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Worthcloud Technology W-BW2K Wi-Fi Module User Manual

**Worthcloud
Technology W-BW2K Wi-Fi Module
User Manual
Version: 20210902**

Contents

Product description

1.1description
It is worth watching the W-BW2K embedded Wi-Fi +BT module provides a solution for connecting the user's physical device to the Wi-Fi wireless network or BLE Bluetooth direct connection and provides a UART serial port and other data processing solutions, through this module, traditional low-end serial devices or MCU-controlled devices can easily access Wi-Fi or BLE wireless networks, so as to achieve IoT network control and management. It is worth seeing that the W-BW2K module adopts the industry's low-power embedded structure, and has been professionally optimized for applications in low-flow and low-frequency data transmission fields such as smart furniture, smart grids, and handheld devices, personal medical care, and industrial control.
It is worth seeing that the W-BW2K module is a compact module that integrates all Wi-Fi & BLE functions, and is easy to integrate on the hardware PCB single-board circuit of the customer's product. It is equipped with a built-in PCB antenna and supports IPEX external antennas.
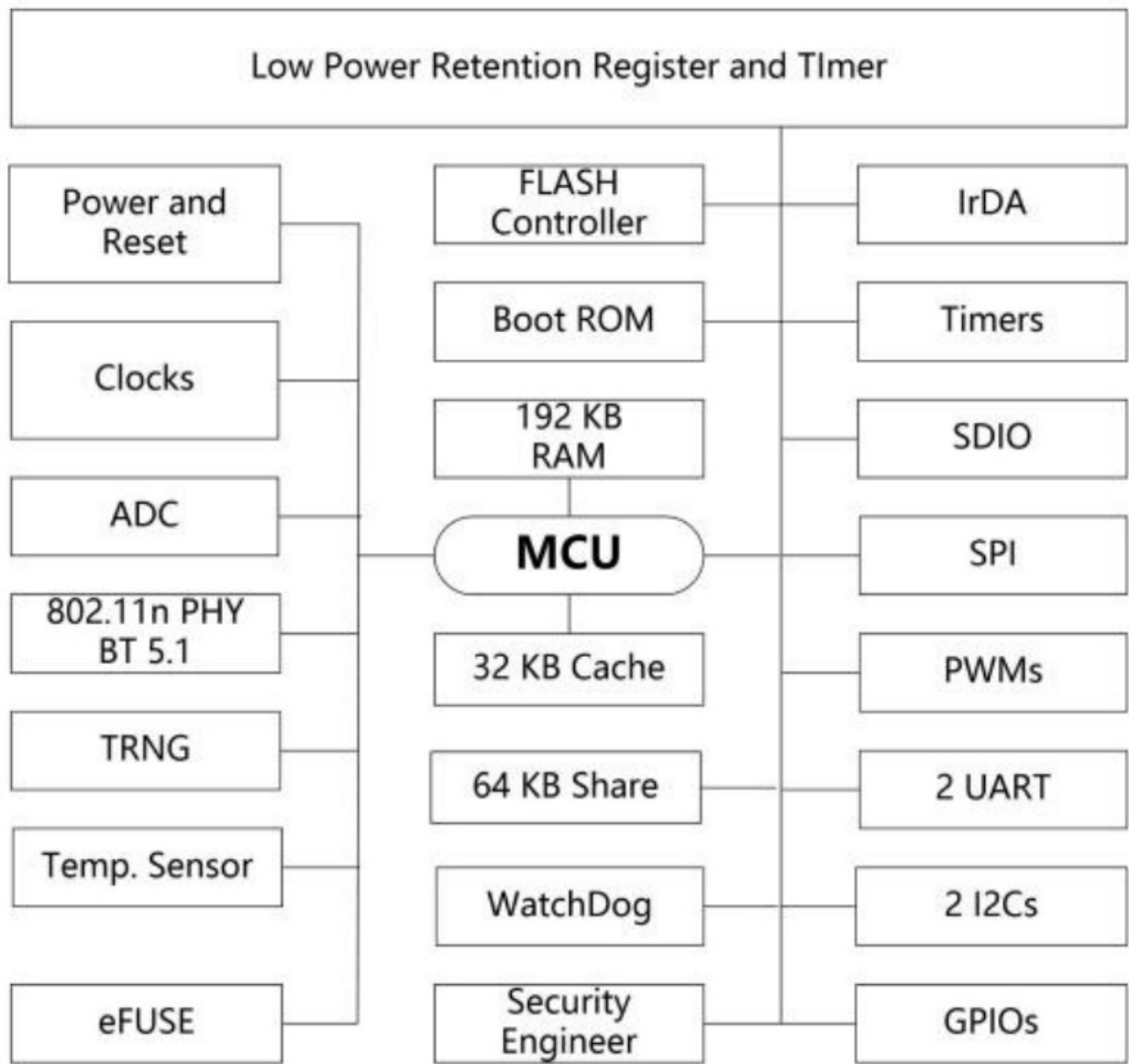
Figure 1. System Block Diagram

