

RE743 WIFI/BLE

Module Specification

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Version update instructions

Date	Version	Update Content
2021-01-25	V0.1	Initial Document

WaterWorld

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1. Product Description

The RE743 wireless WIFI+BLE module uses the latest WIFI SOC SV32WB01 chip, which integrates BLE 5.0. The chip integrates MCU, main frequency 320MHz, built-in 384KB SRAM and 128K ROM. It works in the 2.4GHz frequency band and supports 802.11 b/g/n wireless standards; the module adopts 3.3V/5V power supply and stamp hole SMT installation method, so that the module can be flexibly applied to various products to meet customer needs.

2. Product Features

2.1 WLAN

- Andes Technology D10F processor (main frequency 320MHz), 128K ROM and 384KB SRAM for instructions and data, embedded 16Mbit SPI Flash;
- Working voltage: 3.13V-5.25V; IO voltage: 3.13V-5.25V;
- Interface: 1*UART, 1*ADC, 5*GPIO can be reused;
- 802.11 b/g/n;
- H20/H40;
- STA/AP ;
- WEP、WPA/WPA2 ;
- OTA;
- On-board PCB or External antenna.

2.2 Bluetooth

- BLE 5.0;
- AFH ;
- Simultaneous use with WIFI;
- Simultaneous reception/broadcasting/scanning;
- SIG Mesh V1.01 protocol;
- GATT and Mesh protocol.

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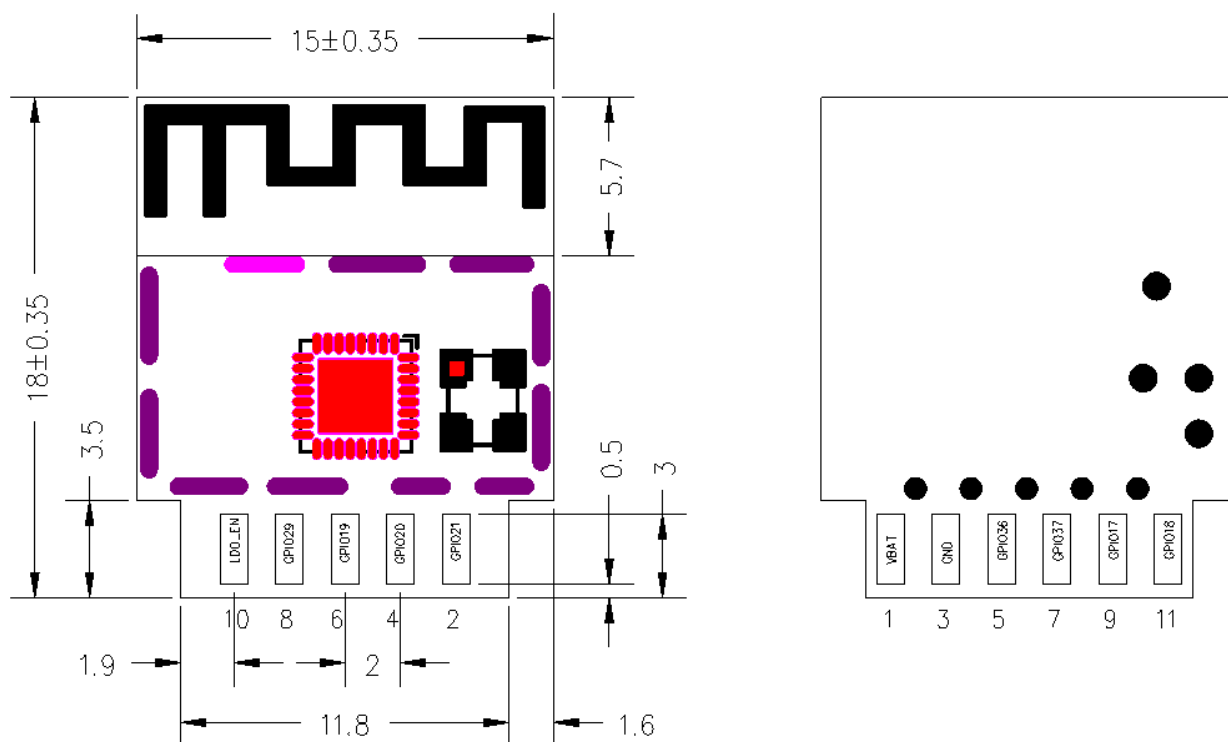
3. Applications

