FN-LINK 欧智通

PRODUCT SPECIFICATION

6252B-UUB

Wi-Fi Dual-band 2T2R + Bluetooth 5.2

Combo Module

Version:v1.5

6252B-UUB Module Datasheet

	Part NO.	Description
Ordering Information	FG6252BUUB-00	RTL8852BU-VS-CG, a/b/g/n/ac/ax, BLE5.2, 2T2R, 15X13mm, USB2.0 , 3 Antenna with shielding
	FG6252BUUB-01	RTL8852BU-VS-CG, a/b/g/n/ac/ax, BLE5.2, 2T2R, 15X13mm, USB2.0 , 3 Antenna , no shielding
	FG6252BUUB-02	RTL8852BU-VS-CG, a/b/g/n/ac/ax, BLE5.2, 2T2R, 15X13mm, USB2.0 +PCM, 3 Antenna with shielding
	FG6252BUUB-03	RTL8852BU-VS-CG, a/b/g/n/ac/ax, BLE5.2, 2T2R, 15X13mm, USB2.0 , 2 Antenna with shielding
	FG6252BUUB-04	RTL8852BU-CG, a/b/g/n/ac/ax, BLE5.2, 2T2R, 15X13mm, USB3.0 , 3 Antenna with shielding

Customer: _____

Customer P/N: _____

Signature: _____

Date: _____

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Revision History

Version	Date	Contents of Revision Change	Preparde	Checked	Approved
V1.0	2022/01/12	New version	FC	SXL	QJP
V1.1	2022/03/10	Add size reference	FC	SXL	QJP
V1.2	2022/05/11	Modify Pin Definition	FC	SXL	QJP
V1.3	2022/06/08	Update Ordering Information Update The Key Material List Update packaging information	FC	SXL	QJP
V1.4	2022/06/17	Update Reference Design	FC	SXL	QJP
V1.5	2022/09/01	Add 2 Antenna version	FC	SXL	QJP

1. General Description

1.1 Introduction

The 6252B-UUB is a highly integrated module that support 2-stream 802.11ax solutions with Multi-user MIMO (Multiple-Input, Multiple-Output) with Wireless LAN (WLAN) and integrated Bluetooth 5 USB network interface controller. It combines a WLAN MAC, a 2T2R capable WLAN baseband, and RF in a single chip. The RTL8852BU-VS-CG provides a complete solution for a high-performance integrated wireless and Bluetooth device.

This compact module is a total solution for a combination of Wi-Fi + BT technologies. The module is specifically developed for Smart phones and Portable devices.

1.2 Description

Model Name	6252B-UUB
Product Description	Support Wi-Fi/Bluetooth functionalities
Dimension	L x W x H: 13 x 15 x 2.3 mm
Wi-Fi Interface	Support USB 2.0
BT Interface	USB 2.0
Operating temperature	-0°C to 70°C
Storage temperature	-40°C to 85°C

2. Features

General

- Support 802.11ac 2x2,Wave-2 compliant with RX MU-MIMO
- Backward compatible with 802.11a/n/ac devices while operating at 802.11ax data rates.
- IEEE 802.11a/b/g/n/ac/ax compatible WLAN
- IEEE 802.11i (WPA, WPA2, WPA3). Open, shared key, and pair-wise key authentication services
- IEEE 802.11ax MIMO OFDM/OFDMA,IEEE 802.11ac MIMO OFDM,IEEE 802.11n MIMO OFDM

PHY Features

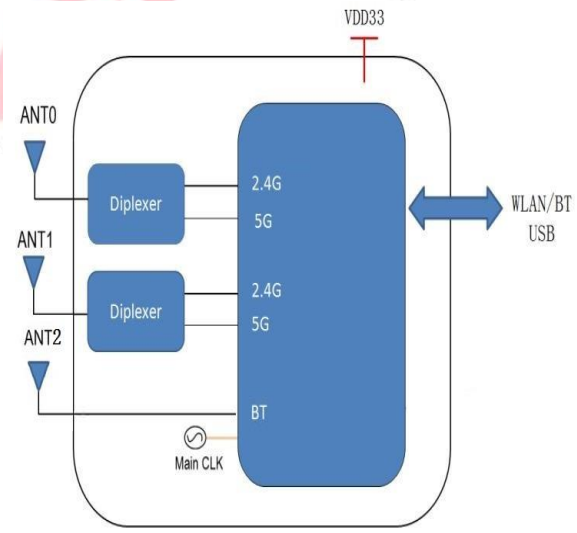
- CMOS MAC, Baseband PHY and RF in a single chip for IEEE 802.11a/b/g/n/ac/ax compatible WLAN
- Maximum PHY data rate up to 286.8 Mbps using 20MHz bandwidth, 573.5Mbps using 40MHz bandwidth, and 1201Mbps using 80MHz bandwidth

Bluetooth Features

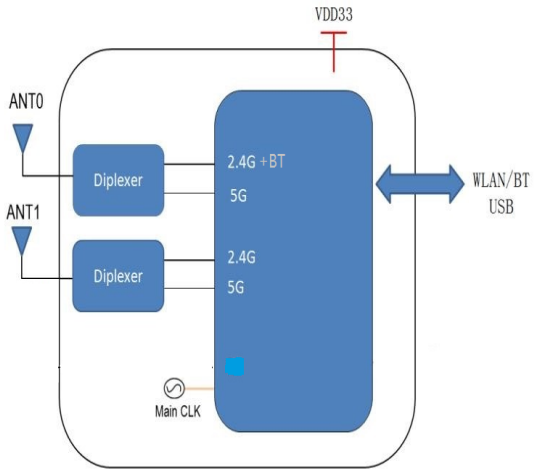
- Complies with USB2.0 for WLAN and BT controller
- Compatible with Bluetooth v2.1+EDR
- Support Bluetooth 5system (BT 5.2 Logo Compliant)
- Dual Mode support: Simultaneous LE and BR/EDR

3. Block Diagram

3 Antenna version



2 Antenna version



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 ~ 2.4835 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 ≤ -10dB
	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 (11b,20MHz) @8% PER	- 1Mbps PER @ -94 dBm	≤-83
	- 11Mbps PER @ -85 dBm	≤-76
SISO Receive Sensitivity (11g,20MHz) @10% PER	- 6Mbps PER @ -90 dBm	≤-85
	- 54Mbps PER @ -71 dBm	≤-68
SISO Receive Sensitivity (11n,20MHz) @10% PER	- MCS=0 PER @ -90 dBm	≤-85
	- MCS=7 PER @ -69 dBm	≤-67
SISO Receive Sensitivity (11n,40MHz) @10% PER	- MCS=0, PER @ -87 dBm	≤-82
	- MCS=7, PER @ -66 dBm	≤-64
SISO Receive Sensitivity (11ac,20MHz) @10% PER	- MCS=0, PER @ -90 dBm	≤-85
	- MCS=8, PER @ -64 dBm	≤-62
SISO Receive Sensitivity (11ac,40MHz) @10% PER	- MCS=0, PER @ -87 dBm	≤-82
	- MCS=9, PER @ -59 dBm	≤-57
SISO Receive Sensitivity (11ax,20MHz) @10% PER	- MCS=0, PER @ -90 dBm	≤-85
	- MCS=11, PER @ -60 dBm	≤-55
SISO Receive Sensitivity (11ax,40MHz) @10% PER	- MCS=0, PER @ -87 dBm	≤-82
	- MCS=11, PER @ -57 dBm	≤-52
Maximum Input Level	802.11b : -10 dBm	
	802.11g/n : -20 dBm	
Antenna Reference	Small antennas with 0~2 dBi peak gain	

