Product Specification

Revision	V2.1		
Date	2018-10-06		
Model Name	R8601		
Product Name	IEEE 802.11b/g/n (1T1R) USB WLAN Module		
Bilian Approve Field			
Engineer	**QC**	**Sales**	
Customer Approve Field			
Engineer	**QC**	**Manufactory**	**Purchasing**

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Revision History

Date	Document Revision	Product Revision	Description
/	2.0	V2.0	Hardware change optimization
2018/10/06	2.1	V2.1	Hardware change optimization

1. Introduction

1.1 General Description

R8601 wireless module is designed base on MT7601UN . It is a wifi module which can support far than 100M communication.It operates at 2.412~2.462GHz and supports IEEE802.11b/g/n 1T1R , wireless data rate can reach up to 150Mbps.

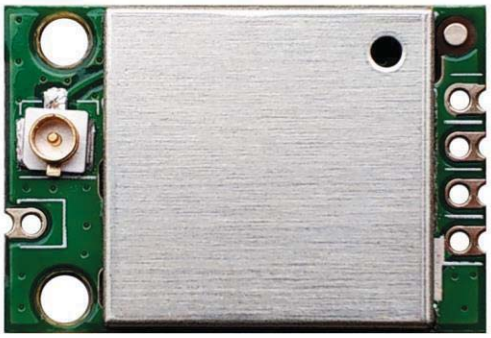


Figure 1 Top View

Figure 2 Bottom View

Note: The above pictures are for reference only

1.2 Features

- Operating Frequencies : 2.4~2.4835GHz
- Host Interface is USB, complies with USB2.0
- IEEE Standards : IEEE 802.11b/g/n
- Wireless data rate can reach up to 150Mbps
- Connect to the external antenna through the IPEX connector
- Power Supply:3.3V±0.2V

1.3 Applications

- Imaging platforms (printers, digital still cameras, digital picture frames)
- Gaming platforms
- Consumer electronic devices (DTV,DVD players, Blu-ray players.etc.)
- Tablet, notebook, E-book
- Other devices which need to be supported by wireless network

