

PRODUCT SPECIFICATION

N280A-SRL

Wi-Fi 1x1 11ax dual band+ Bluetooth 5.4

Combo Module

Version:v1.1

Customer: _____

Customer P/N: _____

Signature: _____

Date: _____

FCC ID: 2AATL-N280A-SRL

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N280A-SRL Module Datasheet

Ordering Information	Part NO.	Description
	FGN280ASRL-02	AIC8800D80,a/b/g/n/ac/ax,1T1R,Wi-Fi6,BT5.4,12X12,1T1R, SDIO,with shielding,Industrial Grade



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1. General Description

1.1 Introduction

N280A-SRL is a highly integrated chip with dual band Wi-Fi6, BT5.4 for wireless application.

Its WLAN function supports the SDIO 3.0 interface, and BT only supports UART interface . The module provides simple legacy and 20MHz/40MHz/80MHz co-existence mechanism to ensure backward and network compatibility.Support 2.4GHz/5GHz Wi-Fi6.

The wireless module PHY rate can achieve up 600.4Mbps

1.2 Description

Model Name	N280A-SRL
Product Description	Support Wi-Fi /BT functionalities
Dimension	L x W x H: 12 x 12 x 2.3 mm
Wi-Fi Interface	Support SDIO 3.0
OS supported	Android /Linux/ windows
Operating temperature	-40°C to 85°C
Storage temperature	-40°C to 125°C

2. Features

General

- Compliant with IEEE 802.11a/b/g/n/ac/ax
- support 2.4G+5G dual band, 20/40/80MHz bandwidth
- Wi-Fi Security WEP / WPA / WPA2/WPA3-SAE Personal, MFP
- Support STA, SoftAP, Wi-Fi Direct modes concurrently
- Support STBC, beamforming
- Support Wi-Fi 6 TWT

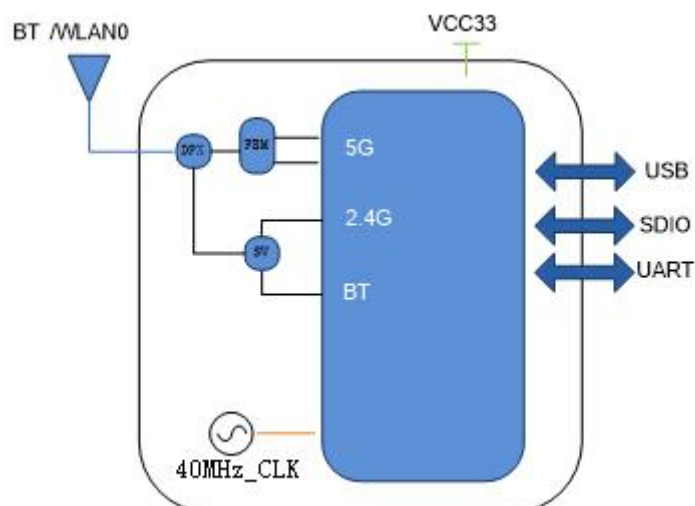
PHY Features

- Data rates up to 600.4Mbps with 20/40/80MHz bandwidth

Host Interface

- Supports SDIO3.0/USB2.0
- Supports all the mandatory and optional features of Bluetooth 5.4
- Supports advanced master and slave topologies

3. Block Diagram



4. General Specification

4.1 2.4GHz RF Specification

Feature	Description	
WLAN Standard	IEEE 802.11b/g/n/ax, Wi-Fi compliant	
Frequency Range	2.400 GHz ~ 2.4835 GHz (2.4 GHz ISM Band)	
Number of Channels	2.4GHz: Ch1 ~ Ch13, Ch14	
Modulation	DBPSK/DQPSK/CCK(DSSS)、BPSK/QPSK/16QAM/64QAM(OF DM)	
Test Items	Typical Value	EVM
Output Power	802.11b /11Mbps : 18dBm $\pm$ 3 dB	EVM $\leq$ -10dB
	802.11g /54Mbps : 15dBm $\pm$ 3 dB	EVM $\leq$ -25dB
	802.11n /MCS7 : 15dBm $\pm$ 3 dB	EVM $\leq$ -28dB
	802.11ax /MCS11 : 13 $\pm$ 3 dBm	EVM $\leq$ -35dB
Spectrum Mask	Meet with IEEE standard	
Freq. Tolerance	$\pm$ 20ppm	
Receive Sensitivity (11b,20MHz) @8% PER	- 11Mbps @-85dBm	$\leq$ -76dBm
Receive Sensitivity (11g,20MHz) @10% PER	- 54Mbps @-73dBm	$\leq$ -68dBm
Receive Sensitivity (11n,20MHz) @10% PER	- MCS=7 @-70dBm	$\leq$ -67dBm
Receive Sensitivity (11n,40MHz) @10% PER	- MCS=7 @-68dBm	$\leq$ -64dBm
Receive Sensitivity (11ax,20MHz) @10% PER	- MCS=11 @-60dBm	$\leq$ -52dBm
Receive Sensitivity (11ax,40MHz) @10% PER	- MCS=11 @-57dBm	$\leq$ -49dBm
Maximum Input Level	802.11b : -10 dBm	
	802.11g/n : -20 dBm	

