

**PRODUCT SPECIFICATION**

**6252C-PUB**

**Wi-Fi Dual-band 2T2R 11ax + Bluetooth 5.2**

**Combo Module**

**Version:v1.0**



## 6252C-PUB Module Datasheet

| Ordering Information | Part NO.      | Description                                                                         |
|----------------------|---------------|-------------------------------------------------------------------------------------|
|                      | FG6252CPUB-00 | RTL8852BE-CG/wifi6/2T2R+BT,802.11a/b/g/n/ac/ax+BLE5.2,2T2R,PCIE+USB,12*16,PCIE port |

Customer: \_\_\_\_\_

Customer P/N: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Office: 14th floor, Block B, phoenix zhigu, Xixiang Street, Baoan District, Shenzhen

Factory: NO.8, Litong RD., Liuyang Economic & Technical Development Zone, Changsha, CHINA

TEL:+86-755-2955-8186

Website:www.fn-link.com

## CONTENTS

|                                            |           |
|--------------------------------------------|-----------|
| <b>1. General Description.....</b>         | <b>5</b>  |
| 1.1 Introduction.....                      | 5         |
| 1.2 Description.....                       | 5         |
| <b>2. Features.....</b>                    | <b>6</b>  |
| <b>3. Block Diagram.....</b>               | <b>7</b>  |
| <b>4. General Specification.....</b>       | <b>7</b>  |
| 4.1 2.4GHz RF Specification.....           | 7         |
| 4.2 5GHz RF Specification.....             | 8         |
| 4.3 Bluetooth Specification.....           | 10        |
| <b>5. ID setting information.....</b>      | <b>11</b> |
| <b>6. Pin Definition.....</b>              | <b>11</b> |
| 6.1 Pin Outline.....                       | 11        |
| 6.2 Pin Definition details.....            | 12        |
| <b>7. Electrical Specifications.....</b>   | <b>14</b> |
| 7.1 Power Supply DC Characteristics.....   | 14        |
| 7.2 Power Consumption.....                 | 14        |
| 7.3 PCIe Bus during Power On Sequence..... | 15        |
| 7.4 Interface Circuit time series.....     | 15        |
| 7.4.1 PCIe PERST# Timing Sequence.....     | 15        |
| 7.4.2 Power Off Sequence.....              | 16        |
| 7.4.3 BT_DIS Timing Sequence.....          | 16        |
| 7.4.4 Platform state transitions.....      | 16        |
| <b>8. Size reference.....</b>              | <b>17</b> |
| 8.1 Module Picture.....                    | 17        |
| 8.2 Marking Description.....               | 17        |
| 8.3 Physical Dimensions.....               | 18        |
| 8.4 Layout Recommendation.....             | 19        |
| <b>9. The Key Material List.....</b>       | <b>19</b> |
| <b>10. Reference Design.....</b>           | <b>20</b> |
| <b>11. Recommended Reflow Profile.....</b> | <b>21</b> |
| <b>12. RoHS compliance.....</b>            | <b>21</b> |
| <b>13. Package.....</b>                    | <b>22</b> |
| 13.1 Reel.....                             | 22        |
| 13.2 Carrier Tape Detail.....              | 22        |
| 13.3 Packaging Detail.....                 | 23        |
| <b>14. Moisture sensitivity.....</b>       | <b>23</b> |

## Revision History

[illegible]

## 1. General Description

### 1.1 Introduction

The fn-link6252C-PUB 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) PCI Express network interface controller with integrated Bluetooth 5 USB interface controller.It combines a WLAN MAC, a2T2R capable WLAN baseband, and RF in a single chip. The RTL8852BE provides a complete solution for a high-performance integrated wireless and Bluetooth device

電波法により5.2/5.3 GHz帯は屋内使用に限ります。  
5.2/5.3 GHz band is restricted to indoor use due to the Radio Law”

### 1.2 Description

|                       |                                            |
|-----------------------|--------------------------------------------|
| Model Name            | 6252C-PUB                                  |
| Product Description   | Support Wi-Fi/Bluetooth functionalities    |
| Dimension             | L x W x H: 16x 12x 1.7 (typical) mm        |
| Wi-Fi Interface       | Support PCIe                               |
| BT Interface          | USB                                        |
| OS supported          | Android /Linux/ Win CE /iOS /XP/WIN7/WIN10 |
| Operating temperature | 0°C to 70°C                                |
| Storage temperature   | -55°C to 85°C                              |

## 2. Features

### General

- IEEE 802.11a/b/g/n/ac/ax compatible WLAN
- Supports 20/40MHz at 2.4GHz and supports 20/40/80MHz at 5GHz
- Supports 802.11ac 2x2, Wave-2 compliant with RX MU-MIMO
- Complete 802.11n MIMO solution for 2.4GHz and 5GHz band
- Enhanced BT/Wi-Fi Coexistence Control to improve transmission quality in different profiles
- Integrated 32K oscillator for power management

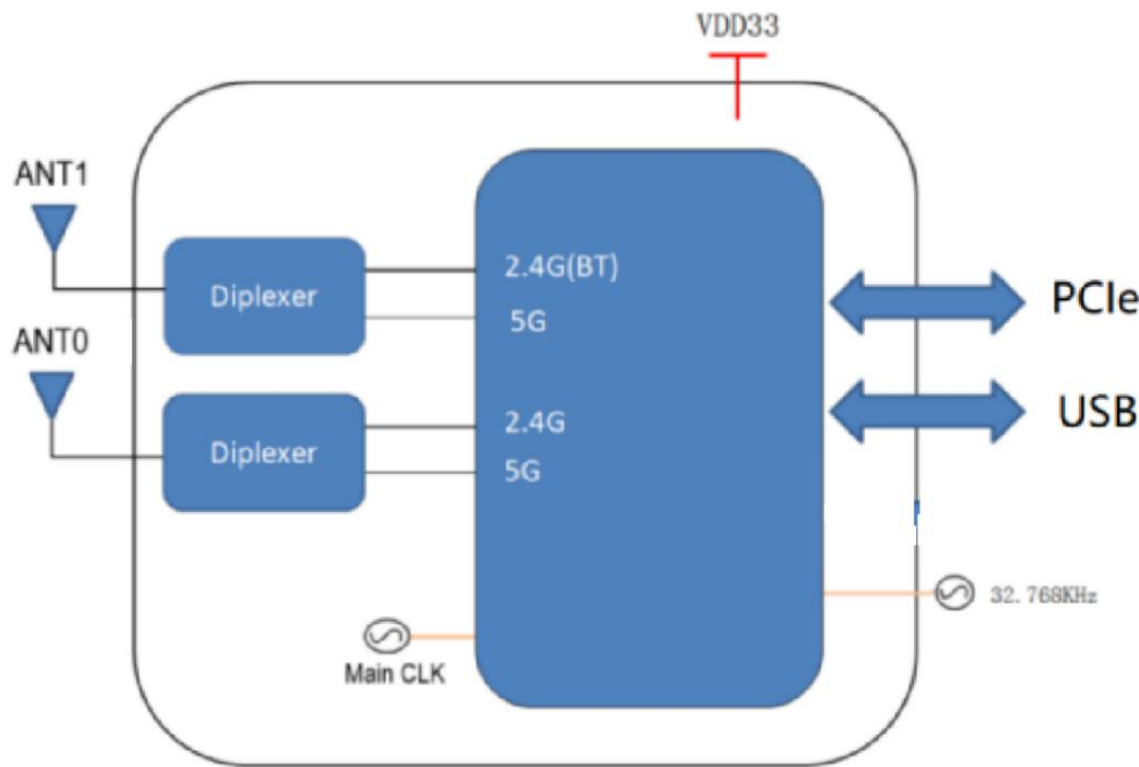
### Host Interface

- Supports low power PCIe(Base Specification Revision 1.1) interface for WLAN and USB(2.0FS-mode)

### Bluetooth Features

- Supports Bluetooth 5.2 system
- Compatible with Bluetooth v2.1+EDR
- Dual Mode support: Simultaneous LE and BR/EDR
- Supports Bluetooth for class1, class2 and class3 power level transmissions without requiring an external PA

