飞腾云
PHATEN

WiFi+BLE Module
NG-EC3

NG-EC3

Module Datasheet

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Office / Factory: 401, Building 1, No. 200 Kejie 2nd Road, Shutianpu Community, Matian Street, Guangming District, Shenzhen, China

Website: https://www.phaten.com

Customer Approval

Company _____

Title _____

Signature _____

Date _____

FTY _____

Version Update Record

Version	Date	Revision Content	Editorial Staff	Approval
V1.0	2024-07-24			

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1 Overview

NG-EC3 is a module equipped with a RISC_V 32-bit single-core processor, built-in highly integrated ESP32-C3 chip, and realizes dual-mode wireless communication between Wi-Fi and low-power Bluetooth (Bluetooth®5 LE).

The built-in ESP32-C3 chip, i.e., 4M, 400 KB SRAM, 384 KB ROM memory, up to 160 MHz main frequency, and rich communication interfaces and GPIO pins, can support a variety of scenarios and complex applications.

1.1Features

●32-bit RISCV single-core processor

●Main frequency support 160MHz

●Operating voltage: 3.0V~3.6V

●Wi-Fi, Bluetooth connectivity

√ Supports 802.11 b/g/n

√ Supports 20 MHz and 40 MHz bandwidth in 2.4 GHz band

√ Supports 1T1R mode with data rates up to 150 Mbps

√ Supports Bluetooth LE: Bluetooth 5, Bluetooth mesh

√ PCB on-board antenna

√ Operating temperature: -30° C to 85° C

1.2General Specification

Model Name	NG-EC3
Product Description	WiFi+BLE Module
Interface Type	SMT
Environmental notes	All hardware components are fully compliant with the EU RoHS directive

1.3Absolute electrical parameters

parameter	description	minimum	maximum	unit
Ts	Storage temperature	-40	105	℃
VDD	service voltage	-0.3	3.6	V
Human body model (HBM)	TAMB -25℃	-2	2	KV
Charged-device model (CDM)	TAMB -25℃	-0.5	0.5	KV

1.4Normal working conditions

parameter	description	minimum	standard	maximum	unit
Ta	working temperature	-30	-	85	℃
VDD	working voltage	3	3.3	3.6	V
V_{IL}	low level input voltage	-0.3	-	0.25*VDD[1]	V
V_{IH}	high level input voltage	0.75*VDD[1]	-	VDD[1]+0.3	V
V_{OL}	Low-level output voltage	-	-	0.1*VDD[1]	V
V_{OH}	high level output voltage	0.8*VDD[1]	-	-	V
I_{OH}	High level pull current	-	40	-	mA
I_{OL}	Low level irrigation current	-	28	-	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	2.412~2.462GHz (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, 11Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54Mbps 802.11n: HT20 MCS0-7, 72.2 Mbps 802.11n: HT40 MCS0-7, 150 Mbps
Antenna type	PCB Gain 0.8dBi

TX:

TX Rate	Min.	Typ.	Max.	EVM
802.11b@11Mbps	-	14.15dBm	-	≤-10dB
802.11g@54Mbps	-	14.52dBm	-	≤-25dB
802.11n@HT20_MCS7	-	13.46dBm	-	≤-27dB
802.11n@HT40_MCS7	-	13.01dBm	-	≤-27dB
Frequency offset error	-12ppm	-	12ppm	

RX:

RX Rate	Standard Value	unit
802.11b@11Mbps	≤-88	dBm
802.11g@54Mbps	≤-76	dBm
802.11n@HT20_MCS7	≤-74	dBm
802.11n@HT40_MCS7	≤-71	dBm

2.2 Bluetooth technical indicators

product features		product description		
general requirements				
Bluetooth specifications		Bluetooth 5		
service frequency		2.402 ~ 2.480GHz		
RF technical parameters				
type	Min.	Typ.	Max.	unit
transmitting power	-	-3.87	-	dBm
Connect the rate	-	1	-	Mbps
frequency error	-75	-	75	Khz
Sensitivity @30.8% PER 1Mbps		≤-96dBm		