4.2 WI-FI 5GHz 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)	
Test Items	Typical Value	EVM

Output Power	802.11a 54Mbps: 14 ± 3 dBm	EVM ≤ -25 dB
	802.11n MCS7: 14 ± 3 dBm	EVM ≤ -28 dB
	802.11ac MCS8: 13 ± 3 dBm	EVM ≤ -30 dB
	802.11ac MCS9: 13 ± 3 dBm	EVM ≤ -32 dB
	802.11ax MCS11 : 11 ± 3 dBm	EVM ≤ -35 dB
Receive Sensitivity (11a,20MHz) @10% PER	- 54Mbps PER @ -71 dBm, typical	≤ -68
Receive Sensitivity (11n,20MHz) @10% PER	- MCS=7 PER @ -69 dBm, typical	≤ -67
Receive Sensitivity (11n,40MHz) @10% PER	- MCS=7 PER @ -67 dBm, typical	≤ -64
Receive Sensitivity (11ac,20MHz) @10% PER	- MCS=8 PER @ -66 dBm, typical	≤ -59
Receive Sensitivity (11ac,40MHz) @10% PER	- MCS=9 PER @ -63 dBm, typical	≤ -54
Receive Sensitivity (11ac,80MHz) @10% PER	- MCS=9 PER @ -60 dBm, typical	≤ -51
Receive Sensitivity (11ax,20MHz) @10% PER	- MCS=11 PER @ -60 dBm, typical	≤ -52
Receive Sensitivity (11ax,40MHz) @10% PER	- MCS=11 PER @ -57 dBm, typical	≤ -49
Receive Sensitivity (11ax,80MHz) @10% PER	- MCS=11 PER @ -53 dBm, typical	≤ -46
Maximum input level	802.11a/n: -30 dBm	
	802.11ac: -30 dBm	
	802.11ax: -30 dBm	

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

4.3 Bluetooth Specification

Feature	Description
General Specification	
Bluetooth Standard	BR、EDR(1Mbps&2Mbps&3Mbps)、LE(1Mbps)、LE(2Mbps)
Host Interface	UART

Frequency Band	2400 MHz ~ 2483.5 MHz
Number of Channels	79 channels for classic 、 40 channels for BLE
Modulation	GFSK, $\pi/4$ -DQPSK, 8-DPSK
RF Specification	
Output Power , tolerance ± 3 dB	
	CL1(dBm)
BDR Output Power	9
EDR Output Power	8
BLE Output Power	9
Sensitivity, tolerance $\pm$ dB	
Sensitivity @ BER=0.1% for GFSK (1Mbps)	-83
Sensitivity @ BER=0.01% for $\pi/4$ -DQPSK (2Mbps)	-83
Sensitivity @ BER=0.01% for 8DPSK (3Mbps)	-75
Sensitivity @ BER=30.8% for LE (1Mbps)	-85
Sensitivity @ BER=30.8% for LE (2Mbps)	-83
Maximum Input Level	GFSK (1Mbps):-20dBm
	$\pi/4$ -DQPSK (2Mbps) :-20dBm
	8DPSK (3Mbps) :-20dBm

Note:BT power control by test firmware. Normal driver may not follow this spec.

