Product Specification

Revision	V1.0		
Date	2018-11-23		
Model Name	BL-M8822BU3		
Product Name	IEEE 802.11b/g/n/ac(2T2R) USB3.0 WLAN & BT Module		
Bilian Approve Field			
Engineer	**QC**	**Sales**	
Customer Approve Field			
Engineer	**QC**	**Manufactory**	**Purchasing**

Shenzhen Bilian Electronic Co., Ltd
Address: 10-11F, Building A1, Huaqiang idea park, Guangming district, Shenzhen.Guangdong, China
Homepage: www.b-link.net.cn

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Revision History

Date	Document Revision	Product Revision	Description
2018/09/18	0.1	V0.1	Preliminary release
2018/11/23	1.0	V1.0	Batch production

1. Introduction

1.1 General Description

BL-M8822BU3 product is a highly integrated module that support 2-stream 802.11ac solutions with Multi-user MIMO (Multiple In, Multiple Out) with wlan USB2.0/3.0 network interface controller.It supports Bluetooth ,It combines a WLAN MAC, a 2T2R capable WLAN baseband, and RF in a single chip. The product provides a complete solution for a high-performance integrated wireless and Bluetooth device.

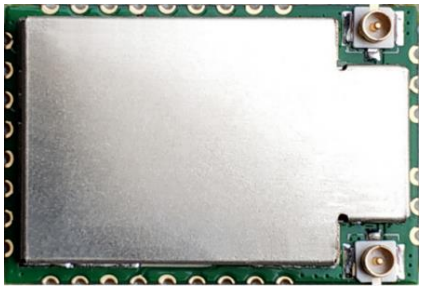

Figure 1-Top View

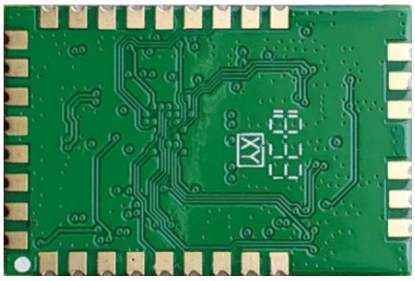

Figure 2-Bottom View

Note: The above pictures are for reference only

1.2 Features

- Operating Frequencies: 2.4~2.4835GHz and 5.15~5.85GHz
- Host Interface is USB2.0 (It only changes can support USB3.0)
- IEEE Standards: IEEE 802.11a/b/g/n/ac
- Wireless data rate can reach up to 867Mbps
- Power Supply:3.3V±0.2V

3. Product Technical Specifications

3.1 General Specifications

Item	Description
Product Name	BL-M8822BU3
Main Chip	RTL8822BU
Host Interface	USB2.0/ USB3.0
IEEE Standards	IEEE 802.11a/b/g/n/ac
Operating Frequencies	2.4GHz~2.4835GHz /5.15~5.85Hz
Modulation	WIFI: 802.11b: CCK, DQPSK, DBPSK 802.11a/g: 64-QAM,16-QAM, QPSK, BPSK 802.11n: 64-QAM,16-QAM, QPSK, BPSK 802.11ac: 256-QAM,64-QAM,16-QAM, QPSK, BPSK BT: 8DPSK, π/4DQPSK, GFSK
Working Mode	Infrastructure, Ad-Hoc
Wireless Data Rate	WIFI: 802.11b: 1, 2 ,5.5,11Mbps, 802.11a: 6,9,12,18,24,36,48,54Mbps, 802.11g: 6,9,12,18,24,36,48,54Mbps, 802.11n-2.4/5G HT20: MCS0~15, 6.5~144.4Mbps, 802.11n-2.4/5G HT40: MCS0~15, 13~300Mbps, 802.11ac-VHT20、40、80:MCS0~9, reach up to 867Mbps, BT: 1Mbps for Basic Rate 2,3Mbps for Enhanced Date Rate
Rx Sensitivity	-96dBm (Min)
Antenna Type	Connect to the external antenna through the IPEX or welding antenna
Dimension(L*W*H)	27*18*2.0mm (L*W*H), Tolerance: ±0.15mm
Power Supply	3.3V±0.2V
Clock Source	40MHz
Working Temperature	-10° C to +70° C
Storage Temperature	-40° C to +85° 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 Power Consumption

