BL-M8811CU5

802.11ac 433Mbps WiFi

USB Module Specification

SHENZHEN BILIAN ELECTRONIC CO., LTD

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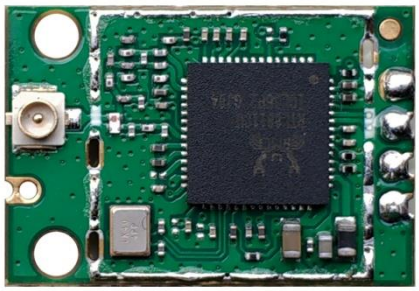
Web: www.b-link.net.cn



Revision History

Module Name: BL-M8811CU5	
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

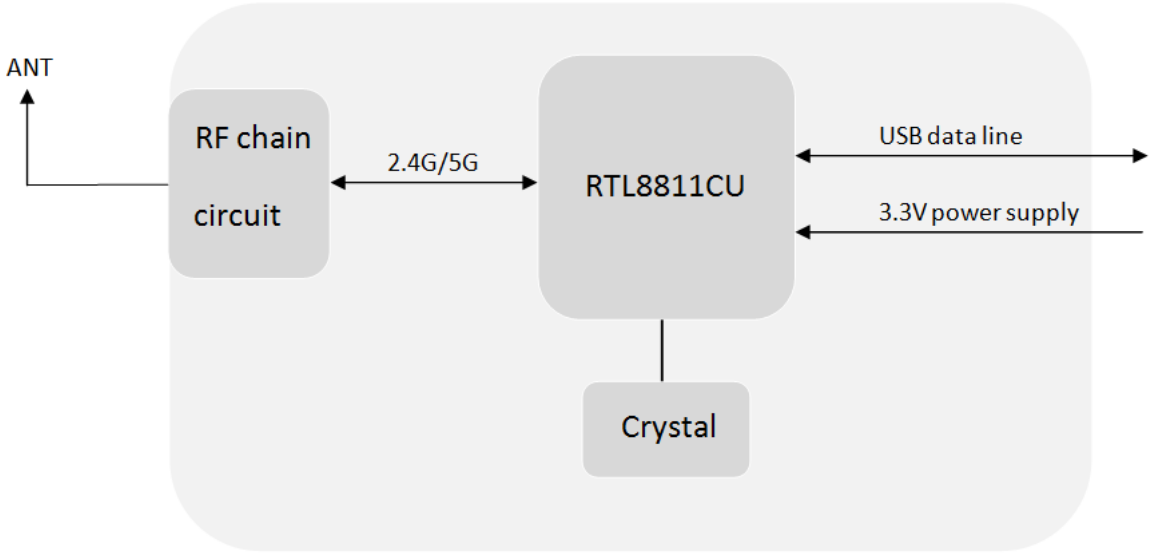
1. Introduction

BL-M8811CU5 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

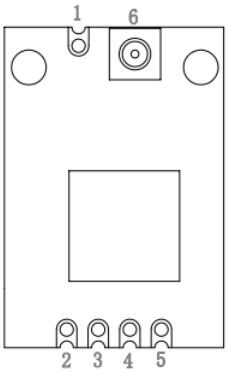
1.2 Block Diagram



1.3 General Specifications

Module Name	BL-M8811CU5 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, 20.3*14.0*2.35mm (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	NC	--	--	
2	VDD33	P	DC 3.3V Power Supply	
3	UDM	I/O	USB Transmitter/Receiver Differential Pair	
4	UDP	I/O	USB Transmitter/Receiver Differential Pair	
5	GND	P	Ground	
6	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 Transmitter Specifications			
TX Rate	TX Power（dBm)	TX Power Tolerance（dB)	EVM（dB)
802.11b@1~11Mbps	17	±1.5	≦-15
802.11g@6Mbps	15	±1.5	≦-15
802.11g@54Mbps	15	±1.5	≦-25
802.11n@HT20_MCS0	14	±1.5	≦-10
802.11n@HT20_MCS7	14	±1.5	≦-28
802.11n@HT40_MCS0	14	±1.5	≦-10
802.11n@HT40_MCS7	14	±1.5	≦-28
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

