BL-M8733BS2

802.11n 150Mbps WLAN + BT v5.2

Combo SDIO Module Specification

SHENZHEN BILIAN ELECTRONIC CO., LTD

Add: Room 501,Building 3,No.32,Dafu Road,Zhangge Community,FuchengStreet,Longhua District,Shenzhen,China

Web: www.b-link.net.cn

Module Name: BL-M8733BS2

Module Type: 802.11a/b/g/n 150Mbps WLAN + BT v5.2 Combo SDIO Module	
Revision: V1.0	
Customer Approval:	
Company:	
Title:	
Signature:	Date:
LB-link Approval:	
Title:	
Signature:	Date:

(Top View)

(Bottom View)

Revision History

Revision	Summary	Release Date
0.1	First release	2023-02-20
1.0	Official release	2023-03-14

1. Introduction

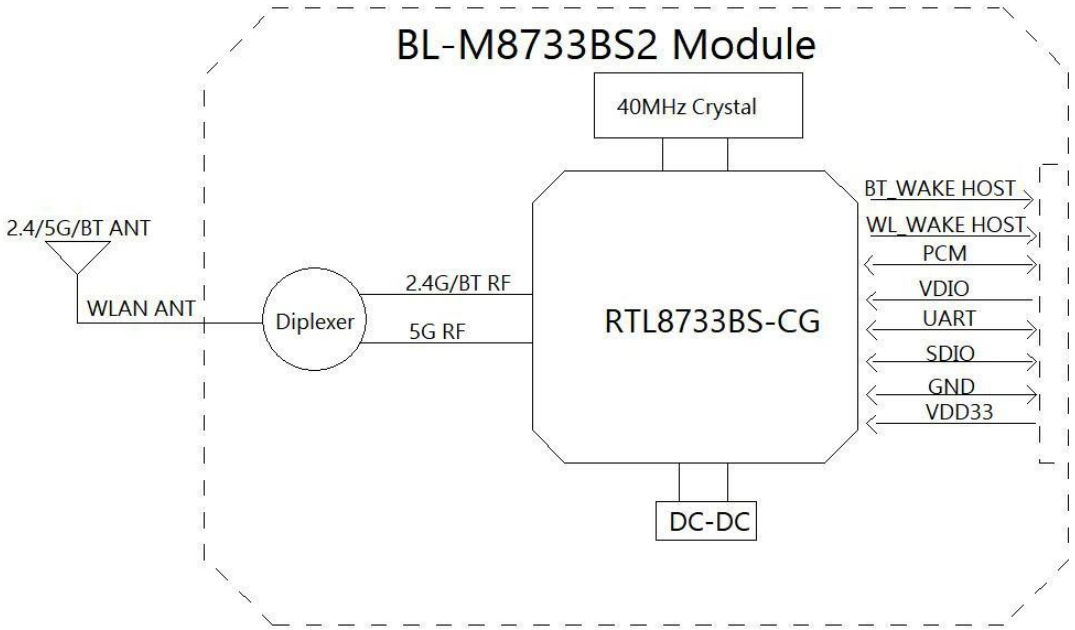
BL-M8733BS2 is a highly integrated Dual-band WLAN + Bluetooth v5.2 Combo module. It combines a 1T1R Dual-band WLAN subsystem with SDIO interface controllers and a Bluetooth

subsystem with UART interface controller. This module compatible IEEE802.11a/b/g/n standard and provides the maximum PHY rate up to 150Mbps. It supports Bluetooth dual mode with BT v5.2/v4.2/v2.1 compliant, offering feature-rich and lower cost ideal for OTT boxes, IP cameras, POS and other embedded devices that need wireless connection.

1.1 Features

- Operating Frequencies: 2.4~2.4835GHz or 5.15~5.85GHz
- Host Interface: SDIO 2.0 for WLAN, HS-UART for Bluetooth
- IEEE Standard: IEEE 802.11a/b/g/n
- Wireless PHY rate can reach up to 150Mbps
- Bluetooth Specification: v2.1+EDR/v4.2/v5.2
- Simultaneous BT LE and BR/EDR
- Power Supply: DC 3.3V main power and 1.8V/3.3V I/O power

1.2 Block Diagram

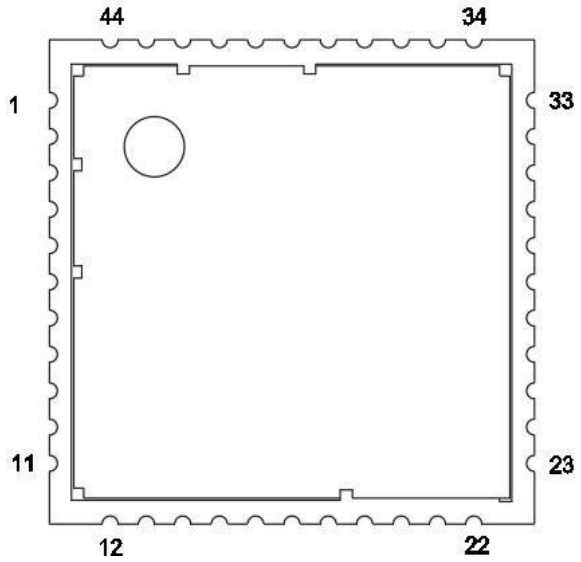


1.3 General Specifications

Module Name	BL-M8733BS2

Chipset	RTL8733BS-CG
WLAN Standards	IEEE802.11 a/b/g/n
Bluetooth Standards	Bluetooth Core Specification v5.2/v4.2/2.1
Host Interface	SDIO 2.0 for WLAN & UART interface for BT
Antenna	Connect to the external antenna through half hole
Dimension	12*12*2.3mm (L*W*H)
Power Supply	DC 3.3V±0.2V @ 600 mA (Max) DC 3.3V±0.2V or 1.8V±0.1V I/O power supply
Operation Temperature	-20℃ to +70℃
Operation Humidity	10% to 95% RH (Non-Condensing)