Vcc=5V，Ta = 25 °C，unit: mA				
Supply current	Typ.		Max	
Standby (RF disabled)	99		112	
802.11b	1Mbps		11Mbps	
Supply current	Typ.	Max.	Typ.	Max.
TX mode	301	355	263	296
Rx mode	89.7	100	89.5	99
802.11g	6Mbps		54Mbps	
Supply current	Typ.	Max.	Typ.	Max.
TX mode	297	339	232	254
Rx mode	91.5	102	89.7	103
802.11n HT20	MCS0		MCS7	
Supply current	Typ.	Max.	Typ.	Max.
TX mode	325	302	234	256
Rx mode	90.2	103	90.1	103
802.11n HT40	MCS0		MCS7	
Supply current	Typ.	Max.	Typ.	Max.
TX mode	297	335	252	71
Rx mode	98.8	112	100.3	110
802.11a	6Mbps		54Mbps	
Supply current	Typ.	Max.	Typ.	Max.
TX mode	374	391	300	340
Rx mode	92.6	105	91.8	105
802.11n HT40(5G)	MCS0		MCS7	
Supply current	Typ.	Max.	Typ.	Max.
TX mode	383	411	317	349

Rx mode	94.1	106	95.2	105
802.11ac	MCS0		MCS9	
Supply current	Typ.	Max.	Typ.	Max.
TX mode	380	408	272	296
Rx mode	104	116	108	114
2T2R				
802.11n HT40(2.4G)	MCS8		MCS15	
Supply current	Typ.	Max.	Typ.	Max.
TX mode	573	621	489	525
Rx mode	93.9	107	94.5	105
802.11n HT40(5G)	MCS8		MCS15	
Supply current	Typ.	Max.	Typ.	Max.
TX mode	613	687	616	651
Rx mode	95.2	105	95.3	106
802.11ac(5G)	NSS2-MCS0		NSS2-MCS9	
Supply current	Typ.	Max.	Typ.	Max.
TX mode	602	663	532	567
Rx mode	105	117	107	113

3.3 RF Specifications

Receiver Minimum Input Sensitivity@PER	WiFi-2.4G: 11b 1Mbps: -94dBm@PER<8%; 11b 11Mbps: -84dBm@PER<8%; 11g 54Mbps: -70dBm@PER<10%; 11n-HT40-MCS7-2.4G: -65dBm@PER<10%; WiFi-5G: 11a 54Mbps: -70dBm@PER<10%; 11n-HT40-MCS7-5G: -65dBm@PER<10%; 11ac-HT80-MCS9-5G: -55dBm@PER<10%;

3.4 Bluetooth RF Specification

RF Characteristics for BT				
Items	Contents			
Host Interface	USB			
Specification	BT V4.2/V4.1/V3.0/V2.1			
Modulation	FHSS: GFSK, π/4-DQPSK, 8DPSK			
Channel frequency	2.401~2.481 GHz			
Data rate	1Mbps,2Mbps,3Mbps			
TX Characteristics	min.	typ.	max.	Unit
Power level(BR/EDR)	0	4	10	dBm
Power level(BLE)	0	4	10	dBm
RX Characteristics	min.	typ.	max.	Unit
Minimum input level(Muti-slot packages sensitivity mode<0.1%)	-90	-85	-80	dBm