2. Functional Block Diagram

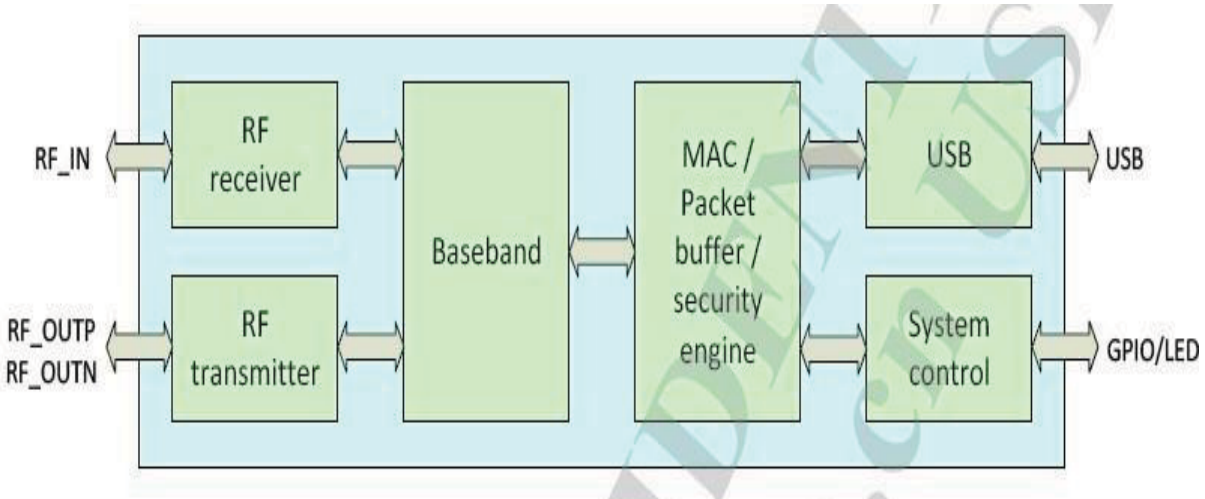


Figure 1 MT7601 block diagram

Figure 3 MT7601UN block diagram

3. Product Technical Specifications

3.1 General Specifications

Item	Description
Product Name	R8601
Main Chip	MT7601UN
Host Interface	USB2.0
IEEE Standards	IEEE 802.11b/g/n
Operating Frequencies	2.4GHz~2.4835GHz
Modulation	802.11b: CCK, DQPSK, DBPSK 802.11g: 64-QAM,16-QAM, QPSK, BPSK 802.11n: 64-QAM,16-QAM, QPSK, BPSK
Working Mode	Infrastructure, Ad-Hoc
Wireless Data Rate	802.11b: 1, 2 ,5.5,11Mbps 802.11g: 6,9,12,18,24,36,48,54Mbps 802.11n: MCS0~7，HT20 reach up to72.2Mbps, HT40 reach up to150Mbps
Rx Sensitivity	-94dBm (Min)
TX Power	17dBm(Max)
Antenna Type	2.4G metal plate antenna，Pa03-2.4g-2dbpcb antenna
Dimension(L*W*H)	20.3x 14x 2.3mm (LxWxH)，Tolerance: ±0.15mm
Power Supply	3.3V±0.2V
Power Consumption	Standby :100mA@3.3V (Max) TX mode :285mA@3.3V (Max)

Clock Source	40MHz
Working Temperature	-10°C to +70°C
Storage Temperature	-40°C to +70°C

ESD CAUTION: Although this module is designed to be as robust as possible, Electrostatic Discharge (ESD)can damage this module. It must be protected from ESD at all times and handled under the protection of ESD.

3.2 DC Characteristics

Absolute Maximum Ratings

Symbol	Parameters	Maximum rating	Unit
VDD33	3.3V Supply Voltage	3.5	V
VESD	ESD protection（HBM）	2000	V

Recommended Operating range

At room temperature 25℃				
Symbol	**Min.**	**Typ.**	**Max.**	**Unit**
VDD33	3.1	3.3	3.5	V

3.3 DC Power Consumption

Vcc=3.3V， T_a = 25 °C， unit: mA				
Supply current	Typ.		Max	
Standby (RF disabled)	95		100	
802.11b	1Mbps		11Mbps	
Supply current	Typ.	Max.	Typ.	Max.
TX mode	255	265	225	238
RX mode	90	95	92	96
802.11g	6Mbps		54Mbps	
Supply current	Typ.	Max.	Typ.	Max.
TX mode	256	264	138	146
RX mode	90	94	95	98
802.11n HT20	7.2Mbps		72.2Mbps	
Supply current	Typ.	Max.	Typ.	Max.
TX mode	255	263	152	155
RX mode	90	94	98	99
802.11n HT40	15Mbps		150Mbps	

Supply current	Typ.	Max.	Typ.	Max.
TX mode	253	262	138	143
RX mode	91	96	97	98

3.4 RF Specifications

TX Power	802.11b 11Mbps:17±1.5dBm 802.11g 54Mbps:15±1.5dBm 802.11n-HT20 72.2Mbps:15±1.5dBm 802.11n-HT40 150Mbps:14±1.5dBm
TX Constellation Error(EVM)	802.11b 11Mbps:≤-20dB 802.11g 54Mbps:≤-25dB 802.11n-HT20 72.2Mbps:≤-28dB 802.11n-HT40 150Mbps:≤-28dB
Receiver Minimum Input Sensitivity@PER	802.11b 11Mbps:≤-85dBm 802.11g 54Mbps:≤-72dBm 802.11n-HT20 72.2Mbps:≤-68dBm 802.11n-HT40 150Mbps:≤-66dBm