Note: The RF specification will be updated in future version

4.2 5GHz RF Specification

Feature	Description	
WLAN Standard	IEEE 802.11a/n/ac/ax, Wi-Fi compliant	
Frequency Range	5.150 GHz ~ 5.850 GHz (5.0 GHz Band)	
Number of Channels	5.0GHz：Please see the table1	
Test Items	**Typical Value**	**EVM**
Output Power	802.11a 54Mbps: 18 ± 2 dBm	EVM ≤ -25dB
	802.11n MCS7: 17 ±2 dBm	EVM ≤ -28dB
	802.11ac VHT20/MCS8: 16 dBm ± 2 dB	EVM ≤ -30dB
	802.11ac VHT40/MCS9: 15 dBm ± 2 dB	EVM ≤ -32dB
	802.11ac VHT80/MCS9: 15 dBm ± 2 dB	EVM ≤ -32dB
	802.11ax VHT20/MCS11: 13 dBm ± 2 dB	EVM ≤ -35dB
	802.11ax VHT40/MCS11: 13 dBm ± 2 dB	EVM ≤ -35dB
	802.11ax VHT80/MCS11: 13 dBm ± 2 dB	EVM ≤ -35dB
Receive Sensitivity (11a,20MHz) @10% PER	- 6Mbps PER @ -89 dBm, typical	≤-85
	- 54Mbps PER @ -71 dBm, typical	≤-68
Receive Sensitivity (11n,20MHz) @10% PER	- MCS=0 PER @ -89 dBm, typical	≤-85
	- MCS=7 PER @ -69 dBm, typical	≤-67
Receive Sensitivity (11n,40MHz) @10% PER	- MCS=0 PER @ -87 dBm, typical	≤-82
	- MCS=7 PER @ -67 dBm, typical	≤-64
Receive Sensitivity (11ac,20MHz) @10% PER	- MCS=0 PER @ -90 dBm, typical	≤-85
	- MCS=8 PER @ -66 dBm, typical	≤-62
Receive Sensitivity (11ac,40MHz) @10% PER	- MCS=0 PER @ -87 dBm, typical	≤-82
	- MCS=9 PER @ -63 dBm, typical	≤-57
Receive Sensitivity (11ac,80MHz) @10% PER	- MCS=0 PER @ -84 dBm, typical	≤-79
	- MCS=9 PER @ -62 dBm, typical	≤-54
Receive Sensitivity (11ax,20MHz) @10% PER	- MCS=0 PER @ -90 dBm, typical	≤-85
	- MCS=11 PER @ -60 dBm, typical	≤-55
Receive Sensitivity (11ax,40MHz) @10% PER	- MCS=0 PER @ -87dBm, typical	≤-82
	- MCS=11 PER @ -57 dBm, typical	≤-52
Receive Sensitivity (11ax,80MHz) @10% PER	- MCS=0 PER @ -84 dBm, typical	≤-79
	- MCS=11 PER @ -54 dBm, typical	≤-49
Maximum input level	802.11a/n: -30 dBm	
	802.11ac: -30 dBm	
	802.11ax: -30 dBm	
Antenna Reference	Small antennas with 0~2 dBi peak gain	

Note: The RF specification will be updated in future version

[1]5GHz(20MHz) Channel table

Band range	Operating Channel Numbers	Channelcenter 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
	136	5680
	140	5700
5745MHz~5825MHz	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, π/4-DQPSK, 8-DPSK		
RF Specification			
	Min(dBm)	**Typical**(dBm)	**Max**(dBm)
Output Power (Class 1)	2	5	8
Sensitivity @ BER=0.1% for GFSK (1Mbps)		-82	
Sensitivity @ BER=0.01% for π/4-DQPSK (2Mbps)		-80	
Sensitivity @ BER=0.01% for 8DPSK (3Mbps)		-80	
Maximum Input Level	GFSK (1Mbps):-20dBm		
	π/4-DQPSK (2Mbps) :-20dBm		
	8DPSK (3Mbps) :-20dBm		