4. Pin Assignments

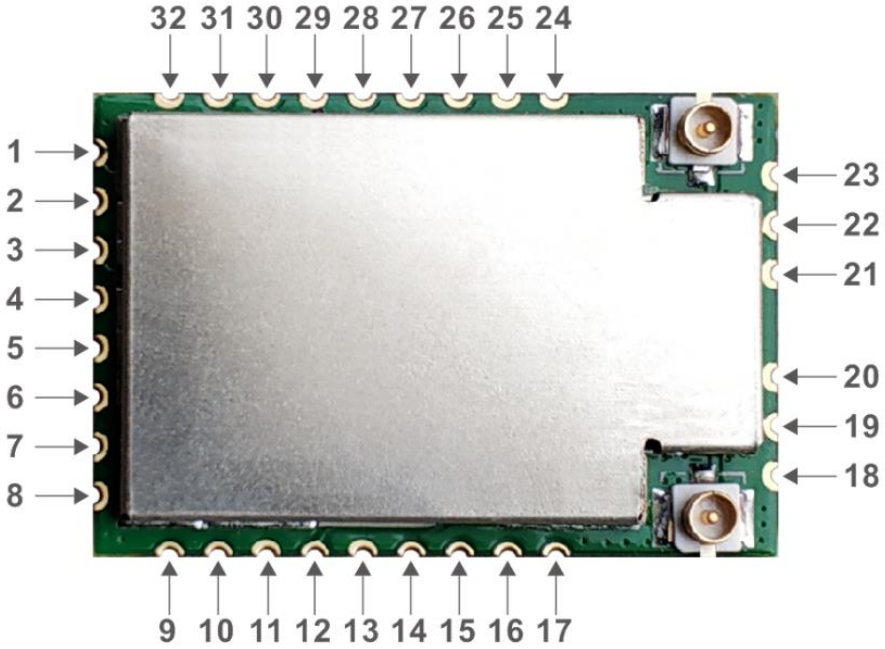

Figure 4-Pin Assignments (Top view)

Pin No：	Pin Name	Type	Description
1	USB3_TXN	I	USB3.0TX data-
2	USB3_TXP	I	USB3.0TX data+
3	USB3_RXN	O	USB3.0RX data-
4	USB3_RXP	O	USB3.0RX data+
5	GND	p	Ground
6	USB_DP	I/O	USB data+ (USB2.0)
7	USB_DM	I/O	USB data- (USB2.0)
8	GND	p	Ground
9	NC	/	NC
10	NC	/	NC
11	GND	-	Ground
12	BT_RF	I/O	BT RF port
13	GND	/	Ground
14	BT_WAKE_HOST	O	BT wake up HOST
15	BT-WAKE	I	Wake up BT
16	NC	/	NC

17	NC	/	NC
18	GND	p	Ground
19	WL-RF1	I/O	NC
20	GND	p	Ground
21	GND	p	Ground
22	WL-RF0	I/O	NC
23	GND	p	Ground
24	GND	p	Ground
25	GND	p	Ground
26	WL-WAKE-HOST		WLAN wake up HOST
27	BT-REG-ON	I	GPIO: Control BT device enabled ON: pull high,OFF:pull low
28	WL-REG-ON	I	GPIO: Control WIFI device enabled ON: pull high,OFF:pull low
29	GND	p	Ground
30	VDD33	I	3.3V Voltage input
31	NC	/	NC
32	GND	p	Ground