2. Pin Assignments



(Top View)

2.1 Pin Definition

No	Pin Name	Type	I/O Level	Description
1	GND	RF		RF Ground connections.
2	WLAN ANT	RF		2.4G / 5G/ BT RF PAD for WLAN_ANT and BT_ANT.
3	GND	RF		RF Ground connections.
4	NC	/		NC

5	NC	/		NC
6	BT_HOST_WAKE	I	VDIO	1. Shared with GPIO11. 2. This pin can be configured as the host wakes up the Bluetooth controller.
7	BT_WAKE_HOST	O	VDIO	1. Shared with GPIO12. 2. This pin is used by BT functions to wake up the host when the remote wake function is enabled. The polarity can be defined by the customer
8	NC	/		NC
9	VDD33	P		DC 3.3V Main power supply.
10	NC	/		NC
11	NC	/		NC
12	WL_DIS#	I	VDIO	1. Shared with GPIO13. 2. This pin can externally shut down WLAN function when WL DIS# is pulled low, and SDIO interface will be also disabled. It can also be configured as the WLAN Radio-off function with host interface remaining connected. There is no pull-up resistor inside the module and high level input is required to enable WLAN function.
13	WL_WAKE_HOST	O	VDIO	1. Shared with GPIO14. 2. This pin is used by WLAN to wake up the host when the remote wake function is enabled. The polarity can be defined by the customer.
14	SD_D2	I/O	VDIO	SDIO data line 2.
15	SD_D3	I/O	VDIO	SDIO data line 3.
16	SD_CMD	I/O	VDIO	SDIO command line.
17	SD_CLK	I	VDIO	SDIO clock line.
18	SD_D0	I/O	VDIO	SDIO data line 0.
19	SD_D1	I/O	VDIO	SDIO data line 1.
20	GND	P		Ground connections.
21	NC	/		NC
22	VDIO	P		1.8V or 3.3V power supply for digital I/O.
23	NC	/		NC
24	SUSCLK_IN	I	VDIO	1. Shared with GPIO4. 2. External 32K or RTC clock input.
25	PCM_OUT	O	VDIO	1. Shared with GPIO1. 2. PCM Data output. 3. Strap Pin, internal pull low by 100K resistor to set internal 1.2V supply "SPS_Mode", the Module enter into "LDO_Mode" (More power consumption) when it pulled high, do not pull High during power on!

26	PCM_CLK	I/O	VDIO	PCM Clock signal, shared with GPIO3.
27	PCM_IN	I	VDIO	1. Shared with GPIO0. 2. PCM data input. 3. Strap Pin, internal pull low to set "Normal operation mode", the Module enter into "Test/Debug mode" (Can't work properly)when it pulled high, do not pull High during power on!
28	PCM_SYNC	I/O	VDIO	1. Shared with GPIO2. 2. PCM sync signal. 3. Strap Pin, internal pull low to set "Internal NV memory mode ", the Module enter into "External EPROM mode" (Can't work properly) when it pulled high, do not pull High during power on!
29	NC	/		NC
30	NC	/		NC
31	GND	P		Ground connections.
32	NC	/		NC
33	GND	P		Ground connections.
34	BT_DIS#	I	VDIO	1. Shared with GPIO6. 2. This pin can externally shut down BT function when BT DIS# is pulled Low, and UART interface will be also disabled. It can be also defined as the BT Radio-off function with host interface remaining connected. There is no pull-up resistor inside the module and high level input is required to enable BT function.
35	NC	/		NC
36	GND	P		Ground connections.
37	NC	/		NC
38	NC	/		NC
39	NC	/		NC
40	NC	/		NC
41	GND	P		Ground connections. (This pin has been connected to other GNDs on the module, so it NC or connected to other signals such as UART_CTS in the customer's application circuit will not affect normal use)
42	UART_TX	O	VDIO	High-Speed UART Data output.
43	UART_RX	I	VDIO	High-Speed UART Data input.
44	UART_CTS	I	VDIO	High-Speed UART CTS input.

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			1.7	2.0	/
Supply Voltage	VDD33	3.1	3.3	3.5	V
	VDIO	1.62	1.8	1.98	V
		3.1	3.3	3.5	V

3.2 Digital 3.3V I/O DC Specifications

Symbol	Parameter	Min	Typ	Max	Units
VIH	Input High Voltage	2.0	3.3	3.5	V
VIL	Input Low Voltage	--	0	0.5	V
VOH	Output High Voltage	2.97	3.3	3.5	V
VOL	Output Low Voltage	0	--	0.33	V

3.3 Digital 1.8V I/O DC Specifications

Symbol	Parameter	Min	Typ	Max	Units
VIH	Input High Voltage	1.3	1.8	2.0	V
VIL	Input Low Voltage	--	0	0.3	V
VOH	Output High Voltage	1.62	--	1.98	V
VOL	Output Low Voltage	0	--	0.18	V

3.4 Current Consumption

Conditions : VDD33=3.3V ,VDIO=3.3V ; Ta:25℃			
Use Case	VDD33 Current		
	Typ (I_{RMS})	Max(I_{Peak})	Units
2.4G WLAN TRX Throughput (Linux Driver)	151	290	mA