3. Block Diagram



4. General Specification

4.1 2.4GHz RF Specification

| Feature            | Description                              |             |
|--------------------|------------------------------------------|-------------|
| WLAN Standard      | IEEE 802.11 b/g/n/ac/ax Wi-Fi compliant  |             |
| Frequency Range    | 2.400 GHz ~ 2.497 GHz (2.4 GHz ISM Band) |             |
| Number of Channels | 2.4GHz: Ch1 ~ Ch14                       |             |
| Test Items         | Typical Value                            | EVM         |
| Output Power       | 802.11b /11Mbps: 19dBm ± 2 dB            | EVM ≤ -9dB  |
|                    | 802.11g /54Mbps: 18dBm ± 2 dB            | EVM ≤ -25dB |
|                    | 802.11n /MCS7: 17dBm ± 2 dB              | EVM ≤ -28dB |
|                    | 802.11ac VHT20 MCS8: 16dBm ± 2 dB        | EVM ≤ -30dB |
|                    | 802.11ac VHT40 MCS9: 15dBm ± 2 dB        | EVM ≤ -32dB |
|                    | 802.11ax HE20 MCS11: 13dBm ± 2 dB        | EVM ≤ -35dB |
|                    | 802.11ax HE40 MCS11: 13dBm ± 2 dB        | EVM ≤ -35dB |
| Spectrum Mask      | Meet with IEEE standard                  |             |

|                                                 |                                       |           |  |
|-------------------------------------------------|---------------------------------------|-----------|--|
| Freq. Tolerance                                 | ± 20ppm                               |           |  |
| SISO Receive Sensitivity<br>(11b,20MHz) @8% PER | - 1Mbps @ -94 dBm                     | ≤-83 dBm  |  |
|                                                 | - 11Mbps @ -85 dBm                    | ≤-76 dBm  |  |
| Receive Sensitivity<br>(11g,20MHz) @10% PER     | - 6Mbps @ -90 dBm                     | ≤-85 dBm  |  |
|                                                 | - 54Mbps @ -71 dBm                    | ≤-68 dBm  |  |
| Receive Sensitivity<br>(11n,20MHz) @10% PER     | - MCS=0 @ -90 dBm                     | ≤-85 dBm  |  |
|                                                 | - MCS=7 @ -69 dBm                     | ≤-67 dBm  |  |
| Receive Sensitivity<br>(11n,40MHz) @10% PER     | - MCS=0 @ -87 dBm                     | ≤-82 dBm  |  |
|                                                 | - MCS=7 @ -66 dBm                     | ≤-64 dBm  |  |
| Receive Sensitivity<br>(11ac,20MHz) @10% PER    | - MCS=0 @ -90 dBm                     | ≤ -82 dBm |  |
|                                                 | - MCS=8 @ -64 dBm                     | ≤ -60 dBm |  |
| Receive Sensitivity<br>(11ac ,40MHz) @10% PER   | - MCS=0 @ -87 dBm                     | ≤ -79 dBm |  |
|                                                 | - MCS=9 @ -59 dBm                     | ≤ -55 dBm |  |
| Receive Sensitivity<br>(11ax,20MHz) @10% PER    | - MCS=0 @ -90 dBm                     | ≤-74 dBm  |  |
|                                                 | - MCS=11 @ -60 dBm                    | ≤-52 dBm  |  |
| Receive Sensitivity<br>(11ax ,40MHz) @10% PER   | - MCS=0 @ -87 dBm                     | ≤-71 dBm  |  |
|                                                 | - MCS=11 @ -57 dBm                    | ≤-49 dBm  |  |
| Maximum Input Level                             | 802.11b : -10 dBm                     |           |  |
|                                                 | 802.11g/n : -20 dBm                   |           |  |
| Antenna Reference                               | Small antennas with 0~2 dBi peak gain |           |  |

## 4.2 5GHz RF Specification

Conditions : VBAT=3.3V ; VDDIO=3.3V ; Temp:25°C

| Feature            | Description                               |                  |
|--------------------|-------------------------------------------|------------------|
| WLAN Standard      | IEEE 802.11a/n/ac/ax 2x2, Wi-Fi compliant |                  |
| Frequency Range    | 4.900 GHz ~ 5.845 GHz (5.0 GHz ISM Band)  |                  |
| Number of Channels | 5.0GHz: Please see the table1             |                  |
| Test Items         | Typical Value                             | EVM              |
| Output Power       | 802.11a /54Mbps: 18 dBm $\pm$ 2 dB        | EVM $\leq$ -25dB |
|                    | 802.11n /MCS7: 17 dBm $\pm$ 2 dB          | EVM $\leq$ -28dB |
|                    | 802.11ac VHT20 MCS8: 16 dBm $\pm$ 2 dB    | EVM $\leq$ -30dB |
|                    | 802.11ac VHT40 MCS9: 15 dBm $\pm$ 2 dB    | EVM $\leq$ -32dB |
|                    | 802.11ac VHT80 MCS9: 15 dBm $\pm$ 2 dB    | EVM $\leq$ -32dB |
|                    | 802.11ax HE20 MCS11: 13 dBm $\pm$ 2 dB    | EVM $\leq$ -35dB |
|                    | 802.11ax HE40 MCS11: 13 dBm $\pm$ 2 dB    | EVM $\leq$ -35dB |
|                    | 802.11ax HE80 MCS11: 13 dBm $\pm$ 2 dB    | EVM $\leq$ -35dB |

| Test Items                                   | Test Value                            | Standard Value |
|----------------------------------------------|---------------------------------------|----------------|
| Receive Sensitivity<br>(11a,20MHz) @10% PER  | - 6Mbps @ -90 dBm                     | ≤-85           |
|                                              | - 54Mbps @ -71 dBm                    | ≤-68           |
| Receive Sensitivity<br>(11n,20MHz) @10% PER  | - MCS=0 @ -90 dBm                     | ≤-85           |
|                                              | - MCS=7 @ -69 dBm                     | ≤-67           |
| Receive Sensitivity<br>(11n,40MHz) @10% PER  | - MCS=0 @ -87 dBm                     | ≤-82           |
|                                              | - MCS=7 @ -66 dBm                     | ≤-64           |
| Receive Sensitivity<br>(11ac,20MHz)@10% PER  | - MCS=0, NSS1 @ 90 dBm                | ≤-82           |
|                                              | - MCS=8, NSS1 @ -64 dBm               | ≤-60           |
| Receive Sensitivity<br>(11ac,40MHz) @10% PER | - MCS=0, NSS1 @ -87 dBm               | ≤-79           |
|                                              | - MCS=9, NSS1 @ -59 dBm               | ≤-55           |
| Receive Sensitivity<br>(11ac,80MHz) @10% PER | - MCS=0, NSS1 @ -84 dBm               | ≤-79           |
|                                              | - MCS=9, NSS1 @ -56 dBm               | ≤-54           |
| Receive Sensitivity<br>(11ax,20MHz) @10% PER | - MCS=0 @ -90 dBm                     | ≤-74           |
|                                              | - MCS=11 @ -60 dBm                    | ≤-52           |
| Receive Sensitivity<br>(11ax,40MHz) @10% PER | - MCS=0 @ -87 dBm                     | ≤-71           |
|                                              | - MCS=11 @ -57 dBm                    | ≤-49           |
| Receive Sensitivity<br>(11ax,80MHz) @10% PER | - MCS=0 @ -84 dBm                     | ≤-68           |
|                                              | - MCS=11 @ -54 dBm                    | ≤-46           |
| Maximum Input Level                          | 802.11a/n: -30 dBm                    |                |
| Antenna Reference                            | Small antennas with 0~2 dBi peak gain |                |

**15GHz(20MHz) Channel table**

| Band range      | Operating Channel Numbers | Channel center frequencies(MHz) |
|-----------------|---------------------------|---------------------------------|
| 5180MHz~5240MHz | 36                        | 5180                            |
|                 | 40                        | 5200                            |
|                 | 44                        | 5220                            |
|                 | 48                        | 5240                            |
| 5260MHz~5320MHz | 52                        | 5260                            |
|                 | 56                        | 5280                            |
|                 | 60                        | 5300                            |
|                 | 64                        | 5320                            |
| 5550MHz~5700MHz | 100                       | 5500                            |
|                 | 104                       | 5520                            |
|                 | 108                       | 5540                            |
|                 | 112                       | 5560                            |
|                 | 116                       | 5580                            |
|                 | 120                       | 5600                            |
|                 | 124                       | 5620                            |
|                 | 128                       | 5640                            |
|                 | 132                       | 5660                            |

|                 |     |      |
|-----------------|-----|------|
| 5745MHz~5825MHz | 136 | 5680 |
|                 | 140 | 5700 |
|                 | 149 | 5745 |
|                 | 153 | 5765 |
|                 | 157 | 5785 |
|                 | 161 | 5805 |
|                 | 165 | 5825 |

### 4.3 Bluetooth Specification

| Feature                                               | Description                           |              |          |
|-------------------------------------------------------|---------------------------------------|--------------|----------|
| General Specification                                 |                                       |              |          |
| Bluetooth Standard                                    | Bluetooth V5.2 of 1, 2 and 3 Mbps.    |              |          |
| Host Interface                                        | USB                                   |              |          |
| Antenna Reference                                     | Small antennas with 0~2 dBi peak gain |              |          |
| Frequency Band                                        | 2402 MHz ~ 2480 MHz                   |              |          |
| Number of Channels                                    | 79 channels                           |              |          |
| Modulation                                            | GFSK, $\pi/4$ -DQPSK, 8-DPSK          |              |          |
| RF Specification                                      |                                       |              |          |
|                                                       | Min(dBm)                              | Typical(dBm) | Max(dBm) |
| Output Power (Class 1)                                | 2                                     | 5            | 8        |
| Sensitivity @ BER=0.1%<br>for GFSK (1Mbps)            |                                       |              | -70      |
| Sensitivity @ BER=0.01%<br>for $\pi/4$ -DQPSK (2Mbps) |                                       |              | -70      |
| Sensitivity @ BER=0.01%<br>for 8DPSK (3Mbps)          |                                       |              | -70      |
| Maximum Input Level                                   | GFSK (1Mbps):-20dBm                   |              |          |
|                                                       | $\pi/4$ -DQPSK (2Mbps) :-20dBm        |              |          |
|                                                       | 8DPSK (3Mbps) :-20dBm                 |              |          |