4. Pin Assignments

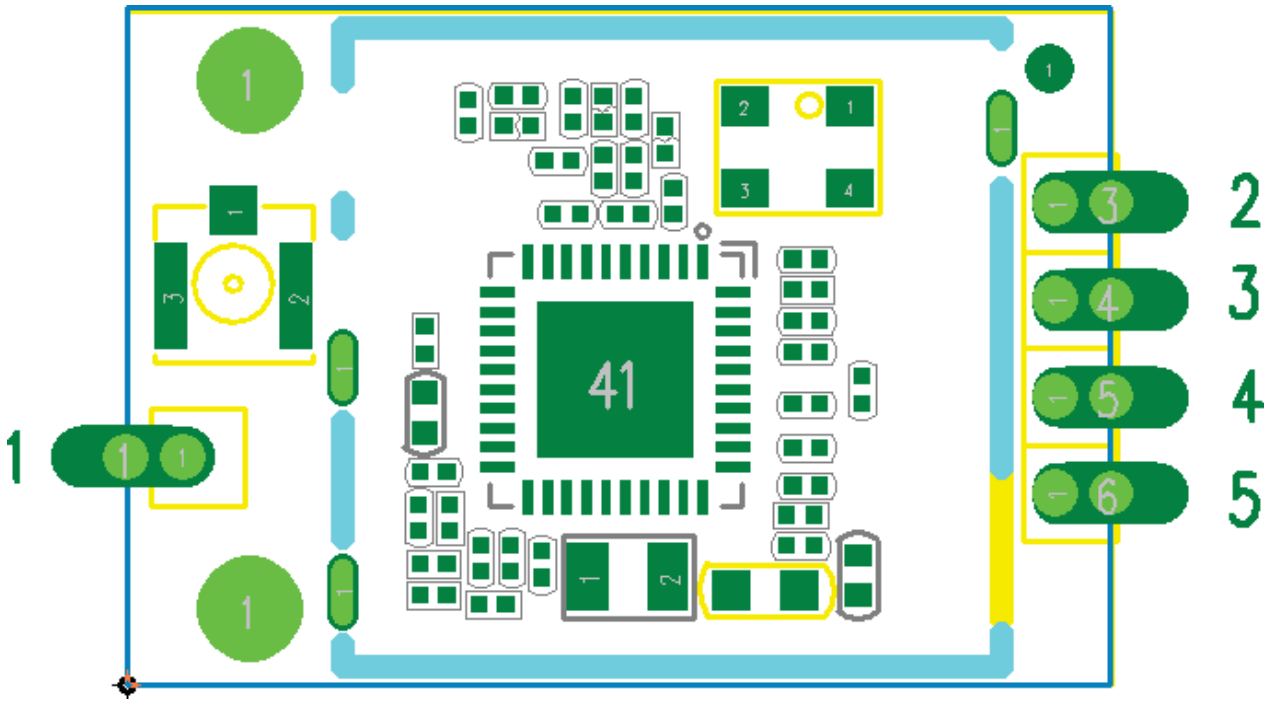


Figure 4 Pin Assignments (Top view)

Pin No：	Pin Name	Type	Description
1	NC	/	No attribute positioning hole
2	GND	P	Ground
3	UDP	I/O	USB Transmitter/Receiver Differential Pair
4	UDM	I/O	USB Transmitter/Receiver Differential Pair
5	VDD33	P	3.3V Power Supply

5. Typical Application Circuit

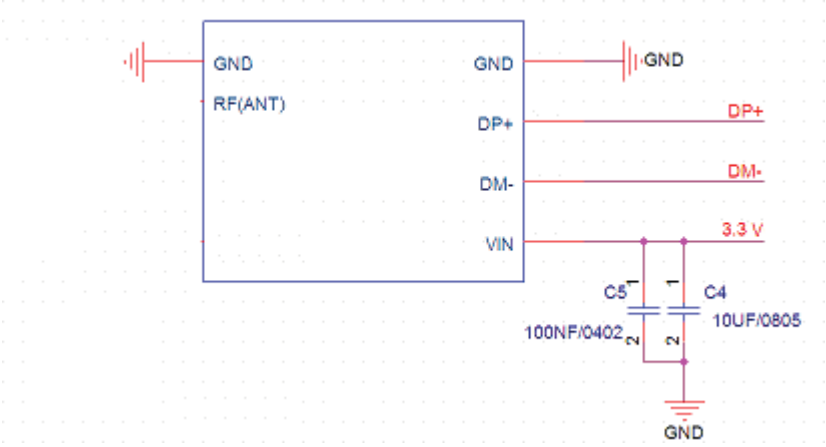


Figure 5 Recommended Layout Pattern

NOTE： RF trace need to keep 50 ohm impedance. USB differential pair need to keep 90ohm impedance.