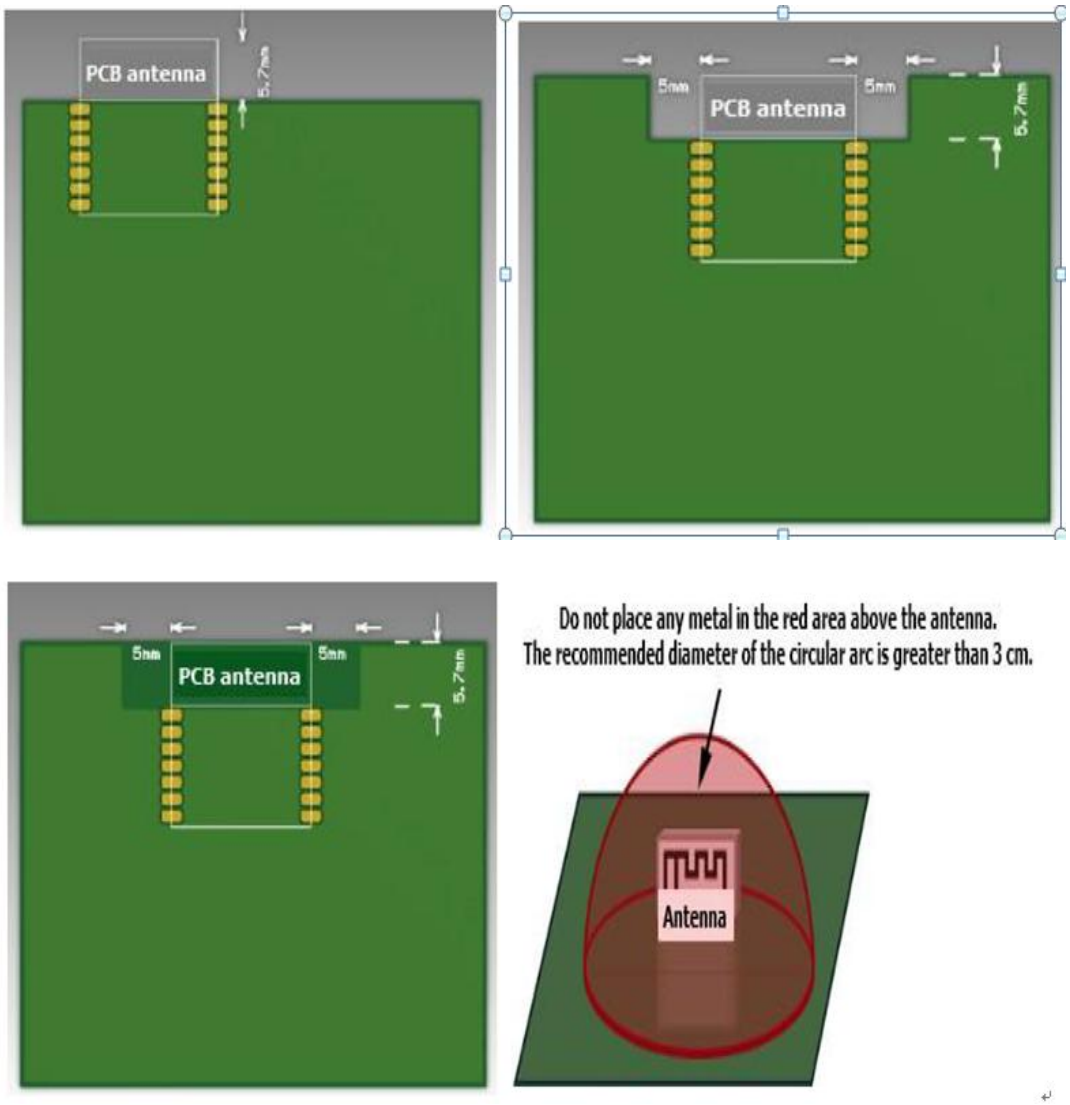
3Antenna information

3.1Antenna type

PCB onboard antenna access mode

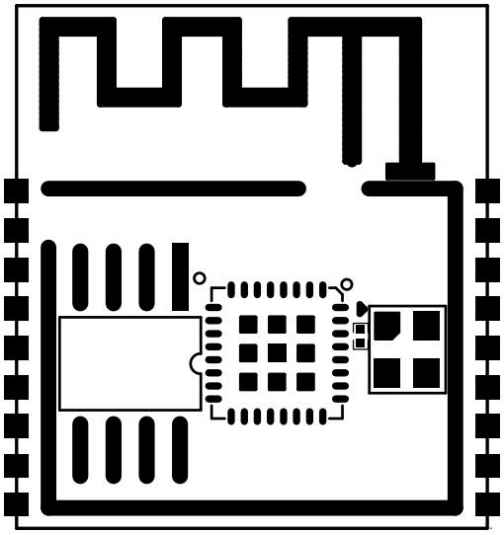
3.2Notes for antenna design

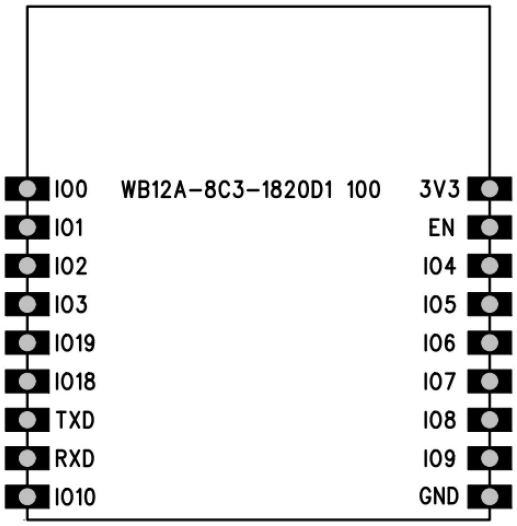
When using PCB onboard antenna on Wi-Fi module, it is recommended to ensure the optimization of Wi-Fi performance, the distance between the module antenna part and other metal parts is at least 15mm above. User PCB board in the antenna area do not line or even copper, so as not to affect the antenna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



