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PANTUM BL-M8822BU4 Wi-Fi Module User Guide

Contents

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PANTUM BL-M8822BU4 Wi-Fi Module

Introduction

BL-M8822BU4 is a highly integrated module built into 2 x 2 dual-band wireless LAN and Bluetooth. Supports 2T2R WLAN baseband and RF. It supports IEEE802.11a/ B/G/N/AC standards and provides a maximum connection rate of up to 867Mbps, which can provide power-rich wireless connections and reliable throughput over long distances. Support bluetooth 2.1/3.0/4.1.

Features

- Operating Frequencies: 2.4~2.4835GHz and 5.15~5.85GHz Host Interface is USB 2.0
- IEEE Standards: IEEE 802.11a/b/g/n/ac
- Wireless data rate can reach up to 867Mbps
- Bluetooth 2.1and/3.0/4.1
- Module built-in antenna, max gain 2dB
- Power Supply: VDD 5.0V±0.2V main power supply

FCC regulatory compliance statement

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.

Information to user
Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

List of applicable FCC rules:

- 47 CFR Part 15, Subpart C 15.247

- 47 CFR Part 15, Subpart E 15.407

- 47 CFR Part 15, Subpart C 15.249

Summarize the specific operational use conditions
This module can be used in IOT devices, the input voltage to the module is nominally 5V. Only the embedded integral antenna is allowed. Any other external antenna is prohibited.

Limited module procedures
This module is not a limited module.

Trace antenna designs
The antenna is not a trace antenna.

RF exposure considerations

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

Antennas
If you desire to increase antenna gain and either change antenna type or use same antenna type certified, a Class II permissive change application is required to be filed by us, or you (host manufacturer) can take responsibility through the change in FCC ID (new application) procedure followed by a Class II permissive change application.

Label and compliance information
Please notice that if the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. following: "Contains FCC ID: 2AEGO5103WM" any similar wording that expresses the same meaning may be used. Labeling requirements shall have complied on the end-user device. Labeling rules for a special devices, please refer to §2.925, § 15.19 (a)(5) and relevant KDB publications. For E-label, please refer to §2.935.

Information on test modes and additional testing requirements
The host manufacturer can use the software for access to the test modes. Connected to the computer through the serial port of the host product, the channel and power controlling software provided by the applicant was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the application and is going to be fixed on the firmware of the end product.

Additional testing, Part 15 Subpart B disclaimer
This modular transmitter is only FCC authorized for the specific rule parts listed on our grant, 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.. Host manufacturer in any case shall ensure host product which is installed and operating with the module is in compliant with Part 15B requirements. Please note that For a Class B or Class A digital device or peripheral, the instructions furnished the user manual of the end-user product shall include statement set out in. §15.105 Information to the user or such similar statement and place it in a prominent location in the text of host product manual. Original texts as following:

For Class B
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.

General Specifications

Module Name	BL-M8822BU4, WLAN+BT Combo Module
Chipset	RTL8822BU-CG
WiFi Standards	IEEE802.11a/b/g/n/ac, 2T2R MIMO, 2.4G/5GHz, 867Mbps (Max)
Host Interface	USB2.0
Antenna	Module built-in antenna 2.4G wifi Ant. 1:2 dBi ; Ant. 2:2 dBi ; 5G wifi: Ant. 1:2 dBi ; Ant. 2:2 dBi ; Bluetooth: Ant. 1:1.6 dBi
Dimension	SMD 6Pins, 46.5*40.0*7.6mm (L*W*H), Tolerance: +/-0.15mm
Power Supply	DC 5.0V±0.2V @650mA Max standby power @200mA
Operation Temperature	-20℃ to +70℃

Operation Humidity	10% to 95% RH (Non-Condensing)
Storage Temperature	-45°C to +85°C
Storage Humidity	10% to 95% RH (Non-Condensing)
System Supported	Linux/Android/IOS/win7-win10
Adaptability Test (300328 V1.8)	Supported
FHSS	WiFi not supported, BT Supp

