



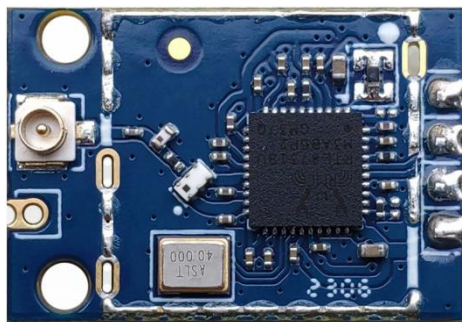
BL-M8731BU5

**802.11n 150Mbps Dual-band
WLAN USB2.0 Module Specification**

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(Top View)



(Bottom View)

Module Name: BL-M8731BU5	
Module Type: 802.11a/b/g/n dual-band 150Mbps WLAN USB2.0 Module	
Revision: V1.0	
Customer Approval:	
Company:	
Title:	
Signature:	Date:
LB-link Approval:	
Title:	
Signature:	Date:

Revision History

Revision	Summary	Release Date	Revised By
0.1	Initial release	2023-02-24	Drq
1.0	Official release	2023-04-03	Drq

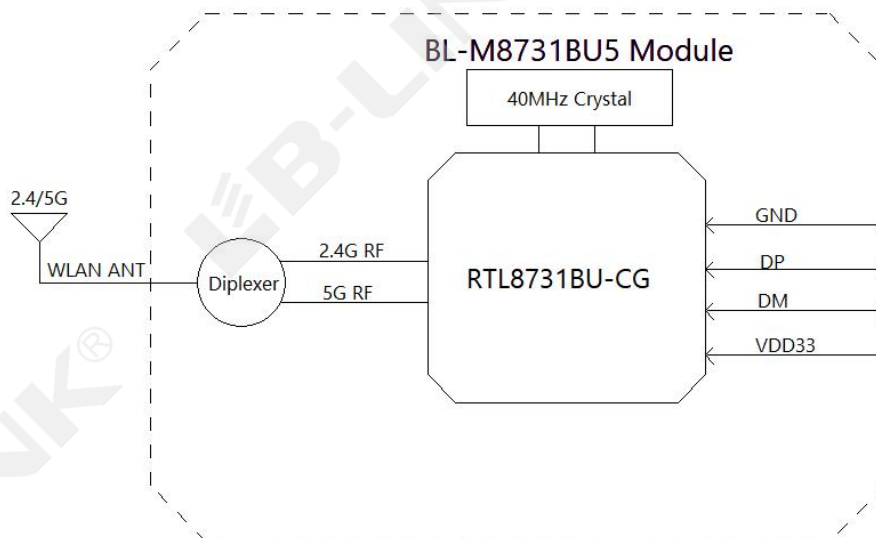
1. Introduction

BL-M8731BU5 is a highly integrated dual-band WLAN module base on RTL8731BU-CG, which combines WLAN MAC, 1T1R Baseband and Radio in single chip. It compatible IEEE 802.11a/b/g/n standard and supports Maximum PHY rate up to 150Mbps. The module provides excellent WLAN performance and lower cost ideal for wireless network applications such as set-top boxes, OTT boxes, IP cameras, LED projectors.

1.1 Features

- Operating Frequency: 2.4~2.4835GHz and 5.15~5.85GHz
- Host Interface is USB2.0
- Wireless PHY rate can reach up to 150Mbps
- Connect to external antenna through IPEX/ MHF-1 connector
- DC 3.3V±0.2V power supply