6. Mechanical Specifications

Module dimension: Typical (L*W * H): 20.3mm*14.0mm*2.3mm Tolerance : +/-0.15mm

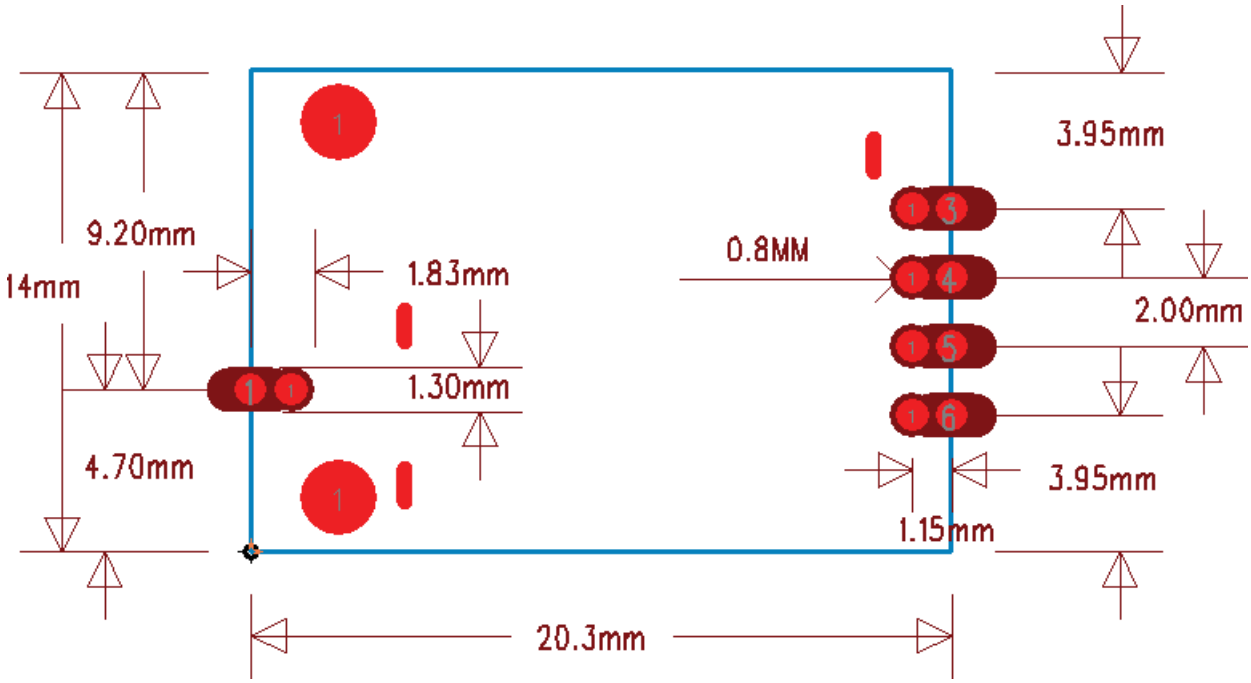


Figure 6 Module dimension

7. Others

7.1 Package Information

Figure 7 Package Information

7.2 Storage Temperature and Humidity

1. Storage Condition: Moisture barrier bag must be stored under 30℃, humidity under 85% RH. The calculated shelf life for the dry packed product shall be a 12 months from the bag seal date.Humidity indicator cards must be blue, <30%.

2. Products require baking before mounting if humidity indicator cards reads > 30% temp < 30℃,humidity < 70% RH, over 96 hours.

Baking condition: 125℃, 12 hours.

Baking times: 1 time.

7.3 Recommended Reflow Profile

Reflow soldering shall be done according to the solder reflow profile,Typical Solder Reflow Profile isillustrated in Figures 15. The peak temperature is 245℃.

