Innovation For Surfing

欧智通科技

Fn-Link

6222D-UUB

WiFi Dual-band 2X2 11ac +
Bluetooth V4.2

Use's Manual

Revision History

Version	Date	Description	Draft	Approved
1.0	2016-08-01	-Preliminary	Ken	William Tan
1.1	2017-03-02	Update datasheet	Colin Ming	William Tan
1.2	2017-04-10	Modified pins definition	Colin Ming	William Tan

CONTENTS

1. Introduction

Fn-Link Technology would like to announce a low-cost and low-power consumption module which has all of the WiFi and Bluetooth functionalities. The highly integrated module makes the possibilities of web browsing, VoIP, Bluetooth headsets applications. With seamless roaming capabilities and advanced security, also could interact with different vendors' 802.11a/b/g/n/ac 2x2 Access Points in the wireless LAN.

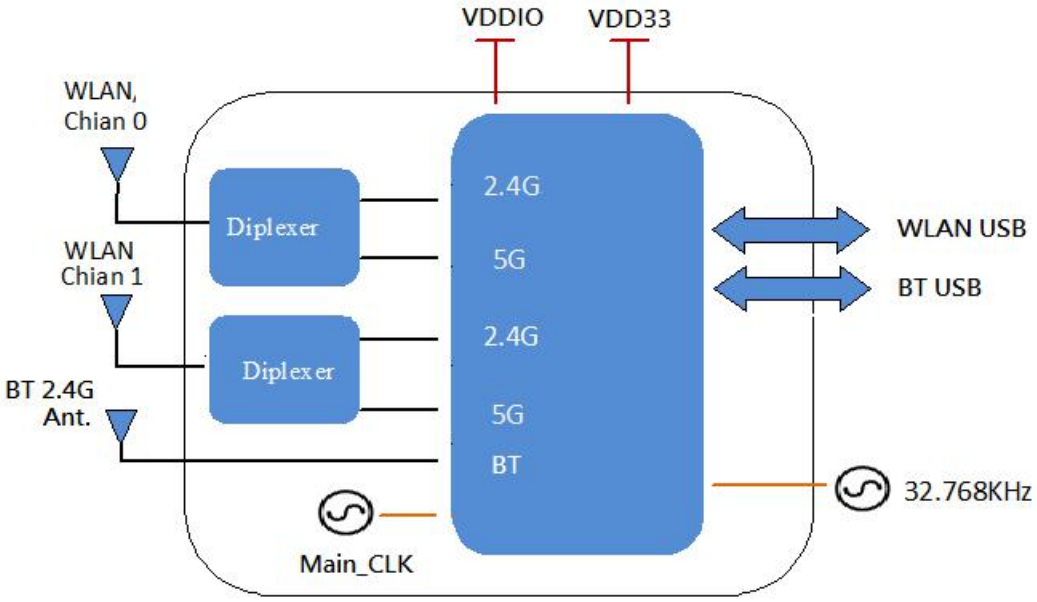
The wireless module complies with IEEE 802.11 a/b/g/n/ac 2x2 MIMO standard and it can achieve up to a speed of 867Mbps with dual stream in 802.11n to connect the wireless LAN. The integrated module provides USB interface for WiFi and Bluetooth.

This compact module is a total solution for a combination of WiFi + BT technologies. The module is specifically developed for Smart TV and OTT Box application.

2. Features

- Highly integrated wireless local area network(WLAN) system-on-chip (SOC) for 5 GHZ 802.11ac, or 2.4G/5G 802.11n WLAN applications.
- Dual-stream spatial multiplexing up to 867 Mbps data rate.
- Supports 20/40MHz at 2.4GHz and supports 20/40/80MHz at 5GHz
- Supports USB interface for WLAN and Bluetooth.
- Supports Bluetooth V4.2+HS, BLE and be backwards compatible with Bluetooth 1.2, 2.X+ enhance data rate.
- Supports Bluetooth for class1 and class2 power level transmissions.

A simplified block diagram of the module is depicted in the figure below.



3. General Specification

3.1 General Specification

Model Name	6222D-UUB
Product Description	Support WiFi/Bluetooth
Dimension	L x W x H: 27 x 18 x 2.0 (typical) mm
WiFi Interface	Support USB3.0/USB2.0
BT Interface	USB2.0
Operating temperature	-10°C to 70°C
Storage temperature	-40°C to 85°C
Humidity	Operating Humidity 10% to 95% Non-Condensing

3.1.2 Recommended Operating Rating

	Min.	Typ.	Max.	Unit
Operating Temperature	-10	25	70	deg.C
VCC33	3.15	3.3	3.45	V
VDDIO	1.7	1.8 or 3.3	3.45	V

