BL-R8811CU9

802.11ac 433Mbps WiFi

USB Module Specification

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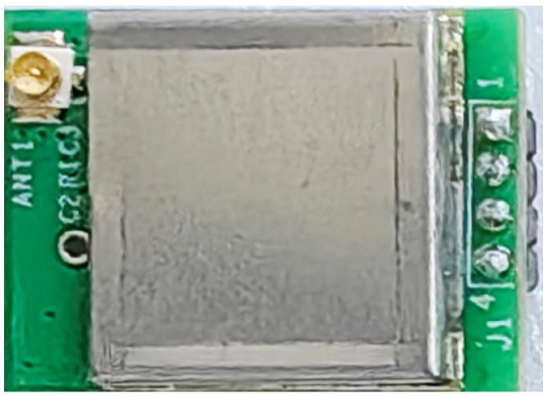


Revision History

Module Name: BL-R8811CU9	
Module Type: 802.11a/b/g/n/ac 433Mbps WiFi USB Module	
Revision: V1.0	
Customer Approval:	
Company:	
Title:	
Signature:	Date:
BL-link Approval:	
Title:	
Signature:	Date:

Revision History

Revision	Summary	Release Date
1.0	Official release	2020-03-03

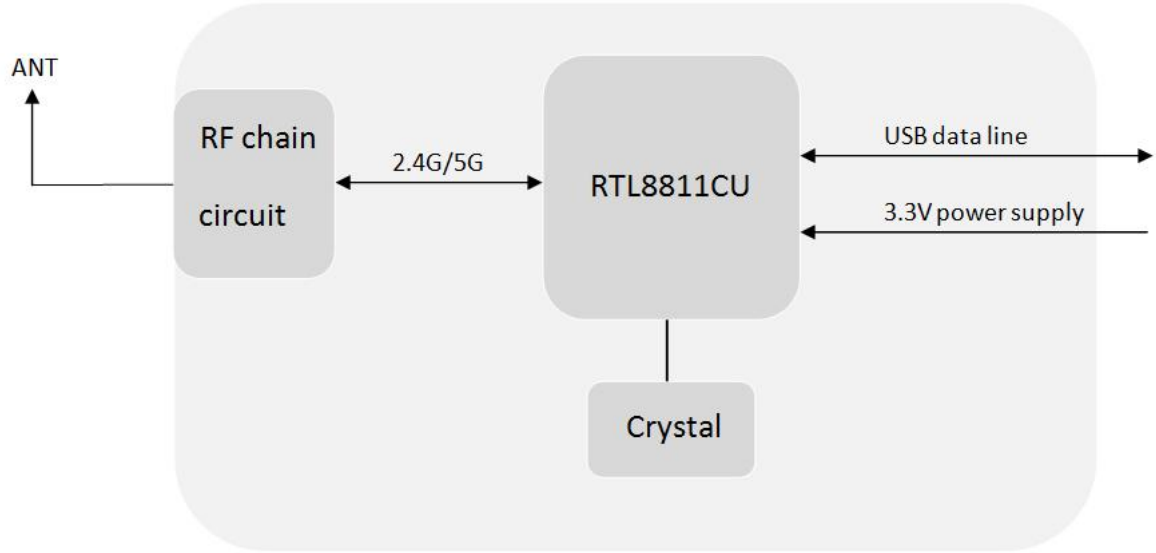
1. Introduction

BL-R8811CU9 module is designed base on RTL8811CU. It supports IEEE 802.11a/b/g/n/ac 1T1R with high throughput data rate for WLAN products and provides the highest PHY rate up to 433.3Mbps. It combines a WLAN MAC, a 1T1R capable WLAN baseband, modem and offers stable, high rate, long distance wireless connectivity through external antenna. It can be used on the IP Camera/ Smart TV and other wireless devices easily.

1.1 Features

- Operating Frequencies: 2.4~2.4835GHz or 5.15~5.85GHz
- Host Interface is USB
- IEEE Standards: IEEE 802.11a/b/g/n/ac
- Wireless data rate can reach up to 433Mbps
- Connect to external antenna through IPEX connector
- Power Supply: DC 3.3V±0.2V main power supply

1.2 Block Diagram



1.3 General Specifications

Module Name	BL-R8811CU9 WiFi USB Module
Chipset	RTL8811CU-CG
WiFi Standards	IEEE 802.11a/b/g/n/ac
Host Interface	USB2.0
Antenna	Connect to the external antenna through IPEX connecter
Dimension	SMD 6Pin, 22.6*17.0*10.5mm (L*W*H)
Power Supply	DC 3.3V±0.2V @ 500 mA (Max)
Operation Temperature	-10℃ to +70℃
Operation Humidity	10% to 95% RH (Non-Condensing)