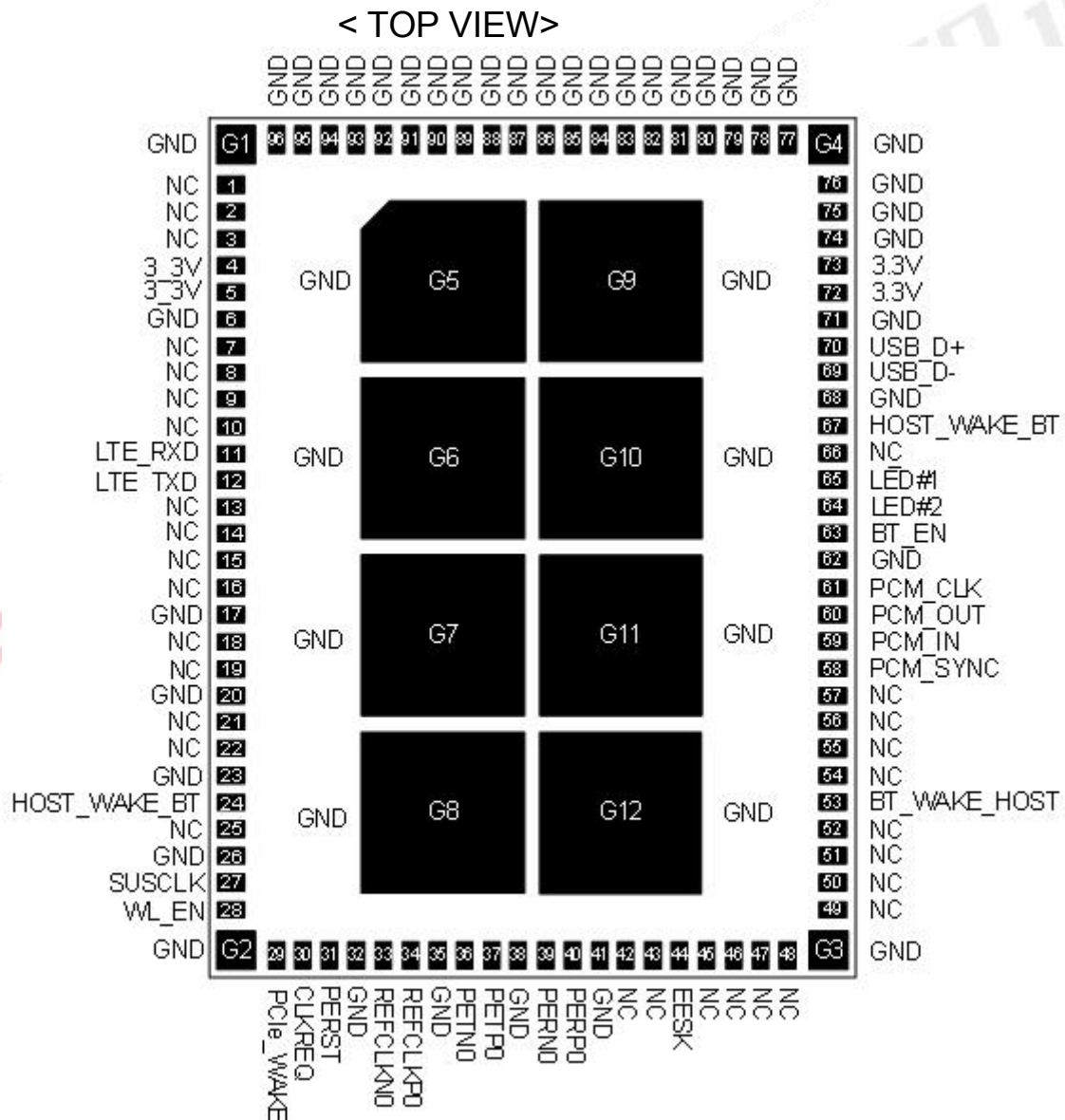
## 5. ID setting information

WI-FI

|            |     |
|------------|-----|
| Vendor ID  | TBD |
| Product ID | TBD |

## 6. Pin Definition

### 6.1 Pin Outline



## 6.2 Pin Definition details

| NO. | Name         | Type | Description                               | Voltage |
|-----|--------------|------|-------------------------------------------|---------|
| 1   | NC           | —    | No connect                                |         |
| 2   | NC           | —    | No connect                                |         |
| 3   | NC           | —    | No connect                                |         |
| 4   | 3_3V         | P    | Main power voltage source input 3.3V      | 3.3V    |
| 5   | 3_3V         | P    | Main power voltage source input 3.3V      | 3.3V    |
| 6   | GND          | —    | Ground connections                        |         |
| 7   | NC           | —    | No connect                                |         |
| 8   | NC           | —    | No connect                                |         |
| 9   | NC           | —    | No connect                                |         |
| 10  | NC           | —    | No connect                                |         |
| 11  | LTE_RXD      | I    | LTE coexist signal                        | 3.3V    |
| 12  | LTE_TXD      | O    | LTE coexist signal                        | 3.3V    |
| 13  | NC           | —    | No connect                                |         |
| 14  | NC           | —    | No connect                                |         |
| 15  | NC           | —    | No connect                                |         |
| 16  | NC           | —    | No connect                                |         |
| 17  | GND          | —    | Ground connections                        |         |
| 18  | NC           | —    | No connect                                |         |
| 19  | NC           | —    | No connect                                |         |
| 20  | GND          | —    | Ground connections                        |         |
| 21  | NC           | —    | No connect                                |         |
| 22  | NC           | —    | No connect                                |         |
| 23  | GND          | —    | Ground connections                        |         |
| 24  | HOST_WAKE_BT | I    | Host wake up BT                           | 3.3V    |
| 25  | NC           | —    | No connect                                |         |
| 26  | GND          | —    | Ground connections                        |         |
| 27  | SUSCLK       | I    | External sleep clock input(32.768KHz)     | 3.3V    |
| 28  | WL_EN        | —    | WLAN enable pin, High: enable,Low:disable | 3.3V    |
| 29  | PCIe_WAKE    | OD   | PCIe wake up host                         | 3.3V    |
| 30  | CLKREQ       | OD   | PCIe reference clock request signal       | 3.3V    |
| 31  | PERST        | PD   | PCIe reset module                         | 3.3V    |
| 32  | GND          | —    | Ground connections                        |         |
| 33  | REFCLKN0     | I    | PCIe CLK Difference -                     |         |
| 34  | REFCLKP0     | I    | PCIe CLK Difference +                     |         |
| 35  | GND          | —    | Ground connections                        |         |

|    |              |     |                                                                                                                                                      |      |
|----|--------------|-----|------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| 36 | PETN0        | O   | PCIe Data Out Difference -                                                                                                                           |      |
| 37 | PETP0        | O   | PCIe Data Out Difference +                                                                                                                           |      |
| 38 | GND          | —   | Ground connections                                                                                                                                   |      |
| 39 | PERN0        | I   | PCIe Data IN Difference -                                                                                                                            |      |
| 40 | PERP0        | I   | PCIe Data IN Difference +                                                                                                                            |      |
| 41 | GND          | —   | Ground connections                                                                                                                                   |      |
| 42 | NC           | —   | No connect                                                                                                                                           |      |
| 43 | NC           | —   | No connect                                                                                                                                           |      |
| 44 | EESK/NC      | —   | EESK or No connect, NC if not use, do not connect to GND                                                                                             |      |
| 45 | NC           | —   | No connect                                                                                                                                           |      |
| 46 | NC           | —   | No connect                                                                                                                                           |      |
| 47 | NC           | —   | No connect                                                                                                                                           |      |
| 48 | NC           | —   | No connect                                                                                                                                           |      |
| 49 | NC           | —   | No connect                                                                                                                                           |      |
| 50 | NC           | —   | No connect                                                                                                                                           |      |
| 51 | NC           | —   | No connect                                                                                                                                           |      |
| 52 | NC           | —   | No connect                                                                                                                                           |      |
| 53 | BT_WAKE_HOST | O   | Bluetooth wake up host                                                                                                                               | 3.3V |
| 54 | NC           | —   | No connect                                                                                                                                           |      |
| 55 | NC           | —   | No connect                                                                                                                                           |      |
| 56 | NC           | —   | No connect                                                                                                                                           |      |
| 57 | NC           | —   | No connect                                                                                                                                           |      |
| 58 | PCM_SYNC     | I/O | PCM sync signal                                                                                                                                      | 3.3V |
| 59 | PCM_IN       | I   | PCM data input                                                                                                                                       | 3.3V |
| 60 | PCM_OUT      | O   | PCM Data output                                                                                                                                      | 3.3V |
| 61 | PCM_CLK      | I/O | PCM clock                                                                                                                                            | 3.3V |
| 62 | GND          | —   | Ground connections                                                                                                                                   |      |
| 63 | BT_EN        | I   | This pin can externally shut down the module BT function when BT_EN is pulled Low. When this pin is pulled low, USB interface will be also disabled. | 3.3V |
| 64 | LED#2        | O   | BT link LED, active low.                                                                                                                             | 3.3V |
| 65 | LED#1        | O   | WLAN link LED, active low.                                                                                                                           | 3.3V |
| 66 | NC           | —   | No connect                                                                                                                                           |      |
| 67 | HOST_WAKE_BT | I   | Host wake up BT, active high                                                                                                                         | 3.3V |
| 68 | GND          | —   | Ground connections                                                                                                                                   |      |
| 69 | USB_D-       | I/O | USB difference line for BT                                                                                                                           |      |

