



# PRODUCT SPECIFICATION

Version 1.0

## IEEE 802.11 b/g/n 1T/1R USB Module Integrated Bluetooth v2.1/3.0/4.2

**Model Number:** MT9632  
(Realtek : RTL8723DU )

客户认可 Custom Approval Section		
Custom Name		
Department		
Approval		Date:

DESIGN	CHECK	APPROVAL
Xuhuan	Houdewei	Gaozhao
2023-7-21	2023-7-21	2023-7-21



# PRODUCTS SPECIFICATION

## Document revision history

Revision	Date	Approved by	Remarks
Version 1.0	2023-7-21		Draft



# PRODUCTS SPECIFICATION

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## 1. General Description

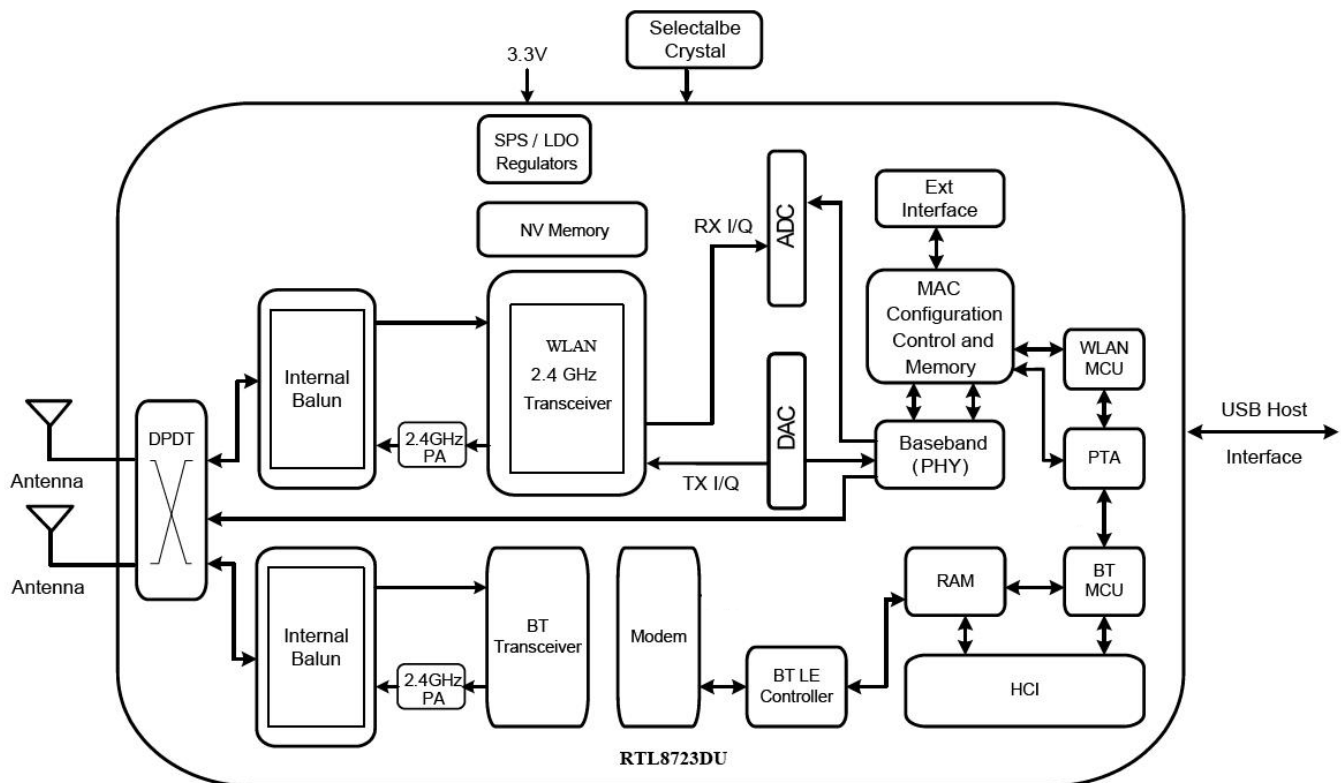
This document is to specify the product requirements for 802.11 **b/g/n** USB Module. This Card is based on Realtek RTL8723DU chipset that complied with IEEE 802.11b/g/n standard from 2.4~2.5GHz. It can be used to provide up to 54Mbps for IEEE 802.11g, 11Mbps for IEEE 802.11b and 150Mbps for IEEE 802.11n to connect your wireless LAN. The Bluetooth controller complies with Bluetooth core specification v5.0, and supports mode( Low Energy Controllers).