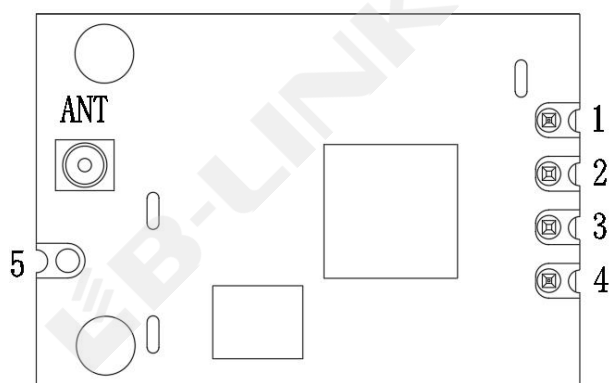
1.2 Block Diagram



1.3 General Specifications

Module Name	BL-M8731BU5
Chipset	RTL8731BU-CG
WLAN Standard	IEEE 802.11 a/b/g/n
Host Interface	USB2.0 for WLAN
Antenna	Connect to external antenna through IPEX / MHF-1 connector
Dimension	20.3*14.0*8.0mm (L*W*H) ±0.15mm
Power Supply	DC 3.3V±0.2V @ 700 mA (Max)
Operation Temperature	-20°C to +70°C
Operation Humidity	10% to 95% RH (Non-Condensing)

2. Pin Assignments



(Top View)

2.1 Pin Definition

No.	Pin Name	Type	I/O Level	Module Pin Description
1	GND	P		Ground connection
2	DP	AI/O		USB2.0 Transmitter/Receiver Differential Pair
3	DM	AI/O		USB2.0 Transmitter/Receiver Differential Pair
4	VDD33	P		DC 3.3V Power Supply
5	NC	--		No connection
	ANT	RF		IPEX connector for 2.4G/5G RF to WLAN_ANT

P: Power or Ground; I/O: In/Output; AI/O: Analog In/Output; RF: Analog RF Port or RF Ground;

3. Electrical and Thermal Specifications

3.1 Recommended Operating Conditions

Parameters		Min	Typ	Max	Units
Ambient Operating Temperature		-20	25	70	°C
External Antenna VSWR			1.7	2	/
Supply Voltage	VDD33	3.1	3.3	3.5	V

3.2 Current Consumption

Conditions : VDD33=3.3V ; Ta:25°C			
Use Case	VDD33 Current		
	Typ(I _{RMS})	Max(I _{Peak})	Units
WLAN Unassociated (Linux Driver)	135	150	mA
2.4G WLAN TCP throughput TX 90Mbps (Linux Driver)	357	490	mA
2.4G WLAN TCP throughput RX 80Mbps (Linux Driver)	161	460	mA
5G WLAN TCP throughput TX 90Mbps (Linux Driver)	383	500	mA
5G WLAN TCP throughput RX 80Mbps (Linux Driver)	163	460	mA
2.4G 11b@1Mbps TX@20dBm (RF test)	442	500	mA
2.4G 11g@11Mbps TX@20dBm (RF test)	377	480	mA
2.4G 11g@6Mbps TX@20dBm (RF test)	378	540	mA
2.4G 11g@54Mbps TX@19dBm (RF test)	224	470	mA
2.4G 11n@HT20_MCS0 TX@20dBm (RF test)	376	550	mA
2.4G 11n@HT20_MCS7 TX@18dBm (RF test)	197	490	mA
2.4G 11n@HT40_MCS0 TX@20dBm (RF test)	375	510	mA
2.4G 11n@HT40_MCS7 TX@18dBm (RF test)	203	460	mA
2.4G 11b@1Mbps RX (RF test)	138	150	mA
2.4G 11n@HT40_MCS7 RX (RF test)	138	150	mA
5G 11a@6Mbps TX@19dBm (RF test)	416	515	mA
5G 11a@54Mbps TX@17dBm (RF test)	234	500	mA
5G 11n@HT20_MCS0 TX@18dBm (RF test)	386	485	mA

5G 11n@HT20_MCS7 TX@16dBm (RF test)	204	470	mA
5G 11n@HT40_MCS0 TX@18dBm (RF test)	385	480	mA
5G 11n@HT40_MCS7 TX@16dBm (RF test)	199	470	mA
5G 11a@6Mbps RX (RF test)	135	155	mA
5G 11n@HT40_MCS7 RX (RF test)	135	155	mA

