

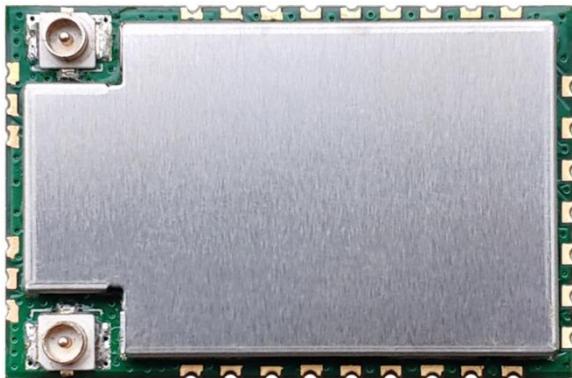


BL-M8852BU1

**802.11ax 1201Mbps WLAN + BT5.2
USB2.0 Combo Module Specification**

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(Top View)



(Bottom View)

(Note: BL-M8852BU1 and BL-M8852AU1 share PCB design)

Module Name: BL-M8852BU1	
Module Type: 802.11ax 1201Mbps WLAN + BT5.2 USB2.0 Combo Module	
Revision: V1.1	
Customer Approval:	
Company:	
Title:	
Signature:	Date:
Approval:	
Title:	
Signature:	Date:

Revision History

Revision	Summary	Release Date	Revised By
1.0	Content optimization	2023-03-17	Qx
1.1	Update packaging specifications and others	2024-04-20	Garry

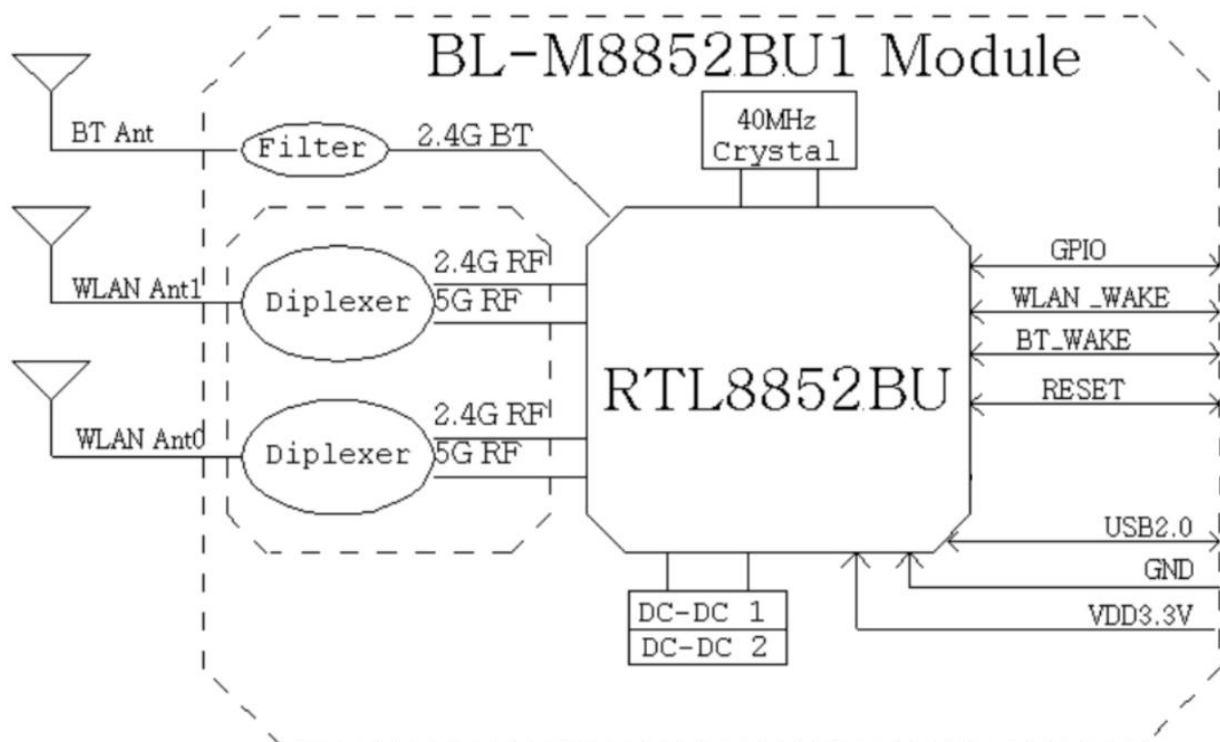
1. Introduction

BL-M8852BU1 is a highly integrated Dual-band WLAN + Bluetooth v5.2 Combo module. It combines a 2T2R Dual-band WLAN subsystem and a Bluetooth v5.2 subsystem. This module compatible IEEE 802.11 a/b/g/n/ac/ax standard and provides the maximum PHY rate up to 1201Mbps, it supports Bluetooth dual mode with v5.2/v4.2/v2.1 compliant, offering feature-rich wireless connectivity at high standards, and delivering reliable, cost-effective, high throughput from an extended distance.

1.1 Features

- Operating Frequency: 2.4~2.4835GHz or 5.15~5.85GHz
- Host interface: Complies with USB2.0 for WLAN and BT controller
- IEEE Standards: IEEE 802.11a/b/g/n/ac/ax
- Wireless PHY rate can reach up to 573.5Mbps or 1201Mbps
- VDD3.3V±0.2V main power supply

