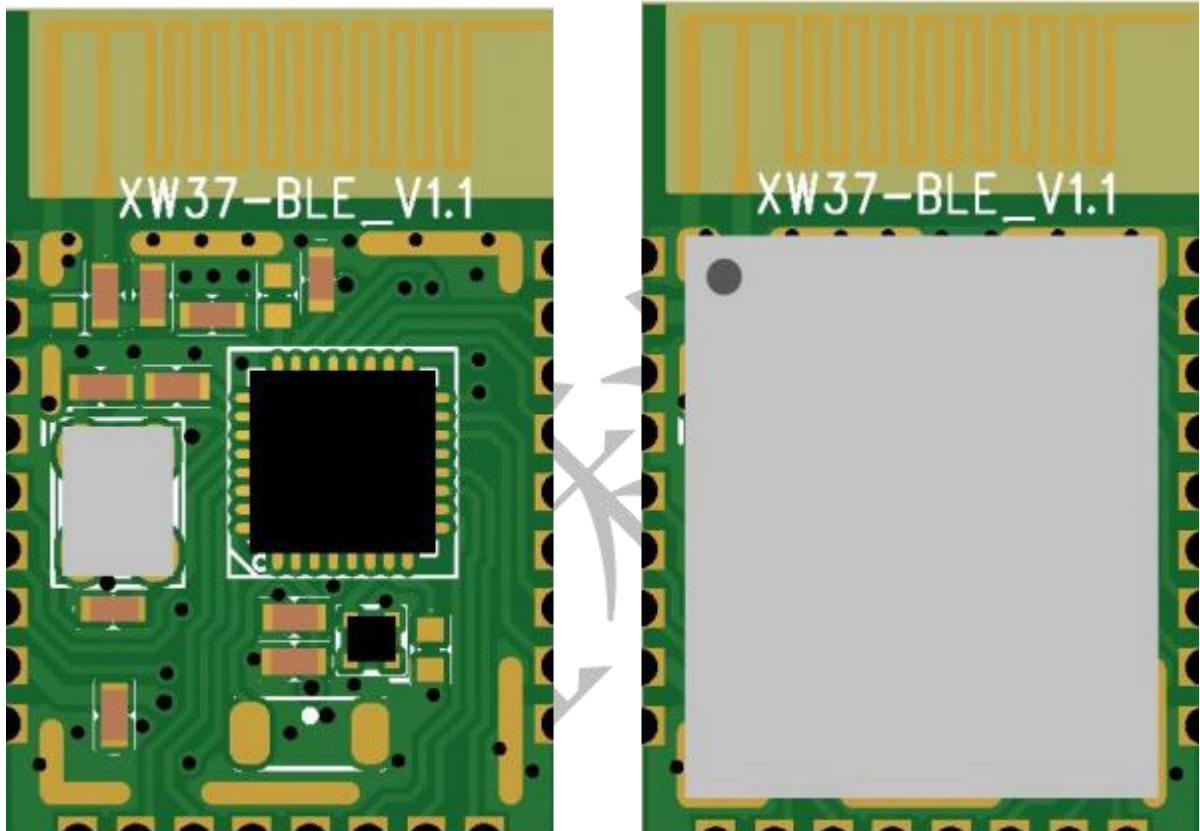


XW37-BLE 5.2 Module



Version: V1.1

Date: 2026.09.23

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Note

The contents of this manual may be modified due to product version upgrades or other reasons. Users shall apply to our company for the final document to obtain the latest product information. This manual serves only as a usage guide, and the accuracy of its content is not guaranteed. All statements, information and recommendations in this manual do not constitute any express or implied warranty.

Revision History

Date	Version	Author	Description
2023.12.13	V1.0	Jerk	Initial release
2026.09.23	V1.1	Jerk	Added LDO version

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1. Product Overview

XW37-BLE is a low-power Bluetooth 5.2 module. This module integrates a high-performance 2.4 GHz RF transceiver, a feature-rich baseband processor, a 32-bit MCU running at 32 MHz, and a variety of peripheral interfaces. It is equipped with 2 Mbit SiP Flash, 32 KB RAM and 32 KB ROM, supporting programmable protocols to meet customized customer applications.

We provide customers with complete hardware and software reference designs to help shorten your product development cycle and reduce your cost investment.