- Smart home/Smart home appliances
- Smart socket/Smart lamp
- Smart Building
- Industrial wireless control
- Baby monitoring room
- Webcam

4. Module size, Package and Pin definitions

4.1 Module size

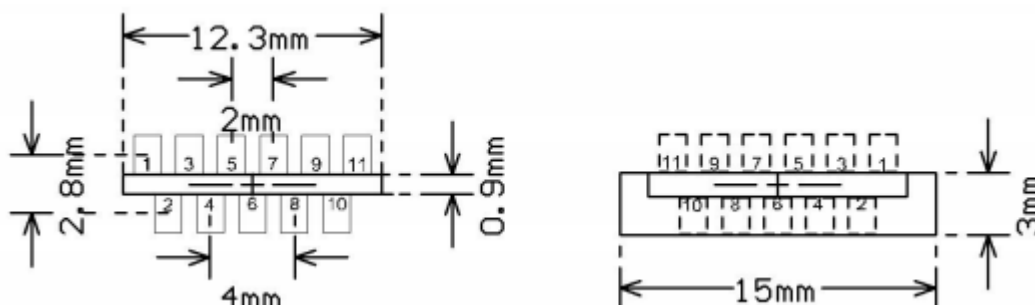
Dimension (mm):15mm*18mm*2.4mm, PCB thickness:0.8mm, flatness less than 0.1mm.



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4.2 Package



4.3 Pin Definitions

NO.	Name	GPIO	PWM	ADC	I2C0	UART	Remark
1	VBAT						Module 5V/3.3V
2	GPIO 21	GPIO21	PWM				
3	GND						GND
4	GPIO 20	GPIO20	PWM				
5	RXD2	GPIO36	PWM	ADC6	I2C0_SCL	UART2-RXD	
6	GPIO 19	GPIO19	PWM				
7	TXD2	GPIO37	PWM	ADC7	I2C0_SDA	UART2-TXD	
8	GPIO29	GPIO29	PWM	ADC3			
9	GPIO17	GPIO17	PWM				
10	LDOEN						Built-in pull high, pull low reset
11	GPIO18	GPIO18	PWM				

Note: The programming interface RXD0/TXD0, GPIO13 is connected to 3.3V to enter the programming mode.

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5. Electrical Characteristics

5.1 Electrical Characteristics

Parameter	Description	Min	Typ	Max	Unit
TS	Storage temperature	-40	-	125	°C
VI	Power supply voltage	-0.3	-	3.6	V
Electrostatic discharge voltage (human body model)	-25°C	-	-	4	KV
Electrostatic discharge voltage (machine model)	-25°C	-	-	0.5	KV
TA	Operating temperature	-20	25	105	°C
VBAT	Operating Voltage	3.13	3.3	5.25	V
I _{in}	Working current 3.3V	10	-	220	mA
VIH	IO High-level input voltage	1.8	-	VCC	V
VIL	IO Low-level input voltage	-0.3	-	0.24	V
VOH	IO High-level output voltage	1.8	-	VCC	V
VOL	IO Low-level output voltage	-	-	0.1	V
I _{max}	IO drive current	-	-	12	mA

5.2 Power Consumption

	Mode	Power(dBm)	Typ	Unit
WIFI continuous transmission	11b 11M	17	125	mA
	11g 54M	15	56	mA
	11n20 MCS7	15	84	mA
	11n40 MCS7	15	68	mA
WIFI continuous reception	11b 11M	N/A	37	mA
	11g 54M	N/A	39	mA
	11n20 MCS7	N/A	39	mA
	11n40 MCS7	N/A	42	mA
BLE transmission		3	91	mA
BLE reception		N/A	39	mA

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6. RF Characteristics

This specification is based on conduction test results. Environment (0°C , + 25°C , + 40°C) Voltage 3.3V。
IEEE802.11b