4. WLAN RF Specifications

4.1 2.4G WLAN RF Specification

Conditions : VDD33=3.3V ; Ta:25°C			
Features	Description		
WLAN Standard	IEEE 802.11b/g/n		
Frequency Range	2.4~2.4835GHz (2.4GHz ISM Band)		
Channels	Ch1~Ch13 (For 20MHz Channels)		
Modulation	802.11b (DSSS): CCK, DQPSK, DBPSK; 802.11g (OFDM): BPSK, QPSK, QAM16, QAM64; 802.11n (OFDM): BPSK, QPSK, QAM16, QAM64;		
Data Rate	802.11b: 1, 2, 5.5, 11Mbps; 802.11g: 6, 9, 12, 18, 24, 36, 48, 54Mbps; 802.11n (HT20): MCS0~MCS7 6.5~72.2Mbps; 802.11n (HT40): MCS0~MCS7(1T1R) 13.5~150Mbps;		
Frequency Tolerance	≤±20ppm		
2.4G Transmitter Specifications (TX power tolerance calibrated, customers can define the target TX power by modifying configuration file of the driver software. Customers must define the TX power same or lower than recommended Target TX Power as below)			
TX Rata	Recommended Target TX Power (dBm)	TX Power Tolerance (dBm)	EVM (dB)
802.11b@1~11Mbps	20	±2	≤-10
802.11g@6Mbps	20	±2	≤-10
802.11g@54Mbps	19	±2	≤-25
802.11n@HT20_MCS0	20	±2	≤-10
802.11n@HT20_MCS7	18	±2	≤-28
802.11n@HT40_MCS0	20	±2	≤-10

802.11n@HT40_MCS7	18	±2	≤-28
2.4G Receiver Specifications			
RX Rata	Min Input Level (Typ dBm)	Max Input Level (Typ dBm)	PER
802.11b@1Mbps	-95	-5	< 8%
802.11b@11Mbps	-88	-5	< 8%
802.11g@6Mbps	-92	-5	< 10%
802.11g@54Mbps	-74	-5	< 10%
802.11n@HT20_MCS0	-90	-5	< 10%
802.11n@HT20_MCS7	-72	-5	< 10%
802.11n@HT20_MCS0	-90	-5	< 10%
802.11n@HT20_MCS7	-70	-5	< 10%

4.2 5G WLAN RF Specification

Conditions: VDD33=3.3V; Ta:25°C			
Features		Description	
WLAN Standard		IEEE 802.11a/n	
Frequency Range		5.15~5.25GHz; 5.25~5.35GHz; 5.47~5.73GHz; 5.735~5.835GHz (5GHz ISM Band)	
Channels		Ch36, Ch40, Ch44, Ch48; Ch52~Ch64; Ch100~Ch140; Ch149~Ch165 (For 20MHz Channels)	
Modulation		802.11a (OFDM): BPSK, QPSK, QAM16, QAM64; 802.11n (OFDM): BPSK, QPSK, QAM16, QAM64;	
Data Rate		802.11a: 6, 9, 12, 18, 24, 36, 48, 54Mbps; 802.11n (HT20): MCS0~MCS7 6.5~72.2Mbps; 802.11n (HT40): MCS0~MCS7(1T1R) 13.5~150Mbps;	
Frequency Tolerance		≤ ±20ppm	
5G Transmitter Specifications (TX power tolerance calibrated, customers can define the target TX power by modifying configuration file of the driver software. Customers must define the TX power same or lower than recommended Target TX Power as below)			
TX Rata		Recommended Target TX Power (dBm)	TX Power Tolerance (dBm) EVM (dB)