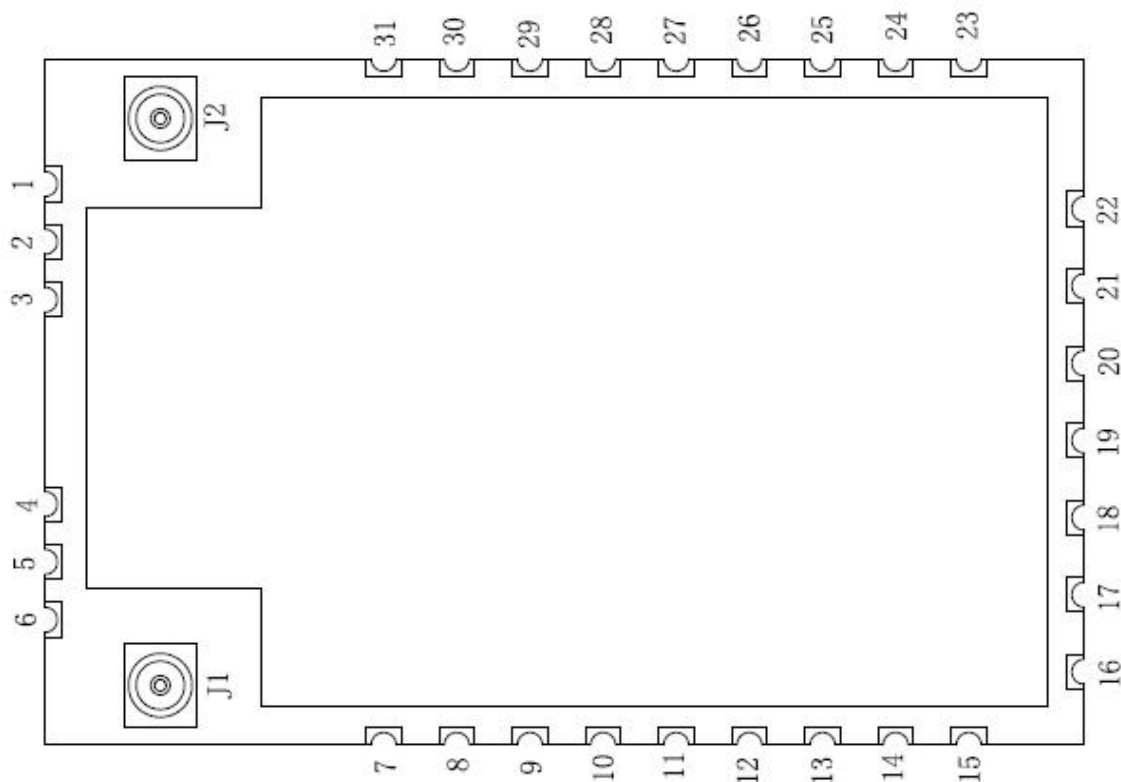
1.2 Block Diagram



1.3 General Specifications

Module Name	BL-M8852BU1
Chipset	RTL8852BU-VS-CG(USB2.0)
WLAN Standard	IEEE 802.11 a/b/g/n/ac/ax
BT Specification	Bluetooth Core Specification v5.2/v4.2/v2.1
Host Interface	Complies with USB2.0 for WLAN and BT controller
Antenna	IPEX connector for external WLAN antenna; Half hole PAD for external BT antenna
Dimension	27.0*17.8*2.4mm (L*W*H)
Power Supply	DC 3.3V±0.2V @ 1200 mA (Max)
Operation Temperature	-20°C to +70°C
Operation Humidity	10% to 95% RH (Non-Condensing)

2. Pin Assignments



TOP View

2.1 Pin Definition

No.	Pin Name	Type	Level	Module Pin Description
1	GND	RF		RF Ground for WLAN_ANT1
2	NC	RF		NC (Reserved 2.4G / 5G RF PAD for WLAN_ANT1)
3	GND	RF		RF Ground for WLAN_ANT1
4	GND	RF		RF Ground for WLAN_ANT0
5	NC	RF		NC (Reserved 2.4G / 5G RF PAD for WLAN_ANT0)
6	GND	RF		RF Ground for WLAN_ANT0
7	GND	P		Ground
8	GPIO	I/O	3.3V	GPIO5, I/O; (If not used,this Pin can be left floating)
9	GPIO	I/O	3.3V	1、 GPIO6, I/O; 2、 Reserved " GNT_WLAN" for debug purpose; (If not used,this Pin can be left floating)
10	GND	P		Ground
11	GPIO	I/O	3.3V	1、 GPIO7, I/O; 2、 Reserved " GNT_BT" for debug purpose; (If not used,this Pin can be left floating)
12	GPIO/ WLAN_Wake_Host	I/O	3.3V	1、 GPIO10, I/O; 2、 WLAN Wake up Host, output; (If not used,this Pin can be left floating)
13	GND	P		Ground
14	NC			NC
15	NC			NC
16	NC			NC.
17	NC			NC
18	GND	P		Ground
19	HSD+	A I/O		USB 2.0 Device High Speed Interface differential pair (to connect USB 2.0/3.0 Host "HSD+")
20	HSD-	A I/O		USB 2.0 Device High Speed Interface differential pair (to connect USB 2.0/3.0 Host "HSD-")
21	VDD33	P		DC 3.3V power supply
22	RESET	I	3.3V	Reset active Low input, this pin can externally shutdown

				/reset the module, internal pull high by 47K resistor; (If not used, this Pin can be left floating)
23	GPIO/ BT_Wake_Host	I/O	3.3V	1、GPIO14, I/O; 2、BT Wake up Host, output; (If not used, this Pin can be left floating)
24	GPIO/ HOST_Wake_WLAN	I/O	3.3V	1、GPIO12, I/O; 2、Host Wake up WLAN, input; (If not used, this Pin can be left floating)
25	GPIO/ HOST_Wake_BT	I/O	3.3V	1、GPIO13, I/O; 2、Host Wake up BT, input; (If not used, this Pin can be left floating)
26	EECS	I/O	3.3V	Reserved " EECS" for debug purpose; (If not used, this Pin can be left floating)
27	GPIO	I/O	3.3V	1、GPIO9, I/O; 2、Reserved " UART_TX" for BQB test purpose; (If not used, this Pin can be left floating)
28	GPIO	I/O	3.3V	1、GPIO11, I/O; 2、Reserved " UART_RX" for BQB test purpose; (If not used, this Pin can be left floating)
29	GND	RF		RF Ground for BT_ANT
30	BT_RF	RF		RF PAD for BT_ANT
31	GND	RF		RF Ground for BT_ANT
J1	ANT0	RF		IPEX connector for 2.4G / 5G RF to WLAN_ANT0
J2	ANT1	RF		IPEX connector for 2.4G / 5G RF to WLAN_ANT1

P: Power or Ground; I/O: In/Output; I: Input; A I/O: Analog In/Output; AI: Analog Input;
AO: Analog Output; RF: Analog RF Port or RF Ground;

3. Electrical and Thermal Specifications

3.1 Recommended Operating Conditions

Parameters		Min	Typ	Max	Units
Ambient Operating Temperature		-20	25	70	°C
External Antenna VSWR			1.7	2	/
Supply Voltage	VDD33	3.1	3.3	3.5	V

3.2 Current Consumption

Conditions : VDD33=3.3V ; Ta:25°C .			
Use Case	VDD33 Current		
	Typ (RMS)	Max (Ipp)	Units
WLAN Unassociated (Linux Driver, BT disable)	266	340	mA
WLAN 2.4G TRX Throughput 160Mbps(Linux Driver, BT disable)	266	740	mA
WLAN 5G TRX Throughput 240Mbps(Linux Driver, BT disable)	352	1020	mA
BT0 LE 1Mbps MP3 playback (Linux Driver, WLAN disable)	218	235	mA
2.4G 11b 1Mbps TX @ 19dBm (1TX RF test)	344	416	mA
2.4G 11g 6Mbps TX @ 18dBm (1TX RF test)	278	440	mA
2.4G HE_SU 20MHz MCS15 TX@15dBm (2TX RF test)	201	560	mA
2.4G HE_SU 40MHz MCS0 TX@16dBm (2TX RF test)	267	720	mA
2.4G HE_SU 40MHz MCS11 TX@15dBm (2TX RF test)	202	704	mA
2.4G HE_SU 40MHz MCS11 RX (2RX RF test)	169	216	mA
5G 11a 6Mbps TX @ 18dBm (1TX RF test)	441	800	mA
5G 11n HT20Mbps MCS7 TX @ 16dBm (1TX RF test)	200	688	mA
5G VHT80 MCS0 TX@17dBm (2TX RF test)	313	1160	mA
5G VHT80 MCS9 TX@15dBm (2TX RF test)	240	1120	mA
5G HE_SU 80MHz MCS0 TX@16dBm (2TX RF test)	336	1160	mA
5G HE_SU 80MHz MCS11 TX@15dBm (2TX RF test)	263	1110	mA
5G HE_SU 80MHz MCS11 RX(2TX RF test)	202	260	mA
BT BR_1M TX@5dBm (BT RF test, WLAN disable)	236	286	mA
BT BR_1M RX Active (BT RF test, WLAN disable)	193	248	mA
BT EDR_3M TX@5dBm (BT RF test, WLAN disable)	238	279	mA
BT LE_1M TX@5dBm (BT RF test, WLAN disable)	218	268	mA

