FT1852BEV1, N126, LK-A61

Module Datasheet

Module Datasheet

Office / Factory : 602, Building 1, Aidi meng tuo Industrial Park, the 4th Industrial Zone, shutianpu Community, Ma Tian Street, Guang ming District, Shenzhen CHINA

Customer Approval

Company_____

Title_____

Signature_____

Date_____

FTY_____

Version Update Record

Version	Date	Revision Content	Editorialstaff	approval
V1.0	2022/03/28	The first version		
V1.1	2022/06/13	**N126** **Product name update**		

CONTENTS

1 Overview

1.1Introduction

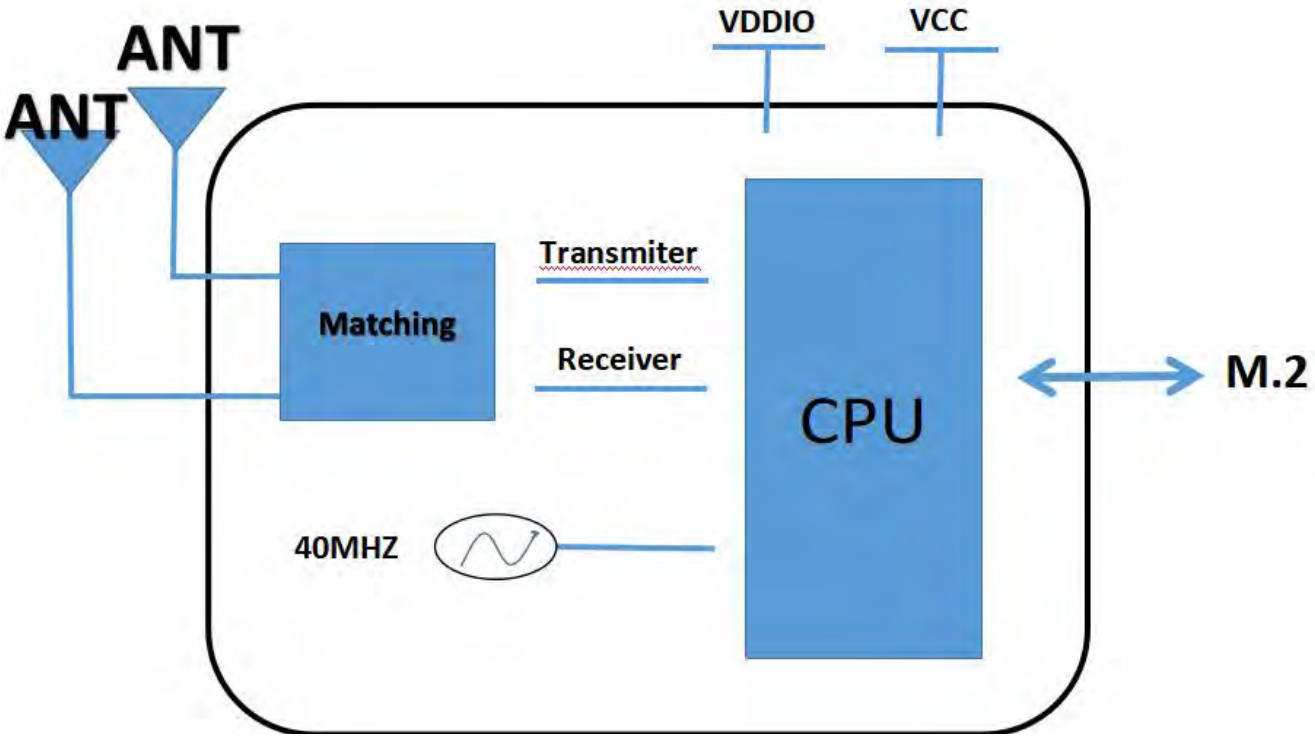
The 1 1 is a highly integrated single-chip that support 2-stream 802.11ax solutions with Multi-user MIMO (Multiple-Input, Multiple-Output) with Wireless LAN (WLAN) PCI Express network interface controller with integrated Bluetooth 5 USB interface controller. It combines a WLAN MAC, a 2T2R capable WLAN baseband, and RF in a single chip. The RTL8852BE provides a complete solution for a high-performance integrated wireless and Bluetooth device.

The 1 1 baseband implements Multi-user Multiple Input, Multiple Output (MU-MIMO) Orthogonal Frequency Division Multiplexing (OFDM) with two transmit and two receive paths (2T2R). Features include two spatial stream transmissions, short Guard Interval (GI), spatial spreading, and support for variant channel bandwidth. Moreover, 1 1 provides one spatial stream space-time block code (STBC), Transmit Beamforming (TxBF) and Low Density Parity Check (LDPC) to extend the range of transmission. At the receiver, extended range and good minimum sensitivity is achieved by having receiver diversity up to 2 antennas. As the recipient, the 1 1 also supports explicit sounding packet feedback that helps senders with beamforming capability.

1.2 Features

- CMOS MAC, Baseband PHY and RF in a single chip for IEEE 802.11a/b/g/n/ac/ax compatible WLAN
- Support Bluetooth 5 system (BT 5.2 Logo Compliant)
- Complete 802.11n MIMO solution for 2.4GHz and 5Ghz band
- Maximum PHY data rate up to 286.8 Mbps using 20MHz bandwidth, 573.5Mbps using 40MHz bandwidth, and 1201Mbps using 80MHz bandwidth
- Backward compatible with 802.11a/b/g devices while operating at 802.11n data rates
- Backward compatible with 802.11a/n/ac devices while operating at 802.11ax data rates
- Compliance with Windows operating system host-implemented FIPS 140-2 security requirements
- Support 20/40/80MHz 5GHz
- supports WLAN-Bluetooth coexistence
- supports low power Bluetooth
- Support Bluetooth 5 system (BT 5.2 Logo Compliant)
- Compatible with Bluetooth v2.1+EDR

1.3 Block Diagram



1.4 General Specification

Model Name	1 1
Product Description	WIFI6 and Bluetooth M.2 Module
Dimension	L x W x H: 22x 30 x 2.4 (±0.3) mm
Wi-Fi Interface	Support M.2
BT interface	Support M.2
Operating temperature	0 to +70° C
Storage temperature	-55°C to 125°C

1.5 DC Characteristics

Power Supply Characteristics

Symbol	Parameter	Minimum	Typical	Maximum	Units
VDD33	3.3V I/O Supply Voltage	3.1	3.3	3.6	V
VD09	0.9V Core Supply Voltage	0.84	0.9	0.99	V
VD13	1.35V Analog Supply Voltage	1.35	1.4	1.485	V

