

# WT32-SC01 Datasheet



Version **V3.3**  
Wireless-tag  
**2020-05-09**

### Disclaimer and copyright notice

Information in this article, Include URL for reference, subject to change without notice.

The documents are provided "as is" without any warranty liability, including any warranties of merchantability, fitness for a particular purpose or non-infringement, and any warranties referred to elsewhere in any proposal, specification or sample. This document is not liable for any infringement of any patent rights arising from the use of the information in this document. This document does not hereby grant any license for the use of intellectual property, whether express or implied, by estoppel or otherwise.

It is hereby declared that all trade names, trademarks and registered trademarks mentioned herein are the property of their respective owners.

Historical version			
Version	Author	Date	Describe
1.0	YAN	2020-01-25	First creation
3.2	YAN	2020-04-10	Modify physical picture and add board test parameters
3.3	YAN	2020-05-09	Correct typos and add software development

## Content

OVERVIEW .....	1
BOARD SIZE.....	1
HARDWARE RESOURCE .....	3
1、ESP32-WROVER-B Module .....	3
2、TP Interface .....	3
3、LCM Display interface .....	3
4、Power management.....	3
5、External power interface.....	3
6、RST Key.....	4
7、Type-C Interface .....	4
8-9、Expansion Board Interface.....	4
10、Power Indicator .....	4
11、UART Communication Indicator .....	4
POWER ON INSTRUCTIONS .....	6
1、Power supply .....	6
2、Precautions.....	6
BOARD ELECTRICAL PARAMETERS.....	7
CIRCUIT SCHEMATIC .....	8
FIRMWARE BURNING.....	10
1、Step One:.....	10
2、Step Two:.....	10
3、Step Three:.....	10
FUNCTION DEVELOPMENT .....	12
1、Screen Brightness Adjustment .....	12
2、Graphical Interface Development .....	13

## Overview

WT32-SC01 is a development board for visual touch screen, the board is equipped with GUI platform firmware developed independently, support graphic drag and drop programming to help users complete the development of customized control platform. The main controller of WT32-SC01 development board adopts esp32-wrover-b module, this module is a general-purpose Wi Fi + Bt + ble MCU module, 4MB SPI flash and 8MB PSRAM are configured in. WT32-SC01 development board can also develop and debug functions such as buttons, voice and camera through the expansion interfaces on both sides, greatly shorten the development cycle of users.

## Board Size

As shown in the figure below is the dimension diagram of WT32-SC01 development board, the size of the board is 58mmx91mm, and there are 4.05mm diameter positioning holes at four feet of the board.

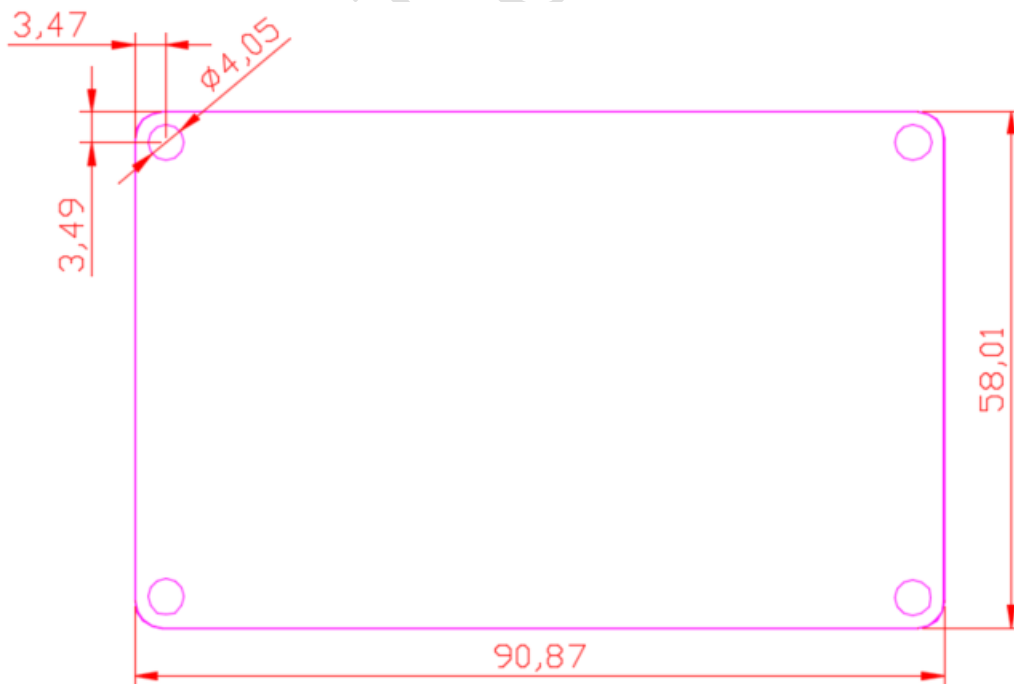


Figure 2-1: PCB dimension diagram



Figure 2-2: Physical dimension diagram 1

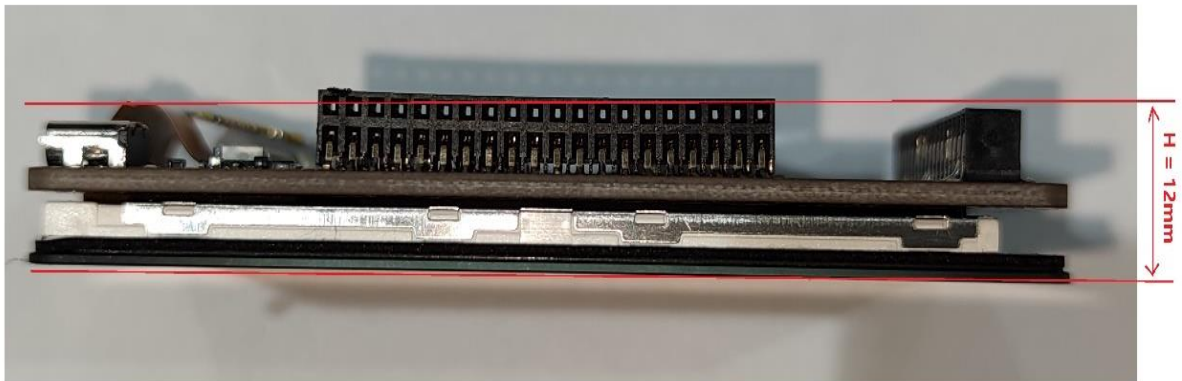


Figure 2-3: Physical dimension diagram 2

## Hardware Resource

The hardware resources of the development board are as follows:

Figure 2 shows the physical front view of the development board. It consists of a 3.5-inch LCD screen with a resolution of 320x480 and a capacitive touch pad, and it Supports two touch.