4. WLAN & Bluetooth RF Specifications

4.1 2.4G WLAN RF Specification

Conditions : VDD33=3.3V ; Ta:25°C			
Features		Description	
WLAN Standard		IEEE 802.11b/g/n/ac/ax	
Frequency Range		2.4~2.4835GHz (2.4GHz ISM Band)	
Channels		Ch1~Ch13 (For 20MHz Channels)	
Modulation		802.11b (DSSS): CCK, DQPSK, DBPSK; 802.11g (OFDM): BPSK, QPSK, QAM16, QAM64; 802.11n (OFDM): BPSK, QPSK, QAM16, QAM64; 802.11ac (OFDM): BPSK, QPSK, QAM16, QAM64, QAM256; 802.11ax (OFDMA): BPSK, BPSK_DCM, QPSK, QPSK_DCM, QAM16, QAM16_DCM, QAM64, QAM256, QAM1024;	
Data Rate		802.11b: 1, 2, 5.5, 11Mbps; 802.11g: 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) 13.5~150Mbps; 802.11n (HT40): MCS8~MCS15(2T2R) 27~300Mbps; 802.11ac (VHT20): MCS0~MCS8(1T1R) 6.5~86.7Mbps; 802.11ac (VHT20): MCS0~MCS8(2T2R) 13~173.3Mbps; 802.11ac (VHT40): MCS0~MCS9(1T1R)13.5~200Mbps; 802.11ac (VHT40): MCS0~MCS9(2T2R)27~400Mbps; 802.11ax (HE_MU,26~242RU): MCS0~MCS11(1T1R) 0.4~143.4Mbps; 802.11ax (HE_MU,26~242RU): MCS0~MCS11(2T2R) 0.8~286.8Mbps; 802.11ax (HE_SU, non-OFDMA 20MHz): MCS0~MCS11(1T1R) 3.6~143.4Mbps; 802.11ax (HE_SU, non-OFDMA 20MHz): MCS0~MCS11(2T2R) 7.3~286.8Mbps; 802.11ax (HE_SU, non-OFDMA 40MHz): MCS0~MCS11(1T1R) 7.3~286.8Mbps; 802.11ax (HE_SU,non-OFDMA 40MHz): MCS0~MCS11(2T2R) 14.6~573.5Mbps;	
Frequency Tolerance		≤±20ppm	
2.4G Transmitter Specifications (WLAN_ANT0 & WLAN_ANT1. TX power tolerance calibrated, customers can define the target TX power by modifying configuration file of the driver software. Customers must define the TX power same or lower than recommended Target TX Power as below)			
TX Rate	Recommended Target TX Power (dBm)	TX Power Tolerance (dBm)	EVM (dB)
802.11b@1~11Mbps	19	±2	≤-10
802.11g@6Mbps	18	±2	≤-10

802.11g@54Mbps	17	±2	≤-25
802.11n@HT20_MCS0	17	±2	≤-10
802.11n@HT20_MCS7	16	±2	≤-28
802.11n@HT40_MCS0	17	±2	≤-10
802.11n@HT40_MCS7	16	±2	≤-28
802.11ac@VHT40_MCS9	15	±2	≤-32
802.11ax@HE_SU 20M_MCS11	15	±2	≤-35
802.11ax@HE_SU 40M_MCS11	15	±2	≤-35

2.4G Receiver Specifications (WLAN_ANT0 & WLAN_ANT1)

RX Rate	Min Input Level (dBm)	Max Input Level (dBm)	PER
802.11b@1Mbps	-95	-5	< 8%
802.11b@11Mbps	-88	-5	< 8%
802.11g@6Mbps	-93	-5	< 10%
802.11g@54Mbps	-75	-5	< 10%
802.11n@HT20_MCS0	-93	-5	< 10%
802.11n@HT20_MCS7	-73	-5	< 10%
802.11n@HT40_MCS0	-89	-5	< 10%
802.11n@HT40_MCS7	-70	-5	< 10%
802.11ac@VHT40_MCS9	-65	-5	< 10%
802.11ax@HE_SU 20M_MCS0	-94	-5	< 10%
802.11ax@HE_SU 20M_MCS11	-63	-5	< 10%
802.11ax@HE_SU 40M_MCS0	-88	-5	< 10%
802.11ax@HE_SU 40M_MCS11	-61	-5	< 10%

4.2 5G WLAN RF Specification

Conditions: VDD33=3.3V; Ta:25°C	
Features	Description
WLAN Standard	IEEE 802.11a/n/ac/ax
Frequency Range	5.15~5.25GHz; 5.25~5.35GHz; 5.47~5.725GHz; 5.725~5.85GHz (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; 802.11ax (OFDMA): BPSK, BPSK_DCM, QPSK, QPSK_DCM, QAM16, QAM16_DCM, QAM64, QAM256, QAM1024;		
Data 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) 13.5~150Mbps; 802.11n (HT40): MCS8~MCS15(2T2R) 27~300Mbps; 802.11ac (VHT20): MCS0~MCS8(1T1R) 6.5~86.7Mbps; 802.11ac (VHT20): MCS0~MCS8(2T2R) 13~173.3Mbps; 802.11ac (VHT40): MCS0~MCS9(1T1R)13.5~200Mbps; 802.11ac (VHT40): MCS0~MCS9(2T2R)27~400Mbps; 802.11ac (VHT80): MCS0~MCS9(1T1R)29.3~433.3Mbps; 802.11ac (VHT80): MCS0~MCS9(2T2R)58.5~866.7Mbps; 802.11ax (HE_MU,26~484RU): MCS0~MCS11(1T1R) 0.4~286.8Mbps; 802.11ax (HE_MU,26~484RU): MCS0~MCS11(2T2R) 0.8~573.5Mbps; 802.11ax (HE_SU, non-OFDMA 20MHz): MCS0~MCS11(1T1R) 3.6~143.4Mbps; 802.11ax (HE_SU, non-OFDMA 20MHz): MCS0~MCS11(2T2R) 7.3~286.8Mbps; 802.11ax (HE_SU, non-OFDMA 40MHz): MCS0~MCS11(1T1R) 7.3~286.8Mbps; 802.11ax (HE_SU,non-OFDMA 40MHz): MCS0~MCS11(2T2R) 14.6~573.5Mbps; 802.11ax (HE_SU,non-OFDMA 80MHz): MCS0~MCS11(1T1R) 15.3~600.4Mbps; 802.11ax (HE_SU, non-OFDMA 80MHz): MCS0~MCS11(2T2R) 30.6~1201Mbps;		
Frequency Tolerance	≤ ±20ppm		

5G Transmitter Specifications (WLAN_ANT0 & WLAN_ANT1. TX power tolerance calibrated, customers can define the target TX power by modifying configuration file of the driver software. Customers must define the TX power same or lower than recommended Target TX Power as below)