5. Typical Application Circuit

RF reference circuit

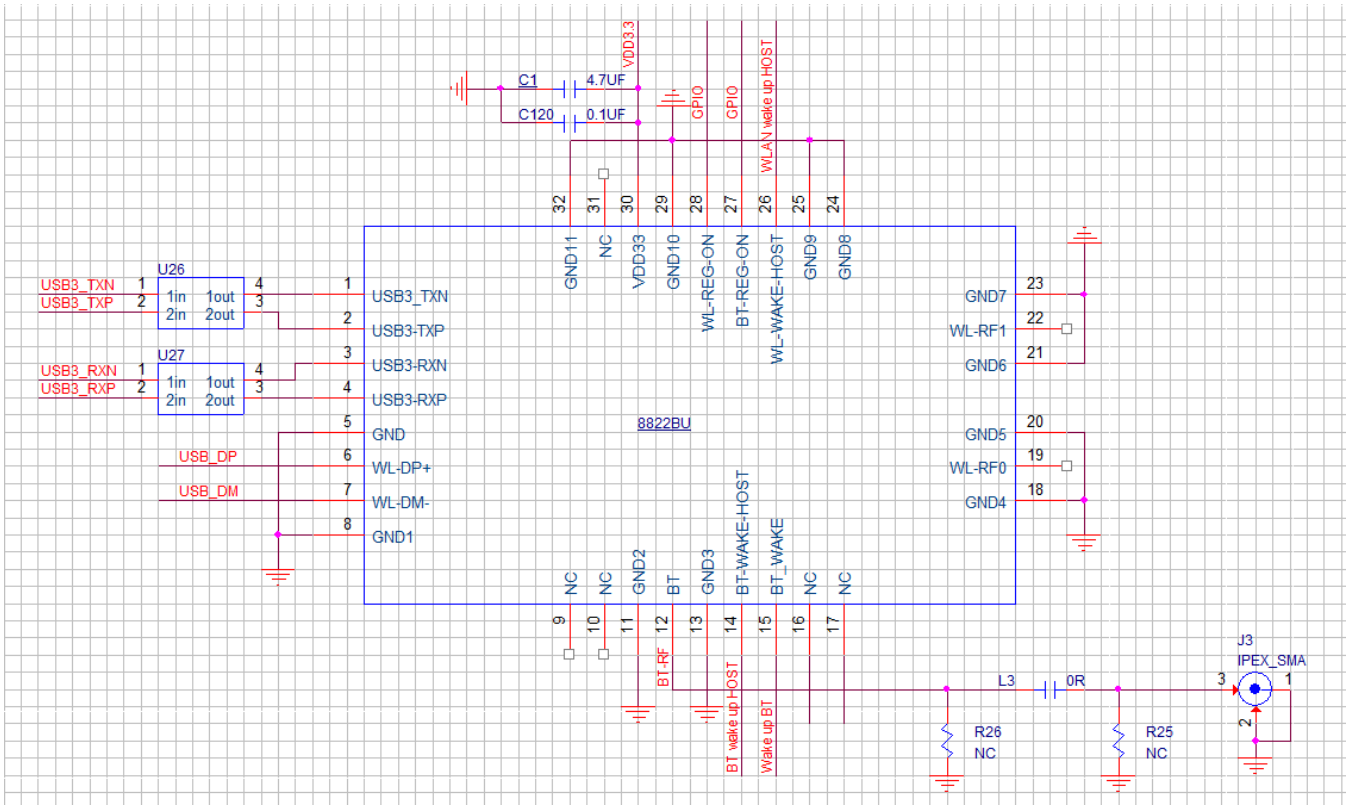

Figure 5-Typical application circuit

NOTE： 1.RF trace need to keep 50 ohm impedance.

2. RF(WIFI) connect to external antenna through the ipex connector，if choose the RF signals connect to the half hole, please refer to the black box matching circuit