2 RF Specifications

2.1 2.4GHz RF Specification

Features	Description
WLAN Standard	IEEE802.11b/g/n
Frequency Range	2.41 ~2.4 GHz (2.4GHz ISM Band)
Modulation Method	DSSS,DBPSK, DQPSK, CCK and OFDM with BPSK, QPSK, 16QAM, 64QAM,)
Number of Channel	2.4GHz: 11: (Ch. 1-11) – United States 13: (Ch. 1-13) – Europe 14: (Ch. 1-14) – Japan

2.4G Transmitter Specifications

TX Rate	TX Power	TX Power Tolerance	EVM
802.11b@11Mbps	17dBm	±2dBm	≤-13dB
802.11g@54Mbps	14dBm	±2dBm	≤-25dB
802.11n@BW20_MCS7	13dBm	±2dBm	≤-28dB
802.11n@BW40_MCS7	13dBm	±2dBm	≤-28dB
802.11ax@HE20_HE11	10dBm	±2dBm	≤-28dB
802.11ax@HE40_HE11	10dBm	±2dBm	≤-28dB

Frequency Error：±12PPM

2.4G Receiver Specifications

RX Rate	Standard Value	PER
802.11b@11Mbps	≤ -85dBm	<8%
802.11g@54Mbps	≤ -68dBm	< 10%
802.11n@BW20_MCS7	≤ -66dBm	< 10%
802.11n@BW40_MCS7	≤ -65dBm	< 10%
802.11ax@HE20_HE11	≤ -55dBm	< 10%
802.11ax@HE40_HE11	≤ -53dBm	< 10%

2.2 5GHz RF Specification

Features	Description
WLAN Standard	IEEE802.11a/n/ac/ax
Frequency Range	.1 GHz ~ . GHz (5GHz ISM Band)
Modulation Method	OFDM (BPSK, QPSK, 16QAM,64QAM, 256QAM and 1024QAM)

5G Transmitter Specifications			
TX Rate	**TX Power**	**TX Power Tolerance**	**EVM**
802.11a@ 54Mbps	13dBm	±2dBm	≤-25dB
802. 11n@HT40_MCS7	12dBm	±2dBm	≤-28dB
802.11ac@VHT80_MCS9	10dBm	±2dBm	≤-32dB
802.11ax@HE80_HE11	10dBm	±2dBm	≤-36dB

Frequency Error：±12PPM

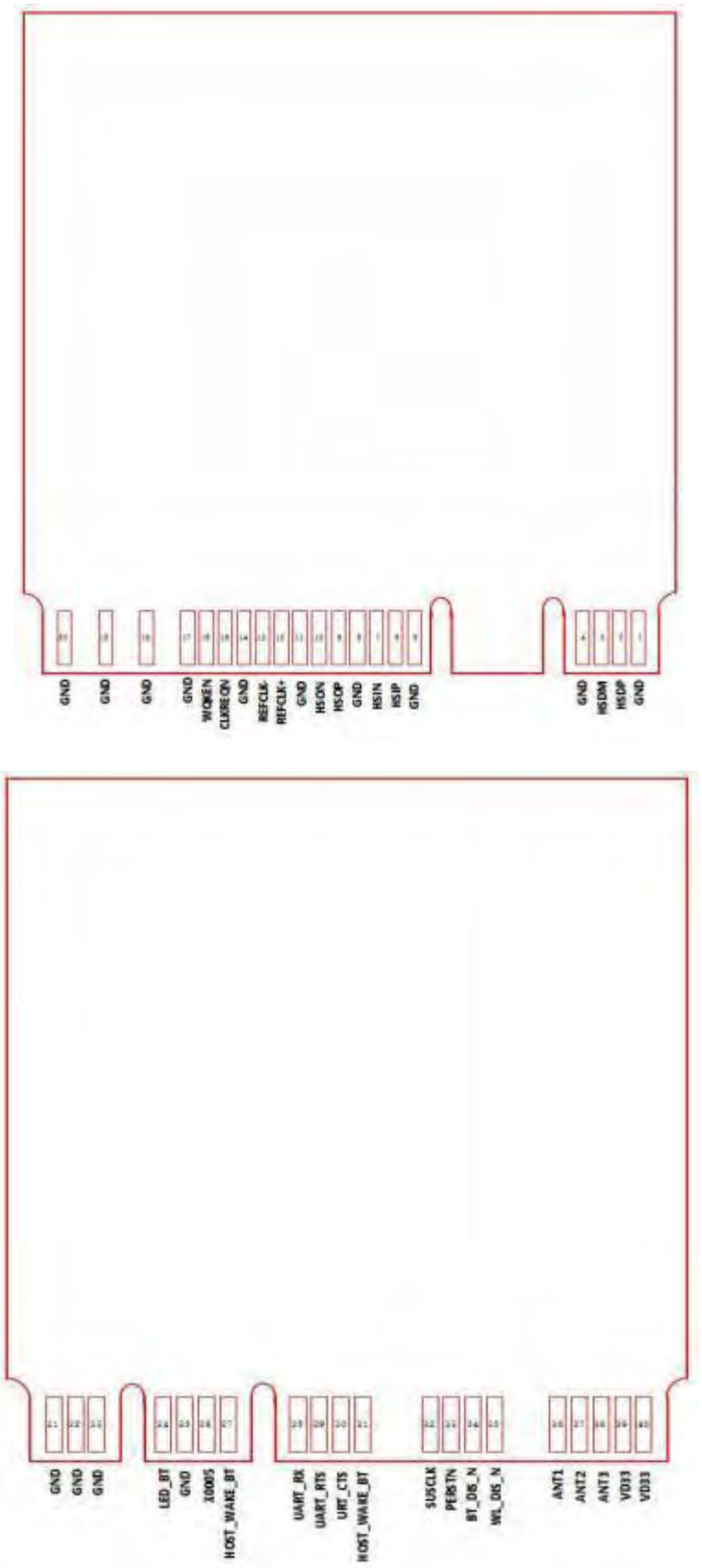
5G Receiver Specifications		
RX Rate	**Standard Value**	**PER**
802.11a@ 54Mbps	≤ -70dBm	<10%
802. 11n@HT40_MCS7	≤ -65dBm	< 10%
802.11ac@VHT80_MCS9	≤ -56dBm	< 10%
802.11ax@HE80_HE11	≤ -51dBm	< 10%

