

## IEEE 802.11 a/b/g/n/ac/ax 2T/2R USB2.0 Combo Module Integrated Bluetooth V2.1/3.0/4.2/5.2

**Model Number: WXT09R2101**

**(REALTEK : RTL8852BU)**

**(Reolink Item number:  
48.01.001.0075A )**

**(MAC address from GSD)**

| 客户认可<br>Custom Approval Section |  |       |
|---------------------------------|--|-------|
| Custom Name                     |  |       |
| Department                      |  |       |
| Approval                        |  | Date: |

| 拟制<br>DESIGN | 审核<br>CHECK | 批准<br>APPROVAL |
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| 2023-11-28   | 2023-11-28  | 2023-11-28     |

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# PRODUCTS SPECIFICATION

WXT09R2101

## Document revision history

| Revision    | Date       | Approved by | Remarks                  |
|-------------|------------|-------------|--------------------------|
| Version 1.0 | 2022-09-08 |             | Draft                    |
| Version 1.1 | 2022-10-20 |             | Updated                  |
| Version 1.2 | 2023-11-28 |             | Add customer part number |
|             |            |             |                          |
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|             |            |             |                          |



## 1. General Description

The Realtek RTL8852BU is a highly integrated single-chip that support 2-stream 802.11ax solutions with Multi-user MIMO (Multiple-Input, Multiple-Output) with Wireless LAN (WLAN) USB interface controller. It combines a WLAN MAC, a 2T2R capable WLAN baseband, and RF in a single chip. The RTL8852BU provides a complete solution for a high-performance integrated wireless and Bluetooth device.

## 2. Features

- Compatible with IEEE 802.11a standard, providing wireless data rate up to 54Mbps.
- Compatible with IEEE 802.11b standard, providing wireless data rate up to 11Mbps.
- Compatible with IEEE 802.11g standard, providing wireless data rate up to 54Mbps.
- Compatible with IEEE 802.11n standard, providing wireless data rate up to 300Mbps.
- Compatible with IEEE 802.11ac standard, providing wireless data rate up to 866.7Mbps.
- Compatible with IEEE 802.11ax standard to provide wireless 573.5Mbps data rate in 2.4GHz band.
- Compatible with IEEE 802.11ax standard to provide wireless 1201Mbps data rate in 5GHz band.
- Support 20MHz, 40MHz bandwidth in 2.4GHz band.
- Support 20MHz, 40MHz, 80Mhz bandwidth in 5GHz band.
- Support STBC, LDPC
- support QoS Enhancement (WMM)
- Security support for WPA/WPA2/WPA3
- Operation at 2.4~2.5GHz and 5.15~5.825GHz frequency band to meet worldwide regulations
- Bluetooth specification 2.1/3.0/4.2
- Bluetooth 5.2
- High speed USB 2.0 interface
- HSF compliant

## 3.2 General Requirements

### 3.2.1 IEEE 802.11b Section

|         | Feature                                       | Detailed Description                                                                                                                                                        |
|---------|-----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3.2.1.1 | Standard                                      | <ul style="list-style-type: none"> <li>IEEE 802.11b</li> </ul>                                                                                                              |
| 3.2.1.2 | Radio and Modulation Schemes                  | <ul style="list-style-type: none"> <li>DQPSK , DBPSK and CCK with DSSS</li> </ul>                                                                                           |
| 3.2.1.3 | Operating Frequency                           | <ul style="list-style-type: none"> <li>2400 ~ 2483.5MHz ISM band</li> </ul>                                                                                                 |
| 3.2.1.4 | Channel Numbers                               | <ul style="list-style-type: none"> <li>13 channels for Worldwide</li> </ul>                                                                                                 |
| 3.2.1.5 | Data Rate                                     | <ul style="list-style-type: none"> <li>at most 11Mbps</li> </ul>                                                                                                            |
| 3.2.1.6 | Media Access Protocol                         | <ul style="list-style-type: none"> <li>CSMA/CA with ACK</li> </ul>                                                                                                          |
| 3.2.1.7 | Transmitter Output Power at Antenna Connector | <ul style="list-style-type: none"> <li>Typical RF Output Power at each RF chain, and at room Temp. 25°C</li> <li>17±2 dBm at 11Mbps</li> </ul>                              |
| 3.2.1.8 | Receiver Sensitivity at Antenna Connector     | <ul style="list-style-type: none"> <li>Typical Sensitivity at each RF chain. @Frame (1000-byte PDUs) Error Rate≤8% at room Temp 25°C</li> <li>-83 dBm for 11Mbps</li> </ul> |

### 3.2.2 IEEE 802.11g Section

|         | Feature                                       | Detailed Description                                                                                                                                                         |
|---------|-----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3.2.2.1 | Standard                                      | <ul style="list-style-type: none"> <li>IEEE 802.11g</li> </ul>                                                                                                               |
| 3.2.2.2 | Radio and Modulation Type                     | <ul style="list-style-type: none"> <li>QPSK , BPSK , 16QAM ,64QAM with OFDM</li> </ul>                                                                                       |
| 3.2.2.3 | Operating Frequency                           | <ul style="list-style-type: none"> <li>2400 ~ 2483.5MHz ISM band</li> </ul>                                                                                                  |
| 3.2.2.4 | Channel Numbers                               | <ul style="list-style-type: none"> <li>13 channels for Worldwide</li> </ul>                                                                                                  |
| 3.2.2.5 | Data Rate                                     | <ul style="list-style-type: none"> <li>at most 54Mbps</li> </ul>                                                                                                             |
| 3.2.2.6 | Media Access Protocol                         | <ul style="list-style-type: none"> <li>CSMA/CA with ACK</li> </ul>                                                                                                           |
| 3.2.2.7 | Transmitter Output Power at Antenna Connector | <ul style="list-style-type: none"> <li>Typical RF Output Power at each RF chain, at room Temp. 25°C</li> <li>15±2 dBm at 54Mbps</li> </ul>                                   |
| 3.2.2.8 | Receiver Sensitivity at Antenna Connector     | <ul style="list-style-type: none"> <li>Typical Sensitivity at each RF chain. @Frame (1000-byte PDUs) Error Rate≤10% at room Temp 25°C</li> <li>-71 dBm for 54Mbps</li> </ul> |