## 2. Features

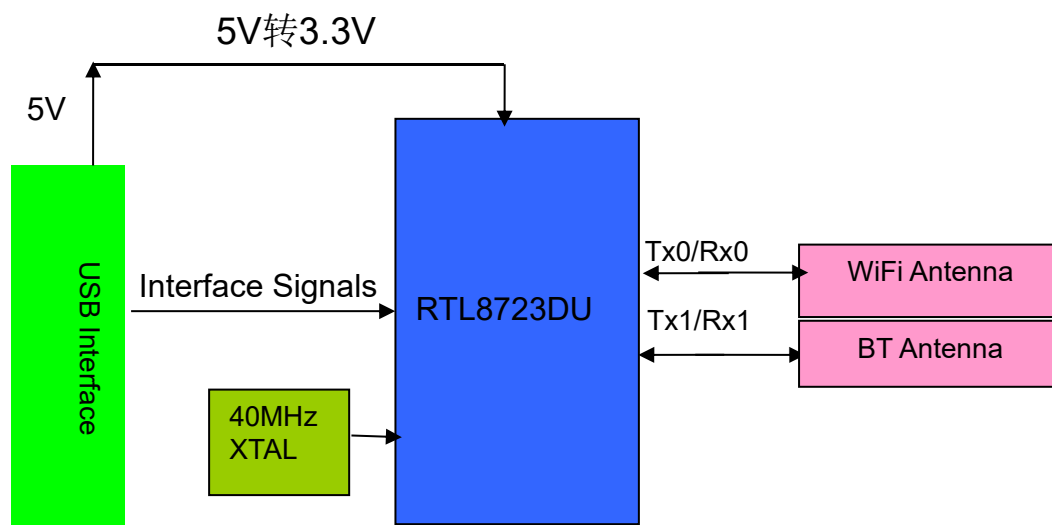
- Compatible with IEEE 802.11b standard to provide wireless 11Mbps data rate
- Compatible with IEEE 802.11g standard to provide wireless 54Mbps data rate
- Compatible with IEEE 802.11n standard to provide wireless 150Mbps data rate
- Operation at 2.4~2.5GHz frequency band to meet worldwide regulations
- Bluetooth v5.0 Low Energy(LE)
- 802.11i(WPA,WPA2).Open, shared key, and pair-wise key authentication services
- WAPI supported
- Drivers support Windows, Android, Linux
- RoHS compliant.

## 3. Application Diagrams

### 3.1 Functional Block Diagram



Single-Band 11n (1x1) and Integrated Bluetooth Controller Solution with Antenna Diversity



## 3.2 General Requirements

### 3.2.1 IEEE 802.11b Section

	Feature	Detailed Description
3.2.1.1	Standard	<ul style="list-style-type: none"> <li>IEEE 802.11b</li> </ul>
3.2.1.2	Radio and Modulation Schemes	<ul style="list-style-type: none"> <li>DQPSK , DBPSK and CCK with DSSS</li> </ul>
3.2.1.3	Operating Frequency	<ul style="list-style-type: none"> <li>2400 ~ 2483.5MHz ISM band</li> </ul>
3.2.1.4	Channel Numbers	<ul style="list-style-type: none"> <li>13 channels for Worldwide</li> </ul>
3.2.1.5	Data Rate	<ul style="list-style-type: none"> <li>at most 11Mbps</li> </ul>
3.2.1.6	Media Access Protocol	<ul style="list-style-type: none"> <li>CSMA/CA with ACK</li> </ul>
3.2.1.7	Transmitter Output Power at Antenna Connector	<ul style="list-style-type: none"> <li>Typical RF Output Power at each RF chain, and at room Temp. 25°C</li> <li>21.651dBm at 11Mbps</li> </ul>
3.2.1.8	Receiver Sensitivity at Antenna Connector	<ul style="list-style-type: none"> <li>Typical Sensitivity at each RF chain. @Frame (1000-byte PDUs) Error Rate&lt;8% at room Temp 25°C</li> <li>-83 dBm for 11Mbps</li> </ul>