Figure 3 is the physical figure on the back of the development board, which contains the following hardware resources:

### 1、ESP32-WROVER-B Module

Esp32-wrever-b is a Wi Fi + Bt + ble MCU module for all kinds of applications. It has powerful functions and wide applications. It can be used in low-power sensor networks and demanding applications, For example, voice coding, audio streaming and MP3 decoding. The parameters of this esp32-wrapper-b are:8Mbyte PSRAM+4Mbyte Flash.

### 2、TP Interface

Capacitive touchpad interface, I2C interface, 0.5mm spacing, 6pin, flip down type.

### 3、LCM Display interface

3.5-inch LCM display interface, SPI interface, 0.5mm spacing, 24pin. This SPI interface is connected to the hardware HSPI interface of esp32, the operating clock frequency can reach 80MHz. The screen parameters used are: Size-3.5Inch; Pixel density-165PPI; Resolution:320\*RGB\*480; Screen model: WT-352215-A2.

### 4、Power management

Two LDOS of 3.3V output, One supplies power to the board itself, The other supplies power to the external expansion board, The power supply is separated to prevent the expansion board from interfering with the power supply of esp32, it ensures the stability of the esp32.

### 5、External power interface

Reserved external power interface (positive and negative as shown in + - sign on the figure), input voltage range 5v-9v, maximum load current  $I > 2A$ .

## 6、 RST Key

Touch the self-reset button to connect to the EN pin of ESP32. This button can be used to reset ESP32.

## 7、 Type-C Interface

Universal USB-C interface (Type-C interface), this interface is used to power the development board, UART communication and firmware download. The hardware of the download circuit implements data flow control, so the firmware download supports one-click automatic download.

## 8-9、 Expansion Board Interface

The interface of the external expansion board can be used for power supply, communication, control, etc. So as to achieve functional expansion to meet the various needs of users. The 8 and 9 interfaces are connected by Pin to Pin, so the circuit connection of the expansion board inserted into the 8 interface and the 9 interface is the same, but only to meet the user's experience of installing the expansion board in different directions. Simultaneously: When the IO of the two expansion boards does not conflict, two expansion boards can be inserted at the same time to achieve two expansion functions. Expansion board interface specifications: 2.0mm pitch, 2X20Pin, can be installed on both sides of the horizontal row. The interface definition is shown in Figure 3-Extended Edition Interface Definition Diagram.

## 10、 Power Indicator

The power indicator (red light) lights up when you plug in the USB cable.

## 11、 UART Communication Indicator

The TXD indicator and RXD indicator in the UART will flash when there is data flow.