5. ID setting information

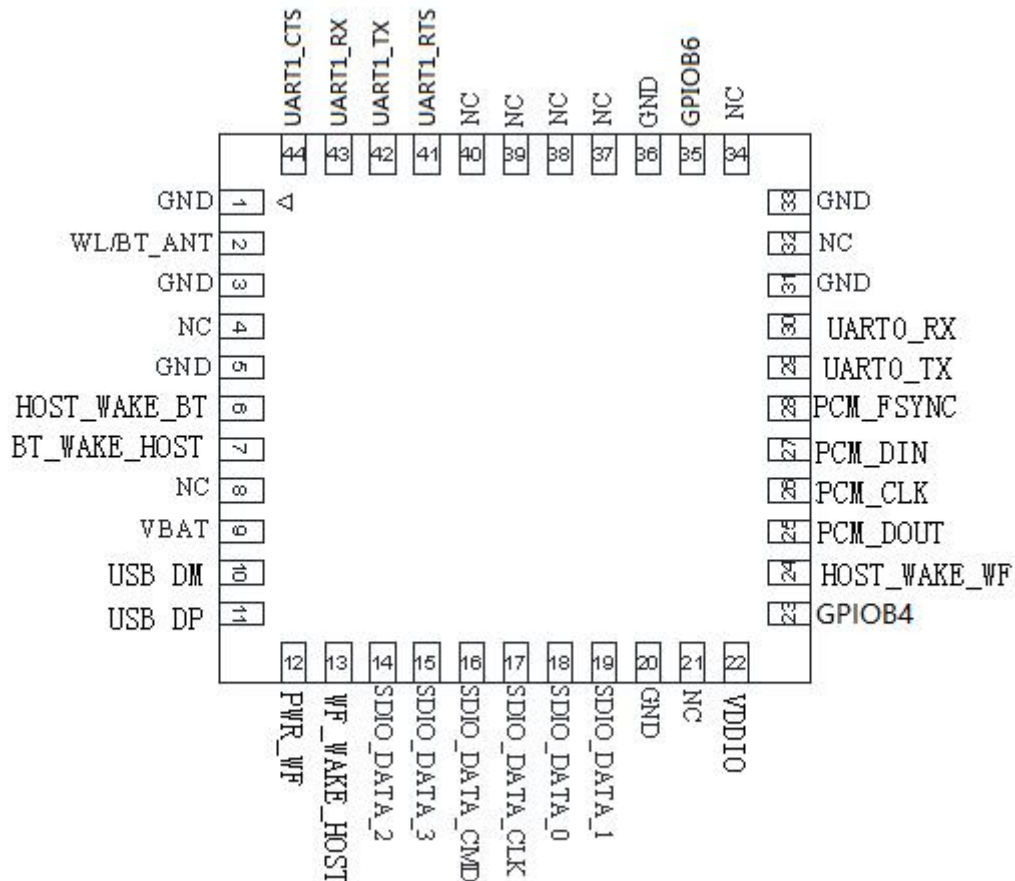
WI-FI

Vendor ID	TBD
Product ID	TBD

6. Pin Definition

6.1 Pin Outline

< TOP VIEW >



6.2 Pin Definition details

NO.	Name	Description	Voltage
1	GND	Ground connections	
2	WL/BT_ANT	WLAN and BT RF I/O port	
3	GND	Ground connections	
4	NC	Floating (Don't connected to ground)	
5	GND	Ground connections	
6	HOST_WAKE_BT	GPIOB3/HOST_WAKE_BT	VIO
7	BT_WAKE_HOST	GPIOB2/BT_WAKE_HOST	VIO
8	NC	Floating (Don't connected to ground)	
9	VBAT	Main power voltage source input	3.3V

10	USB DM	USB DM	
11	USB DP	USB DP	
12	PWR_WF	Default Power Enable: pull high» 6ms Power Disable: pull low	
13	WF Wake Up Host	WF Wake Up Host	VIO
14	SD_D2	SDIO data line 2, GPIOA15	VIO
15	SD_D3	SDIO data line 3, GPIOA14	VIO
16	SD_CMD	SDIO command line, GPIOA13	VIO
17	SD_CLK	SDIO clock line ,GPIOA12	VIO
18	SD_D0	SDIO data line 0 ,GPIOA11	VIO
19	SD_D1	SDIO data line 1, GPIOA10	VIO
20	GND	Ground connections	
21	NC	Floating (Don't connected to ground)	
22	VDDIO	I/O Voltage	1.8V/3.3V
23	GPIOB4	GPIOB4,if not used please keep NC	VIO
24	HOST_WAKE_WF	HOST_WAKE_WF	VIO
25	PCM_DOUT	PCM Data output	VIO
26	PCM_CLK	PCM clock	VIO
27	PCM_DIN	PCM data input	VIO
28	PCM_SYNC	PCM sync signal	VIO
29	UART0 TX	GPIOA9, UART0 TX	VIO
30	UART0 RX	GPIOA8, UART0 RX	VIO
31	GND	Ground connections	
32	NC	Floating (Don't connected to ground)	
33	GND	Ground connections	
34	NC	Floating (Don't connected to ground)	
35	GPIOB6	GPIOB6,,if not used please keep NC	VIO
36	GND	Ground connections	
37	NC	Floating (Don't connected to ground)	
38	NC	Floating (Don't connected to ground)	
39	NC	Floating (Don't connected to ground)	
40	NC	Floating (Don't connected to ground)	
41	UART1_RTS	BT_UART1_RTS, GPIOA7	VIO
42	UART1_TX	BT_UART1_TX, GPIOA5	VIO
43	UART1_RX	BT_UART1_RX, GPIOA4	VIO
44	UART1_CTS	BT_UART1_CTS, GPIOA6	VIO

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	-40	25	85	deg.C
VBAT	3	3.3	3.6	V
VDDIO	1.7	1.8/3.3	3.6	V

7.2 Power Consumption

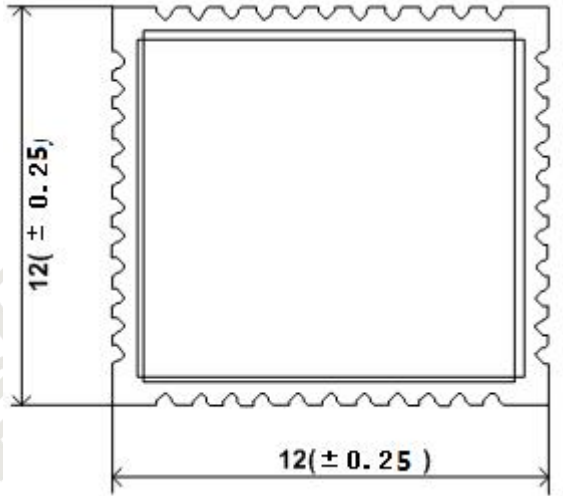
2.4G	Test condition: VBAT=3.3V / VDDIO=3.3V	
	Current @ TX	Current @ RX
	Maximum(mA)	Maximum(mA)
11b@18dbm	188	57
11g@15dbm	157	57
HT20-mcs7@14dbm	149	58
HT40-mcs7@14dbm	143	57
VHT20-mcs8@14dbm	144	56
VHT40-mcs9@14dbm	142	56
HE20-mcs11@13dbm	125	57
HE40-mcs11@13dbm	124	58
HE80-mcs11@13dbm	124	58