TX Rate	Recommended Target TX Power (dBm)	TX Power Tolerance (dBm)	EVM (dB)
802.11a@6Mbps	18	±2	≤-10
802.11a@54Mbps	17	±2	≤-25
802.11n@HT20_MCS0	17	±2	≤-13
802.11n@HT20_MCS7	16	±2	≤-28

802.11n@HT40_MCS0	17	±2	≤-13
802.11n@HT40_MCS7	16	±2	≤-28
802.11ac@VHT20_MCS0	17	±2	≤-13
802.11ac@VHT80_MCS0	17	±2	≤-10
802.11ac@VHT80_MCS9	15	±2	≤-32
802.11ax@HE_SU 20M_MCS0	17	±2	≤-13
802.11ax@HE_SU 20M_MCS11	15	±2	≤-35
802.11ax@HE_SU 40M_MCS11	15	±2	≤-13
802.11ax@HE_SU 80M_MCS11	15	±2	≤-35
5G Receiver Specifications (WLAN_ANT0 & WLAN_ANT1)			
RX Rate	Min Input Level (dBm)	Max Input Level (dBm)	PER
802.11a@6Mbps	-93	-5	< 10%
802.11a@54Mbps	-73	-5	< 10%
802.11n@HT20_MCS0	-92	-5	< 10%
802.11n@HT20_MCS7	-73	-5	< 10%
802.11n@HT40_MCS0	-86	-5	< 10%
802.11n@HT40_MCS7	-70	-5	< 10%
802.11ac@VHT80_MCS0	-86	-5	< 10%
802.11ac@VHT80_MCS9	-59	-5	< 10%
802.11ax@HE_SU 20M_MCS0	-93	-5	< 10%
802.11ax@HE_SU 20M_MCS11	-63	-5	< 10%
802.11ax@HE_SU 80M_MCS0	-87	-5	< 10%
802.11ax@HE_SU 80M_MCS11	-59	-5	< 10%

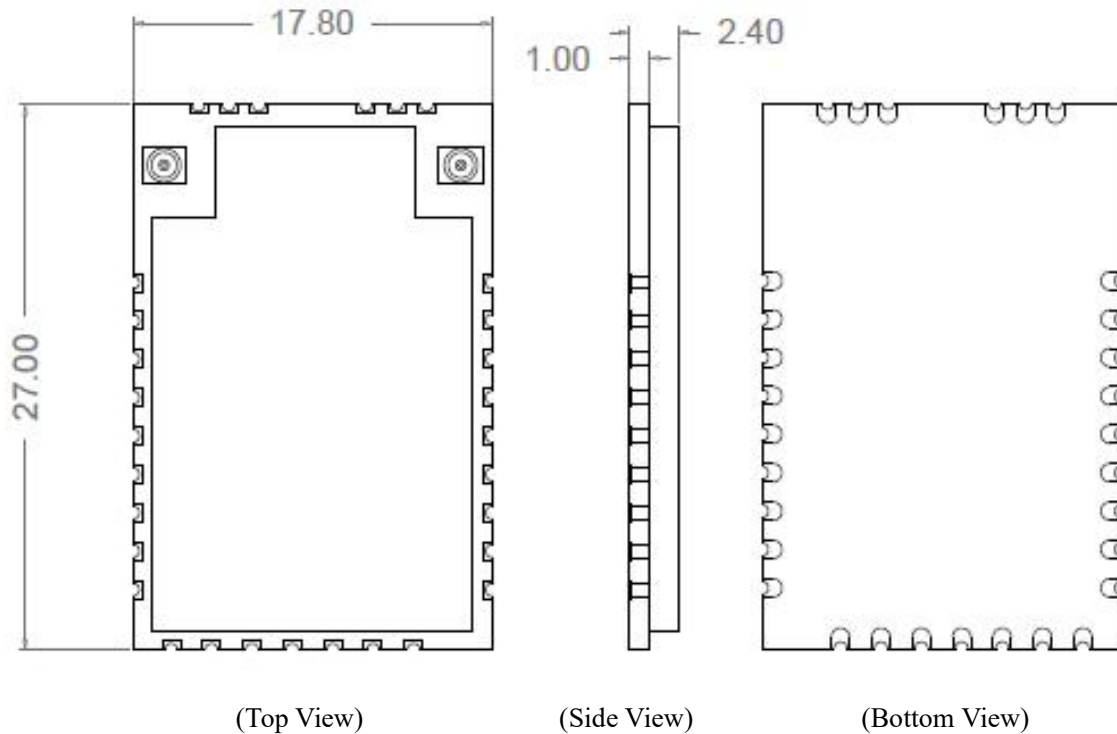
4.3 Bluetooth RF Specification

Conditions: VDD33=3.3V; Ta:25℃			
Features	Description		
Bluetooth Specification	Bluetooth Core Specification v5.2/v4.2/v2.1		
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;		
Data Rate & Modulation	BR_1Mbps: GFSK; EDR_2Mbps: π/4-DQPSK; EDR_3Mbps: 8DPSK; LE_125Kbps: GFSK (Coded_S=8); LE_500Kbps: GFSK (Coded_S=2); LE_1Mbps: GFSK (Uncoded); LE_2Mbps: GFSK (Uncoded);		
Bluetooth Transmitter Specifications (BT_ANT)			
Items	Min (dBm)	Typ (dBm)	Max (dBm)
TX Power			
BR_1M	2	5	8
EDR_2/3M	2	5	8
LE_125K/500K/1M/2M	2	5	8
Items	Min	Typ	Max
BR_1M (DH1) Modulation Characteristics			
Δf1avg	140KHz	164.8KHz	175KHz
Δf2avg	115KHz	151.2KHz	175KHz
Δf2max	115KHz	139.9KHz	/
Δf2avg/Δf1avg	0.8	0.91	/
Items	Min	Typ	Max
EDR_3M(3DH5) EDR Carrier Frequency Stability and Modulation Accuracy			
ωi	-75KHz	2.69KHz	+75KHz

ωi+ωo	-75KHz	2.74KHz	+75KHz	
ωo	-10KHz	-0.4KHz	+10KHz	
8DPSK RMS DEVM	/	0.044	0.13	
8DPSK Peak DEVM	/	0.093	0.25	
Items	Min	Typ	Max	
LE_1M Modulation Characteristics				
Δf1avg	225KHz	249.8KHz	275KHz	
Δf2avg	185KHz	239.4KHz	/	
Δf2max	185KHz	243.6KHz	/	
Δf2avg/Δf1avg	0.8	0.96	/	
Items	Min	Typ	Max	
LE_2M Modulation Characteristics				
Δf1avg	450KHz	499.64KHz	550KHz	
Δf2avg	370KHz	505.55KHz	/	
Δf2max	370KHz	498.78KHz	/	
Δf2avg/Δf1avg	0.8	1	/	
Bluetooth Receiver Specifications (BT_ANT)				
Items	Sensitivity		Maximum Input Level	
	Input Level(Typ)	BER	Input Level(Typ)	BER
BR_1M (DH1)	-90 dBm	≤ 0.1%	-5 dBm	≤ 0.1%
EDR_3M (3DH5)	-80 dBm	≤ 0.01%	-5 dBm	≤ 0.1%
	Input Level (Typ)	PER	Input Level (Typ)	PER
LE_125K	-92 dBm	≤ 5%	-5 dBm	≤ 5%
LE_1M	-88 dBm	≤ 5%	-5 dBm	≤ 5%
LE_2M	-84 dBm	≤ 5%	-5 dBm	≤ 5%