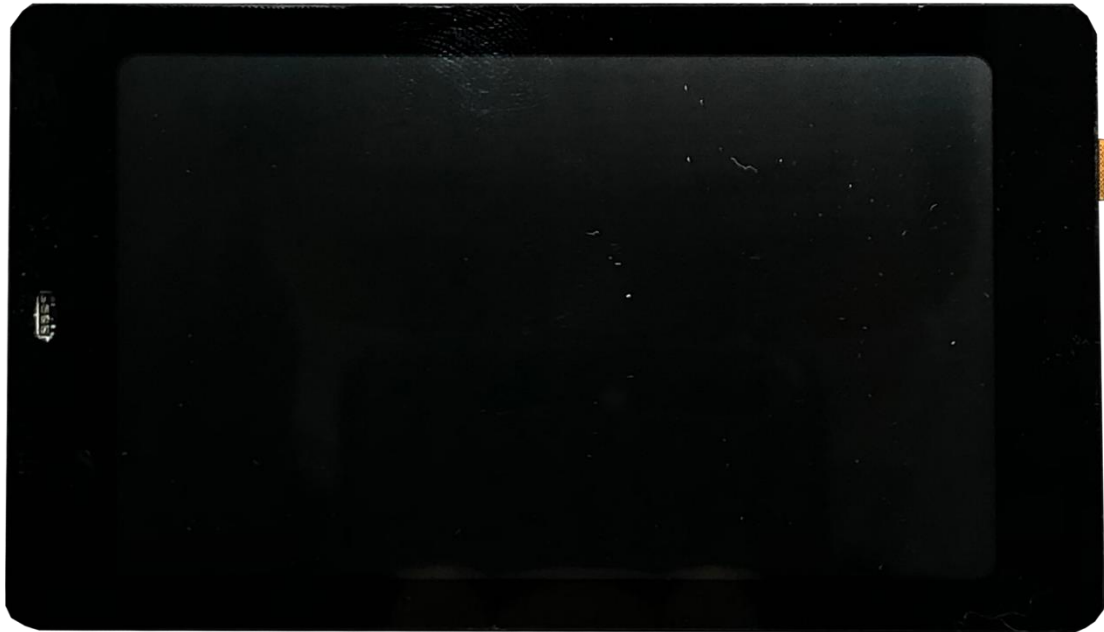


Figure 3-1: Front view of WT32-SC01 development board

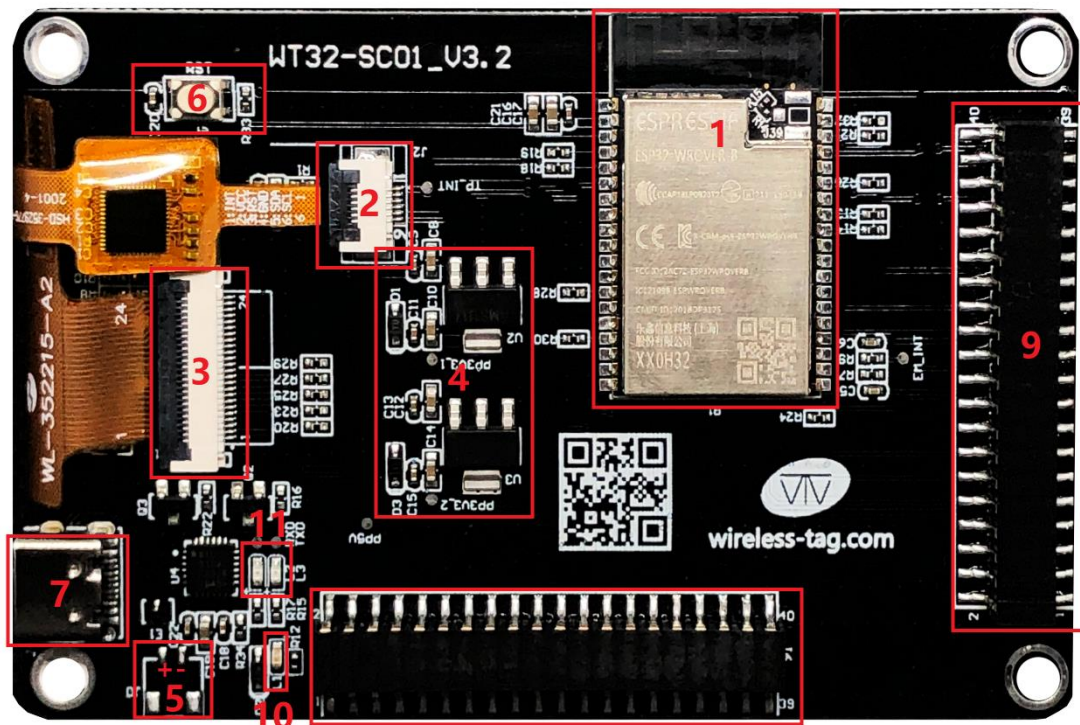


Figure 3-1: Rear view of WT32-SC01 development board



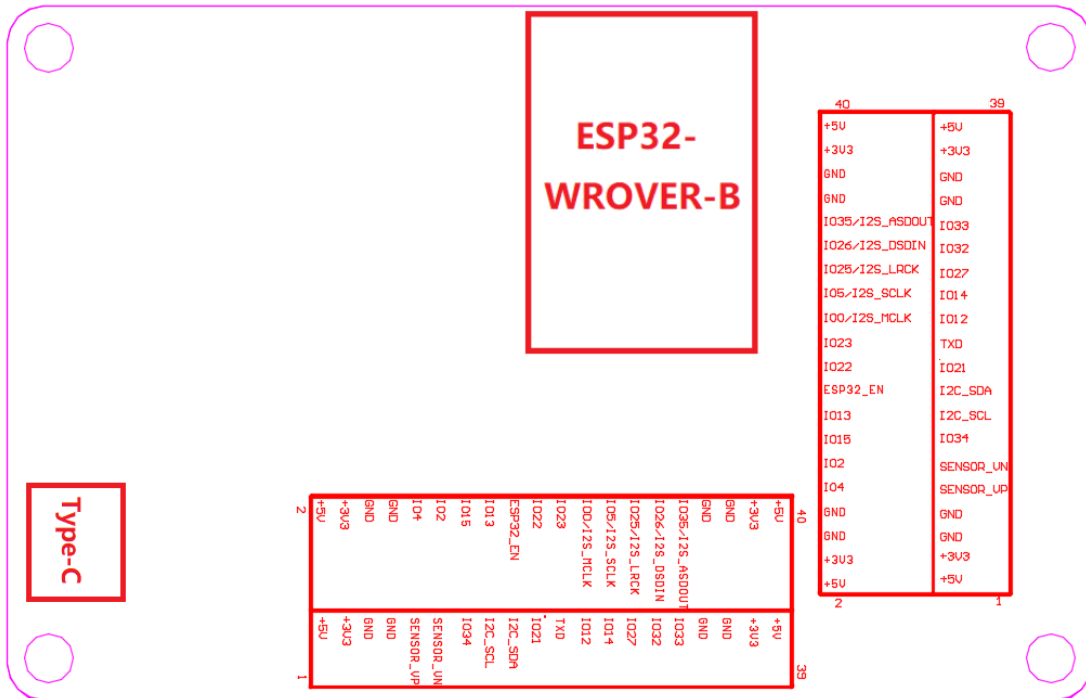


Figure 3-3: WT32-SC01 board interface definition diagram

## Power On Instructions

### 1、 Power supply

This development board supports USB Type-C 5V power supply and reserved external power input interface (as shown by reference number 5 in Figure 3). It is recommended that the input voltage 5V support current is not less than 1A when other expansion boards are not inserted, and the input voltage 5V support current is not less than 2A when other expansion boards are inserted (refer to the actual power consumption of the expansion board for details). Note: When the external power supply is provided through the reserved power interface, the power supply voltage input range is 5V-9V, and the load current is recommended to be  $I > 2A$ .

### 2、 Precautions

Please make sure that the FPC cables of the TP and LCM screens have been inserted into the corresponding FPC sockets before powering on the development board, otherwise the TP and LCM screens may be damaged.

If the development board is abnormal, please test the voltage of the three TestPad points (PP5V, PP3V3\_1 and PP3V3\_2) on the board first. Among them, the output of PP3V3\_1 is used to supply 3.3v power to the board, PP3V3\_2 is used to supply 3.3v power to the external expansion board, and PP5V is the USB input 5V power supply which also

provides external expansion board. Figure 5 is a schematic diagram of the test points of the power supply of the development board.

