飞腾云
PHATEN

CB2L

CB2L

IOT Module

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Customer Approval

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1 Overview

This module is a low-power embedded Wi-Fi module. It consists of a highly integrated wireless RF chip, T1, and a small number of peripheral components, and can support dual role AP and STA connections, as well as low-power Bluetooth connectivity.

A 32-bit MCU running at up to 160 MHz with 2Mbyte Flash and 288 KB RAM enables the module to support cloud connectivity, and the MCU's extended instructions for signal processing enable efficient audio encoding and decoding. A wide range of peripherals such as PWM, UART, SPI, and up to five 32-bit PWM outputs make the chip ideal for high-quality LED control.

1.1 Features

- Built-in low-power 32-bit MCU that also acts as an application processor
- Clock rate of 160 MHz
- Operating voltage: 3.0V to 3.6V
- Wi-Fi connectivity
- IEEE 802.11b/g/n
- Channels 1 to 14 at 2.4 GHz
- Supports WEP, WPA/WPA2, WPA/WPA2 PSK (AES), and WPA3 security modes
- Supports STA, AP, and STA + AP combo working modes
- Two pairing modes are supported, namely Wi-Fi Easy Connect (EZ mode) and access point (AP) mode. Both modes are available on Android and iOS devices
- Operating temperature: -40° C to 105° C
- Bluetooth connectivity
  - ✓ Bluetooth Core Specification v5.2
  - ✓ Integral Wi-Fi and Bluetooth coexistence interface.
  - ✓ The onboard PCB antenna

1.2 General Specification

Model Name	CB2L
Product Description	Wi-Fi and Bluetooth Dual Mode Module
Interface Type	DIP&SMT
Environmental notes	All hardware components are fully compliant with the EU RoHS directive

1.3 Absolute electrical parameters

parameter	description	minimum	maximum	unit
Ts	Storage temperature	-55	125	℃
VDD	service voltage	-0.3	3.9	V
Human body model (HBM)	TAMB -25℃	-4	4	KV
Charged-device model (CDM)	TAMB -25℃	-2	200	V

1.4 Normal working conditions

parameter	description	minimum	standard	maximum	unit
Ta	working temperature	-40	-	105	℃
VBAT	working voltage	3.0	3.3	3.6	V
V_{OL}	Low-level output voltage	VSS	-	VSS+0.3	V
V_{OH}	high level output voltage	VBAT-0.3	-	VBAT	V
Imax	I/O drive current	-	6	20	mA

2 RF technical indicators

2.1 Basic RF characteristics

product features	product description
Wireless standards	IEEE 802.11 b/g/n
Communication frequency range	2.412~2.484GHz (2.4GHz ISM Band)
modulator approach	DSSS,DBPSK, DQPSK, CCK and OFDM (BPSK/QPSK/16-QAM/ 64-QAM)
transmission speed	802.11b: 1,2,5.5,11 Mbps 802.11g: 6,9,12,18,24,36,48,54Mbps 802.11n: HT20 MCS0-7
Antenna type	PCB antenna

TX:

TX Rate	Min.	Typ.	Max.	EVM
802.11b@11Mbps	15dBm	17dBm	19dBm	≤-10dB
802.11g@54Mbps	13dBm	15dBm	17dBm	≤-25dB
802.11n@N20_MCS7	12dBm	14dBm	16dBm	≤-27dB
Frequency error	-12ppm	-	12ppm	

RX:

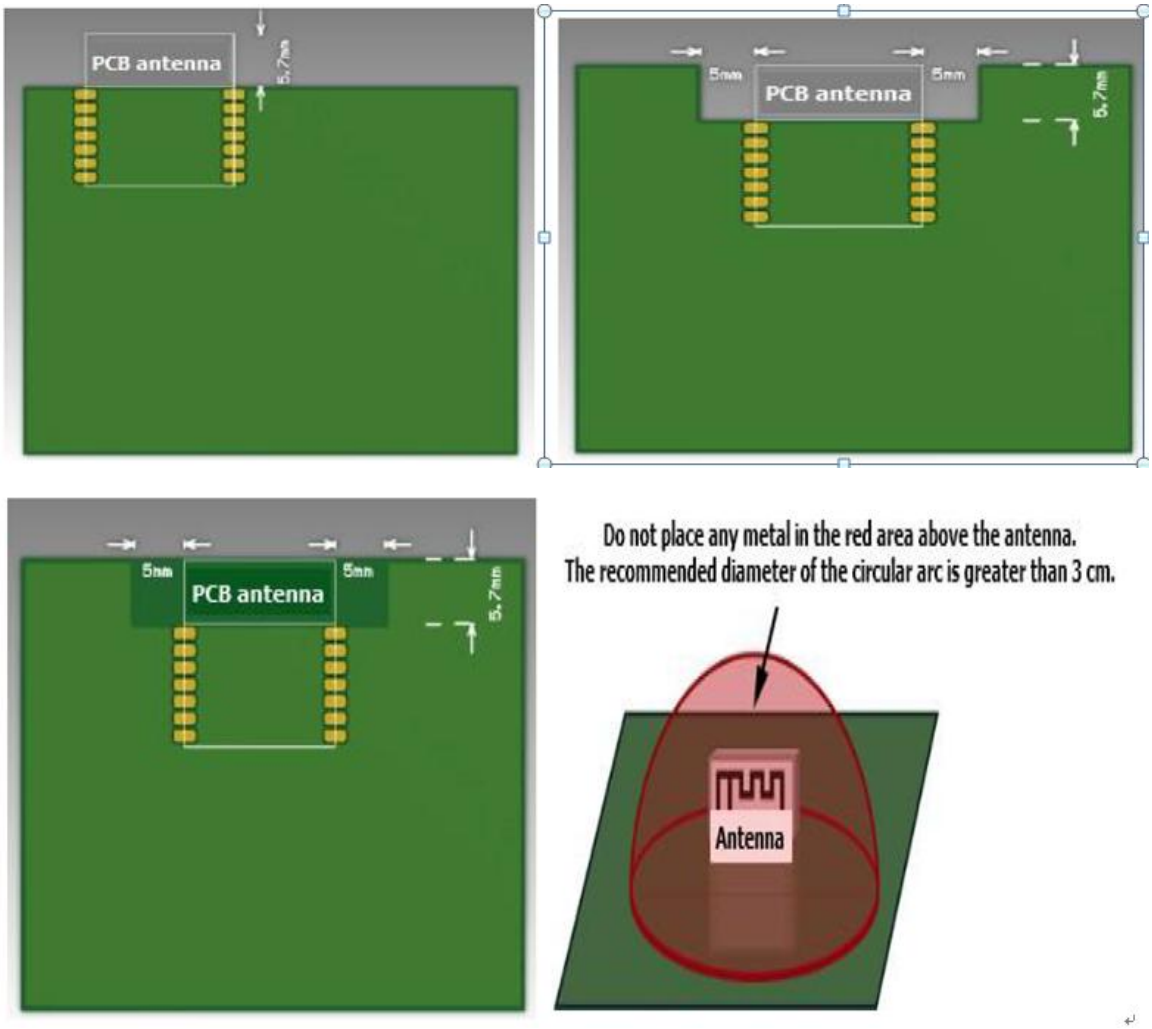
RX Rate	Standard Value	unit
PER<8% 802.11b@11Mbps	≤-85	dBm
PER<10% 802.11g@54Mbps	≤-72	dBm
PER<10% 802.11n@N20_MCS7	≤-69	dBm

2.2 Bluetooth technical indicators

product features	product description			
general requirements				
	Bluetooth 5.2			
	2.402~2.480GHz			
RF technical parameters				
type	Min.	Typ.	Max.	unit
transmitting power	-20	-	20	dBm
Connect the rate	-	1	-	Mbps
frequency error	-150	_	150	Khz
Sensitivity @30.8% PER 1Mbps	≤-96dBm			

