User Manual

Revision	V0.1		
Date	2019-7-15		
Model Name	BL-M8822CU1		
Product Name	WiFi Module		
Bilian Approve Field			
Engineer	**QC**	**Sales**	
Customer Approve Field			
Engineer	**QC**	**Manufactory**	**Purchasing**

Table of Contents

Revision History

Date	Document Revision	Product Revision	Description
2019/07/15	0.1	V0.1	Preliminary release

1. Introduction

1.1 General Description

BL-M8822CU1 is a highly integrated module that was built in a 2*2 dual-band wireless LAN radio and Bluetooth radio. It combines a WLAN MAC, a 2T2R capable WLAN base band, and RF in a single chip. It supports IEEE 802.11a/b/g/n/ac standard and provides the highest PHY rate up to 867Mbps, offering feature-rich wireless connectivity and reliable throughput from an extended distance.
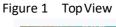
Figure 1   Top View   Figure 2 BottomView
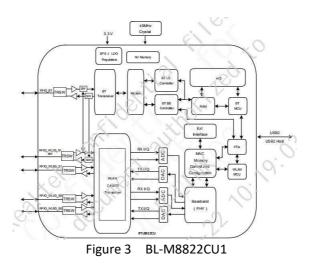

Note: The above pictures are for reference only

1.2 Features

- Operating Frequencies : 2.4~2.4835GHz and 5.15~5.85GHz
- Host Interface is USB
- IEEE Standards : IEEE 802.11a/b/g/n/ac
- Wireless data rate can reach up to867Mbps
- Connect to external antenna through IPEX connectors
- Power Supply: VBAT 3.3V±0.3V main power supply

1.3 Applications

- MID
- IP Camera
- STB
- Smart TV
- E-book
- Other devices which need to be supported by wirelessnetwork

2. Functional Block Diagram

Figure 3　BL-M8822CU1

3. Product Technical Specifications

3.1 General Specifications

Item	Description
Product Name	BL-M8822CU1
Main Chip	RTL8822CU-CG
Host Interface	USB2.0 for WiFi and Bluetooth
IEEE Standards	IEEE 802.11a/b/g/n/ac
Operating Frequencies	2.4~2.4835GHz, 5.180~5.835 GHz
Modulation	WiFi : 802.11b DSSS: CCK, DQPSK, DBPSK 802.11g OFDM: 64-QAM,16-QAM, QPSK, BPSK 802.11n OFDM: 64-QAM,16-QAM, QPSK, BPSK 802.11ac OFDM: 256-QAM, 64-QAM,16-QAM, QPSK, BPSK
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:MCS0~8 VHT40、80:MCS0~9 ,reach up to 867Mbps
Rx Sensitivity	-95dBm (Min)
Antenna Type	PCB Antenna
Dimension(L*W*H)	27*17.8*3.0mm (LxWxH) Tolerance:+/-0.15mm
Clock Source	40MHz
Working Temperature	-10℃ to +70℃
Storage Temperature	-40℃ to +85℃

3.2 wifi DC Power Consumption

VDD=3.3V，Ta = 25 ℃，unit: mA			
Supply current	Typ		Max
RX sense mode(No Link)	60		90

802.11b	1Mbps		11Mbps	
Supply current	Typ.	Max.	Typ.	Max.
Continuous TX mode	230	244	198	256
RX mode	62	74	65	75
802.11g	6Mbps		54Mbps	
Supply current	Typ.	Max.	Typ.	Max.
Continuous TX mode	371	606	229	482
RX mode	62	73	62	77
802.11n HT20	MCS0		MCS7	
Supply current	Typ.	Max.	Typ.	Max.
Continuous TX mode	371	596	223	472
RX mode	61	75	62	78
802.11n HT20	MCS 8		MCS15	
Supply current	Typ.	Max.	Typ.	Max.
Continuous TX mode	279	406	161	402