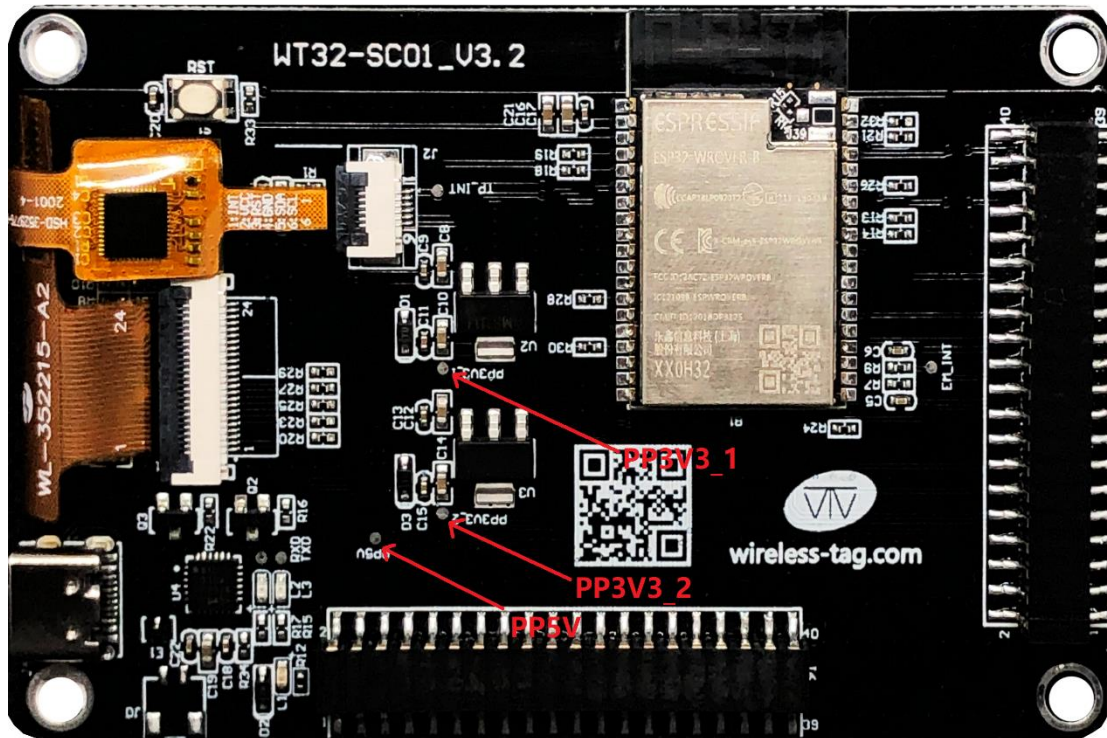


Figure 4-1: Schematic diagram of power supply test points of the development board

## Board Electrical Parameters

Test environment:

- 1、 Temperature: Room temperature 25 °C
- 2、 Power supply: 5.0V Voltage ripple  $V < 100\text{mA}$

Test parameters:

- 1、 Normal working current: 240mA (Average current)
- 2、 Working current under sleep: Less than 18mA (Average current)

