秘密级别： 公开
生效时间：2022 年 9 月 19
保密期限： 长期

Model WF-M620-RSD2 Datasheet

IEEE 802.11 1x1 WiFi 4 Wireless LAN Module

[SoC MT3620AN]

for 802.11a/b/g/n

Version： 1.0

<Specification may be changed without prior notice>

Sichuan AI-Link Technology Co., Ltd

四川爱联科技股份有限公司

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Please sign and return this page and the front page to our company by email or fax, or by courier to the following address:

Address: Anzhou Industrial Park, Mianyang, Sichuan, P.R.C
Company: Sichuan AI-Link Technology Co., Ltd.

Module Name	**WF-M620-RSD2**		
	Designed by	Reviewed by	Approved by
Signature	FENG, Jie	HUANG, Wei	FAN, Xijun
Date	9/19/2022	9/19/2022	9/19/2022

Model WF-M620-RSD2

- **Compatible WLAN Standards**

  IEEE Std. 802.11 a/b/g/n

- **SoC**

  MT3620AN

- **Product Size**

  24mm×27mm×2.5mm

- **Product Weight**

  3.1 g

	Sichuan AI-Link Technology Co., Ltd.
	Anzhou Industrial Park, Mianyang, Sichuan, P.R.C
	+86-0816-2438701
	http://www.ailinkiot.com
	ai-link@ailinkiot.com

RoHS

Features

WLAN

- IEEE 802.11 a/b/g/n compliant
- Support 20MHz bandwidth in 2.4GHz, 5GHz band
- Dual bands 1T1R mode
- data rate up to 72.2Mbps
- Support STBC, LDPC, explicit beamforming as the beamformee
- Greenfield, mixed-mode, legacy modes support
- IEEE 802.11 d/e/h/i/w support
- Security support for WFA WPA/WPA2 personal, WPS2.0, WAPI
- QoS support of WFA WMM, WMM PS

Revision Record

Revision	Date	Description	Edited by
V1.0	4/21/2022	Premier Release	FENG, Jie
V1.1	9/19/2022	Added CE Radiation Exposure Statement	FENG, Jie
** Private Preview Only*			

Contents

1 General Description

1.1 System Overview

WF-M620-RSD2 is a small form-factor Wi-Fi module, intended for use as a secure Wi-Fi client in internet-connected IoT applications.It supports Microsoft ' s Azure Sphere end-to-end solution which provides an unprecedented level of security to connected device manufacturers.

WF-M620-RSD2 module is based on the MediaTek MT3620AN SoC, which supports dual-band 802.11 a/b/g/n Wi-Fi connectivity, a 500 MHz Arm® Cortex™-A7 core for user applications, and two general purpose 200MHz Arm Cortex-M4F I/O subsystem cores designed to support real-time requirements. The on-chip peripherals (GPIO, UART, I2C, SPI, PWM and ADC) can be mapped to dedicated I/O pins on the module for connection to external sensors, I/O connectors, or other user application circuits.

The module has a 24mm x 27mm form-factor, with 74 pad castellated "stamp-hole" footprints. It has a U.FL connector for external antenna.

Microsoft' s end-to-end security, OTA update service, and user-friendly Visual Studio development environment add significant value when compared to traditional MCU solutions.

1.2 System Properties

Dimension	Typically, 24mm×27mm×2.5mm
Chipset	MT3620AN
Operating Frequency	2.4GHz:2.412~2.484 GHz 5 GHz：5.180~5.825GHz
Form Factor	74 Pins(stamp hole)
Antenna	1x1 U.FL Connector
Operating Voltage	DC 3.3V±10%
PCB	4-layers design (1.0+/-0.15mm)

Information	
Peripheral Interface	UART×5：ISU0,ISU1,ISU2,ISU3,ISU4 I2S×1：I2S0 PWM×6：PWM0~PWM5 ADC×4：ADC0~3 GPIO：36 GPIO pins with multi-functions
Data Rate	11b: 1, 2, 5.5 and 11Mbps 11a/g: 6, 9, 12, 18, 24, 36, 48 and 54 Mbps 11n: MCS0~7, up to 72.2Mbps
Current Consumption	TX Avg 151mA @11b 11M 17dBm
Operating Temperature	-40℃ to +85℃
Storage Temperature	-45℃ to +125℃
ESD Protection	IEC(Contact discharge)：±4000V IEC(Air discharge)：±8000V

1.3 Block Diagram

The hardware architecture of the WF-M620-RSD2 module is shown in Figure 1. The module Complies with IEEE standards 802.11a/b/g/n 1X1 dual-band.