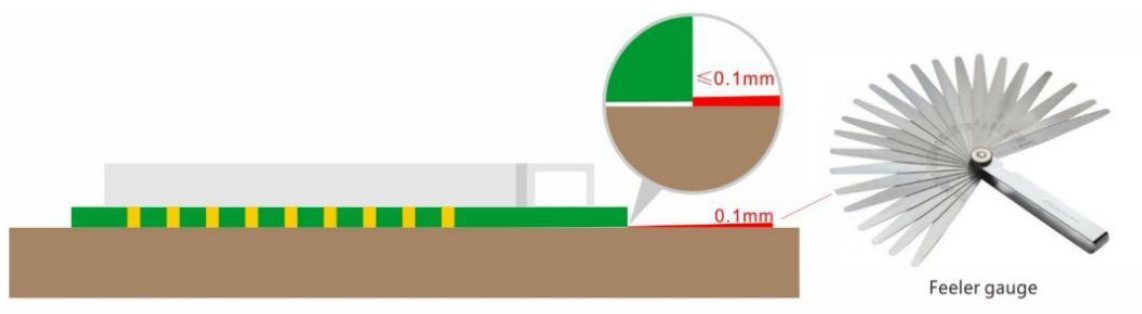
5. Mechanical Specifications

5.1 Module Outline Drawing



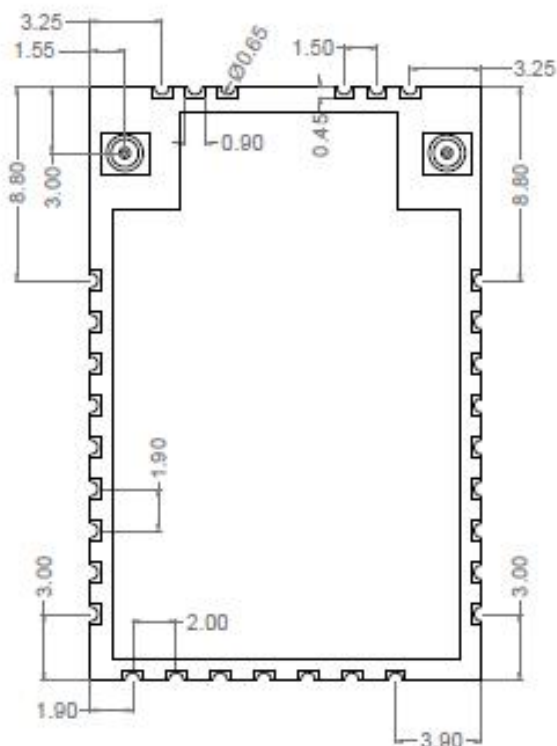
Module dimension: 27.0*17.8*2.4mm(L*W*H; Tolerance: $\pm 0.3\text{mm}_L/W$, $\pm 0.2\text{mm}_H$)

IPEX / MHF-1 connector dimension: 2.6*3.0*1.2mm (L*W*H, $\varnothing 2.0\text{mm}$)

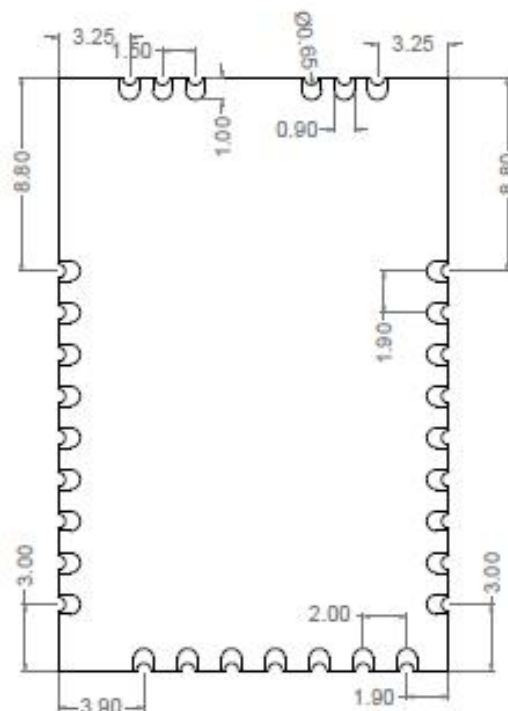


Module Bow and Twist: $\leq 0.1\text{mm}$

5.2 Mechanical Dimensions



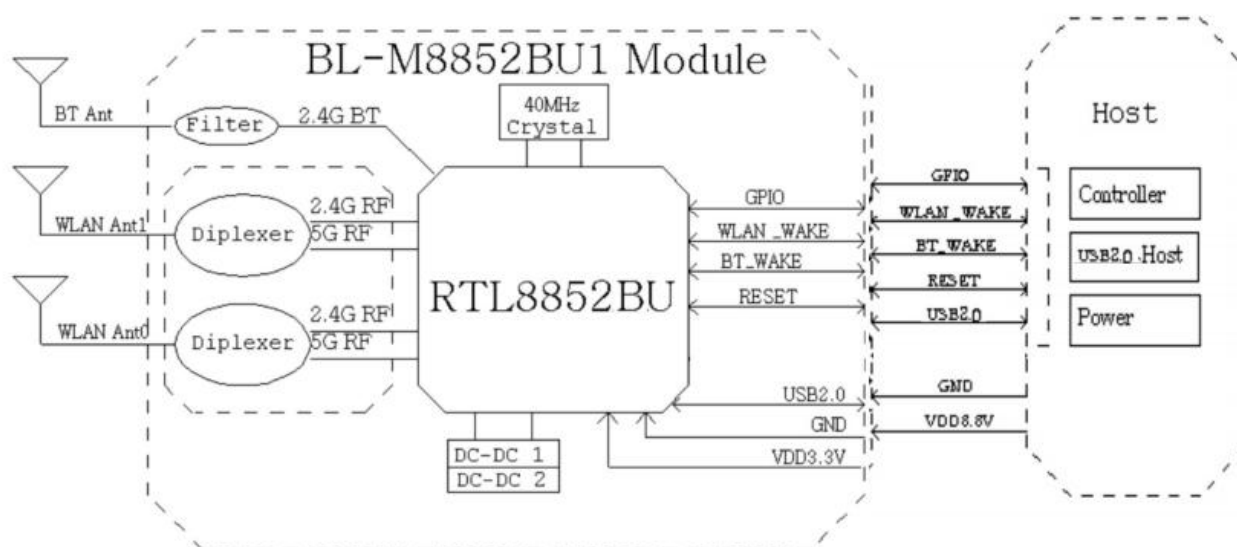
(Top View)



(Bottom View)

6. Application Information

6.1 Typical Application Circuit



6.2 HW Application Note

6.2.1 VDD33 Power requirement

Supply Voltage: DC 3.1~3.5V & Ripple Voltage <80mV;