2.3 Bluetooth Specification

Feature	Description		
General Specification			
Bluetooth Standard	Bluetooth V3.3 of 1, 2 and 3 Mbps		
Host Interface	USB 2.0		
Antenna Reference	Small antennas with 0~2 dBi peak gain		
Frequency Band	2.40 GHz ~ . GHz		
Number of Channels	79 channels		
Modulation	S S S		
RF Specification			
Power (BDR：1Mbps)	0dBm	——	10dBm
Power(EDR：2Mbps)	0dBm	——	10dBm
Power(EDR：3Mbps)	0dBm	——	10dBm
Power (BLE：1Mbps)	0dBm	——	10dBm
Power (BLE：3Mbps)	0dBm	——	10dBm
Sensitivity @ BER=0.1% for (BDR：1Mbps)		-88 dBm	
Sensitivity @ BER=0.1% for(EDR：2Mbps)		-91dBm	
Sensitivity @ BER=0.1% for(EDR：3Mbps)		-85dBm	
Sensitivity @ BER=30.8%for (BLE：1Mbps)		-91 dBm	
Sensitivity @ BER=30.8%for (BLE：3Mbps)		-90dBm	
Initial Freq Error	BDR：1Mbps:±75KHZ		
	EDR：2Mbps :±75KHZ		
	BLE：1Mbps :±75KHZ		

3 Pin Assignments

3.1 Pin Outline



3.2 Pin Definition

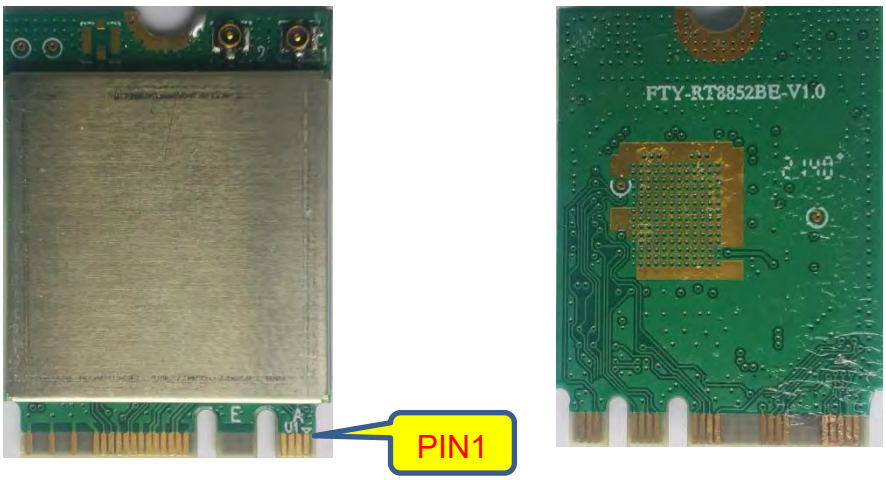
Pin	Definition	Description
1	GND	Ground
2	HSDP	HSDP
3	HSDM	HSDM
4	GND	Ground
5	GND	Ground
6	HSIP	HSIP
7	HSIN	HSIN
8	GND	Ground
9	HSOP	HSOP
10	HSON	HSON
11	GND	Ground
12	REFCLK+	REFCLK+
13	REFCLK-	REFCLK-
14	GND	Ground
15	CLKREQN	CLKREQN
16	WQKEN	WQKEN
17	GND	Ground
18	GND	Ground
19	GND	Ground
20	GND	Ground
21	GND	Ground
22	GND	Ground
23	GND	Ground
24	LED_BT	LED_BT
25	GND	Ground
26	X0005	X0005
27	UART_TX	UART_TX
28	UART_RX	UART_RX

29	UART_RTS	UART_RTS
30	UART_CTS	UART_CTS
31	HOST_WAKE_BT	HOST_WAKE_BT
32	SUSCLK	SUSCLK
33	PERSTN	PERSTN
34	BT_DIS_N	BT_DIS_N
35	WL_DIS_N	WL_DIS_N
36	ANT1	NC
37	ANT2	NC
38	ANT3	NC
39	VD33	VD33
40	VD33	VD33