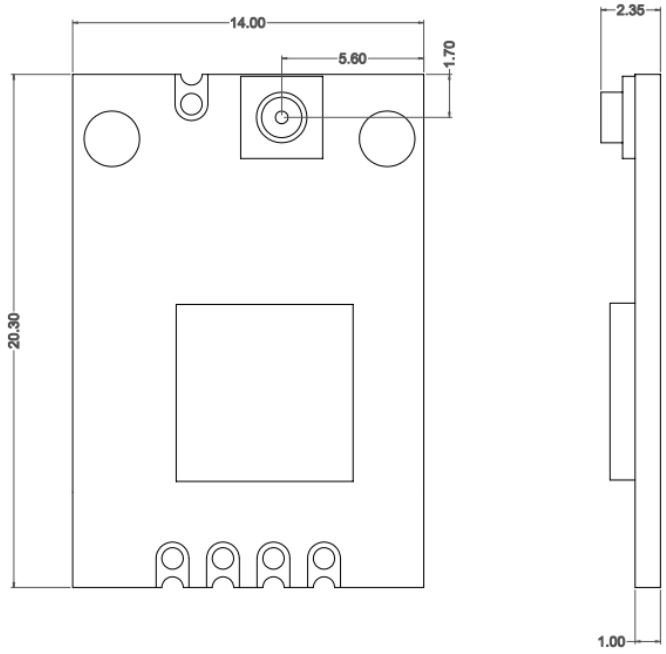
5G Transmitter Specifications			
TX Rate	**TX Power（dBm)**	**TX Power Tolerance（dB)**	**EVM（dB)**
802.11a@6Mbps	13	±2	≦-10
802.11a@54Mbps	13	±2	≦-25
802.11n@HT20_MCS0	12	±2	≦-10
802.11n@HT20_MCS7	12	±2	≦-28
802.11n@HT40_MCS0	12	±2	≦-10
802.11n@HT40_MCS7	12	±2	≦-28
802.11ac@VHT80_MCS0	11	±2	≦-10
802.11ac@VHT80_MCS9	11	±2	≦-32

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%

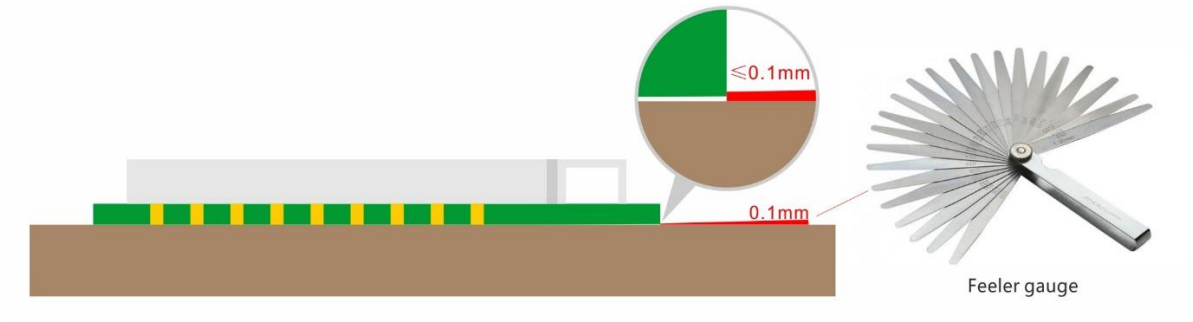
802.11ac@VHT80_MCS0	-82	-10	< 10%
802.11ac@VHT80_MCS9	-57	-10	< 10%

