet to ensure that the IOS side can also get the device MAC address using the WeChat applet connection.



The following figure shows the iBeacon broadcast packet: flag, manufacturer data is put in the broadcast packet, service data and broadcast name are put in the reply packet. The broadcast packet must follow this fixed format to fulfill the iBeacon protocol definition. In manufacturer data data, 4C 00 is Apple's company id, 02 15 is iBeacon's fixed format, Proximity uuid(16 bytes)+Major(2 bytes)+Minor(2 bytes)+Measured power(1 byte). In iBeacon broadcast mode, manufacturer data can only change the value of Proximity uuid, Major, Minor.

service data= service data UUID(FFE1) + battery level information + MAC address.

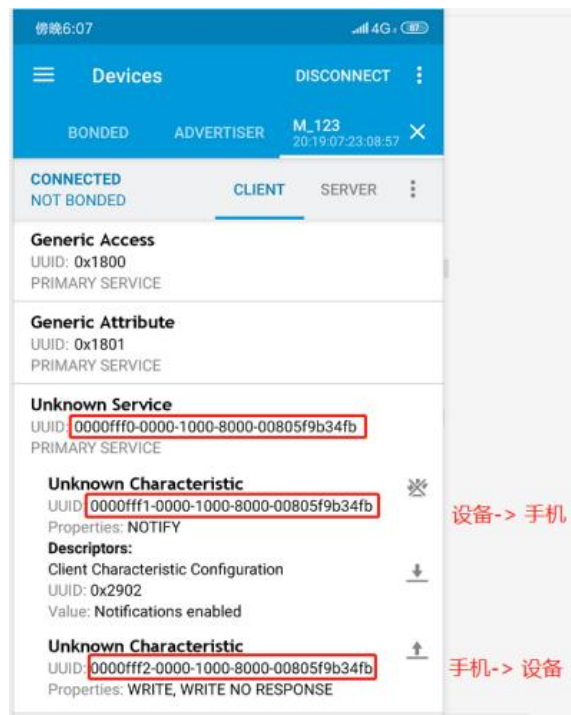


### 6.3.6 Slave Passthrough

Connect to the device using the mobile app and keep the BTDATA pin low to perform data passthrough. when BTDATA is not low, it does not affect the broadcasting and connecting of the device, just that passthrough is not possible. Using nRF connect, you can see the specific service, characteristic and corresponding properties.

The UUID consists of the alias UUID (2 byte, 3.4 byte on the left in the figure) + the base UUID (the remaining 14 byte).

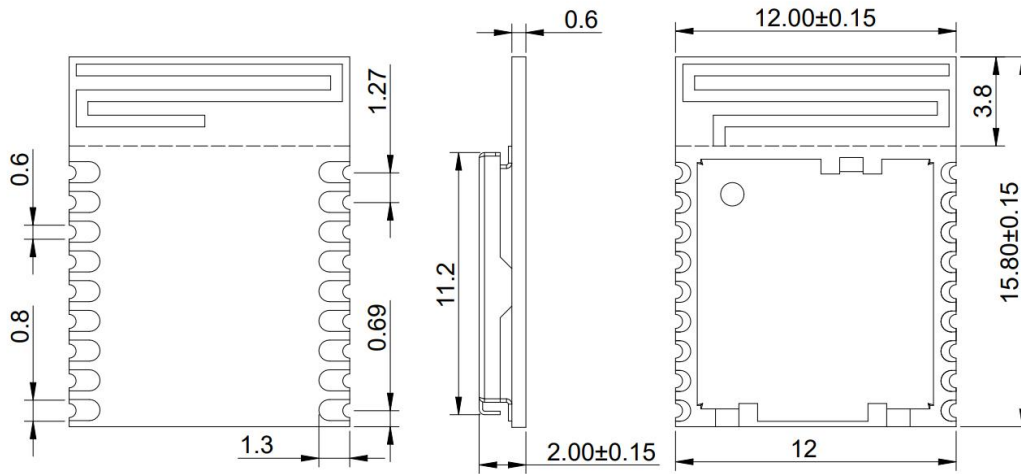
The base UUID used for services, features in the passthrough program is standard and is illustrated below with the alias UUID.