4 Dimensions

4.1 Module Picture

L x W：22.x 30 (±0.3) mm

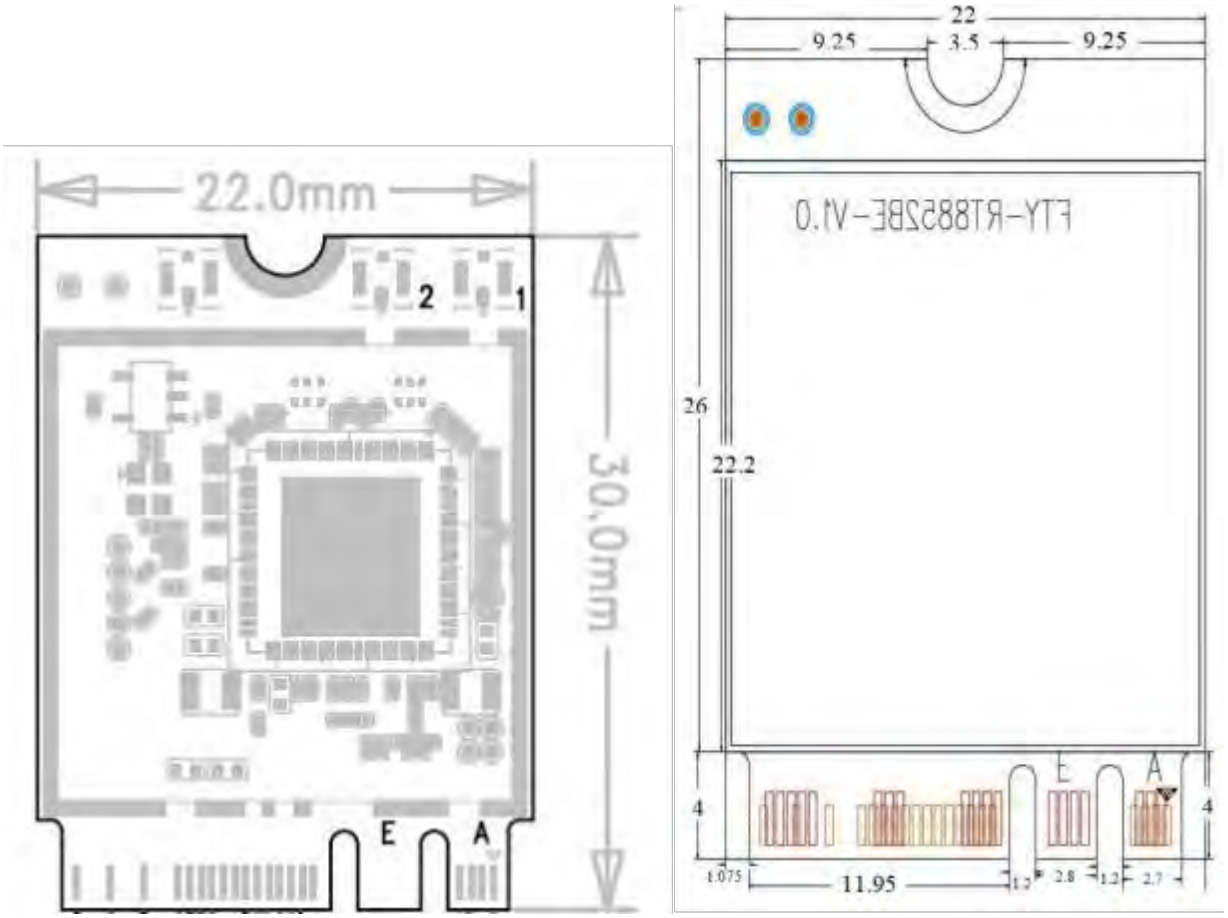


H:2.4(±0.3)mm

4.2 Module Physical Dimensions

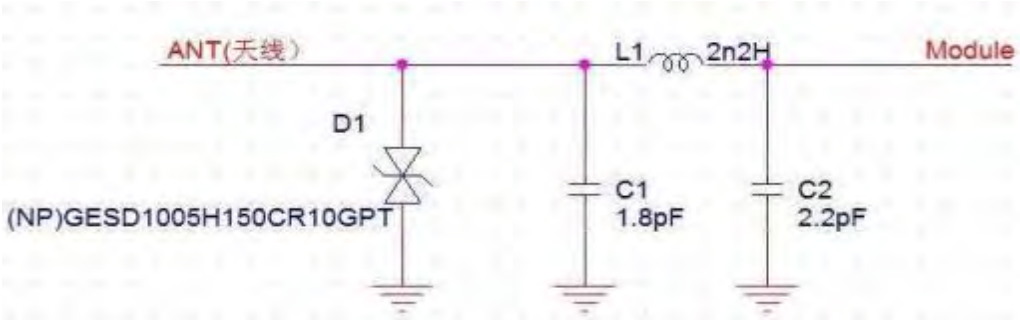
(Unit: mm)

< TOP VIEW >



5 Reference Design

5.1 WIFI RF Circuit reference pictures

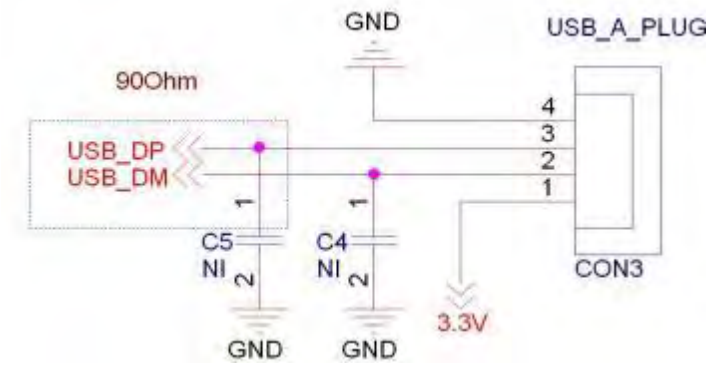


1. Above the dotted box part of the antenna matching is needed, the actual antenna matching electronic parameters shallprevail.

2.For RF part layout to do 50 ohm impedance. can't go on 90°of layout .The line length can't more than20 mm.

Note: Please be sure to add a TVS tube at the end of the welding antenna to prevent ESD static electricity from damaging the WIFI module (as shown in the reference circuit above).

5.2 USB interface electrical characteristics



Note:

1.USB data cable need to do 90Ohm impedance

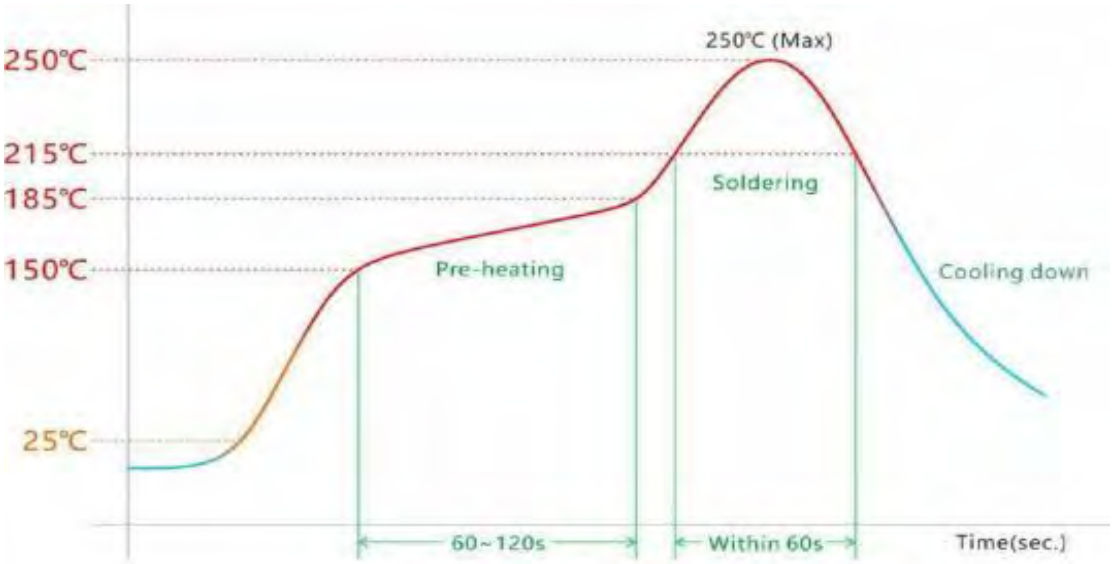
2.It is recommended to keep a power switch at the input end of the power supply. Each time the card is opened or closed, it can be used for power on and power off. WIFI can be reset, so that there will be no error phenomenon of not opening WIFI.

6 The Key Material List

No.	Parts	Specification	Manufacturer	Note
1	Chipset	RTL8852BE-CG	Realtek Semiconductor Corp	
2	PCB	FTY-RT8852BE-V1.0	Shenzhen xiangyu circuit co., LTD	
3	PCB	FTY-RT8852BE-V1.0	Shenzhen Kexiang Precision Circuit Technology Co., LTD	
4	Crystal oscillator	2016 40MHz ±8ppm 12pF (-30~85°C)	hefei jing wei te Electronics Co. Ltd.	
5	Crystal oscillator	2016 40MHz ±8ppm 12pF (-30~85°C)	ZhejiangLanjing Microelectronics Co., LTD.	
6	duplexor	双工器 1.6×0.8mm 6P 2.4G-5.95G -40_+85°	Shenzhen Flytel Technology Co., LTD	
7	duplexor	双工器 1.6×0.8mm 6P 2.4G-5.95G -40_+85°	Shenzhen Microgate Technology Co., Ltd	