Note: The RF specification will be updated in future version

5. ID setting information

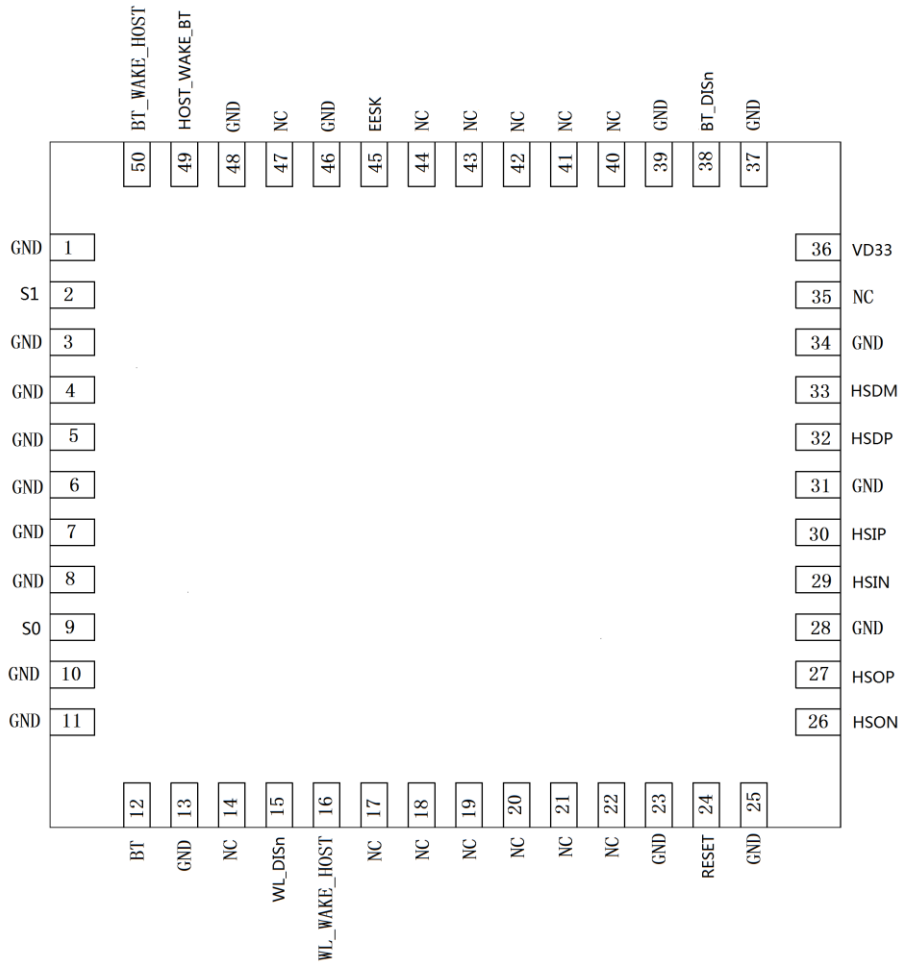
WI-FI

Vendor ID	0BDA
Product ID	A85B

6. Pin Definition

6.1 Pin Outline

< TOP VIEW >



6.2 Pin Definition details

NO.	Name	Type	Description	Voltage
1	GND		Ground connections	
2	S1	I/O	RF I/O chain1, dual band Wi-Fi/BT	
3	GND		Ground connections	
4	GND		Ground connections	

5	GND		Ground connections	
6	GND		Ground connections	
7	GND		Ground connections	
8	GND		Ground connections	
9	S0	I/O	RF I/O chain0, dual band Wi-Fi	
10	GND		Ground connections	
11	GND		Ground connections	
12	BT		RF BT/NC	
13	GND		Ground connections	
14	NC		Floating (NC)	
15	WL_DISn	I	Enable pin for WLAN device ON: pull high ; OFF: pull low	VDDIO
16	WL_WAKE_HOST	O	WLAN to wake up HOST	VDDIO
17	NC		Floating (NC)	
18	NC		Floating (NC)	
19	NC		Floating (NC)	
20	NC		Floating (NC)	
21	NC		Floating (NC)	
22	NC		Floating (NC)	
23	GND		Ground connections	
24	RESET	I/O	Enable pin for chipset. Pull low to shut down RTL8852BU. (Internal 47Kohm pull-high to 3.3V)	VDDIO
25	GND		Ground connections	
26	HSON		USB 3.0 Transmit Differential Pair	
27	HSOP		USB 3.0 Transmit Differential Pair	
28	GND		Ground connections	
29	HSIN		USB 3.0 Receive Differential Pair	
30	HSIP		USB 3.0 Receive Differential Pair	
31	GND		Ground connections	
32	HSDP	I/O	USB2.0 differential pair D+	
33	HSDM	I/O	USB2.0 differential pair D-	
34	GND		Ground connections	
35	NC		Floating (NC)	
36	VD33	P	Main power input 3.3V	3.3V
37	GND		Ground connections	
38	BT_DISn		Enable pin for BT device	

			ON: pull high ; OFF: pull low	
39	GND		Ground connections	
40	NC		Floating (NC)	
41	NC		Floating (NC)	
42	NC		Floating (NC)	
43	NC		Floating (NC)	
44	NC		Floating (NC)	
45	EESK		BT FW log	
46	GND		Ground connections	
47	NC		Floating (NC)	
48	GND		Ground connections	
49	HOST_WAKE_BT	I	Host to wake up Bluetooth device	VDDIO
50	BT_WAKE_HOST	O	Bluetooth device to wake up host.	VDDIO

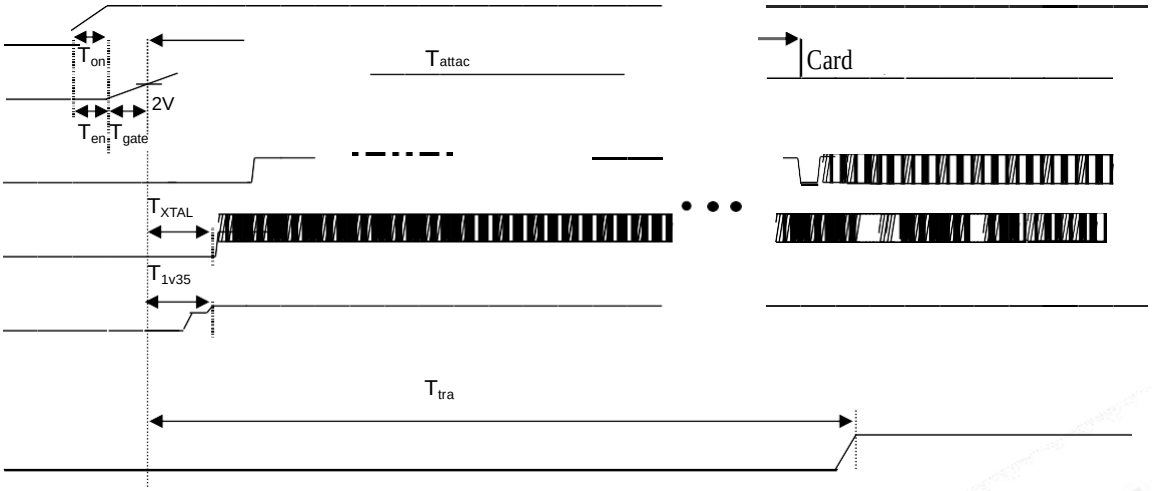
P:POWER I:INPUT O:OUTPUT VDDIO:3.3V

7. Electrical Specifications

7.1 Power Supply DC Characteristics

	MIN	TYP	MAX	Unit
Operating Temperature	-10	25	70	deg.C
VCC33	3.0	3.3	3.6	V

7.2 USB Bus during power on Sequence



Ton: The main power ramp up duration

Ten: Interval between the rising point of 3.3V and chip_en

Tgate: Interval of 3.3V to be gated when chip_en voltage level < 2V

Tattach: USB attach state. The duration from resistor attached to USB host starting card detection procedure

Txtal: XTAL starts

Ttrap: Power on trap duration. In back of this duration if pull high GPIO4, GPIO5 and EESK are necessary.

Power on Flow Description

After the main 3.3V ramp up, the internal power on reset is released by the power ready detection circuit and the power management unit is enabled. The power management unit enables the internal regulator and clock circuits.

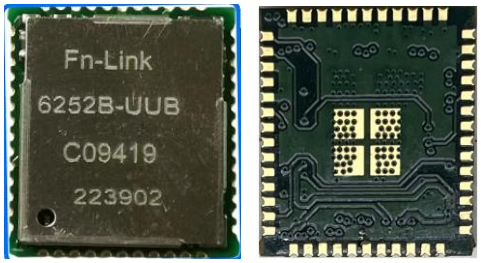
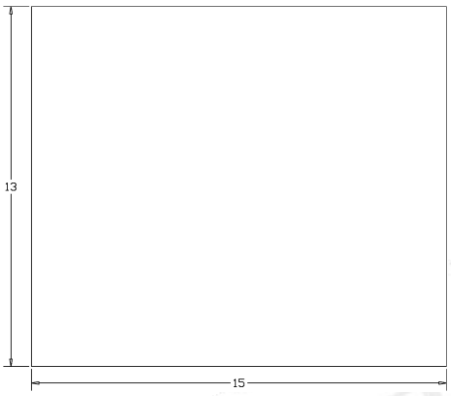
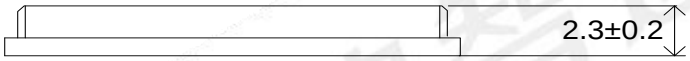
The power management unit also enables the USB circuits.