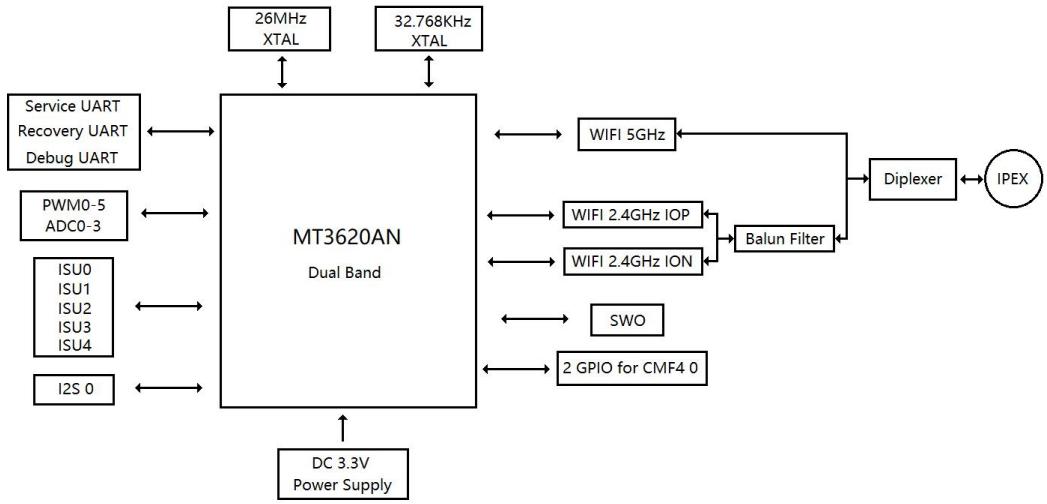
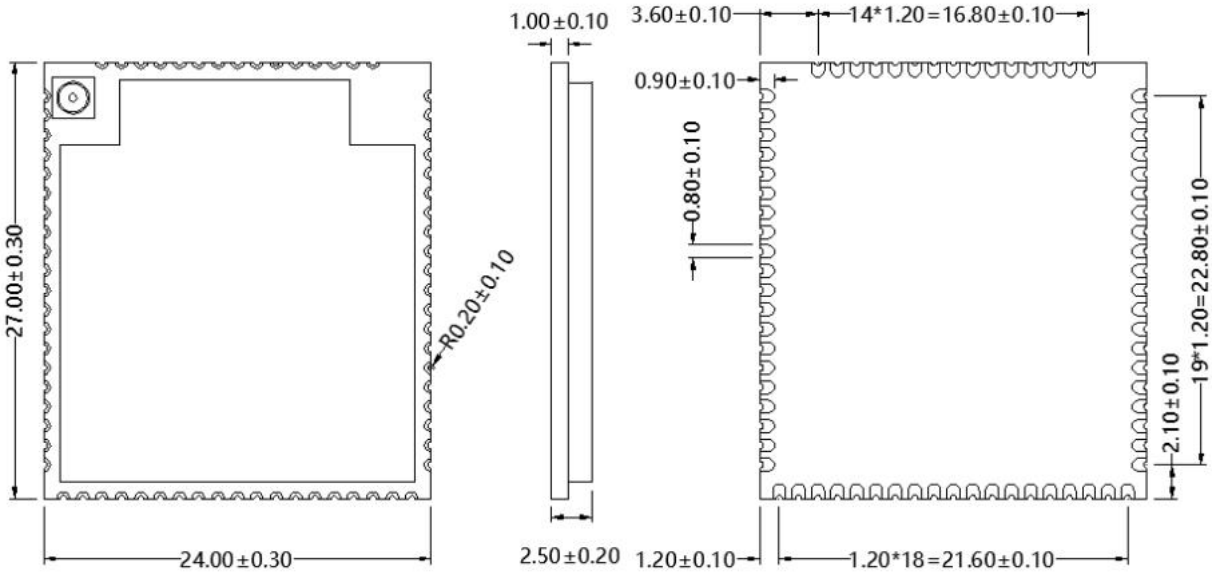


Figure 1: WF-M620-RSD2 Block Diagram

2 Mechanical Dimensions

2.1 Mechanical Outline Drawing

- Typical Dimension (W x L x T): 24.0mmx 27.0mm x 2.5mm
- General tolerance: ±0.3mm
- PCB Thickness: 1.0mm (+/-0.1mm)