4. WiFi RF Specification

4.1 2.4GHz RF Specification

Feature	Description	
WLAN Standard	IEEE 802.11a/b/g/n/ac WiFi compliant	
Frequency Range	2.400 GHz ~ 2.497 GHz (2.4 GHz ISM Band)	
Number of Channels	2.4GHz：Ch1 ~ Ch14	
Output Power	802.11b /11Mbps : 16 dBm ± 1.5 dB @ EVM ≤ -9dB	
	802.11g /54Mbps : 15 dBm ± 1.5 dB @ EVM ≤ -25dB	
	802.11n /MCS7 : 14 dBm ± 1.5 dB @ EVM ≤ -28dB	
Test Items	**Typical Value**	**Standard Value**
SISO Receive Sensitivity (11b,20MHz) @8% PER	- 1Mbps PER @ -92 dBm, typical	≤-83
	- 2Mbps PER @ -90 dBm, typical	≤-80
	- 5.5Mbps PER @ -87 dBm, typical	≤-79
	- 11Mbps PER @ -85 dBm, typical	≤-76
SISO Receive Sensitivity (11g,20MHz) @10% PER	- 6Mbps PER @ -89 dBm, typical	≤-85
	- 9Mbps PER @ -88 dBm, typical	≤-84
	- 12Mbps PER @ -87 dBm, typical	≤-82
	- 18Mbps PER @ -84 dBm, typical	≤-80
	- 24Mbps PER @ -81 dBm, typical	≤-77
	- 36Mbps PER @ -78 dBm, typical	≤-73
	- 48Mbps PER @ -73 dBm, typical	≤-69
	- 54Mbps PER @ -71 dBm, typical	≤-68
MIMO Receive Sensitivity (11g,20MHz) @10% PER	- 6Mbps PER @ -91 dBm, typical	≤-88
	- 9Mbps PER @ -90 dBm, typical	≤-86
	- 12Mbps PER @ -89 dBm, typical	≤-85
	- 18Mbps PER @ -87 dBm, typical	≤-84
	- 24Mbps PER @ -84 dBm, typical	≤-81
	- 36Mbps PER @ -81 dBm, typical	≤-79
	- 48Mbps PER @ -76 dBm, typical	≤-73
	- 54Mbps PER @ -74 dBm, typical	≤-68
SISO Receive Sensitivity (11n,20MHz) @10% PER	- MCS=0 PER @ -89 dBm, typical	≤-85
	- MCS=1 PER @ -86 dBm, typical	≤-82
	- MCS=2 PER @ -84 dBm, typical	≤-80
	- MCS=3 PER @ -80 dBm, typical	≤-77
	- MCS=4 PER @ -77 dBm, typical	≤-73
	- MCS=5 PER @ -72 dBm, typical	≤-69

	- MCS=6	PER @ -71 dBm, typical	⩽-68
	- MCS=7	PER @ -69 dBm, typical	⩽-67
MIMO Receive Sensitivity (11n,20MHz) @10% PER	- MCS=0	PER @ -90 dBm, typical	⩽-87
	- MCS=1	PER @ -89 dBm, typical	⩽-85
	- MCS=2	PER @ -87 dBm, typical	⩽-83
	- MCS=3	PER @ -84 dBm, typical	⩽-80
	- MCS=4	PER @ -80 dBm, typical	⩽-75
	- MCS=5	PER @ -75 dBm, typical	⩽-70
	- MCS=6	PER @ -73 dBm, typical	⩽-68
	- MCS=7	PER @ -72 dBm, typical	⩽-67
	- MCS=8	PER @ -87 dBm, typical	⩽-82
	- MCS=15	PER @ -68 dBm, typical	⩽-64
Maximum Input Level	802.11b : -10 dBm		
	802.11g/n : -20 dBm		
Antenna Reference	Small antennas with 3.15 dBi peak gain		

4.2 5GHz RF Specification

Feature	Description	
WLAN Standard	IEEE 802.11a/n 2x2, WiFi compliant	
Frequency Range	4.900 GHz ~ 5.845 GHz (5.0 GHz ISM Band)	
Number of Channels	5.0GHz：Please see the table[1]	
Output Power	802.11a /54Mbps : 13 dBm ± 1.5 dB @ EVM ≤ -25dB	
	802.11n /MCS7 : 12 dBm ± 1.5 dB @ EVM ≤ -28dB	
	802.11ac /MCS9 : 11 dBm ± 1.5 dB @ EVM ≤ -32Db	
Test Items	**Typical Value**	**Standard Value**
SISO Receive Sensitivity (11a,20MHz) @10% PER	- 6Mbps PER @ -88 dBm	≤-85
	- 9Mbps PER @ -87 dBm	≤-84
	- 12Mbps PER @ -86 dBm	≤-82
	- 18Mbps PER @ -83 dBm	≤-80
	- 24Mbps PER @ -80 dBm	≤-77
	- 36Mbps PER @ -77 dBm	≤-73
	- 48Mbps PER @ -72 dBm	≤-69
	- 54Mbps PER @ -70 dBm	≤-68
MIMO Receive Sensitivity (11a,20MHz) @10% PER	- 6Mbps PER @ -90 dBm	≤-86
	- 9Mbps PER @ -89 dBm	≤-85
	- 12Mbps PER @ -88 dBm	≤-83
	- 18Mbps PER @ -86 dBm	≤-81
	- 24Mbps PER @ -83 dBm	≤-78
	- 36Mbps PER @ -80 dBm	≤-75
	- 48Mbps PER @ -75 dBm	≤-69
	- 54Mbps PER @ -71 dBm	≤-66
SISO Receive Sensitivity (11n,20MHz) @10% PER	- MCS=0 PER @ -88 dBm	≤-85
	- MCS=1 PER @ -85 dBm	≤-82
	- MCS=2 PER @ -83 dBm	≤-80
	- MCS=3 PER @ -80 dBm	≤-77
	- MCS=4 PER @ -76 dBm	≤-73
	- MCS=5 PER @ -71 dBm	≤-69
	- MCS=6 PER @ -70 dBm	≤-68
	- MCS=7 PER @ -68 dBm	≤-67
MIMO Receive Sensitivity (11n,20MHz) @10% PER	- MCS=0 PER @ -89 dBm	≤-82
	- MCS=1 PER @ -88 dBm	≤-80
	- MCS=2 PER @ -86 dBm	≤-79
	- MCS=3 PER @ -83 dBm	≤-78