FFF0 is the service UUID, FFF1 is the cell phone receives data and the module sends data; FFF2 is the cell phone sends data and the module receives data.

Eigenvalue UUID	Executable Operation	Maximum Packet Length	Note
FFF1	notify	244	<p>The serial port sends data to the module, which is forwarded to the phone. The cell phone enables notify before it can get the data. The maximum number of bytes the module can send in a packet is 244 byte.</p> <p>Note: This process firmware does automatic sub-package processing, you can do not have to follow the length of a package for sub-package.</p>
FFF2	write	244	<p>The phone sends data to the module and forwards it to the serial port. When using the API interface function to write data, the maximum length of data written at one time is 244 bytes</p>

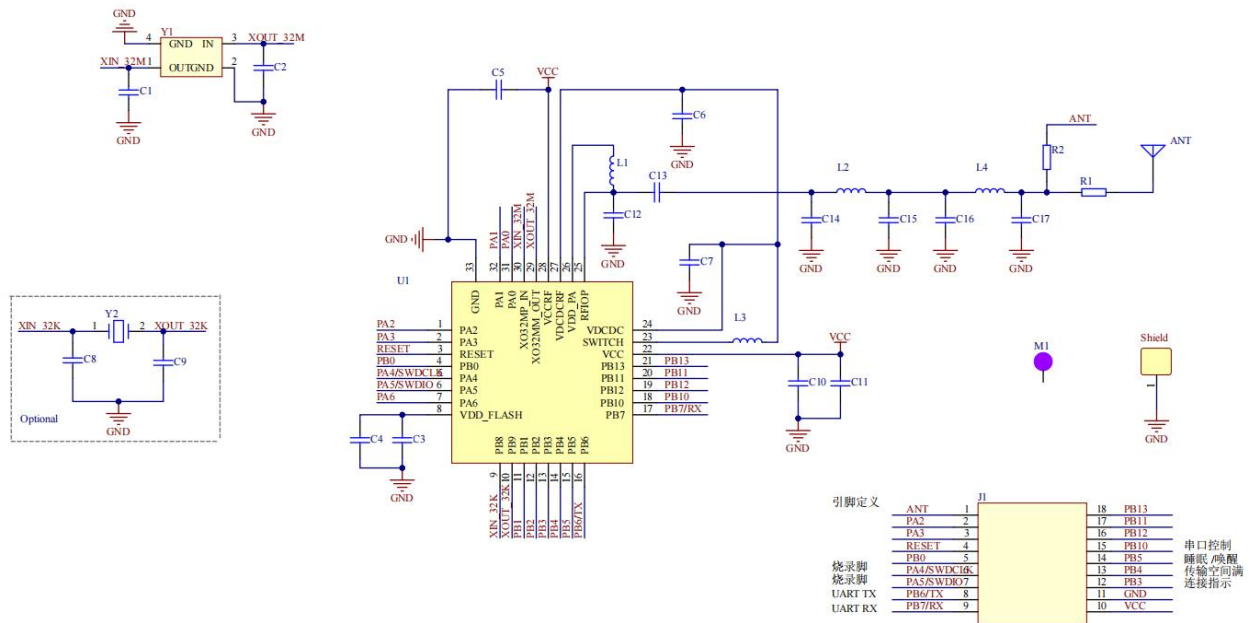
## 7 Mechanical Drawing



(Default unit: mm Default tolerance:  $\pm 0.1$ )