Top View *Side View* *Bottom View*

2.2 Pin definitions

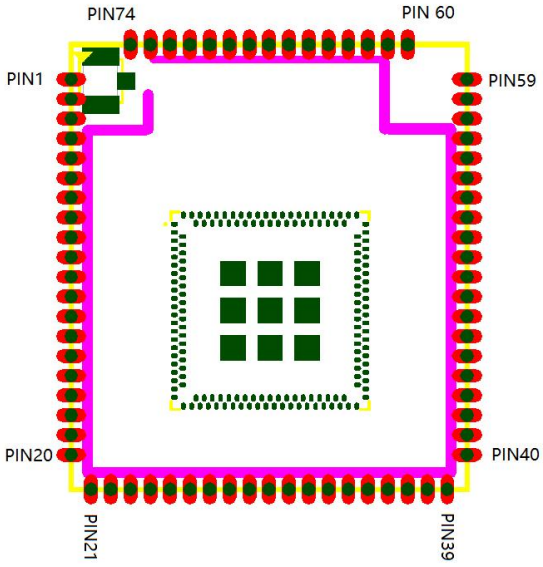


Figure 2.2 Pin assignment

Pin#	Pin name	Type	Description
1	GND	P	Ground
2	GND	P	Ground
3	3V3	PI	DC 3.3V Power Supply
4	3V3	PI	DC 3.3V Power Supply
5	GPIO0/PWM0	DIO	Interrupt-capable GPIO multiplexed with PWM output
6	GPIO1/PWM1	DIO	Interrupt-capable GPIO multiplexed with PWM output
7	GPIO2/PWM2	DIO	Interrupt-capable GPIO multiplexed with PWM output
8	GPIO3/PWM3	DIO	Interrupt-capable GPIO multiplexed with PWM output
9	GPIO4/PWM4	DIO	Interrupt-capable GPIO multiplexed with PWM output
10	GPIO5/PWM5	DIO	Interrupt-capable GPIO multiplexed with PWM output
11	GPIO26/SCLK0/TXD0	DIO	GPIO multiplexed with ISU0[1] functions(SPI CLK/UART TX)
12	GPIO27 /MOSI0/RTS0/SCL0	DIO	GPIO multiplexed with ISU0 functions(SPI MOSI/UART RTS/I2C CLK)
13	GPIO28/MISO0/RXD0/SDA0	DIO	GPIO multiplexed with ISU0 functions(SPI MISO/UART RX/I2C DATA)
14	GPIO29/CSA0/CTS0	DIO	GPIO multiplexed with ISU0 functions(SPI CSA/UART CTS)
15	GPIO31/SCLK1/TXD1	DIO	GPIO multiplexed with ISU1 functions(SPI CLK/UART TX)
16	GPIO32/MOSI1/RTS1/SCL1	DIO	GPIO multiplexed with ISU1 functions(SPI MOSI/UART RTS/I2C CLK)
17	GPIO33/MISO1/RXD1/SDA1	DIO	GPIO multiplexed with ISU1 functions(SPI MISO/UART RX/I2C DATA)
18	GPIO34/CSA1/CTS1	DIO	GPIO multiplexed with ISU1 functions(SPI CSA/UART CTS)
19	GND	P	Ground
20	GND	P	Ground
21	GPIO36/SCLK2/TXD2	DIO	GPIO multiplexed with ISU2 functions(SPI CLK/UART TX)
22	GPIO37/MOSI2/RTS2/SCL2	DIO	GPIO multiplexed with ISU2 functions(SPI MOSI/UART RTS/I2C CLK)
23	GPIO38/MISO2/RXD2/SDA2	DIO	GPIO multiplexed with ISU2 functions(SPI MISO/UART RX/I2C DATA)
24	GPIO39/CSA2/CTS2	DIO	GPIO multiplexed with ISU2 functions(SPI CSA/UART CTS)
25	GPIO41/ADC0	ADIO	GPIO multiplexed with ADC input
26	GPIO42/ADC1	ADIO	GPIO multiplexed with ADC input
27	GPIO43/ADC2	ADIO	GPIO multiplexed with ADC input
28	GPIO44/ADC3	ADIO	GPIO multiplexed with ADC input
29	VREF_ADC	AI	Reference voltage input for ADC[2]
30	EXT_PMU_EN	DO	External power supply enable output
31	WAKEUP	DI	External wakeup from RTC mode (deepest sleep mode)
32	AVDD_3V3_RTC	PI	Power rail for real-time clock[3]
33	VOUT_2V5	PO	Output from internal 2.5V LDO
34	PMU_EN	DI	Internal PMU override. If driven low, MT3620 is turned off and in a very low power state, equivalent to RTC mode power consumption. Only the PMU quiescent current will be drawn. When released, the PMU will start up.
35	DEBUG_CTS	DI	Azure Sphere OS debug CTS
36	DEBUG_RXD	DI	Azure Sphere OS debug RXD
37	DEBUG_RTS	DO	Azure Sphere OS debug RTS/Strapping pin when MT3620 boot up
38	DEBUG_TXD	DO	Azure Sphere OS debug TXD
39	GND	P	Ground

