



PRODUCT SPECIFICATION

3243E-U

Wi-Fi Single -band 1T1R 802.11b/g/n/ax

WIFI+BLE5.2+SLE1.0

Combo Module

Version:v1.9

Customer: _____

Customer P/N: _____

Signature: _____

Date: _____

FCC ID: _____

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

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

3243E-U Module Datasheet

Ordering Information	Part NO.	Description
	FG3243EUXX-00	Q35343U100,802.11b/g/n/ax ,WIFI+BLE5.2+SLE1.0,1T1R,USB2.0,12.2X12.9mm



CONTENTS

1. General Description	6
1.1 Introduction	6
1.2 Description	7
2. Features	7
3. Block Diagram	8
4. General Specification	8
4.1 WI-FI 2.4GHz RF Specification	8
All rate power table	9
4.2 Bluetooth Specification	10
4.3 SLE Specification	10
5. Pin Definition	12
5.1 Pin Outline	12
5.2 Pin Definition details	12
6. Electrical Specifications	13
6.1 Power Supply DC Characteristics	13
7. Interface Circuit time series	14
7.1 USB Bus Timing during Power On Sequence	14
8. Size reference	16
8.1 Module Picture	16
8.2 Marking Description	16
8.3 Layout Recommendation	17
9. The Key Material List	17
10. Reference Design	18
11. Recommended Reflow Profile	19
12. RoHS compliance	19
13. Package	20
13.1 Reel	20
13.2 Carrier Tape Detail	20
13.3 Packaging Detail	21
13.4 Tray	22
14. Moisture sensitivity	22
15. List of applicable FCC rules	22
15.1. Specific operational use conditions	22
15.2. Limited module procedures	23
15.3. Trace antenna designs	23
15.4. RF exposure considerations	23

15.5. Antennas	23
15.6. Label and compliance information	23
15.7. Information on test modes and additional testing requirements	23
15.8. Additional testing, Part 15 Subpart B disclaimer	23



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1. General Description

1.1 Introduction

3243E-U is a Combo chip highly integrated with 2.4GHz Wi Fi, BLE, and SLE, integrating IEEE 802.11b/g/n/ax baseband and RF circuits, including power amplifiers Large PA, low noise amplifier LNA, RF balun, antenna switch, and power management module, etc; Supports 802.11n 20MHz/40MHz bandwidth and 802.11ax 20MHz Bandwidth, providing a maximum physical layer speed of 150Mbps and longer coverage distance.

The 3243E-U Wi Fi baseband implements orthogonal frequency division multiple access (OFDMA) technology, orthogonal frequency division multiplexing (OFDM) technology, and is backward compatible with direct sequence spread spectrum (DSSS) Complement Keying (CCK) technology supports various data rates of IEEE 802.11b/g/n protocol and MCS0~MCS9 rates of IEEE 802.11ax protocol.

3243E-U supports BLE 1MHz/2MHz bandwidth, BLE 4.0/4.1/4.2/5.0/5.1/5.2 protocol, BLE Mesh and BLE gateway functions, maximum air speed Rate of 2Mbps.

The 3243E-U supports SLE 1MHz/2MHz/4MHz bandwidth, SLE1.0 protocol, SLE gateway function, and a maximum air port speed of 12Mbps.

The 3243E-U chip integrates a high-performance 32-bit microprocessor and a secure processing engine; Provide UART and GPIO interfaces, while supporting high-speed SDIO2.0 interfaces, up to Clock can reach 50MHz; Supports USB2.0 interface, with a maximum speed of 480Mbps; The chip serves as a slave and is loaded onto the host MCU through an SDIO/USB interface for operation.

3243E-U supports OpenHarmony, FreeRTOS, Huawei LiteOS, Android, and Linux systems, providing a more open development environment and faster system operation Travel environment.

1.2 Description

Model Name	3243E-U
Product Description	Support Wi-Fi/Bluetooth/SLE functionalities
Dimension	L x W x H: 12.2 x 12.9 x 2.37 mm
Wi-Fi Interface	Support USB 2.0
BT Interface	USB
Operating temperature	-40° C to 85° C
Storage temperature	-40° C to 125° C

2. Features

General Features

- 802.11 b/g/n/ax 1T1R WLAN and Bluetooth 5.2 SLE1.0 combo chip
- Complete 802.11n solution for both 2.4GHz(ch1-ch14) band
- Supports 802.11n 20MHz/40MHz bandwidth and 802.11ax 20MHz bandwidth
- Support maximum speed: 150Mbps@HT40 MCS7, 114.7Mbps@HE20 MCS9.
- Maximum data rate 54Mbps in 802.11g; and 150Mbps in 802.11n