# Circuit Schematic

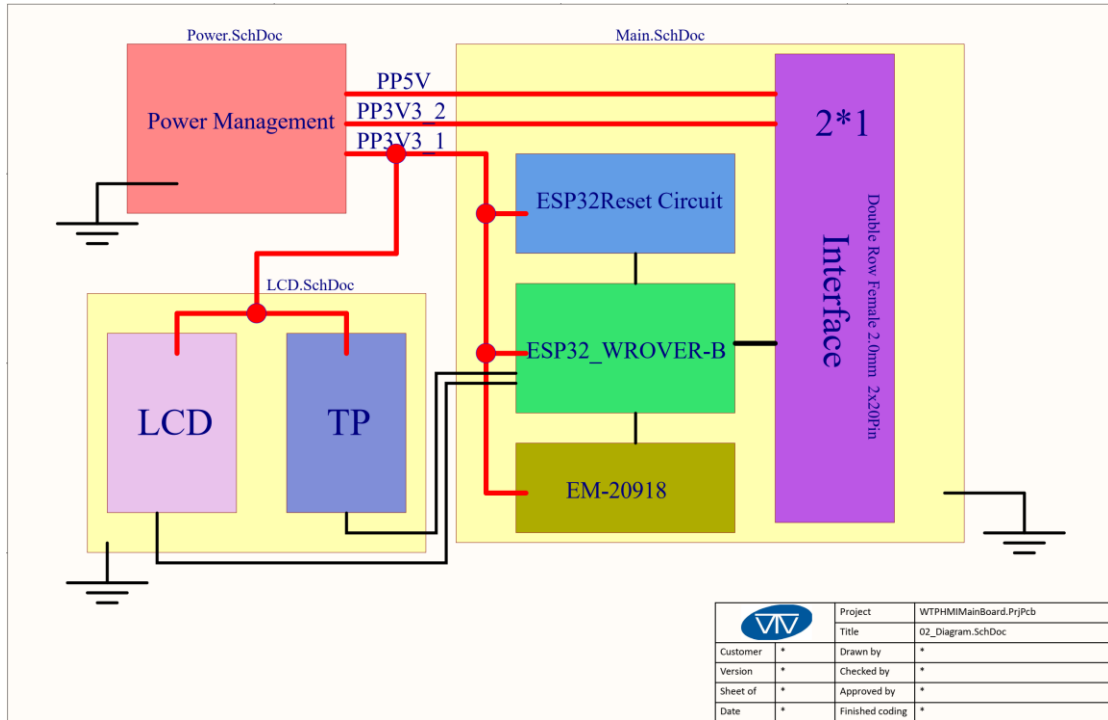


Figure 6-1: Schematic diagram one

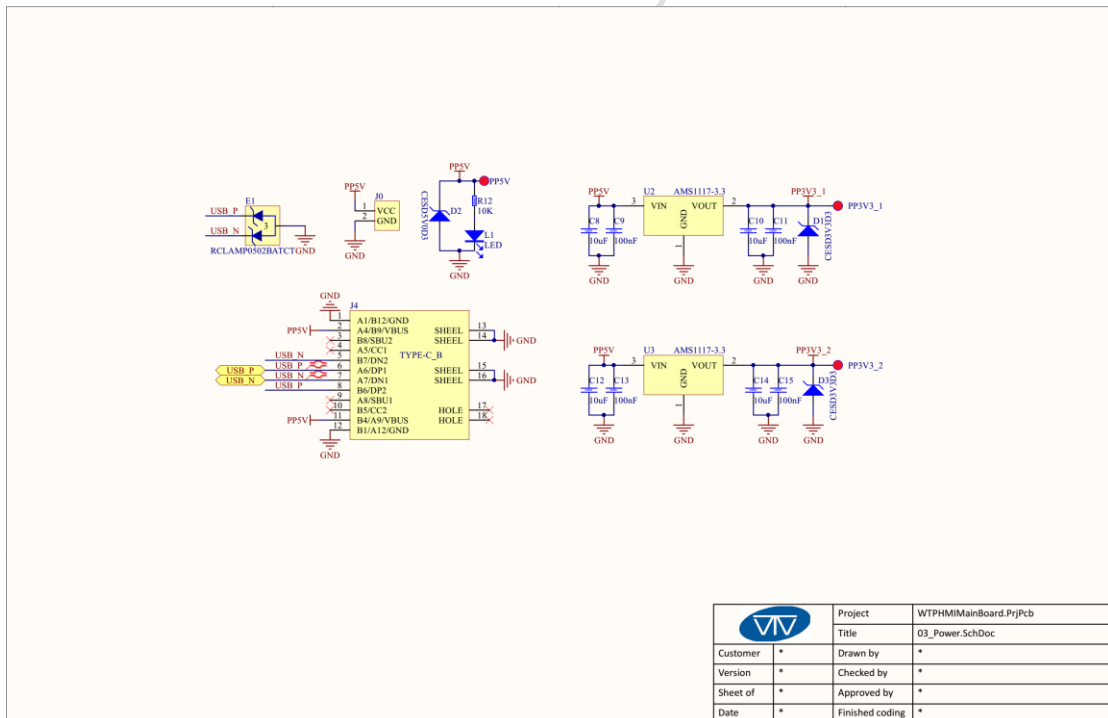


Figure 6-2: Principle 2

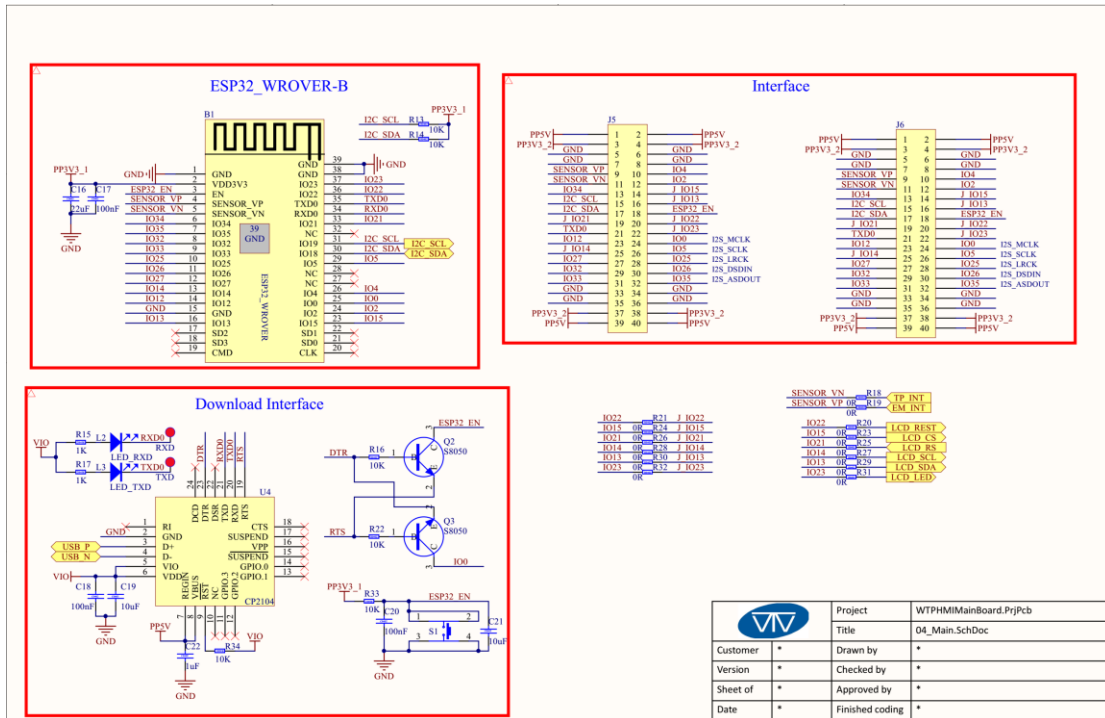
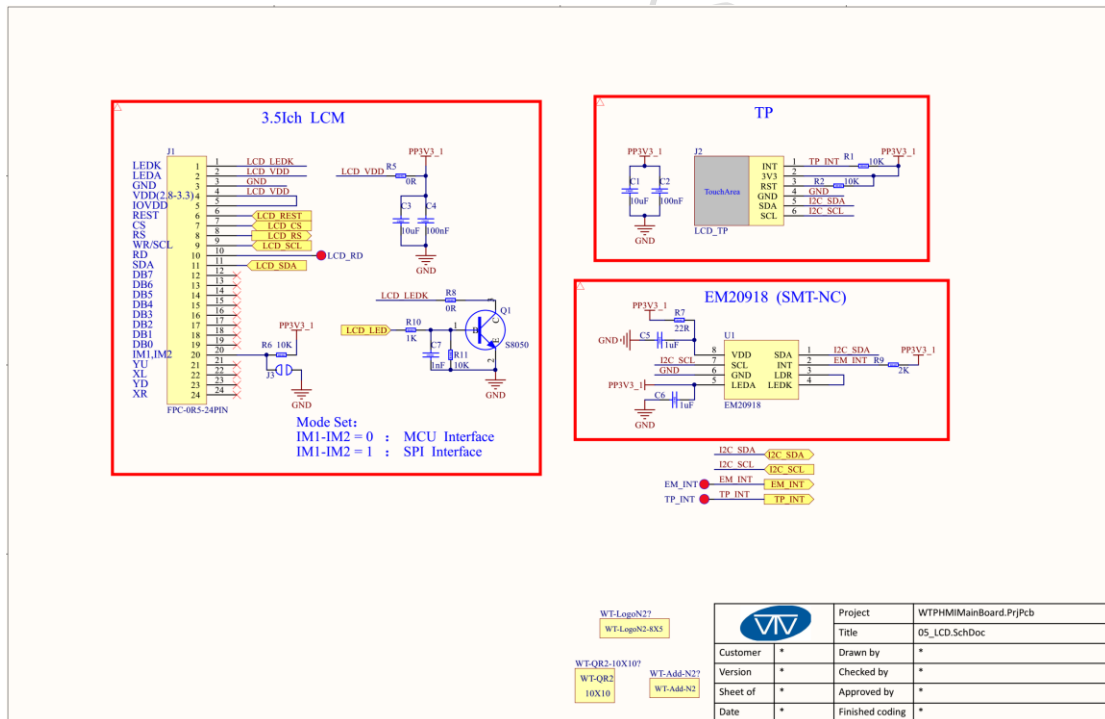


Figure 6-3: Schematic diagram three



Schematic diagram 4

## Firmware Burning

### 1、 Step One:

Connect the WT32-SC01 board to the computer via the USB-TypeC data cable. Since this development board has automatic data flow control processing, the firmware can be automatically downloaded through ESP32 Flash\_Download\_Tools.