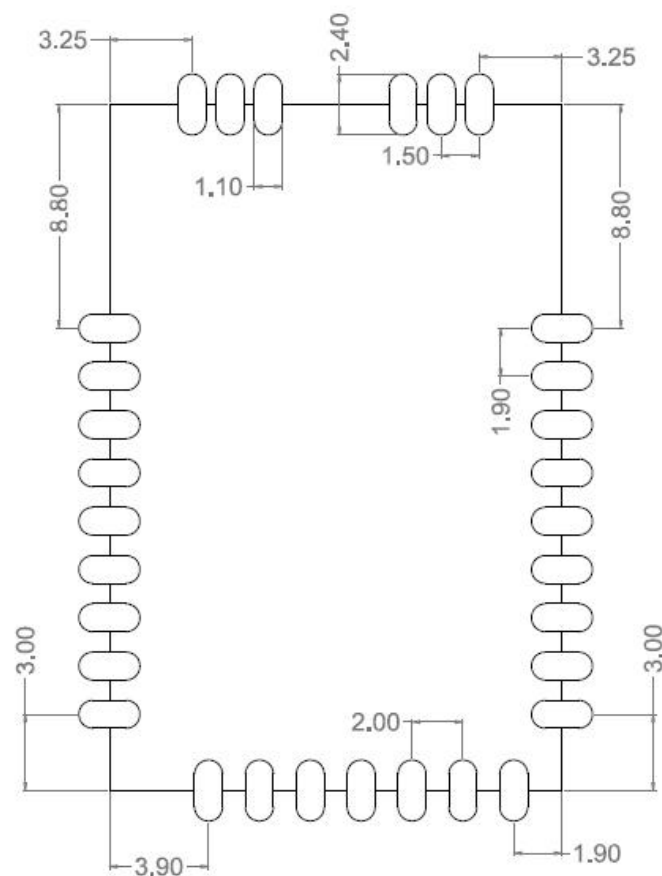
Maximum RMS current $\geq 1\text{A}$ and Maximum Peak current $\geq 1.5\text{A}$;

For achieve fast transient response, a current mode buck converter recommended.

6.2.2 USB interface Design Guidelines

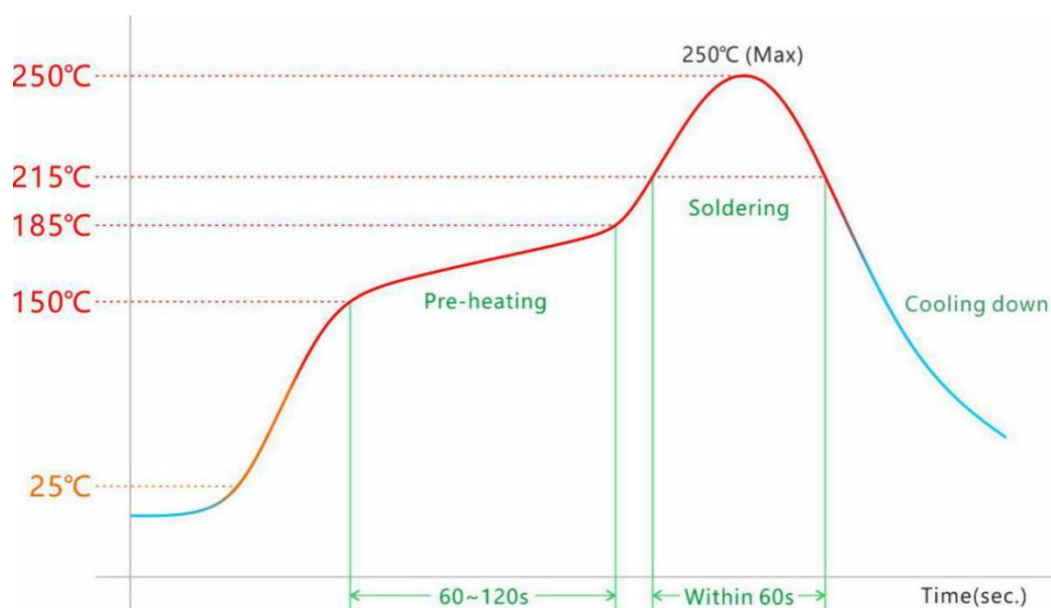
- A、BL-M8852BU1 supports a USB device port which is fully compliant with USB v2.0 specification.
- B、Use minimum of PCB layer change、PCB trace/cable corner、connector--cable interconnection、signal pairs length mismatch, to reduces signal reflections and impedance changes.
- C、USB signal pairs as short as possible, avoid interference from Power and other signals.
- D、The equivalent capacitance of ESD protection component (option) on HSD+/- should be less than 3pF.

6.3 Recommend PCB Layout Footprint



(Design Unit: mm)

6.4 Reflow Soldering Standard Conditions



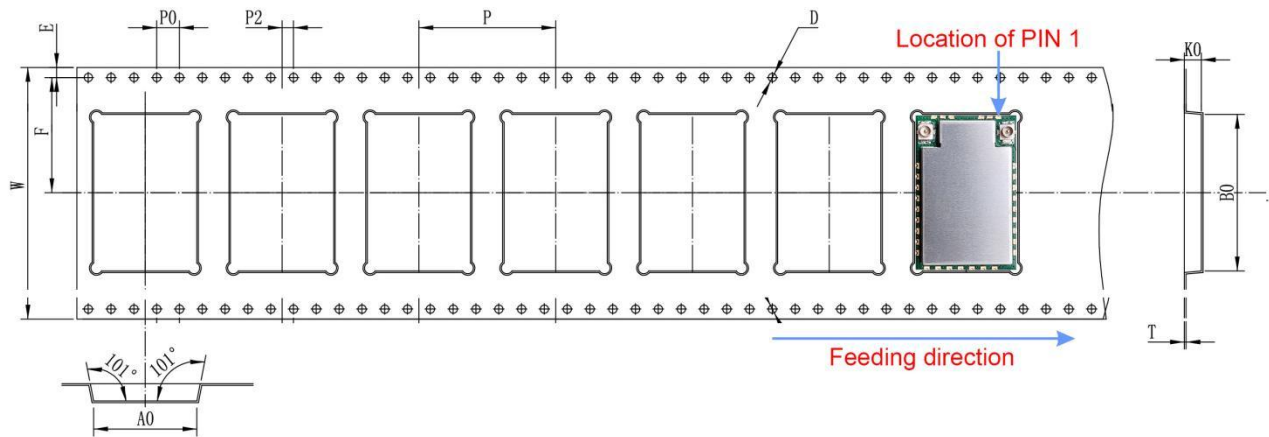
Please use the reflow within 2 times.
Set up the highest temperature within 250°C.