2. Pin Assignments

2.1 Pin Definition

No	Pin Name	Type	Description	Supply
1	VDD33	P	DC 3.3V Power Supply	
2	UDM	I/O	USB Transmitter/Receiver Differential Pair	
3	UDP	I/O	USB Transmitter/Receiver Differential Pair	
4	GND	P	Ground	
5	IPEX	RF	IPEX connector	

P: Power, I: Input, O: Output, I/O: In/Output, RF: Analog RF Port

3. Electrical and Thermal Specifications

3.1 Recommended Operating Conditions

Parameters		Min	Typ	Max	Units
Ambient Operating Temperature		-20	25	70	℃
External Antenna VSWR			1.92:1	2:1	/
Supply Voltage	VDD	3.1	3.3	3.5	V

3.2 Current Consumption

Conditions : VDD=3.3V ; Ta:25℃			
Use Case	VDD Current (average)		
	Typ	Max	Units
WiFi Unassociated (Linux)	130	160	mA
2.4G 11Mbps TX (RF test)	383	453	mA
2.4G HT40 MCS0 TX (RF test)	352	403	mA
2.4G HT40 MCS7 TX (RF test)	360	409	mA
5G VHT80 MCS0 TX (RF test)	383	436	mA
5G VHT80 MCS9 TX (RF test)	391	412	mA
2.4G RX Active (RF test)	140	165	mA
5G RX Active (RF test)	160	185	mA

4. WiFi RF Specifications

4.1 2.4G WiFi RF Specification

Conditions: VDD=3.3V; Ta:25℃	
Features	Description
WLAN Standard	IEEE 802.11b/g/n, CSMA/CA
Frequency Range	2.4~2.4835GHz (2.4GHz ISM Band)
Channels	Ch1~Ch13 (For 20MHz Channels)

Modulation	802.11b (DSSS): DBPSK, DQPSK, CCK; 802.11a/g (OFDM): BPSK, QPSK, QAM16, QAM64; 802.11n (OFDM): BPSK, QPSK, QAM16, QAM64;
Date 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 13.5~150Mbps;
Frequency Tolerance	≦±15ppm

2.4G Receiver Specifications			
RX Rate	Min Input Level (dBm)	Max Input Level (dBm)	PER
802.11b@1Mbps	-96	-5	< 8%
802.11b@11Mbps	-87	-5	< 8%
802.11g@6Mbps	-90	-5	< 10%
802.11g@54Mbps	-73	-5	< 10%
802.11n@HT20_MCS0	-89	-5	< 10%
802.11n@HT20_MCS7	-69	-5	< 10%
802.11n@HT40_MCS0	-87	-5	< 10%
802.11n@HT40_MCS7	-68	-5	< 10%

4.2 5G WiFi RF Specification

Conditions: VDD=3.3V; Ta:25℃	
Features	Description
WLAN Standard	IEEE 802.11a/n/ac, CSMA/CA
Frequency Range	5.15~5.25GHz; 5.25~5.35GHz; 5.47~5.73GHz; 5.735~5.835GHz (5GHz ISM Band)

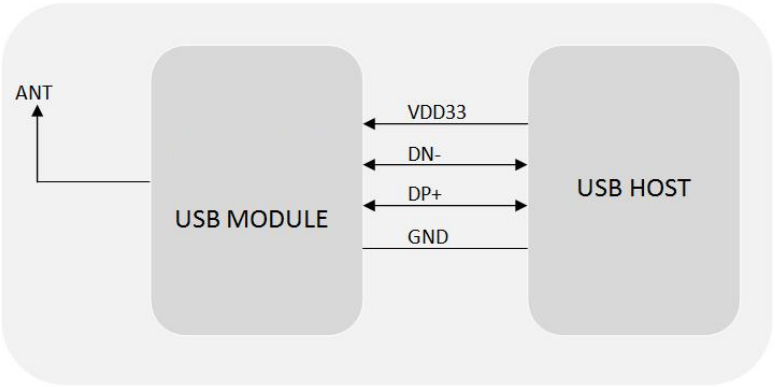
Channels	Ch36, Ch40, Ch44, Ch48; Ch52~Ch64; Ch100~Ch140; Ch149~Ch165 (For 20MHz Channels)
Modulation	802.11a (OFDM): BPSK, QPSK, QAM16, QAM64; 802.11n (OFDM): BPSK, QPSK, QAM16, QAM64; 802.11ac (OFDM): BPSK, QPSK, QAM16, QAM64, QAM256;
Date Rate	802.11a: 6, 9, 12, 18, 24, 36, 48, 54Mbps; 802.11n (HT20): MCS0~MCS7 6.5~72.2Mbps; 802.11n (HT40): MCS0~MCS7) 13.5~150Mbps; 802.11ac (VHT20): MCS0~MCS8 6.5~86.7Mbps; 802.11ac (VHT40): MCS0~MCS9 13.5~200Mbps; 802.11ac (VHT80): MCS0~MCS9 29.3~433.3Mbps;
Frequency Tolerance	≦ ±15ppm