	- MCS=4	PER @ -79 dBm	≤-74
	- MCS=5	PER @ -74 dBm	≤-68
	- MCS=6	PER @ -73 dBm	≤-66
	- MCS=7	PER @ -71 dBm	≤-64
	- MCS=8	PER @ -88 dBm	≤-84
	- MCS=15	PER @ -68 dBm	≤-63
SISO Receive Sensitivity (11n,40MHz) @10% PER	- MCS=0	PER @ -85 dBm	≤-82
	- MCS=1	PER @ -82 dBm	≤-79
	- MCS=2	PER @ -80 dBm	≤-77
	- MCS=3	PER @ -77 dBm	≤-74
	- MCS=4	PER @ -73 dBm	≤-70
	- MCS=5	PER @ -69 dBm	≤-66
	- MCS=6	PER @ -67 dBm	≤-65
	- MCS=7	PER @ -66 dBm	≤-64
MIMO Receive Sensitivity (11n,40MHz) @10% PER	- MCS=0	PER @ -87 dBm	≤-79
	- MCS=1	PER @ -85 dBm	≤-76
	- MCS=2	PER @ -83 dBm	≤-74
	- MCS=3	PER @ -80 dBm	≤-71
	- MCS=4	PER @ -76 dBm	≤-67
	- MCS=5	PER @ -72 dBm	≤-63
	- MCS=6	PER @ -70 dBm	≤-62
	- MCS=7	PER @ -69 dBm	≤-63
	- MCS=8	PER @ -85 dBm	≤-79
	- MCS=15	PER @ -66 dBm	≤-61
SISO Receive Sensitivity (11ac,20MHz) @10% PER	- MCS=0, NSS1	PER @ -86 dBm	≤-82
	- MCS=1, NSS1	PER @ -84 dBm	≤-80
	- MCS=2, NSS1	PER @ -82 dBm	≤-77
	- MCS=3, NSS1	PER @ -79 dBm	≤-73
	- MCS=4, NSS1	PER @ -75 dBm	≤-69
	- MCS=5, NSS1	PER @ -70 dBm	≤-68
	- MCS=6, NSS1	PER @ -69 dBm	≤-67
	- MCS=7, NSS1	PER @ -68 dBm	≤-62
	- MCS=8, NSS1	PER @ -64 dBm	≤-60
MIMO Receive Sensitivity (11ac,20MHz) @10% PER	- MCS=0, NSS1	PER @ -88 dBm	≤-79
	- MCS=1, NSS1	PER @ -87 dBm	≤-77
	- MCS=2, NSS1	PER @ -85 dBm	≤-74
	- MCS=3, NSS1	PER @ -82 dBm	≤-71
	- MCS=4, NSS1	PER @ -78 dBm	≤-66

	- MCS=5, NSS1 PER @ -73 dBm	≤-65
	- MCS=6, NSS1 PER @ -72 dBm	≤-64
	- MCS=7, NSS1 PER @ -71 dBm	≤-59
	- MCS=8, NSS1 PER @ -67 dBm	≤-57
SISO Receive Sensitivity (11ac,40MHz) @10% PER	- MCS=0, NSS1 PER @ -84 dBm	≤-79
	- MCS=1, NSS1 PER @ -81 dBm	≤-77
	- MCS=2, NSS1 PER @ -79 dBm	≤-74
	- MCS=3, NSS1 PER @ -76 dBm	≤-70
	- MCS=4, NSS1 PER @ -73 dBm	≤-66
	- MCS=5, NSS1 PER @ -68 dBm	≤-65
	- MCS=6, NSS1 PER @ -67 dBm	≤-64
	- MCS=7, NSS1 PER @ -66 dBm	≤-59
	- MCS=8, NSS1 PER @ -61 dBm	≤-57
	- MCS=9, NSS1 PER @ -60 dBm	≤-55
MIMO Receive Sensitivity (11ac,40MHz) @10% PER	- MCS=0, NSS1 PER @ -86 dBm	≤-79
	- MCS=1, NSS1 PER @ -84 dBm	≤-76
	- MCS=2, NSS1 PER @ -82 dBm	≤-74
	- MCS=3, NSS1 PER @ -79 dBm	≤-72
	- MCS=4, NSS1 PER @ -76 dBm	≤-67
	- MCS=5, NSS1 PER @ -71 dBm	≤-63
	- MCS=6, NSS1 PER @ -70 dBm	≤-62
	- MCS=7, NSS1 PER @ -69 dBm	≤-61
	- MCS=8, NSS1 PER @ -64 dBm	≤-56
	- MCS=9, NSS1 PER @ -63 dBm	≤-54
SISO Receive Sensitivity (11ac,80MHz) @10% PER	- MCS=0, NSS1 PER @ -81 dBm	≤-79
	- MCS=1, NSS1 PER @ -78 dBm	≤-76
	- MCS=2, NSS1 PER @ -76 dBm	≤-74
	- MCS=3, NSS1 PER @ -72 dBm	≤-71
	- MCS=4, NSS1 PER @ -69 dBm	≤-67
	- MCS=5, NSS1 PER @ -66 dBm	≤-63
	- MCS=6, NSS1 PER @ -64 dBm	≤-62
	- MCS=7, NSS1 PER @ -62 dBm	≤-61
	- MCS=8, NSS1 PER @ -58 dBm	≤-56
	- MCS=9, NSS1 PER @ -56 dBm	≤-54
MIMO Receive Sensitivity (11ac,80MHz) @10% PER	- MCS=0, NSS1 PER @ -82 dBm	≤-76
	- MCS=1, NSS1 PER @ -81 dBm	≤-73
	- MCS=2, NSS1 PER @ -79 dBm	≤-71
	- MCS=3, NSS1 PER @ -75 dBm	≤-68