Items	Contents			
Specification	IEEE802.11b			
Mode	DBPSK, DQPSK and CCK and DSSS			
Channel	CH1 to CH11@ 11g			
Data rate	1, 2, 5.5, 11Mbps			
TX Characteristics	Min	Typ	Max	Unit Remark
1. Power Levels				
1) 17dBm Target (For Each antenna port) @11Mbps	15	17	19	dBm
2. Spectrum Mask @ Target Power				
1) fc +/-11MHz to +/-22MHz	-	-	-30	dBr
2) at fc +/-20MHz	-	-	-50	dBr
3. Constellation Error(EVM) @ Target Power				
1) 1Mbps	-	-30	-16.5	dB
2) 2Mbps	-	-	-16.5	dB
3) 5.5Mbps	-	-	-16.5	dB
4) 11Mbps	-	-28	-16.5	dB
4. Frequency Error				
1) IEEE802.11b	-10	-	10	ppm
RX Characteristics	Min	Typ	Max	Unit Remark
5. Minimum Input Level Sensitivity(each chain)				
1) 1Mbps (FER \leq 8%)	-	-95	-83	dBm
2) 2Mbps (FER \leq 8%)	-	-	-80	dBm
3) 5.5Mbps (FER \leq 8%)	-	-	-77	dBm
4) 11Mbps (FER \leq 8%)	-	-86	-76	dBm
6. Maximum Input Level (PER \leq 10%)				
1) IEEE802.11b	-10	10	-	dBm

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WIFI+BLE Module Specification

IEEE802.11g

Items	Contents			
Specification	IEEE802.11g			
Mode	BPSK, QPSK, 16QAM, 64QAM and OFDM			
Channel	CH1 to CH11@ 11g			
Data rate	6, 9, 12, 18, 24, 36, 48, 54Mbps			
TX Characteristics	Min	Typ	Max	Unit Remark
1. Power Levels				
1) 15dBm Target (For Each antenna port @ 11g/54M)	13	15	17	dBm
2. Spectrum Mask @ Target Power				
1) at fc +/-11MHz	-	-	-20	dBr
2) at fc +/-20MHz	-	-	-28	dBr
3) at fc > +/-30MHz	-	-	-40	dBr
3. Constellation Error(EVM) @ Target Power				
1) 6Mbps	-	-28	-5	dB
2) 9Mbps	-	-	-8	dB
3) 12Mbps	-	-	-10	dB
4) 18Mbps	-	-	-13	dB
4) 18Mbps	-	-	-13	dB
5) 24Mbps	-	-30	-16	dB
6) 36Mbps	-	-	-19	dB
7) 48Mbps	-	-	-22	dB
8) 54Mbps	-	-29	-27	dB
4. Frequency Error				
1) IEEE802.11g	-10	-	10	ppm
RX Characteristics				
	Min	Typ	Max	Unit Remark
5. Minimum Input Level Sensitivity(each chain)				
1) 6Mbps (PER \leq 10%)	-	-88	-82	dBm
2) 9Mbps (PER \leq 10%)	-	-	-80	dBm
3) 12Mbps (PER \leq 10%)	-	-	-79	dBm
4) 18Mbps (PER \leq 10%)	-	-	-77	dBm
5) 24Mbps (PER \leq 10%)	-	-	-75	dBm
6) 36Mbps (PER \leq 10%)	-	-	-72	dBm
7) 48Mbps (PER \leq 10%)	-	-	-68	dBm
8) 54Mbps (PER \leq 10%)	-	-72	-65	dBm
6. Maximum Input Level (PER \leq 10%)				
1) IEEE802.11g	-20	-4	-	dBm

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WIFI+BLE Module Specification

IEEE802.11n 20

Items	Contents			
Specification	IEEE802.11n 20			
Mode	BPSK, QPSK, 16QAM, 64QAM and OFDM			
Channel	CH1 to CH11@ 11g			
Data rate	MCS0/1/2/3/4/5/6/7/8/9/10/11/12/13/14/15			
TX Characteristics	Min	Typ	Max	Unit Remark
1. Power Levels				
1) 14dBm Target (For Each antenna port) @ 2.4G/ MCS7	13	15	17	dBm
2. Spectrum Mask @ Target Power				
1) at fc +/-11MHz	-	-	-20	dBr
2) at fc +/-20MHz	-	-	-28	dBr
3) at fc > +/-30MHz	-	-	-45	dBr
3. Constellation Error(EVM) @ Target Power				
1) MCS0	-	-28	-5	dB
2) MCS1	-	-	-10	dB
3) MCS2	-	-	-13	dB
4) MCS3	-	-29	-16	dB
5) MCS4	-	-	-19	dB
6) MCS5	-	-	-22	dB
7) MCS6	-	-	-25	dB
8) MCS7	-	-29	-27	dB
4. Frequency Error				
1) IEEE802.11n 20	-10	-	10	ppm
RX Characteristics				
5. Minimum Input Level Sensitivity(each chain)	Min	Typ	Max	Unit Remark
1) MCS0 (PER \leq 10%)	-	-89	-82	dBm
2) MCS1 (PER \leq 10%)	-	-	-80	dBm
3) MCS2 (PER \leq 10%)	-	-	-79	dBm
4) MCS3 (PER \leq 10%)	-	-	-77	dBm
5) MCS4 (PER \leq 10%)	-	-	-75	dBm
6) MCS5 (PER \leq 10%)	-	-	-72	dBm
7) MCS6 (PER \leq 10%)	-	-	-68	dBm
8) MCS7 (PER \leq 10%)	-	-70	-64	dBm
6. Maximum Input Level (PER \leq 10%)				
1) IEEE802.11n 20	-20	-4	-	dBm