|        |        |     |                                      |      |
|--------|--------|-----|--------------------------------------|------|
| 70     | USB_D+ | I/O | USB difference line for BT           |      |
| 71     | GND    | —   | Ground connections                   |      |
| 72     | 3.3V   | P   | Main power voltage source input 3.3V | 3.3V |
| 73     | 3.3V   | P   | Main power voltage source input 3.3V | 3.3V |
| 74-96  | GND    | —   | Ground connections                   |      |
| G1-G12 | GND    | —   | Ground connections                   |      |

P:POWER I:INPUT O:OUTPUT

## 7. Electrical Specifications

### 7.1 Power Supply DC Characteristics

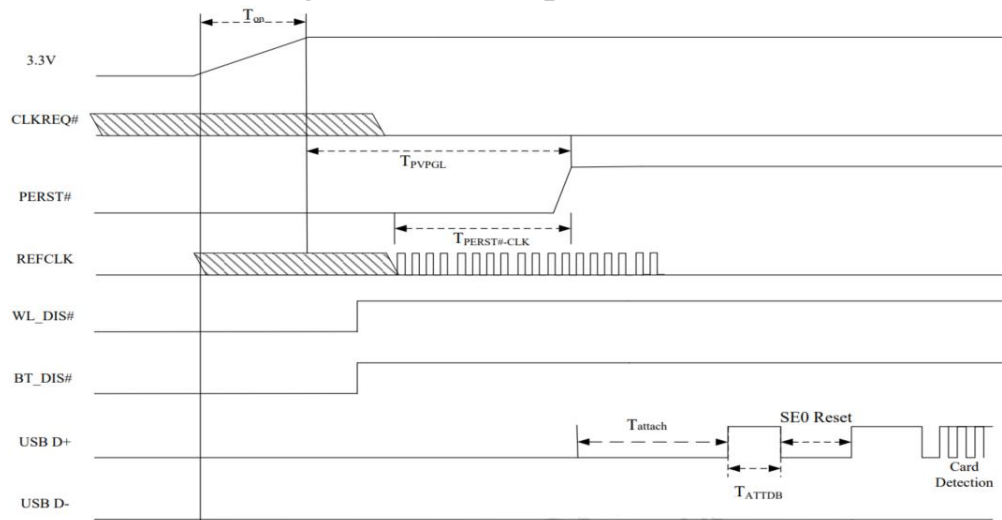
The digital IO supports VDD33 or VDD18 application.

|                       | MIN | TYP | MAX | Unit  |
|-----------------------|-----|-----|-----|-------|
| Operating Temperature | 0   | 25  | 70  | deg.C |
| VDD33                 | 3.0 | 3.3 | 3.6 | V     |

### 7.2 Power Consumption

| Power Consumption |                | VDD33 = 3.3V(Unit:mA) |
|-------------------|----------------|-----------------------|
|                   | Wi-Fi on Mode  |                       |
|                   | TX (2.4G 1M)   |                       |
|                   | TX (2.4G HT40) |                       |
|                   | RX (2.4G HT40) |                       |
|                   | TX (5G 6M)     |                       |
|                   | TX (5G vHT80)  |                       |
|                   | RX (5G vHT80)  |                       |
|                   | BT on          |                       |
|                   | BT Hopping     |                       |
|                   | BT TX          |                       |
|                   | BT RX          |                       |

## 7.3 PCIe Bus during Power On Sequence



**T<sub>on</sub>**: The main power ramp up duration

**T<sub>PVPGL</sub>**: Power valid to PERST# input inactive

**T<sub>PERST#-CLK</sub>**: Reference clock stable before PERST# inactive

**T<sub>attach</sub>**: The interval to turn on BT after PERST# de-asserted

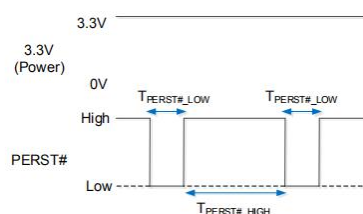
**T<sub>ATTDB</sub>**: the debounce interval with a minimal duration of 100ms that provided by the USB system Software

**T<sub>SE0 Reset</sub>**: USB host send SE0 Reset duration

| Symbol                        | Unit | Min                                       | Typical | Max |
|-------------------------------|------|-------------------------------------------|---------|-----|
| <b>T<sub>on</sub></b>         | ms   | 0.5                                       | 1.5     | 5   |
| <b>T<sub>PVPGL</sub></b>      | ms   | Implementation specific; recommended 50ms |         |     |
| <b>T<sub>PERST#-CLK</sub></b> | us   | 100                                       | —       | —   |
| <b>T<sub>attach</sub></b>     | ms   | 0.5                                       | 2       | 5   |
| <b>T<sub>ATTDB</sub></b>      | ms   | 100                                       | —       | —   |
| <b>T<sub>SE0 Reset</sub></b>  | ms   | 10                                        | —       | —   |

## 7.4 Interface Circuit time series

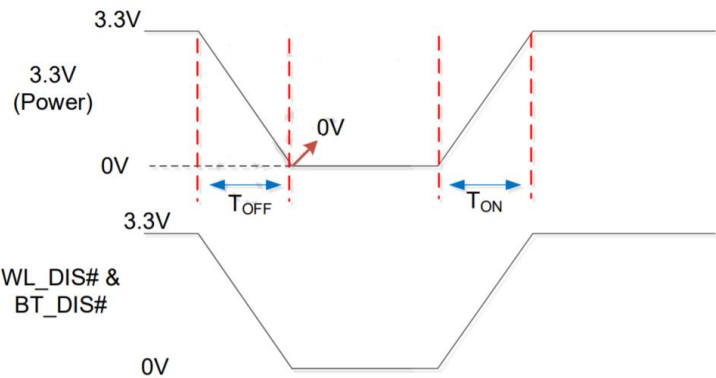
### 7.4.1 PCIe PERST# Timing Sequence



RTL8821CE-CG PCIe PERST# Timing Parameters

|                          | Min | Typical | Max | Unit | Description          |
|--------------------------|-----|---------|-----|------|----------------------|
| T <sub>PERST# LOW</sub>  | 6   | 10      | X   | ms   | PERST# low duration  |
| T <sub>PERST# HIGH</sub> | 400 | 500     | X   | ms   | PERST# high duration |

7.4.2 Power Off Sequence

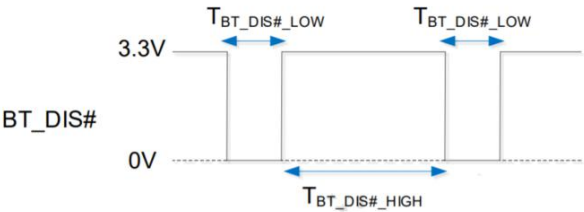


RTL8822CE-CG Power Off Timing Parameters

| Symbol    | Min   | Typical | Max | Unit | Description                                                      |
|-----------|-------|---------|-----|------|------------------------------------------------------------------|
| $T_{OFF}$ | 1.5ms | --      | --  | ms   | Measure point start on 100% Measure point end on 0% (must be 0V) |
| $T_{ON}$  | 0.5   | 1.5     | 5   | ms   | Measure point start on 0% (must be 0V) Measure point end on 100% |

Note: If BT\_DIS# can't connect to the same power source with 3.3V, it need to be de-asserted before PERST# with 100ms in power on sequence.