5G Receiver Specifications			
RX Rate	**Min Input Level（dBm)**	**Max Input Level（dBm)**	**PER**
802.11a@6Mbps	-89	-5	< 10%
802.11a@54Mbps	-72	-5	< 10%
802.11n@HT20_MCS0	-87	-5	< 10%
802.11n@HT20_MCS7	-69	-5	< 10%
802.11n@HT40_MCS0	-86	-5	< 10%
802.11n@HT40_MCS7	-67	-5	< 10%

802.11ac@VHT80_MCS0	-82	-10	< 10%
802.11ac@VHT80_MCS9	-57	-10	< 10%

5. Application Information

5.1 Typical Application Circuit



6. Key Components Of Module

No.	Parts	Specification	Manufacturer	Note
1	Chipset	RTL8811CU-CG	Realtek	
2	PCB	BL-R8811CU9	Shenzhen Tie Fa Technology	
			Guangdong KINGSHINE ELECTRONICS CO. LTD	
2	Crystal	40MHz-15pF-10ppm-2520	HUBEI TKD ELECTRONICS	
			TECHNOLOGY CO., LTD	
			HOSONIC ELECTRONIC CO., LTD	
3	Diplexer	DPX105850DT-6019A1	TDK China Co., Ltd	

7. Package and Storage Information

7.1 Package Dimensions

Package specification:

1. 90 modules per blister plate and 1000 modules per box.
2. The blister is bound with wire membrane and put into anti-static vacuum bag.
3. Put 1 bag of dry beads (20g) in each anti-static vacuum bag. 1pcs 3 point humidity card.
4. The outer box size is 35.2*21.5*15.5cm.

7.2 Storage Conditions

Absolute Maximum Ratings:
Storage temperature: -45℃ to +85℃,
Storage humidity: 10% to 95（Non-Condensing）
Recommended Storage Conditions:
Storage temperature: 5℃ to +40℃,
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 soldering.
Baking condition: 60℃, 24hours, 1time.

ESD Sensitivity:
The Module is a static-sensitive electronic device.
Do not operate or store near strong electrostatic fields.
Take proper ESD precautions!

FCC Statement

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) thi s device may not cause harmful interference, and (2) this device must accept any interference received, incl uding interference that may cause undesired operation.

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, pursua nt to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful inte rference in a residential installation. This equipment generates uses and can radiate radio frequency energy a nd, if not installed and used in accordance with the instructions, may cause harmful interference to radio com munications. 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 turn ing 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 important announcement

Important Note:

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 and your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Country Code selection feature to be disabled for products marketed to the US/Canada.

This device is intended only for OEM integrators under the following conditions:

1. The antenna must be installed such that 20 cm is maintained between the antenna and users, and
2. The transmitter module may not be co-located with any other transmitter or antenna,
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. (if modular only test Channel 1-11)

As long as the three conditions above are met, further transmitter testing 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.

Important Note:

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

End Product Labeling

The final end product must be labeled in a visible area with the following" Contains FCC ID: **2AL6KBL-R8811CU9**"

Manual Information to the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.

The end user manual shall include all required regulatory information/warning as show in this manual.

Integration instructions for host product manufacturers according to KDB 996369 D03 OEM Manual v01

2.2 List of applicable FCC rules

CFR 47 FCC PART 15 SUBPART C has been investigated. It is applicable to the modular transmitter

2.3 Specific operational use conditions

This module is stand-alone modular. If the end product will involve the Multiple simultaneously transmitting condition or different operational conditions for a stand-alone modular transmitter in a host, host manufacturer have to consult with module manufacturer for the installation method in end system.

2.4 Limited module procedures

Not applicable

2.5 Trace antenna designs

Not applicable

2.6 RF exposure considerations

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.

2.7 Antennas

This radio transmitter **FCCID: 2AL6KBL-R8811CU9** has been approved by Federal Communications Commission to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Model	Type	Connector	Peak gain (dBi)				
			2400-2483.5 MHz	5150-5250 MHz	5250-5350 MHz	5470-5725 MHz	5725-5850 MHz
2400-2483.5 MHz	External Antenna	/	2.00dBi	/	/	/	/
2400-2483.5 MHz 5000-6000 MHz	External Antenna	/	2.00dBi	2.00dBi	2.00dBi	2.00dBi	2.00dBi
2400-2483.5 MHz 5000-6000 MHz	External Antenna	/	2.00dBi	2.00dBi	2.00dBi	2.00dBi	2.00dBi

2.8 Label and compliance information

The final end product must be labeled in a visible area with the following" Contains FCC ID:2AL6KBL-R8811CU9".

2.9 Information on test modes and additional testing requirements

Host manufacturer is strongly recommended to confirm compliance with FCC requirements for the transmitter when the module is installed in the host.

2.10 Additional testing, Part 15 Subpart B disclaimer

Host manufacturer is responsible for compliance of the host system with module installed with all other applicable requirements for the system such as Part 15 B.