## 3.2.3 IEEE 802.11a Section

|         | Feature                                       | Detailed Description                                                                                                                                                         |
|---------|-----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3.2.3.1 | Standard                                      | <ul style="list-style-type: none"> <li>IEEE 802.11a</li> </ul>                                                                                                               |
| 3.2.3.2 | Radio and Modulation Type                     | <ul style="list-style-type: none"> <li>QPSK , BPSK , 16QAM ,64QAM with OFDM</li> </ul>                                                                                       |
| 3.2.3.3 | Operating Frequency                           | <ul style="list-style-type: none"> <li>5.15~5.25GHz</li> <li>5.25~5.35GHz</li> <li>5.47~5.725GHz</li> <li>5.725~5.825GHz</li> </ul>                                          |
| 3.2.3.4 | Data Rate                                     | <ul style="list-style-type: none"> <li>at most 54Mbps</li> </ul>                                                                                                             |
| 3.2.3.5 | Media Access Protocol                         | <ul style="list-style-type: none"> <li>CSMA/CA with ACK</li> </ul>                                                                                                           |
| 3.2.3.6 | Transmitter Output Power at Antenna Connector | <ul style="list-style-type: none"> <li>Typical RF Output Power at each RF chain, at room Temp. 25°C</li> <li>15±2 dBm at 54Mbps</li> </ul>                                   |
| 3.2.3.7 | Receiver Sensitivity at Antenna Connector     | <ul style="list-style-type: none"> <li>Typical Sensitivity at each RF chain. @Frame (1000-byte PDUs) Error Rate≤10% at room Temp 25°C</li> <li>-71 dBm for 54Mbps</li> </ul> |

## 3.2.4 IEEE 802.11n Section

|         | Feature                                       | Detailed Description                                                                                                                                                                                                                                                                                                                                                                              |
|---------|-----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3.2.4.1 | Standard                                      | <ul style="list-style-type: none"> <li>IEEE 802.11n</li> </ul>                                                                                                                                                                                                                                                                                                                                    |
| 3.2.4.2 | Radio and Modulation Type                     | <ul style="list-style-type: none"> <li>BPSK , QPSK , 16QAM ,64QAM with OFDM</li> </ul>                                                                                                                                                                                                                                                                                                            |
| 3.2.4.3 | Operating Frequency                           | <ul style="list-style-type: none"> <li>2.4GHz :2400 ~ 2483.5MHz for ISM band</li> <li>5GHz : 5.15~5.25GHz; 5.25~5.35GHz; 5.47~5.725GHz; 5.725~5.825GHz;</li> </ul>                                                                                                                                                                                                                                |
| 3.2.4.4 | Data Rate                                     | at most 300 Mbps                                                                                                                                                                                                                                                                                                                                                                                  |
| 3.2.4.5 | Media Access Protocol                         | <ul style="list-style-type: none"> <li>CSMA/CA with ACK</li> </ul>                                                                                                                                                                                                                                                                                                                                |
| 3.2.4.6 | Transmitter Output Power at Antenna Connector | <p>Typical RF Output Power at each RF chain,and at roomTemp. 25°C</p> <ul style="list-style-type: none"> <li>2GHZ Band: <ul style="list-style-type: none"> <li>15±2dBm at HT20 MCS7</li> <li>15±2dBm at HT40 MCS7</li> </ul> </li> <li>5GHZ Band: <ul style="list-style-type: none"> <li>15±2dBm at HT20 MCS7</li> <li>15±2dBm at HT40 MCS7</li> </ul> </li> </ul>                                |
| 3.2.4.7 | Receiver Sensitivity at Antenna Connector     | <p>Typical Sensitivity at each RF chain. @Frame(1000-byte PDUs)Error Rate≤10% and at room Temp. 25°C</p> <ul style="list-style-type: none"> <li>2GHZ Band: <ul style="list-style-type: none"> <li>-69dBm at HT20 MCS7</li> <li>-66dBm at HT40 MCS7</li> </ul> </li> <li>5GHZ Band: <ul style="list-style-type: none"> <li>-69dBm at HT20 MCS7</li> <li>-66dBm at HT40 MCS7</li> </ul> </li> </ul> |

## 3.2.5 IEEE 802.11ac Section

|         | Feature                                       | Detailed Description                                                                                                                                                                |
|---------|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3.2.5.1 | Standard                                      | <ul style="list-style-type: none"> <li>IEEE 802.11ac</li> </ul>                                                                                                                     |
| 3.2.5.2 | Radio and Modulation Type                     | <ul style="list-style-type: none"> <li>QPSK , BPSK , 16QAM ,64QAM,256QAM with OFDM</li> </ul>                                                                                       |
| 3.2.5.3 | Operating Frequency                           | <ul style="list-style-type: none"> <li>5GHz : 5.15~5.25GHz; 5.25~5.35GHz;<br/>5.47~5.725GHz; 5.725~5.825GHz;</li> </ul>                                                             |
| 3.2.5.4 | Data Rate                                     | <ul style="list-style-type: none"> <li>at most 866.7Mbps</li> </ul>                                                                                                                 |
| 3.2.5.5 | Media Access Protocol                         | <ul style="list-style-type: none"> <li>CSMA/CA with ACK</li> </ul>                                                                                                                  |
| 3.2.5.6 | Transmitter Output Power at Antenna Connector | Typical RF Output Power at each RF chain, at room Temp. 25°C <ul style="list-style-type: none"> <li>5GHZ Band:<br/>13±2dBm at VHT80 MCS9</li> </ul>                                 |
| 3.2.5.7 | Receiver Sensitivity at Antenna Connector     | Typical Sensitivity at each RF chain. @Frame(1000-byte PDUs)Error Rate≤10% at room Temp 25°C <ul style="list-style-type: none"> <li>5GHZ Band:<br/>-55 dBm at VHT80 MCS9</li> </ul> |