7.4.3 BT\_DIS Timing Sequence



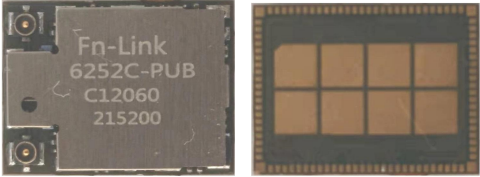
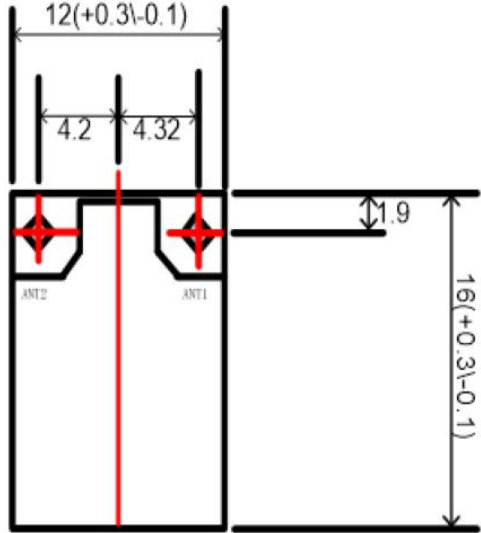
|              | Min | Typical | Max | Unit | Description           |
|--------------|-----|---------|-----|------|-----------------------|
| BT_DIS#_LOW  | 200 | --      | --  | ms   | BT_DIS# low duration  |
| BT_DIS#_HIGH | 500 | --      | --  | ms   | BT_DIS# high duration |

7.4.4 Platform state transitions

| 3.3V Power range | 3.3V Ripple                            | 3.3V Noise | Rise time |     |
|------------------|----------------------------------------|------------|-----------|-----|
|                  |                                        |            | Min       | Max |
| +/-0.165V        | 300mVpp @ switching frequency > 100KHz |            | 0.5ms     | 5ms |

8. Size reference

8.1 Module Picture

|                                                                                                                         |                                                                                     |
|-------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <p>L x W : 16 x 12 (+0.3/-0.1) mm</p>  |   |
| <p>H: 1.7 (±0.2) mm</p>                                                                                                 |  |
| <p>Weight</p>                                                                                                           | <p>0.75(±0.1)g</p>                                                                  |