4 Pin description

4.1 Pin &Pin



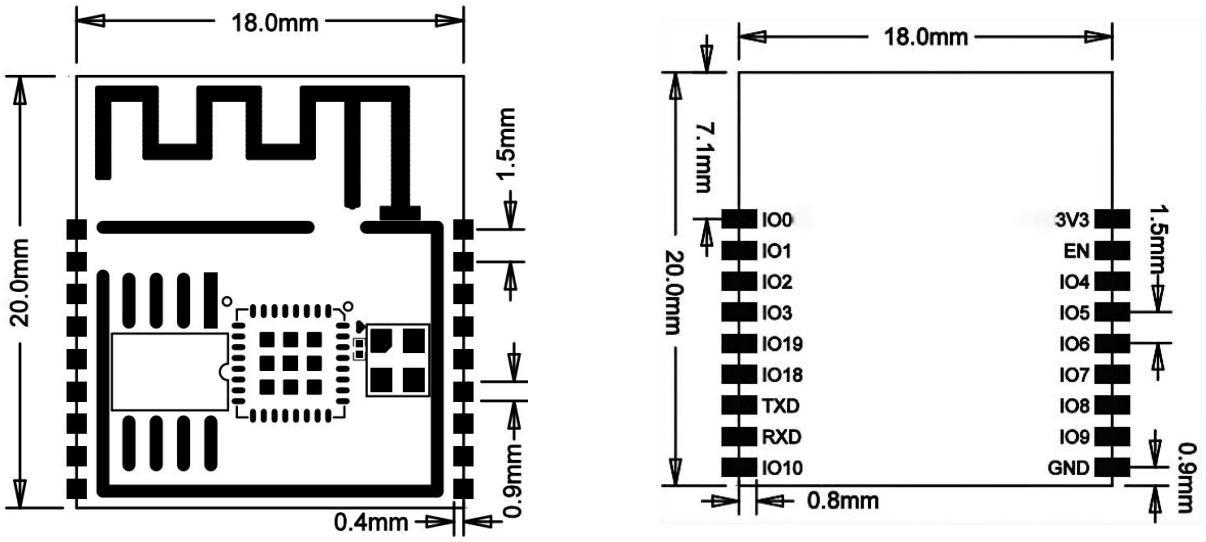


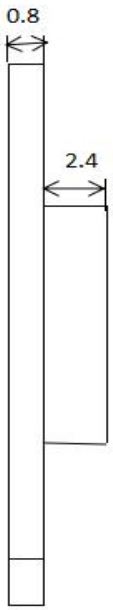
	Pin	IO	Feature
1	3V3	P	3V3
2	EN	I	
3	IO4	I/O/T	GPIO4, ADC1_CH4, FSPIHD, MTMS
4	IO5	I/O/T	GPIO5, ADC2_CH0, FSPIWP MTDI
5	IO6	I/O/T	GPIO6, FSPICLK, MTCK
6	IO7	I/O/T	GPIO7, FSPID, MTDO
7	IO8	I/O/T	GPIO8
8	IO9	I/O/T	GPIO9
9	GND	P	Ground connection
10	IO10	I/O/T	GPIO10,FSPICS0
11	RXD	I/O/T	GPIO20,U0RXD
12	TXD	I/O/T	GPIO21,U0TXD
13	IO18	I/O/T	GPIO18,USB_D-
14	IO19	I/O/T	GPIO19,USB_D+
15	IO3	I/O/T	GPIO3, ADC1_CH3
16	IO2	I/O/T	GPIO2, ADC1_CH2, FSPIQ
17	IO1	I/O/T	GPIO1, ADC1_CH1, XTAL_32K_N
18	IO0	I/O/T	GPIO0, ADC1_CH0, XTAL_32K_P

5 Packaging information and production guidance

5.1 Mechanical dimensions

PCB ： 18.0±0.3 (L)×20.0±0.3(W) ×0.8±0.1(H) 单位：mm





Side View

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, and (2) this device must accept any interference received, including 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: **2BMDW-NG-EC3** "

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 v01r01

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

Not applicable

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 **FCC ID:2BMDW-NG-EC3** 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.

Antenna No.	Model No. of antenna:	Type of antenna:	Gain of the antenna (Max.)		Frequency range:
			Antenna 1	Antenna 2	
Bluetooth	/	PCB Antenna	0.8	N/A	2402-2480MHz
2.4G Wi-Fi	/	PCB Antenna	0.8	N/A	2412-2462MHz

2.8 Label and compliance information

The final end product must be labeled in a visible area with the following" Contains **FCC ID: 2BMDW-NG-EC3** ".

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.

2.11 Note EMI Considerations

Host manufacture is recommended to use D04 Module Integration Guide recommending as "best practice" RF design engineering testing and evaluation in case non-linear interactions generate additional non-compliant limits due to module placement to host components or properties.

2.12 How to make changes

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. According to the KDB 996369 D02 Q&A Q12, that a host manufacture only needs to do an evaluation (i.e., no C2PC required when no emission exceeds the limit of any individual device (including unintentional radiators) as a composite. The host manufacturer must fix any failure.