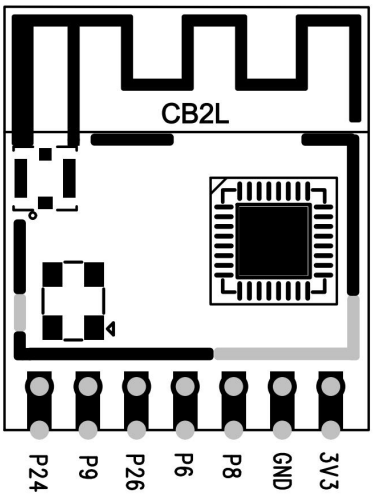
3 Antenna information

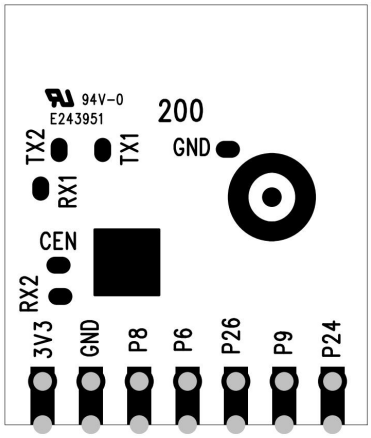
When using PCB onboard antenna on Wi-Fi module, it is recommended to ensure the optimization of Wi-Fi performance, the distance between the module antenna part and other metal parts is at least 15mm above. User PCB board in the antenna area do not line or even copper, so as not to affect the antenna performance.



4 Pin description

4.1 Pin&Pin



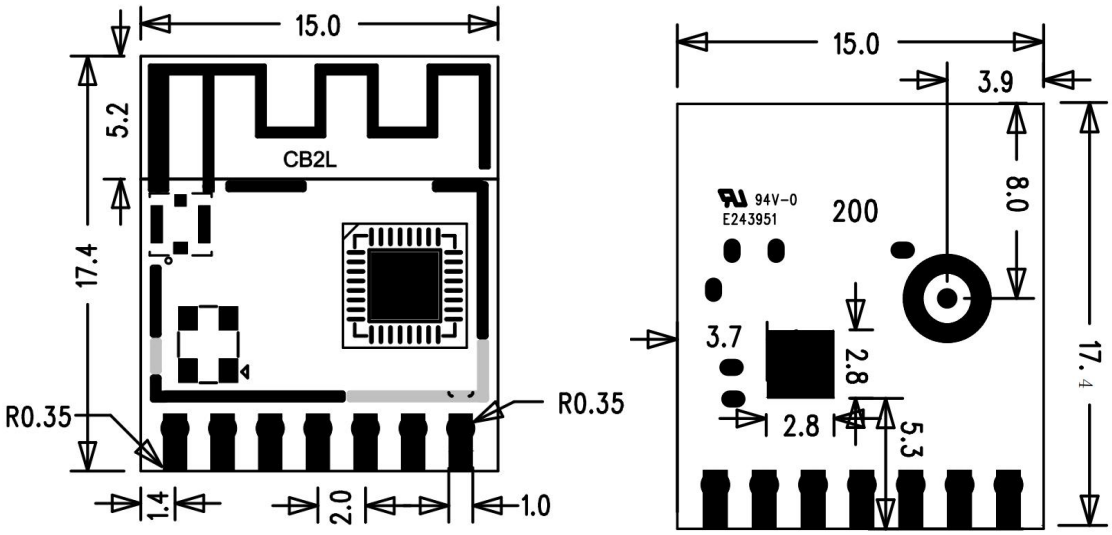


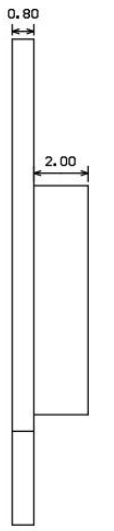
NO.	Pin	IO	description
1	P24	I/O	PWM4（ IC Pin 17）
2	P9	I/O	PWM3（ IC Pin 27）
3	P26	I/O	PWM5（ IC Pin 23）
4	P6	I/O	PWM0（ IC Pin 24）
5	P8	I/O	PWM2（ IC Pin 26）
6	GND	P	GND
7	3V3	P	3V3

5 Packaging information and production guidance

5.1 Mechanical dimensions

PCB Size：15±0.3mm (L)×17.4±0.3mm (W) ×0.8±0.1mm (H)。单位：mm





Side View

Side View

6 Product key device information

No.	Parts	Specification		Note
1	Chipset	T1		
2	PCB	CB2L		
3	Crystal oscillator	3225 26MHz ±10ppm 7.3pF -40~105° C		

warning

Federal Communication Commission Interference Statement

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 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 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.

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.

IMPORTANT NOTE:

FCC 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 & your body.

This device and its antenna(s) must not be co-located with any other transmitters except in accordance with FCC multi-transmitter product procedures.

Refering to the multi-transmitter policy, multiple-transmitter(s) and module(s) can be operated simultaneously without C2PC.