8.2 Marking Description

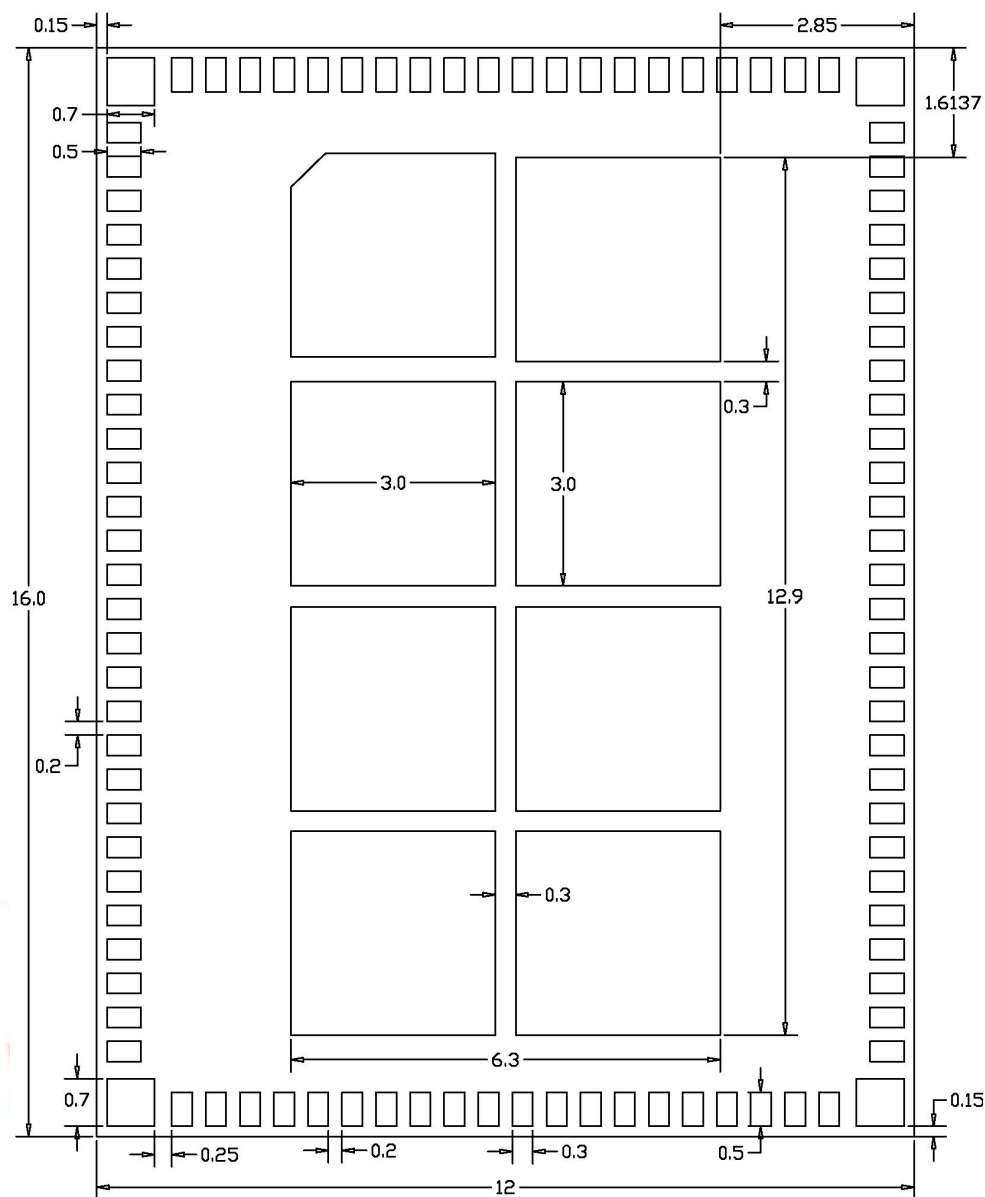
< TOP VIEW >

Brand name -----  
Model name -----  
Lot code -----  
Date code -----

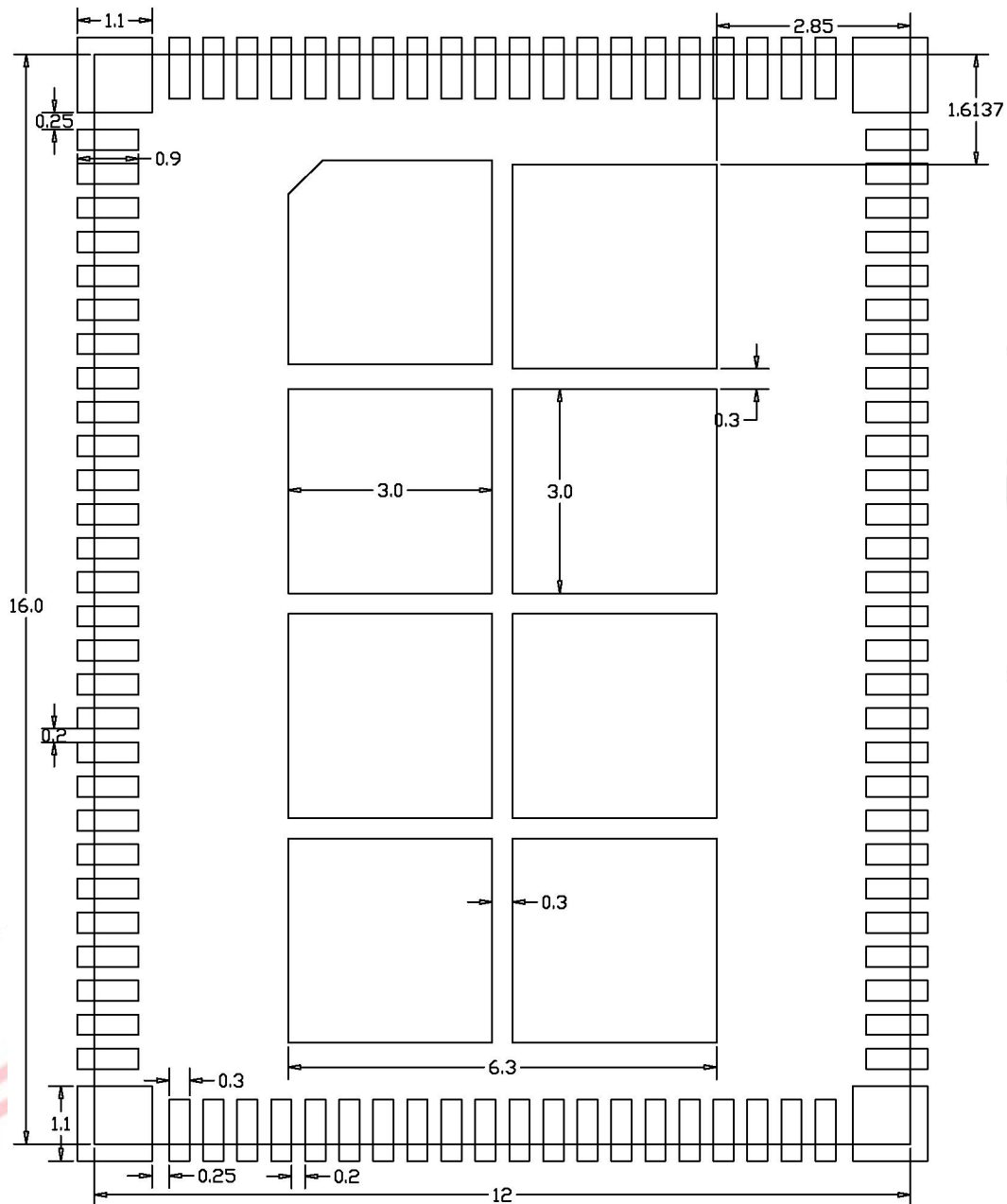


### 8.3 Physical Dimensions

<TOP View>



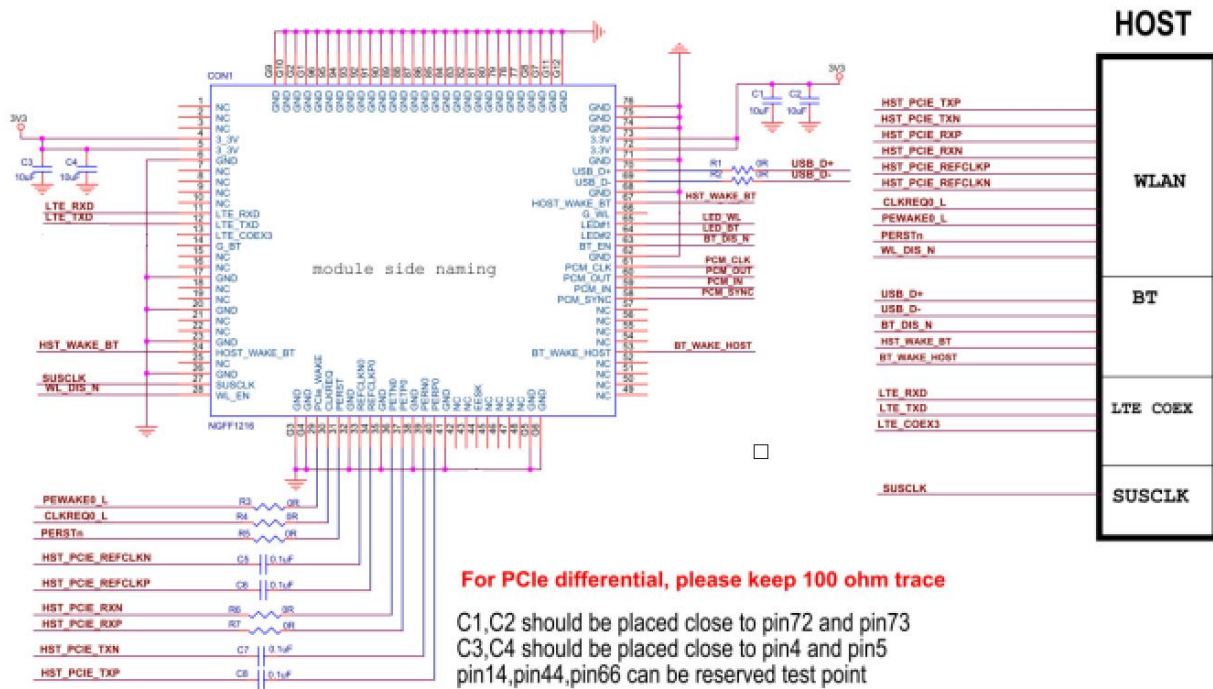
## 8.4 Layout Recommendation



## 9. The Key Material List

| Item | Part Name | Description                    | Manufacturer                    |
|------|-----------|--------------------------------|---------------------------------|
| 1    | PCB       | 6252C-PUB 4L,12X16X0.4mm       | 欣强,XY-PCB, GDKX, Sunlord        |
| 2    | Crystal   | 2016 40MHZ, $\pm 10$ ppm, 12pF | ECEC, Hosonic, TKD, JWT, Murata |
| 3    | Chipset   | RTL8852BE-CG                   | Realtek                         |
| 4    | Shielding | 6252C-PUB-V2.0 Shielding       | 信太, 精力通                         |

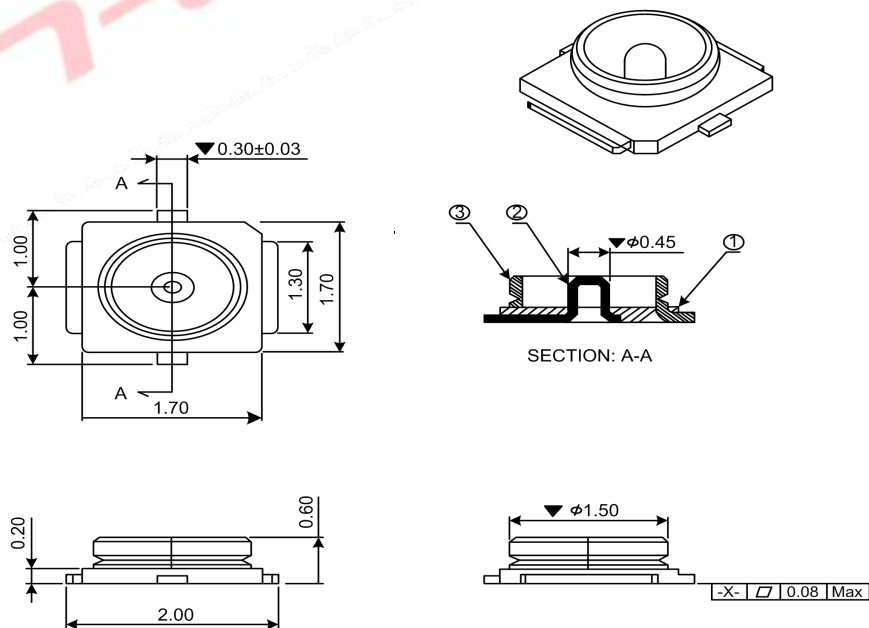
## 10. Reference Design



Note:

1. ANT\_A, ANT\_B are all support 2.4G/5G function, ANT\_B is support Bluetooth also;
2. The module requires independent power supply, supply capacity  $\geq 1000\text{mA}$  and ripple less than 150mV;
3. Do not share power with amplifier, camera, etc.

Connector Specification

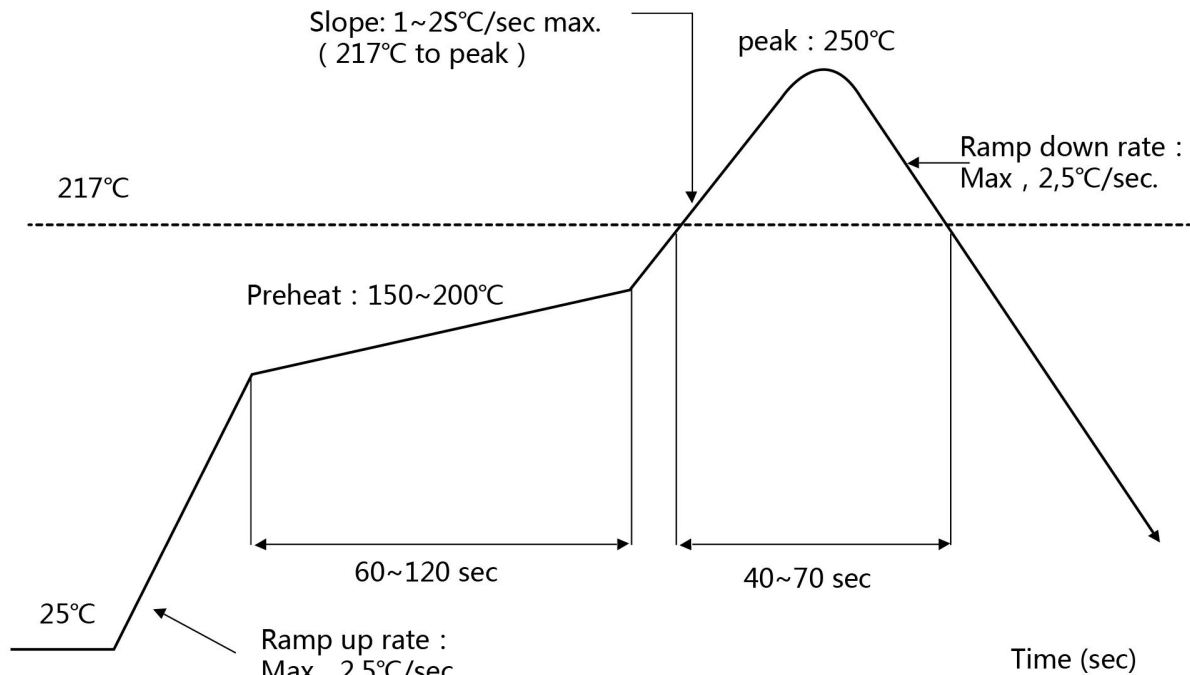


## 11. Recommended Reflow Profile

Referred to IPC/JEDEC standard.