	- MCS=4, NSS1 PER @ -72 dBm	≤-64
	- MCS=5, NSS1 PER @ -69 dBm	≤-60
	- MCS=6, NSS1 PER @ -67 dBm	≤-59
	- MCS=7, NSS1 PER @ -65 dBm	≤-58
	- MCS=8, NSS1 PER @ -61 dBm	≤-53
	- MCS=9, NSS1 PER @ -60 dBm	≤-51
Maximum Input Level	802.11a/n : -30 dBm	
Antenna Reference	Small antennas with 4.27 dBi peak gain	

[1]5GHz(20MHz) Channel table

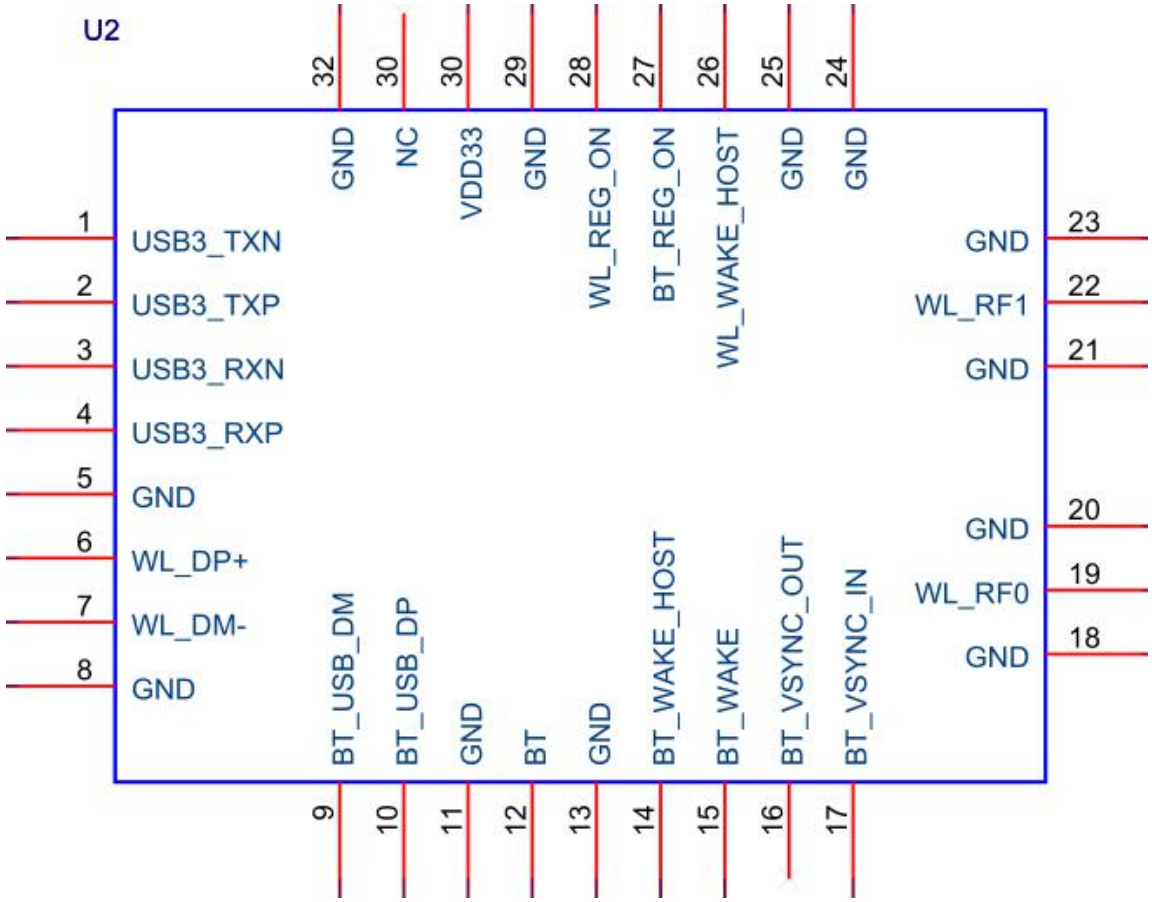
Band range	Operating Channel Numbers	Channel center frequencies(MHz)
5180MHz~5240MHz	36	5180
	40	5200
	44	5220
	48	5240
5260MHz~5320MHz	52	5260
	56	5280
	60	5300
	64	5320
5550MHz~5700MHz	100	5500
	104	5520
	108	5540
	112	5560
	116	5580
	120	5600
	124	5620
	128	5640
	132	5660
	136	5680
	140	5700
5745MHz~5825MHz	149	5745
	153	5765
	157	5785
	161	5805
	165	5825