## 3.2.6 IEEE 802.11ax Section

|         | Feature                                       | Detailed Description                                                                                                                                                                                                              |
|---------|-----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3.2.6.1 | Standard                                      | <ul style="list-style-type: none"> <li>IEEE 802.11ax</li> </ul>                                                                                                                                                                   |
| 3.2.6.2 | Radio and Modulation Type                     | <ul style="list-style-type: none"> <li>QPSK , BPSK , 16QAM ,64QAM,256QAM, 1024QAM with OFDMA</li> </ul>                                                                                                                           |
| 3.2.6.3 | Operating Frequency                           | <ul style="list-style-type: none"> <li>2G: 2400 ~ 2483.5MHz ISM band</li> <li>5GHz : 5.15~5.25GHz; 5.25~5.35GHz;<br/>5.47~5.725GHz; 5.725~5.825GHz;</li> </ul>                                                                    |
| 3.2.6.4 | Data Rate                                     | <ul style="list-style-type: none"> <li>2G: at most 573.5Mbps</li> <li>5G: at most 1201Mbps</li> </ul>                                                                                                                             |
| 3.2.6.5 | Media Access Protocol                         | <ul style="list-style-type: none"> <li>CSMA/CA with ACK</li> </ul>                                                                                                                                                                |
| 3.2.6.6 | Transmitter Output Power at Antenna Connector | Typical RF Output Power at each RF chain, at room Temp. 25°C <ul style="list-style-type: none"> <li>2GHZ Band:<br/>12±2dBm at HE40 MCS11</li> <li>5GHZ Band:<br/>11±2dBm at HE80 MCS11</li> </ul>                                 |
| 3.2.6.7 | Receiver Sensitivity at Antenna Connector     | Typical Sensitivity at each RF chain. @Frame(1000-byte PDUs)Error Rate≤10% at room Temp 25°C <ul style="list-style-type: none"> <li>2GHZ Band:<br/>-55 dBm at HE40 MCS11</li> <li>5GHZ Band:<br/>-50 dBm at HE80 MCS11</li> </ul> |



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## 3.2.7 Bluetooth Section

| Feather                                        |                                                | Description |           |
|------------------------------------------------|------------------------------------------------|-------------|-----------|
| General specification                          |                                                |             |           |
| Bluetooth standard                             | Bluetooth V2.1/3.0/4.2/5.2                     |             |           |
| Frequency band                                 | 2402MHz-2480MHz                                |             |           |
| Channel Numbers                                | 79 channels for BDR+EDR<br>40 channels for BLE |             |           |
| Modulation                                     | GFSK, $\pi/4$ -DQPSK and 8DPSK                 |             |           |
| RF specification                               |                                                |             |           |
|                                                | Min (dBm)                                      | Type (dBm)  | Max (dBm) |
| BDR Output Power                               |                                                | 6           |           |
| BLE Output Power                               |                                                | 6           |           |
| Sensitive @BER=0.1% FOR GFSK(1Mbps)            |                                                | -86         |           |
| Sensitive @BER=0.01% FOR $\pi/4$ -DQPSK(2Mbps) |                                                | -86         |           |
| Sensitive @BER=0.01% FOR 8DPSK(3Mbps)          |                                                | -80         |           |
| Maximum input level                            | GFSK(1Mbps) -20dBm                             |             |           |
|                                                | $\pi/4$ -DQPSK(2Mbps) -20dBm                   |             |           |
|                                                | 8DQPSK(3Mbps) -20dBm                           |             |           |
| Sensitive @PER=30.8% FOR BLE                   |                                                | -90         |           |

## 4. Electrical and Thermal Characteristics

### 4.1 Temperature Limit Ratings

| Parameter                     | Minimum | Maximum | Units |
|-------------------------------|---------|---------|-------|
| Storage Temperature           | -40     | +80     | °C    |
| Ambient Operating Temperature | 0       | 70      | °C    |
| Junction Temperature          | 0       | 125     | °C    |

### 4.2 General Section

|       | Feature      | Detailed Description |
|-------|--------------|----------------------|
| 4.2.1 | Antenna Type | • WIFI&BT :IPEX      |



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|       |                           |                               |
|-------|---------------------------|-------------------------------|
| 4.2.2 | Operating Voltage         | • 3.3V±0.3V                   |
| 4.2.3 | Current Consumption       | • <2A                         |
| 4.2.4 | Form Factor and Interface | • High Speed USB2.0 Interface |