WLAN Interface

- USB Multi-Function

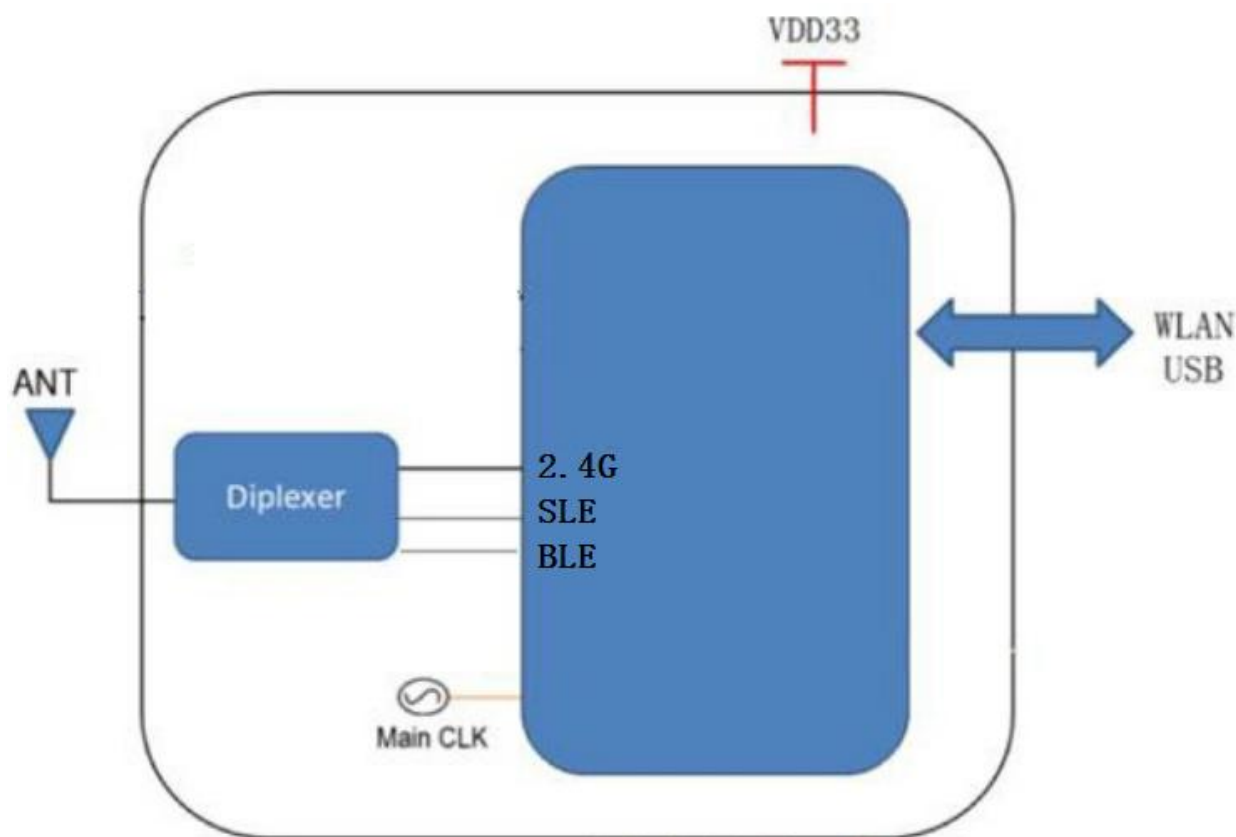
Bluetooth Features

- Supports BLE 4.0/4.1/4.2/5.0/5.1/5.2
- Supports speeds of 125Kbps, 500Kbps, 1Mbps, and 2Mbps.

SLE Features

- Supports SLE 1MHz/2MHz/4MHz, with a maximum air port speed of 12Mbps.

3. Block Diagram



4. General Specification

4.1 WI-FI 2.4GHz RF Specification

Feature	Description	
WLAN Standard	IEEE 802.11 b/g/n Wi-Fi compliant	
Frequency Range	2.400 GHz ~ 2.4835 GHz (2.4 GHz ISM Band)	
Number of Channels	2.4GHz: Ch1 ~ Ch13	
Test Items	Typical Value	EVM
Output Power	802.11b /11Mbps : 20dBm $\pm$ 2 dB	EVM $\leq$ -9dB
	802.11g /54Mbps : 16dBm $\pm$ 2 dB	EVM $\leq$ -25dB
	802.11n /MCS7 : 15dBm+ $\pm$ 2 dB	EVM $\leq$ -28dB
	802.11ax HE20 MCS9: 14dBm $\pm$ 2 dB	EVM $\leq$ -32dB
Spectrum Mask	Meet with IEEE standard	
Freq. Tolerance	$\pm$ 20ppm	
Test Items	TYP Test Value	Standard Value
SISO Receive Sensitivity	- 1Mbps @ -94 dBm	$\leq$ -83 dBm

(11b,20MHz) @8% PER	- 11Mbps @ -87 dBm	≤-76 dBm
Receive Sensitivity	- 6Mbps @ -90 dBm	≤-85 dBm
(11g,20MHz) @10% PER	- 54Mbps @ -73 dBm	≤-68 dBm
Receive Sensitivity	- MCS=0 @ -90 dBm	≤-85 dBm
(11n,20MHz) @10% PER	- MCS=7 @ -72 dBm	≤-67 dBm
Receive Sensitivity	- MCS=0 @ -87 dBm	≤-82 dBm
(11n,40MHz) @10% PER	- MCS=7 @ -69 dBm	≤-64 dBm
Receive Sensitivity	- MCS=0 @ -90 dBm	≤-74 dBm
(11ax,20MHz) @10% PER	- MCS=9 @ -65 dBm	≤-52 dBm
Maximum Input Level	802.11b : -10 dBm	
	802.11g/n : -20 dBm	
Antenna Reference	Small antennas with 0~2 dBi peak gain	