5. Bluetooth Specification

5.1 Bluetooth Specification

Feature	Description		
General Specification			
Bluetooth Standard	Bluetooth V4.2 of 1, 2 and 3 Mbps.		
Host Interface	USB2.0		
Antenna Reference	Small antennas with 3.15 dBi peak gain		
Frequency Band	2402 MHz ~ 2480 MHz		
Number of Channels	79 channels		
Modulation	FHSS, GFSK, DPSK, DQPSK		
RF Specification			
	Min.	**Typical.**	**Max.**
Output Power (Class 1.5)		9 dBm	
Sensitivity @ BER=0.1% for GFSK (1Mbps)		-92 dBm	
Sensitivity @ BER=0.01% for π/4-DQPSK (2Mbps)		-92 dBm	
Sensitivity @ BER=0.01% for 8DPSK (3Mbps)		-85 dBm	
Maximum Input Level	GFSK (1Mbps):-20dBm		
	π/4-DQPSK (2Mbps) :-20dBm		
	8DPSK (3Mbps) :-20dBm		

6. Pin Assignments



NO.	Name	Type	Description
1	USB3_TXN	I/O	USB3.0 TX data-
2	USB3_TXP	I/O	USB3.0 TX data+
3	USB3_RXN	I/O	USB3.0 RX data-
4	USB3_RXP	I/O	USB3.0 RX data+
5	GND	—	Ground connections
6	USB_DP	I/O	USB data+ (USB2.0/3.0)
7	USB_DM	I/O	USB data- (USB2.0/3.0)
8	GND	—	Ground connections
9	NC	—	No connection (Floating)
10	NC	—	No connection (Floating)
11	GND	—	Ground connections
12	BT_RF	I/O	BT RF port
13	GND	—	Ground connections
14	BT_WAKE_HOST	O	BT wake up HOST
15	BT_WAKE	I	Wake up BT
16	NC	—	No connection (Floating)

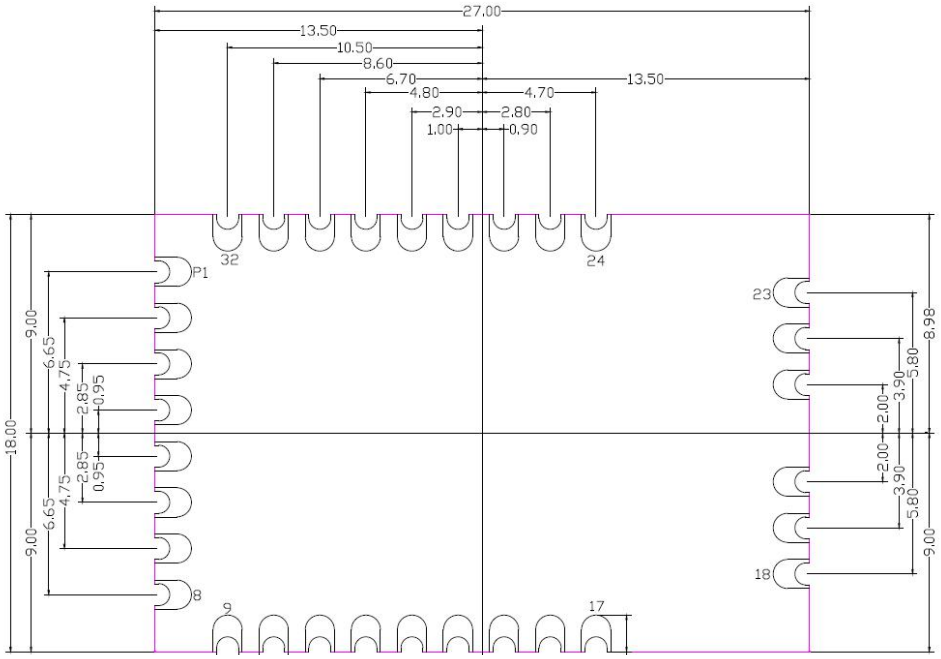
17	NC	—	No connection (Floating)
18	GND	—	Ground connections
19	WL_RF1	I/O	2.4G/5G WIFI RF port1
20	GND	—	Ground connections
21	GND	—	Ground connections
22	WL_RF0	I/O	2.4G/5G WIFI RF port0
23	GND	—	Ground connections
24	GND	—	Ground connections
25	GND	—	Ground connections
26	WL_WAKE_HOST		WLAN wake up HOST
27	BT_REG_ON	I	GPIO Control BT device enabled, ON: pull high, OFF: pull low
28	WL_REG_ON	I	GPIO Control WIFI device enabled, ON: pull high, OFF: pull low
29	GND	—	Ground connections
30	VDD33	I	3.3V Voltage input
31	NC	—	No connection (Floating)
32	GND	—	Ground connections