7 Recommended Reflow Profile

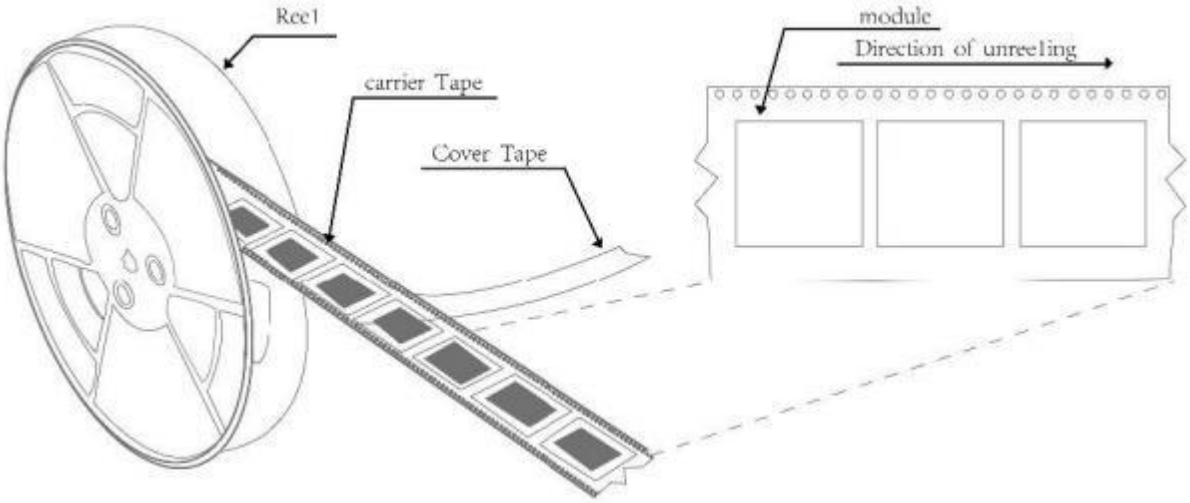
Referred to IPC/JEDEC standard.
Peak Temperature : <250° C
Number of Times : ≤2 times