1.1 Product Features

- Ultra-small size low-power Bluetooth 5.2 module
- Built-in 12-bit high-precision ADC
- Supports UART/GPIO/I2C/PWM/ADC/SPI/JTAG and other interfaces
- Deep sleep current: 0.8 μ A
- UART can be enabled via pin to switch between operating and sleep states
- Supports command switching between AT command mode and transparent transmission mode
- Supports parameter configuration via AT commands
- At 0 dBm transmit power, the communication range can reach up to 40 m in open space
- Supports a maximum payload of 20 bytes per data packet
- Power supply range: 1.7~3.3 V; 3.0 V supply is recommended
- Outline dimensions: 18 mm * 12 mm * 1.7 mm

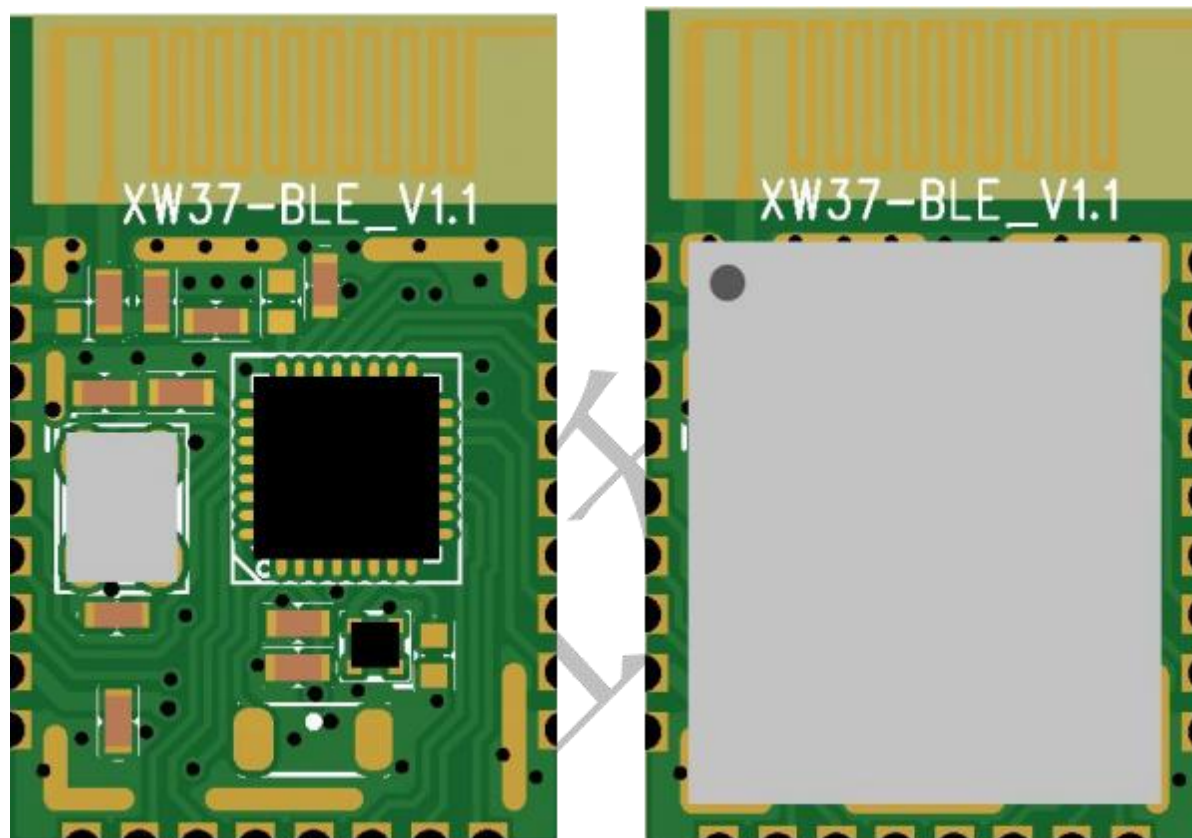
1.2 Application Solutions

■ Household Appliances ■ Industrial Wireless Control ■ Wearable Electronic Products ■ Smart Sockets & Lights ■ Wireless Remote Control ■ Healthcare Products ■ Bluetooth-to-UART Products