5G WLAN TRX Throughput (Linux Driver)	130	290	mA
2.4G 11b@1Mbps TX@20dBm (RF-Test)	380	460	mA
2.4G 11b@11Mbps TX@20dBm (RF-Test)	388	460	mA
2.4G 11g@6Mbps TX@20dBm (RF-Test)	303	380	mA
2.4G 11g@54Mbps TX@19dBm (RF-Test)	178	360	mA
2.4G 11n@HT20_MCS0 TX@20dBm (RF-Test)	283	360	mA
2.4G 11n@HT20_MCS7 TX@18dBm (RF-Test)	174	360	mA
2.4G 11n@HT40_MCS0 TX@20dBm (RF-Test)	260	380	mA
2.4G 11n@HT40_MCS7 TX@18dBm (RF-Test)	153	350	mA
2.4G 11n@HT40_MCS0 RX (RF-Test)	73	84	mA
2.4G 11n@HT40_MCS7 RX (RF-Test)	74	84	mA
5G 11a@6Mbps TX@19dBm (RF-Test)	414	520	mA
5G 11a@54Mbps TX@17dBm (RF-Test)	252	520	mA
5G 11n@HT20_MCS0 TX@18dBm (RF-Test)	377	490	mA
5G 11n@HT20_MCS7 TX@16dBm (RF-Test)	230	490	mA
5G 11n@HT40_MCS0 TX@18dBm (RF-Test)	339	490	mA
5G 11n@HT40_MCS7 TX@16dBm (RF-Test)	189	490	mA
5G 11n@HT40_MCS0 RX (RF-Test)	71	84	mA
5G 11n@HT40_MCS7 RX (RF-Test)	73	86	mA
BT			
BR_1M TX@5dBm (RF-Test)	85	120	mA
EDR_2M TX@5dBm (RF-Test)	95	120	mA
EDR_3M TX@5dBm (RF-Test)	98	120	mA
EDR_3M RX (RF-Test)	86	105	mA
LE_1M TX@5dBm (RF-Test)	100	130	mA
LE_2M TX@5dBm (RF-Test)	88	120	mA
LE_2M RX (RF-Test)	85	105	mA

4. WLAN&BT RF Specifications

4.1 2.4G WLAN RF Specification

Conditions : VDD33=3.3V ; Ta:25℃

Features	Description
WLAN Standard	IEEE 802.11b/g/n
Frequency Range	2.4~2.4835GHz (2.4GHz ISM Band)
Channels	Ch1~Ch13 (For EU/MIC Channels),Ch1~Ch11(For FCC/IC Channels)
Modulation	802.11b (DSSS): CCK, DQPSK, DBPSK; 802.11g (OFDM): BPSK, QPSK, QAM16, QAM64; 802.11n (OFDM): BPSK, QPSK, QAM16, QAM64;
Data 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	≦ ±20ppm

2.4G Transmitter Specifications (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	20	±2	≦ -10
802.11g@6Mbps	20	±2	≦ -10
802.11g@54Mbps	19	±2	≦ -25
802.11n@HT20_MCS0	20	±2	≦ -10
802.11n@HT20_MCS7	18	±2	≦ -28
802.11n@HT40_MCS0	20	±2	≦ -10
802.11n@HT40_MCS7	18	±2	≦ -28
2.4G Receiver Specifications			
RX Rate	**Min Input Level (Typ)**	**Max Input Level (Typ)**	**PER**
802.11b@1Mbps	-95 dBm	-10 dBm	< 8%
802.11b@11Mbps	-87 dBm	-10 dBm	< 8%
802.11g@6Mbps	-90 dBm	-10 dBm	< 10%
802.11g@54Mbps	-74 dBm	-10 dBm	< 10%
802.11n@HT20_MCS0	-89 dBm	-10 dBm	< 10%
802.11n@HT20_MCS7	-72 dBm	-10 dBm	< 10%

802.11n@HT40_MCS0	-87 dBm	-10 dBm	< 10%
802.11n@HT40_MCS7	-70 dBm	-10 dBm	< 10%

4.2 5G WLAN RF Specification

Conditions : VDD33=3.3V ; Ta:25℃			
Features	**Description**		
WLAN Standard	IEEE 802.11a/n		
Frequency Range	5.15~5.25GHz; 5.25~5.35GHz; 5.47~5.725GHz; 5.725~5.850GHz(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;		
Data 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;		
Frequency Tolerance	≦ ±20ppm		
5G Transmitter Specifications (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	19	±2	≦ -10
802.11a@54Mbps	17	±2	≦ -25
802.11n@HT20_MCS0	18	±2	≦ -10
802.11n@HT20_MCS7	16	±2	≦ -28
802.11n@HT40_MCS0	18	±2	≦ -10
802.11n@HT40_MCS7	16	±2	≦ -28
5G Receiver Specifications			
RX Rate	**Min Input Level (Typ)**	**Max Input Level (Typ)**	**PER**

802.11a@6Mbps	-92 dBm	-10 dBm	< 10%

802.11a@54Mbps	-74 dBm	-10 dBm	< 10%
802.11n@HT20_MCS0	-90 dBm	-10 dBm	< 10%
802.11n@HT20_MCS7	-72 dBm	-10 dBm	< 10%
802.11n@HT40_MCS0	-89 dBm	-10 dBm	< 10%
802.11n@HT40_MCS7	-70 dBm	-10 dBm	< 10%

4.3 Bluetooth RF Specification

Conditions: VDD33=3.3V; Ta:25℃			
Features	**Description**		
Bluetooth Specification	Bluetooth v2.1+EDR/v4.2/v5.2		
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_1Mbps: GFSK (Uncoded); LE_2Mbps: GFSK (Uncoded);		
Bluetooth Transmitter Specifications			
Items	**Min (dBm)**	**Typ (dBm)**	**Max (dBm)**
TX Power			
BR_1M	2	5	8
EDR_2M	2	5	8
EDR_3M	2	5	8
LE_125K/500K	2	5	8
LE_1M	2	5	8
LE_2M	2	5	8
Items	**Min**	**Typ**	**Max**
BR_1M (DH1) Modulation Characteristics			
Δ f1avg	140KHz	165.2KHz	175KHz

