BL-M8189ME1(ETV)

802.11b/g/n 150Mbps 1T1R

WiFi SDIO Module

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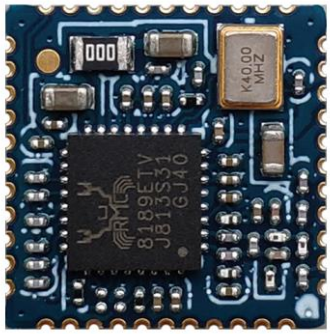


TOP

Module Name: BL-M8189ME1	
Module Type: 802.11b/g/n 150Mbps 1T1R WiFi SDIO Module	
Revision: V1.2	
Customer Approval:	
Company:	
Title:	
Signature:	Date:
BL-link Approval:	
Title:	
Signature:	Date:

Revision History

Revision	Summary	Release Date
1.0	Initial release	2015.09.15
1.1	Official release	2021.04.24

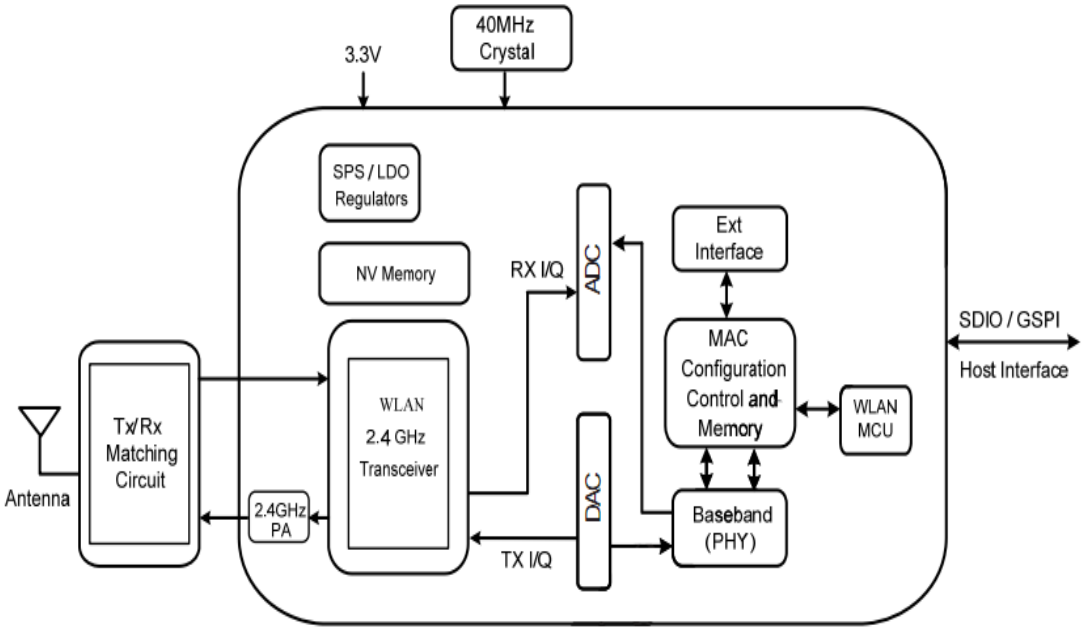
1. Introduction

BL-R8189ME1 product Accord with FCC CE and is 150M wireless SDIO adapter which has lower power consumption, high linearity output power, accords with IEEE802.11B/G/N, and supports IEEE802.11i safety protocol, along with IEEE 802.11e standard service quality. It connects with other wireless device which accorded with these standards together, supports the new data encryption on 64/128 bit WEP and safety mechanism on WPA-PSK/WPA2-PSK, WPA/WPA2.IIt' s easy and convenient to link to wireless network for the users using desktop, laptop and other device that needs connect to wireless network.