3. Module supports USB2.0 by default

4. Modular antenna supports IPEX by default

5. Modular BT antenna supports cursor holes by default

6. Mechanical Specifications

Module dimension: Typical (L*W * H): 27*18*2.0mm Tolerance: +/-0.15mm

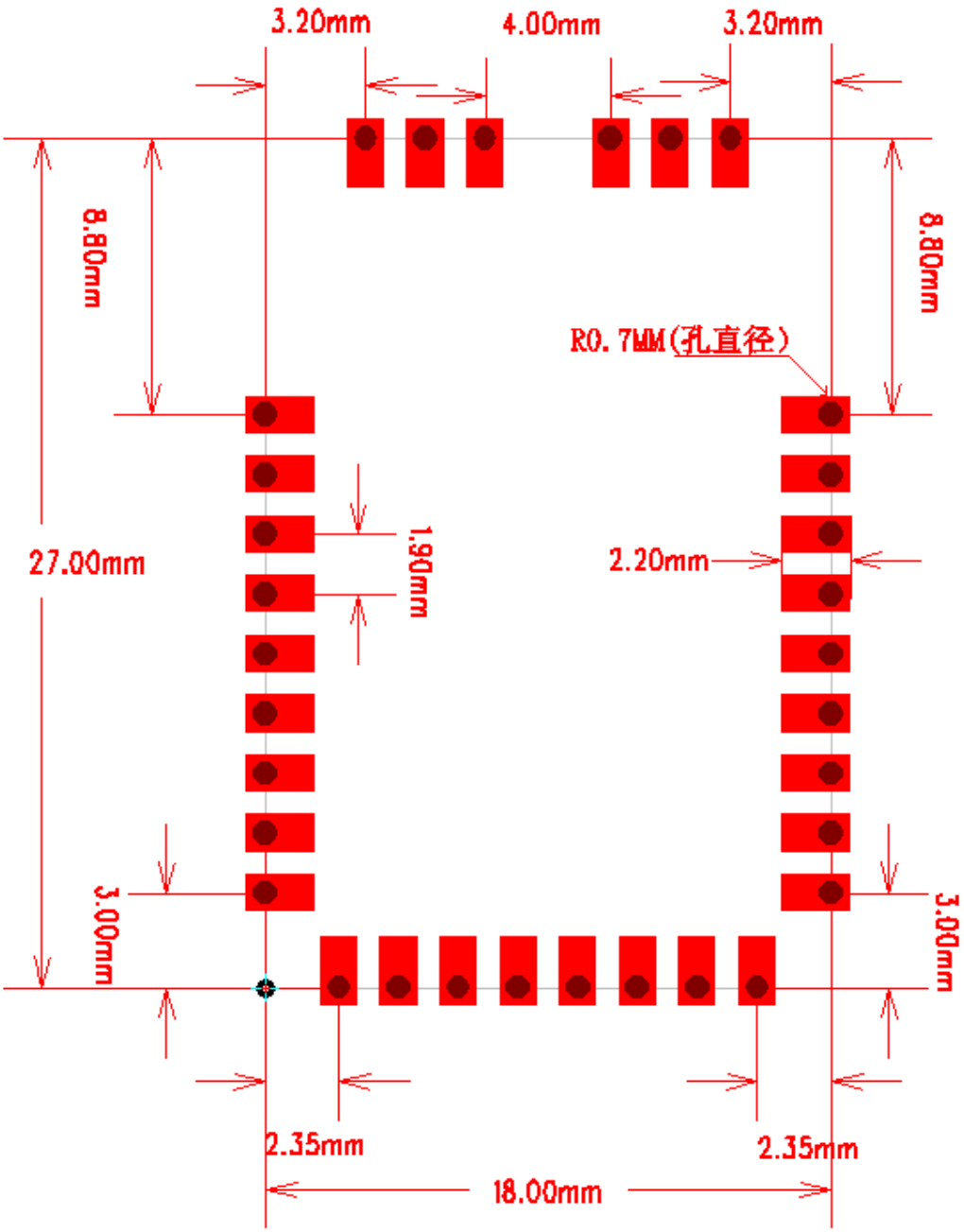

Figure 6-Module dimension

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 is illustrated in Figures 8. The peak temperature is 245℃.

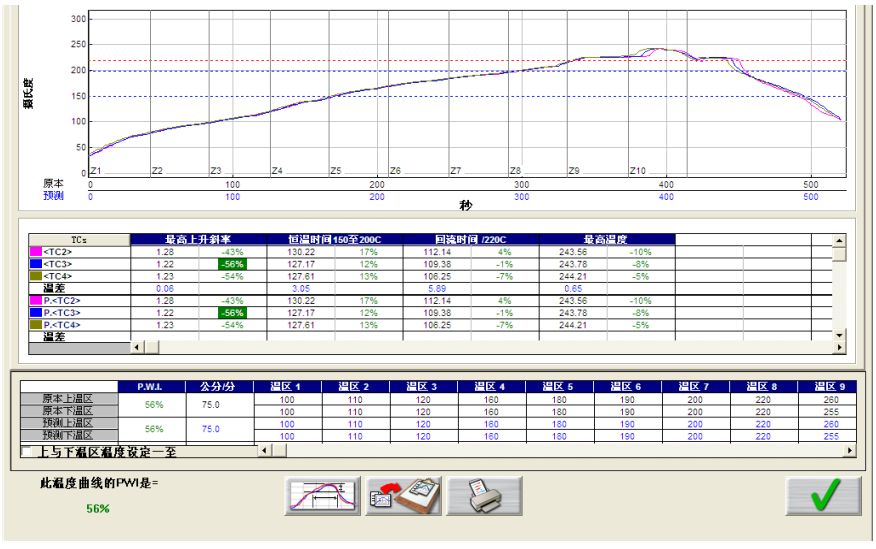

Figure 8 Typical Solder Reflow Profile

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-M8822BU3**"

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-M8822BU3**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	/	2.0dBi	/	/	/	/
5000-6000 MHz	External Antenna	/	/	2.0dBi	/	/	2.0dBi

2.8 Label and compliance information

The final end product must be labeled in a visible area with the following" Contains FCC ID:2AL6KBL-M8822BU3".

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.