40	GND	P	Ground
41	3V3	PI	DC 3.3V Power Supply
42	3V3	PI	DC 3.3V Power Supply
43	SWD_DIO	DIO	ARM SWD data
44	SWD_CLK	DI	ARM SWD clock
45	SWO	DO	ARM SWO debug output
46	GPIO56/TX0	DIO	GPIO multiplexed with I2S 0
47	GPIO57/MCLK0	DIO	GPIO multiplexed with I2S 0
48	GPIO58/FS0	DIO	GPIO multiplexed with I2S 0
49	GPIO59/RX0	DIO	GPIO multiplexed with I2S 0
50	GPIO60/BCLK0	DIO	GPIO multiplexed with I2S 0
51	GPIO66/SCLK3/TXD3	DIO	GPIO multiplexed with ISU3 functions(SPI CLK/UART TX)
52	GPIO67/MOSI3/RTS3/SCL3	DIO	GPIO multiplexed with ISU3 functions(SPI MOSI/UART RTS/I2C CLK)
53	GPIO68/MISO3/RXD3/SDA3	DIO	GPIO multiplexed with ISU3 functions(SPI MISO/UART RX/I2C DATA)
54	GPIO69/CSA3/CTS3	DIO	GPIO multiplexed with ISU3 functions(SPI CSA/UART CTS)
55	GPIO70/CSB3	DIO	GPIO multiplexed with ISU3 functions(SPI CSB)
56	GPIO72/MOSI4/RTS4/SCL4	DIO	GPIO multiplexed with ISU4 functions(SPI MOSI/UART RTS/I2C CLK)
57	GPIO73/MISO4/RXD4/SDA4	DIO	GPIO multiplexed with ISU4 functions(SPI MISO/UART RX/I2C DATA)
58	GND	P	Ground
59	GND	P	Ground
60	GND	P	Ground
61	GND	P	Ground
62	SYSRST_N	DI	System reset,active low.
63	SERVICE_TXD	DO	Azure Sphere Service UART TXD
64	SERVICE_RTS	DO	Azure Sphere Service UART RTS
65	SERVICE_RXD	DI	Azure Sphere Service UART RXD
66	SERVICE_CTS	DI	Azure Sphere Service UART CTS
67	RECOVERY_RXD	DI	Azure Sphere flash re-imaging Recovery UART RXD
68	RECOVERY_TXD	DO	Azure Sphere flash re-imaging Recovery UART TXD
69	RECOVERY_RTS	DO	Azure Sphere flash re-imaging Recovery UART RTS
70	RECOVERY_CTS	DI	Azure Sphere flash re-imaging Recovery UART CTS
71	IO0_GPIO85/IO0_RXD	DI	Dedicated GPIO multiplexed with UART for I/O CM4F 0
72	IO0_GPIO86/IO0_TXD	DO	Dedicated GPIO multiplexed with UART for I/O CM4F 0
73	GND	P	Ground
74	GND	P	Ground

Note:

1.ISU is a serial communication block which can be configured as I2C master, I2C slave, SPI master, SPI slave, or UART; I2C runs at up to 1MHz, SPI at up to 40MHz, and UARTs at up to 3Mbps.

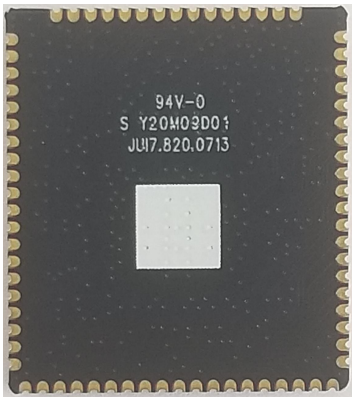
2.The MT3620AN ADC VREF maximum is 2.5V.Should not input >2.5V when using the ADC because the ADC will not read any value higher than 2.5V.If the ADC pin is not configured for ADC operation,then 3.3V input is ok.

3.WF-M620-RSD2 RTC functionality is enabled, the AVDD_3V3_RTC must be always powered, or the MT3620 will hang up during the system boot procedure.

4.The power supply for all GPIO pins is 3.3V.

2.3 Product Photos

Top View



Bottom View

2.4 Laser Pattern Information

Figure 2.4 Laser pattern

3 RF Characteristics

Wi-Fi Subsystem

Items	Contents	
WLAN Standard	IEEE 802.11a/b/g/n	
Frequency Range	2.412~2.484 GHz (2.4 GHz)	
	5.180~5.825 GHz (5 GHz)	
Channels	CH1 to CH13 @ 2.4GHz	
	CH36 to CH165 @ 5GHz	
Modulation Mode	802.11 b: DBPSK, DQPSK ,CCK	
	802.11 a/g/n: BPSK, QPSK, 16QAM, 64QAM	
Output Power & EVM	Power Value	EVM
	802.11b /11Mbps: 17dBm ± 2dBm	≤ -10dB
	802.11g /54Mbps: 15dBm ± 2dBm	≤ -25dB
	802.11a /54Mbps: 12dBm ± 2dBm	≤ -25dB
	802.11n HT20 /MCS7: @2.4G 14 dBm ± 2dBm	≤ -28dB
	802.11n HT20 /MCS7: @5G 12 dBm ± 2dBm	≤ -28dB
Receiver Sensitivity @2.4G PER≤ 10% @5G PER≤ 10%	Rate Type	Max
	802.11b /11Mbps @2.4G PER≤8%	-85dBm
	802.11g /54Mbps @2.4G	-72dBm
	802.11a /54Mbps @5G	-71dBm
	802.11n HT20 /MCS7 @2.4G	-68dBm
	802.11n HT20 /MCS7 @5G	-68dBm

** Note: [1] Typical RF Output Power are tested at room temp.25℃*

4 Interface

4.1 Service UART

The service UART provides the main interface between the MT3620 and the development environment running on a host PC.The service UART is dedicated to system functionality for the A7 subsystem. It is not available for customer application use.Core A7 app debugging, sideload, manufacturing test, getting device ID operation all use the Service UART port.