5G	Test condition: VBAT=3.3V / VDDIO=3.3V	
	Current @ TX	Current @ RX
	Maximum(mA)	Maximum(mA)
54M@15dbm	165	58
MCS7 HT20@14dbm	144	56
MCS7 HT40@14dbm	148	56
MCS8 VHT20@14dbm	147	58

MCS9 VHT40@14dbm	146	57
MCS11 HE20@12dbm	143	58
MCS11 HE40@12dbm	135	58
MCS11 HE80@12dbm	134	58

8. Size reference

8.1 Module Picture

L x W : 12 x 12 (±0.25) mm	
H: 2.3 (±0.2) mm	
Weight	0.59(±0.1)g

8.2 Marking Description

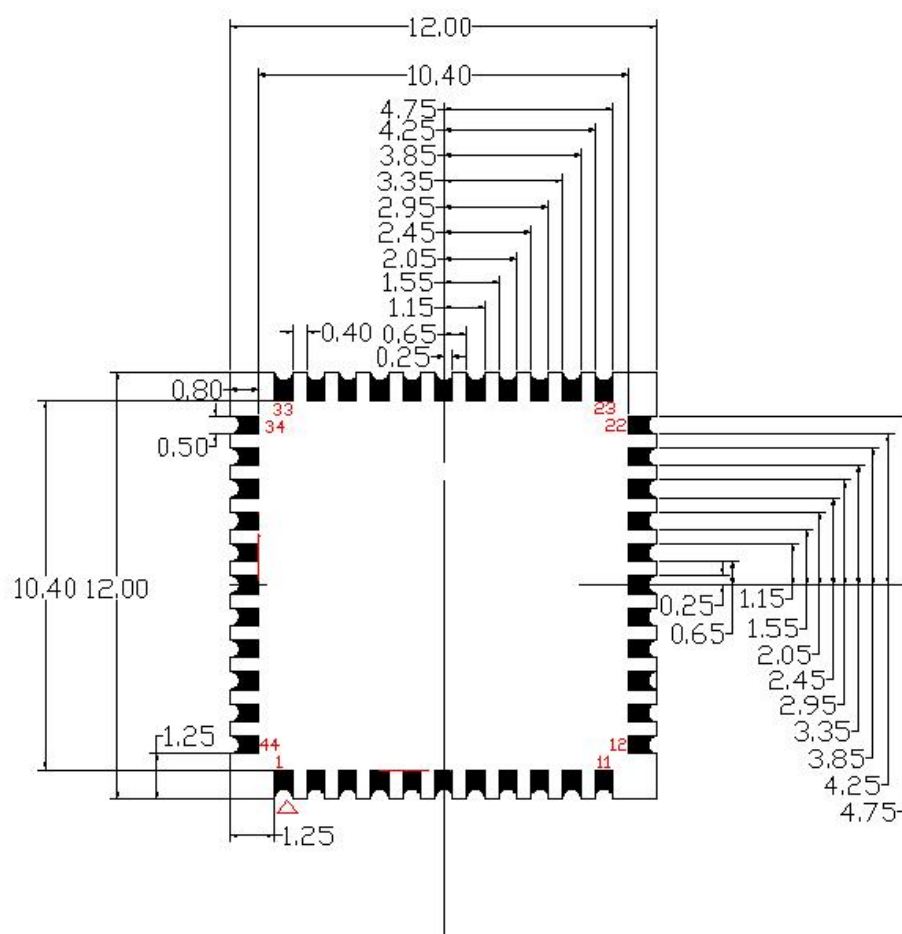


8.3 List of certified information

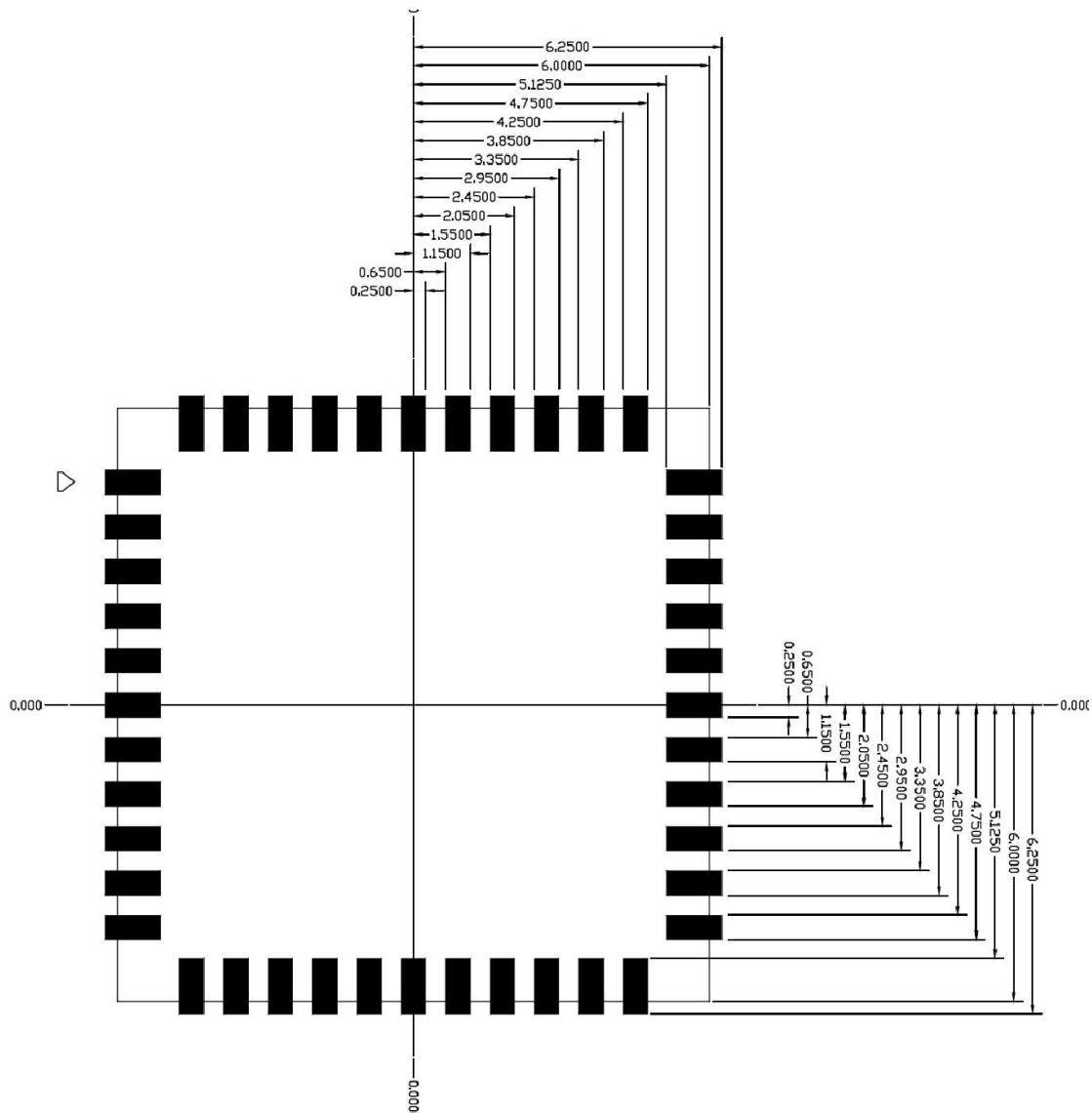
Certification project	Certificate number
SRRC	24J43T230002(M)
FCC	TBD
CE	TBD
IC	TBD
NCC	TBD
KCC	TBD
TELEC	TBD
Brazil	TBD
Argentina	TBD
Japan	TBD