Current Consumption

Conditions: VDD=5V ; Ta:25°C			
Use Case	VBAT Current (average)		
	Typ	Max	units
WiFi Radio Off (Linux Driver)	20	50	mA
WiFi Disable (Linux Driver)	2.8	—	mA
WiFi Unassociated (Linux Driver)	189	210	mA
WoWLAN(Linux Driver)	20	50	mA

2.4G 1Mbps TX (1RF-Test)	401	425	mA
2.4G 1Mbps RX (1RF-Test)	196	216	mA
2.4G 11Mbps TX (1RF-Test)	345	468	mA
2.4G 11Mbps RX (1RF-Test)	195	218	mA
2.4G 6Mbps TX (1RF-Test)	386	416	mA
2.4G 6Mbps RX (1RF-Test)	196	218	mA
2.4G MCS0(HT20) TX (1RF-Test)	385	415	mA
2.4G MCS0(HT20) RX (1RF-Test)	195	216	mA
2.4G MCS8(HT40) TX (2RF-Test)	351	389	mA
2.4G MCS8(HT40) RX (RF-Test)	205	215	mA
2.4G MCS15(HT40) TX (2RF-Test)	387	402	mA
2.4G MCS15(HT40) RX (2RF-Test)	195	216	mA
5.8G 6Mbps TX (RF-Test RF0 and RF1)	388	415	mA
5.8G 6Mbps RX (1RF-Test)	196	210	mA
5.8G 54Mbps TX (1RF-Test)	337	415	mA
5.8G 54Mbps RX (1RF-Test)	196	215	mA
5.8G MCS0(HT20) TX (1RF-Test)	358	405	mA
5.8G MCS0(HT20) RX (1RF-Test)	195	216	mA
5.8G MCS7(HT40) TX (1RF-Test)	365	420	mA
5.8G MCS7(HT40) RX (1RF-Test)	196	215	mA
5.8G MCS0(HT80) TX (1RF-Test)	468	542	mA
5.8G MCS9(HT80) RX (1RF-Test)	196	219	mA
5.8G MCS15(HT80) TX (2RF-Test)	487	552	mA
5.8G MCS15(HT80) RX (2RF-Test)	196	219	mA

Pin Assignments

No	Pin Name	Type	Description	Supply
1	5.0V	—	Power supply 5V is required MAX 5.5V	
2	USB_DM –	I/O	USB data- (USB2.0)	
3	USB_DP +	I/O	USB data- (USB2.0)	
4	GND	P	Ground connections	
5	BT_WAKE	I	Wake up BT (Pull high to wake up and pull low to close)	
6	ON/OFF	I	Control "EN" of DC-DC,High level (default) Turn on Delay 0.5ms	

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

WiFi RF Specifications

2.4G WiFi RF Specification

Conditions: VDD=5V; Ta:25°C	
Features	Description
WLAN Standard	IEEE 802.11b/g/n
Frequency Range	2.4~2.4835GHz
Modulation	802.11b DSSS: CCK, DQPSK, DBPSK 802.11g OFDM: 64QAM,16QAM, QPSK, BPSK 802.11n OFDM: 64QAM,16QAM, QPSK, BPSK
Date Rate	802.11b: 1, 2 ,5.5,11Mbps, 802.11g: 6,9,12,18,24,36,48,54Mbps, 802.11n-2.4 HT20: MCS0~15, 6.5~144.4Mbps, 802.11n-2.4 HT40: MCS0~15, 13~300Mbps,
Frequency Tolerance	≦ ±25ppm

2.4G Authentication Channel Distribution

Regulation Domain (mib regdomain value)	Supported Channels
FCC	1,2,3,4,5,6,7,8,9,10,11
ETSI	1,2,3,4,5,6,7,8,9,10,11,12,13

5G WiFi RF Specification

Conditions: VDD=5V; Ta:25°C	
Features	Description
WLAN Standard	IEEE 802.11a/n/ac
Frequency Range	5150MHz~5250MHz; 5250~5350MHz; 5470~5725MHz; 5725MHz~5850MHz

