



易联智通
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E-LINTER loquat embedded Wi-Fi + BLE acquisition module

datasheet

V250708-R



Revision history

date	author	version	description
2025/02/18	ZHU QIU JU	V250218R	Initial version
2025/02/18	WAN YUE	V250708R	Chapter 6 "Limit Values" has been added, and Chapter 7 "Specification Parameters" has been supplemented with the part number and material description for the 105°C (component/parameter).



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1. Introduction

Loquat-Embedded Model is an industrial-grade embedded Wi-Fi + BLE acquisition module. This module supports the standard IEEE 802.11 b/g/n protocol. With this module, users can conveniently realize the data conversion and transmission from RS-485 wired data acquisition to wireless Wi-Fi, and can easily add Wi-Fi and Bluetooth communication functions to existing devices.

This product is equipped with Bluetooth 5.0 (Low Energy). Users can configure the Wi-Fi network and set the parameters of the device where this product is installed via Bluetooth near-field communication.

This product offers models that support power supply and communication isolation. Users whose devices do not have built-in isolation can choose such models to meet the requirements of application scenarios with higher safety standard levels.



2. Features

- Wi-Fi: Support Wi-Fi 2.4G 802.11 b/g/n protocol
- Support BLE 5.0
- Wi-Fi Encryption: WPA/WPA2/WPA2-Enterprise
- E-Touch support (Android/iOS compatible)
- Receive/Transmit double buffers
- Support remote firmware upgrade (OTA)
- Wide operating temperature range: -40°C ~ +85°C/+105°C
- Support for power isolation*
- Support for communication isolation*



3. Ordering

Table 3-1 Ordering Information

Part number	description
ECMG-0019-1000-00	Wi-Fi + BLE, RS-485, DC 5-16V, EEBR-03 Pin definition, W. FL antenna interface, E-LINTER IoT, -40°C ~ +85°C
ECMG-0019-1006-00	Wi-Fi + BLE, RS-485, DC 5-16V, EEBR-03 Pin definition, W. FL antenna interface, E-LINTER IoT, -40°C ~ +105°C
ECMG-0219-1000-00	Wi-Fi + BLE, RS-485, DC 5-16V, EEBR-03 Pin definition, Power isolation, Signal isolation, W. FL antenna interface, E-LINTER IoT, -40°C ~ +85°C



4. Coding rules

4.1. Serial number encoding rules

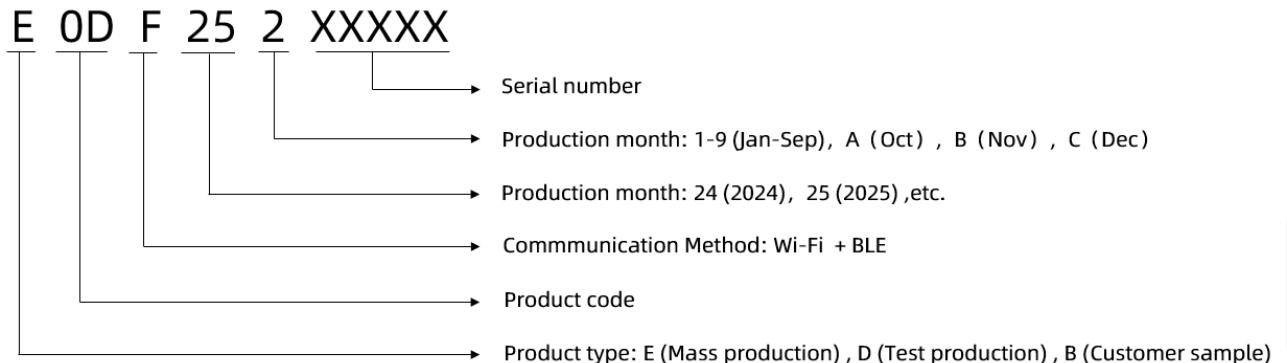


Figure 4-1 Serial number coding diagram



5. Pin and dimension

5.1. Pin definition

The physical interfaces of this module are detailed as follows:

Table 5-1: Pin Description for RS-485 Version

Pin	Name	Definition	Description
1	VCC	Power Supply	5–16V Power Input
2	GND	Ground	Ground Connection
3	A	Differential Signal	RS-485 Differential Signal A
4	B	Differential Signal	RS-485 Differential Signal B

5.2. Dimension Information

The outline dimension parameters of this product are as follows:

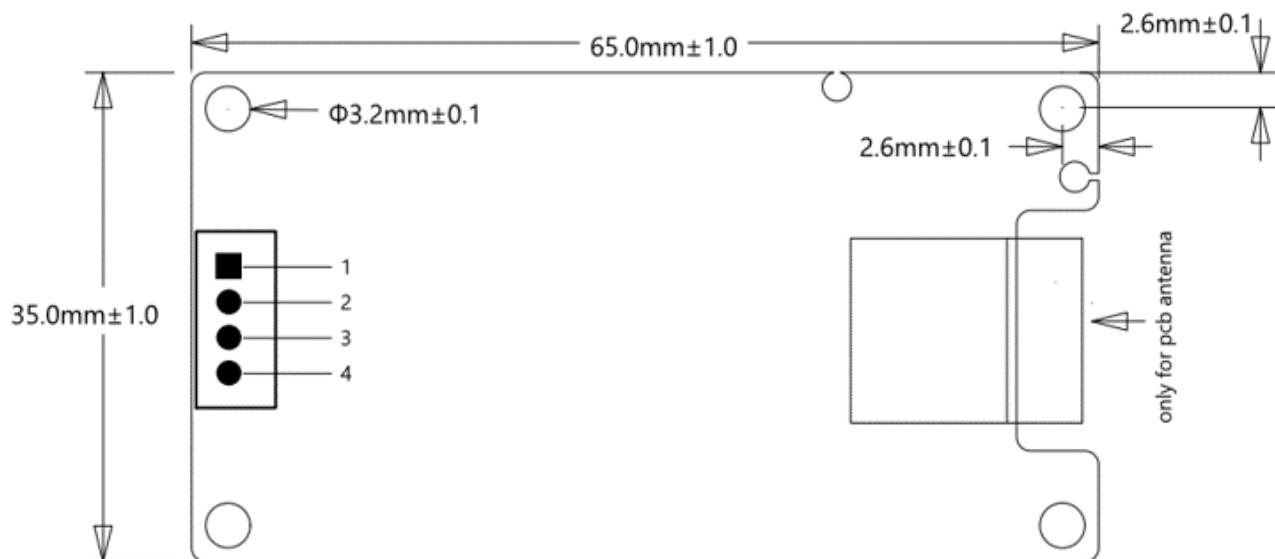


Figure 5-2 Dimension Information, unit: mm

5.3. Connector Terminals

This module uses a 4-pin terminal with 2.5mm pitch to connect to the main board. The dimension information of the connecting terminal is as follows:

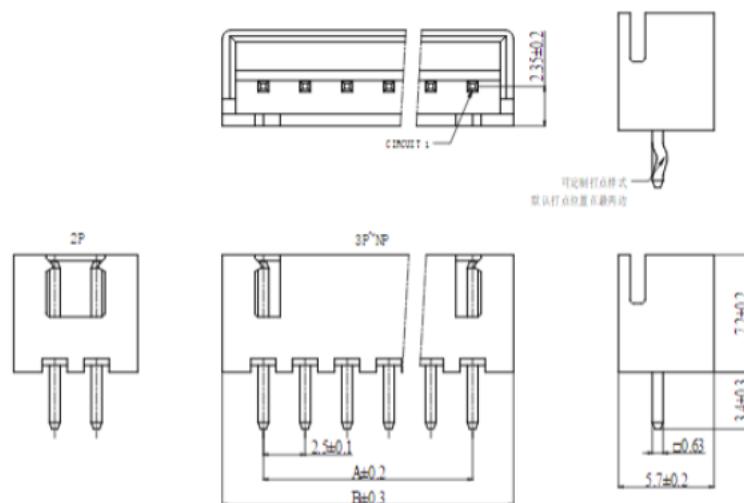


Figure 5-3 Connector Terminal , unit: mm

5.4. Antenna Connector

The Wi-Fi and Bluetooth antennas of this module adopt W.FL (3rd generation IPEX) antenna connectors. The dimension information is shown in the figure below. Please select a suitable antenna adapter cable.