8.4 Physical Dimensions

<TOP View>



8.5 Layout Recommendation

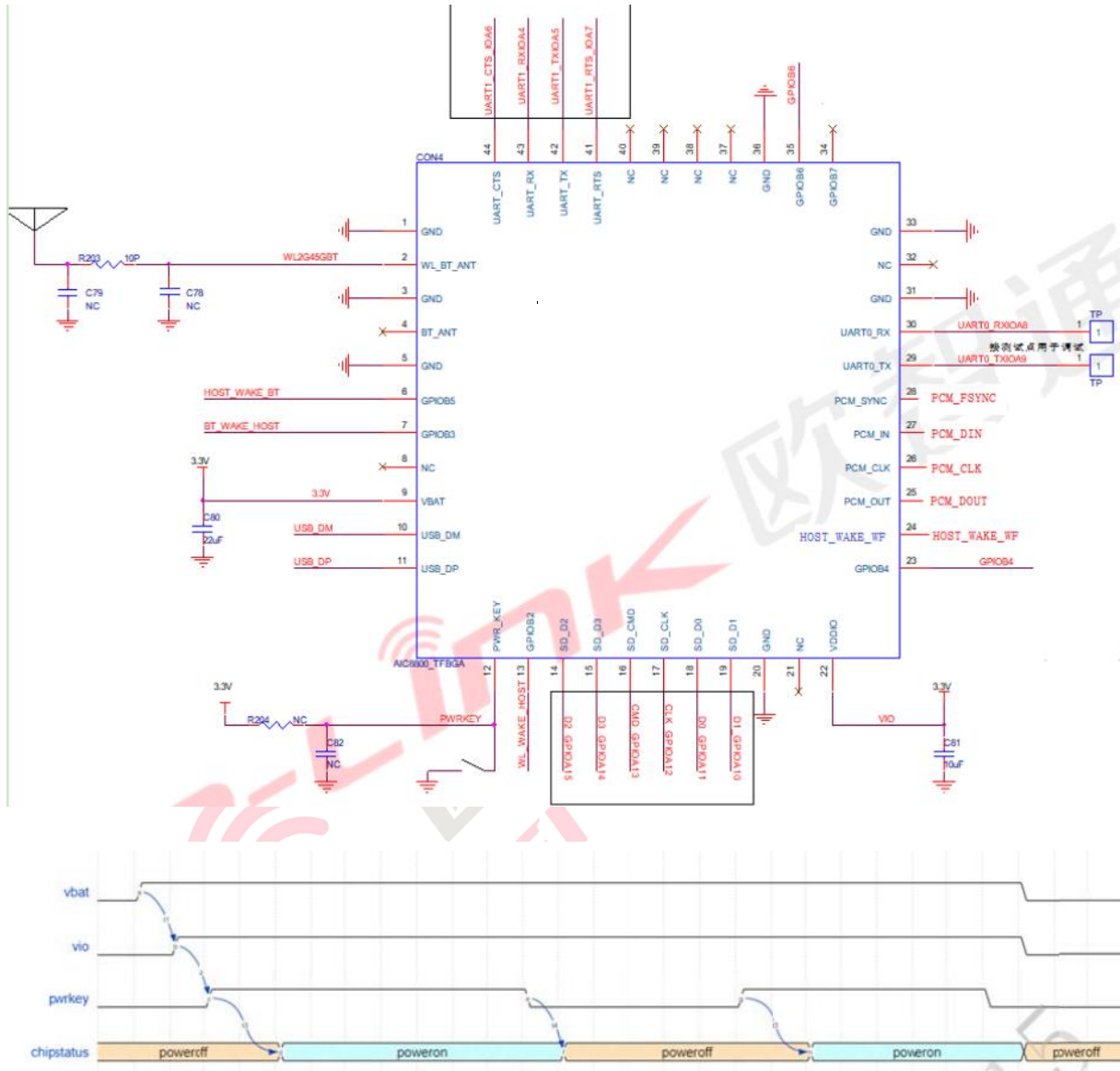


9. The Key Material List

Item	Part Name	Description	Manufacturer
1	Inductor	2016 4.7uH, $\pm 20\%$	Sunlord, Ceaiya, Cenker, Taiyo, inpaq
2	Crystal	2016 40MHz $\pm 10\text{ppm}$	ECEC, TKD, Hosonic, JWT, TXC
3	Chipset	AIC8800D80	AIC
4	PCB	FR4, 4 LAYER, GREEN	XY-PCB, GDKX, Sunlord, SLPCB, Truly, ZL-PCB
5	shielding	N240A-SRL shielding	Sun-tek, JLitong, 卓益

10. Reference Design

Note: Module requires independent power supply , supply capacity $\geq 1\text{A}$ and ripple less than 100mV; Do not share power with amplifier, infrared device, camera, etc.



- t1: VIO's power on time $\geq$ VBAT's
t2: power key's high time $\geq$ VIO's +200us
t3: chip all power on ready time $\geq$ power key high time + 8ms
t4: pwrkey pull low to chip all power off time $\geq$ 6ms