USB analog circuits attach resisters to indicate the insertion of the USB device.

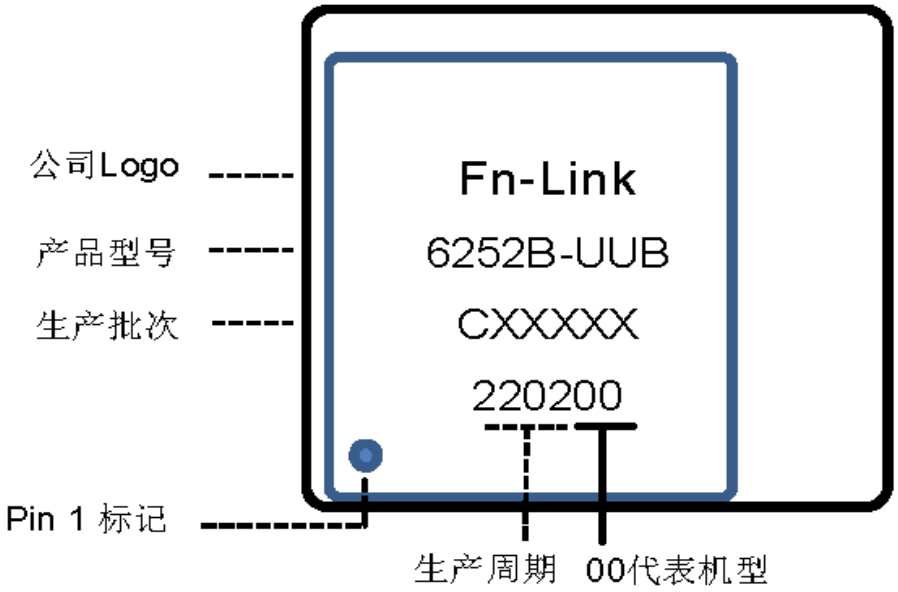
	Unit	Min.	Typical	Max.
T_{on}	ms	-	1.5	5
T_{en}	ms	0	0	5
T_{gate}	ms	0	1.5	8
T_{attach}	ms	100	250	-
T_{xtal}	ms	-	1.5	8
T_{1v35}	ms	-	3	11
T_{trap}	ms	400	500	-

8. Size reference

8.1 Module Picture

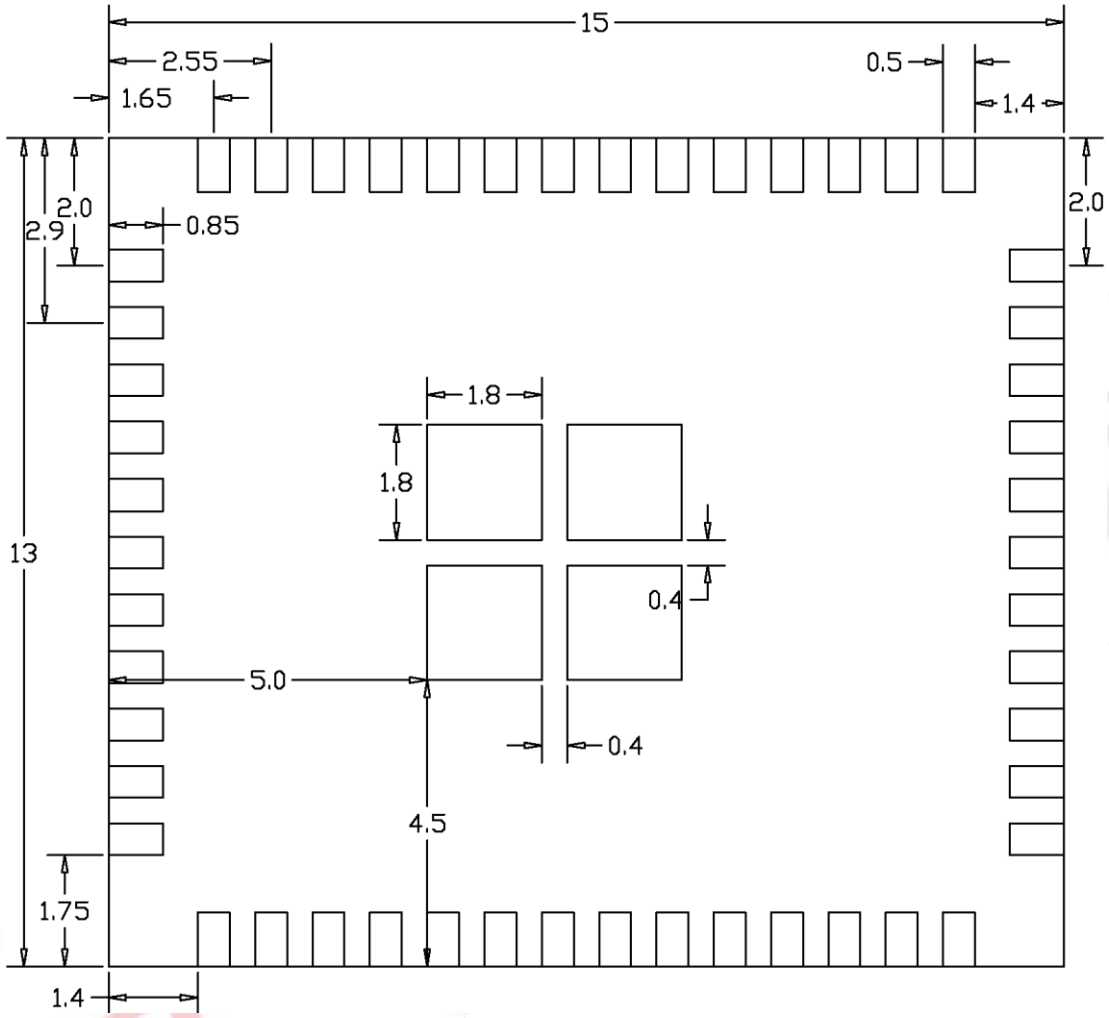
L x W : 13 x 15 (+0.3/-0.1) mm 	
H:2.3 (±0.2) mm	
Weight	0.91g