All rate power table

11b	1M	2M	5.5M	11M							
target_tx_power	20dBm	20dBm	20dBm	20dBm							
11g	6M	9M	12M	18M	24M	36M	48M	54M			
target_tx_power	19dBm	19dBm	19dBm	19dBm	18dBm	18dBm	17dBm	16dBm			
11n20	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8	MCS9	
target_tx_power	19dBm	19dBm	19dBm	19dBm	18dBm	17dBm	16dBm	15dBm	14dBm	14dBm	
11n40	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8	MCS9	MCS32
target_tx_power	19dBm	19dBm	19dBm	19dBm	18dBm	17dBm	16dBm	15dBm			

Note: The power configuration profile is as follows: If adjustment of the target power is required, it can be modified in the ws73.cfg.ini file. The unit is 0.5 dBm, and the configurable range is: 0~46

```
## 1M 2M 5.5M 11M 11b
target_tx_power_2g_11b=0x28,0x28,0x28,0x28;
## 6M 9M 12M 18M 24M 36M 48M 54M 11g
target_tx_power_2g_11g=0x26,0x26,0x26,0x26,0x24,0x24,0x22,0x20;
## MCS0~MCS9 11n(MCS7)/11ax
target_tx_power_2g_20m=0x26,0x26,0x26,0x26,0x24,0x22,0x20,0x1E,0x1C,0x1C;
## MCS0~MCS9 11n(MCS7)/11ax MCS32 11n
target_tx_power_2g_40m=0x26,0x26,0x26,0x26,0x24,0x22,0x20,0x1E,0x1C,0x1C,0x1C;
# regulation power 0.5dBm
```

Note: Other data rates transmit power are controlled by Power-by-Rate function of the driver.

4.2 Bluetooth Specification

Feature	Description
General Specification	
Bluetooth Standard	LE(1Mbps),2LE(2Mbps)
Host Interface	USB
Frequency Band	2400 MHz ~ 2483.5 MHz
Number of Channels	40 channels for BLE
Modulation	GFSK, $\pi/4$ -DQPSK,8DPSK
RF Specification	
Output Power , tolerance +/-2 dB	
	CL1(dBm)
BLE Output Power	6
Sensitivity, tolerance : /	
Sensitivity @ BLE=30.8% for LE (1Mbps)	-93
Sensitivity @ BLE=30.8% for 2LE (2Mbps)	-90
Maximum Input Level	GFSK (1Mbps):-20dBm

4.3 SLE Specification

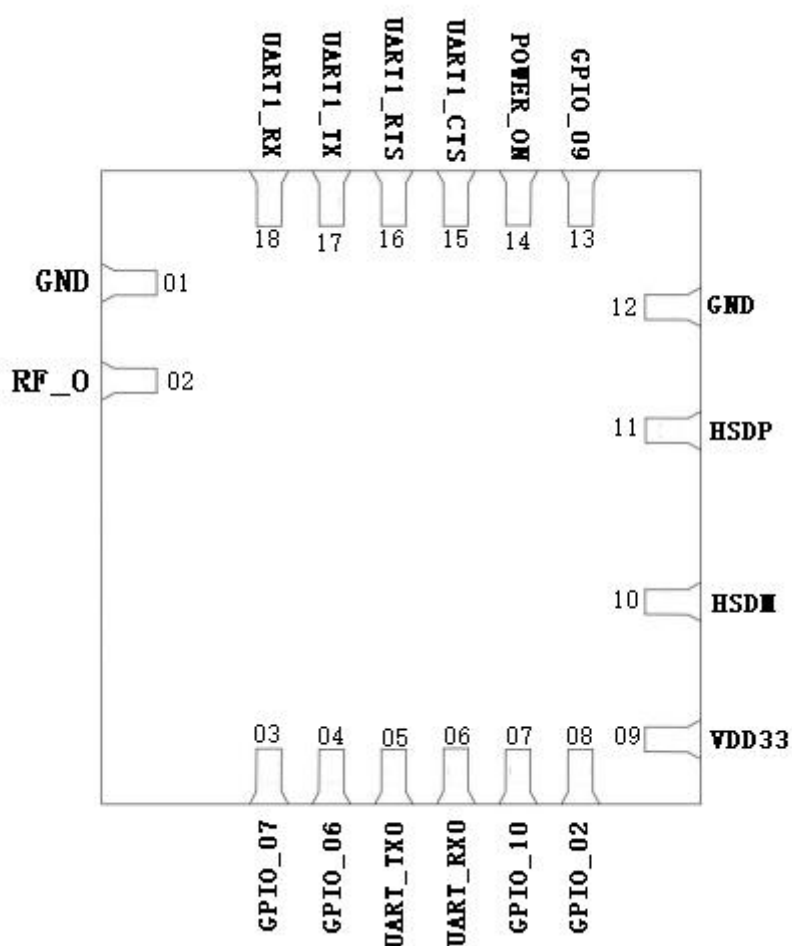
Feature	Description
General Specification	
Bluetooth Standard	SLE(1Mbps),2SLE(2Mbps)
Host Interface	USB
Frequency Band	2400 MHz ~ 2483.5 MHz
Number of Channels	40 channels for BLE
Modulation	GFSK, QPSK,8PSK
RF Specification	