4.2 Recovery UART

The recovery UART is for upgrading the Azure Sphere OS without connection to the Internet.

4.3 Debug UART

The Debug UART provides additional debugging capabilities and is reserved for future use.The UART is available in our module design,we recommend that you expose this interface, at least in development and lab environments, to enable easier debugging of any issues that arise.

4.4 SWD Interface

The SWD interface is used for programming the real time M4F cores.

5 Electrical Current Consumption

WLAN Current Consumption

Description	Value	Unit
2.4GHz-Band TX CCK, 11Mbps, TX @ 17 dBm	151	mA

**Note:*

[1] Results are measured provided VDD33 is 3.3V. TX power is measured at the antenna port. The temperature is 25oC.

[2] The duty cycle for TX/RX measurement is 100%.

[3] The chip variation is +/- 25%.

6 Software Information

SDK

Please go to the Microsoft official website to download Azure Sphere SDK.The Link is as follow:

https://software-static.download.prss.microsoft.com/dbazure/Azure_Sphere_SDK_2207.exe

For more reference development documents，Please refer to the following link:

https://docs.microsoft.com/en-us/azure-sphere/

7 Reference Design

7.1 Recommend PCB Layout Decal

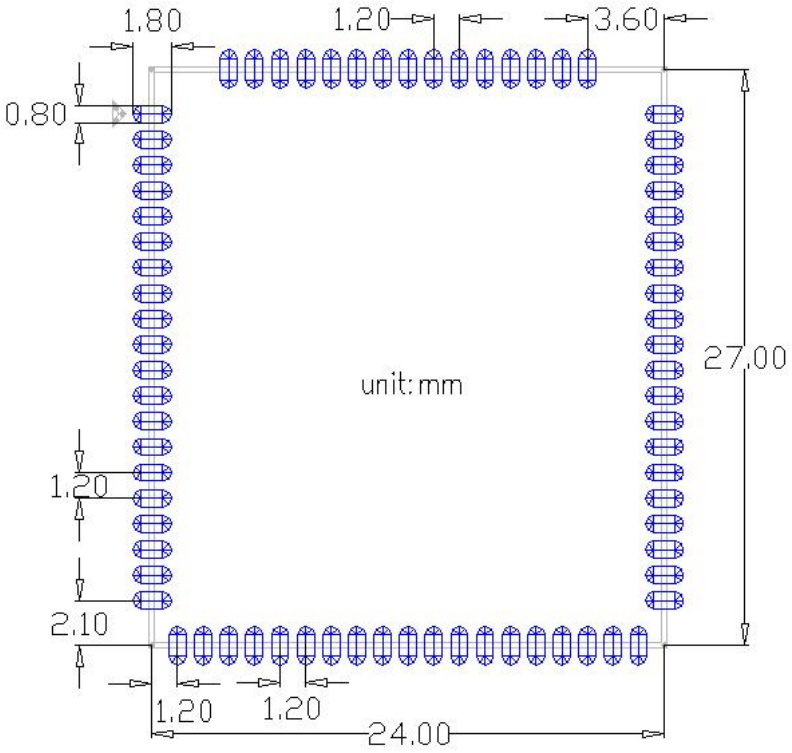


Figure 7.2 Recommend PCB Layout

**Note:*

Unit：mm

7.2 RF Connector and Antenna Selection

RF Connector Dimension

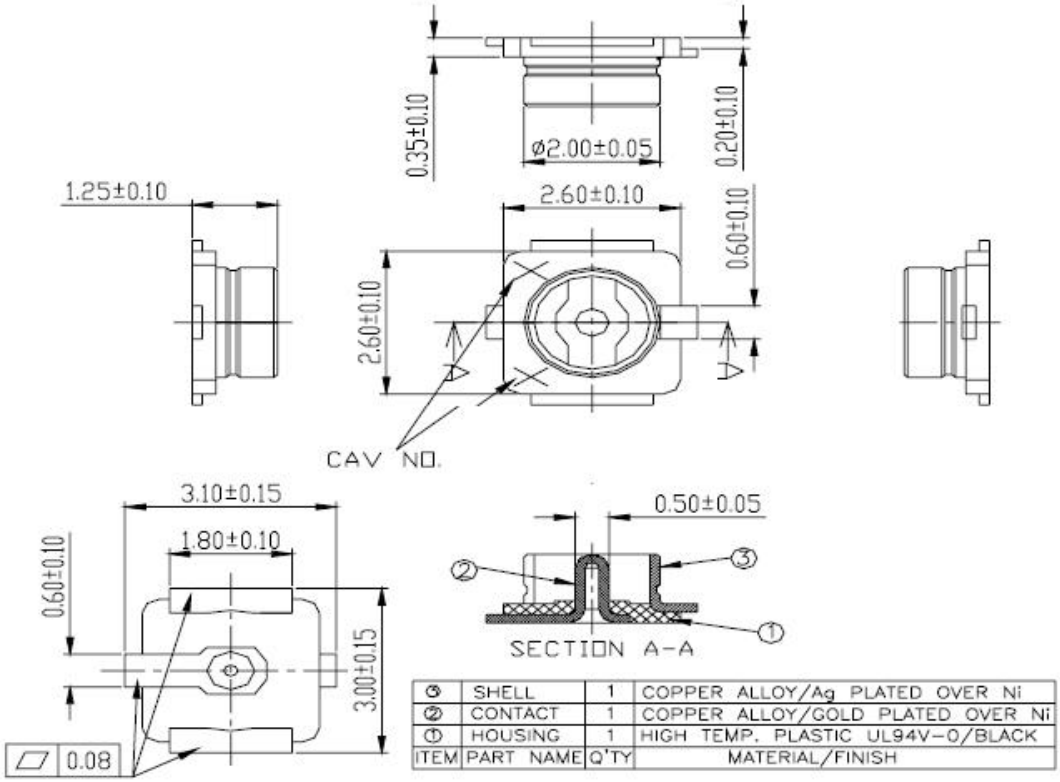


Figure 2: The dimensions of RF connector

I-PEX, P/N: 818000368 (Unit: mm)

**Note:*

The external antenna should supports dual bands 2.4GHz and 5GHz.

8 Package, Storage & Disposal

WF-M620-RSD2 modules are available in reel packaging at quantities of 600 units.The reel dimensions are 13 inches(reel diameter) ×44mm(tape width).

8.1 Reel Package

[1] Reel Dimension

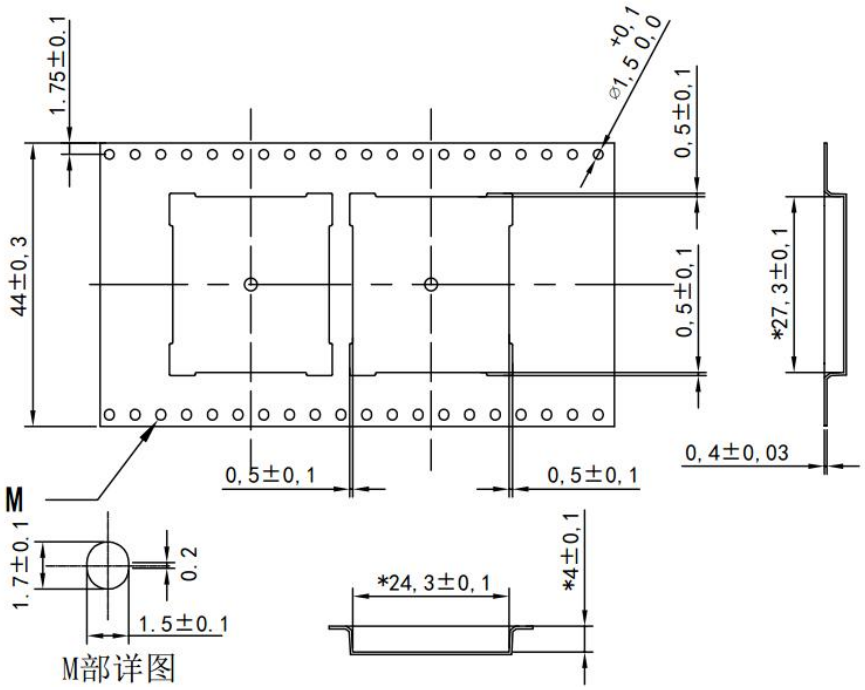
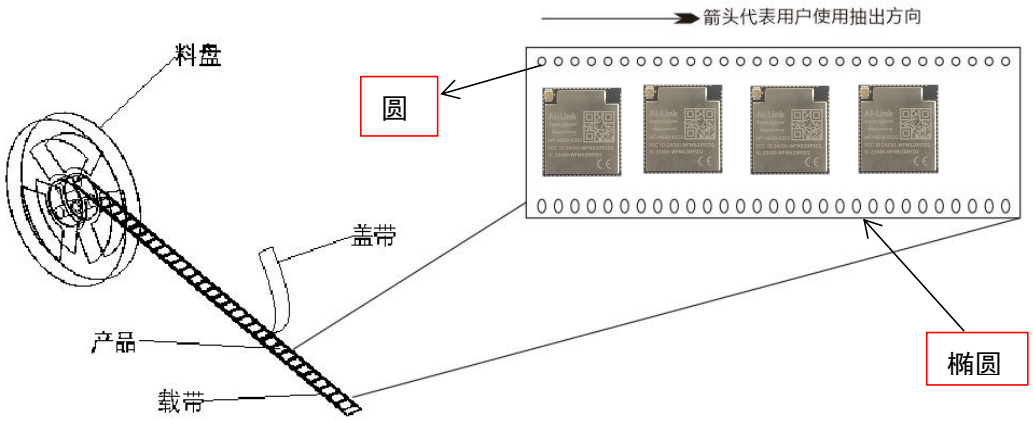