8.2 Marking Description

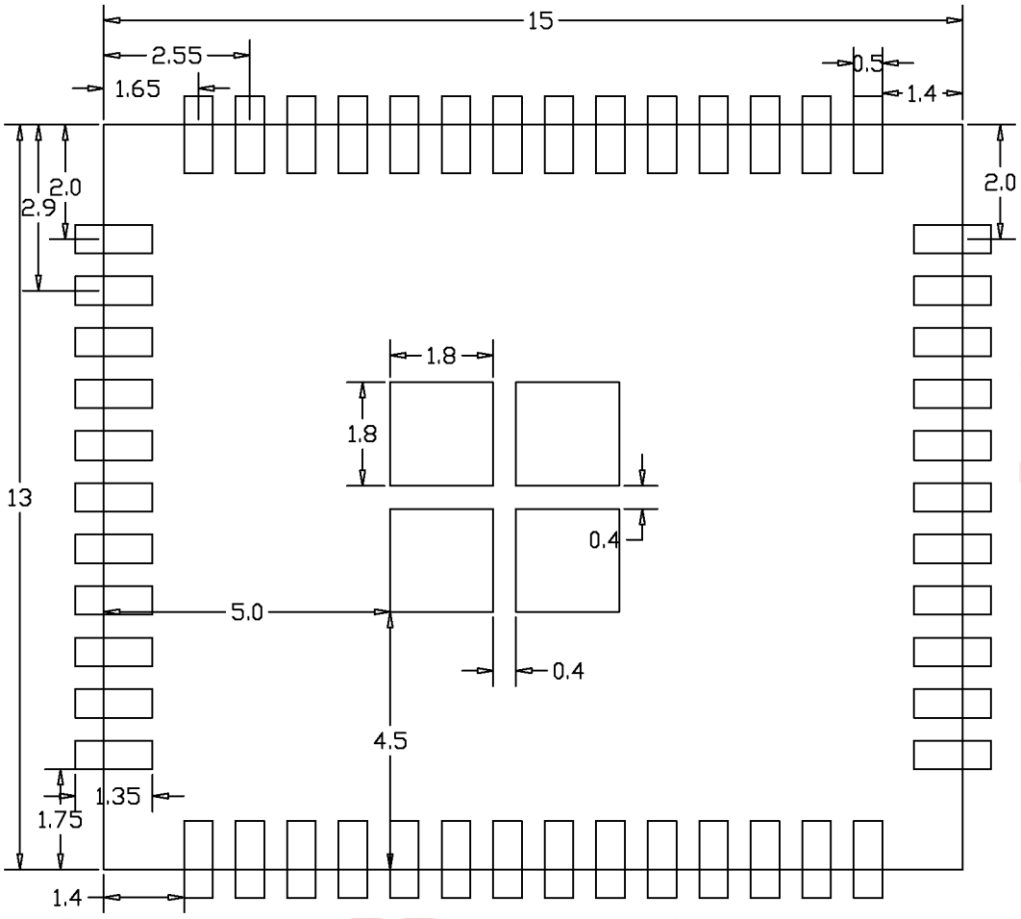


8.3 Physical Dimensions

<TOP View>



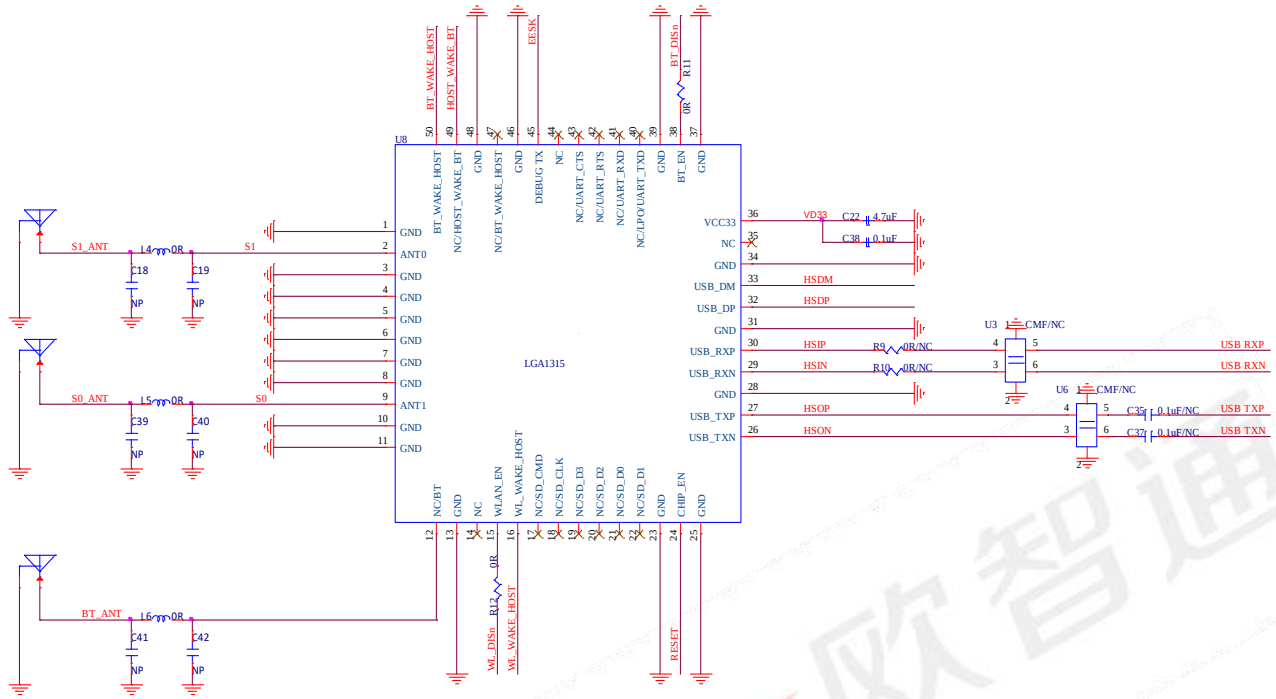
8.4 Layout Recommendation



9. The Key Material List

Item	Part Name	Description	Manufacturer
1	PCB	6252B-UUB 深绿色,4L,15X13X0.8mm	XY-PCB, GDKX, Sunlord, SLPCB KX-PCB,
2	Crystal	2016 40MHz ±10ppm 12pF	ECEC, Hosonic, TKD, JWT
3	Chipset	RTL8852BU-VS-CG QFN-76	Realtek
4	Shielding	6252B-UUB Shielding	信太，精力通