7. Dimensions

7.1 Physical Outline

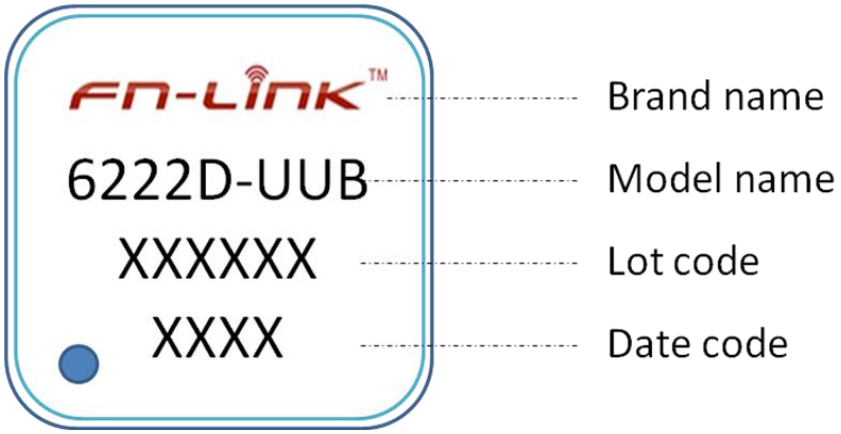
(Unit: mm)