Peak Temperature : <250°C

Number of Times : ≤2 times



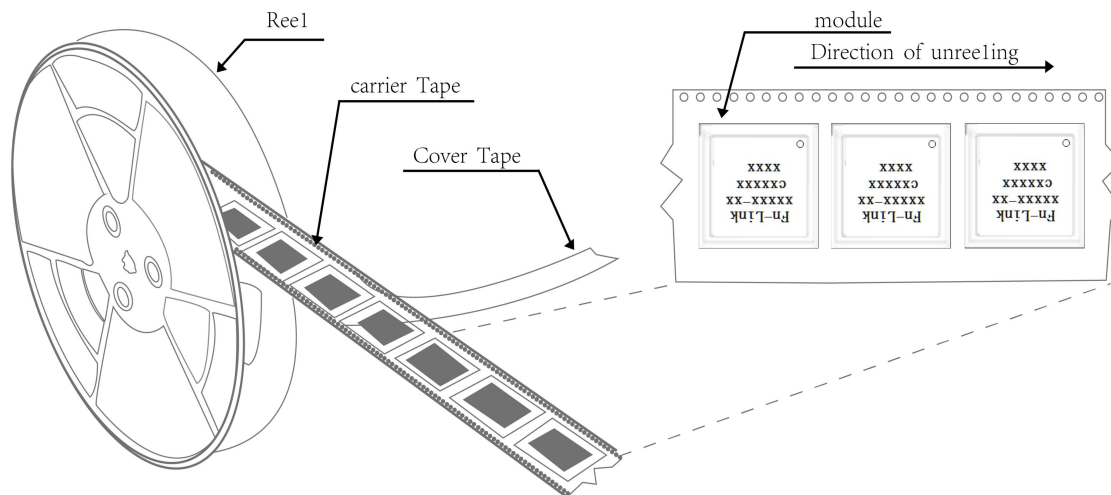
## 12. RoHS compliance

All hardware components are fully compliant with EU RoHS directive

## 13. Package

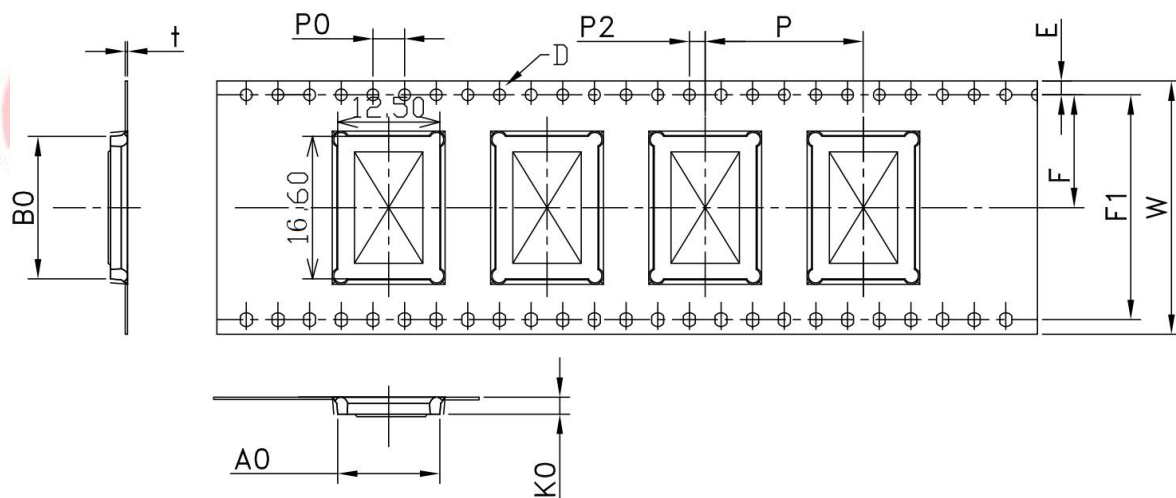
### 13.1 Reel

A roll of 2000pcs

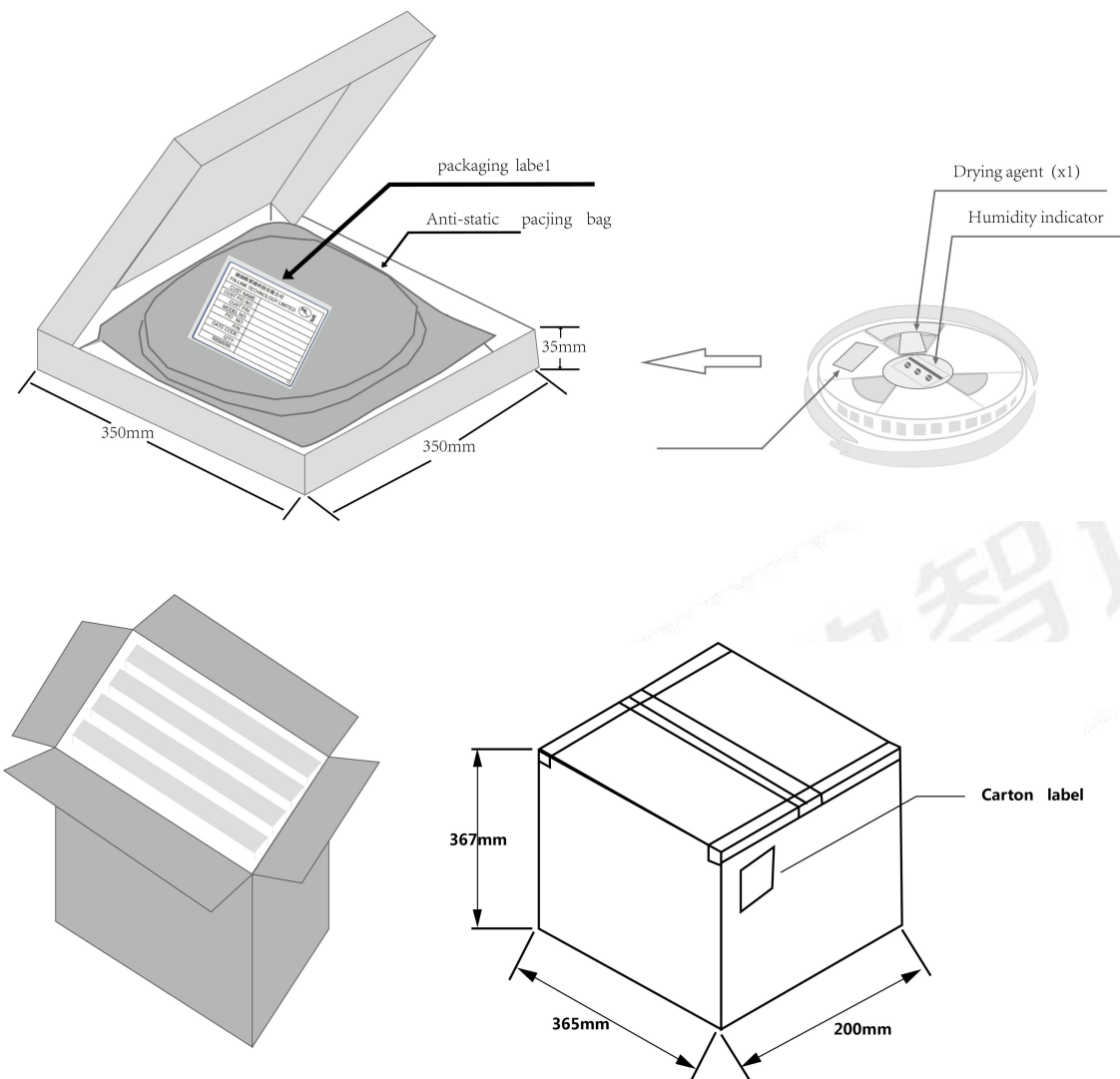


### 13.2 Carrier Tape Detail

| ITEM | W                                                    | A0         | B0         | D                                                    | E         | F          | F1         | K0         | P0        | P2         | P         | T          |
|------|------------------------------------------------------|------------|------------|------------------------------------------------------|-----------|------------|------------|------------|-----------|------------|-----------|------------|
| DIM  | 32                                                   | 12.50      | 16.60      | 1.5                                                  | 1.75      | 14.20      | 28.4       | 2.15       | 4.0       | 2.0        | 20.0      | 0.30       |
| TOLE | $\begin{smallmatrix} +0.3 \\ -0.3 \end{smallmatrix}$ | $\pm 0.18$ | $\pm 0.18$ | $\begin{smallmatrix} +0.1 \\ -0.0 \end{smallmatrix}$ | $\pm 0.1$ | $\pm 0.15$ | $\pm 0.10$ | $\pm 0.10$ | $\pm 0.1$ | $\pm 0.15$ | $\pm 0.1$ | $\pm 0.05$ |



### 13.3 Packaging Detail



### 14. Moisture sensitivity

The Modules is a Moisture Sensitive Device level 3, in according with standard IPC/JEDEC J-STD-020, take care

all the relatives requirements for using this kind of components.