### 3.2.2 IEEE 802.11g Section

	Feature	Detailed Description
3.2.2.1	Standard	<ul style="list-style-type: none"> <li>IEEE 802.11g</li> </ul>
3.2.2.2	Radio and Modulation Type	<ul style="list-style-type: none"> <li>QPSK , BPSK , 16QAM ,64QAM with OFDM</li> </ul>
3.2.2.3	Operating Frequency	<ul style="list-style-type: none"> <li>2400 ~ 2483.5MHz ISM band</li> </ul>
3.2.2.4	Channel Numbers	<ul style="list-style-type: none"> <li>13 channels for Worldwide</li> </ul>
3.2.2.5	Data Rate	<ul style="list-style-type: none"> <li>at most 54Mbps</li> </ul>
3.2.2.6	Media Access Protocol	<ul style="list-style-type: none"> <li>CSMA/CA with ACK</li> </ul>
3.2.2.7	Transmitter Output Power at Antenna Connector	<ul style="list-style-type: none"> <li>Typical RF Output Power at each RF chain, at room Temp. 25°C</li> <li>21.896dBm at 54Mbps</li> </ul>
3.2.2.8	Receiver Sensitivity at Antenna Connector	<ul style="list-style-type: none"> <li>Typical Sensitivity at each RF chain. @Frame (1000-byte PDUs) Error Rate&lt;10% at room Temp 25°C</li> <li>-71 dBm for 54Mbps</li> </ul>

## 3.2.3 IEEE 802.11n Section

	Feature	Detailed Description
3.2.3.1	Standard	<ul style="list-style-type: none"> <li>IEEE 802.11n</li> </ul>
3.2.3.2	Radio and Modulation Type	<ul style="list-style-type: none"> <li>BPSK , QPSK , 16QAM ,64QAM with OFDM</li> </ul>
3.2.3.3	Operating Frequency	<ul style="list-style-type: none"> <li>2400 ~ 2483.5MHz ISM band</li> <li>Channel Frequency for HT20: 2412~2472MHZ</li> <li>Channel Frequency for HT40: 2422~2462MHZ</li> </ul>
3.2.3.4	Data Rate(Mbps)	<ul style="list-style-type: none"> <li>at most 150 Mbps</li> </ul>
3.2.3.5	Media Access Protocol	<ul style="list-style-type: none"> <li>CSMA/CA with ACK</li> </ul>
3.2.3.6	Transmitter Output Power at Antenna Connector	<ul style="list-style-type: none"> <li>Typical RF Output Power at each RF chain, Data Rate and at room Temp. 25°C</li> <li>Channel Frequency for HT20</li> <li>21.964dBm at MCS7</li> <li>Channel Frequency for HT40</li> <li>21.564 dBm at MCS 7</li> </ul>
3.2.3.7	Receiver Sensitivity at Antenna Connector	<ul style="list-style-type: none"> <li>Typical Sensitivity at Which Frame(1000-byte PDUs)Error Rate=10% HT20</li> <li>-68dBm at MCS7</li> <li>HT40</li> <li>-66dBm at MCS7</li> </ul>

## 3.2.4 Bluetooth Section

Feather		Description	
General specification			
Bluetooth standard	Bluetooth V5.0		
Frequency band	2402MHz-2480MHz		
Channel Numbers	40 channels for BLE		
Modulation	GFSK		
RF specification			
	Min（dBm）	Type（dBm）	Max（dBm）
BDR Output Power		5	
BLE Output Power		5	
Sensitive @BER=0.1% FOR GFSK(1Mbps)		-86	
Sensitive @BER=0.01% FOR $\pi/4$ -DQPSK(2Mbps)		-86	
Sensitive @BER=0.01% FOR 8DPSK(3Mbps)		-80	
Maximum input level	GFSK(1Mbps) -20dBm		
Sensitive @PER=30.8% FOR BLE		-90	