2.Product Module Interface

2.1Product Outline Drawing

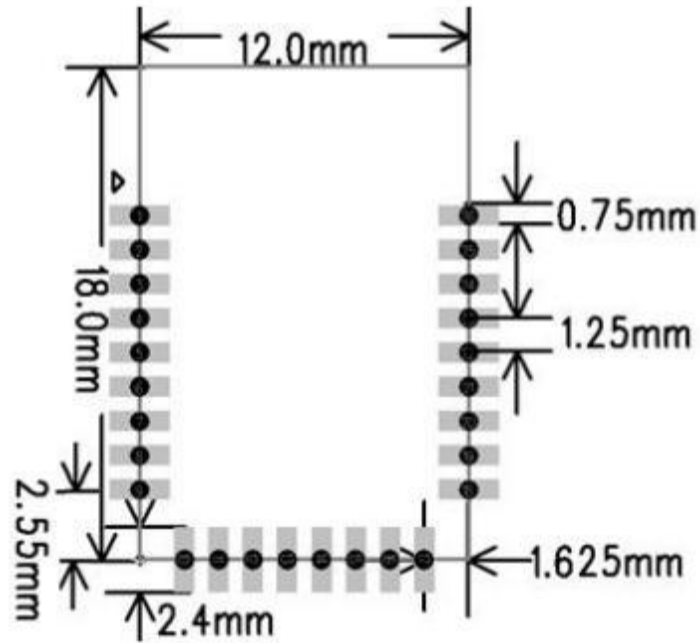
The module is available in two versions: with shield cover and without shield cover. The default delivery version is without shield cover.



产品外形图

2.2 Product Package Dimension Drawing

XW37-BLE

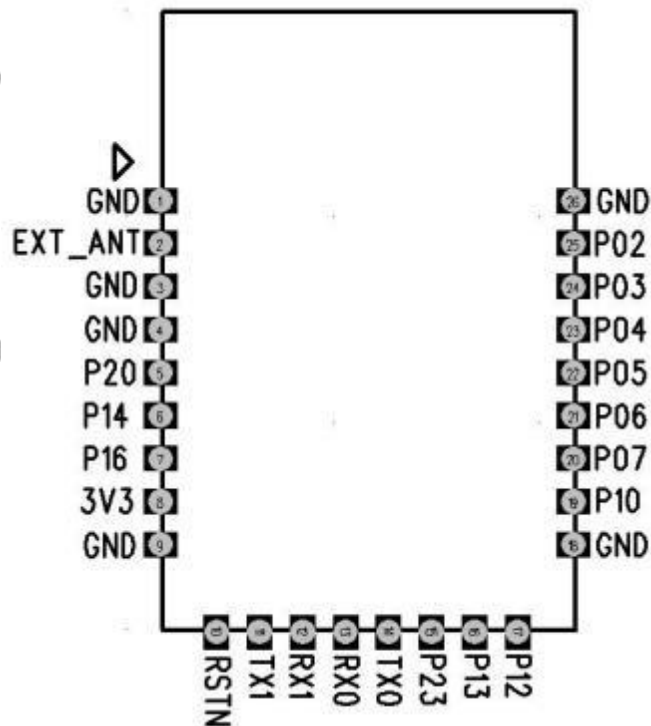


Package Dimension Drawing©

Module Model	Length (mm)	Width (mm)	Height (mm)	PAD Size (mm)	PinPitch (mm)	Board Thickness (mm)
XW37-BLE	18	12	1.7±0.2	-	1.25	0.8

2.3Pin Definition

The XW37-BLE module has a total of 26 interfaces, including 17 GPIOs.



XW37-BLE Pin Diagram

Table 2.3 Pin Function Definition

No.	Pin Name	Function Description
1、 3、 4、 9、 18、 26	GND	Ground
2	EXT_ANT	External antenna connection when required
5	P20	General-purpose IO
6	P14	General-purpose IO, I2C_SDA
7	P16	General-purpose IO
8	3V3	3.0V VCC; the output current of the external power supply is recommended to be above 60mA
10	RSTN	Reset pin, active low
11	P21/TXD1	General-purpose IO, UART_TXD1 communication interface with MCU
12	P22/RXD1	General-purpose IO, UART_RXD1 communication interface with MCU
13	P01/TXD0	General-purpose IO, Download_UART_TX0
14	P00/RXD0	General-purpose IO, Download_UART_RX0, ADC0
15	P23	General-purpose IO, PWM3
16	P13	General-purpose IO, I2C_SCL
17	P12	General-purpose IO, PWM4
19	P10	General-purpose IO, PWM3
20	P07	General-purpose IO, PWM2, SPI_NSS, JTAG_TMS
21	P06	General-purpose IO,, SPI_MISO , ADC5, PWM1 , JTAG_TCK
22	P05	General-purpose IO,, SPI_MOSI , ADC4 , JTAG_TDO
23	P04	General-purpose IO,, SPI_SCK , ADC3 , JTAG_TDI
24	P03	General-purpose IO,, I2C_SDA , ADC2
25	P02	General-purpose IO,, I2C_SCL , ADC1