1.2 Features

1. Support Wi-Fi 802.11b/g/n and BLE 5.1 wireless standards
2. Using 32-bit MCU, the main frequency is up to 120MHz, 256KB RAM, 2MB
3. Flash Support Wi-Fi/BLE to UART data communication Support Wi-Fi STA/AP, and Direct working mode
4. Support AP and STA dual roles in parallel
5. 50 MHz clock frequency SDIO
6. Six PWM outputs supporting high-speed clock or low-power clock
7. Support wireless and remote firmware upgrade, provide a wireless batch configuration tool
8. SDK development kit is available to support secondary development
9. Supports different types of antenna options
10. Built-in PCB antennaSupport IPEX external antenna
11. 3.3V single power supply
12. Dimensions:
13. 16mm x 24mm x 3mm, SMD16 package

1.3 Main application areas

1. Intelligent lighting

2. Smart socket

3. Intelligent building

4. Industrial control

5. Remote device monitoring

6. IoT applications

1.4Module basic parameters
Table1. It is worth seeing the technical parameters of W-BW2K module

Classification	parameter	value
Wi-Fi	wireless standard	802.11 b/g/n
	Frequency Range	2.412GHz-2.472GHz
	transmit power	802.11b: +18dBm ± 1dBm (@11Mbps)
		802.11g: +15dBm ± 1dBm (@54Mbps)
		802.11n: +14dBm ± 1dBm (@HT20 MCS7) 802.11n: +14dBm ± 1dBm (@HT40 MCS7)
	Receive sensitivity	802.11b: -98dBm (@1Mbps)
		802.11b: -88dBm (@11Mbps)
		802.11g: -90dBm (@6Mbps)
		802.11g: -75dBm (@54Mbps)
		802.11n: -72dBm (@MCS7)
BLE	wireless standard	BLE5.1
	Frequency Range	2.402GHz-2.480GHz
	transmit power	Max 10dBm
	Receive sensitivity	-96 dBm
Hardware parameters	antenna	PCB antenna
	Data interface	CART
		GPIO SPI PWM ADC I2C IR
	GPIO	source current 3mA VCC-0.3V sink current 3mA GND+0.3V
	Operating Voltage	2.7~3.6V
	Working current	TX=17 dBm, 802.11b 11 Mbps type:210 mA TX=15 dBm, 802.11g 54 Mbps type:170 mA RX=-10 dBm,802.11b 11 Mbps type:50 mA RX=-10 dBm,802.11g 54 Mbps type:60 mA
	Operating temperature	-40℃- 105℃

	storage temperature	-40℃- 125℃
	humidity	<85%
	Moisture Level (MSL)	Level 3
	size	16mm x 24mm x 3mm
Software parameters	Wireless network type	STA/AP
	Security Mechanism	WEP/WPA-PSK/WPA2-PSK/WPA3-SAE
	encryption type	WEP64/WEP128/TKIP/AES
	upgrade firmware	local wireless Remote upgrade
	Custom Development	Provide SDK for secondary development of customers
	Network protocol	IPv4 TCP/UDP/HTTP/TLS 1.2
	User configuration	AT+ command set, Web page