5. Mechanical Specifications

5.1 Module Outline Drawing

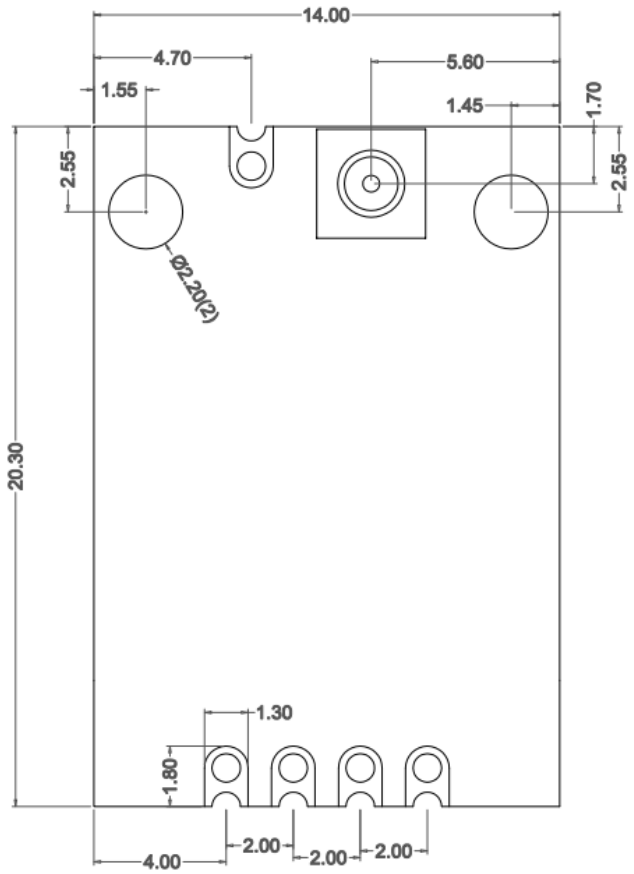


Module dimension: 20.3*14.0*2.35mm(L*W*H; Tolerance: ±0.15mm)