3. Product Functions and Test Operation Instructions

●Supports Bluetooth 4.2 Master mode and Slave mode.●Supports WeChat AirSync protocol.●Default Configuration:

Operating Mode: Default is transparent transmission mode. Switch to command mode if AT commands are to be used;

UART Parameters: 9600 baud, 8 data bits, no parity, 1 stop bit;

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Bluetooth Name: BleSerial Port;

Advertising Interval: "80 , 80" , i.e. max = 50ms, min = 50ms;

Connection Interval: "36,24,2,100" , i.e. max = 36, min = 24, latency = 2, timeout = 300 (max = 45ms, min = 30ms, latency = 2, timeout = 1000ms) 。

4.UUID

Slave Service UUID: 0xFFB0

Characteristic UUID: 0xFFB1 Properties: Write Without Response Characteristic UUID:

0xFFB2 Properties: Read, Notify

5.Communication Interface between Module and MCU

5.1 Asynchronous Serial Communication

The BLE module communicates with the MCU via UART. Default port characteristics: baud rate 9600, 8 data bits, 1 stop bit, no parity.

5.2 Data Packet Format

In transparent transmission mode, the BLE module forwards the data sent by the MCU to the APP intact. Data sent from the APP to the BLE module is also forwarded directly to the MCU.

In command mode, AT commands can be used to configure the module.

Configuration can be performed by sending AT commands from the APP or via a serial port assistant on a PC.

5.3 Operating Mode Configuration

5.3.1 Switching between Command Mode and Transparent Transmission Mode

Transparent transmission mode is the default mode after power-up. In this mode, send "+++" . The module returns "AT+ok Mode=AT Mode\r\n" to enter command mode.

AT commands can then be used for configuration and read operations.

In command mode, input "AT+exit\r\n." The module returns " AT+ok

Mode=Normal\r\n" to "enter transparent transmission mode. All data sent afterwards will be transparently transmitted directly.

Note: When sending "+++" to switch modes, send only the three " + " characters.

No other characters shall be included, and \r\n must not be appended.

5.3.2 UART Switch

Pin 24 (P03): high level enters UART transparent transmission mode; low level enters low-power mode; floating state defaults to UART transparent transmission mode. A level transition is required to trigger the mode change. (Note: UART transparent transmission is unavailable in low-power mode.)

5.3.3 Status Indicator

13PIN (P01) : High level when not connected; Low level when connected.

5.3.4 MCU Interrupt Wake-up

14PIN (P00) : Default low level. It becomes high level upon receiving data from APP, and returns to low level after reception is completed.

5.3.5 Power On / Off Control

15PIN(P23) : Low level enters DEEP SLEEP mode; High level for normal operation; Floating state defaults to normal operation.

6. AT Commands

Note: Transparent transmission mode is the default mode after power-up. Send "+++" to switch to command mode when in transparent transmission mode. AT commands sent under command mode must end with \r\n. When operating with serial port assistant, check the "Send Newline" option.

6.1 AT Command List

Command	Description
"AT+setBR 9600\r\n"	Set baud rate
"AT+getName\r\n"	Read Bluetooth name
"AT+setName =bleName\r\n"	Set Bluetooth name
"AT+getAddr\r\n"	Read Bluetooth address
"AT+setAddr =112233445566\r\n"	Set Bluetooth address
"AT+getStatus\r\n"	Read Bluetooth status
"AT+setAdvInt 80 100\r\n"	Set advertising interval
"AT+setConnInt 36242300 \r\n "	Set connection interval
"AT+disConnect\r\n"	Disconnect connection
"AT+reStart\r\n"	Restart module
"AT+getPara\r\n"	Get configuration parameters
"AT+exit\r\n"	Exit command mode (switch to transparent transmission mode); Send "+++" to switch to command mode in transparent transmission mode.