RX mode	62	73	62	75
802.11n HT40	MCS0		MCS7	
Supply current	Typ.	Max.	Typ.	Max.
Continuous TX mode	332	604	189	476
RX mode	60	74	61	75
802.11n HT40	MCS 8		MCS15	
Supply current	Typ.	Max.	Typ.	Max.
Continuous TX mode	242	404	143	410
RX mode	63	75	62	73
802.11a	6Mbps		54Mbps	
Supply current	Typ.	Max.	Typ.	Max.
Continuous TX mode	459	712	283	762
RX mode	60	74	58	72
802.11n HT20(5G)	MCS0		MCS7	
Supply current	Typ.	Max.	Typ.	Max.
Continuous TX mode	458	734	277	754
RX mode	62	77	60	71
802.11n HT20(5G)	MCS8		MCS15	
Supply current	Typ.	Max.	Typ.	Max.
Continuous TX mode	458	734	277	754
RX mode	62	72	60	71
802.11n HT40(5G)	**MCS0**		**MCS7**	
Supply current	Typ.	Max.	Typ.	Max.
Continuous TX mode	416	722	230	728
RX mode	61	75	59	70
802.11n HT40(5G)	MCS8		MCS15	
Supply current	Typ.	Max.	Typ.	Max.
Continuous TX mode	314	624	182	672
RX mode	60	73	58	69
802.11acVHT80(5G)	**MCS0**		**MCS9**	
Supply current	Typ.	Max.	Typ.	Max.
Continuous TX mode	361	744	196	718
RX mode	58	71	61	74

3.3 WiFi RF Specification

TX Power & EVM	WiFi-2.4G: 18.0±1.5dBm&<-15dB@11b 11Mbps 16.0±1.5dBm&<-28dB@11g 54Mbps 16.0±1.5dBm&<-28dB@11n-HT20/40-MCS7
	WiFi-5G: 16.0±2dBm&<-28dB@11a 54Mbps 15.0±2dBm&<-28dB@11n-HT20/40-MCS7 14±2dBm&<-32dB@11ac-HT80-MCS9
Receiver Minimum Input Sensitivity@PER	WiFi-2.4G: 11b 1Mbps: -94dBm@PER<8%; 11b 11Mbps:-86dBm@PER<8%; 11g 54Mbps:-74dBm@PER<10%; 11n-HT20-MCS7:-70dBm@PER<10%; 11n-HT40-MCS7:-68dBm@PER<10%; WiFi-5G: 11a 54Mbps:-72dBm@PER<10%; 11n-HT20-MCS7:-68dBm@PER<10%; 11n-HT40-MCS7:-66dBm@PER<10%; 11ac-HT80-MCS9:-58dBm@PER<10%;

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.

4. Pin Assignments

Figure 4   Top view

PIN	Function	Description
1	GND	Ground connections
2	WL_ANT1	WLAN_ANT(NC) /use IPEX connector
3	GND	Ground connections
4	GND	Ground connections
5	WL_ANT0	WLAN_ANT(NC) /use IPEX connector
6	GND	Ground connections
7	GND	Ground connections
8	NC	No connection(floating)
9	NC	No connection(floating)
10	GND	Ground connections
11	GPIO5	For SPI flash data line SIO1 use (NC)
12	GPIO6	WLAN wake up host /For SPI flash data line SIO2 use (NC)
13	GND	Ground connections
14	NC	No connection(floating)
15	NC	No connection(floating)
16	NC	No connection(floating)
17	NC	No connection(floating)
18	GND	Ground connections

19	HSDP	USB 2.0 differential line
20	HSDM	USB 2.0 differential line
21	VBAT	3.3V Main Power Supply
22	RESET	System reset signal active low
23	BT_WAKE_HOST	BT wake up host
24	GPIO7	HOST wake up WLAN /SPI flash data line SIO3(NC)
25	HOST_WAKE_BT	HOST wake up BT
26	EECS	SPI flash chip select pin(NC)
27	EESK	SPI flash clock pin(NC)
28	GPIO4	SPI flash data line SIO0(NC)
29	GND	Ground connections
30	BT_ANT	BT _ANT
31	GND	Ground connections

5. Typical Application Circuit

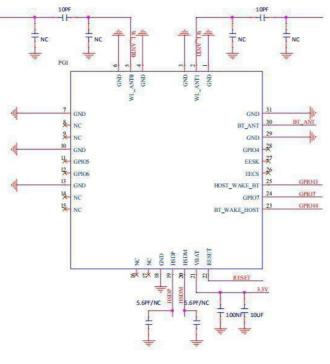Figure 5

NOTE：

a. RF traces need to keep 50 ohm impedance.

b. PIN_22 actives low USB system reset.

c. VBAT 3.3V for main power.