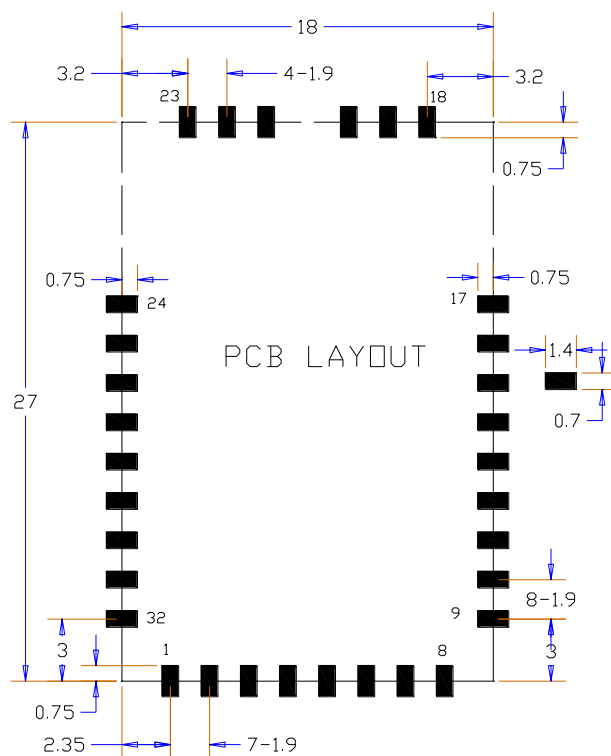
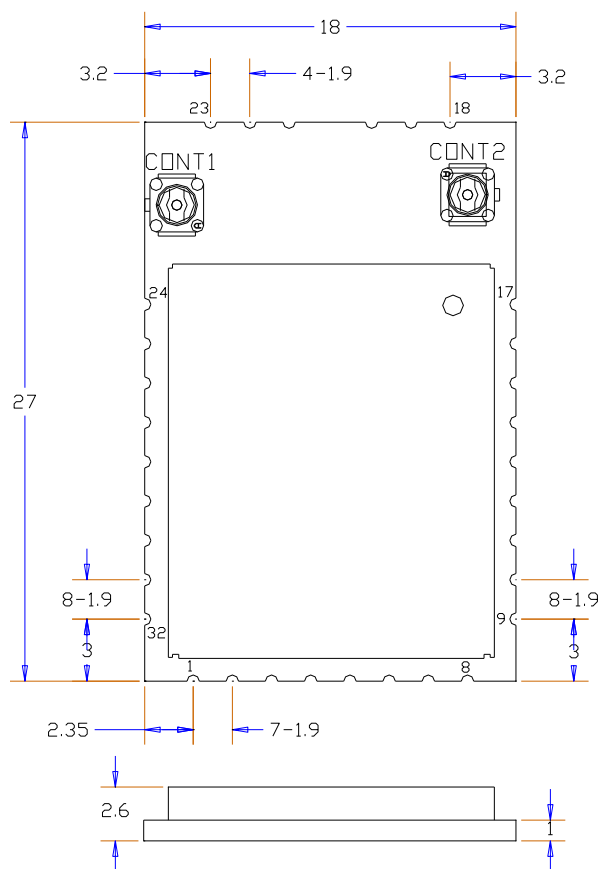
## 4.3 Software

|          |                         |
|----------|-------------------------|
| Driver   | Windows, Android, Linux |
| Security | WPA,WPA2,WPA3           |

## 4.4 Mechanical Dimensions

| Feature | Detailed Description  |
|---------|-----------------------|
| Length  | • 18mm                |
| Width   | • 27mm                |
| Height  | • Max 3.0mm(PCB1.0mm) |

## 5.Mechanical Dimensions



注:

CONT1 : TX0/RX0(WIFI);

CONT2 : TX1/RX1(WIFI)&TX/RX(BT);

Tolerance:

| Length(mm) | Tolerance(mm) |
|------------|---------------|
| 0-5        | ±0.15         |
| 5-10       | ±0.20         |
| 10-50      | ±0.30         |
| >50        | ±0.40         |

## 6. Connector Definition

| PIN | SYMBOL       | DESCRIPTION           | TYPE | PIN | SYMBOL         | DESCRIPTION                                                             | TYPE |
|-----|--------------|-----------------------|------|-----|----------------|-------------------------------------------------------------------------|------|
| 1   | NC           | Not Connect           | /    | 17  | NC             | Not Connect                                                             | /    |
| 2   | NC           | Not Connect           | /    | 18  | GND            | GND                                                                     | /    |
| 3   | NC           | Not Connect           | /    | 19  | NC             | Not Connect                                                             | /    |
| 4   | NC           | Not Connect           | /    | 20  | GND            | GND                                                                     | /    |
| 5   | GND          | GND                   | /    | 21  | GND            | GND                                                                     | /    |
| 6   | WL_USB_DP    | USB D+                | I/O  | 22  | NC             | Not Connect                                                             | /    |
| 7   | WL_USB_DN    | USB D-                | I/O  | 23  | GND            | GND                                                                     | /    |
| 8   | GND          | GND                   | /    | 24  | GND            | GND                                                                     | /    |
| 9   | NC           | Not Connect           | /    | 25  | GND            | GND                                                                     | /    |
| 10  | NC           | Not Connect           | /    | 26  | WLAN_WAKE_HOST | WLAN CHIP WAKES UP HOST                                                 | O    |
| 11  | GND          | GND                   | /    | 27  | GPIO11         | BQB TEST                                                                | /    |
| 12  | NC           | Not Connect           | /    | 28  | RESET          | Shutdown CHIP (Internal 47K $\Omega$ pull up to 3.3V, low level active) | I    |
| 13  | GND          | GND                   | /    | 29  | GND            | GND                                                                     | /    |
| 14  | BT_WAKE_HOST | BT CHIP WAKES UP HOST | O    | 30  | VDD33          | 3.3V                                                                    | I    |
| 15  | HOST_WAKE_BT | HOST WAKES UP BT CHIP | I    | 31  | GPIO9          | BQB TEST                                                                | /    |
| 16  | NC           | Not Connect           | /    | 32  | GND            | GND                                                                     | /    |
|     | CONT1        | TX0/RX0(WIFI)         |      |     | CONT2          | TX1/RX1(WIFI)、TX/RX(BT)                                                 |      |

Note: WIFI and BT share the same address segment, but there will be no situation where they share the same address.