## 4. Electrical and Thermal Characteristics

### 4.1 Temperature Limit Ratings

Parameter	Minimum	Maximum	Units
Storage Temperature	-40	+80	°C
Ambient Operating Temperature	0	60	°C
Junction Temperature	0	125	°C

### 4.2 General Section

	Feature	Detailed Description
4.2.1	Antenna Type	<ul style="list-style-type: none"> <li>WIFI&amp;BT: IPEX</li> </ul>
4.2.2	Operating Voltage	<ul style="list-style-type: none"> <li>5V±10%</li> </ul>
4.2.3	Current Consumption	<ul style="list-style-type: none"> <li>&lt;300mA@RX</li> <li>&lt;500mA@TX</li> </ul>
4.2.4	Interface	<ul style="list-style-type: none"> <li>High Speed USB2.0 Interface</li> </ul>

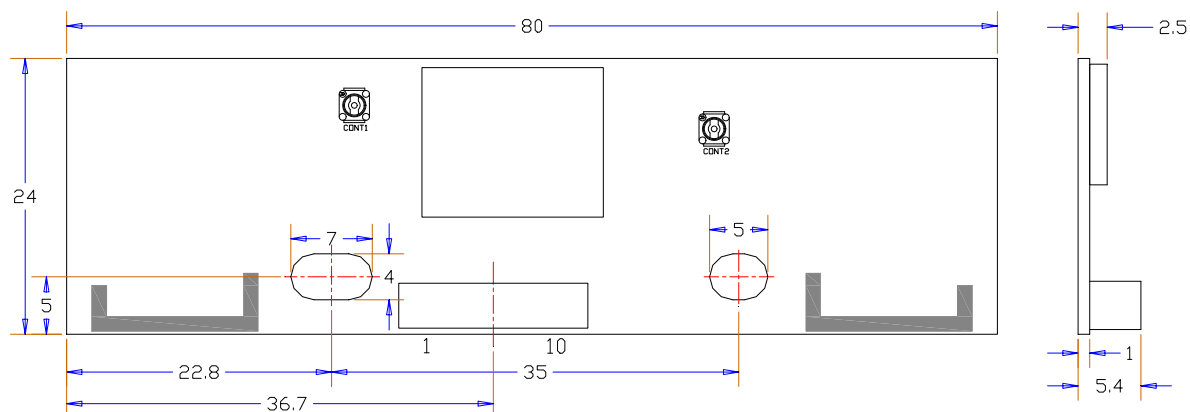
### 4.3 Software

Driver	Windows, Linux , Android
Security	64/128-bits WEP, WPA, WPA2

## 5. EEPROM Information

Reg Domain	Worldwide 2.4G Read from registry; Control by driver
	Offset 0xB8 for 2.4G:0x20
Vendor ID	0x0BDA
Product ID	0xD723

## 6. Mechanical Dimensions



Unit: mm

DIM (mm)	Tolerance (mm)
0-5	±0.15
5-10	±0.20
10-50	±0.30
50-100	±0.40

PIN	SYMBOL	DESCRIPTION
1	NC	NC
2	NC	NC
3	BT_WAKE_HOST	BT_WAKE_HOST
4	GND	GND
5	WL_WAKE_HOST	WL_WAKE_HOST
6	Power_EN	Reset
7	GND	GND
8	WL_USB_DP	WL_USB_DP
9	WL_USB_DN	WL_USB_DN
10	VCC	5V

## 说明:

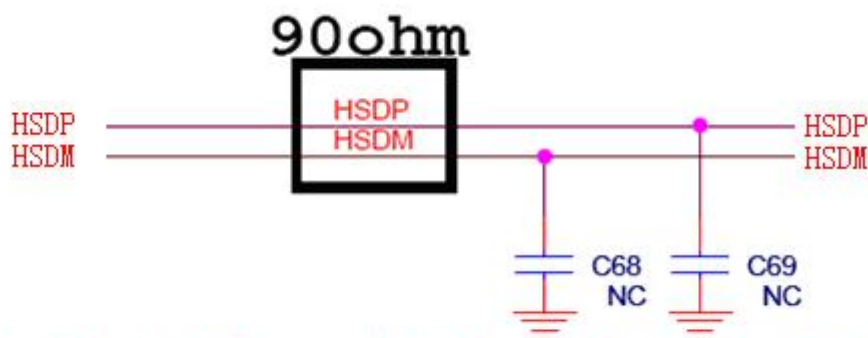
**Pin3** BT\_WAKE\_HOST: Pin 19 of the built-in RTL8723DU.