Output Power , tolerance +/-2 dB	
	CL1(dBm)
GFSK 1M/2M/4M	6
QPSK	6
8PSK	6
Sensitivity, tolerance : /	
SLE 1M GFSK (dBm)	-92
SLE 2M GFSK (dBm)	-89
SLE 1M QPSK (dBm)	-95
SLE 2M QPSK (dBm)	-92
SLE 1M 8PSK (dBm)	-90
SLE 2M 8PSK (dBm)	-87

5. Pin Definition

5.1 Pin Outline

< TOP VIEW >



5.2 Pin Definition details

NO.	Name	Type	Description	Voltage
1	GND		Ground connections	
2	RF_0	I/O	RF I/O, Wi-Fi 2.4G/BLE/SLE	
3	GPIO_07	I/O	Universal GPIO	
4	GPIO_06	I/O	Universal GPIO	
5	UART_TX0	O	GPIO_03/UART_TX0	
6	UART_RX0	I	GPIO_13/UART_RX0	
7	GPIO_10	I/O	wifi device wake-up HOST and Bluetooth device wake-up HOST shared(Hardware strap pin,don't	VDDIO

			pull high or low this pin during module power on)	
8	GPIO_02	I/O	HOST_WAKE_BT/HOST to wake-up Bluetooth device(Hardware strap pin,don' t pull high or low this pin during module power on)	VDDIO
9	VDD33	P	Main power voltage source input 3.3V	3.3V
10	DM	I/O	USB2.0 differential pair D-	
11	DP	I/O	USB2.0 differential pair D+	
12	GND	—	Ground connections	
13	GPIO_09	I/O	Universal GPIO (Hardware strap pin,don' t pull high or low this pin during module power on)	
14	POWER_ON	I	Power_ On default pull-up	
15	UART1_CTS	I	GPIO_01/UART1_CTS	
16	UART1_RTS	O	GPIO_00/UART1_RTS	
17	UART1_TX	O	GPIO_05/UART1 Output (Hardware strap pin,don't pull high on this pin during module power on)	
18	UART1_RX	I	GPIO_04/UART1 Input	

P:POWER I:INPUT O:OUTPUT

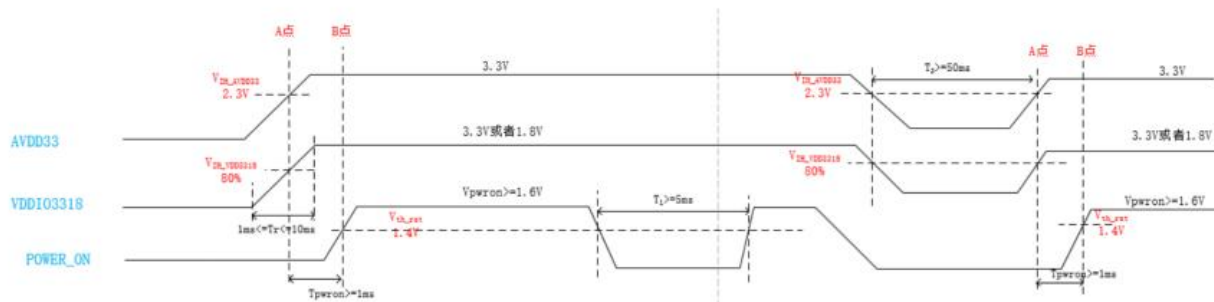
6. Electrical Specifications

6.1 Power Supply DC Characteristics

	MIN	TYP	MAX	Unit
Operating Temperature	-40	25	85	deg.C
VDD33	3.0	3.3	3.6	V

7. Interface Circuit time series

7.1 USB Bus Timing during Power On Sequence



Explanation:

Vpwron: When the PWRON signal reaches 1.4V, the chip's PMU can begin normal operation.

Vth_rst: The PMU's de-reset voltage. To ensure reliable operation of all chips, PWRON must remain inactive for at least 1ms after VBAT and DVDDIO are powered (i.e., $T_{pwron} \geq 1\text{ms}$). Only after this delay, when PWRON rises to 1.4V (V_{th_rst}), can normal operation be guaranteed.

In Figure 2-1, timing point A is defined as the later of the two events during power-up: when the AVDD33 supply reaches V_{IH_AVDD33} , or when the DVDDIO supply reaches $V_{IH_DVDDIO3318}$. Timing point B is defined as the moment when the POWER_ON signal reaches 1.4V (V_{th_rst}) during power-up.