**Note: Recommended pad size 1.8\*0.8mm, pad extends outward 0.5mm**

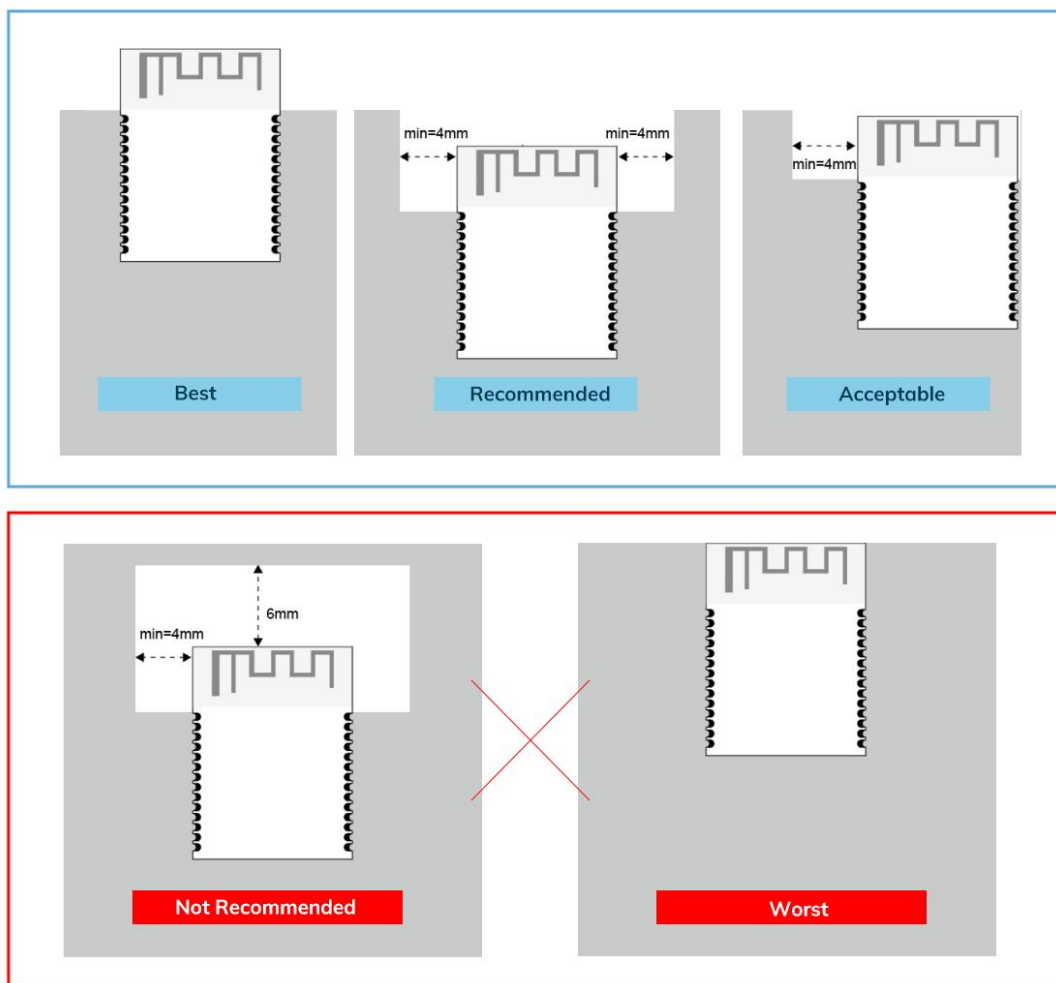
### 8 Electrical Schematic



**Notice:** Before placing an order, please confirm the specific configuration required with the salesperson.

## 9 PCB Layout

Module antenna area can not have GND plane or metal cross wiring, can not be placed near the components, it is best to do skeletonization or headroom area processing, or placed on the edge of the PCB board. Reference examples are as follows, **it is strongly recommended to use the first design, the module antenna design in accordance with the first wiring for debugging.**