8 Package Information

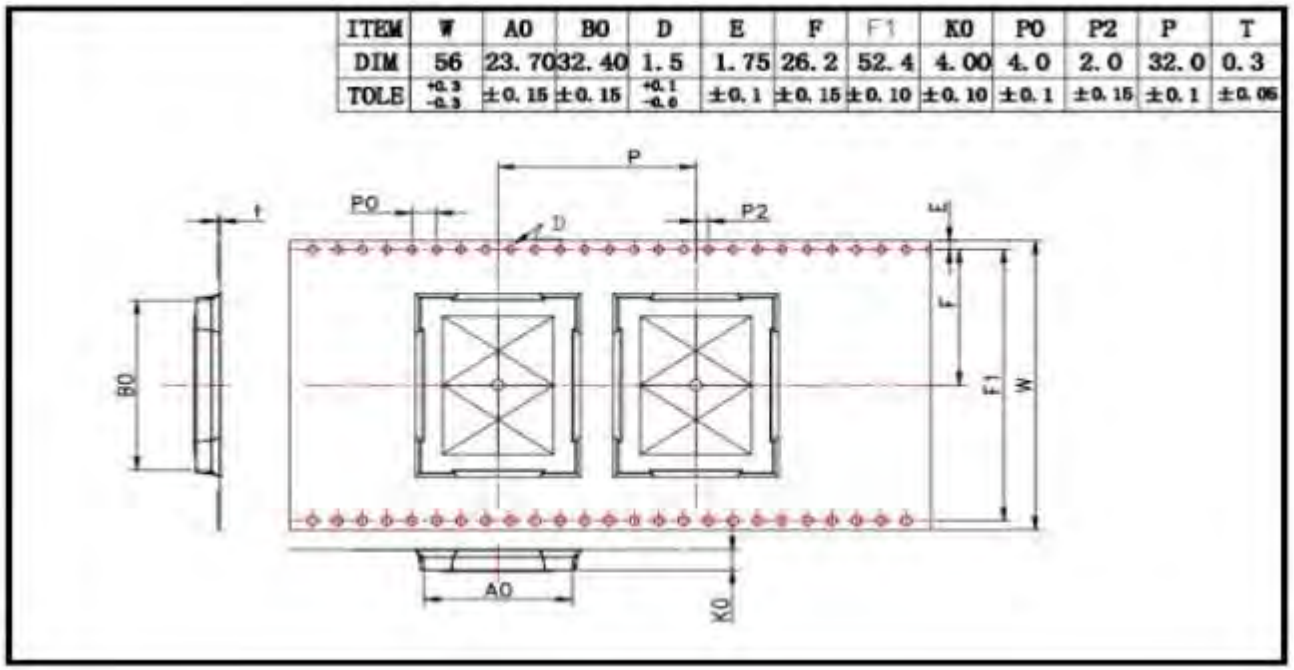
8.1 Reel

A roll of 2000pcs

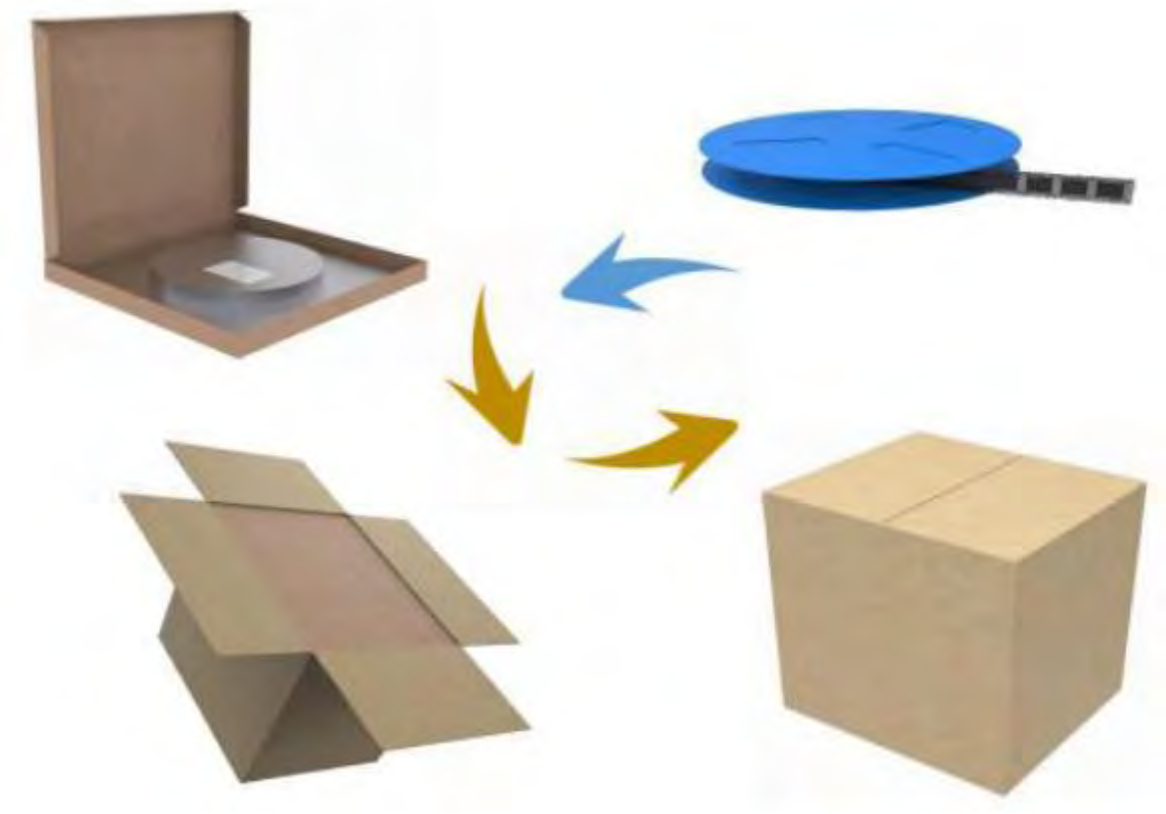


8.2 Carrier Tape Detail

ITEM	W	A0	B0	D	E	F	F1	K0	P0	P2	P	T
DIM	56	23.70	32.40	1.5	1.75	26.2	52.4	4.00	4.0	2.0	32.0	0.3
TOLE	+0.3 -0.3	±0.15	±0.15	+0.1 -0.0	±0.1	±0.15	±0.10	±0.10	±0.1	±0.15	±0.1	±0.05



8.3 Packaging Detail



8.4 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:

a) Calculated shelf life in sealed bag: 12 months at <40°C and <90% relative humidity (RH).

b)Environmental condition during the production: 30°C / 60% RH according to IPC/JEDEC J-STD-033A paragraph 5.

c) The maximum time between the opening of the sealed bag and the reflow process must be 168 hours if condition

b) “IPC/JEDEC J-STD-033A paragraph 5.2” is respected

e) Baking is required if conditions b) or c) are not respected

f) Baking is required if the humidity indicator inside the bag indicates 10% RH or more

FCC Certification Requirements

According to the definition of mobile and fixed device is described in Part 2.1091(b), this device is a mobile device. And the following conditions must be met:

1. This Modular Approval is limited to OEM installation for mobile and fixed applications only. The antenna installation and operating configurations of this transmitter, including any applicable source-based timeaveraging duty factor, antenna gain, and cable loss must satisfy MPE categorical Exclusion Requirements of 2.1091.
2. The EUT is a mobile device; maintain at least a 20 cm separation between the EUT and the user's body and must not transmit simultaneously with any other antenna or transmitter.
3. A label with the following statements must be attached to the host end product: This device contains FT1852BEV1, N126, LK-A61 FCC ID: 2AU7O-N126
4. This module must not transmit simultaneously with any other antenna or transmitter
5. The host end product must include a user manual that clearly defines operating requirements and conditions that must be observed to ensure compliance with current FCC RF exposure guidelines.

For portable devices, in addition to the conditions 3 through 6 described above, a separate approval is required to satisfy the SAR requirements of FCC Part 2.1093

If the device is used for other equipment that separate approval is required for all other operating configurations, including portable configurations with respect to 2.1093 and different antenna configurations.

For this device, OEM integrators must be provided with labeling instructions of finished products. Please refer to KDB784748 D01 v07, section 8. Page 6/7 last two paragraphs:

A certified modular has the option to use a permanently affixed label, or an electronic label. For a permanently affixed label, the module must be labeled with an FCC ID - Section 2.926 (see 2.2 Certification (labeling requirements) above). The OEM manual must provide clear instructions explaining to the OEM the labeling requirements, options and OEM user manual instructions that are required (see next paragraph).

For a host using a certified modular with a standard fixed label, if (1) the module's FCC ID is not visible when installed in the host, or (2) if the host is marketed so that end users do not have straightforward commonly used methods for access to remove the module so that the FCC ID of the module is visible; then an additional permanent label referring to the enclosed module: FT1852BEV1, N126, LK-A61:

"Contains Transmitter Module FCC ID: 2AU7O-N126" or "Contains FCC ID: 2AU7O-N126"

The host OEM user manual must also contain clear instructions on how end users can find and/or access the module and the FCC ID.

Radiation Exposure Statement:

This module support BT(2402-2480MHz) ,WIFI(2412~2462 MHz,5180~5240MHz)which compliance with part 15.249,15.247,15.407 and apply for single module approval .

The module is limited to OEM installation only.

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

OEM integrator shall equipped the antenna to compliance with antenna requirement part 15.203& 15.204 and must not be co-located or operating in conjunction with any other antenna or transmitters. And OEM host shall implement a Class II Permissive Change (C2PC) or a new FCC ID to demonstrate complied with FCC standard.

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

The final end product must be labelled in a visible area with the following: "Contains FCC ID: 2AU7O-N126"

The final host / module combination may also need to be evaluated against the FCC Part 15B criteria for unintentional radiators in order to be properly authorized for operation as a Part 15 digital device.
The user's manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes, or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. In cases where the manual is provided only in a form other than paper, such as on a computer disk or over the Internet, the information required by this section may be included in the manual in that alternative form, provided the user can reasonably be expected to have the capability to access information in that form.

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 manufacturer could void the user's authority to operate the equipment.

To ensure compliance with all non-transmitter functions the host manufacturer is responsible for ensuring compliance with the module(s) installed and fully operational. For example, if a host was previously authorized as an unintentional radiator under the Supplier's Declaration of Conformity procedure without a transmitter certified module and a module is added, the host manufacturer is responsible for ensuring that the after the module is installed and operational the host continues to be compliant with the Part 15B unintentional radiator requirements.

Class B digital device
This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Manual Information to the End User
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.

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

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

2.2 List of applicable FCC rules

CFR 47 FCC PART 15 SUBPART C has been investigated. It is applicable to the modular transmitter

2.3 Specific operational use conditions

This module is stand-alone modular. If the end product will involve the Multiple simultaneously transmitting condition or different operational conditions for a stand-alone modular transmitter in a host, host manufacturer have to consult with module manufacturer for the installation method in end system.

1. According to the following requirements of the power supply, power up, about 3 seconds to to complete the initial.
2. Iphone/Android mobile phone BT/WIFI function to open, search to the corresponding Wireless network adapter name (name can be changed according to customer production requirements), click the name of the BT/WIFI and select the connection.
3. open application software (need to install the company's specific application software development, application software interface can be customized according to customer's product requirements), click on the interface to see the scene.

2.4 Limited module procedures

This module needs to supply a regulated voltage from host device. The FCC ID of the module is indicated by the location of the nameplate on the shield of the product.