10. Reference Design

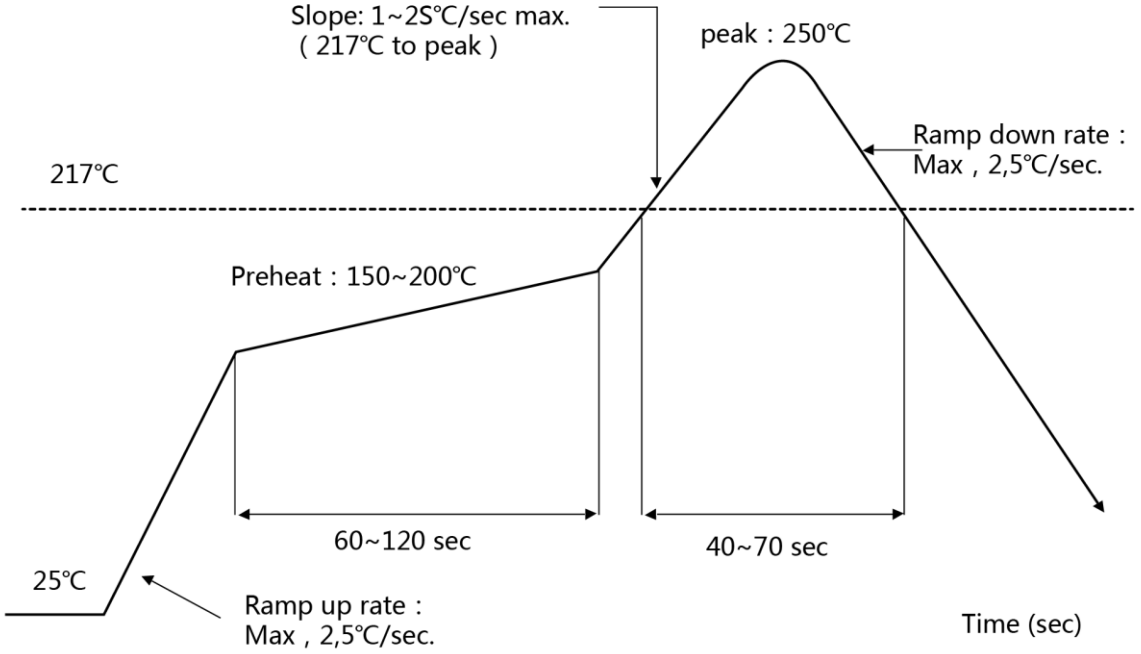


11. Recommended Reflow Profile

Referred to IPC/JEDEC standard.

Peak Temperature : <250°C

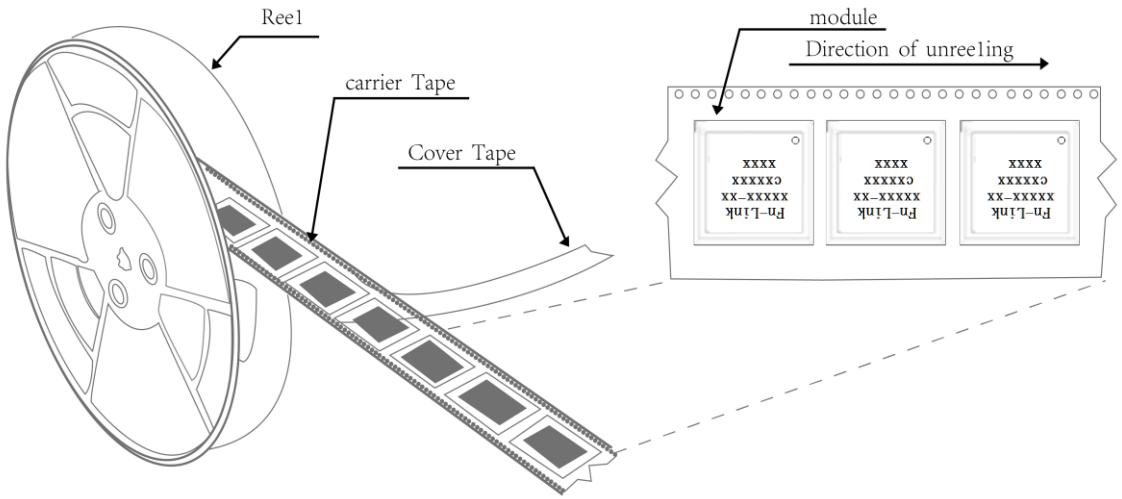
Number of Times : ≤2 times



12. Package

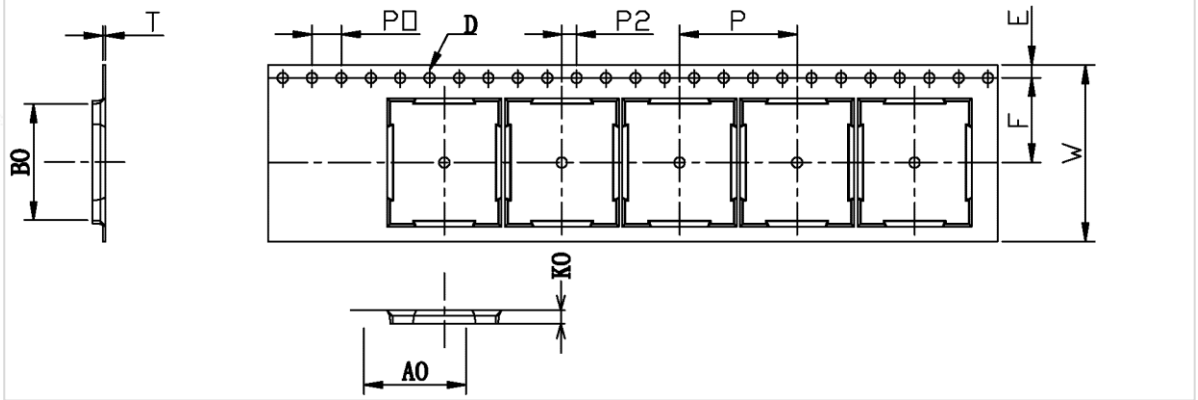
12.1 Reel

A roll of 1500pcs



12.2 Carrier Tape Detail

ITEM	W	A0	B0	D	F	E	K0	P0	P2	P	T
DIM	24	13.40	15.40	1.50	11.5	1.75	2.65	4.0	2.0	16.0	0.30
TOLE	+0.3 -0.3	±0.15	±0.15	+0.1 -0.0	+0.1 -0.1	±0.1	±0.10	±0.1	±0.1	±0.1	±0.05



12.3 Packaging Detail

the take-up package

Using self-adhesive tape

Size of black tape: 24mm*24.4m the cover tape :21.3mm*32.6m

Color of plastic disc: blue

NY bag size:450mm*415mm

size ： 350*350*35mm

The packing case size:360*210*370mmg

13. 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

d) "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 warning statements:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The device has been evaluated to meet general RF exposure requirement.

IC warning statements:

-English Warning Statement:

RSS-GEN ISSUE 5, 8.4 User manual notice

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.

The digital apparatus complies with Canadian CAN ICES-3 (B)/NMB-3(B).

-French Warning Statement:

RSS - Gen version 5, 8.4 avis du manuel de l'utilisateur
Cet appareil contient un émetteur / récepteur sans licence conforme au RSS sans licence d'innovation, science et développement économique Canada.L'opération doit satisfaire aux deux conditions suivantes:
Cet équipement peut ne pas causer d'interférence.
L'équipement doit accepter toute interférence, y compris toute interférence qui pourrait entraîner un fonctionnement indésirable de l'équipement.