**Pin5** WLAN\_WAKE\_HOST: Internal pin 20 of RTL8723DU, internal 100K Pull Up.

**Pin6** Power\_EN: power\_en pin for DC-DC (5V to 3.3V) is connected to control DC-DC.

**Note:** WIFI and BT share the same address segment, but the same address does not occur.

## 7. USB interface electrical characteristics



Two root go line do difference, but also required to make 90 0 the impedance test



**FCC Statements:**

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.

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.

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.

**Radiation Exposure Statement:**

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

**Integration instructions for host product manufacturers according to KDB 996369 D03 OEM Manual v01****2.2 LIST OF APPLICABLE FCC RULES:**

Compliance with § 15.247 regulation

**2.3 SPECIFIC OPERATIONAL USE CONDITIONS:**

The module is typically use in industrial, household and general office / ITE and audio & video, EV charging system end-products. The product must not be co-located or operating in conjunction with any other antenna or transmitters.

#### **2.4 LIMIT MODULE PROCEDURES:**

Not applicable as this radio module meets the Single-Modular transmitter requirements.

#### **2.5 TRACE ANTENNA DESIGNS:**

The module was designed with the fixed PCB print antenna and the maximum gain is about 3.84dBi between 2400-2500MHz, any changes or modifications by the OEM integrator will require additional testing and evaluation.

#### **2.6 RF EXPOSURE CONSIDERATIONS:**

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This product must be installed and operated with a minimum distance of 20 cm between the radiator and user body. OEM integrator shall equipped the antenna to compliance with antenna requirement part 15.203& 15.204 and must not be co-located or operating in conjunction with any other antenna or transmitters, otherwise, a Class II Permissive Change (C2PC) must be filed with the FCC and/or a new FCC authorization must be applied.

#### **2.7 ANTENNAS:**

The antenna of the module was deisgned Dipole antenna and the best gain is about 3.84dBi between 2400-2500MHz. Modification the antenna design may need additional testing and evaluation.

#### **2.8 LABEL AND COMPLIANCE INFORMATION:**

The final end product into which this RF Module is integrated has to be labeled with an visible area and stating the FCC ID of the RF Module, such as "Contains FCC ID: 2AWH3SRXXAA ". If the size of the end product is smaller than 8x10cm, then additional FCC part 15.19 statement is required to be available in the users' manual: 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.

The User's Manual for The finished product should include the following statements:

Any changes or modifications to this equipment not expressly approved by the OEM/Integrator may cause harmful interference and void the user's authority to operate this equipment.
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Integrator is reminded to assure that these installation instructions will not be made available to the end-user of the final host device.

#### **2.9 INFORMATION ON TEST MODES AND ADDITIONAL TESTING REQUIREMENTS:**

Data transfer module demo board can control the EUT work in RF test mode at specified conditions. This radio module must not be installed to co-locate and operating

simultaneously with other radios in the host system except in accordance with FCC multi-transmitter product procedures. Additional testing and equipment authorization may be required operate simultaneously with other radio. This device is intended only for OEM integrators under the following conditions: 1) The antenna must be installed such that 20cm is maintained between the antenna and users, and 2) The transmitter module may not be co-located with any other transmitter or antenna. As long as the 2 conditions above are met, further transmitter tests will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

#### **2.10 ADDITIONAL TESTING, PART 15 SUBPART B DISCLAIMER:**

The host product manufacturer is responsible for compliance with any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. The final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.

#### **General Statements**

The module is intended only for OEM integrators.

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

The OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed

OEM integrator shall not modify and change the fixed designed PCB print antenna, and must not be co-located or operating in conjunction with any other antenna or transmitters, otherwise, a Class II Permissive Change (C2PC) must be filed with the FCC and/or a new FCC authorization must be applied.

The product is typically use in industrial, household and general office / ITE and audio & video, EV charging system end-products.