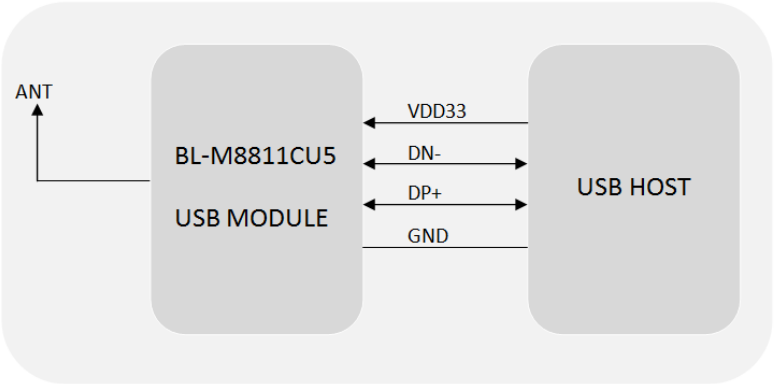
Module Bow and Twist：≤0.1mm

5.2 Mechanical Dimensions

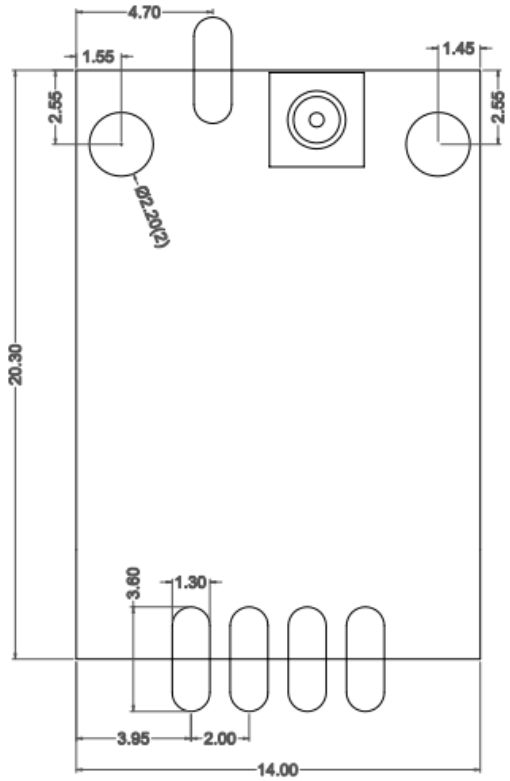


6. Application Information

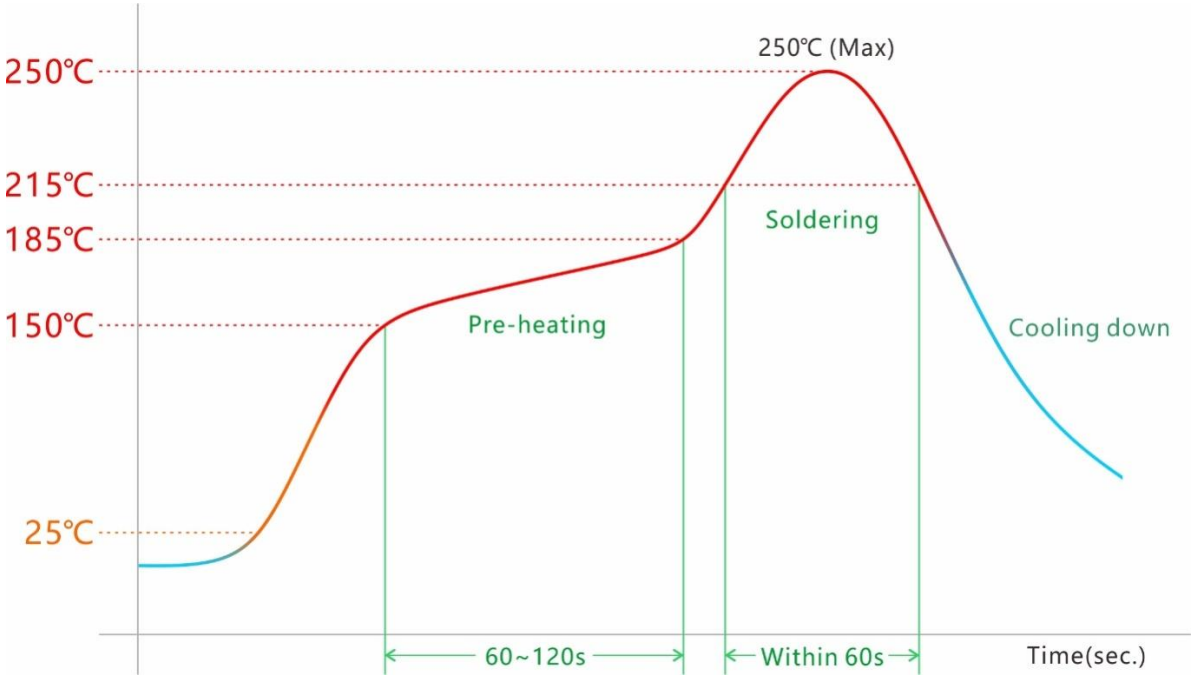
6.1 Typical Application Circuit



6.2 Recommend PCB Layout Footprint



6.3 Reflow Soldering Standard Condition



Please use the reflow within 2 times.
Set up the highest temperature within 250℃.

7. Key Components Of Module

No.	Parts	Specification	Manufacturer	Note
1	Chipset	RTL8811CU-CG	Realtek	
2	PCB	BL-M8811CU5	Shenzhen Tie Fa Technology	
			Guangdong KINGSHINE ELECTRONICS CO. LTD	
			MILLION SOURCE PRINTED CIRCUIT BOARD CO., LTD	
			Quzhou Sunlord 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	

8. Package and Storage Information

8.1 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.

8.2 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!

EU Declaration of Conformity

for

(RED) 2014/53/EU

We, Shenzhen Bilian Electronic Co.,Ltd.