If the FCC ID is visible when the module is installed inside another device, then the module is installed must also display a label referring to the enclosed module.

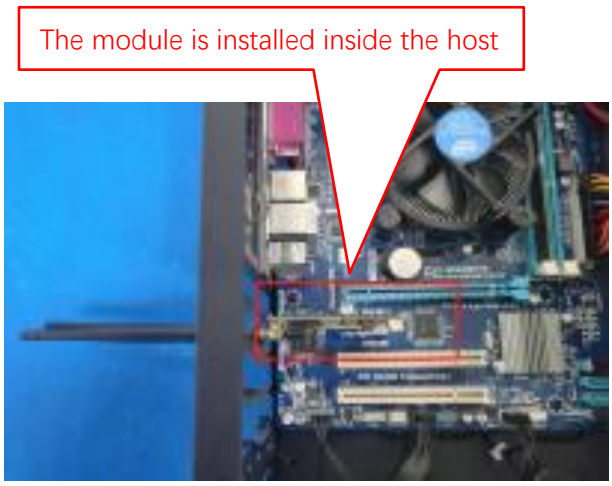
Host Manufacturer: Shenzhen Phaten Technology Co., Ltd.

Host Model Number: FTY-CS-ZJ-178

Product name: Test host, Aluminium casing

Host Installation instructions： Plug the signal port of the module into the corresponding port on the main board of the host. See the figure below, marked in the red box.

Length, width and height: 16cm*7cm*17cm



Note: See Appendix 1 at the end for detailed instructions on how to install.

2.5 Trace antenna designs

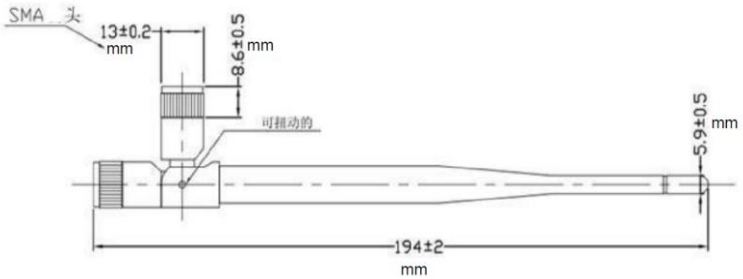
Please perform the Trace antenna design that followed the specifications of the antenna.

The concrete contents of a check are the following three points.

1) It is the same type as the antenna type of antenna specifications.
   Confirm the same size as the Gerber file.
2) An antenna gain is lower than a gain given in antenna specifications.
   Measure the gain, and confirm the peak gain is less than the application value.
3) The emission level is not getting worse.
   Measure the spurious, and confirm degradation of less than 3dB than spurious value of worst of report used for the application.

Please refer to the following figure for antenna information.

Frequency Range	5180-5240MHZ, 2400-2500MhZ
VSWR	≤2.0
GAIN	5.2G: -4.62dBi 2.4G: 1.08dBi
Input Impedance	50 Ω



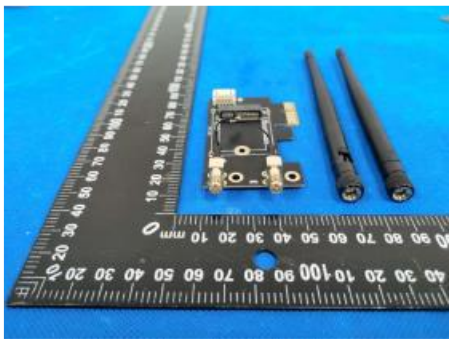
2.6 RF exposure considerations

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.

2.7 Antennas

This radio transmitter FCC ID: 2AU7O-N126 has been approved by Federal Communications Commission to operate with the antenna types listed below, with the maximum permissible gain indicated. This device does not use antenna types whose gain is greater than the maximum gain of any of the listed types not included below.

The antenna is External antenna, It's not permanently fixed. the antenna is 2.4G 1.08dBi, 5.2G -4.62dBi),This antenna is permanently paired with a product to sell.



2.8 Label and compliance information

The final end product must be labeled in a visible area with the following" Contains FCC ID: 2AU7O-N126".

2.9 Information on test modes and additional testing requirements

Host manufacturer is strongly recommended to confirm compliance with FCC requirements for the transmitter when the module is installed in the host.

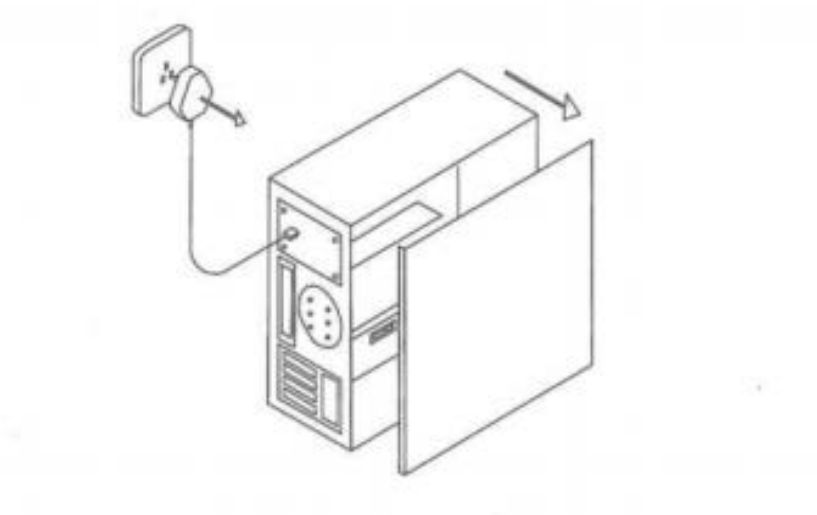
2.10 Additional testing, Part 15 Subpart B disclaimer

Host manufacturer is responsible for compliance of the host system with module installed with all other applicable requirements for the system such as Part 15 B.