< TOP VIEW >



Marking Description

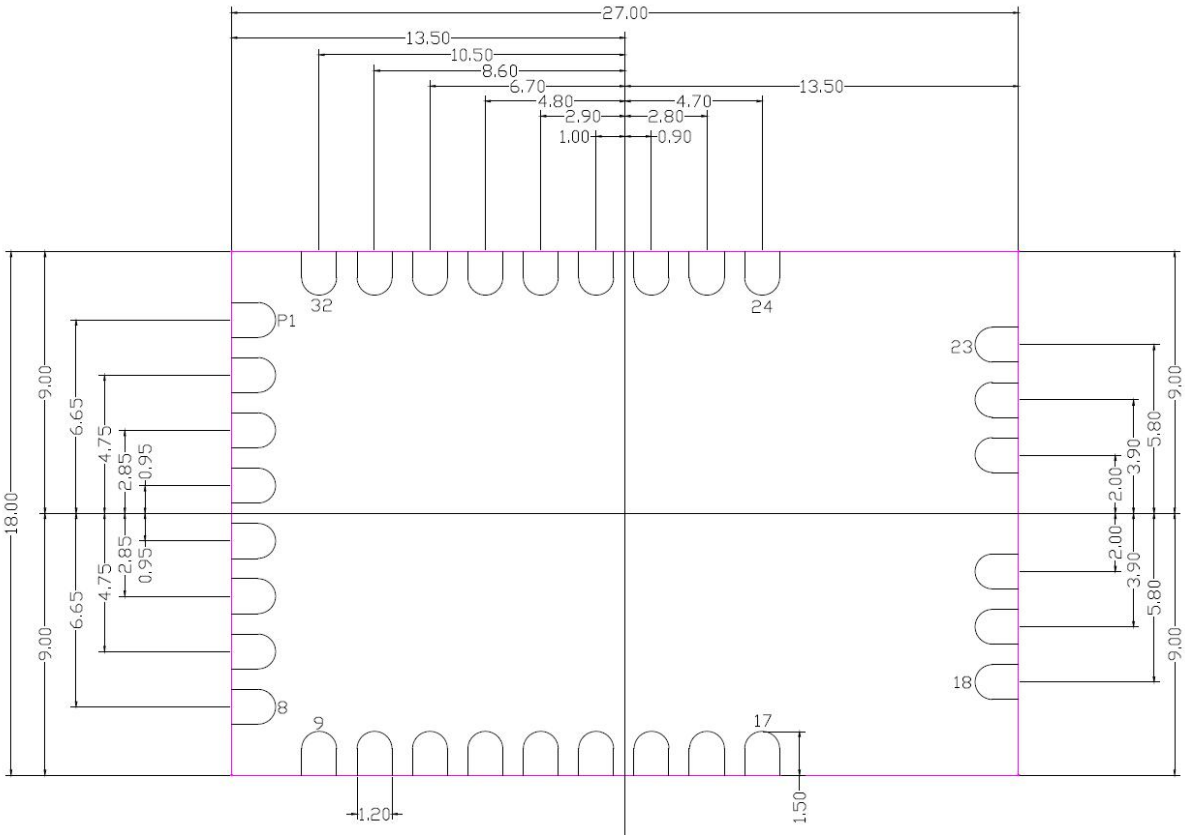
< TOP VIEW >



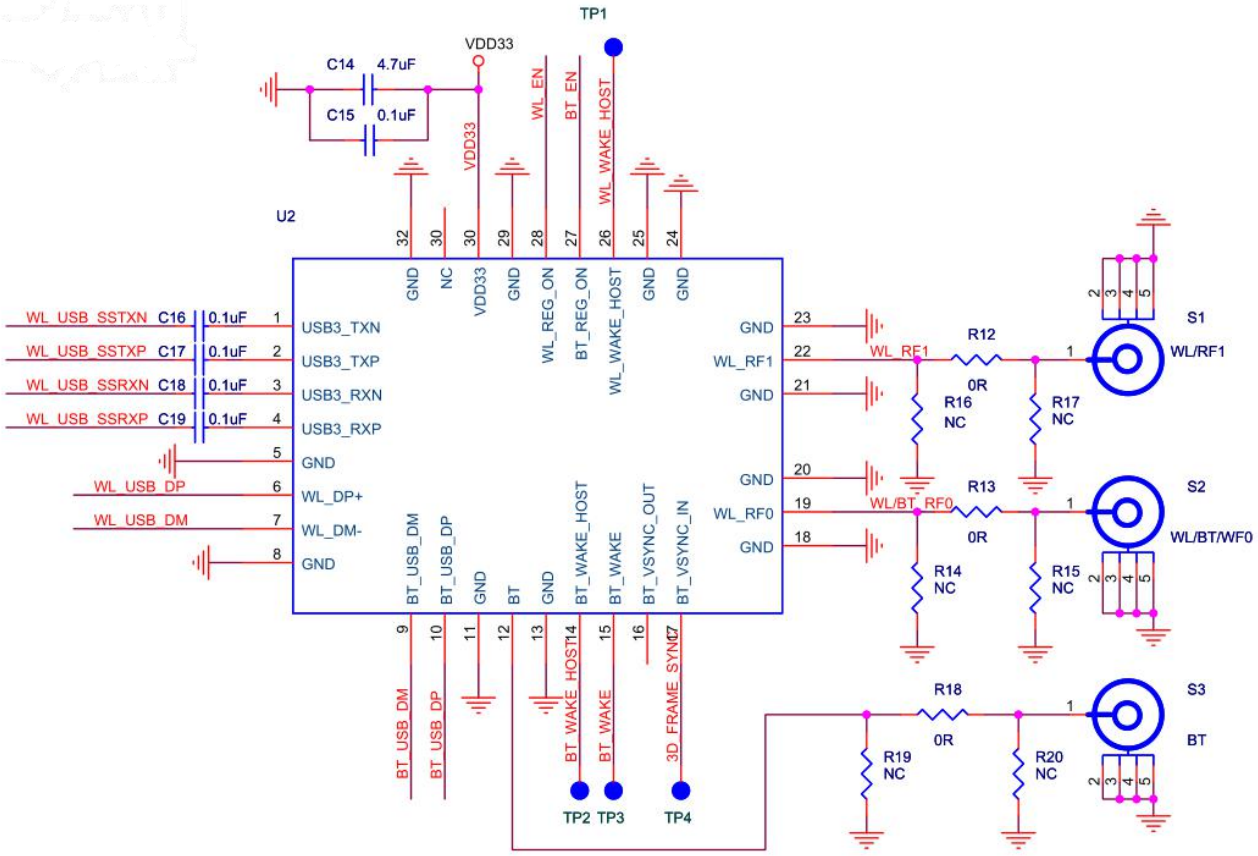
7.2 Layout Recommendation

(Unit: mm)