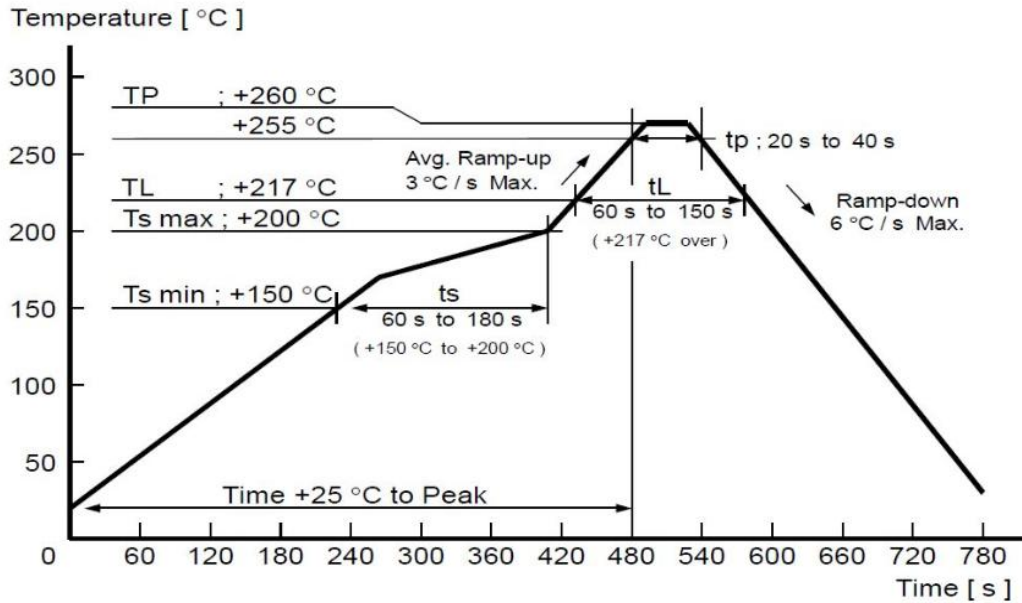


**Layout Notes:**

- 1) Preferred Module antenna area completely clearance and not be prevented by metals, otherwise it will influence antenna's effect (as above DWG. indication).
- 2) Cover the external part of module antenna area with copper as far as possible to reduce the main board's signal cable and other disturbing.
- 3) It is preferred to have a clearance area of 4 square meter or more area around the module antenna (including the shell) to reduce the influence to antenna.
- 4) Device should be grounded well to reduce the parasitic inductance.
- 5) Do not cover copper under module's antenna in order to avoid affect signal radiation or lead to transmission distance affected.
- 6) Antenna should keep far from other circuits to prevent radiation efficiency reduction or affects the normal operation of other lines.
- 7) Module should be placed on edge of circuit board and keep a distance away from other circuits.
- 8) Suggesting to use magnetic beads to insulate module's access power supply.