HARDWARE INTRODUCTION

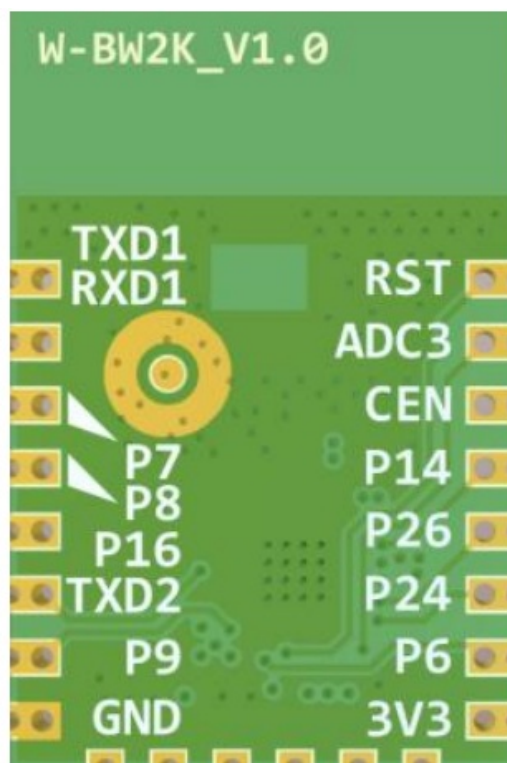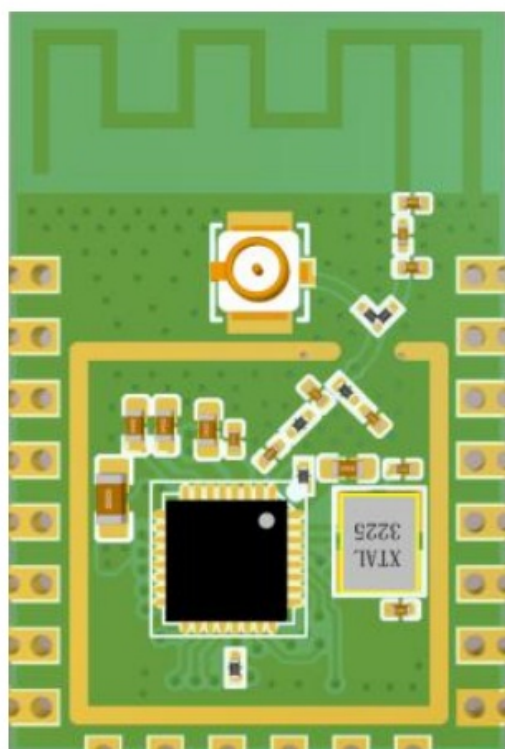The