**Pin 14 BT\_WAKE\_HOST**, The internal pull-up of the module is set to 3.3V, and the port status should be configured as low-level effective.

**Pin 15 HOST\_WAKE\_BT**, There is no up-down sliding function inside the module.

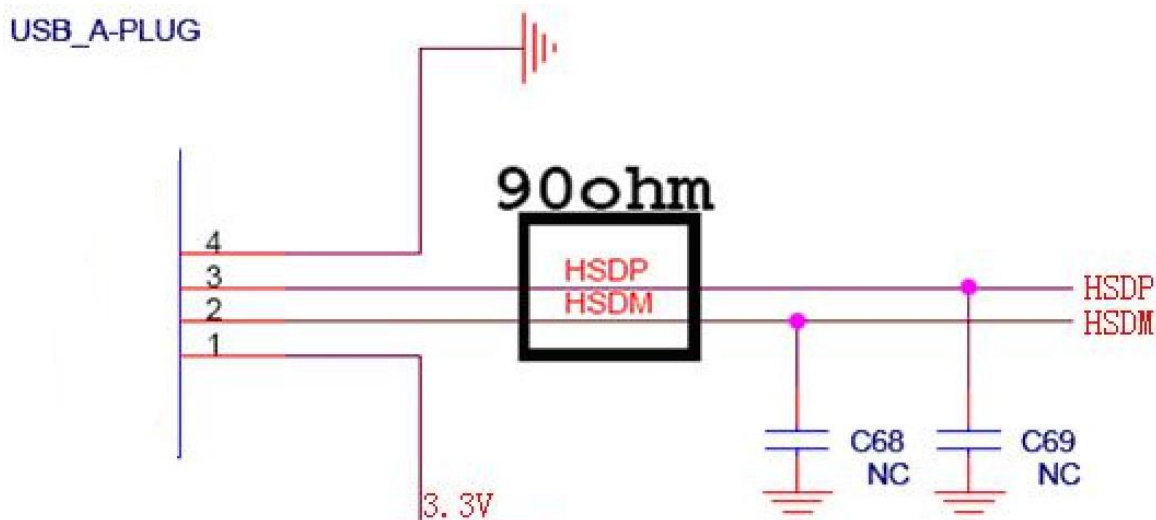
**Pin 26 WLAN\_WAKE\_HOST**, The internal circuit of the module has been pulled up to 3.3V. The port status should be configured to be effective when it is at a low level.

**Pin 28 CHIP\_EN** The internal part of the module has been pulled up to 3.3V, so the host end does not need to be pulled up.

## 7. Component LIST

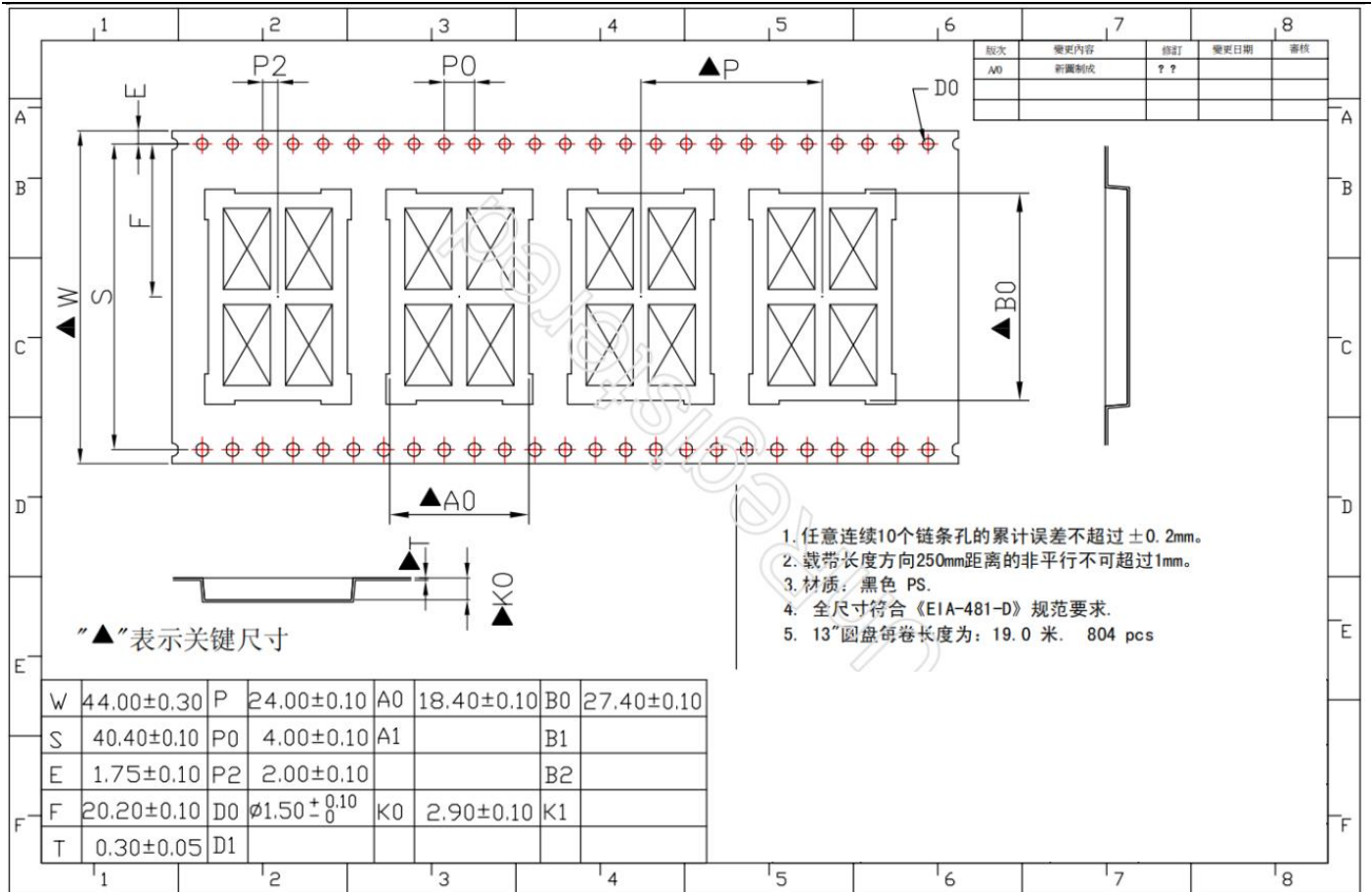
| Number | Name             | Trademark / Manufacturer | status   |
|--------|------------------|--------------------------|----------|
| 1      | IC               | Realtek                  | In using |
| 2      | Duplexer         | TDK、Walsin、Jiali         | In using |
| 3      | PCB              | FZX、BLC、BXXW、LHD         | In using |
| 4      | Capacitance      | JPN、TWN                  | In using |
| 5      | Inductance       | JPN、TWN、QLX、FH           | In using |
| 6      | Power Inductance | TWN、FH、QLX               | In using |
| 7      | Resistance       | GJ、HXK、DY、WQ             | In using |
| 8      | Crystal          | Jiagao、JBSP、DJ、CJ、HL     | In using |
| 9      | Shielding cover  | Material (Brass)         | In using |