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"AT+shutDown\r\n"	Shut down the module
"AT+reStore\r\n"	Restore factory settings
"AT+getInfo\r\n"	Query version information
"AT+help\r\n"	Command help

6.2 Baud Rate Modification

Command Description: Takes effect after manual restart.

Example: "AT+setBR 9600\r\n" ("\r\n" is the terminator and shall not be entered manually. A line terminator (0D 0A) must be appended after each command, the same applies below.)

Hexadecimal: 41 54 2B 73 65 74 42 52 20 39 36 30 30 0D 0A (No spaces between bytes. Spaces can be inserted if your software automatically ignores spaces, the same applies below.)

Response: "AT+ok\r\n" (Operation succeeded) "AT+err_code\r\n" (" Operation failed. Refer to "Command Error Return Parameter Description" for err_code details.)

Baud Rate Setting Range: (Error will be prompted if the parameter is invalid)

2400 , 4800 , 9600 , 19200 , 38400 , 57600 , 115200

6.3 Read Bluetooth Device Name

Example: "AT+getName\r\n"

Hexadecimal: 41 54 2B 67 65 74 4E 61 6D 65 0D 0A

Response: "AT+ok =bleName\r\n" (Operation succeeded)

"AT+err_code\r\n" (Operation failed. Refer to "Command Error Return Parameter Description" for err_code details.")

6.4 Set Bluetooth Device Name

Command Description: Takes effect after manual restart.

Example: "AT+setName =bleName\r\n" (e.g., set toSENSSUN FAT)

Hexadecimal: 41 54 2B 73 65 74 4E 61 6D 65 3D 62 6C 65 4E 61 6D 65 0D 0A

Response: "AT+ok restart effect!\r\n" (Operation succeeded. Send restart command, changes take effect after reboot. "AT+err_code\r\n" (Operation failed. Refer to "Command Error Return Parameter Description" for err_code details.")

6.5 Read Bluetooth MAC Address

Example: "AT+getAddr\r\n"

Hexadecimal: 41 54 2B 67 65 74 41 64 64 72 0D 0A

Response: "AT+ok FF:11:22:33:66:FF\r\n" (Operation succeeded)

"AT+err_code\r\n" (Operation failed. Refer to "Command Error Return Parameter Description" for details of err_code.")

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6.6 Set Bluetooth MAC Address

Example: "AT+setAddr=112233445566\r\n"

Hexadecimal: 41 54 2B 73 65 74 41 64 64 72 3D 31 31 32 32 33 33 34 34 35 35 36 36 0D 0A , Response: "AT+ok restart effect!\r\n" (Operation succeeded. Send restart command; settings take effect after reboot.) "AT+err_code\r\n" (Operation failed. Refer to "Command Error Return Parameter Description" for details of err_code.)

6.7 Read Bluetooth Module Status: Advertising / Connected

Example: "AT+getStatus\r\n" , Hexadecimal: 41 54 2B 67 65 74 53 74 61 74 75 73 0D 0A, Response: "AT+ok status_code\r\n" (Operation succeeded) , status_code is shown below:

00	Module in idle state
01	Module in advertising state
02	Module in connected state
03	Scan with response
04	Scan without response

"AT+err_code\r\n" (" Operation failed. Refer to "Command Error Return Parameter Description" for details of err_code.)

6.8 Modify Bluetooth Advertising Interval

Command Description: Takes effect after manual restart.

Example: "AT+setAdv Int 80 100\r\n" (Minimum interval = $80 \times 0.625\text{ms}$, Maximum interval = $100 \times 0.625\text{ms}$) Hexadecimal: 41 54 2B 73 65 74 41 64 76 49 6E 74 20 38 30 20 31 30 30 0D 0A ((For advertising interval min/max values: "min < =max" , Range: 80 ~ 16000, corresponding to 50 ms ~ 10000 ms)

Response: "AT+ok restart effect!\r\n" (Operation succeeded. Send restart command; settings take effect after reboot.)

"AT+err_code\r\n" (Operation failed. Refer to "Command Error Return Parameter Description" for details of err_code.)

6.9 Modify Bluetooth Connection Interval

Command Description: Takes effect immediately. Do not set it frequently; otherwise, disconnection may happen. Example: "AT+setConnInt 36 24 23 00\r\n" (The

parameters are max, min, latency, timeout) Hexadecimal: 41 54 2B 73 65 74 43 6F 6E 6E 49 6E 74 20 33 36 32 34 32 33 30 30 0D 0A

In this example, the maximum interval is $36 \times 1.25\text{ ms}$, the minimum interval is $24 \times 1.25\text{ ms}$, slave latency is 2, and the connection supervision timeout is $300 \times 10\text{ ms}$.