### 2、 Step Two:

As shown in Figure 7-1 below: Select the firmware path to be burned at 1. The address is usually 0X00. After setting, remember to tick the front; Select the system clock to be 40MHz at 2 locations; Choose the size of Flash as 32Mbit in 3 places; Select SPI MODE as DIO mode at 4 places; Select the port number of the current board recognized by the computer at 5; Select the serial port baud rate at 6 places (the larger the value, the faster the firmware download rate, and the maximum support is 1152000bps); After completing the previous configuration, click at 7 to start burning the firmware.

### 3、 Step Three:

After completing the above two steps, press the reset button on the back of the development board to start running the firmware just burned.

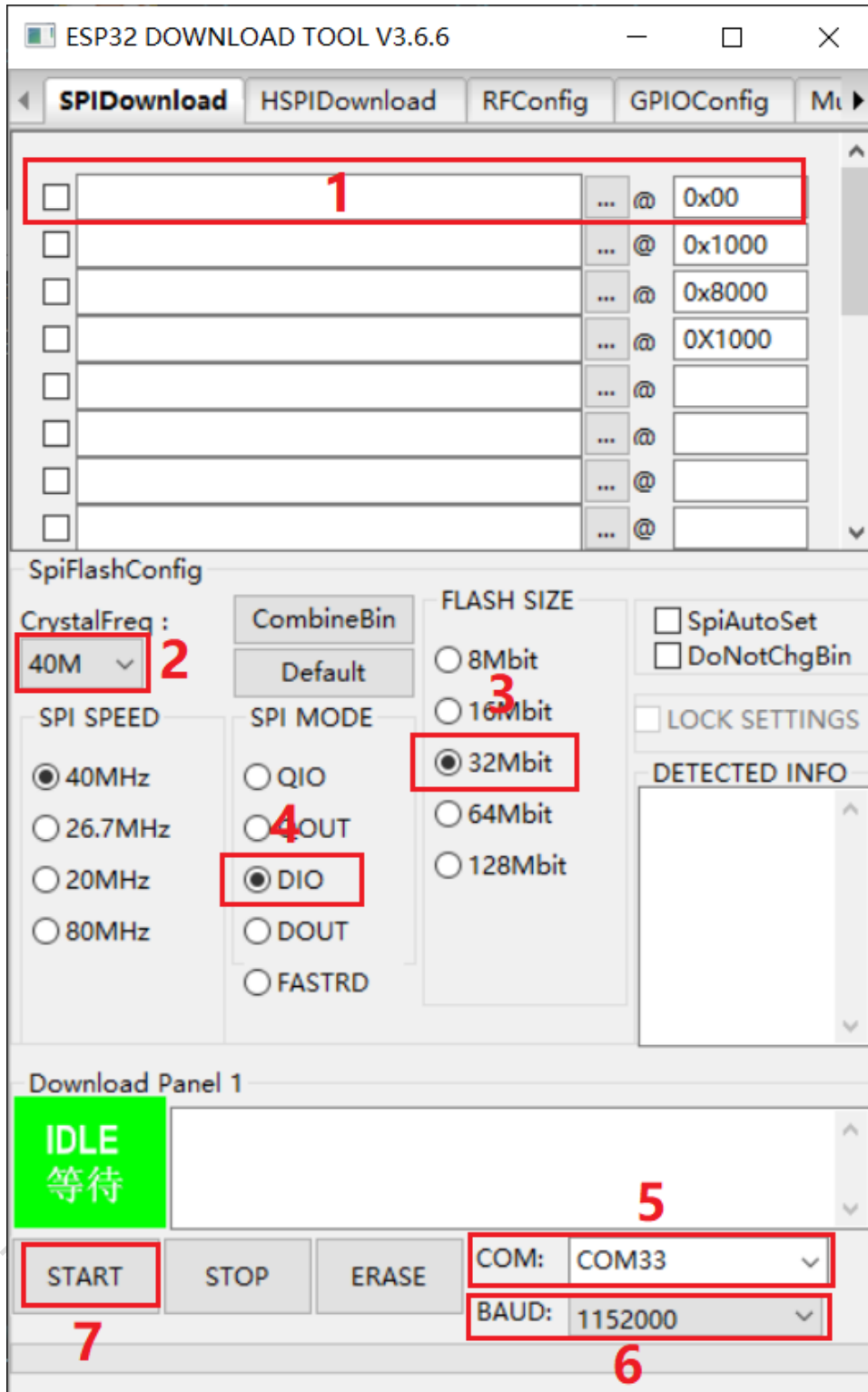


Figure 7-1: Burning instructions

## Function Development

### 1、 Screen Brightness Adjustment

As shown in Figure 8-1, GPIO23 of ESP32 is a pin to control the LCD backlight, Users can control the backlight on and off through IO23 or adjust the backlight brightness of the LCD through PWM modulation.