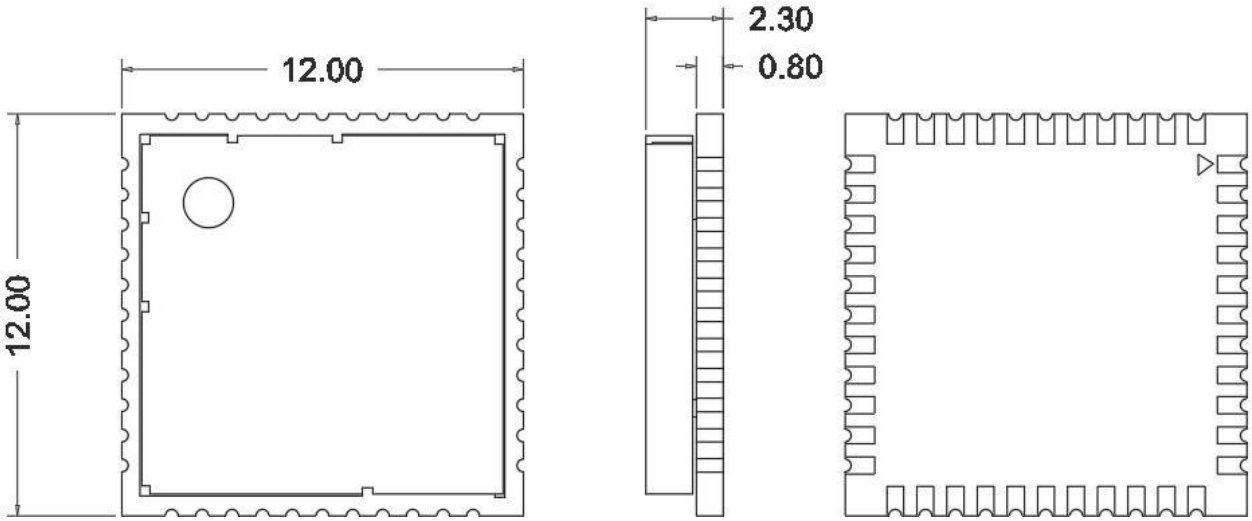
Δ f2avg	115KHz	152.6KHz	175KHz
Δ f2max	115KHz	158.6KHz	/
Δ f2avg/Δ f1avg	0.8	0.92	/
Items	**Min**	**Typ**	**Max**
EDR_3M(3DH5) EDR Carrier Frequency Stability and Modulation Accuracy			
ω i	-75KHz	27.5KHz	+75KHz
ω i+ω o	-75KHz	28.1KHz	+75KHz
ω o	-10KHz	0.57KHz	+10KHz
8DPSK RMS DEVM	/	0.043	0.13
8DPSK Peak DEVM	/	0.095	0.25
Items	**Min**	**Typ**	**Max**
LE_1M Modulation Characteristics			
Δ f1avg	225KHz	253.53KHz	275KHz
Δ f2avg	185KHz	228.34KHz	275KHz
Δ f2max	185KHz	225.71KHz	275KHz
Δ f2avg/Δ f1avg	0.8	0.9	2

Bluetooth Receiver Specifications

Items	**Sensitivity**		**Maximum Input Level**	
	Input Level (Typ)	**BER**	**Input Level (Typ)**	**BER**
BR_1M	-90 dBm	≦ 0.1%	-5 dBm	≦ 0.1%
EDR_2M	-88 dBm	≦ 0.01%	-5 dBm	≦ 0.1%
EDR_3M	-85 dBm	≦ 0.01%	-5 dBm	≦ 0.1%
Items	**Input Level (Typ)**	**PER**	**Input Level (Typ)**	**PER**
LE_125K/500K	-92 dBm	≦ 5%	-5 dBm	≦ 5%
LE_1M	-90 dBm	≦ 5%	-5 dBm	≦ 5%
LE_2M	-84 dBm	≦ 5%	-5 dBm	≦ 5%

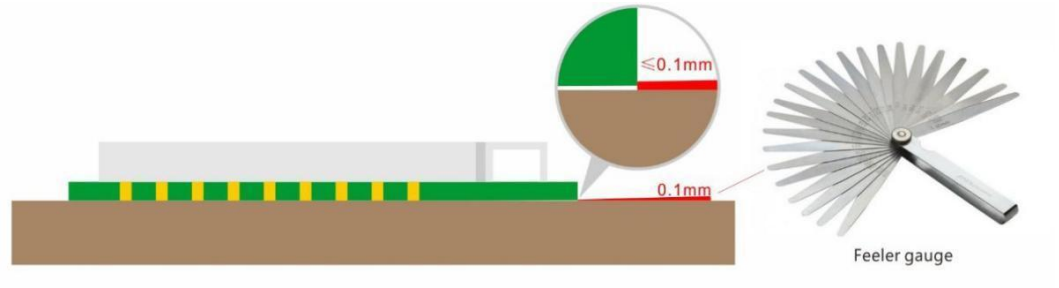
5. Mechanical Specifications

5.1 Module Outline Drawing



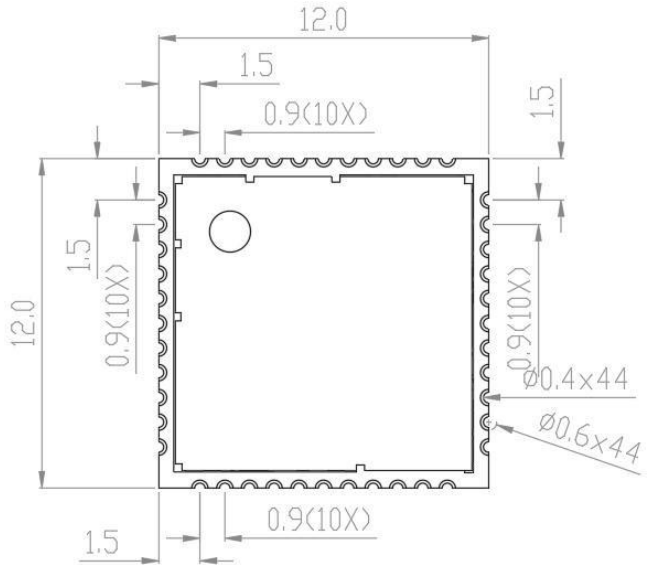
(Top View) (Side View) (Bottom View)