Power-Up Sequence:

The external DVDDIO power supply ramp time shall be within the range of 1ms to 10ms. The external power supplies AVDD33 and IO supply DVDDIO are in the powered-off state, POWER_ON is inactive, and the chip is in the powered-off state.

The external power supplies AVDD33 and DVDDIO are powered up (no specific order required between them), while the external POWER_ON control signal remains low.

The external POWER_ON signal is driven high. POWER_ON must be pulled high (to the DVDDIO level) at least 1ms after AVDD33 and DVDDIO have completed their power-up.

After the NW117 internal PMU detects the POWER_ON signal as high, the internal de-reset sequence starts 400 μs later. Hardware control word latching completes 4.5ms (32kHz) after the de-reset sequence begins, and digital logic de-reset completes 10.4ms (32kHz) after the sequence begins. The chip then starts normal operation.

After power-up, if POWER_ON is pulled low and then high again, the duration T1 (low time) must be greater than 5ms.

Power-Down Sequence:

POWER_ON must be powered down no later than DVDDIO and AVDD33.

The power-down threshold for POWER_ON is 1.4V.

During power-down, the residual voltage on the DVDDIO and AVDD33 supplies must be discharged to below 0.8V before a subsequent power-up can occur.

The time interval T2 between repeated power cycles (power-down and power-up) of the chip's DVDDIO and AVDD33 supplies must satisfy: $T2 > 50\text{ms}$.

Note:

The power-up and power-down edges must be monotonic with no undershoot or overshoot.

When DVDDIO and AVDD33 are supplied from the same power rail, the requirement $T_{pwron} \geq 1\text{ms}$ may not be met. In such cases, an RC circuit at the board level can be used to delay POWER_ON. The RC time constant should be $\geq 20\text{k}\Omega \times 220\text{nF} = 4.4\text{ms} \approx 5\text{ms}$ to meet the requirement.

Back-Drive Prevention Requirements (Constraints on the HOST side):

When NW117 is in the powered-down state, any IO pins on the HOST (a chip connected to NW117's IOs) that are connected to NW117 must be configured as high-impedance (Hi-Z) or low level.

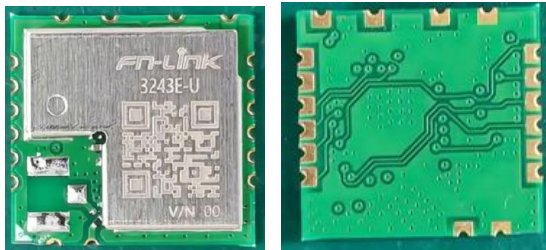
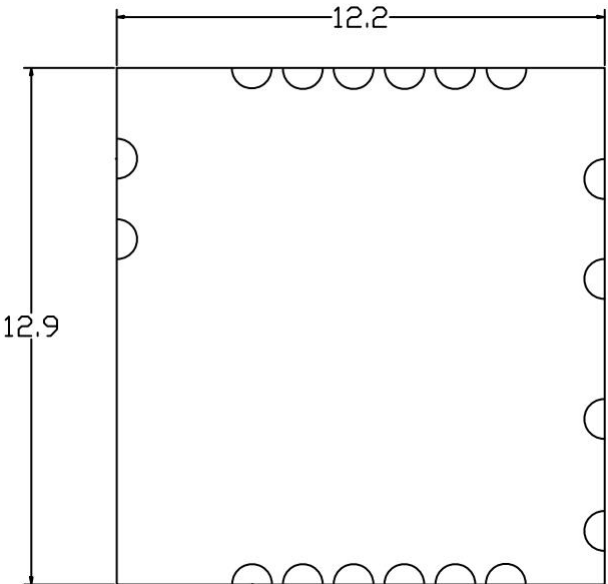
When NW117 is in the powered-up state, the connected HOST IO pins should be configured as input or output based on the actual application.

For pins with pull-up resistors (e.g., SDIO), the pull-up power supply is recommended to be connected to NW117's DVDDIO.

After the chip loses power, it must be ensured that the POWER_ON, DVDDIO, and AVDD33 voltages are below 800mV.