7. Key Components Of Module

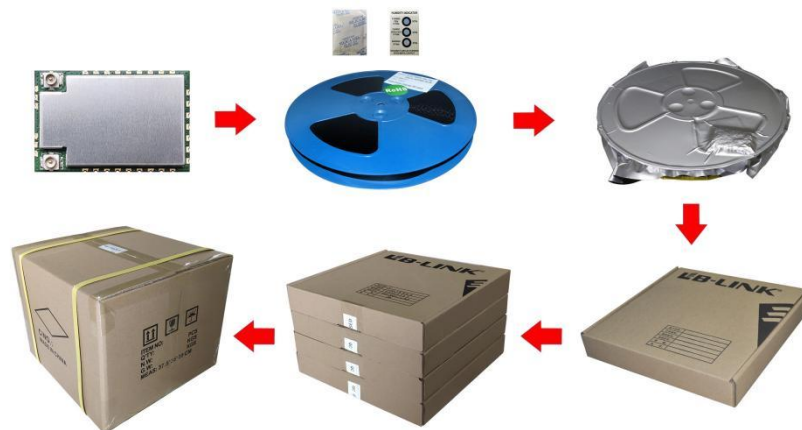
No.	Parts	Specification	Manufacturer	Note
1	Chipset	RTL8852BU-VS-CG(USB2.0)	Realtek Semiconductor Corp.	
2	PCB	BL-M8852AU1	SHEN ZHEN QILI ELECTRON CO.,LTD	
			MILLION SOURCE PRINTED CIRCUIT BOARD CO.,LTD	
			ShenZhen Tie Fa Technology Limited	
3	Crystal	40MHZ-2520	HUBEI TKD CRYSTAL ELECTRONIC SCIENCE AND TECHNOLOGY CO.,LTD	
			LUCKI CM ELECTRONICS CO.,LTD	
			Chengde oscillator Electronic Technology CO.,LTD	
			JinHua East Crystal Electronic CO.,LTD	
4	Diplexer	DIP1608	Walsin Technology Corporation	
			Dongguan Hekang Electronics Co.,LTD	

8. Package and Storage Information

8.1 Package Dimensions



ITEM	W	A0	B0	K0	E	F	P	P0	P2	D	T
DIM	44.00±0.3	18.1±0.1	27.4±0.1	2.5±0.1	1.75±0.1	21.5±0.1	24.00±0.1	4.00±0.1	2.00±0.1	Ø1.5±0.1	0.30±0.05



Package specification:

1. 900 modules per roll and 3,600 modules per box.
2. Outer box size: 37.5*36*29cm.
3. The diameter of the blue environment-friendly rubber plate is 13 inches, with a total thickness of 48mm (with a width of 44mm carrying belt).
4. Put 1 package of dry agent (20g) and 1 humidity card in each anti-static vacuum bag.
5. Each carton is packed with 4 boxes.

8.2 Storage Conditions

Absolute Maximum Ratings:

Storage temperature: -40°C to +85°C,
Storage humidity: 10% to 95 (Non-Condensing)

Recommended Storage Conditions:

Storage temperature: 5°C to +40°C,
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°C, 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!



ESD CAUTION

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.

2 This device must accept any interference received, including interference that may cause undesired operation.
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 ard 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.

CAUTION: The user is cautioned that changes or modifications not expressly approved by the party responsible for compliance could vold the user's authority to operate the equipment.

FCC Radiation Exposure Statement:

To maintain compliance with FCC' s RF Exposure guidelines, This equipment should be installed and operated with minimum distance between 20cm the radiator your body: Use only the supplied antenna.

FCC Certification

Integration instructions for host product manufacturers according to KDB 996369 D03 OEM Manual v01r01

2.2 List of applicable FCC rules

The BL-M8852BU1 is an 802.11ax 1201Mbps WLAN + BT5.2 USB2.0 Combo Module. It is within U.S. FCC part 15.247 standard

2.3 Specific operational use conditions

The EUT is a 802.11ax 1201Mbps WLAN + BT5.2 USB2.0 Combo Module Operation Frequency: 2402-2480MHz for BT; 2412-2462MHz for WIFI 2.4G, 5180-5240/5250MHz~5350MHz/5470MHz~5725MHz/ 5725-5850MHz/ for WIFI 5G

Modulation Type: GFSK for BLE, WLAN(DSSS/OFDM/OFDMA), GFSK, $\pi/4$ -DQPSK, 8-DPSK for BT

2.4 Limited module procedures

Not applicable; Single Modular Approval Request

2.5 Trace antenna designs

The802.11ax 1201Mbps WLAN +BT5.2 USB2.0 Combo Module beams signals and communicates with its antenna, which is FPC Antenna

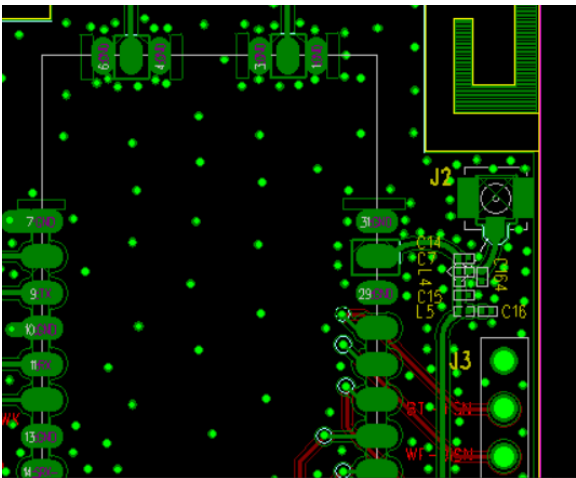
IPEX connector for WLAN antenna;

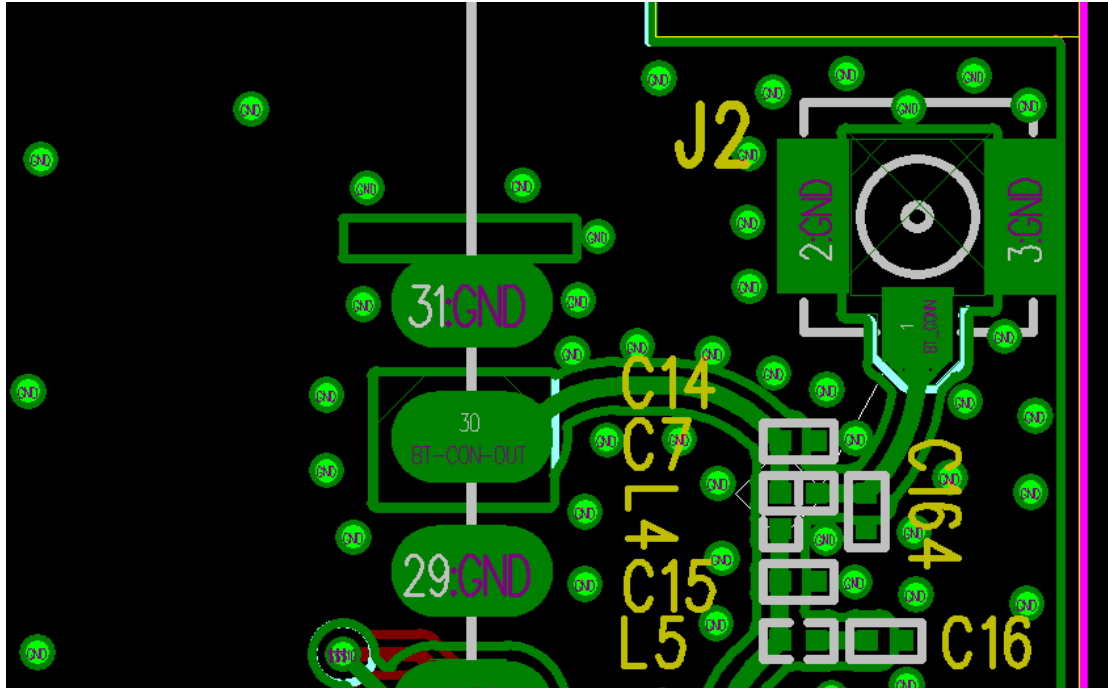
Half hole PAD for external BT antenna

Users should connect antennas to half hole pad through FP types of RF trace and the trace impedance must be controlled in 50Ω. recommends that the total insertion loss between the antenna pads and antennas should meet the following requirements:

Trace loss Frequency	Loss
2400MHz-2500MHz	<0.6dB
5150MHz-5850MHz	<1.2dB

The BT antenna needs to be equipped with a RF connector and an antenna matching circuit. The recommended circuit is shown in the following figure.