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Minimum and Maximum Connection Interval: both range from:

0x0006~0x0C80 (7.5ms~4000ms) , min <= max.

ranges from 0x0000~0x01F3 (0~499) 。

Connection Supervision Timeout: ranges from 0x000A~0x0C80. The connection interval must be less than the connection timeout: $[\max * 1.25 * (1 + \text{latency})] < 10 * \text{timeout}$.

Response: "AT+ok\r\n" (Operation succeeded. No reboot required; takes effect immediately.) "AT+err_code\r\n" (Operation failed. Refer to "Command Error Return Parameter Description" for details of err_code.)

6.10 Disconnect Bluetooth Module Connection

Example: "AT+disConnect\r\n" Hex: 41 54 2B 64 69 73 43 6F 6E 6E 65 63 74 0D 0A Response: "AT+ok\r\n" (Operation succeeded)

"AT+err_code\r\n" (Operation failed. Refer to Command Error Return Parameter Description for err_code details.)

6.11 Reset / Reboot

Example: "AT+reStart\r\n" Hex: 41 54 2B 64 69 73 43 6F 6E 6E 65 63 74 0D 0A Response: "AT+ok restart now \r\n" (Operation succeeded, automatic immediate reboot)

6.12 Get Configuration Parameters

Example: "AT+getPara\r\n" Hex: 41 54 2B 67 65 74 50 61 72 61 0D 0A Response: "AT+ok uart 9600,8,N,1; adv 120 160; con 36,24,2,300.\r\n" (Operation succeeded) , The returned parameters include UART, advertising interval and connection interval.

6.13 Exit Command Mode

Example: "AT+exit\r\n" Hex: 41 54 2B 65 78 69 74 0D 0A

Response: "AT+ok Mode=Normal\r\n" (Operation succeeded, switch to transparent transmission mode)

6.14 Power Off

Example: "AT+shutDown\r\n" Hex: 41 54 2B 73 68 75 74 44 6F 77 6E 0D 0A

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Response: "AT+ok power off now!\r\n" (Operation succeeded)

6.15 Restore Factory Settings

Example: "AT+reStore\r\n"

Hex: 41 54 2B 72 65 53 74 6F 72 65 0D 0A

Response: "AT+ ok restart now\r\n" (Operation succeeded)

6.16 Query Version Information

Example: "AT+getInfo\r\n"

Hex: 41 54 2B 67 65 74 49 6E 66 6F 0D 0A

Response: "AT+ok HW=288-BLE-JXKJ,SW=V0.2"

6.17 Help Command

Example: "AT+help\r\n"

Hex: 41 54 2B 68 65 6C 70 0D 0A

Response: AT+ok

Help:

system_shutdown

setBR

getName

setName

getAddr

setAddr

getStatus

setAdvInt

setConnInt

disconnect

reStore

reStart

getPara

getInfo

exit

help

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6.18 Description of Command Error Return Parameters

err_code	Meaning
"06"	Previous operation not completed
"07"	Invalid command parameter
"08"	Module is in disconnected state
"09"	Module is in connected state
"10"	Module is advertising
"11"	Operation failed