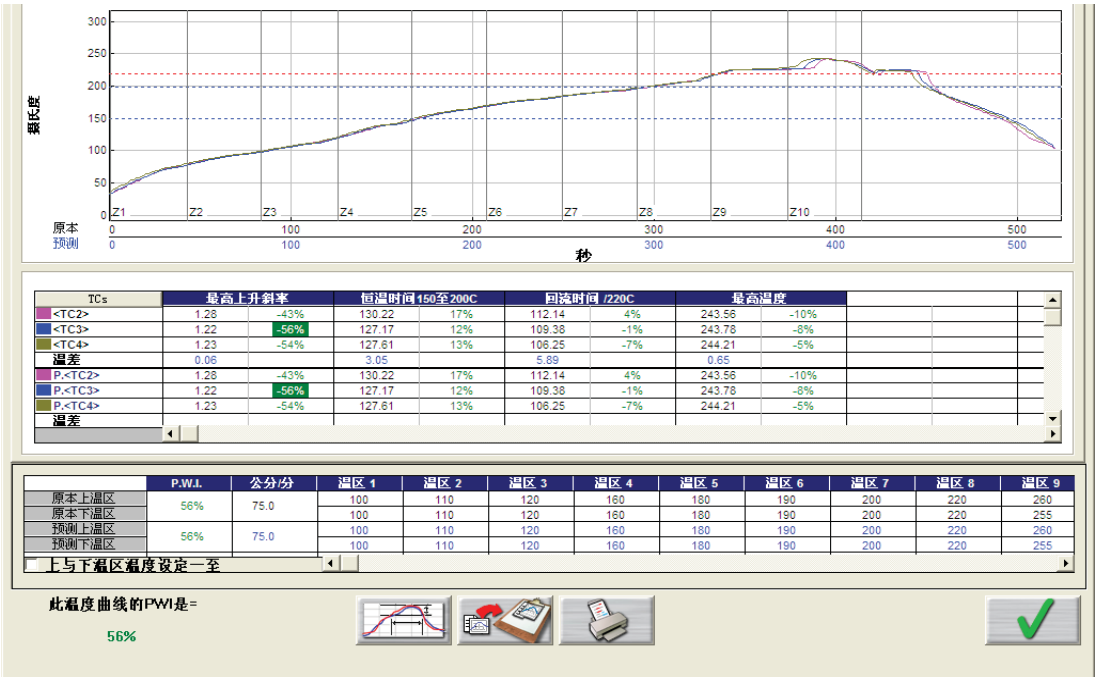
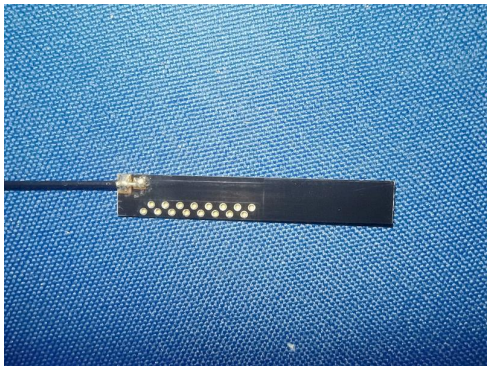


Figure 8 Typical Solder Reflow Profile

7.4 FCC Warning

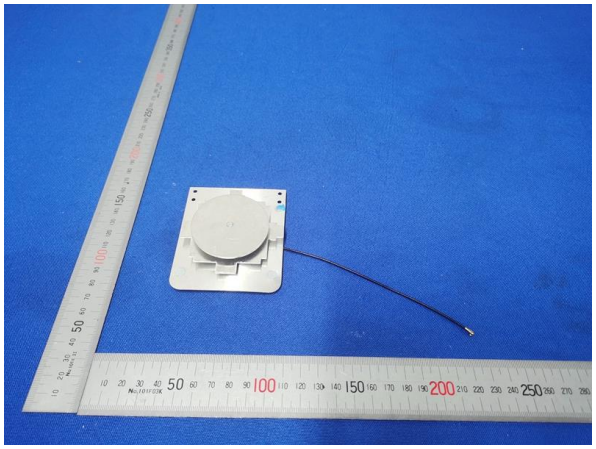
Antenna Connector: Male IPEX antenna connector
Antenna: Alternative integral antennas provided to the EUT.

ANT 1:



with Gain 2.0dBi maximum

ANT 2:



with Gain 3.0dBi maximum

FCC Statement
FCC standards: FCC CFR Title 47 Part 15 Subpart C Section 15.247

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

FCC Radiation Exposure Statement
The modular can be installed or integrated in mobile or fix devices only. This modular cannot be installed in any portable device if without further certification.
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. This modular must be installed and operated with a minimum distance of 20 cm between the radiator and user body.

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 Transmitter Module FCC ID: ZHZR8601 Or Contains FCC ID: ZHZR8601”
When the module is installed inside another device, the user manual of the host must contain below warning statements;
1. 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.

2. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
The devices must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product.
Any company of the host device which install this modular with limit modular approval should perform the test of radiated & conducted emission and spurious emission,etc. according to FCC part 15C : 15.247 and 15.209 & 15.207 ,15B Class B requirement, Only if the test result comply with FCC part 15C : 15.247 and 15.209 & 15.207 ,15B Class B requirement， then the host can be sold legally.