Module dimension: 12.0*12.0*2.3mm (L*W*H; Tolerance: ±0.15mm)

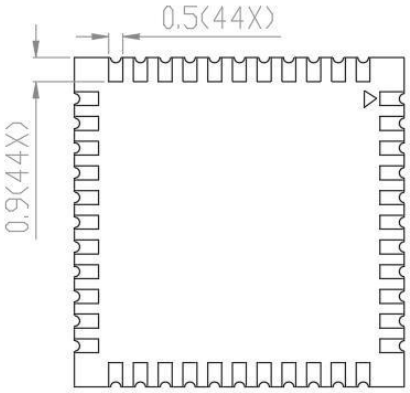


Module Bow and Twist：≤ 0.1mm

5.2 Mechanical Dimensions



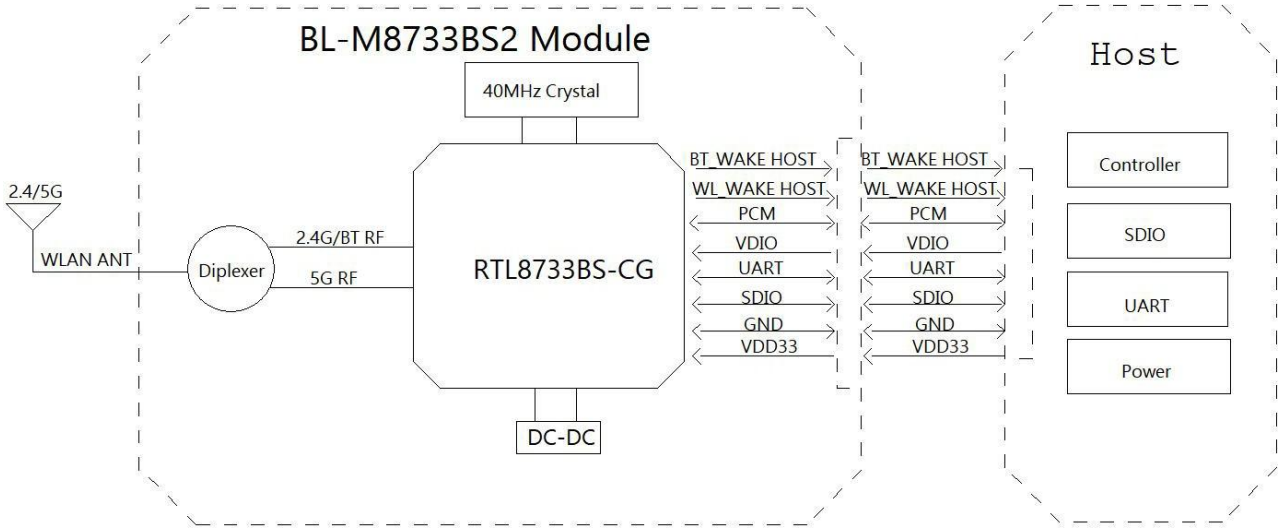
(Top View)



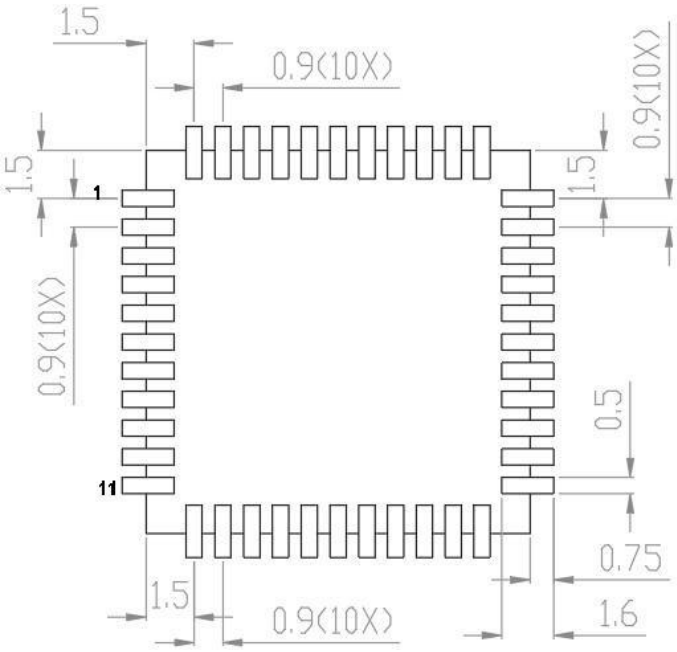
(Bottom View)