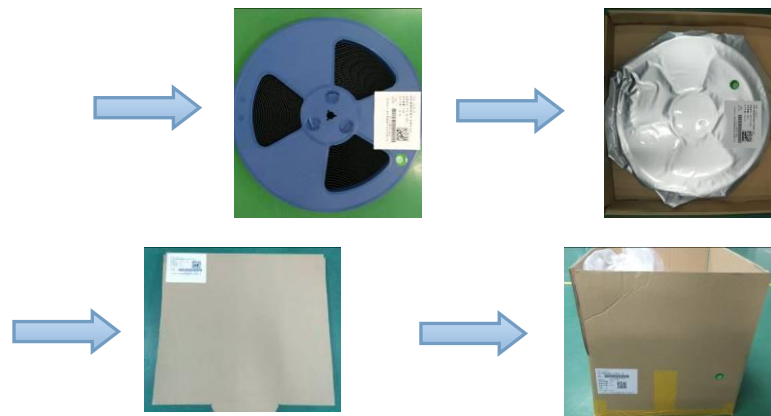
## 8. USB interface electrical characteristics (Recommend Schematic diagram)



Two root go line do difference, but also required to make 90 0 the impedance test

## 9. Package





Outer box: 426\*375\*300mm

Inner box: 411\*365\*54mm

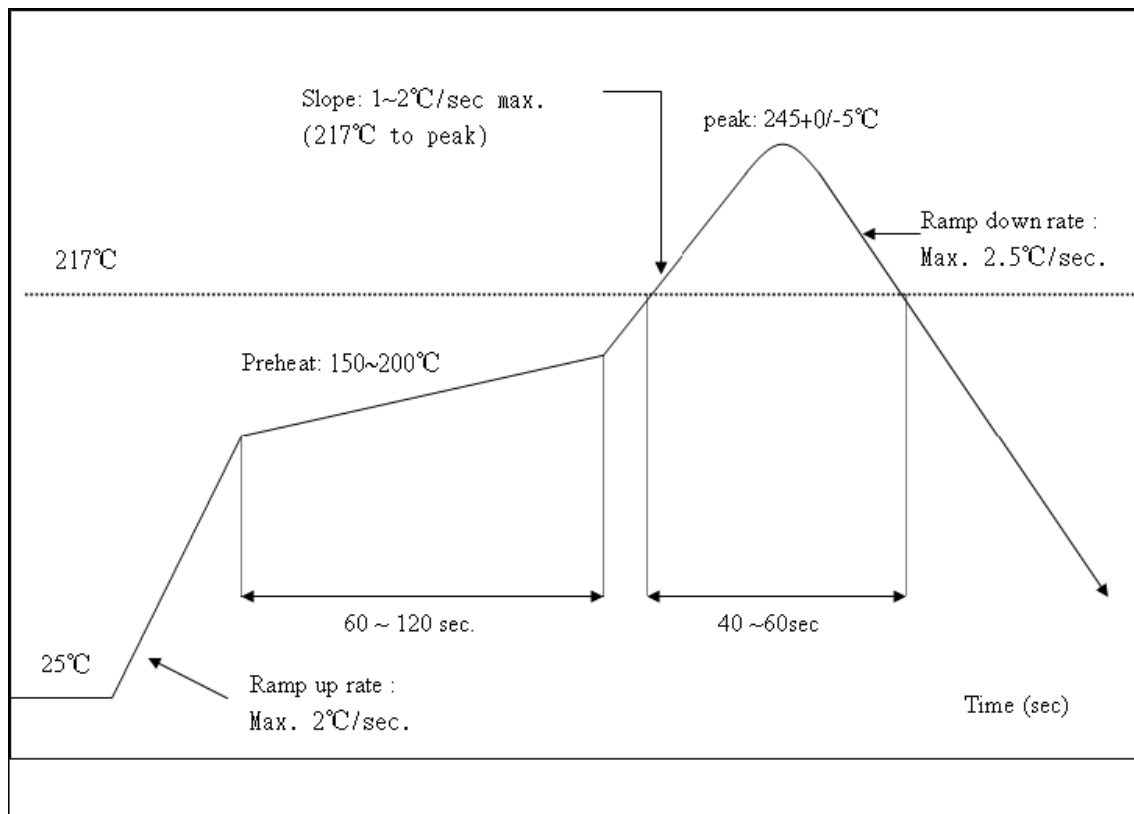
Packaging quantity: 4000 PCS per box (5 boxes, 800 PCS per box)