This equipment complies with IC radiation exposure limits set forth for an uncontrolled environment and meets RSS-102 of the IC radio frequency (RF) Exposure rules. This equipment has very low levels of RF energy that are deemed to comply without testing of specifc absorption ratio (SAR).Cet équipement est conforme aux limites d'exposition aux rayonnements énoncées pour un environnement non contrôlé et respecte les règles d'exposition aux fréquences radioélectriques (RF) CNR-102 de l'IC. Cet équipement émet une énergie RF très faible qui est considérée conforme sans évaluation du débit d'absorption spécifque (DAS).

This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.
Lors de l'installation et du fonctionnement de cet équipement, la distance minimale entre le radiateur et le corps doit être de 20cm.

Additional Section: Integration instructions for host product manufacturers according to KDB 996369 D03 OEMManual v01

2.1 Conditions on using FN-LINK TECHNOLOGY LIMITED regulatory approvals:
A. Customer must ensure that its product (The ”CUSTOMER Product”) 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 (customers' product must also compliant with these rules)
FCC Part 15 Subpart C 15.247 & 15.207 & 15.209& 15.205
FCC Part 15 Subpart E 15.407
2.3 Specific operational use conditions
Radio Technology: Bluetooth V5.2 BLE (No limit)
Operation frequency : 2402MHz -2480MHz
Number of channels : 40
Modulation : GFSK
Data Rate : 1Mpbs/2Mpbs
Channel spacing : 2MHz
Antenna Type : PCB antenna, max gain 2.22dBi

Radio Technology: Bluetooth V5.2 EDR (No limit)
Operation frequency : 2402MHz -2480MHz
Number of channels 79
Modulation : GFSK, π/4 DQPSK, 8-DPSK
Data Rate : 1Mpbs, 2Mpbs, 3Mpbs
Channel spacing : 1MHz
Antenna Type : PCB antenna, max gain 2.22dBi

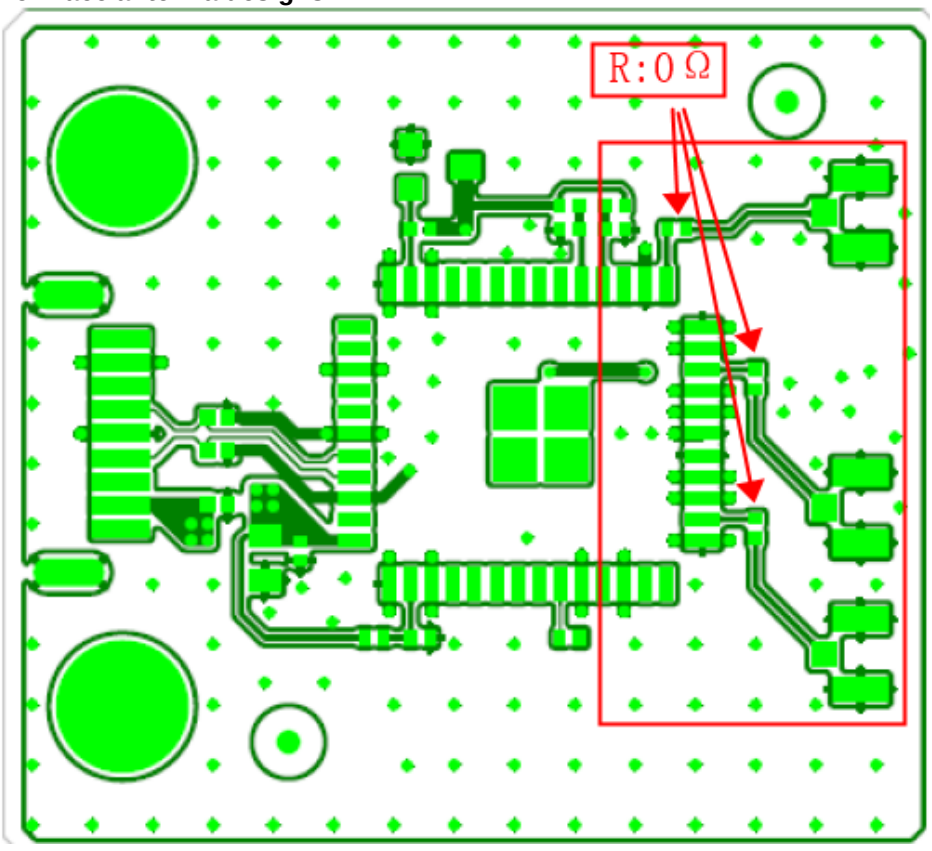
Radio Technology: 2.4G WiFi (No limit)
Operation frequency : 2412MHz-2462MHz for IEEE 802.11 b, g. n/HT20, ax20, 2422MHz~2452MHz for IEEE802.11n/HT40, ax40
Channel No. : 802.11b/802.11g /802.11n(HT20)/802.11ax20: 11
802.11(HT40)/802.11ax40: 7
Modulation : IEEE 802.11b: DSSS(CCK,DQPSK,DBPSK)
IEEE 802.11g: 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 : Rod antenna 1, max gain 2.99dBi
Rod antenna 2, max gain 2.99dBi
The antenna MIMO combining gain is 5.99dBi.

Radio Technology: 5G WiFi (Only for indoor use)
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; 5260-5320MHz; 5510-5670MHz; 5755~5795MHz
802.11ac(VHT80)/ax80: 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)/ax80
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 : Rod antenna 1, max gain 3.73dBi
Rod antenna 2, max gain 3.73dBi
The antenna MIMO combining gain is 6.73dBi.
The module can be used for mobile applications with the same ant. type with maximum 3.73dBi antenna and the same ANT. PCB layout. 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 informationto 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. If the end product manufacturer use it to a portable product, please provide the SAR compliance.

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



2.6 RF exposure considerations
The device can be used in mobile exposure condition without restriction and if RF exposure statement or module layout is changed, then the host product manufacturer required to take responsibility of the module through a change in FCC ID or newapplication. The FCC ID of the module cannot be used on the final product. In these circumstances, the host manufacturer will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

2.7 Antennas

Antenna Specification are as follows:
Antenna Type: Rob antenna
Antenna Gain(Peak):2.22 dBi (Provided by manufacturer)
Antenna Type: Rob antenna
Antenna Gain(Peak):3.73 dBi (Provided by manufacturer)
This device is intended only for host manufacturers under the following conditions:
The transmitter module may not be co-located with any other transmitter or antenna;
The module shall be only used with the External antenna(s) that has been originally tested and certified with this module. The antenna must be either permanently attached or employ a 'unique'antenna coupler.

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

2.8 Label and compliance information

Host product manufacturers need to provide a physical or e-label stating "Contains FCC ID 2AATL-6252B-UUB" With their finished product.