1.1 Features

- Operating Frequencies: 2.4~2.484GHz
- Host Interface is SDIO 2.0
- IEEE Standards: IEEE 802.11b/g/n
- Wireless data rate can reach up to 150Mbps
- Connect to external antenna through half hole pad
- Power Supply: 3.3±0.2V main power supply; 3.3±0.2V or 1.8±0.1V for VDIO (SDIO and Digital I/O power supply)

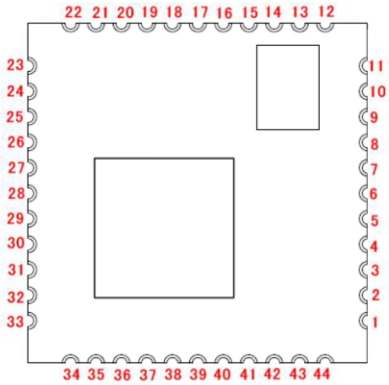
1.2 Block Diagram



1.3 General Specifications

Module Name	BL-M8189ME1 WiFi Module
Chipset	RTL8189ETV -CG
WiFi Standards	IEEE802.11b/g/n/, 1T1R, 2.4GHz, 150Mbps (Max)
Host Interface	SDIO 2.0
Antenna	Connect to the external antennas through half hole pad
Dimension	SMD 44Pins, 12*12*1.5mm (L*W*H)
Power Supply	DC 3.3±0.2V(main power) @ 350 mA (Max) DC 3.3±0.2V or 1.8±0.1V(SDIO and Digital I/O power)
Operation Temperature	-20℃ to +45℃
Operation Humidity	10% to 95% RH (Non-Condensing)
Storage Temperature	-40℃ to +85℃
Storage Humidity	10% to 95% RH (Non-Condensing)

2. Pin Assignments



Top view

2.1 Pin Definition

No	Pin Name	Type	Description	Supply
1	GND	P	Ground	
2	RF	O	WLAN RF pad	
3	GND	P	Ground	

4	NC	/	NC	
5	NC	/	NC	
6	NC	/	NC	
7	NC	/	NC	
8	NC	/	NC	
9	VBAT	P	VDD3.3V	
10	NC	/	NC	
11	NC	/	NC	
12	WL_REG_ON	I	Power down select, pull high for use	
13	WAKE	O	WLAN to wake-up HOST, pull high for use	
14	SD_D2	I/O	SDIO data 2	
15	SD_D3	I/O	SDIO data 3 /GSPI chip select	
16	SD_CMD	I/O	SDIO command/GSPI data input	
17	SD_CLK	I	SDIO clock /GSPI clock	
18	SD_D0	I/O	SDIO data 0 /GSPI data output	
19	SD_D1	I/O	SDIO data 1 /GSPI data out	
20	GND	P	Ground	
21	NC	/	NC	
22	VDIOSDIO	P	VDIO for SDIO pin, the power supply is same as the signal level of SDIO bus. Base on platform to choose 3.3V or 1.8V..	
23	NC	/	NC	
24	NC	/	NC	
25	NC	/	NC	
26	NC	/	NC	
27	NC	/	NC	
28	NC	/	NC	
29	NC	/	NC	
30	NC	/	NC	
31	GND	P	Ground	
32	NC	/	NC	
33	GND	P	Ground	
34	NC	/	NC	
35	NC	/	NC	
36	GND	P	Ground	
37	NC	/	NC	

38	NC	/	NC	
39	NC	/	NC	
40	NC	/	NC	
41	GND	P	Ground	
42	NC	/	NC	
43	NC	/	NC	
44	NC	/	NC	

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		0	25	50	℃
External Antenna VSWR		1	1.92	2.5	/
Supply Voltage	VDD33	3.1	3.3	3.5	V
	VDIO(1.8V)	1.7	1.8	2.0	V

3.2 Current Consumption

Conditions : VDD33=3.3V ; Ta:25℃			
Use Case	VDD33 Current (average)		
	Typ	Max	Units
2.4G 11Mbps TX (RF-Test)	315	340	mA
2.4G 11Mbps RX (RF-Test)	170	177	mA
2.4G 54Mbps TX (RF-Test)	230	305	mA
2.4G 54Mbps RX (RF-Test)	178	184	mA
2.4G MCS7(HT40) TX (RF-Test)	220	295	mA
2.4G MCS7(HT40) RX (RF-Test)	182	190	mA