6. Application Information

6.1 Typical Application Circuit

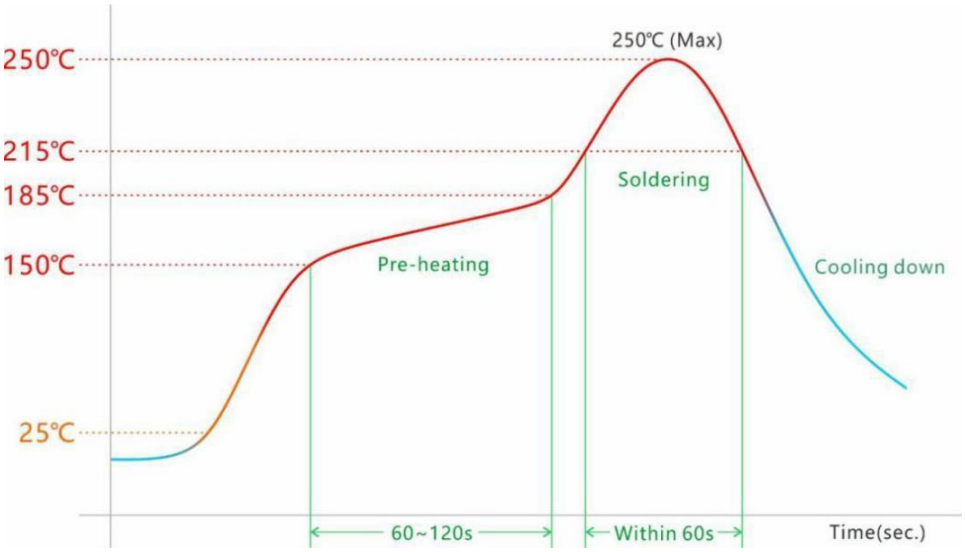


6.2 Recommend PCB Layout Footprint



(Design Unit: mm)

6.3 Reflow Soldering Standard Conditions



Please use the reflow within 2 times.

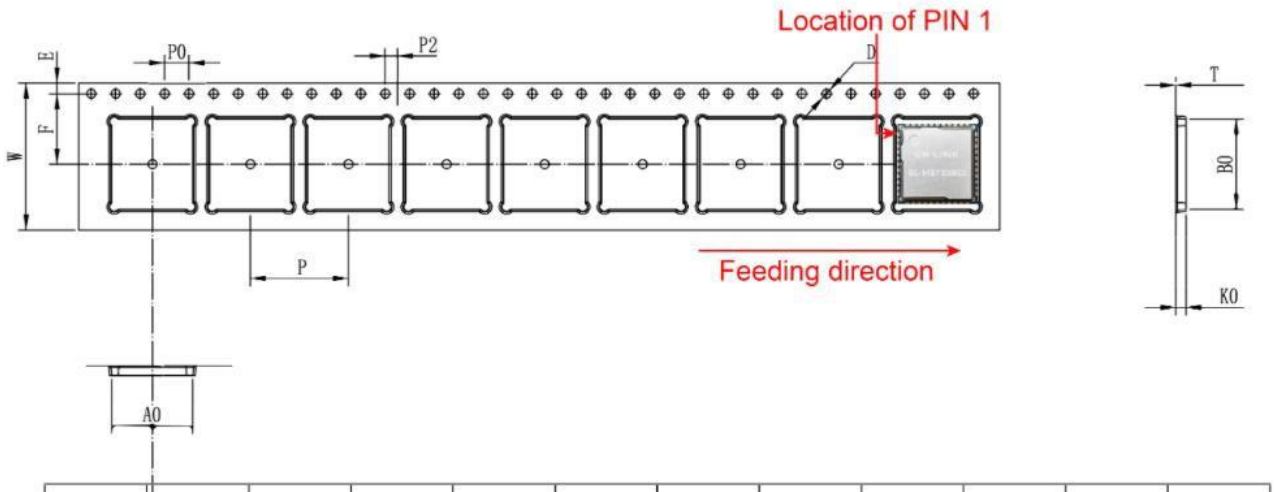
Set up the highest temperature within 250℃.

7. Key Components Of Module

No.	Parts	Specification	Manufacturer	Note
1	Chipset	RTL8733BS-CG	Realtek Semiconductor Corp.	
2	PCB	BL-M8733BS2	Shenzhen Tie Fa Technology Limited	
			MILLION SOURCE PRINTED CIRCUIT BOARD CO.,LTD	
			SHEN ZHEN QILI ELECTRON CO.,LTD	
3	Crystal	40MHz-2016	JinHua East Crystal Electronic Co.,Ltd	
			LUCKI CM ELECTRONICS CO.,LTD	
			Chengde oscillator Electronic Technology CO.,LTD	
4	Diplexer	DIP1608	Walsin Technology Corporation	
			Advanced Ceramic X Corp.	
			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	24.00+0.3	12.50±0.1	12.50±0.1	2.40±0.1	1.75±0.1	11.5±0.1	20.00±0.1	4.00±0.1	2.00±0.1	Ø1.5±0.1	0.30±0.05

Package specification:

1. 1,000 modules per roll and 5,000 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 28mm (with a width of 24mm carrying belt).
4. Put 1 package of dry agent (20g) and humidity card in each anti-static vacuum bag.
5. Each carton is packed with 5 boxes.

8.2 Storage Conditions

Absolute Maximum Ratings:

Storage temperature: -40℃ 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 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：

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

9. FCC Certification

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

2.2 List of applicable FCC rules

The BL-M8733BS2 is an 802.11a/b/g/n 150Mbps WLAN + BT v5.2 Combo SDIO Module. It is within U.S. FCC part 15.247,15.407 standard

2.3 Specific operational use conditions The EUT is a 802.11a/b/g/n 150Mbps WLAN + BT v5.2 Combo SDIO Module

Operation Frequency: 2402-2480MHz for BT; 2412-2462MHz for WIFI 2.4G,
5150-5250/5250MHz~5350MHz/5470MHz~5725MHz/ 5725-5850MHz/ for WIFI 5G
Modulation Type: GFSK, π/4-DQPSK, 8-DPSK for BT, GFSK for BLE,WLAN(DSSS/OFDM)