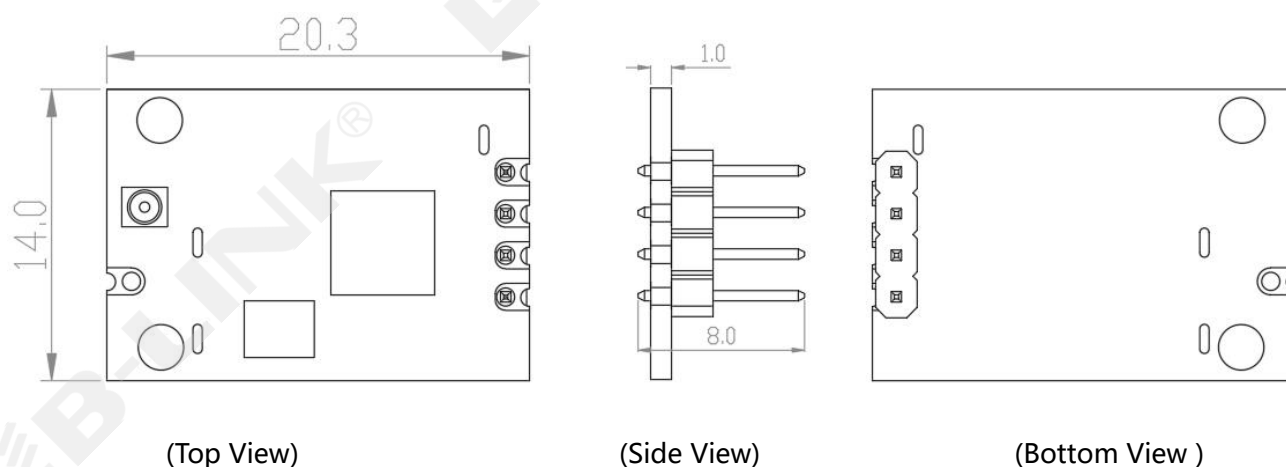
802.11a@6Mbps	19	±2	≤-10
802.11a@54Mbps	17	±2	≤-25
802.11n@HT20_MCS0	18	±2	≤-10
802.11n@HT20_MCS7	16	±2	≤-28
802.11n@HT40_MCS0	18	±2	≤-10
802.11n@HT40_MCS7	16	±2	≤-28

5G Receiver Specifications

RX Rate	Min Input Level (Typ dBm)	Max Input Level (Typ dBm)	PER
802.11a@6Mbps	-91	-5	< 10%
802.11a@54Mbps	-74	-5	< 10%
802.11n@HT20_MCS0	-89	-5	< 10%
802.11n@HT20_MCS7	-72	-5	< 10%
802.11n@HT40_MCS0	-88	-5	< 10%
802.11n@HT40_MCS7	-70	-5	< 10%

5. Mechanical Specifications

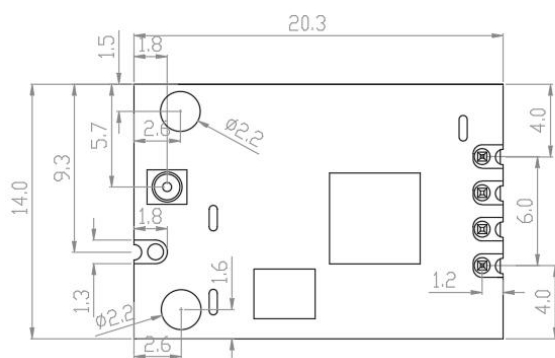
5.1 Module Outline Drawing



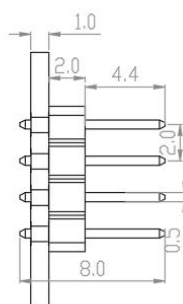
Module dimension: 20.3*14.0*8.0mm(L*W*H; Tolerance: ±0.15mm)

IPEX / MHF-1 connector dimension: 2.6*3.0*1.25mm (L*W*H; Ø2.0mm)

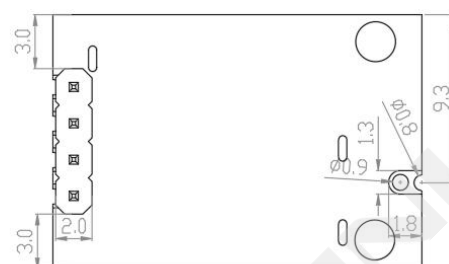
5.2 Mechanical Dimensions



(Top View)