## 10. 产品的MSL水平 : Moisture Sensitivity Level (MSL) : JEDEC L3

| Level | Floor Life<br>(車間時間) |                | Soak Requirements<br>(濕度環境要求) |                |                     |                |
|-------|----------------------|----------------|-------------------------------|----------------|---------------------|----------------|
|       |                      |                | Standard<br>(標準)              |                | Accelerated<br>(加速) |                |
|       | Time                 | Cond<br>°C/%RH | Time (hrs)                    | Cond<br>°C/%RH | Time (hrs)          | Cond<br>°C/%RH |
| 1     | unlimited            | ≤30/85%        | 168+5/-0                      | 85/85          | n/a                 | n/a            |
| 2     | 1 year               | ≤30/60%        | 168+5/-0                      | 85/60          | n/a                 | n/a            |
| 2a    | 4 weeks              | ≤30/60%        | 696+5/-0                      | 30/60          | 120+1/-0            | 60/60          |
| 3     | <b>168 hours</b>     | <b>≤30/60%</b> | <b>192+5/-0</b>               | <b>30/60</b>   | <b>40+1/-0</b>      | <b>60/60</b>   |
| 4     | 72 hours             | ≤30/60%        | 96+2/-0                       | 30/60          | 20+0.5/-0           | 60/60          |
| 5     | 48 hours             | ≤30/60%        | 72+2/-0                       | 30/60          | 15+0.5/-0           | 60/60          |
| 5a    | 24 hours             | ≤30/60%        | 48+2/-0                       | 30/60          | 10+0.5/-0           | 60/60          |
| 6     | TOL                  | ≤30/60%        | TOL                           | 30/60          | n/a                 | 60/60          |

## 11. Recommended Reflow Profile

Referred to IPC/JEDEC standard. Peak Temperature :  $<250^{\circ}\text{C}$  Number of Times :  $\leq 2$  times



## 12. Wireless module before the SMT note:

1. When customers Open stencil advice sure the hole bigger to the Wireless module plate, please press 1 to 1 and 0.7 mm is widened to open outward, the thickness of 0.12 mm.
2. Can't get the wifi module bare hands when needs, must we wear the gloves and static ring.
3. The furnace temperature according to the size of the customer the mainboard, generally like to stick on a tablet standard temperature of  $250 \pm 5^{\circ}\text{C}$

Storage and use Wifi module control should pay attention to the following matters:

• Module of the storage life of vacuum packaging:

1-1. Storage life : 12 months. Storage conditions:  $<40^{\circ}\text{C}$ . Relative humidity:  $<90\%\text{R.H.}$

1-2. After this bag is opened, devices that will be subjected to infrared reflow, vapor-phase reflow, or equivalent processing must be :

1-3. Check the humidity card : stored at  $\leq 20\%\text{RH}$ . If :  $30\%\sim 40\%$  (pink) or greater than  $40\%$  (red). Labeling module has moisture absorption.

① Mounted within 168 hours at factory

conditions of:  $t \leq 30^{\circ}\text{C}$ ,  $\leq 60\%\text{R.H.}$

② Once opened, the workshop the preservation of life for 168 hours.

1-4. If baking is required, devices may be baked for:

① Modules must be to remove module moisture problem.

② Baking temperature:  $50^{\circ}\text{C}$ , 72 hours.

③ After baking, put proper amount of desiccant to seal packages.

1-5. The actual number of module vacuum packing which is based on the actual number of packages to the customer requirements, vacuum packing of picture<1>

2. Module reel packaging items as follows.

2-1. Storage life : 12 months. Storage conditions:  $<40^{\circ}\text{C}$ . Relative humidity:  $<90\%\text{R.H.}$

2-2. Module apart packing after 168 hours, To launch patch need to bake, to remove the module hygroscopic, baking temperature conditions:  $50^{\circ}\text{C}$ , 72 hours.

2-3. The actual number of module reel packing which is based on the actual number of packages to the customer requirements, Reel packing of picture<2>

3. Module pallet packaging items as follows:

3-1. Storage life: 3 months. Storage conditions:  $<40^{\circ}\text{C}$ . Relative humidity:  $<90\%\text{R.H.}$

3-2. Module if not used within 48 hours, before launch the need for baking, baking temperature:  $50^{\circ}\text{C}$ , 72 hours.

3-3. Pallet packaging each plate is 100 PCS. The actual number of module pallet packing which is based on the actual number of packages to the customer requirements.



## 13. Design Guidelines

### 1. Antenna Design

The module features a surface-mount pad antenna interface. RF signals can be routed from Pin 31 to either integrated or external antennas. Regardless of antenna type,  $\pi$ -matching circuits (recommended: 2 sets) must be implemented on the RF path.

### 2. Integrated Antenna

Follow standard PCB antenna design principles when using integrated antennas.