2.4 Limited module procedures

Not applicable; Single Modular Approval Request

2.5 Trace antenna designs

The BL-M8733BS2 is an 802.11a/b/g/n 150Mbps WLAN + BT v5.2 Combo SDIO Module beams signals and communicates with its antenna, which is FPC Antenna

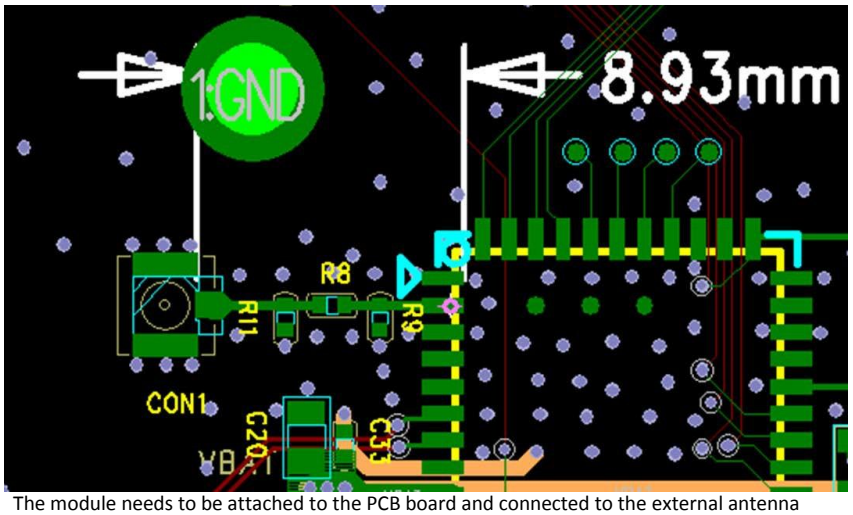
Users should connect antennas to half hole pad through FP types of RF trace and the trace impedance must be controlled in 50Ω. recommends that the total insertion loss between the antenna pads and antennas should meet the following requirements:

Trace loss

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

To facilitate the antenna tuning and certification test, a RF connector and an antenna matching circuit should be added. The following figure is the recommended circuit.

From CONI port to PCB module, the R8: 0Ω , R9: NC(Normally Closed) and R11:NC (Normally Closed)



The module needs to be attached to the PCB board and connected to the external antenna through the solder joint of the circuit on the PCB. the internal structure is FPC. A resistance of 0R is added between the module and the antenna at L1 to ensure that the impedance of the connection between the module and the antenna reaches 50R.The CON1 position on the PCB is where the external antenna is connected.

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 BL-M8733BS2 is an 802.11a/b/g/n 150Mbps WLAN + BT v5.2 Combo SDIO Module beams signals and communicates with its antenna, which have two FPC Antenna

The antenna pads and antennas should meet the following requirements:

Antenna Type	Antenna model	Antenna Supplier	cable loss	cable length	Connector
Ant1: FPC	450L	Shen Zhen Cicent Communication Technology Co.,Ltd	2.4G: 0.6dB 5G: 1dB	270±2.5mm	IPEX1
Ant2: FPC	Irobot	Shen Zhen Cicent Communication Technology Co.,Ltd	2.4G:0.5dB 5G: 0.8dB	122±2mm	IPEX1

Antenna Designation:
BT/WIFI 2.4G/5G: ANT1 FPC antenna, ANT2: FPC Antenna
Antenna Gain: BT/2.4G WIFI: ANT1: 1.7dBi, ANT2: 2.3dBi

5G WIFI:
ANT 1: WIFI 5.2G: -0.3dBi, WIFI 5.3G:1.6dBi, WiFI5.6G:1.9dBi, WIFI 5.8G: 1.9dBi ;
ANT 2Gain: WIFI 5.2G:0.9dBi, WIFI 5.3G:1.5dBi, WiFI5.6G 2.8dBi: WIFI 5.8G: 2.3dBi

2.8 Label and compliance information

The final end product must be label in a visible area , the Host must Contains FCC ID: 2AL6KBL-M8733BS2.

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 5 mm 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, 5150-5250 /5250MHz~5350MHz/5470MHz~5725MHz/ 5725-5850MHz for WIFI 5G 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 5mm 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.

FCC Caution:

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

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) thisdevice must accept any interference received, including interference that may cause undesired operation.
This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or

transmitter.

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 device for operation in the band 5150-5350 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems

ISED Statement

- English: This device complies with Innovation, Science and Economic Development Canada′ s licence - exempt RSS standard(s).Op eration is subject to the following two conditions: (1) This device may not cause interference , and (2) This device must accept any interference, including interference that may cause u ndesired operation of the device.The digital apparatus complies with Canadian CAN ICES - 3 (B)/NMB - 3(B).

- French:L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareildoit accepter tout brouillageradioélectriquesubi, mêmesi le brouillageest susceptible d'encompromettre le fonctionnement.

This radio transmitter (ISED certification number: 20944-BLM8733BS2) has been approved by Industry Canada to operate with the antenna types listed with the maximum permissible gain indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Le pré sent é metteurradio (ISED certification number: 20944-BLM8733BS2) a étéapprouvépar Industrie Canada pour fonctionner avecles types d'antenne énumérés ci-dessous et ayant un gain admissible maximal. Les types d'antenne non inclusdans cette liste, et dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'é metteur.

Operation Frequency: 2402-2480MHz for BT; 2412-2462MHz for WIFI 2.4G,
5150-5250/5250MHz~5350MHz/5470MHz~5725MHz/ 5745-5825MHz/ for WIFI 5G
Modulation Type: GFSK for BLE,WLAN(DSSS/OFDM)

Antenna Designation: BT/WIFI 2.4G/5G: ANT1 FPC antenna, ANT2: FPC Antenna Antenna Gain:
BT/2.4G WIFI: ANT1: 1.7dBi, ANT2: 2.3dBi

5G WIFI:

ANT 1: WIFI 5.2G: -0.3dBi, WIFI 5.3G:1.6dBi, WiFI5.6G:1.9dBi, WIFI 5.8G: 1.9dBi ; ANT 2Gain: WIFI 5.2G:0.9dBi, WIFI 5.3G:1.5dBi, WiFI5.6G 2.8dBi: WIFI 5.8G: 2.3dBi

Radiation Exposure Statement

This equipment complies with Canada radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance20cm between the radiator & your body.