Moreover, the customer has to take care of the following conditions:

- Calculated shelf life in sealed bag: 12 months at  $<40^{\circ}\text{C}$  and  $<90\%$  relative humidity (RH)
- Environmental condition during the production:  $30^{\circ}\text{C}$  /  $60\%$  RH according to IPC/JEDEC J-STD-033A paragraph 5
- The maximum time between the opening of the sealed bag and the reflow process must be 168 hours if condition
- “IPC/JEDEC J-STD-033A paragraph 5.2” is respected
- Baking is required if conditions b) or c) are not respected
- Baking is required if the humidity indicator inside the bag indicates  $10\%$  RH or more

## **Integration instructions for host product manufacturers according to KDB 996369 D03 OEMManual v01**

Conditions on using FN-LINK TECHNOLOGY LIMITED regulatory approvals:

- A. Customer must ensure that its product (The “Wi-Fi/BT module”) is electrically identical to FN-LINK TECHNOLOGY LIMITED reference designs. Customer acknowledges that any modifications to FN-LINK TECHNOLOGY LIMITED reference designs may invalidate regulatory approvals in relation to the CUSTOMER Product, or may necessitate notifications to the relevant regulatory authorities.
- B. Customer is responsible for ensuring that antennas used with the product are of the same type, with same or lower gains as approved and providing antenna reports to FN-LINK TECHNOLOGY LIMITED
- C. Customer is responsible for regression testing to accommodate changes to FN-LINK TECHNOLOGY LIMITED reference designs, new antennas, and portable RF exposure safety testing/approvals.
- D. Appropriate labels must be affixed to the CUSTOMER Product that comply with applicable regulations in all respects.
- E. A user's manual or instruction manual must be included with the customer product that contains the text as required by applicable law. Without limitation of the foregoing, an example (for illustration purposes only) of possible text to include is set forth below:

### **2.2 List of applicable FCC rules**

FCC Part 15 Subpart C 15.247, FCC Part 15 Subpart E

### **2.3 Specific operational use conditions**

Radio Technology: Bluetooth BR/EDR

Operation frequency: 2402-2480MHz

Channel No.: 79 Channels

Channel spacing: 1MHz

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

Antenna Type: FPC Antenna, max gain 3.63dBi (Antenna information is provided by applicant.)

Radio Technology: Bluetooth BLE

Operation frequency: 2402-2480MHz

Channel No.: 40 channels

Data rate: 1Mbps/2Mbps

Channel Separation: 2MHz

Modulation: GFSK

Antenna Type: FPC Antenna, max gain 3.63dBi (Antenna information is provided by applicant.)

Radio Technology: 2.4G WIFI

Operation frequency: 2412MHz-2462MHz for IEEE 802.11 b, g, n/HT20, ax20,  
2422MHz~2452MHz for IEEE802.11n/HT40, ax40

Channel No.: 802.11b/802.11g /802.11n (HT20)/802.11ax20: 11  
802.11(HT40)/802.11ax40: 7

Modulation type: IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK)

IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK)

IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK)

IEEE 802.11ax: OFDMA (64QAM, 16QAM, QPSK, BPSK,  
256QAM, 1024QAM)

Antenna Type: FPC Antenna 1, max gain 3.63dBi,

FPC Antenna 2, max gain 2.93dBi.

The antenna MIMO combining gain is 6.30dBi. (Antenna information is provided by applicant.)

Radio Technology: 5G WIFI

Operation Frequency: 802.11a/n (HT20)/ac (VHT20)/ax20: 5180~5240MHz; 5260-5320MHz; 5500-5700MHz; 5745~5825MHz

802.11n (HT40)/ac (VHT40)/ax40: 5190~5230MHz; 5270-5310MHz; 5510-5670MHz; 5755~5795MHz

802.11ac (VHT80)/ax (VHT80): 5210MHz, 5290MHz, 5530MHz, 5775MHz

Channel separation: 20MHz for 802.11a/ 802.11ac (VHT20)/ 802.11n (HT20)/ax20  
40MHz for 802.11ac (VHT40)/ 802.11n (HT40)/ax40

80MHz for 802.11ac (VHT80)/802.11ax (VHT80)

Modulation technology: IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK)

IEEE 802.11a: OFDM (64QAM, 16QAM, QPSK, BPSK)

IEEE 802.11ac: OFDM (64QAM, 16QAM, QPSK, BPSK)

IEEE 802.11ax: OFDMA (64QAM, 16QAM, QPSK, BPSK, 256QAM, 1024QAM)

Antenna Type: FPC Antenna 1, max gain 3.25dBi,

FPC Antenna 2, max gain 3.77dBi.

The antenna MIMO combining gain is 6.52dBi.(Antenna information is provided by applicant.)

The module can be used for mobile applications with a maximum 6.52dBi 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 shown in this manual.

## **2.4 Limited module procedures**

Not applicable. The module is a Single module and complies with the requirement of FCC Part 15.212.

## **2.5 Trace antenna designs**

The antenna used is the FPC antenna on the module.

## **2.6 RF exposure considerations**

The antennas used for this transmitter must be installed to provide a separation distance of at least 20cm from all persons and must not be located or operating in conjunction with any other antenna or transmitter.

## **2.7 FCC statements**

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

## **2.8 Antennas**

Antenna Specification are as follows:

Antenna Type: FPC antenna

Antenna Gain (Peak):

EDR Antenna Gain: FPC Antenna 1, max gain 3.63dBi

BLE Antenna Gain: FPC Antenna 1, max gain 3.63dBi

2.4GWIFI Antenna Gain:

FPC Antenna 1, max gain 3.63dBi

FPC Antenna 2, max gain 2.93dBi

The antenna MIMO combining gain is 6.30dBi

5GWIFI Antenna Gain:

FPC Antenna 1, max gain 3.25dBi

FPC Antenna 2, max gain 3.77dBi

The antenna MIMO combining gain is 6.52dBi

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;

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.).

## **2.9 Label and compliance information**

Host product manufacturers need to provide a physical or e-label stating “Contains FCC ID: 2AATL-6252C-PUB” With their finished product.

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

Radio Technology: Bluetooth BR/EDR

Operation frequency: 2402-2480MHz

Channel No.: 79 Channels

Channel spacing: 1MHz

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

Antenna Type: FPC Antenna, max gain 3.63dBi (Antenna information is provided by applicant.)

Radio Technology: Bluetooth BLE

Operation frequency: 2402-2480MHz

Channel No.: 40 channels

Data rate: 1Mbps/2Mbps

Channel Separation: 2MHz

Modulation: GFSK

Antenna Type: FPC Antenna, max gain 3.63dBi (Antenna information is provided by applicant.)

Radio Technology: 2.4G WIFI

Operation frequency: 2412MHz-2462MHz for IEEE 802.11 b, g, n/HT20, ax20,  
2422MHz~2452MHz for IEEE802.11n/HT40, ax40

Channel No.: 802.11b/802.11g /802.11n (HT20)/802.11ax20: 11  
802.11(HT40)/802.11ax40: 7

Modulation type: IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK)

IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK)

IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK)

IEEE 802.11ax: OFDMA (64QAM, 16QAM, QPSK, BPSK,  
256QAM, 1024QAM)

Antenna Type: FPC Antenna 1, max gain 3.63dBi,

FPC Antenna 2, max gain 2.93dBi.

The antenna MIMO combining gain is 6.30dBi. (Antenna information is provided by applicant.)

Radio Technology: 5G WIFI

Operation Frequency: 802.11a/n (HT20)/ac (VHT20)/ax20: 5180~5240MHz; 5260-5320MHz; 5500-5700MHz; 5745~5825MHz

802.11n (HT40)/ac (VHT40)/ax40: 5190~5230MHz; 5270-5310MHz; 5510-5670MHz; 5755~5795MHz

802.11ac (VHT80)/ax (VHT80): 5210MHz, 5290MHz, 5530MHz, 5775MHz

Channel separation: 20MHz for 802.11a/ 802.11ac (VHT20)/ 802.11n (HT20)/ax20  
40MHz for 802.11ac (VHT40)/ 802.11n (HT40)/ax40

80MHz for 802.11ac (VHT80)/802.11ax (VHT80)

Modulation technology: IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK)

IEEE 802.11a: OFDM (64QAM, 16QAM, QPSK, BPSK)

IEEE 802.11ac: OFDM (64QAM, 16QAM, QPSK, BPSK)

IEEE 802.11ax: OFDMA (64QAM, 16QAM, QPSK, BPSK, 256QAM, 1024QAM)

Antenna Type: FPC Antenna 1, max gain 3.25dBi,

FPC Antenna 2, max gain 3.77dBi.

The antenna MIMO combining gain is 6.52dBi.(Antenna information is provided by applicant.)

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.

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

The modular transmitter is only FCC authorized for FCC Part 15 Subpart C 15.247 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.