appearance of the combo series Wi-Fi module is as follows.
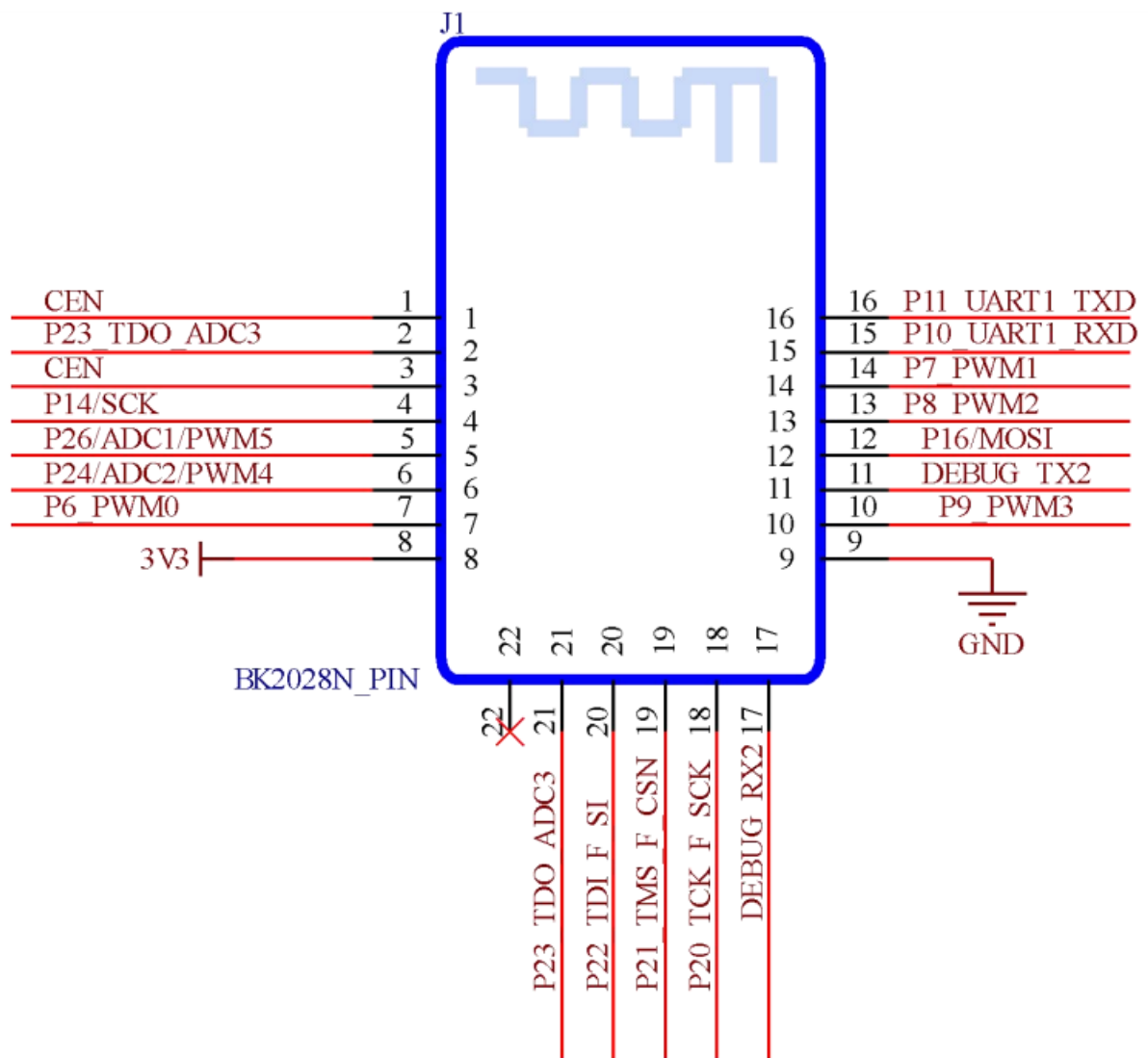