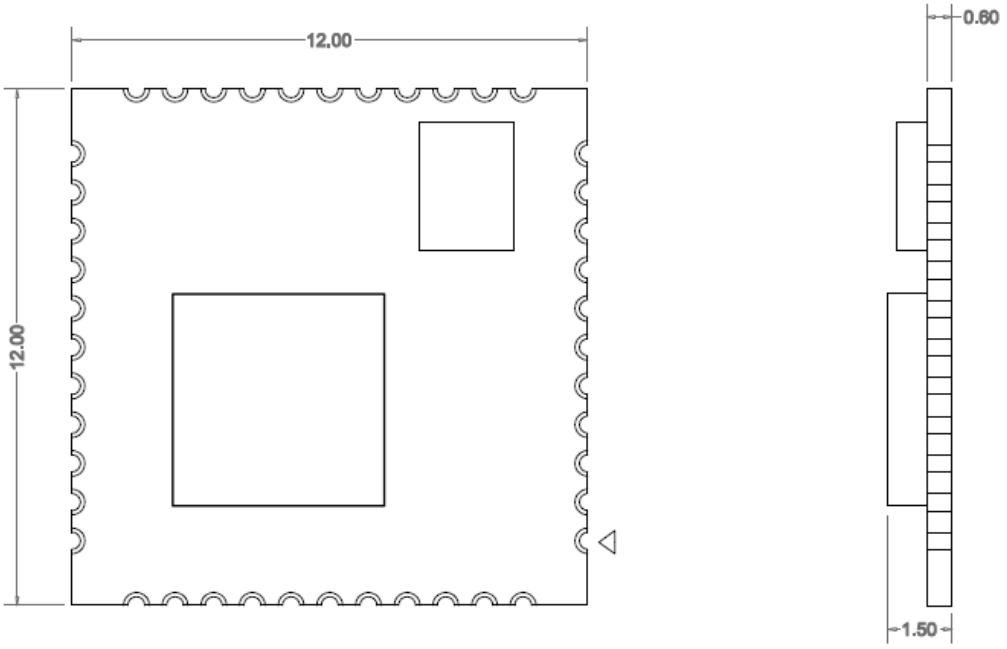
4. WiFi RF Specifications

4.1 2.4G WiFi RF Specification

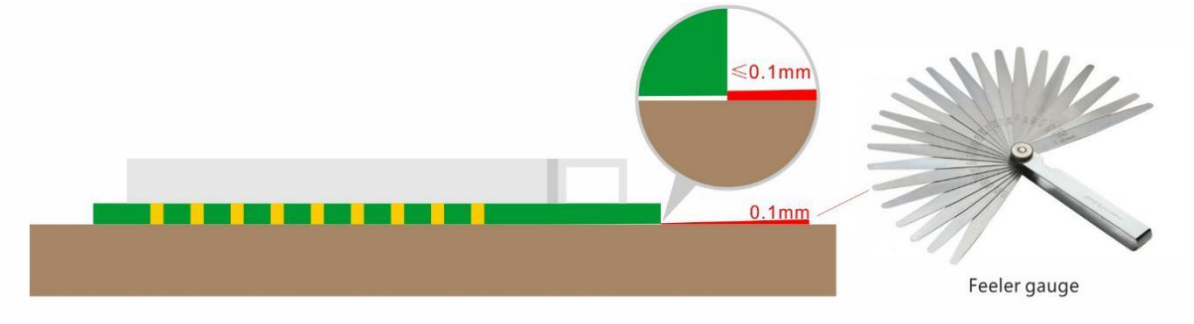
Conditions : VDD33=3.3V ; Ta:25℃			
Features	**Description**		
WLAN Standard	IEEE 802.11b/g/n		
Frequency Range	2.4~2.484GHz (2.4GHz ISM Band)		
Channels	Ch1~Ch14 (For 20MHz Channels)		
Modulation	802.11b (DSSS): DBPSK, DQPSK, CCK; 802.11g (OFDM): BPSK, QPSK, 16QAM, 64QAM; 802.11n (OFDM): BPSK, QPSK, 16QAM, 64QAM;		
Date 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 (HT40): MCS0~MCS7(1T1R_SISO) 13.5~150Mbps;		
Frequency Tolerance	≦ ±15ppm		
2.4G Transmitter Specifications			
TX Rate	**TX Power**	**TX Power Tolerance**	**EVM**
802.11b@1Mbps	17dBm	±1.5dBm	≦-10dB
802.11b@11Mbps	17dBm	±1.5dBm	≦-10dB
802.11g@6Mbps	14dBm	±1.5dBm	≦-10dB
802.11g@54Mbps	14dBm	±1.5dBm	≦-25dB
802.11n@HT20_MCS0	13dBm	±1.5dBm	≦-10dB
802.11n@HT20_MCS7	13dBm	±1.5dBm	≦-28dB
802.11n@HT40_MCS0	13dBm	±1.5dBm	≦-10dB
802.11n@HT40_MCS7	13dBm	±1.5dBm	≦-28dB
2.4G Receiver Specifications			
RX Rate	**Min Input Level(Typ)**	**Max Input Level(Typ)**	**PER**
802.11b@1Mbps	-92dBm	-10dBm	< 8%
802.11b@11Mbps	-86dBm	-10dBm	< 8%
802.11g@6Mbps	-88dBm	-15dBm	< 10%
802.11g@54Mbps	-72dBm	-15dBm	< 10%
802.11n@HT20_MCS0	-88dBm	-15dBm	< 10%
802.11n@HT20_MCS7	-67dBm	-15dBm	< 10%
802.11n@HT40_MCS0	-86dBm	-15dBm	< 10%
802.11n@HT40_MCS7	-65dBm	-15dBm	< 10%