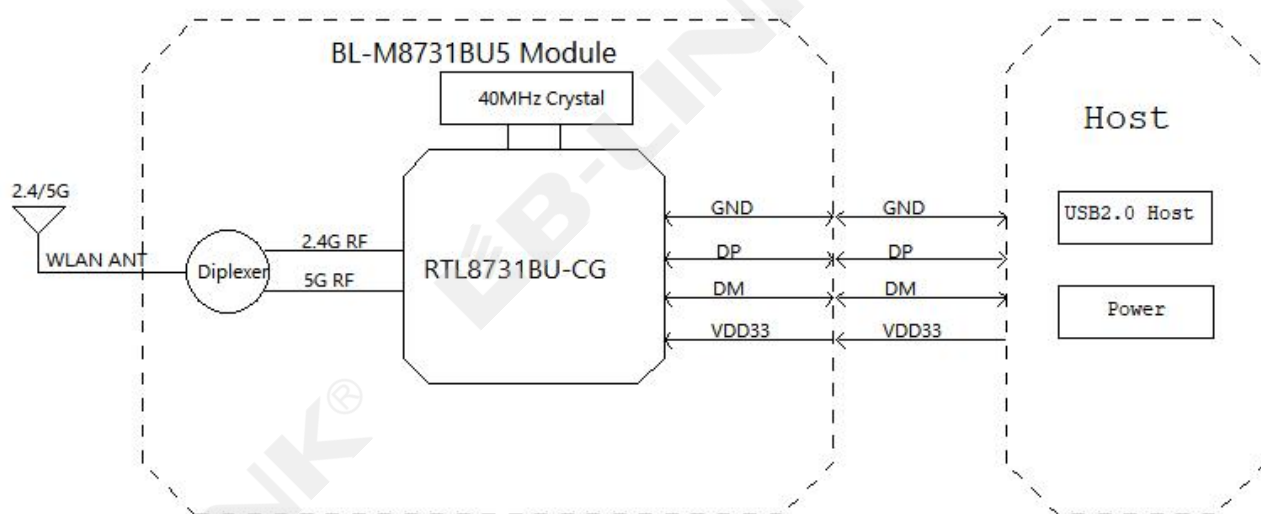
(Side View)



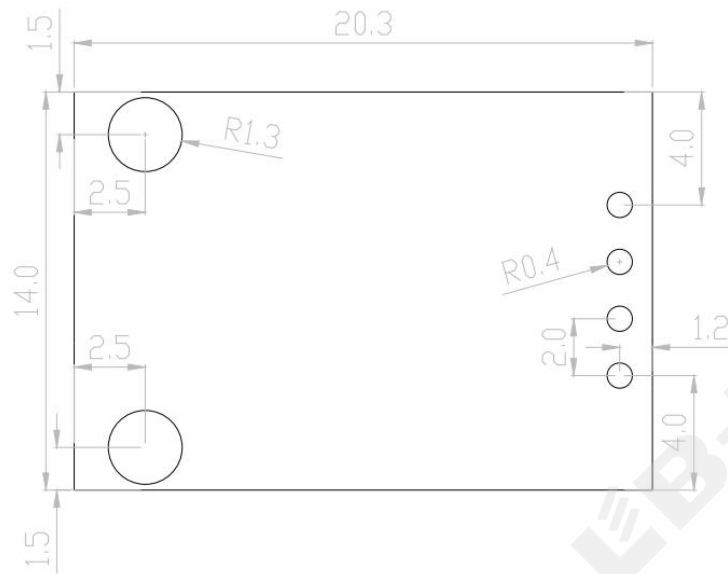
(Bottom View)