Figure 8:1 Reel Dimensions

[2] Feeding Direction



[3] Other Package Details

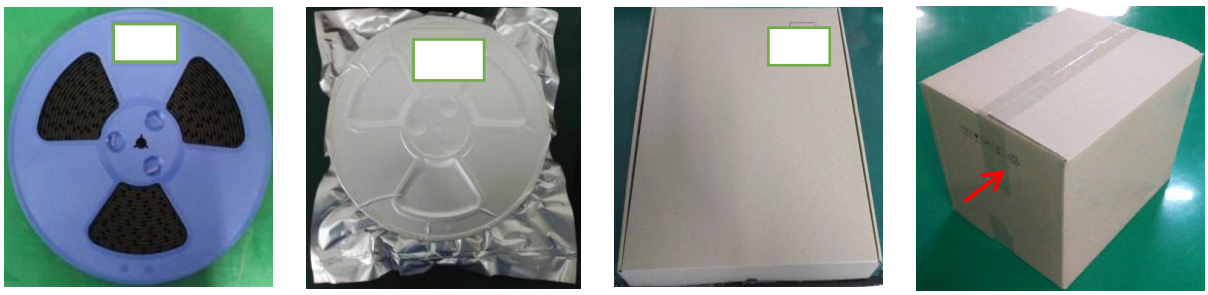


Figure 8:1 Package Details

**Note:*
*1.Dimensions of the gift box:355mm*355mm*55mm;*
*Dimensions of the carton box:370mm*370mm*300mm;*
2.600PCS modules per reel,1 reel for each gift box,5 gift boxes for each carton box,and total 3000PCS modules per carton box;

8.2 Storage

All electronic components must be stored in a clean, well-ventilated place free of corrosive gas. Unless otherwise specified, the temperature and humidity of the storage place must meet below requirements:

- Temperature：-40~125℃;
- Humidity：20%~75%;
- Humidity sensitivity grade： MSL 3
- Container Requirement: products shall be placed in a container well-functioning as an electrostatic shielding.

8.3 Disposal

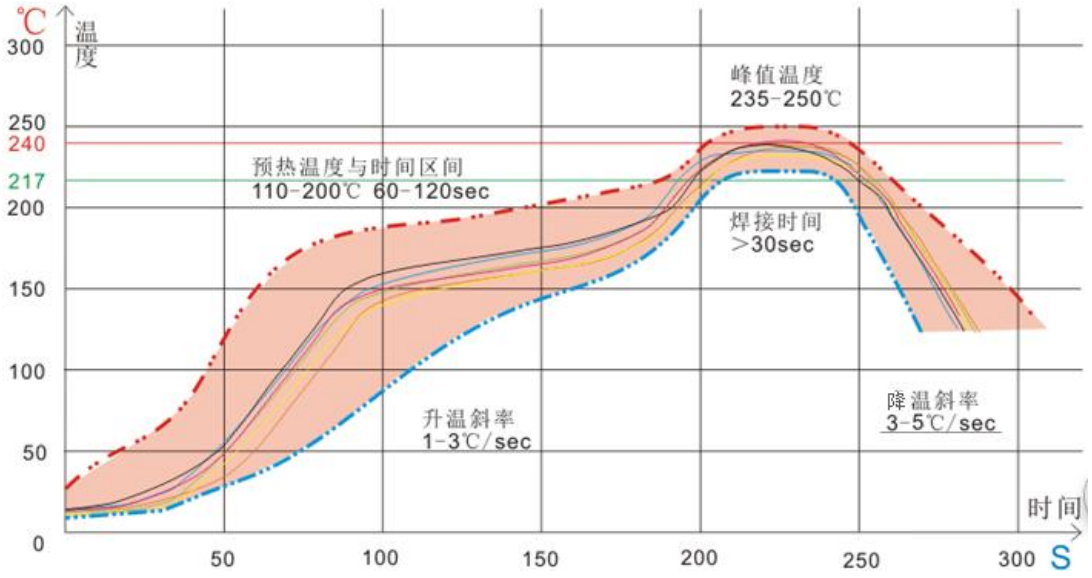
The waste disposal of this product and the package should comply with the applicable local/regional /state/ international regulations.