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WIFI+BLE Module Specification

IEEE802.11n 40

Items	Contents			
Specification	IEEE802.11n 40			
Mode	BPSK, QPSK, 16QAM, 64QAM and OFDM			
Channel	CH3to CH9@ 11g			
Data rate	MCS0/1/2/3/4/5/6/7/8/9/10/11/12/13/14/15			
TX Characteristics	Min	Typ	Max	Unit Remark
1. Power Levels				
1) 15dBm Target (For Each antenna port) @ 2.4G/ MCS7	13	15	17	dBm
2. Spectrum Mask @ Target Power				
1) at fc +/-11MHz	-	-	-20	dBr
2) at fc +/-20MHz	-	-	-28	dBr
3) at fc > +/-30MHz	-	-	-45	dBr
3. Constellation Error(EVM) @ Target Power				
1) MCS0	-	-26	-8	dB
2) MCS1	-	-	-10	dB
3) MCS2	-	-	-13	dB
4) MCS3	-	-29	-16	dB
5) MCS4	-	-	-19	dB
6) MCS5	-	-	-22	dB
7) MCS6	-	-	-25	dB
8) MCS7	-	-29	-27	dB
4. Frequency Error				
1) IEEE802.11n 40	-10	-	10	ppm
RX Characteristics	Min	Typ	Max	Unit Remark
5. Minimum Input Level Sensitivity(each chain)				
1) MCS0 (PER \leq 10%)	-	-89	-82	dBm
2) MCS1 (PER \leq 10%)	-	-	-80	dBm
3) MCS2 (PER \leq 10%)	-	-	-79	dBm
4) MCS3 (PER \leq 10%)	-	-	-77	dBm
5) MCS4 (PER \leq 10%)	-	-	-75	dBm
6) MCS5 (PER \leq 10%)	-	-	-72	dBm
7) MCS6 (PER \leq 10%)	-	-	-68	dBm
8) MCS7 (PER \leq 10%)	-	-67	-61	dBm
6. Maximum Input Level (PER \leq10%)				
1) IEEE802.11n 40	-20	-6	-	dBm

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BLE5.0

Items	Contents			
Specification	BLE5.0			
Channel	CH1 to CH39			
TX Characteristics	Min	Typ	Max	Unit Remark
1. Power Levels				
1) 3dBm Target (For Each antenna port) Rate 0	-6	3	4	dBm
2. modulation characteristics				
1) 11110000 $225\text{kHz} \leq \Delta f_{\text{avg}} \leq 275\text{kHz}$	-	252		kHz
2) 10101010 df2 Deviation Max $\geq 115\text{kHz}$ df2_pass_rate $\geq 99.90\%$	-	229		kHz
3) $\Delta Df_{2\text{avg}} / \Delta Df_{1\text{avg}} \geq 0.8$	-	0.92		
3. Frequency Error				
1) $ F_n \leq 50\text{kHz}$		7		kHz
2) $ F_1 - F_0 \leq 20\text{kHz}$		0.6		kHz
3) $ F_n - F_{n-5} \leq 20\text{kHz}$		0.6		kHz
RX Characteristics	Min	Typ	Max	Unit Remark
5. Minimum Input Level Sensitivity(each chain)				
1) BLE (PER $\leq 10\%$)	-	-89	-82	dBm

7. Antenna Design Considerations

The module is an on-board antenna and the following precautions need to be observed:

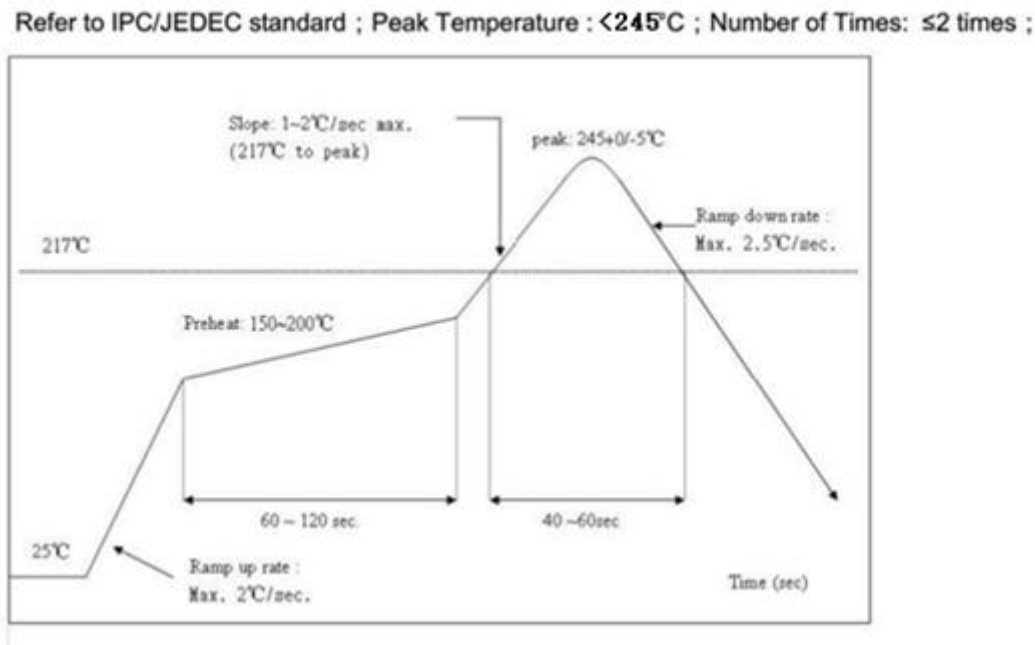
- The WIFI module adopts PCB on-board antenna to ensure the best antenna efficiency, and the distance between the metal part and the antenna area is kept above 15mm.
- Do not wire or coat the PCB board in the antenna area, so as not to affect the antenna performance. Make sure that there is no substrate medium directly below or directly above the printed antenna; make sure that the area around the printed antenna is far away from the metal copper skin, so as to ensure the antenna's radiation effect to the greatest extent.

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8. Recommended Furnace Temperature Curve

Please perform SMT placement according to the reflow profile, the peak temperature is 245°C, and the reflow profile is shown in the figure below:



9. Packing and Shipping method

The module must be mounted by the SMT machine, and the mounting must be completed within 24 hours after unpacking and burning the firmware, otherwise the vacuum packaging must be re-packed, and the module must be baked before mounting. Baking time is 2 hours.

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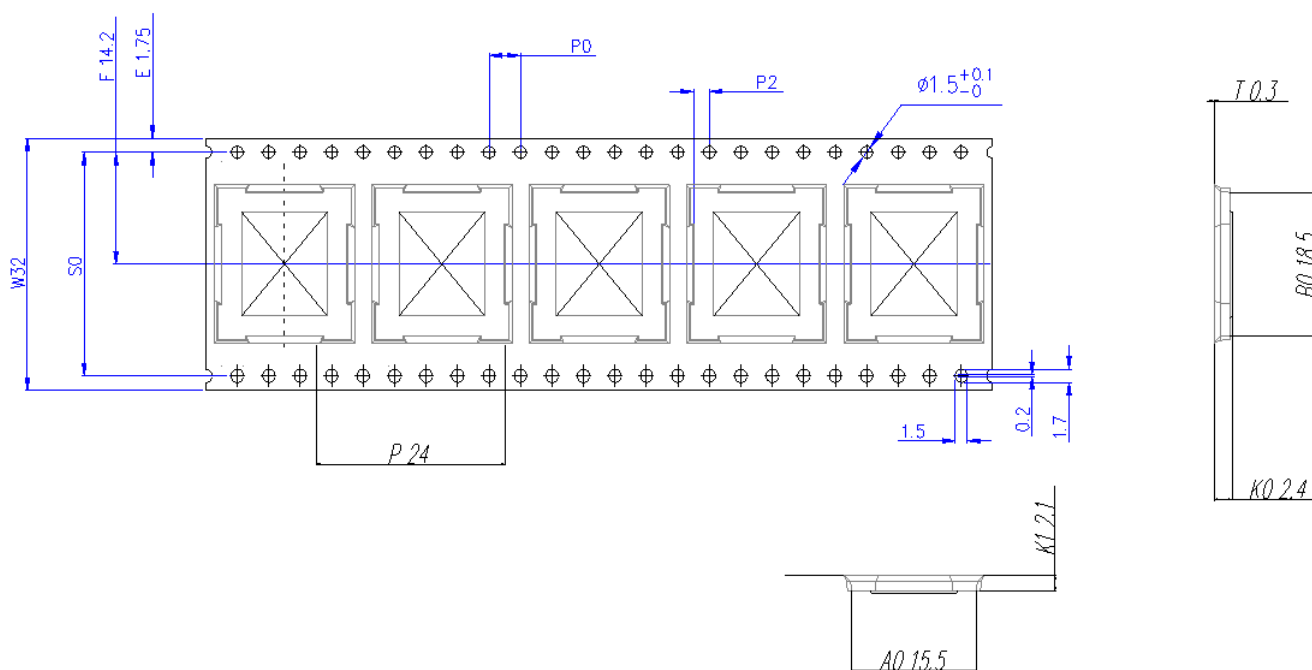
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9.1 Storage Conditions