5. Mechanical Specifications

5.1 Module Outline Drawing

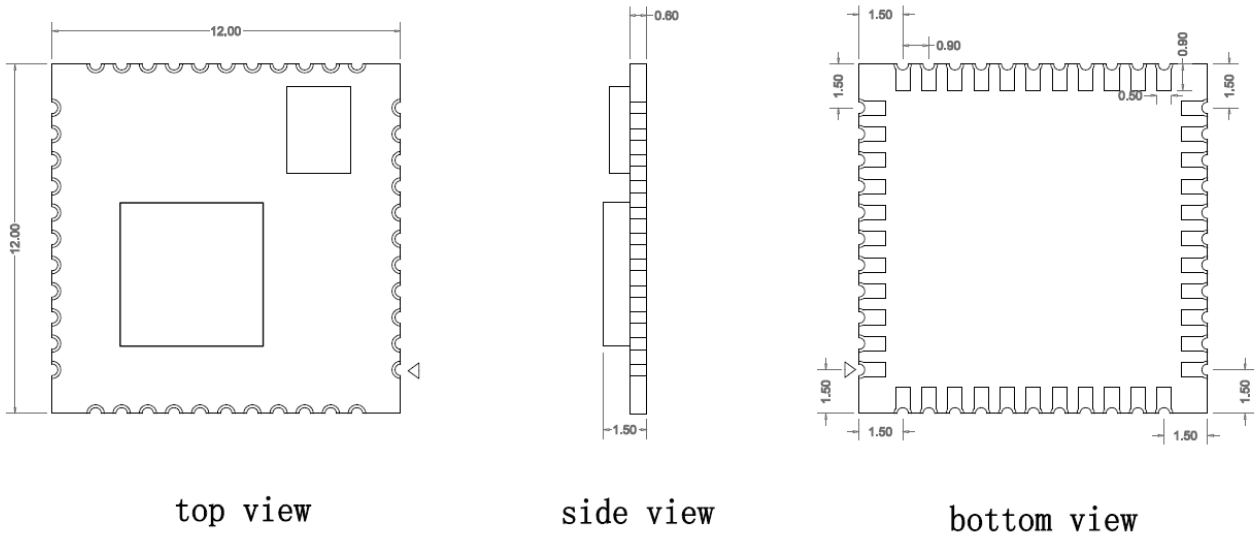


Module dimension: 12.0*12.0*1.5mm (L*W*H; Tolerance: ±0.15mm)