Figure 2. The appearance of W-BW2K

PIN DEFINITION

Figure 3. W-BW2K Pin Definition
Table1. W-BW2K pin function definition

pin	describe	signal type	illustrate
1	RST	I	Low-level reset, high-level active (internally pulled high) corresponds to IC-CEN
2	P23/ADC3/TDO/ F_SO	IO	Set high when general IO port or ADC4 or RF receiving
3	CEN	I	Enable pin, internal pull-up processing, compatible with other module design docking

4	P14/SD_CLK/SCK /ANT0	IO	General IO port or SD CLK or SPI SCK or BLE antenna control ANT0
5	P26/ADC1/IRDA/ PWM5	IO	General IO port or ADC1 or infrared receiver or PWM5
6	P24/ADC2/LPO_ CLK /PWM4	IO	General-purpose IO port or ADC2 or low power clock 32.768K output or PWM4
7	P6/CLK13M/PW M0	IO	General-purpose IO port or crystal clock divided by 1, 2, 4, 8 output or PWM0
8	3V3	I	power supply
9	GND	I	GND
10	P9/BT_PRIORITY/P WM3	IO	Common IO port or BT_PRIORITY control or PWM3 for the coexistence of WIFI and BT
11	P0/UART2_TXD/I 2C 2_SCL	IO	General-purpose IO port or serial port UART2's TXD or I2C 2's SCL
12	P16/SD_CMD/M OSI/ ANT2	IO	Universal IO port or SD's CMD or SPI's MOSI or BLE antenna to control ANT2
13	P8/BT_ACTIVE/P W M2	IO	Common IO port or BT_ACTIVE control or PWM2 for the coexistence of WIFI and BT
14	P7/WIFI_ACTIVE/ P WM1	IO	Common IO port or WIFI_ACTIVE control or PWM1 where WIFI and BT coexist

15	P10/DL_RX/UAR T1_ RXD	IO	General IO port or RXD downloaded by UART for FLASH or RXD of serial port UART1
16	P11/DL_TX/UART 1_ TXD	IO	General IO port or TXD downloaded by UART for FLASH or TXD of serial port UART1
17	P1/UART2_RXD/I 2C 2_SDA	IO	RXD of general IO port or serial port UART2 or SDA of I2C2
18	P20/I2C1_SCL/TC K/ F_SCK	IO	General-purpose IO port or SCL of I2C1 or TCK of JTAG or Flash using SPI to download the clock
19	P21/ADC6/I2C1_ SD A/TMS/ F_CSN	IO	General-purpose IO port or SDA of ADC6 or I2C1 or TMS of JTAG or Flash when downloading with SPI Chip select
20	P22/ADC5/CLK_2 6M /TDI/ TXEN/F_SI	IO	General IO port or ADC5 or crystal frequency output or TDI of JTAG or set high when transmitting or data input when Flash is downloaded by SPI
21	P23/ADC3/TDO/ F_S O	IO	General-purpose IO port or ADC3 or JTAG TDO or Flash data output when downloaded with SPI
22	NC	–	empty pin

ELECTRICAL CHARACTERISTICS

Table2. Electrical Characteristics

parameter	condition	min	type	max	unit
Maximum Soldering Temperature	IPC/JEDEC J-STD-020	–	–	260	°C
Electrostatic discharge (Human Body Model HBM)	TAMB=25°C	–	–	2.5	KV
Electrostatic discharge (MM)	TAMB=25°C	–	–	0.25	KV