8. Size reference

8.1 Module Picture

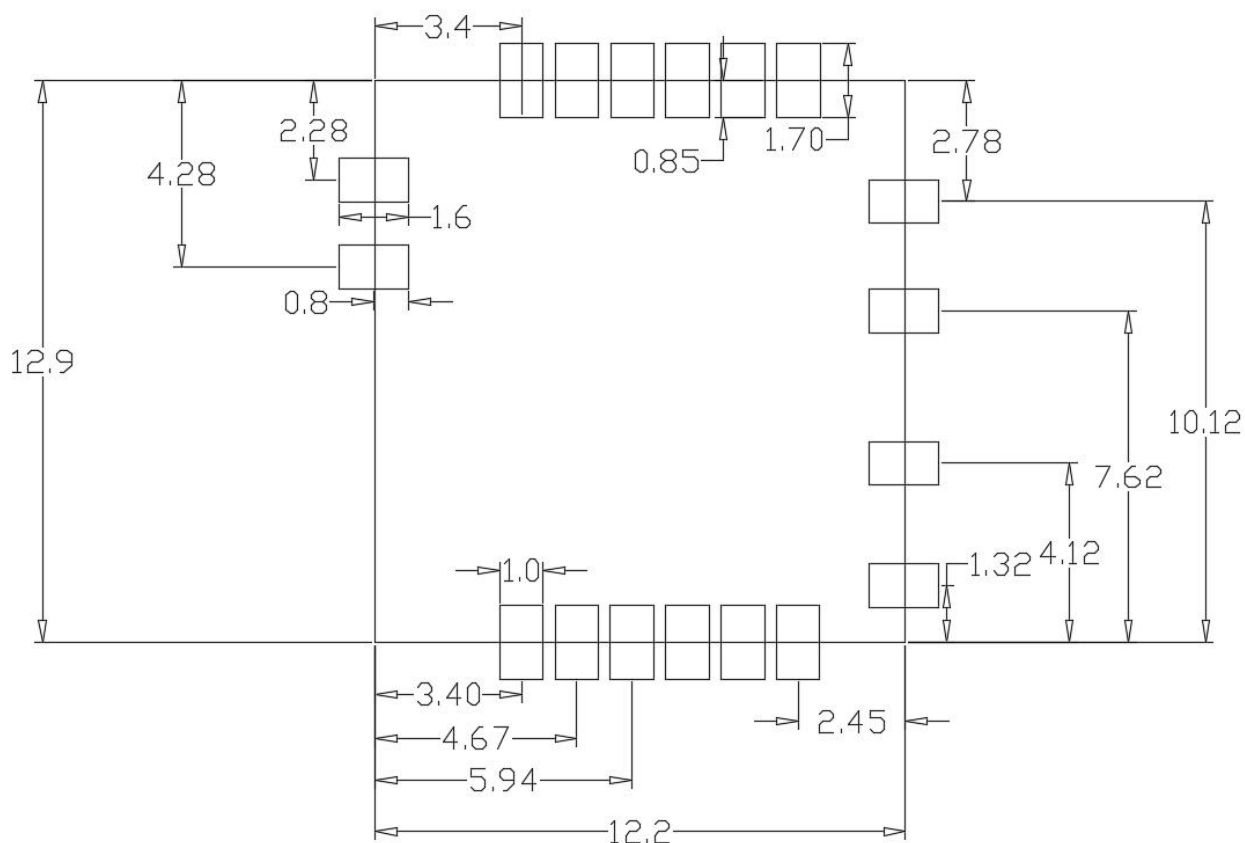
L x W : 12.9 x 12.2 (±0.2) mm 	
H: 2.30 (±0.2) mm	
Weight	0.58g

Note: The module diagram will be updated in a future version

8.2 Marking Description



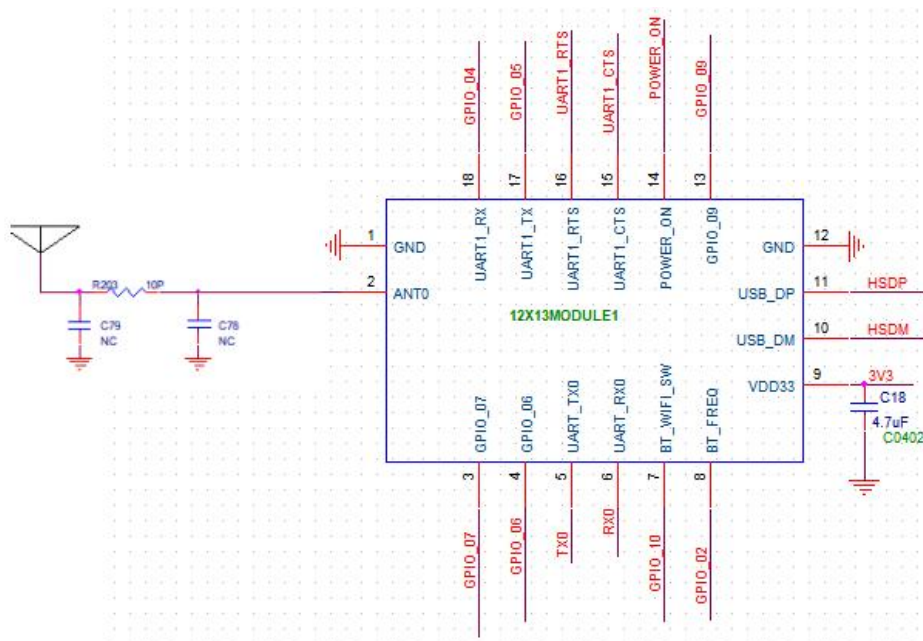
8.3 Layout Recommendation



9. The Key Material List

Item	Part Name	Description	Manufacturer
1	PCB	3243E-U ,FR4,TG150,12.2X12.9X0.8mm	XY-PCB, GDKX, Sunlord, SLPCB, XQ-PCB, TRULY
2	Crystal	2016 40MHz 10ppm 8PF	ECEC, Hosonic, TKD, JWT
3	Chipset	Q35343U100,QFN32,4X4mm	Hisilicon
4	Shielding	6233E-UUB Shielding	信太, 卓益

10. Reference Design



Note: Module requires independent power supply , supply capacity $\geq 1200\text{mA}$ and ripple less than 100mV; Do not share power with amplifier, infrared device, camera, etc. USB differential trace, please keep 90 ohm.