6. Mechanical Specifications

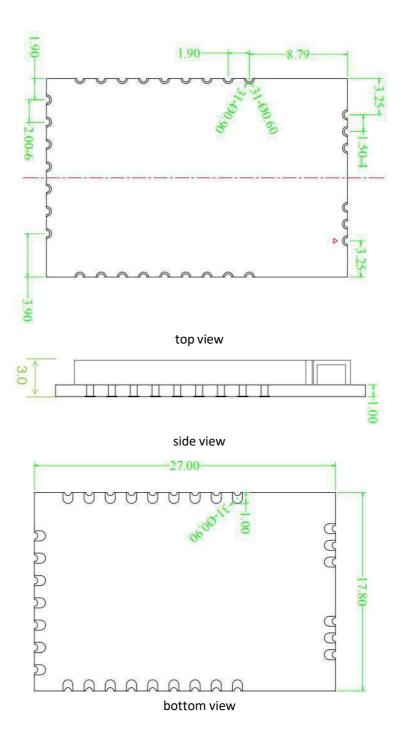Module dimension: Typical (L*W *H): 27mm*17.8mm*3.0mm   Tolerance : +/-0.15mm

top view

side view

bottom view

Figure 6   Module dimension (top , side and bottom view)

7. Antenna specification

Antenna Type:
  Ant0: PCB Antenna
  Ant1: PCB Antenna

Antenna Gain:

  Ant0:   2412MHz to 2462 MHz: 6.07 dBi
            5150 MHz to 5250 MHz: 5.02 dBi
            5250 MHz to 5350 MHz: 6.15 dBi
            5470 MHz to 5725 MHz: 8.46 dBi
            5725 MHz to 5850 MHz: 9.23 dBi

  Ant1:   2412MHz to 2462 MHz: 5.15 dBi
            5150 MHz to 5250 MHz:6.45 dBi
            5250 MHz to 5350 MHz: 6.48 dBi
            5470 MHz to 5725 MHz: 7.26 dBi
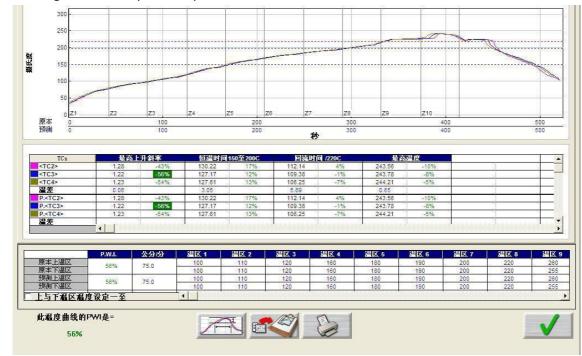   5725 MHz to 5850 MHz: 5.38 dBi

8. Others

8.1 Package Information

土备注：小批量采用托盘包装

Figure 7   Package Information

8.2 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.

8.3 Recommended Reflow Profile

   Reflow soldering shall be done according to the solder reflow profile,Typical Solder Reflow Profile is

illustrated in Figures 15. The peak temperature is 245℃.

Figure 7 Typical Solder Reflow Profile

U.S. FCC Part 15 Regulatory Information

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.

This modular complies with FCC RF radiation exposure limits set for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. This modular must be installed and operated with a minimum distance of 20 cm between the radiator and the user's body.

The device shall automatically discontinue transmission in cases of absence of information to transmit, or operational failure. Then it will scan the available radio signals. If this signal is connected before, it will be automatically connected, otherwise manual connections will be necessary.

The devices must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product.

The module must be installed in Host.
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.

This device complies with FCC part 15C: 15.247 and 15.407.

This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter. The module should be installed at a minimum distance of 20 cm away from a person nearby. The host product manufacturer should state this information to the host instruction manual.

Trace antenna designs - not applicable.

Any final host product with the modular transmitter installed should be under test according to guidance given in KDB 996369 D04. To enter test mode for module, secure CRT command is necessary. When something wrong happens in configuring test modes for host product with module, host product manufacturer should coordinate with module manufacturer for technical support. It is recommended that some investigative measurements should be taken to confirm that host product with module installed does not exceed the spurious emissions limits or band edge limits.

The modular complies with FCC authorised for the specific rule parts (FCC Part 15.247 and 15.407) list on the grant, and that the host product manufacturer is responsible for compliance to 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 when contains digital circuity.

The device is going to be operated in 5150~5350MHz frequency range. It is restricted indoor environment only.

The end product must carry a label stating "Contains FCC ID: SVN-M8822CU1" or shall use e- labeling.

Manufacturer's name and address: SHENZHEN BILIAN ELECTRONIC CO.,LTD
10~11/F, Building 1A, Huaqiang idea park, Guangming district, Shenzhen.
Guangdong, China