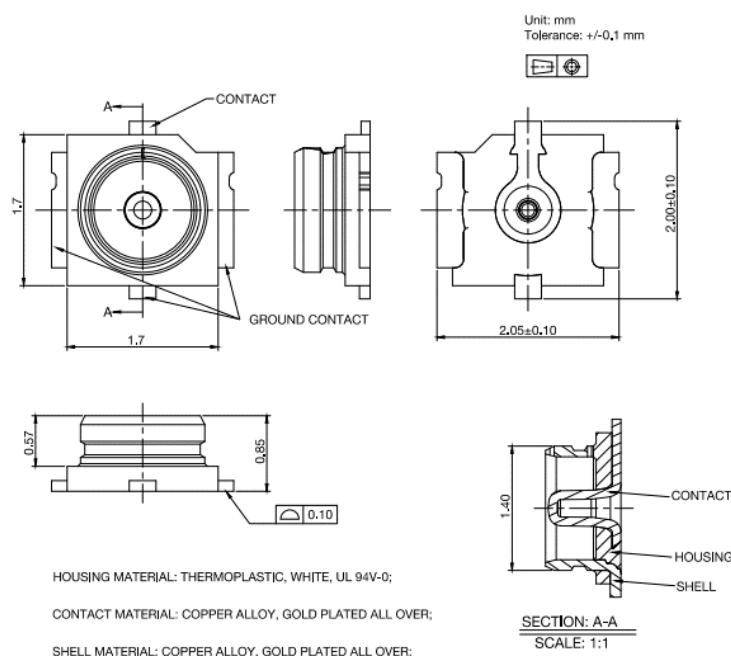


Figure 5-4 Antenna Interface, unit: mm



6. Electrical parameters

6.1. Limit ratings

The product operates outside the limit ratings and may cause permanent damage to the product. At the same time, working between the limit ratings and the recommended ratings for a long time may affect the reliability or service life of the product, and the limit ratings parameters are shown in the following table:

Table 6-1-1 Limit ratings

Characteristic			Min	Max	Unit
Supply Voltage (IPC/JEDEC J-STD-020)			4.5	18.0	V
Operating Temperature Range	ECMG-0019-1000-00	ECMG-0219-1000-00	-40	85	°C
	ECMG-0019-1006-00		-40	105*	°C
Storage temperature range	ECMG-0019-1000-00	ECMG-0219-1000-00	-40	85	°C
	ECMG-0019-1006-00		-40	105	°C

6.2. Recommended Operating Conditions

To ensure the product achieves optimal performance, it is recommended that the product operate under the recommended operating conditions, which are specified as follows:

Table 6-2-1 Recommended Operating Conditions

Symbol	Parameter	Min	Max	Unit
VDD	Supply Pin Voltage	5	16	V
I _{VDD}	Supply Current of External Power Supply	0.5	—	A
T _A	Ambient Temperature	-40	85	°C
Humidity	Humidity	—	85	%RH
V _{ISO} *	Isolation Voltage	—	2,100	Vrms

*The designed operating temperature range of this product is consistent with its limit temperature, which is -40°C ~ 85°C or (-40°C ~ 105°C). If higher requirements are placed on long-term reliability, it is recommended to keep an appropriate margin in actual use.



6.3. Wi-Fi RF

6.3.1. Wi-Fi RF Standards

Operating Channel Center Frequency Range: 2412 ~ 2484 MHz

6.3.2. Wi-Fi RF Transmitter Specifications

Table 6-3-1 Transmit Power When Spectrum Mask and EVM Comply with 802.11 Standards

Data Rate	Typ (dBm)
802.11b, 1 Mbps	20.5
802.11b, 11 Mbps	20.5
802.11g, 6 Mbps	20.0
802.11g, 54 Mbps	18.0
802.11n, HT20, MCS 0	19.0
802.11n, HT20, MCS 7	17.5
802.11n, HT40, MCS 0	18.5
802.11n, HT40, MCS 7	17.0



6.3.3. Wi-Fi RF Receiver Specifications

Table 6-3-2 Receiver Sensitivity

Data Rate	Typ (dBm)
802.11b, 1Mbps	-98.0
802.11b, 2Mbps	-96.0
802.11b, 5.5Mbps	-93.0
802.11b, 11Mbps	-88.6
802.11g, 6Mbps	-92.8
802.11g, 9Mbps	-91.8
802.11g, 12Mbps	-90.8
802.11g, 18Mbps	-88.4
802.11g, 24Mbps	-85.4
802.11g, 36Mbps	-82.0
802.11g, 48Mbps	-77.8
802.11g, 54Mbps	-76.2
802.11n, HT20, MCS0	-92.6
802.11n, HT20, MCS1	-90.6
802.11n, HT20, MCS2	-88.0
802.11n, HT20, MCS3	-84.8
802.11n, HT20, MCS4	-81.6
802.11n, HT20, MCS5	-77.4
802.11n, HT20, MCS6	-75.6
802.11n, HT20, MCS7	-74.4
802.11n, HT40, MCS0	-90.0
802.11n, HT40, MCS1	-87.6
802.11n, HT40, MCS2	-84.8
802.11n, HT40, MCS3	-81.8
802.11n, HT40, MCS4	-78.4
802.11n, HT40, MCS5	-74.2
802.11n, HT40, MCS6	-72.6
802.11n, HT40, MCS7	-71.2