9 Appendix

NO.	Name	Model	Specification	Manufacturer
1	IC	MT3620AN	Dual Band WIFI SoC,DR-QFN	MediaTek
2	PCB	JUI7.820.0713	FR-4, 4-lay,1.0mm	SunLord IQE PCB
3	Crystal	E2SB26E000017E	2520 26MHz	Hosonic/HARMONY/JWT
		ETDG003270007E	2012 32.768Kz	Hosonic/HARMONY/JWT
4	IPEX	I Generation	2.6*2.6*1.25mm	ECT/Bon World

Key Components List

10 Refelow Standard Condition



Heating zone: temperature: < 150 °C, time: between 60 and 90 seconds, the slope is controlled between 1 ~ 3 °C / S.
Preheating constant temperature zone: temperature: 150 °C ~ 200 °C, time: between 60-120 seconds, slope between 0.3-0.8.
Reflow soldering area: peak temperature 235 °C ~ 250 °C (recommended peak temperature < 245 °C), time 30-70 seconds.
Cold area: temperature: 217 °C ~ 170 °C, slope between 3 ~ 5 °C / S.
The solder is lead-free solder in tin-silver copper alloys/Sn&Ag&Cu Lead-free solder (SAC305).

11 Certification Information:

FCC regulatory compliance 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, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Warning: changes or modifications not expressly approved by the party responsible for compliance could void the user’ s authority to operate the equipment.

This Module complies with FCC 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 your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Labelling Instruction for Host Product Integrator

Please notice that if the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: “Contains **FCC ID: 2AOKI-WFM620RSD2**” any similar wording that expresses the same meaning may be used.

Installation Notice to Host Product Manufacturer

The OEM integrator is responsible for ensuring that the end-user has no manual instruction to remove or install module.

The module is limited to installation in mobile application, a separate approval is required for all other operating configurations, including portable configurations with respect to §2.1093 and difference antenna configurations.

Antenna Change Notice to Host manufacturer

If you desire to increase antenna gain and either change antenna type or use same antenna type certified, a Class II permissive change application is required to be filed by us, or you (host manufacturer) can take responsibility through the change in FCC ID (new application) procedure followed by a Class II permissive change application.

FCC other Parts, Part 15B Compliance Requirements for Host product manufacturer

This modular transmitter is only FCC authorized for the specific rule parts listed on our grant, 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.

Host manufacturer in any case shall ensure host product which is installed and operating with the module is in compliant with Part 15B requirements.

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.

CE Radiation Exposure Statement

Herby, Sichuan AI-Link Technology Co., Ltd. Declares that this RF 2.4G&5G Wireless Module, **WF-M620-RSD2** is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU.

Operation Temperature: Use the **WF-M620-RSD2** in the environment with the temperature between -40℃ and 85℃

Operation Frequency range:2.400 ~ 2.4835 GHz,5.150~5.350 GHz,5.470~5.725 GHz

RF Output Power: Max 20dBm

Manufacturer: Sichuan AI-Link Technology Co., Ltd.

Address: Anzhou, Industrial Park, Mianyang, Sichuan

Tel: +86-0816-2438701

Fax: +86-0816-2416943

E-mail: ai-link@ailinkiot.com

ISED Regulatory Compliance

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.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :(1)L'appareil ne doit pas produire de brouillage; (2)L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

This equipment complies with IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.

Cet équipement est conforme aux limites d'exposition aux radiations IC CNR-102 établies pour

un environnement non contrôlé. Cet équipement doit être installé et utilisé avec une distance minimale de 20cm entre le radiateur et votre corps.

Please notice that if the IC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: "Contains **IC: 23460-WFM620RSD2**" any similar wording that expresses the same meaning may be used.
L' étiquette d' homologation d' un module d' Innovation, Sciences et Développement économique Canada devra être posée sur le produit hôte à un endroit bien en vue, en tout temps. En l' absence d' étiquette, le produit hôte doit porter une étiquette sur laquelle figure le numéro d' homologation du module d' Innovation, Sciences et Développement économique Canada, précédé du mot « contient », ou d' une formulation similaire allant dans le même sens et qui va comme suit : Contient **IC: 23460-WFM620RSD2** est le numéro d' homologation du module.

i. the device for operation in the band 5150–5250 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems;
ii. for devices with detachable antenna(s), the maximum antenna gain permitted for devices in the bands 5250-5350 MHz and 5470-5725 MHz shall be such that the equipment still complies with the e.i.r.p. limit;
iii. for devices with detachable antenna(s), the maximum antenna gain permitted for devices in the band 5725-5850 MHz shall be such that the equipment still complies with the e.i.r.p. limits as appropriate; and
i. le dispositif utilisé dans la bande 5150-5250 MHz est réservé à une utilisation en intérieur afin de réduire le risque de brouillage préjudiciable aux systèmes mobiles par satellite dans le même canal;
ii. pour les dispositifs à antenne (s) détachable (s), le gain d'antenne maximal autorisé pour les dispositifs dans les bandes 5250-5350 MHz et 5470-5725 MHz doit être tel que l'équipement soit toujours conforme à la norme e.i.r.p. limite;
pour les dispositifs à antenne (s) détachable (s), le gain d'antenne maximal autorisé pour les dispositifs de la bande 5725-5850 MHz doit être tel que l'équipement soit toujours conforme à la norme e.i.r.p. les limites, le cas échéant; et

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