_____

hereby, declare that the essential requirements set out in the (RED) 2014/53/EU have been fully fulfilled on our product with indication below:

Product Name: 802.11a/b/g/n/ac 433Mbps WiFi USB Module

Model / Brand Name: BL-M8811CU5/ N/A

Hardware version: V1.0

Software version: V1.0

Manufacturer:Shenzhen Bilian Electronic Co.,Ltd.

Address:Room 501, Building 3, No. 32, Dafu Road, Zhangge Community, Fucheng Street, Longhua District, Shenzhen City, China

Operation Frequency:

2412 MHz to 2472 MHz

5180 MHz to 5320 MHz

5500 MHz to 5700 MHz

5745 MHz to 5825 MHz

Transmit Power:

2412 MHz to 2472 MHz: 7.81dBm

5180 MHz to 5320 MHz: 12.83 dBm

5500 MHz to 5700 MHz: 12.24 dBm

5745 MHz to 5825 MHz: 11.75 dBm

The following standards have been applied for the investigation of compliance:

ETSI EN 301 489-1 V2.2.3

ETSI EN 301 489-3 V2.1.1

ETSI EN 301 489-17 V3.2.4

ETSI EN 300 328 V2.2.2

ETSI EN 300 440 V2.2.1

ETSI EN 301 893 V2.1.1)

EN 62479: 2010

EN 50663: 2017

EN 62368-1:2014+ A11:2017

And apply notified body assessment:

Notified Body number 0980

Eurofins Electrical and Electronic Testing NA, Inc.

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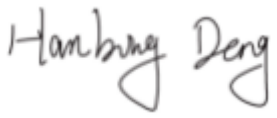
Furthermore, the ISO requirement for the in-process quality control procedure as well as the manufacturing process has been reached. The technical document as well as the test reports will be kept for a period at least 10 years after the last product has been manufactured at the disposal of the relevant national authorities of any Member State for inspection.
Detail contact information for this declaration has been listed below as the window of any issues relevant for this declaration.

Manufacturer Contact
Signature:
Name (in print): Liang Banghuan
Title: PM
Company name: Shenzhen Bilian Electronic Co.,Ltd.
Tel: 18118768735
516371599@qq.com



2023-4-1

Signature Date

FCC 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.
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.
The Module is designed to comply with the FCC statement. FCC ID is 2AL6KBL-M8811CU5. The host system using Module, should have label indicated it contain modular’s FCC ID: 2AL6KBL-M8811CU5 . This radio module must not installed to colocate and operating simultaneously with other radios in host system additional testing and equipment authorization may be required to operating simultaneously with other radio.
The Module and its antenna must not be co-located or operating in conjunction with any other transmitter or antenna within a host device.
The modular must be installed in the host that assign by Company name: Shenzhen Bilian Electronic Co.,Ltd. Model no.:BL-M8811CU5 if other host types used would need further evaluation and possible C2PC if they are not significantly similar to the one tested
The WIFI Module is deaigned for a compact PCB design .It should be installed and operated with host or other minimum distance of 20 centimeters between the radiator and your body." To comply with FCC regulations limiting both maximum RF output power and human exposure to RF radiation, the maximum antenna gain including cable loss in a mobile-only exposure condition must not exceed 2dBi in the 2.4G band and 2.75dBi in the 5G band. The module uses IPEX antenna interface and use dipole antenna,this antenna is sold with the module.
Notice to OEM integrator
The end user manual shall include all required regulatory information/warning as show in this manual. The OEM integrator is responsible for testing their end-product for any additional compliance requirements required with this module installed. If the final product contains circuits of other FCC PART 15 Subparts,the final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed
The intended use is generally not for the general public.It is generally for industry/commercial use.
The connector is within the transmitter enclosure and can only be accessed by disassembly of the transmitter that is not nomally required, the user has no access to the connector.Installation must be controlled. Installation requires special training.
This device complies with Part 15 of the FCC Rules.
This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and your body

Operations in the 5.15-5.35GHz band are restricted to indoors usage only.