### 3. External Antenna

External antennas must meet specifications in Table 13-2-1

Table 13-2-1: External Antenna Requirements

| Parameter       | Specification       |
|-----------------|---------------------|
| Frequency range | 2.4GHz+5GHz         |
| Impedance       | 50 $\Omega$         |
| Return loss     | $\leq -10\text{dB}$ |



# PRODUCTS SPECIFICATION

WXT09R2101

The module is limited to OEM installation ONLY

The antenna installation must be professional installation, and does not permit use of any antenna with the transmitter; the permitted types of antenna must be specified.

The module cannot be sold via retail to the general public or by mail order; it must be sold to authorized dealers or installers only.

The end product intended use is not for consumers and general public; rather device is generally for industrial/commercial use.

The installation shall be performed by trained licensed professionals, it uses specialized software and adjusts the best angles and orientations, which are difficult for ordinary people to do.

The module is limited to installation in mobile or fixed application.

The OEM integrator is responsible for ensuring the end-user has no manual instruction to remove or install module;

Modular approval allows installation in different end-use products by an original equipment manufacturer (OEM) with limited or no additional testing or equipment authorization for the transmitter function provided by the WXT09R2101. Specifically:

- No additional transmitter compliance testing is required if the module is operated with the antenna listed in the document below.
- No additional transmitter-compliance testing is required if the module is operated with the same general type of antenna (i.e. near-field segmented loop, circularly polarized patches) as those listed in this User's Guide and in the FCC filing for the WXT09R2101. Acceptable antennas must be of equal or less far field gain than the antenna previously authorized under the same FCC ID, and must have similar in band and out of band characteristics.

In addition, the end product must comply with all applicable FCC equipment authorizations, regulations, requirements and equipment functions not associated with the WXT09R2101. For example, compliance must be demonstrated to regulations for other transmitter components within the host product, to requirements for unintentional radiators (Part 15B), and to additional authorization requirements for the non-transmitter functions.

The OEM applying the WXT09R2101 is required to include all FCC and/or IC statements and warnings detailed in the following sections to the end product labeling (where specified) and in the finished product manual. The OEM must also strictly adhere to antenna and installation guidelines and MPE restrictions stated in this document.



# PRODUCTS SPECIFICATION

WXT09R2101

## A. FCC Radiation Exposure Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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

This Module complies with FCC radiation exposure limits set forth for an uncontrolled environment

This equipment should be installed and operated with a minimum distance of 20cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

### Labelling instruction for Host Product integrator

Please notice that if the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the

enclosed module. This exterior label can use wording such as the following: "Contains FCC ID: 2BN5S-2508A" any similar wording that expresses the same meaning may be used. Installation

### Notice to Host Product Manufacturer

The OEM integrator is responsible for ensuring that the end-user has no manual instruction to remove or install module.

The module is limited to installation in mobile application, a separate approval is required for all other operating configurations, including portable configurations with respect to §2.1093 and difference antenna configurations.

### Antenna configurations.

#### Antenna Change Notice to Host manufacturer

If you desire to increase antenna gain and either change antenna type or use same antenna type certified, a Class II permissive change application is required to be filed by us, or you (host manufacturer) can take responsibility through the change in FCC ID (new application) procedure followed by a Class II permissive change application.

#### FCC other Parts, Part 15B Compliance Requirements for Host product manufacturer

This modular transmitter is only FCC authorized for the specific rule parts listed on our grant, 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.

Host manufacturer in any case shall ensure host product which is installed and operating with the module is in compliant with Part 15B requirements.

Note: 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:



# PRODUCTS SPECIFICATION

WXT09R2101

- 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.

## B. ISED Regulatory Compliance

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions: (1) This device may not cause interference.(2)This device must accept any interference, including interference that may cause undesired operation of the device.

This equipment complies with IC RSS - 102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.

Cet équipement est conforme aux limites d'exposition aux radiations IC CNR - 102 établies pour un environnement non contrôlé, Cet équipement doit être installé et utilisé avec une distance minimale de 20cm entre le radiateur et votre corps. Please notice that if the IC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: "Contains IC: 33667-2508A" any similar wording that expresses the same meaning may be used.

L'étiquette d'homologation d'un module d'Innovation, Sciences et Développement économique Canada devra être posée sur le produit hôte à un endroit bien en vue, en tout temps. En l'absence d'étiquette, le produit hôte doit porter une

étiquette sur laquelle figure le numéro d'homologation du module d'Innovation, Sciences et Développement économique Canada, précédé du mot « contient », ou d'une formulation similaire allant dans le même sens et qui va comme suit : Contient IC: 33667-2508A est le numéro d'homologation du module

- i. the device for operation in the band 5150–5250 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems;
- ii. for devices with detachable antenna(s), the maximum antenna gain permitted for devices in the bands

5250-5350 MHz and 5470-5725 MHz shall be such that the equipment still complies with the e.i.r.p. limit;

- iii. for devices with detachable antenna(s), the maximum antenna gain permitted for devices in the band 5725-5850 MHz shall be such that the equipment still complies with the e.i.r.p. limits as appropriate; and

- i. le dispositif utilisé dans la bande 5150-5250 MHz est réservé à une utilisation en intérieur afin de réduire le risque de brouillage préjudiciable aux systèmes mobiles par satellite dans le même canal;

- ii. pour les dispositifs à antenne (s) détachable (s), le gain d'antenne maximal autorisé pour les dispositifs dans les bandes 5250-5350 MHz et 5470-5725 MHz doit être tel que l'équipement soit toujours conforme à la norme e.i.r.p. limite;

- iii. pour les dispositifs à antenne (s) détachable (s), le gain d'antenne maximal autorisé pour les dispositifs de la bande 5725-5850 MHz doit être tel que l'équipement soit toujours conforme à la norme e.i.r.p. les limites, le cas échéant; et