Module Bow and Twist: ≤0.1mm

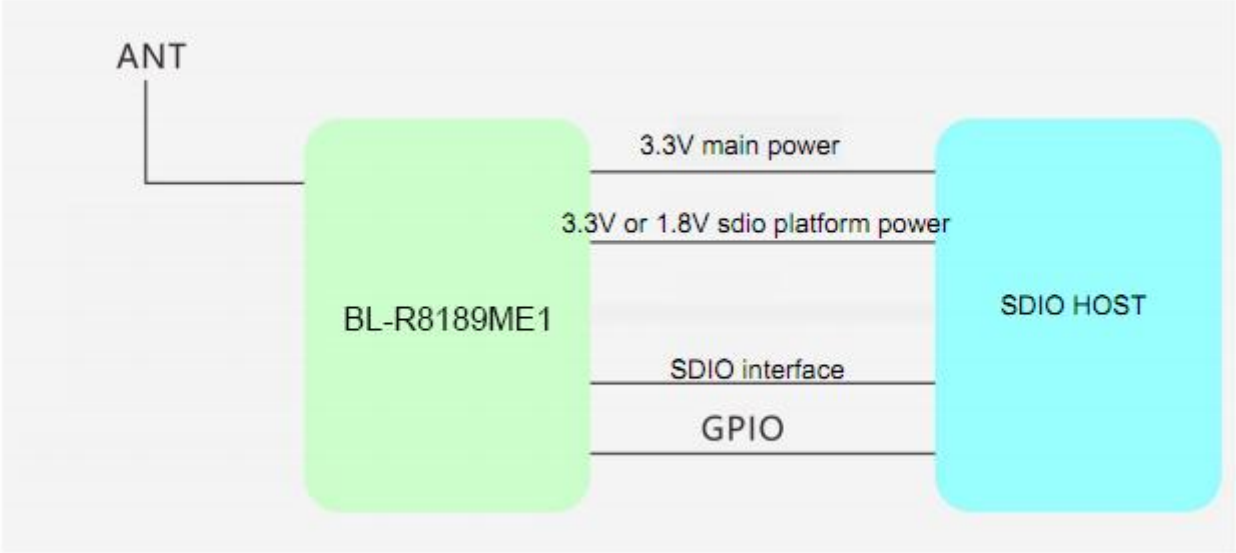
5.2 Mechanical Dimensions



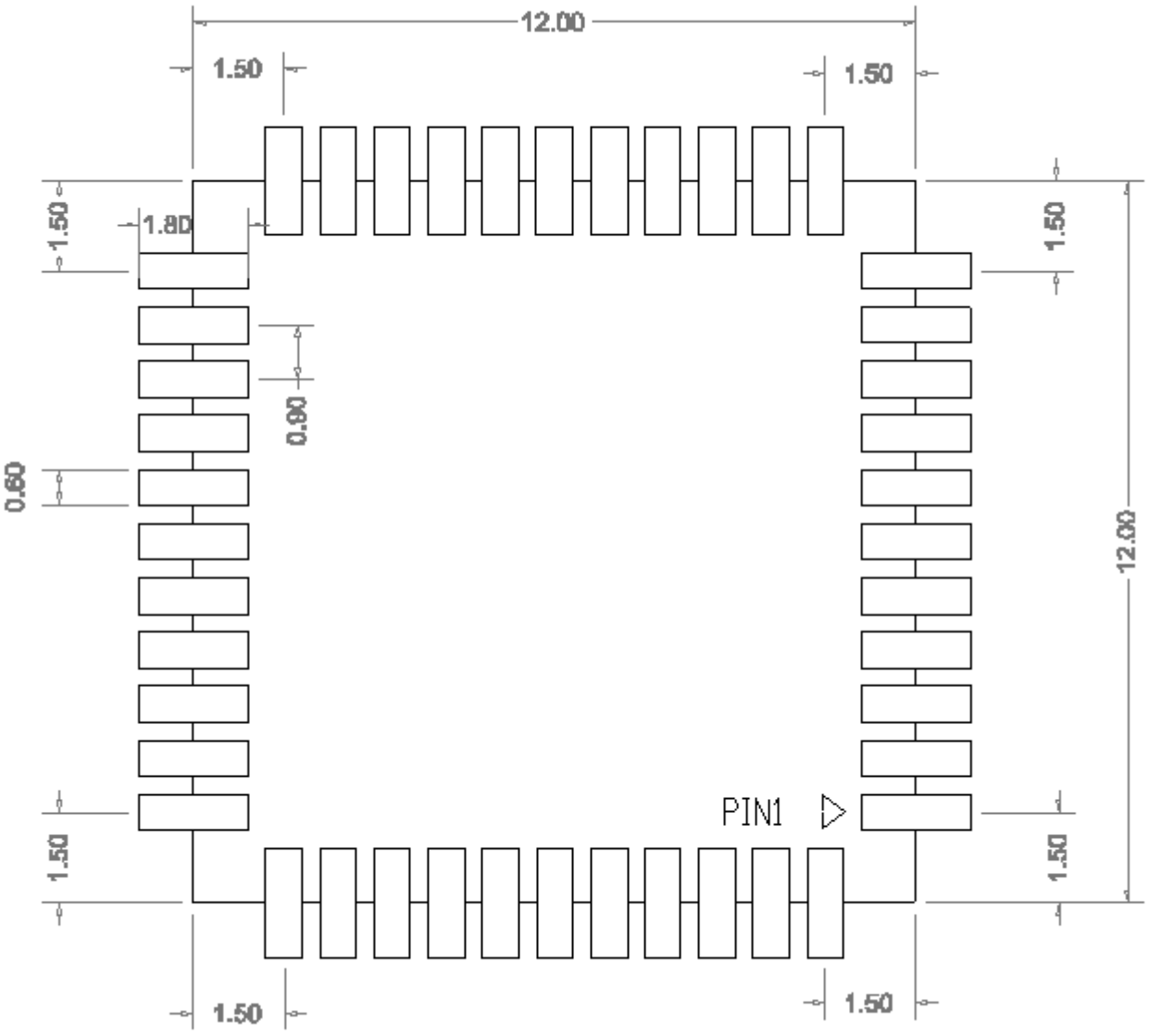
top view　　side view　　bottom view

6. Application Information

6.1 Typical Application Circuit



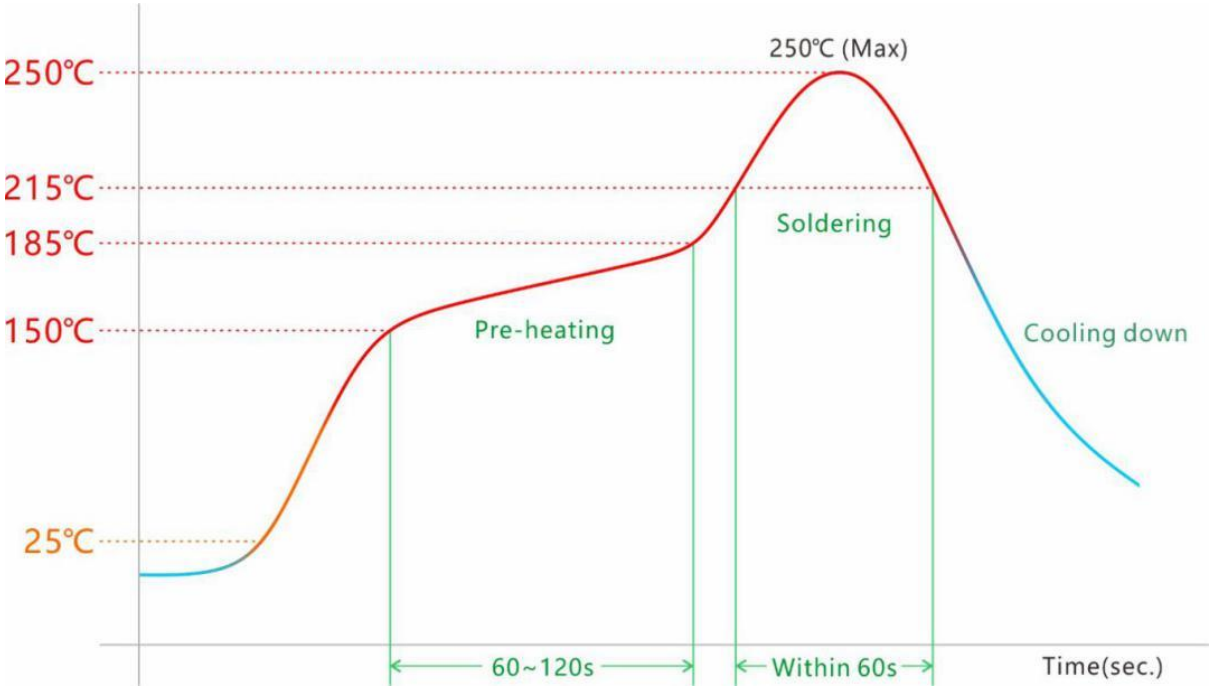
6.2 Recommend PCB Layout Footprint



Design size mm

Top View

6.3 Reflow Soldering Standard Conditions



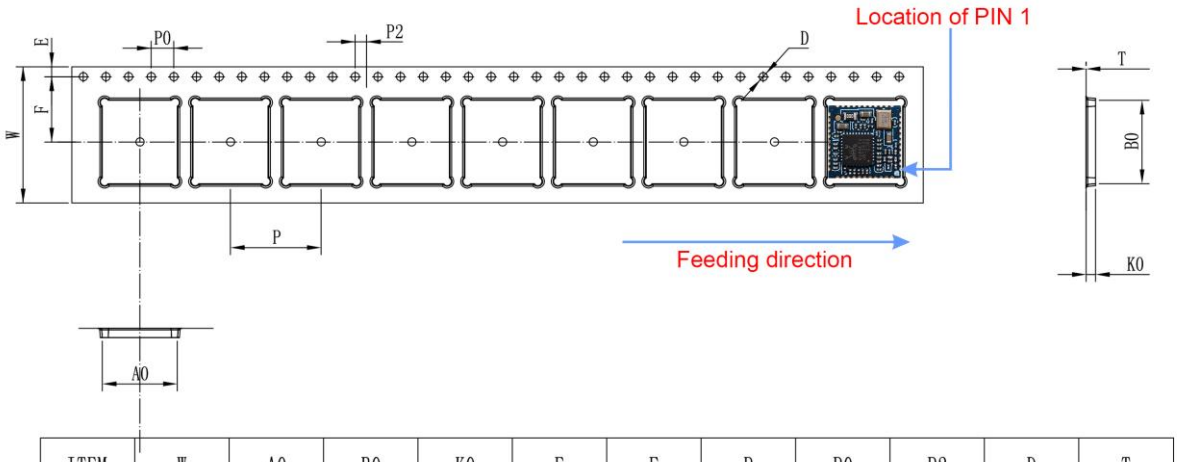
Please use the reflow within 2 times.
Set up the highest temperature within 250℃.

7. Key Components Of Module

No.	Parts	Specification	Manufacturer	Note
1	Chipset	RTL8189ETV-CG	Realtek	
2	PCB	BL-M8189ME1	Shenzhen Tie Fa Technology limited	
			Guangdong KINGSHINE ELECTRONICS CO., LTD	
			Quzhou Sunlord Electronics Co., Ltd	
3	Crystal	26MHz-9pF-10ppm-3225	SHENZHEN KAIYUEXIANG ELECTRONICS CO., LTD	
			HARMONY ELECTRONICS CORP.	
			HOSONIC ELECTRONIC CO., LTD.	
			UN Semiconductor 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	12.85±0.1	14.30±0.1	1.85±0.1	1.75±0.1	11.5±0.1	16.00±0.1	4.00±0.1	2.00±0.1	Ø1.5±0.1	0.30±0.05

Package specification:

1. 2,000 modules per roll and 10,000 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 25.3mm (with a width of 21.3mm 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: -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 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:
The Module is a static-sensitive electronic device.
Do not operate or store near strong electrostatic fields.
Take proper ESD precautions!

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-R8189ME1**"

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

This module is Limited single modular without shielding, host manufacturer have to consult with module manufacturer for the module limiting conditions when integrate the module in the host. module manufacturer should reviews detailed test data or host designs prior to giving the host manufacturer approval.

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 **2AL6KBL-R8189ME1** 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	/	/	/	/

2.8 Label and compliance information

The final end product must be labeled in a visible area with the following" Contains FCC ID:2AL6KBL-R8189ME1".

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.