Channels	Ch36, Ch40, Ch44, Ch48; Ch52~Ch64; Ch100~Ch140; Ch149~Ch165 (For 20MHz Channels)
Modulation	802.11a (OFDM): BPSK, QPSK, 16QAM, 64QAM; 802.11n (OFDM): BPSK, QPSK, 16QAM, 64QAM; 802.11ac (OFDM): BPSK, QPSK, 16QAM, 64QAM, 256QAM;
Date Rate	802.11a: 6, 9, 12, 18, 24, 36, 48, 54Mbps; 802.11n (HT20): MCS0~MCS7(1T1R_SISO) 6.5~72.2Mbps; 802.11n (HT20): MCS8~MCS15(2T2R_MIMO) 13~144.4Mbps; 802.11n (HT40): MCS0~MCS7(1T1R_SISO) 13.5~150Mbps; 802.11n (HT40): MCS8~MCS15(2T2R_MIMO) 27~300Mbps; 802.11ac (VHT20): MCS0~MCS8(1T1R_SISO) 6.5~86.7Mbps; 802.11ac (VHT20): MCS0~MCS8(2T2R_MIMO) 13~173.3Mbps; 802.11ac (VHT40): MCS0~MCS9(1T1R_SISO)13.5~200Mbps; 802.11ac (VHT40): MCS0~MCS9(2T2R_MIMO)27~400Mbps; 802.11ac (VHT80): MCS0~MCS9(1T1R_SISO)29.3~433.3Mbps; 802.11ac (VHT80): MCS0~MCS9(2T2R_MIMO)58.5~866.7Mbps;
Frequency Tolerance	≦ ±20ppm

5.8G Authentication Channel Distribution

Regulation Domain (mib regdomain value)	Supported Channels – DFS Enabled	Supported Channels – DFS Disabled
	36,40,44,48,52,56,60,64,100,104,1	
FCC	08,112,116,136,140,	36,40,44,48,149,153,157,161,165
	149,153,157,161,165	
	36,40,44,48,52,56,60,64,100,104,1	
ETSI	08,112,116,120,124,	36,40,44,48
	128,132,136,140	

7.5 BT RF Specification

Features	Description
Bluetooth Specification	Bluetooth v2.1+EDR/3.0+HS (Bluetooth Classic _ BT BR/EDR), Bluetooth 4.1

Frequency Range	2.4~2.4835GHz (2.4GHz ISM Band)		
Channels	Bluetooth Classic: Ch0~Ch78 (For 1MHz Channels); Bluetooth Low Energy: Ch0~Ch39 (For 2MHz Channels);		
Power Classes	Bluetooth Classic: Class1; Bluetooth Low Energy: Class1.5;		
Date Rate & Modulation	BR_1Mbps: GFSK; EDR_2Mbps: π/4-DQPSK; EDR_3Mbps: 8DPSK; LE_1Mbps: GFSK (Uncoded);		

Bluetooth Transmitter Specifications			
Items	Min	Typ	Max
TX Power			
BR_1M TX Power	0	5	10
EDR_2/3M TX Power	0	5	10
LE_1M TX Power	0	5	10

BR_1M Modulation Characteristics			
Δf1avg	140kHz	157kHz	175kHz
Δf2max [For at least 99.9% of all Δf2 max]	115kHz	145kHz	—
Δf2avg / Δf1avg	0.8	0.98	—
EDR Modulation Accuracy			
RMS DEVM (EDR_2M)	—	8%	20%
99% DEVM (EDR_2M)	—	11%	30%
Peak DEVM (EDR_2M)	—	15%	35%
RMS DEVM (EDR_3M)	—	8%	13%
99% DEVM (EDR_3M)	—	11%	20%

Peak DEVM (EDR_3M)	—	15%	25%
LE_Modulation characteristics			
f1avg (LE_1M)	225kHz	275kHz	f1avg (LE_1M)
Δf2max [For at least 99.9% of all Δf2 max] (LE_1M)	185kHz	—	—
Δf2avg / Δf1avg (LE_1M)	0.8	0.98	—