Table 6-3-3 Maximum Receive Level

Data Rate	Typ (dBm)
802.11b, 1 Mbps	5
802.11b, 11 Mbps	5
802.11g, 6 Mbps	5
802.11g, 54 Mbps	0
802.11n, HT20, MCS 0	5
802.11n, HT20, MCS 7	0
802.11n, HT40, MCS 0	5
802.11n, HT40, MCS 7	0

Table 6-3-4 Receive Adjacent Channel Rejection

Data Rate	Typ (dBm)
802.11b, 1 Mbps	35
802.11b, 11 Mbps	35
802.11g, 6 Mbps	31
802.11g, 54 Mbps	14
802.11n, HT20, MCS 0	31
802.11n, HT20, MCS 7	13
802.11n, HT40, MCS 0	19
802.11n, HT40, MCS 7	8

6.4. BLE characteristic

Table 6-4-1 BLE receiver characteristics

Parameter	Data Rate	Typ (dBm)
sensitivity	@30.8% PER 1M	-96
	@30.8% PER 2M	-93
	@30.8% PER 125K	-104
	@30.8% PER 500K	-99
Maximum received signal	@30.8% PER 1M	10
	@30.8% PER 2M	0
	@30.8% PER 125K	10
	@30.8% PER 500K	10



Table 6-4-2 BLE transmitter characteristics

Parameter	Min (dBm)	Typ	Max (dBm)
RF transmit power	--	0	--
Gain controls step	--	3	--
RF power control range	-27	--	18



7. Specifications

Table 7-1 Specifications

Part number	ECMG-0019-1000-00	ECMG-0219-1000-00	ECMG-0019-1006-00
Electrical parameters			
Power supply voltage	DC 5—16V		
Current consumption	Min. 0.1A; Max. 1A@5V		
Wi-Fi Parameters			
Operating Frequency	2412 ~ 2484 MHz		
Antenna Interface	W. FL		
Bluetooth Parameters			
Version	BLE 5.0		
Antenna Interface	W. FL (Shared with Wi-Fi)		
Communication Parameters			
Level	RS-485		
Communication Parameters	9600bps 8/N/1 (Default)		
Physical Interface	4 Pin Physical Interface		
Mechanical Parameters			
Dimensions	65.0 x 35.0 x 9.0 mm		
Weight	10g (± 1 g)		
Environmental parameters			
Operating Temperature Range	-40 ~ +85 ° C		-40 ~ +105 ° C
Storage Temperature Range	-40 ~ +85 ° C		-40 ~ +105 ° C
Isolation Parameters*			
Maximum Isolation Voltage	2,100 Vrms		
Shielding Case			
Material Description	The shielding case is made of nickel silver. It will turn yellow if the surface oxidizes, which is a normal phenomenon and does not affect performance.		



8. Packaging

8.1. Packaging

The products are placed in blister trays, with 30 pieces per tray, as shown in the figure:



Figure 8-1 Product Packaging Diagram

8.2. Carton information

Quantity per Carton: 30 trays/carton, total 900 pieces. Each carton contains: packing list and shipment inspection report. Carton dimensions: 530.0*290.0*370.0mm (see Figure 8-2). Weight per carton: ~13.6kg (slight variations may occur).

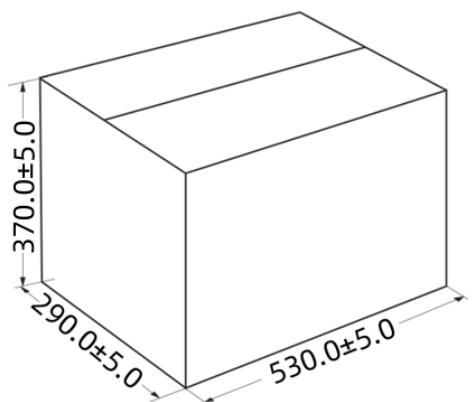


Figure 9-2: Carton Dimensions Diagram

8.3. Carton Labels

The outermost carton includes an outer label with the following information: Customer name, Order number, Product name, Customer P/N, Product P/N, Quantity per Carton, Carton number (e.g., 2/5 indicates total 5 cartons, current is No. 2), and Production date. Actual labels may vary; the format below is for reference only (see Figure 8-3).