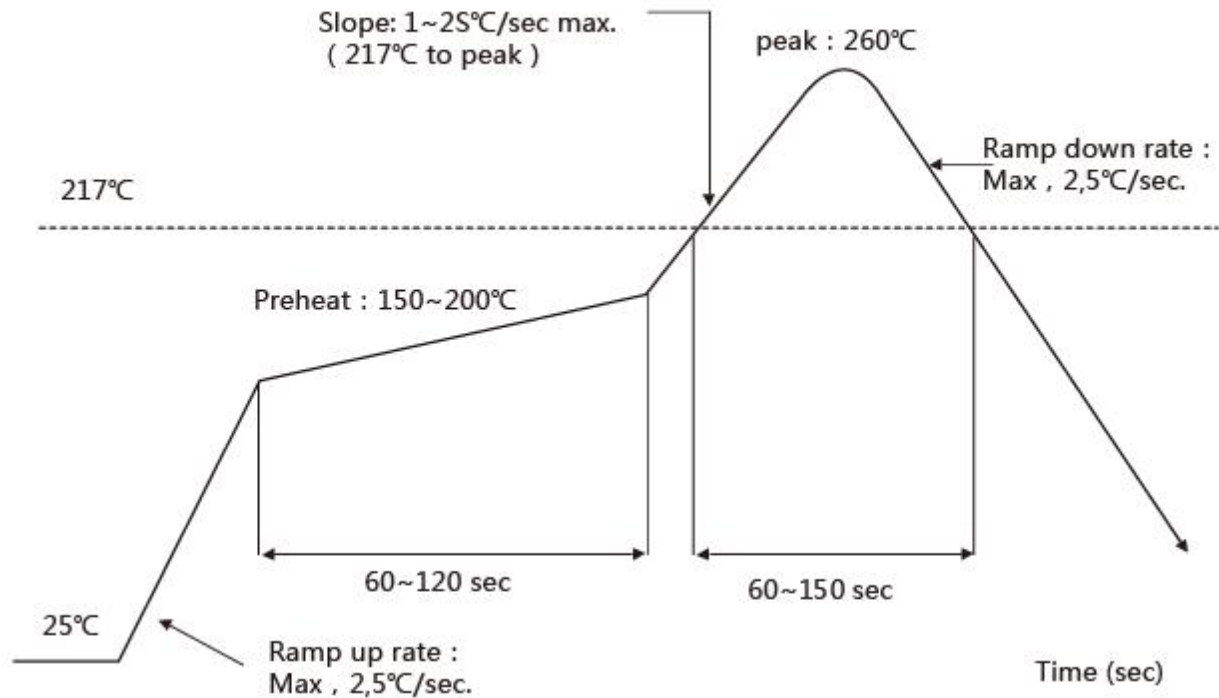
11. Recommended Reflow Profile

Referred to IPC/JEDEC standard.