Mechanical Specifications
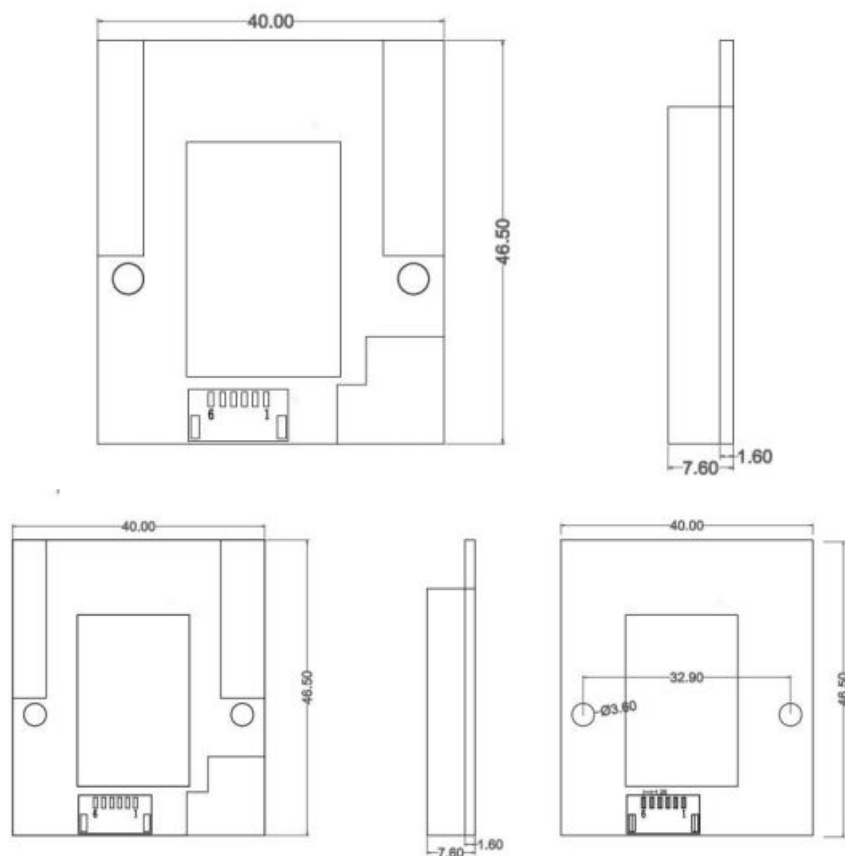
Key Components Of Module

No.	Parts	Specification	Manufacturer	Note
1	Chipset	RTL8822BU-CG	Realtek	
2	PCB	BL-M8822BU4	Shen Zhen Tie Fa Technology limited	
			MILLION SOURCE PRINTED CIRCUIT BOARD CO., LTD	
			Quzhou Sunlord Electronics Co., Ltd	
		JUI7.820.0259 series FR-4 ,4LAY	Million Source Printed Circuit Board Co., Ltd	
			Quzhou Sunlord Electronics Co., Ltd.	
			Sichuan IQE Electronic Technology Co., LTD.	

3	Crystal	SMD3225-40M	Hosonic Electronic Co., Ltd.	
			HELE.	
			TXC	
4	SWITCH	SP3T	Richwave	
			Qwave	

Package and Storage Information

Package Dimensions

Package Information

1. 20 modules per blister plate and 260 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. 1 pcs 3 point humidity card.
4. The outer box size is 35.2*21.5*15.5cm.

Storage Conditions

Absolute Maximum Ratings:

- Storage temperature: -45℃to +85℃
- Storage humidity: 10% to 95% RH Non-Condensing

Recommended Storage Conditions:

- Storage temperature: 5℃to +40℃

- Storage humidity: 20% to 90% RH

Please use this Module within 12month after being vacuum-packaged. The Module shall be stored without opening the packing. After the packing is opened, the Module shall be used within 72hours. When the color of the humidity indicator in the packing changes, The Module shall be baked before soldering.

- Baking condition: 60℃, 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!

Documents / Resources

	PANTUM BL-M8822BU4 Wi-Fi Module [pdf] User Guide 5103WM, 2AEGO5103WM, BL-M8822BU4 Wi-Fi Module, BL-M8822BU4, Wi-Fi Module