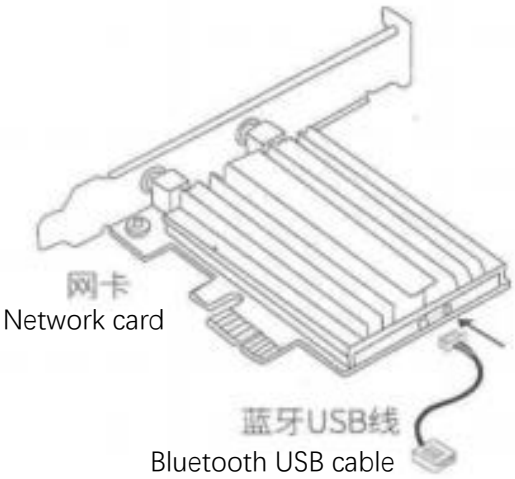
Appendix 1-Quick Installation Guide

1. Install Hardware

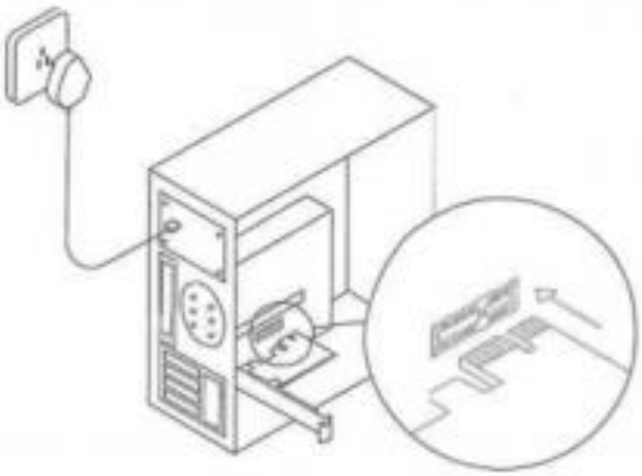
A. Turn off the computer, unplug the power cable then remove the case panel.



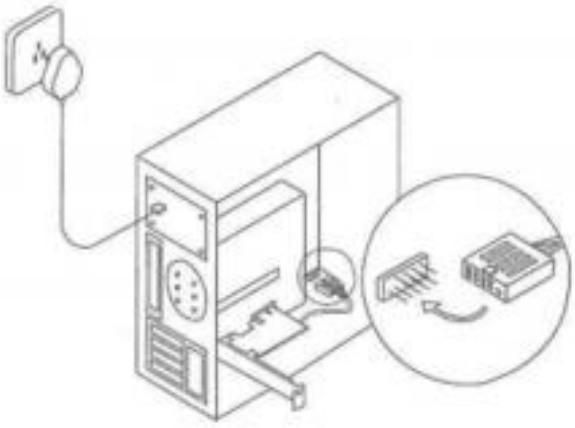
B. Connect the provided 4pin Bluetooth USB cable to the adapter.



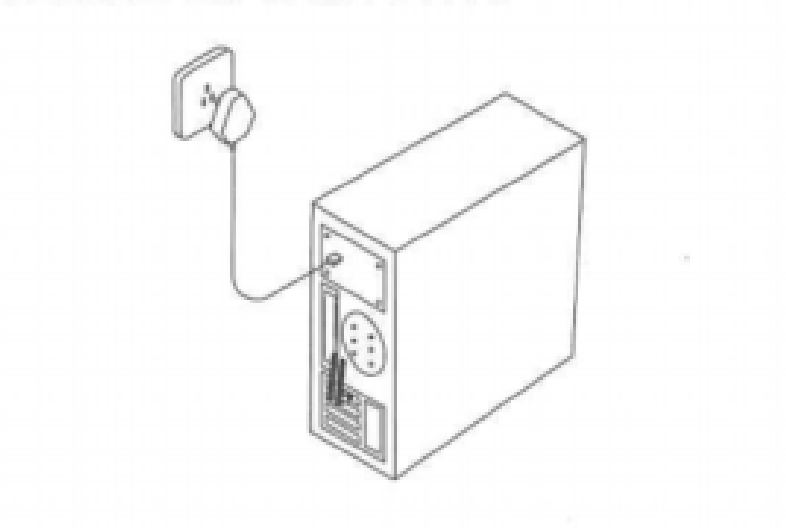
C. Locate the PCIE slot of the computer and carefully insert the adapter.
Note: Please confirm the connecting finger to the bottom and install the balance.



D. Find the 9pin F_USB connector of computer motherboard and plug the 4pin Bluetooth USB Cable into it carefully.
Note: If the Bluetooth USB Cable is not correctly connected to the motherboard, Bluetooth function won't work even after driver installation.



E. Connect the antenna(s) to the PCIE adapter.
   Tip: To maximize performance, make sure the path between the antenna(s) and your router is clear.
F. Replace the case panel,plug in the power cable and turn on your computer.



2. Install Drivers

A. Insert the CD and open the directory.

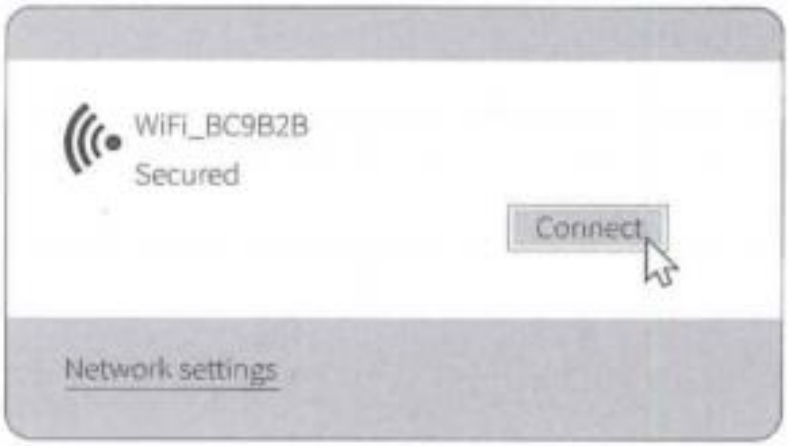
B. Install the Wi-Fi and Bluetooth drivers.

- Wi-Fi: Click on the Wi-Fi driver directory. Select the corresponding driver file according to the adapter model and operating system. Follow the on-screen instructions to complete the installation.

- Bluetooth: Click on the Bluetooth driver directory, select the installation program and follow the on-screen to complete the Bluetooth installation.

3. Join a Wireless Network

A. Click the network icon on the taskbar, select your WiFi network and enter the password.



4. Pair with Bluetooth Devices

A. Click the (Bluetooth) icon on the taskbar. Scan and Add Device.

B. Select your Bluetooth device from the list and follow the onscreen instructions to complete pairing.

Note: Make sure your device's Bluetooth is enabled and discoverable.

5. FAQ

Q1. What systems does this adapter support?

A1: Only support Window10/11.

Q2. Why can't I use Bluetooth after installation?

A2. First, please confirm that the Bluetooth USB cable is connected. Then, please confirm that the Bluetooth program is installed.

Q3. How long is the Bluetooth USB cable?

A3: 30cm.

Q4. Is it suitable for other brands (Intel/AMD)?

A4: Yes, the adapter also could work well.

6. After-sale Service

A. The adapter you purchased from Linccras on Amazon has a lifetime warranty policy.

B. If you encounter any problems during installation and use, or the product is missing/damaged, please contact us at any time.

- E-mail：Aftersaleservice12@outlook.com
- Whatsapp: +86 15846844485

C. We will reply and help you within 24hours.