## 10 Reflow and Soldering

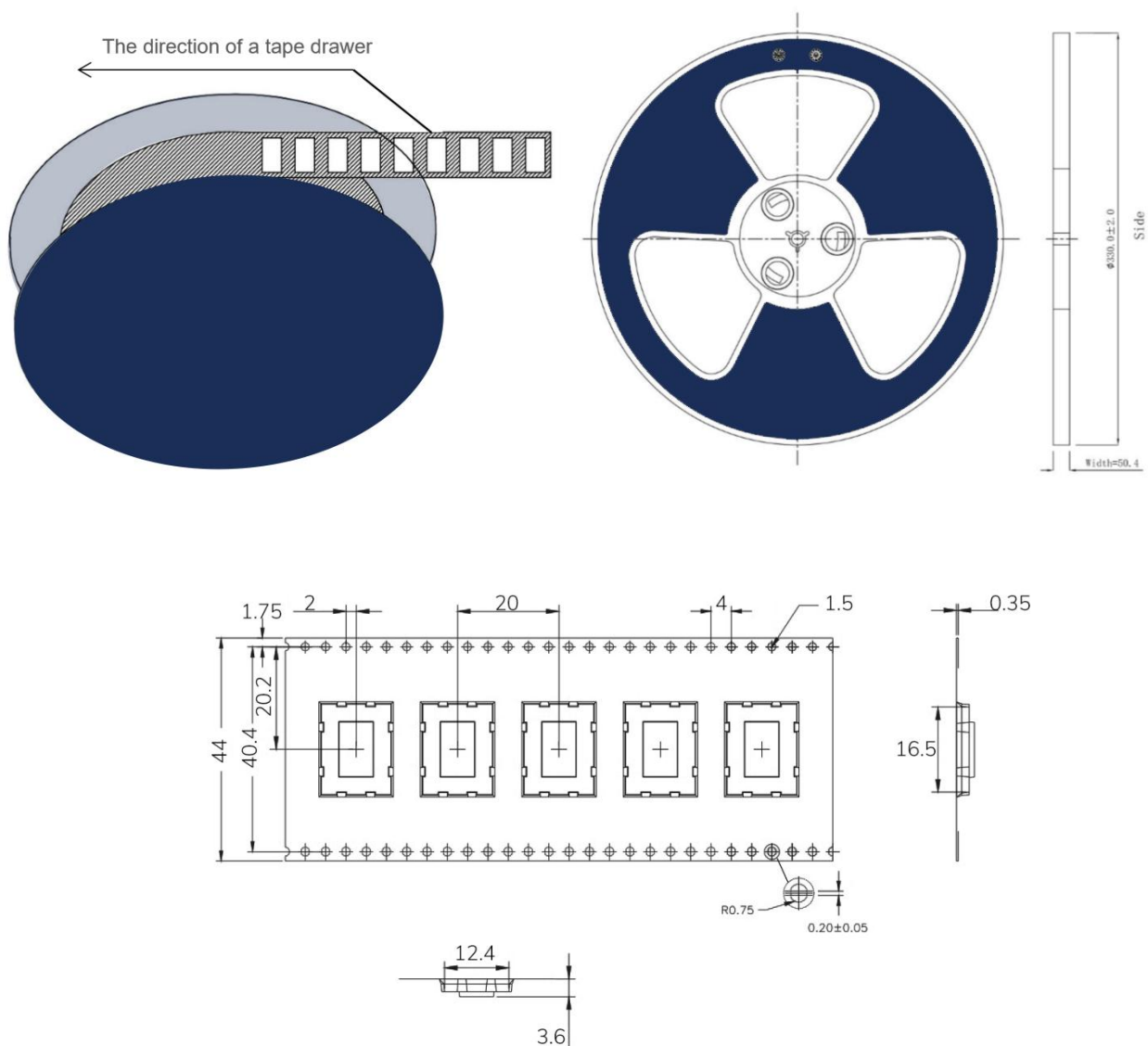
- 1) Do SMT according to above reflow oven temperature deal curve. Max. Temperature is 260°C;
- 2) Refer to IPC/JEDEC standard; Peak TEMP<260°C; Times: ≤2 times, suggest only do once reflow soldering on module surface in case of SMT double pad involved. Contact us if special crafts involved.



- 3)
- 4) Suggesting to make 0.2mm thickness of module SMT for partial ladder steel mesh, then make the opening extend 0.8mm
- 5) After unsealing, it cannot be used up at one time, should be vacuumed for storage, couldn't be exposed in the air for long time. Please avoid getting damp and soldering-pan oxidizing. If there are 7 to 30 days interval before using online SMT, suggest to bake at 65-70 °C for 24 hours without disassembling the tape.
- 6) Before using SMT, please adopt ESD protection measure.



### 11 Package Information



\* (Default unit: mm Default tolerance:  $\pm 0.1$ )

Packing Detail	Specification	Net Weight	Gross Weight	Dimension
Quantity	850PCS	425g	1300g	W: 44mm,T:0.35mm

**\* Note:** Default weight tolerance all are within 10g (except the special notes)

## ● Quality

Cognizant of our commitment to quality, we operate our own factory equipped with state-of-the-art production facilities and a meticulous quality management system. We hold certifications for ISO9001, ISO14001, ISO27001, OHSAS18001, BSCI.

Every product undergoes stringent testing, including transmit power, sensitivity, power consumption, stability, and aging tests. Our fully automated module production line is now in full operation, boasting a production capacity in the millions, capable of meeting high-volume production demands.

## ● Contact Us

Shenzhen Minewsemi Co., Ltd. is committed to swiftly delivering top-quality connectivity modules to our customers. For assistance and support, please feel free to contact our relevant personnel, or contact us as follows:

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**Linkedin:** [www.linkedin.com/company/minewsemi](http://www.linkedin.com/company/minewsemi)

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**Related Documents:** Chip Specification

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