2.9 Information on test modes and additional testing requirements

Radio Technology: Bluetooth V5.2 BLE
Operation frequency : 2402MHz -2480MHz
Number of channels : 40
Modulation : GFSK
Data Rate : 1Mpbs/2Mpbs
Channel spacing : 2MHz
Antenna Type : PCB antenna, max gain 2.22dBi

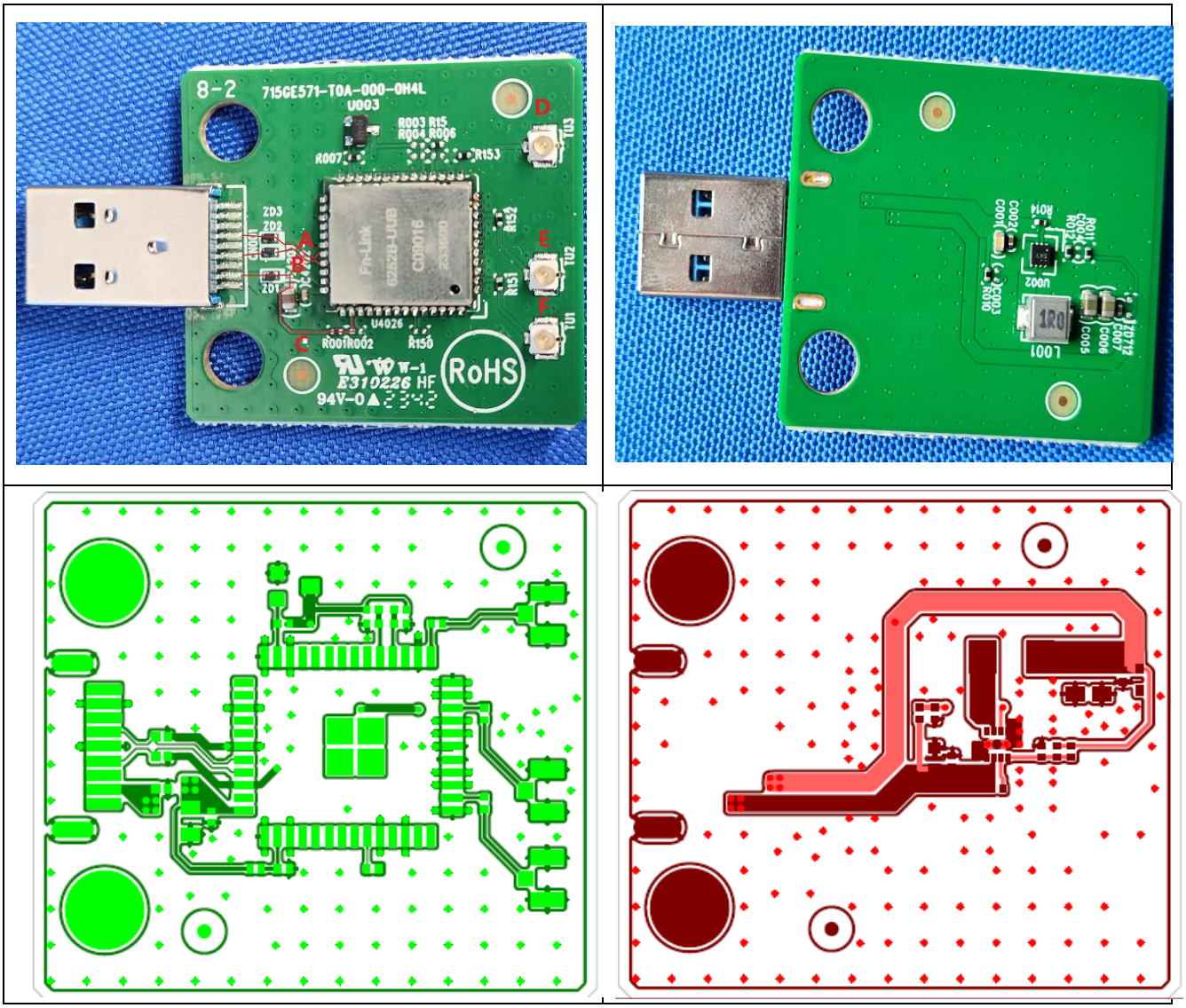
Radio Technology: Bluetooth V5.2 EDR
Operation frequency : 2402MHz -2480MHz
Number of channels 79
Modulation : GFSK, π/4 DQPSK, 8-DPSK
Data Rate : 1Mpbs, 2Mpbs, 3Mpbs
Channel spacing : 1MHz
Antenna Type : PCB antenna, max gain 2.22dBi

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 : IEEE 802.11b: DSSS(CCK,DQPSK,DBPSK)
IEEE 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK)
IEEE 802.11n :OFDM(64QAM, 16QAM, QPSK, BPSK) (Support MIMO mode)
IEEE 802.11ax : OFDMA(64QAM,16QAM,QPSK,BPSK,256QAM,1024QAM) (Support MIMO mode)
Antenna Type : Rod antenna 1, max gain 2.99dBi
Rod antenna 2, max gain 2.99dBi
The antenna MIMO combining gain is 5.99dBi.

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; 5260-5320MHz; 5510-5670MHz; 5755~5795MHz
802.11ac(VHT80)/ax80: 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)/ax80
Modulation technology : IEEE 802.11a: OFDM (64QAM, 16QAM, QPSK, BPSK)
IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK) (Support MIMO mode)
IEEE 802.11ac: OFDM (64QAM, 16QAM, QPSK, BPSK) (Support MIMO mode)
IEEE 802.11ax : OFDMA (64QAM,16QAM,QPSK,BPSK,256QAM,1024QAM) (Support MIMO mode)
Antenna Type : Rod antenna 1, max gain 3.73dBi
Rod antenna 2, max gain 3.73dBi
The antenna MIMO combining gain is 6.73dBi.
Host manufacturer can contact with FN-LINK TECHNOLOGY LIMITED to get how to implement the above function, and how to reproduce the testing mode during certification, if possible, FN-LINK TECHNOLOGY LIMITED can supply the certification sample to host manufacturer.

Host manufacturer must perform test of radiated & conducted emission and spurious emission, etcaccording 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. If no other module used and no change to this module, the product can only to compliance with FCC part 15 B to meet the sale requirment. Only when all the test results of test modes comply with FCC requirements, then the end product canbe sold legally.

2.10 Additional testing, Part 15 Subpart B disclaimer
The modular transmitter is only FCC authorized for FCC Part 15 Subpart C 15.247 & 15.207 & 15.209 & 15.205 and FCC Part 15 Subpart E 15.407 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 circuity), 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.



2.11 Note EMI Considerations:

As shown in the diagram, the module is only controlled and powered by ABC representing a three way USB circuit. Normally, it can be replaced with a separate cable. D and E and F represent the exit of the antenna. But for the convenience of frequency setting and testing, it is fixed on the public board. That is to say, the module can work independently from the public board. This cable method is the final installation method of the module.

2.12 How to address changes to conditions, operation and/or restrictions

Please refer to the additional section 2.1 of this manual.