This module needs to be installed on the PCB board and connected to the external antenna through the IPEX circuit. A 0Ω resistor should be added at the C7 node between the module and the antenna to ensure that the impedance of the connection between the module and the antenna reaches 50Ω.

2.6 RF exposure considerations

To maintain compliance with FCC's RF Exposure guidelines, This equipment should be installed and operated with minimum distance between 20cm the radiator your body: Use only the supplied antenna.

2.7 Antennas

The 802.11ax 1201Mbps WLAN +BT5.2 USB2.0 Combo Module beams signals and communicates with its antenna, which have three FPC Antenna

Antenna Type	Antenna Supplier	cable loss	cable length	Connector
Ant0: FPC	Shenzhen Bilian Electronic Co.,Ltd.	2.4G: 0.6dB 5G: 1dB	110±3mm	IPEX1
Ant1: FPC	Shenzhen Bilian Electronic Co.,Ltd.	2.4G:0.5dB 5G: 0.8dB	110±3mm	IPEX1
BT:FPC	Shenzhen Bilian Electronic Co.,Ltd.	2.4G:0.5dB	110±3mm	IPEX1

Antenna Designation:

BT: 3.79dBi

2.4G: Antenna 0: 3.79dBi; Antenna1: 3.79dBi

5G: Antenna 0: 1.88dBi; Antenna 1:1.88dBi

2.8 Label and compliance information

The final end product must be label in a visible area , the Host must Contains FCC ID: 2AL6KBL-M8852BU1

2.9 Information on test modes and additional testing requirements

Data transfer module demo board can control the EUT work in RF test mode at specified test channel.

2.10 Additional testing, Part 15 Subpart B disclaimer

The module without unintentional-radiator digital circuit, so the module does not required an evaluation by FCC Part 15 Subpart B. The host should be evaluated by the FCC Subpart B

2.11 OEM integration instructions:

This device is intended only for OEM integrators under the following conditions: The transmitter module may not be co-located with any other transmitter or antenna. The module shall be only used with the external antenna(s) that has been originally tested and certified with this module. As long as the conditions above are met, further transmitter test 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 (for example, digital device emissions, PC peripheral requirements, etc.).

2.12 Validity of using the module certification:

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization for this module in combination with the host equipment is no longer considered valid and the FCC ID of the module 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.

ATTENTION

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) This device and its antenna(s) must not be co - located with any other transmitters except in accordance with FCC multi - transmitter product procedures. Referring to the multi - transmitter policy, multiple transmitter(s) and module(s) can be operated simultaneously without C2PC.
- 3) For all products market in US, OEM has to limit the Operating Frequency: 2402-2480MHz for BT;

2412-2462MHz for WIFI 2.4G, by supplied firmware programming tool. OEM shall not supply any tool or info to the end - user regarding to Regulatory Domain change.

USERS MANUAL OF THE END PRODUCT:

In the user manual of the end product, the end user has to be informed to keep at least 20cm separation with the antenna while this end product is installed and operated. The end user has to be informed that the FCC radio - frequency exposure guidelines for an uncontrolled environment can be satisfied. The end user has to also be informed that any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

CE Warming

We,

Shenzhen Bilian Electronic Co.,Ltd. (Room 501, Building 3, No. 32, Dafu Road, Zhangge Community, Fucheng Street, Longhua District, Shenzhen City,China) hereby declares that this product is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU.According to Article 10(2) of Directive 2014/53/EU, the Product can be used in Europe without restriction.

Restrictions in the 5 GHz band:

According to Article 10 (10) of Directive 2014/53/EU, the packaging showsthat this radio equipment will be subject to some restrictions when placedon the market in Belgium (BE), Bulgaria (BG), the Czech Republic (CZ),Denmark (DK), Germany (DE), Estonia (EE), Ireland (IE), Greece (EL), Spain(ES), France (FR), Croatia (HR), Italy (IT), Cyprus (CY), Latvia (LV), Lithuania(LT), Luxembourg (LU), Hungary (HU), Malta (MT), Netherlands (NL), Austria(AT), Poland (PL), Portugal (PT), Romania (RO), Slovenia (SI), Slovakia (SK),Finland (FI), Sweden (SE), the United Kingdom (UK), Turkey (TR), Norway(NO), Switzerland (CH), Iceland (IS), and Liechtenstein (LI).

The WLAN function for this device is restricted to indoor use only when operating in the 5150 to 5230 MHz frequency range.

	ES	LU	RO	CZ	FR	HU	SI
	DK	HR	BE	BG	DE	EE	IE
	EL	IT	Cy	LV	LT	SK	MT
	NL	AT	PL	PT	FI	SE	TR
	NO	CH	IS	LI			

RF Specification:

Function	Operation Frequency	Max output Power(EIRP):
BLE	2402MHz~2480MHz	7.95 dBm
BT(BR+EDR)	2402MHz~2480MHz	8.31 dBm
WIFI 802.11b/g/ N/ax(HT20,HT40)	802.11b/g/n/ax(20MHz): 2412~2472MHz; 802.11n/ax(40MHz):2422~2462MHz	17.26 dBm
Wi-Fi 5.2G(802.11a/n20/n40/ac20/ac4 0/ac80/ax20/ax40/ax80)	802.11a/ n20/ac20/ax20:5180MHz~5240MHz 802.11 n40/ac40/ax40:5190MHz~5230MHz 802.11ac80/ax80:5210MHz	13.87 dBm
Wi-Fi 5.3G(802.11a/n20/n40/ac20/ac4 0/ac80/ax20/ax40/ax80)	802.11a/ n20/ac20/ax20: 5260MHz~5320MHz 802.11 n40/ac40/ax40: 5270MHz~5310MHz 802.11ac80/ax80: 5290MHz	14.16 dBm
Wi-Fi 5.6G(802.11a/n20/n40/ac20/ac4 0/ac80/ax20/ax40/ax80)	802.11a/ n20/ac20/ax20: 5500MHz~5700MHz 802.11 n40/ac40/ax40: 5510MHz~5670MHz 802.11ac80/ax80: 5530-5610MHz	15.78 dBm
Wi-Fi 5.8G(802.11a/n20/n40/ac20/ac4 0/ac80/ax20/ax40/ax80)	802.11a/ n20/ac20/ax20:5745MHz~5825MHz 802.11 n40/ac40/ax40:5755MHz~5795MHz 802.11ac80/ax80: 5775MHz	13.30 dBm