Peak Temperature: $\leq 260^{\circ}\text{C}$

Time within 5°C of peak temperature: $\geq 10\text{s}$

Number of Times: ≤ 2 times



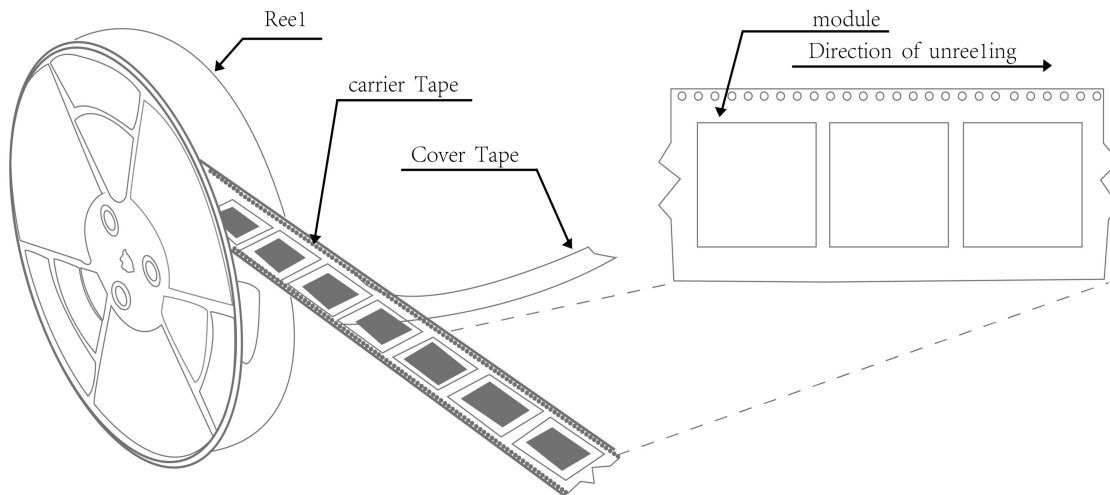
12. RoHS compliance

All hardware components are fully compliant with EU RoHS directive

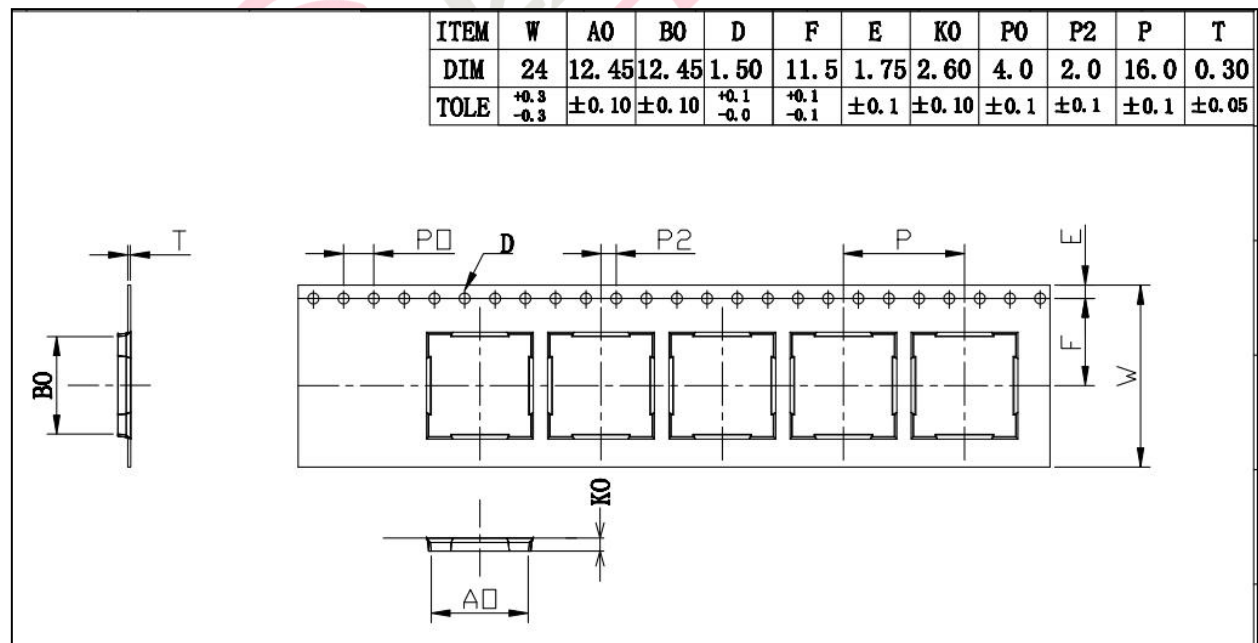
13. Package

13.1 Reel

A roll of 1500pcs



13.2 Carrier Tape Detail



13.3 Packaging Detail

the take-up package



Using self-adhesive tape

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

Color of plastic disc: blue



NY bag size:450mm*415mm



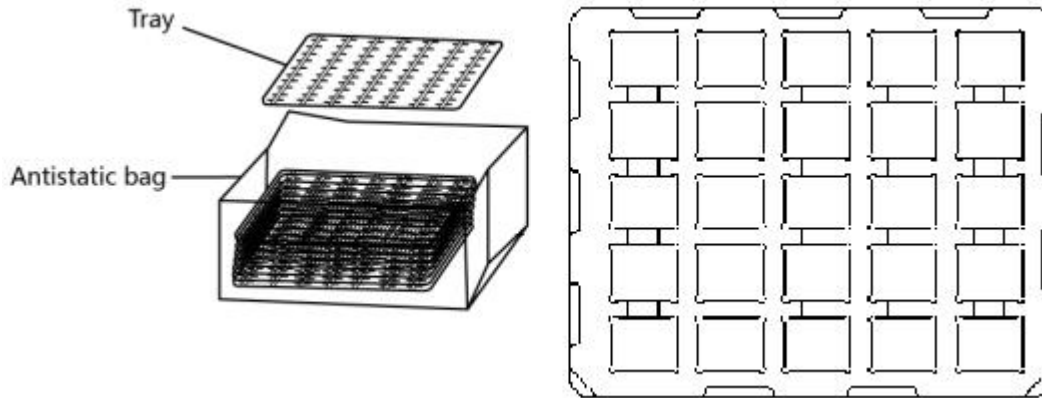
size : 350*350*35mm



The packing case size:360*210*370mm

13.4 Tray

Use pallet packaging for less than 300 pieces



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°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

15. Caution

RF exposure considerations

This equipment complies with the FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator and any part of your body.

Antennas

This product has two external antennas. The antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

No.	Antenna Type	Frequency Range	Gain	Impedance
1	External Antenna	2402-2480MHz 2412-2462MHz 5180-5240MHz 5260-5320MHz 5500-5700MHz 5745-5825MHz	2.4G: 4.7dBi 5G: 5.52dBi	50ohm

Label and compliance information

FCC ID label on the final system must be labeled with "Contains FCC ID:

2AATL-N280A-SRL" or "Contains transmitter module FCC ID: 2AATL-N280A-SRL".

Information on test modes and additional testing requirements

Contact FN-LINK TECHNOLOGY LIMITED will provide stand-alone modular transmitter test mode. Additional testing and certification may be necessary when multiple modules are used in a host.

Additional testing, Part 15 Subpart B disclaimer

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. Since this may depend on the details of how the module is integrated with the host, UConnect International Co.,Ltd. shall provide guidance to the host manufacturer for compliance with the Part 15B requirements.

FCC Warning

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.

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.

NOTE 1: Any changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. End users must follow the specific operating instructions for satisfying RF exposure compliance.

Note 1: This module certified that complies with RF exposure requirement under mobile or fixed condition, this module is to be installed only in mobile or fixed applications.

A mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons. Transmitting devices designed to be used by consumers or workers that can be easily re-located, such as wireless devices associated with a personal computer, are considered to be mobile devices if they meet the 20 centimeter separation requirement.

A fixed device is defined as a device is physically secured at one location and is not able to be easily moved to another location.

Note 2: Any modifications made to the module will void the Grant of Certification, this module is limited to OEM installation only and must not be sold to end-users, end-user has no manual instructions to remove or install the device, only software or operating procedure shall be placed in the end-user operating manual of final products.

Note 3: Additional testing and certification may be necessary when multiple modules are used.

Note 4: The module may be operated only with the antenna with which it is authorized. Any antenna that is of the same type and of equal or less directional gain as an antenna that is authorized with the intentional radiator may be marketed with, and used with, that intentional radiator.

Note 5: For all products market in US, OEM has to limit the operation channels in CH1 to CH11 for 2.4G band by supplied firmware programming tool. OEM shall not supply any tool or info to the end-user regarding to Regulatory Domain change.