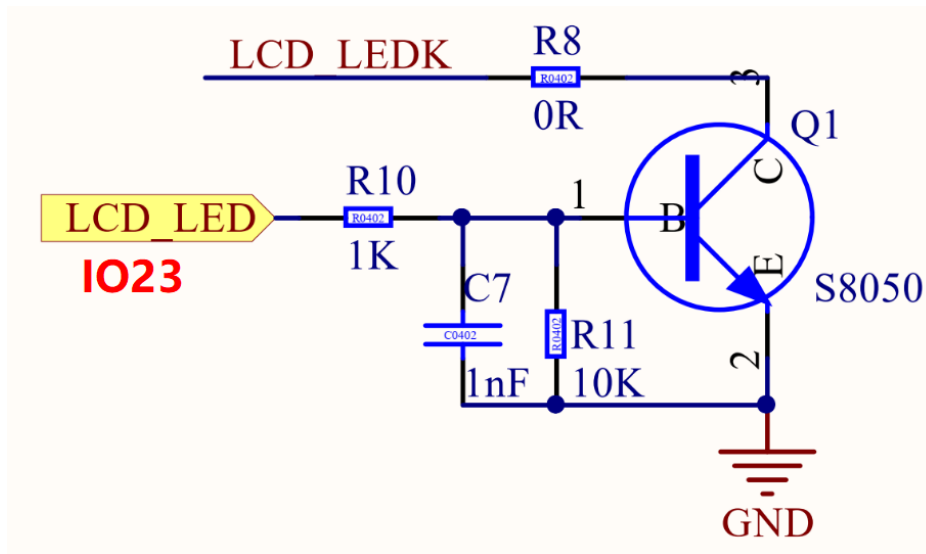


Figure 8-1: LCD backlight control diagram

## 2、Graphical Interface Development

Users can quickly develop through our online platform, the platform is similar to MIT APP Inventor, it realizes the rapid development of building blocks. At present, the platform has improved the development of graphical interface, more driver code blocks will be continuously improved in the future. The login URL of the online platform is as follows: <http://esp32.8ms.xyz/login> .