MECHANICAL DIMENSIONS

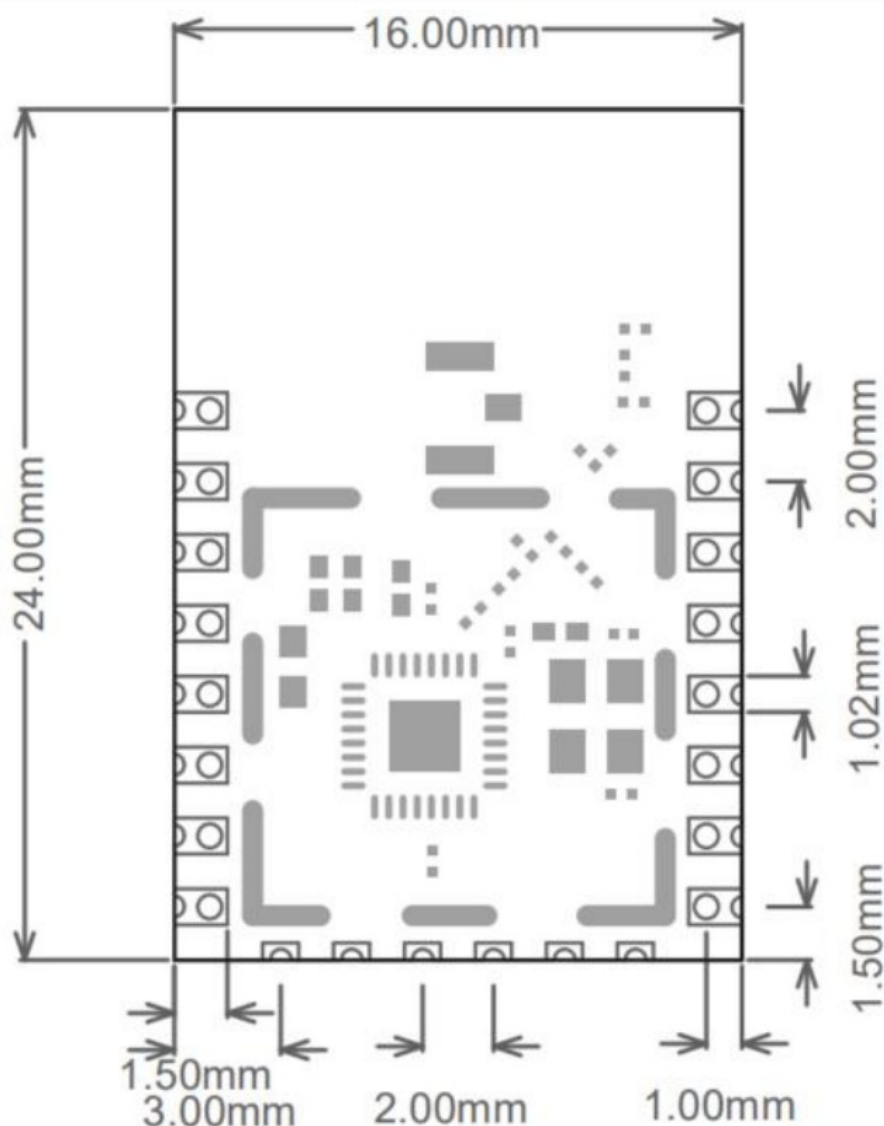The physical dimensions of W-BW2K (unit: mm) are as follows:

Figure 4. W-BW2K Mechanical Dimensions
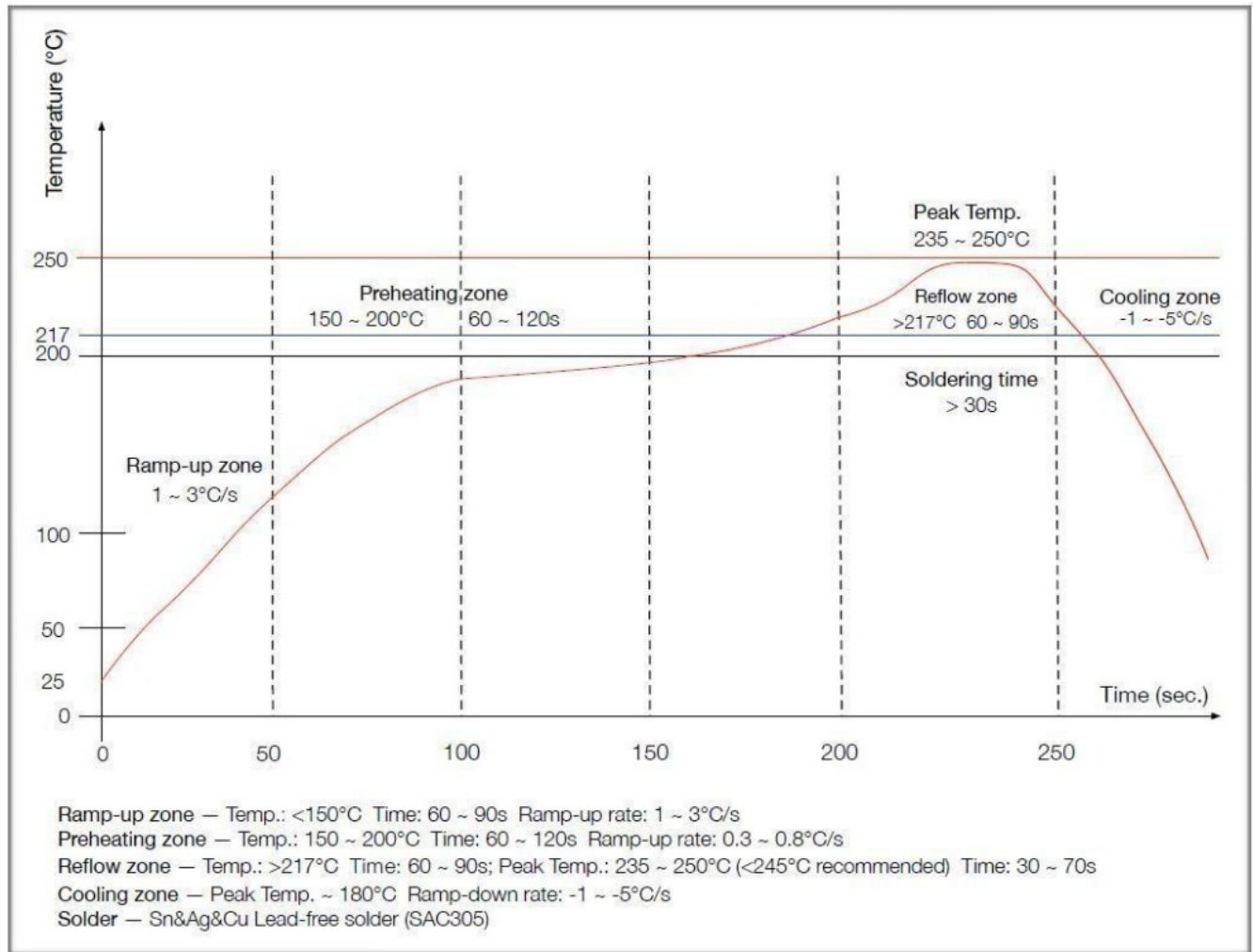
TYPICAL APPLICATION

6.1 Antenna layout requirements

1. For the installation position of the module on the motherboard, the following two methods are recommended:

   Solution 1: Put the module on the edge of the motherboard, and the antenna area extends out of the edge of the motherboard.

Option 2: Put the module on the edge of the motherboard, and hollow out an area on the edge of the motherboard at the antenna position. In order to meet the performance of the onboard antenna, it is forbidden to prevent metal devices around the antenna and keep away from high-frequency devices.

REFLOW SOLDERING CONDITIONS

1. Heating method: conventional convection or IR convection;
2. Allowable reflow times: 2 times, based on the following ramped heating conditions;
3. Maximum temperature: 250°C.

Ramp-up zone — Temp.: <150°C Time: 60 ~ 90s Ramp-up rate: 1 ~ 3°C/s
Preheating zone — Temp.: 150 ~ 200°C Time: 60 ~ 120s Ramp-up rate: 0.3 ~ 0.8°C/s
Reflow zone — Temp.: >217°C Time: 60 ~ 90s; Peak Temp.: 235 ~ 250°C (<245°C recommended) Time: 30 ~ 70s
Cooling zone — Peak Temp. ~ 180°C Ramp-down rate: -1 ~ -5°C/s
Solder — Sn&Ag&Cu Lead-free solder (SAC305)

FCC warning statements:
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.

Caution: Any changes or modifications to this device not explicitly approved by the manufacturer could void your authority to operate this 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.

The device has been evaluated to meet general RF exposure requirements This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance cm between the radiator & your body.

Documents / Resources

W-BW2K User manual Wi-Fi&BLE combo Version 20210902	[**Worthcloud Technology W-BW2K Wi-Fi Module**](#) [pdf] User Manual W-BW2K, WBW2K, 2APL3-W-BW2K, 2APL3WBW2K, W-BW2K Wi-Fi Module, W-BW2K, Wi-Fi Module