This module is intended for OEM integrator. The OEM integrator is responsible for the compliance to all the rules that apply to the product into which this certified RF module is integrated.

Additional testing and certification may be necessary when multiple modules are used.

List of applicable FCC rules

This module has been tested and found to comply with 15.247 requirements for Modular Approval.

The modular transmitter is only FCC authorized for the specific rule parts (i.e., FCC transmitter rules) listed 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. If the grantee markets their product as being Part 15 Subpart B compliant (when it also contains unintentional-radiator digital circuity), then the grantee shall provide a notice stating that the final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.

USERS MANUAL OF THE END PRODUCT:

In the users 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. If the size of the end product is smaller than 8x10cm, then additional FCC part 15.19 statement is required to be available in the users manual: This device complies with Part 15 of 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.

LABEL OF THE END PRODUCT:

The final end product must be labeled in a visible area with the following " Contains TX FCC ID: 2BP8R-CB2L ". If the size of the end product is larger than 8x10cm, then the following FCC part 15.19 statement has to also be available on the label: This device complies with Part 15 of 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.

This module is intended for OEM integrators only. Per FCC KDB 996369 D03 OEM Manual v01 guidance, the following conditions must be strictly followed when using this certified module:

KDB 996369 D03 OEM Manual v01 rule sections:

2.2 List of applicable FCC rules

This module has been tested for compliance to FCC Part 15.247.

2.3 Summarize the specific operational use conditions

The module is typically use in industrial, household and general office / ITE and audio & video, EV charging system end-products. The product must not be co-located or operating in conjunction with any other antenna or transmitters.

2.4 Limited module procedures

Not applicable.

2.5 Trace antenna designs

Not applicable.

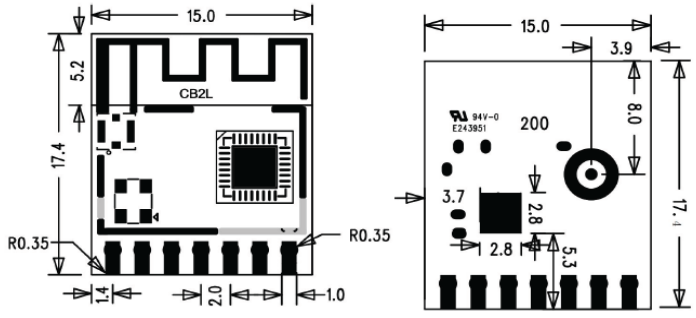
2.6 RF exposure considerations

This equipment complies with FCC mobile 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 & your body. If the module is installed in a portable host, a separate SAR evaluation is required to confirm compliance with relevant FCC portable RF exposure rules.

2.7 Antennas

The following antennas have been certified for use with this module; antennas of the same type with equal or lower gain may also be used with this module. The PCB antenna must be meet the following requirements.

PCB Size: 15±0.3mm (L)×17.4±0.3mm (W) ×0.8±0.1mm (H)。单位：mm



Frequency (MHz)	Peak Gain (dBi)	Efficiency (%)
2400	1.62	52.29
2410	1.71	52.17
2420	1.93	53.14
2430	1.98	54.16
2440	2.00	57.62
2450	2.17	59.64
2460	2.45	61.55
2470	2.38	60.64
2480	2.54	62.86
2490	2.30	59.85
2500	2.49	60.41

2.8 Label and compliance information

The final end product must be labeled in a visible area with the following:"Contains FCC ID:**2BP8R-CB2L**". The grantee's FCC ID can be used only when all FCC compliance requirements are met.

2.9 Information on test modes and additional testing requirements

This transmitter is tested in a standalone mobile RF exposure condition and any co-located or simultaneous transmission with other transmitter(s) or portable use will require a separate class II permissive change re-evaluation or new certification.

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.

IMPORTANT NOTE: In the event that these conditions can not 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 can not 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.

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.

OEM/Host manufacturer responsibilities

OEM/Host manufacturers are ultimately responsible for the compliance of the Host and Module. The final product must be reassessed against all the essential requirements of the FCC rule such as FCC Part 15 Subpart B before it can be placed on the US market. This includes reassessing the transmitter module for compliance with the Radio and EMF essential requirements of the FCC rules. This module must not be incorporated into any other device or system without retesting for compliance as multi-radio and combined equipment