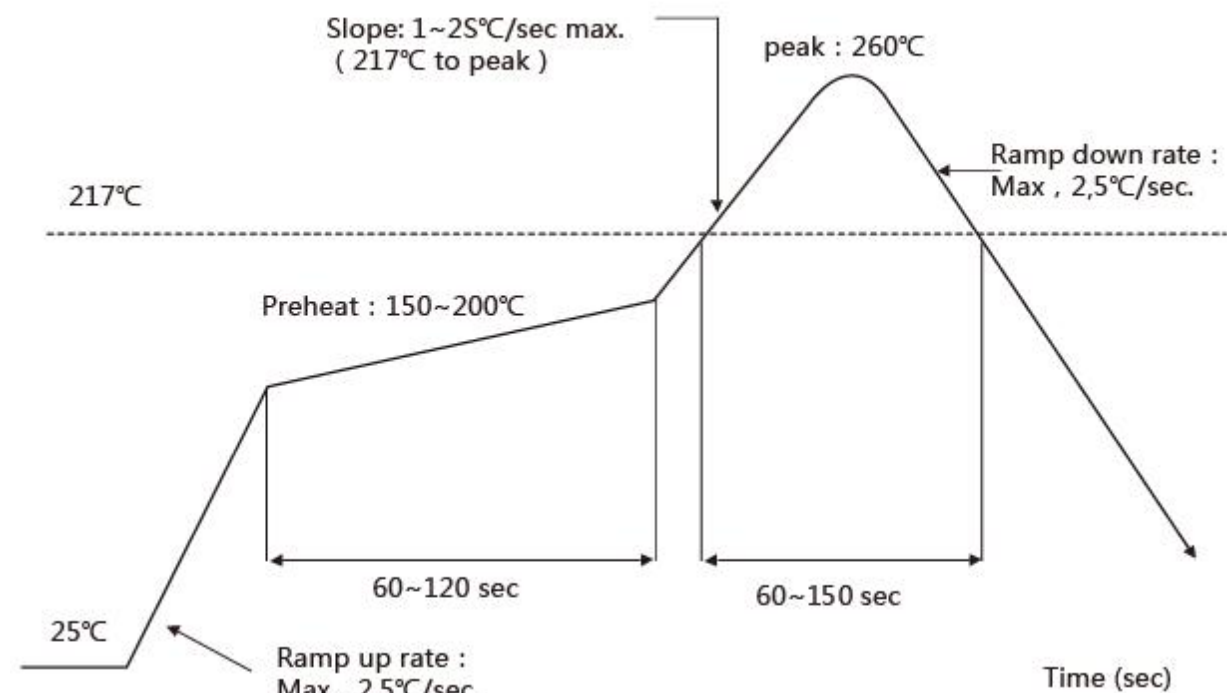
11. Recommended Reflow Profile

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



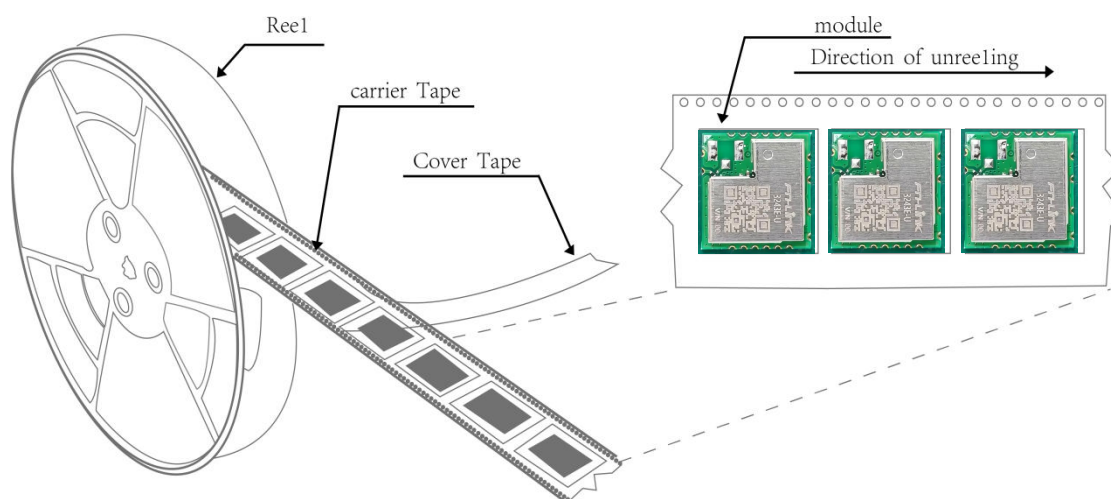
12. RoHS compliance

All hardware components are fully compliant with EU RoHS directive

13. Package

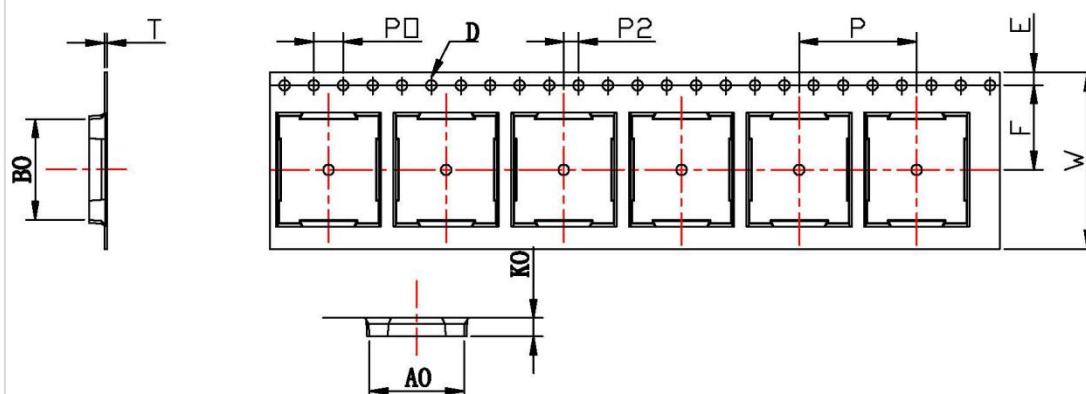
13.1 Reel

A roll of 1500pcs



13.2 Carrier Tape Detail

ITEM	W	A0	B0	D	F	E	K0	P0	P2	P	T
DIM	24	12.50	13.35	1.50	11.5	1.75	2.5	4.0	2.0	16.0	0.30
TOLE	$\begin{smallmatrix} +0.3 \\ -0.3 \end{smallmatrix}$	± 0.15	± 0.15	$\begin{smallmatrix} +0.1 \\ -0.0 \end{smallmatrix}$	$\begin{smallmatrix} +0.1 \\ -0.1 \end{smallmatrix}$	± 0.1	± 0.10	± 0.1	± 0.1	± 0.1	± 0.05



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



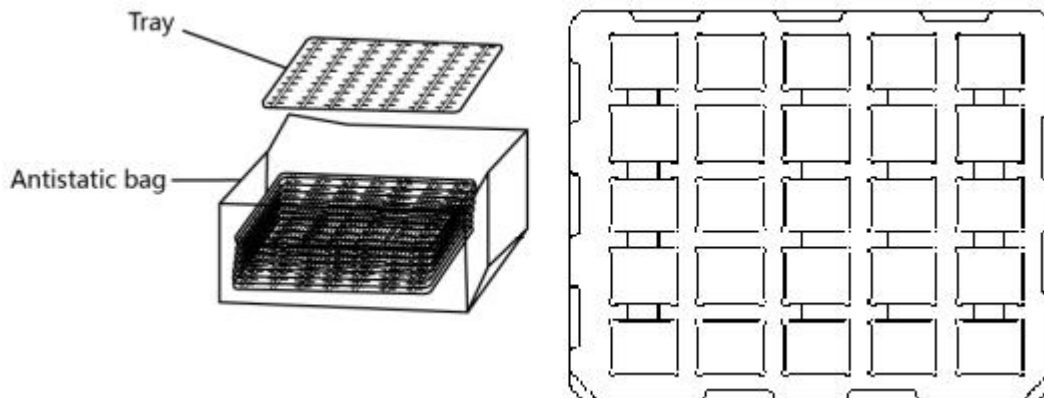
size : 350*350*35mm



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. List of applicable FCC rules

FCC Part 15.247,

15.1. Specific operational use conditions

This product is a Single-modular transmitter policy independent of any host. Not applicable.

15.2. Limited module procedures

This product is a Single-modular transmitter. It is not a limited module. Not applicable.

15.3. Trace antenna designs

This product has a external antennas. Not applicable.

15.4. 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.

15.5. Antennas

No.	Antenna Type	Frequency Range	Max Gain	Impedance
1	External Antenna	2402-2480MHz 2412-2462MHz	4.7dBi	50ohm

15.6. Label and compliance information

Remind end customers to add "Contain FCC ID: 2AATL-3243E-U"

15.7. 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.

15.8. 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, FN-LINK TECHNOLOGY LIMITED 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.

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: 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, FN-LINK TECHNOLOGY LIMITED shall provide guidance to the host manufacturer for compliance with the Part 15B requirements.

Note 6: FCC ID label on the final system must be labeled with "Contains FCC ID: 2AATL-3243E-U" or "Contains transmitter module FCC ID: 2AATL-3243E-U".

Note 7: 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.