< TOP VIEW >



8. Reference Design

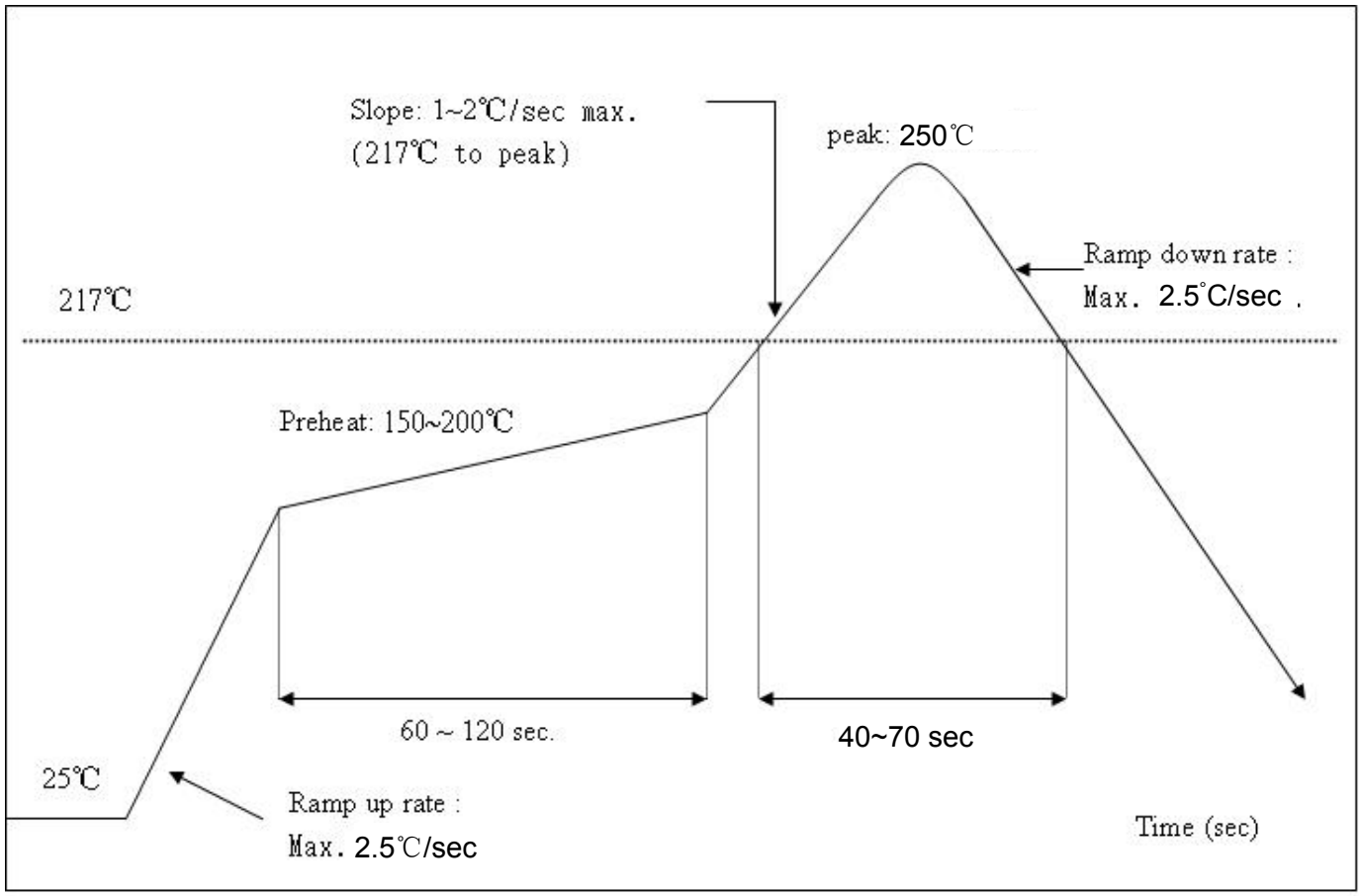


9. Recommended Reflow Profile

Referred to IPC/JEDEC standard.

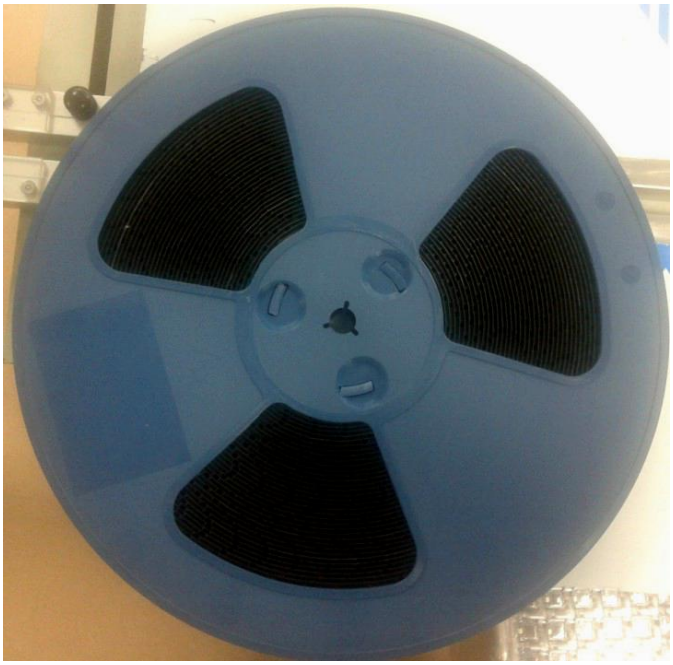
Peak Temperature: <250°C

Number of Times: ≤2 times



10. Package Information

the take-up package



Using self-adhesive tape

Size of black tape: 24mm*32.6m the cover tape: 2.13mm*32.6m

Color of plastic disc: blue

A roll of 2000pcs

NY bag size: 460mm*385mm

size: 350*350*35mm

The packing case size: 350*210*370mm

FCC Statement:

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. (2) This device must accept any interference received, including interference that may cause undesired operation.

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

---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.

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

LABEL OF THE END PRODUCT:

The final end product must be labelled in a visible area with the following "Contains TX FCC ID: 2AATL-6222D-UUB". If the size of the end product is smaller than 8x10cm, then additional FCC part 15.19 statement is required to be available in the users manual: 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.

RF Exposure

This device has been evaluated and shown compliant with the FCC RF Exposure limits under fixed exposure conditions (antennas are greater than 20cm from a person's body) when installed in certain specific OEM configurations.

This modular complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. Due to missing shielding the module is strictly limited to integration by the Grantee himself or his dedicated OEM integrator under control of the Grantee. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

IMPORTANT NOTE:

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

(1) According to FCC Part 15 Subpart C Section 15.212, the radio elements of the modular transmitter must have their own shielding. However, due to there is no shielding for this WIFI/BT module, this module is granted as a Limited Modular Approval.

(2) Integration is typically strictly restricted to Grantee himself or dedicated OEM integrators
under control of the Grantee.

In the event that these conditions can not 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 can not 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.

The module will be responsible to satisfy SAR/RF Exposure requirements, when the module integrated into any (portable, mobile, fixed) host device.

This module is intended for OEM integrator only and the OEM integrators and instructed to ensure that the end user has no manual instructions to remove or install the device. The OEM integrator is still responsible for the FCC compliance requirement of the end product, which integrates this module.

The module has no shielding and tested stand alone. This module is tested and approved as Limited modular approval with stand alone configuration, any OEM incorporated this radio module into any system are require additional testing and evaluation.

The module must in the end-product be installed in such manner that the authorized antennas can be used, any change of the antenna will void the certification.

EU Regulatory RED Declaration of Conformance

Hereby, we(FN-LINK TECHNOLOGY LIMITED) declared that this device is in compliance with the essential requirements and other relevant provisions of the RE Directive 2014/53/EU.

Only indoor use as the restriction of 5150-5250MHz.