7. Power Consumption

Advertising interval 100ms : 450uA

Advertising interval 500ms : 110ua

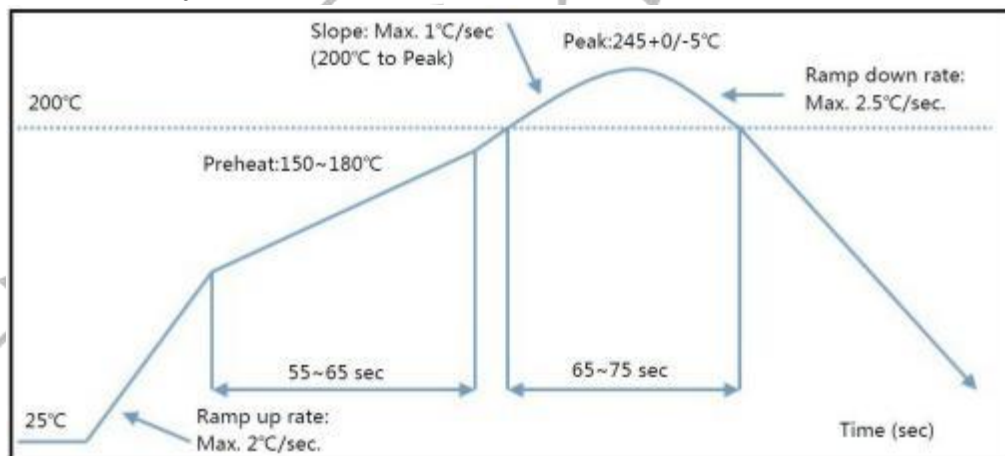
Advertising interval 1000ms : 59ua

Deep sleep current (No advertising): 0.8uA

8.Reflow Profile

Maximum temperature: <250°C

Maximum reflow cycles: ≤2次



Reflow Profile

9.Appendix: Referenced Specifications

《BLUETOOTH SPECIFICATION Version 4.2》

FCC 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.
- 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.

This modular has been tested and found to comply with part 15 requirements for Modular Approval.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Radiated Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment meets the SAR threshold exclusion set forth in KDB 447498 and therefore can be used in mobile/portable configurations. The antenna used for this transmitter must not transmit simultaneously with any other antenna or transmitter, except in accordance with FCC multi-transmitter product procedures. Users and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.

The OEM integrator is still responsible for testing their end-user end-product for any additional compliance requirements required with this modular installed.

Integration instructions for host product manufacturers according to KDB 996369 D03 OEM Manual v01r01

2.2 List of applicable FCC rules

CFR 47 FCC Part 15 Subpart C and Subpart E has been investigated. It is applicable to the modular transmitter

2.3 Specific Operational Use Conditions - Antenna Placement Within the Host Platform

The module is tested for standalone mobile/portable RF exposure use condition.

The transmitter module may not be co-located with any other transmitter or antenna.

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

2.4 Limited Module Procedures

Not applicable

2.5 Trace Antenna Designs

Not applicable

2.6 RF Exposure Considerations

This equipment meets the SAR threshold exclusion set forth in KDB 447498 and therefore can be used in mobile/portable configurations.

2.7 Antenna Type and Gain

The following antennas have been certified for use with this module.

Only antennas of the same type with equal or lower gain may also be used with this module.

Other types of antennas and/or higher gain antennas may require the additional authorization for operation.

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Antenna Specification list below:

Model	Type	Frequency	Gain
2.4GHz PCB ANT	PCB Antenna	2400 – 2500 MHz	-2.01 dBi (Peak)

2.8 End Product Labelling Compliance Information

When the module is installed in the host device, the FCC ID label must be visible through a window on the final device or it must be visible when an access panel, door or cover is easily removed. If not, a second label must be placed on the outside of the final device that contains the following text: “Contains FCC ID: **2AW97-XW37-BLE**”. The FCC ID can be used only when all FCC compliance requirements are met.

2.9 Information on Test Modes and Additional Testing Requirements

This transmitter is tested in a standalone mobile RF exposure condition and any co-located or simultaneous transmission with other transmitter(s) class II permissive change re-evaluation or new FCC authorization.

Host manufacturer installed this modular with single modular approval should perform the test of radiated emission and spurious emission according to FCC part 15C, 15.209, 15.207 requirement, only if the test result comply with FCC part 15C, 15.209, 15.207 requirement, then the host can be sold legally.

2.10 Additional testing, Part 15 Subpart B Disclaimer

This transmitter modular us tested as a subsystem and its certification does not cover the FCC Part 15 Subpart B rules requirement applicable to the final host. The final host will still need to be reassessed for compliance to this portion of rules requirements if applicable.

As long as all conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this modular installed.

2.11 Note EMI Considerations

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user’s manual of the end product which integrates this module.

The host integrator must follow the integration instructions provided in this document and ensure that the composite system end product complies with the requirements by a technical assessment or evaluation to the rules and to KDB Publication 996369.

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

OEM/Host Manufacturer Responsibilities

OEM/Host manufacturers are ultimately responsible for the compliance of the Host and Module. The final product must be reassessed against all the essential requirements of the FCC rule such as FCC Part 15 Subpart B before it can be placed on the US market. This includes reassessing the transmitter module for compliance with the Radio and RF Exposure essential requirements of the FCC rules.

2.12 How to Make Changes - Important Note

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.