The products sealed in moisture barrier bags should be stored in a non-condensing atmospheric environment of $<30^{\circ}\text{C}$ and 70%RH. For dry-packaged products, the shelf life is 6 months from the date of the package is sealed

9.2 Package

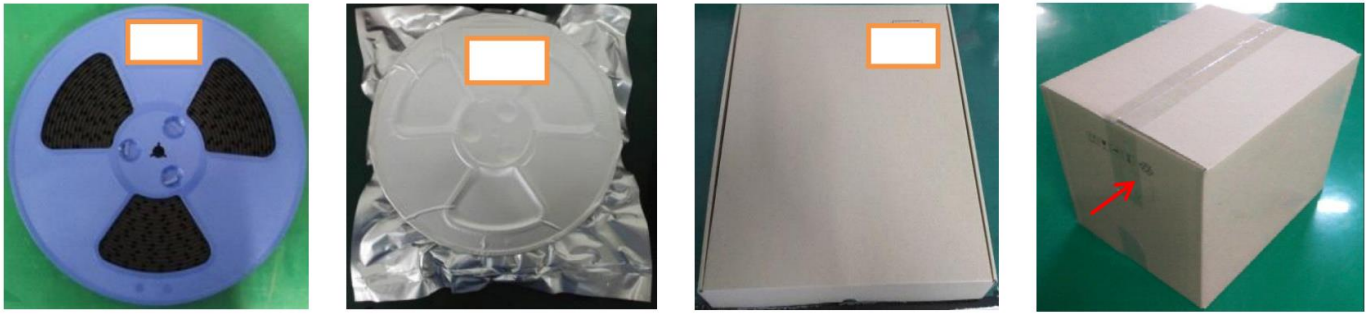
- 1、 The product placement direction, label sticking position, and packaging are carried out according to the schematic diagram;
- 2、 Each roll contains 800 products, each small box contains 1 roll, the big box contains 5 small boxes, and the total number of products is 4000 per box.;
- 3、 Carton size: 375mm*285mm*365mm, Small box size: 355mm*355mm*55mm;
- 4、 Place 2 bags of 2g desiccant in the vacuum bag and 1 6-color humidity card;
- 5、 Other unfinished matters shall be executed according to the customer's packaging requirements.



ITEM	W	A0	B0	K0	P	F	E	S0	DO	P0	P2	T
DIM	32.00 $^{+0.30}_{-0.30}$	15.50 $^{+0.10}_{-0.10}$	18.50 $^{+0.10}_{-0.10}$	2.40 $^{+0.10}_{-0.10}$	20.00 $^{+0.10}_{-0.10}$	14.25 $^{+0.15}_{-0.15}$	1.75 $^{+0.10}_{-0.10}$	28.40 $^{+0.15}_{-0.15}$	1.50 $^{+0.10}_{-0.00}$	4.00 $^{+0.10}_{-0.10}$	2.00 $^{+0.10}_{-0.10}$	0.30 $^{+0.05}_{-0.05}$
ALTERNATE												

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10. FCC Warning

2.2 List of applicable FCC rules

FCC Part 15.247

2.6 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.

2.8 Label and compliance information

FCC ID label on the final system must be labeled with “Contains FCC ID: 2AYCN-RE743” or “Contains transmitter module FCC ID: 2AYCN-RE743”.

2.9 Information on test modes and additional testing requirements

Contact Shenzhen Water World Co., Ltd will provide stand-alone modular transmitter test mode. Additional testing and certification may be necessary when multiple modules are used in a host.

2.10 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, Shenzhen Water World 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:

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(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 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: 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.

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