6. Application Information

6.1 Typical Application Circuit

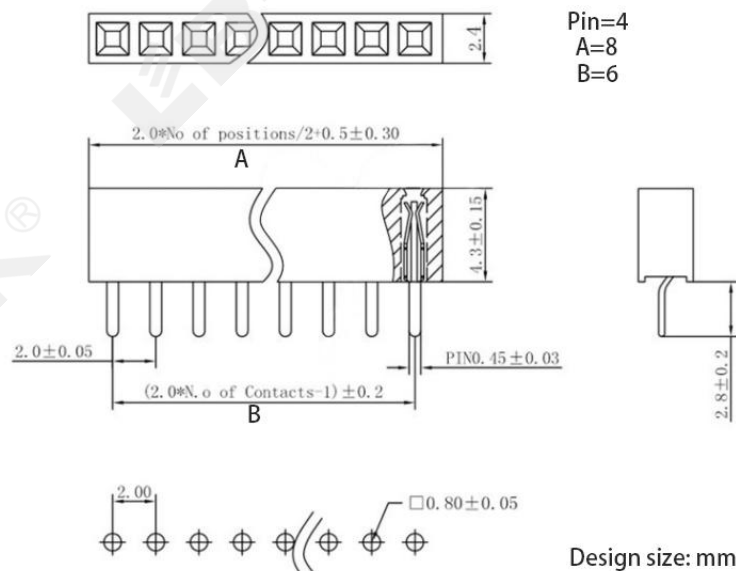


6.2 Recommend PCB Layout Footprint



(Design size: mm)

6.3 Recommend Connectors

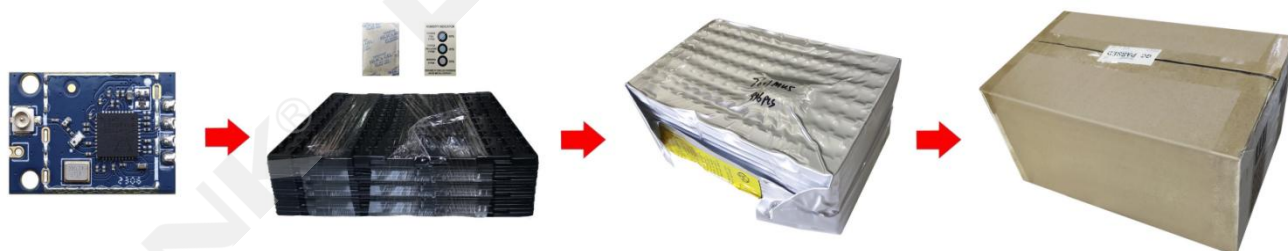


7. Key Components Of Module

No.	Parts	Specification	Manufacturer	Note
1	Chipset	RTL8731BU-CG	Realtek Semiconductor Corp.	
2	PCB	BL-M8731BU5	ShenZhen Tie Fa Technology Limited	
			MILLION SOURCE PRINTED CIRCUIT BOARD CO.,LTD	
			Quzhou Sunlord Electronics Co.,Ltd	
			SHEN ZHEN QILI ELECTRON CO.,LTD	
3	Crystal	40MHz-3225	Chengde oscillator Electronic Technology CO.,LTD	
			JinHua East Crystal Electronic CO.,LTD	
			LUCKI CM ELECTRONICS CO.,LTD	
4	Diplexer	DIP1608	Advanced Ceramic X Corp.	
			Dongguan Hekang Electronics Co.,LTD	

8. Package and Storage Information

8.1 Package Dimensions



Package specification:

1. 90 modules per tray and 1,000 modules per box.
2. The module trays are fixed with wrapping film and packaged into an anti-static vacuum bag.
3. Each anti-static vacuum bag is also filled with a bag (20g) of dry agent and a humidity card.
4. The outer box size is 35.2*21.5*14cm.

8.2 Storage Conditions

Absolute Maximum Ratings:

Storage temperature: -40°C to +85°C,

Storage humidity: 10% to 95 (Non-Condensing)

Recommended Storage Conditions:

Storage temperature: 5°C to +40°C,

Storage humidity: 20% to 90% RH

Please use this Module within 12month after vacuum-packaged.

The Module shall be stored without opening the packing.

After the packing opened, the Module shall be used within 72hours.

When the color of the humidity indicator in the packing changed,

The Module shall be baked before use.

Baking condition: 60°C, 24hours, 1time.

ESD Sensitivity:

ESD Protection: 2KV(HBM ,Maximum rating)

The Module is a static-sensitive electronic device.

Do not operate or store near strong electrostatic fields.

Take proper ESD precautions!



ESD CAUTION