Déclaration d'exposition aux radiations

Cet équipement est conforme Canada limites d'exposition aux radiations dans un environnement non contrôlé. Cet équipement doit être installé et utilisé à distance minimum de 20cm entre le radiateur et votre corps.

This device is intended only for OEM integrators under the following condition:

The transmitter module may not be co-located with any other transmitter or antenna.

As long as the condition above is 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.

Cet appareil est destiné uniquement aux intégrateurs OEM dans les conditions suivantes : Le module émetteur ne peut pas être placé à côté d'un autre émetteur ou d'une autre antenne.
Tant que la condition ci-dessus est remplie, aucun test supplémentaire de l'émetteur ne sera nécessaire. Cependant, l'intégrateur OEM est toujours responsable de tester son produit final pour toute exigence de conformité supplémentaire requise avec ce module installé.

Important Note:

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the Canada authorization is no longer considered valid and the IC 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 Canada authorization.

Note Importante:

Dans le cas où ces conditions ne peuvent être satisfaites (par exemple pour certaines configurations d'ordinateur portable ou de certaines co-localisation avec un autre émetteur), l'autorisation du Canada n'est plus considéré comme valide et l' IC ne peut pas être utilisé sur le produit final. Dans ces circonstances, l'intégrateur OEM sera chargé de réévaluer le produit final (y compris l'émetteur) et l'obtention d'une autorisation distincte au Canada.

End Product Labeling

The final end product must be labeled in a visible area with the following: Contains IC: 20944-BLM8733BS2.

Plaque signalétique du produit final

Le produit final doit être étiqueté dans un endroit visible avec l'inscription suivante: Contient des IC: 20944-BLM8733BS2.

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.

Manuel d'information à l'utilisateur final

L'intégrateur OEM doit être conscient de ne pas fournir des informations à l'utilisateur final quant à la façon d'installer ou de supprimer ce module RF dans le manuel de l'utilisateur du produit final qui intègre ce module.

Le manuel de l'utilisateur final doit inclure toutes les informations réglementaires requises et avertissements comme indiqué dans ce manuel.

Caution:

(i) The device for operation in the band 5150–5250 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems;

(ii) For devices with detachable antenna(s), the maximum antenna gain permitted for devices in the bands 5250-5350 MHz and 5470-5725 MHz shall be such that the equipment still complies with the EIRP limit;

(iii) For devices with detachable antenna(s), the maximum antenna gain permitted for devices in the band 5725-5850 MHz shall be such that the equipment still complies with the EIRP limits specified for point-to-point and non-point-to-point operation as appropriate; and Operations in the 5.25-5.35GHz band are restricted to indoor usage only.

Avertissement:

(i) les dispositifs fonctionnant dans la bande de 5150 à 5250MHz sont réservés uniquement pour une utilisation à l'intérieur afin de réduire les risques de brouillage préjudiciable aux systèmes de satellites mobiles utilisant les mêmes canaux;

(ii) pour les dispositifs munis d'antennes amovibles, le gain maximal d'antenne permis pour les dispositifs utilisant les bandes de 5250 à 5350MHz et de 5470 à 5725 MHz doit être conforme à la limite de la p.i.r.e;

(iii) pour les dispositifs munis d'antennes amovibles, le gain maximal d'antenne permis (pour les dispositifs utilisant la bande de 5725 à 5850 MHz) doit être conforme à la limite de la p.i.r.e. spécifiée pour l'exploitation point à point et l'exploitation non point à point, selon le cas; Les opérations dans la bande de 5.25-5.35GHz sont limités à un usage intérieur seulement.

CE Warning:

This information has to be presented in such a way that the user can readily understand it. Typically, this will necessitate translation into every local language (required by national consumer laws) of the markets where the equipment is intended to be sold. Illustrations, pictograms and using international abbreviations for country names may help reduce the need for translation.

EU Declaration of Conformity 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 Mobile Phone 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 802.11a/b/g/n 150Mbps WLAN + BT v5.2 Combo SDIO Module can be used in Europe without restriction.

The full text of the EU declaration DOC is available at the following: Visit the Web site

http: **http://www.b-link.net.cn**

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 5350 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			

Due to the to the Module is too small to placed the label, the label is printed on outer packaging, please see as below

RF Specification:

Function	**Operation Frequency**	**Max power**
BLE	2402MHz–2480MHz	7.13 dBm.
BT(BR+EDR)	2402MHz–2480MHz	7.94 dBm.
WIFI 802.11b/g/n(HT20)	2412~2472MHz;	18.75dBm.
Wi-Fi 5.2G(802.11a/n20/n40/)	802.11a/ n20:5180MHz~5240MHz 802.11 n40:5190MHz~5230MHz	19.36 dBm.
Wi-Fi 5.3G(802.11a/n20/n40)	802.11a/ n20: 5260MHz~5320MHz 802.11 n40: 5270MHz~5310MHz	18.96 dBm.
Wi-Fi 5.6G(802.11a/n20/n40/)	802.11a/ n20: 5500MHz~5700MHz 802.11 n40: 5510MHz~5670MHz	19.51 dBm.
Wi-Fi5.8G(802.11a/n20/n40/)	802.11a/ n20:5745MHz~5825MHz 802.11 n40:5755MHz~5795MHz	13.54 dBm.