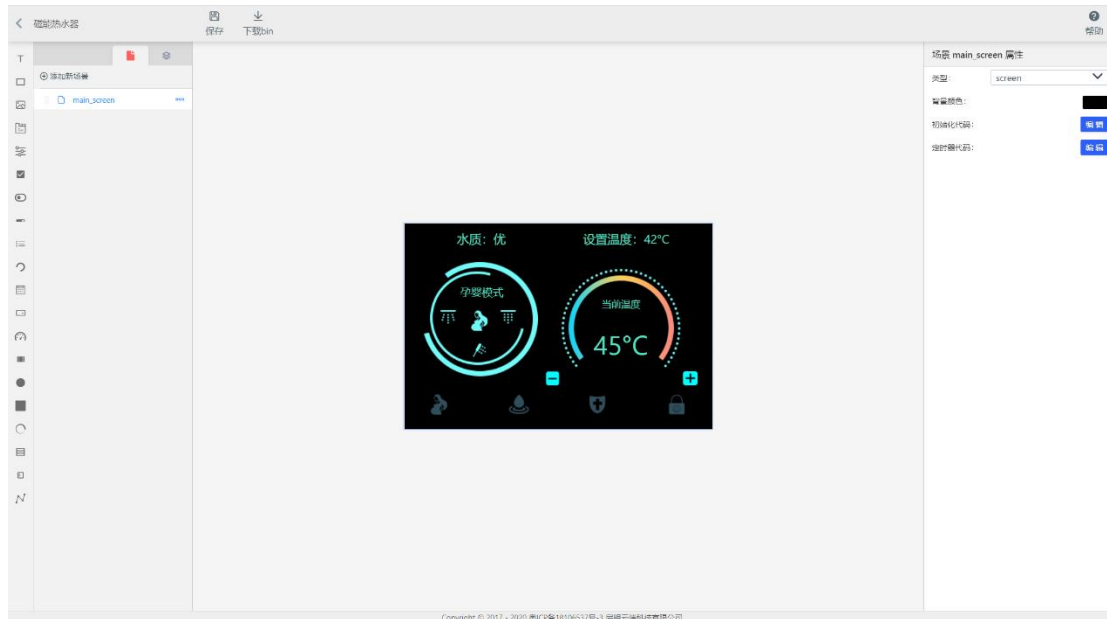


Figure 8-2: Platform development interface one

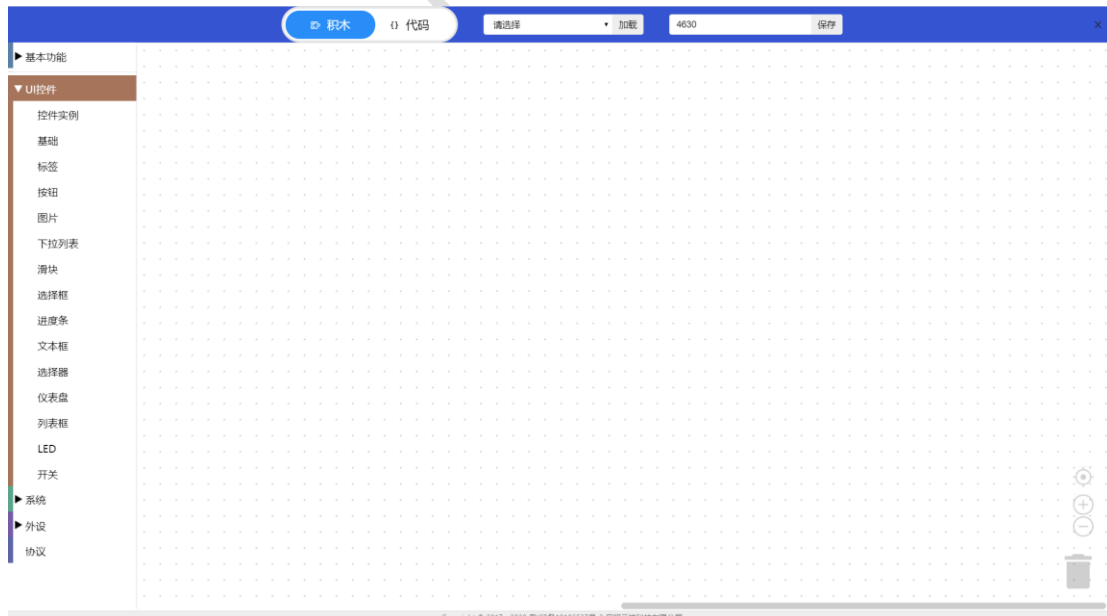


Figure 8-2: Platform development interface two



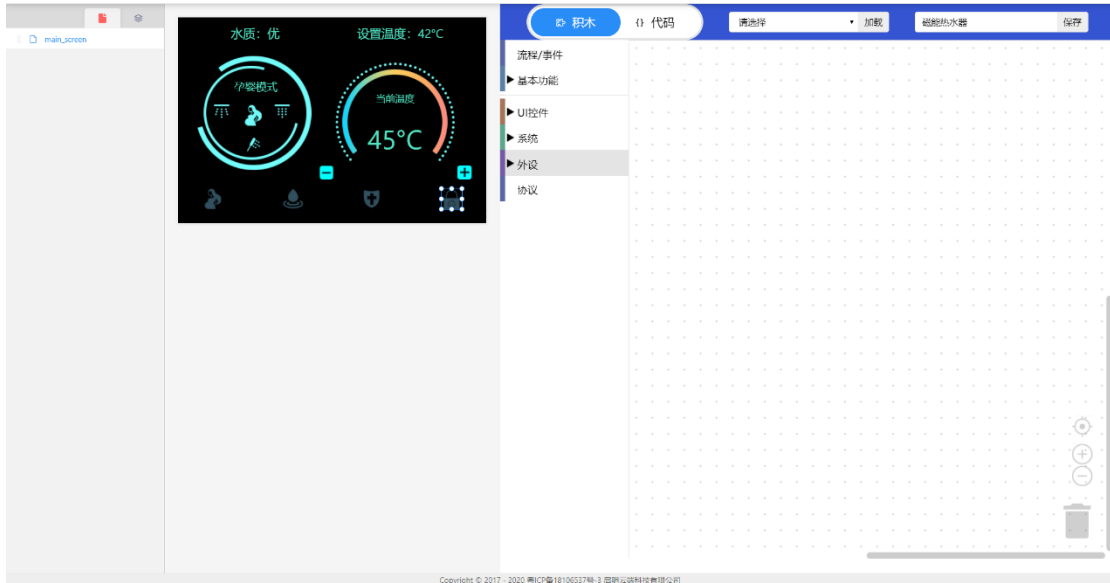


Figure 8-3: Platform development interface three

## **Federal Communication Commission Statement (FCC, U.S.)**

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 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 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.

### **FCC Caution:**

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

### **FCC Radiation Exposure Statement:**

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

## **IMPORTANT NOTES**

### **Co-location warning:**

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

### **OEM integration instructions:**

This device is intended only for OEM integrators under the following conditions:

The transmitter module may not be co-located with any other transmitter or antenna. The module shall be only used with the external antenna(s) that has been originally tested and certified with this module.

As long as the 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 module installed (for example, digital device emissions, PC peripheral requirements, etc.).

### **Validity of using the module certification:**

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization for this module in combination with the host equipment is no longer considered valid and the FCC ID of the module 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.

### **End product labeling:**

The final end product must be labeled in a visible area with the following: "Contains Transmitter Module FCC ID: 2AFOS-WT32-SC01".

**Information that must be placed in the end user manual:**

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 end user manual shall include all required regulatory information/warning as show in this manual.

# Integration instructions for host product manufacturers according to KDB 996369 D03 OEM Manual v01

## 2.2 List of applicable FCC rules

FCC Part 15 Subpart C 15.247 & 15.207 & 15.209

## 2.3 Specific operational use conditions

The module is a Bluetooth module with WiFi & BR&EDR & BLE 2.4G function.

### WiFi Specification:

Operation Frequency: 2412~2462MHz

Number of Channel: 11

Modulation: DSSS, OFDM

Type: PCB Antenna

Gain: 1 dBi

### BR&EDR Specification:

Operation Frequency: 2402~2480MHz

Number of Channel: 79

Modulation: GFSK,  $\pi/4$ -DQPSK, 8DPSK

Type: PCB Antenna

Gain: 1 dBi

### BLE Specification:

Operation Frequency: 2402~2480MHz

Number of Channel: 40

Modulation: GFSK

Type: PCB Antenna

Gain: 1 dBi

The module can be used for mobile or applications with a maximum 1dBi antenna. The host manufacturer installing this module into their product must ensure that the final composite product complies with the FCC requirements by a technical assessment or evaluation to the FCC rules, including the transmitter operation. The host manufacturer 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 end user manual shall include all required regulatory information/warning as show in this manual.

## 2.4 Limited module procedures

Not applicable.

## 2.5 Trace antenna designs

Not applicable. The module has its own antenna, and doesn't need a host's printed board microstrip trace antenna etc.

## 2.6 RF exposure considerations

The module must be installed in the host equipment such that at least 20cm is maintained between the antenna and users' body; and if RF exposure statement or module layout is changed, then the host product manufacturer required to take responsibility of the module through a change in FCC ID or new application. The FCC ID of the module cannot be used on the final product. In these circumstances, the host manufacturer will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization

## 2.7 Antennas

Antenna Specification are as follows:

Type: PCB Antenna

Gain: 1 dBi

This device is intended only for host manufacturers under the following conditions:

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

The module shall be only used with the internal antenna(s) that has been originally tested and certified with this module. The antenna must be either permanently attached or employ a 'unique' antenna coupler.

As long as the conditions above are met, further transmitter test will not be required. However, the host manufacturer is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.).

## **2.8 Label and compliance information**

Host product manufacturers need to provide a physical or e-label stating “Contains Transmitter Module FCC ID: 2AFOS-WT32-SC01” with their finished product.

## **2.9 Information on test modes and additional testing requirements**

### **BR&EDR**

Operation Frequency: 2402~2480MHz  
Number of Channel: 79  
Modulation: GFSK,  $\pi/4$ -DQPSK, 8DPSK

### **BLE**

Operation Frequency: 2402~2480MHz  
Number of Channel: 40  
Modulation: GFSK

### **WIFI**

Operation Frequency: 2412~2462MHz  
Number of Channel: 11  
Modulation: DSSS, OFDM

Host manufacturer must perform test of radiated & conducted emission and spurious emission, etc according to the actual test modes for a stand-alone modular transmitter in a host, as well as for multiple simultaneously transmitting modules or other transmitters in a host product. Only when all the test results of test modes comply with FCC requirements, then the end product can be sold legally.

### **2.10 Additional testing, Part 15 Subpart B disclaimer**

The modular transmitter is only FCC authorized for FCC Part 15 Subpart C 15.247 & 15.207 & 15.209 and that the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. If the grantee markets their product as being Part 15 Subpart B compliant (when it also contains unintentional-radiator digital circuitry), then the grantee shall provide a notice stating that the final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.