Figure 8-3 Outer carton label diagram



9. KDB

2.2

This module has been assessed against the following FCC rule parts: CFR 47 FCC Part 15 C (15.247. DTS). It is applicable to the modular transmitter.

2.3

This radio transmitter Module 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.

The concrete contents to check are the following three points.

- 1) Maximum antenna gains are shown in item 2.7 below.
- 2) Should be installed so that the end user cannot modify the antenna
- 3) Feed line should be designed in 50ohm

Fine-tuning of return loss etc. can be performed using a matching network.

The antenna shall not be accessible for modification or change by the end user.

2.4

The module complies with FCC Part 15.247 and apply for Single module approval.

2.5

Trace antenna designs: applicable.

Any deviation(s) from the defined parameters of the antenna trace, as described by the instructions, require that the host product manufacturer must notify the module grantee that they wish to change the antenna trace design. in this case, a Class 11 permissive change application is required to be filed by the grantee, or the host manufacturer can take responsibility through the change in FCC ID (new application) procedure followed by a Class 11 permissive change application.

The device must be professionally installed.

The intended use is generally not for the general public.

It is generally for industry/commercial use.

The connector is within the transmitter enclosure and can only be accessed by disassembly of the transmitter that is not normally required.



The user has no access to the connector.

Installation must be controlled.

Installation requires special training.

2.6

This equipment complies with FCC 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. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

2.7

The following antennas have been certified for use with this module.

Only antennas of the same type with equal or lower gain may also be used with this module.

Other types of antennas and/or higher gain antennas may require the additional authorization for operation. The installer should use unique antenna connector and 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. The manufacturer of module will inform installer to meet with the FCC part 15.203 in the warning part.

Antenna Specification list below:

2.4G WIFI / BLE:

Antenna type: PCB Antenna

The max antenna gain (in dBi): 3.75 dBi

2.8

Please notice that if the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as "Contains FCC ID: 2BAGJ-ECMB-00"; any similar wording that expresses the same meaning may be used.

2.9

Testing of the host product with all the transmitters installed - referred to as the composite investigation test- is recommended, to verify that the host product meets all the applicable FCC



rules. The radio spectrum is to be investigated with all the transmitters in the final host product functioning to determine that no emissions exceed the highest limit permitted for any one individual transmitter as required by Section 2.947(f). The host manufacturer is responsible to ensure that when their product operates as intended it does not have any emissions present that are out of compliance that were not present when the transmitters were tested individually.

If the modular transmitter has been fully tested by the module grantee on the required number of channels, modulation types, and modes, it should not be necessary for the host installer to re-test all the available transmitter modes or settings. It is recommended that the host product manufacturer, installing the modular transmitter, perform some investigative measurements to confirm that the resulting composite system does not exceed the spurious emissions limits or band edge limits (e.g., where a different antenna may be causing additional emissions).

The testing should check for emissions that may occur due to the intermixing of emissions with the other transmitters, digital circuitry, or due to physical properties of the host product (enclosure). This investigation is especially important when integrating multiple modular transmitters where the certification is based on testing each of them in a stand-alone configuration.

2.10

Any company of the host device which install this modular should perform the test of radiated & conducted emission and spurious emission etc. according to FCC Part 15C: 15.247, only if the test result comply with FCC part 15C: 15.247 requirement. Then the host can be sold legally.

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 circuitry), 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.



10. FCC Statement

1. 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.
2. 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, 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 has been evaluated to meet general RF exposure requirements. This equipment



should be installed and operated with a minimum distance of 20 cm between the radiator and your body.

The Module is designed to comply with the FCC statement. FCC ID is 2BAGJ-ECMB-00. The host system using the Module should have a label indicating it contains the modular's FCC ID is 2BAGJ-ECMB-00. This radio module must not be installed to co-locate and operating simultaneously with other radios in host system additional testing and equipment authorization may be required to operating simultaneously with other radio. The Module and its antenna must not be co-located or operating in conjunction with any other transmitter or antenna within a host device.

The modular must be installed in the host that is assigned by Company name: Chengdu E-LINTER Information Technology Co., Ltd., Model no.: ECMG-01. If other host types used would need further evaluation and possible C2PC if they are not significantly similar to the one tested. The BLE Module is designed for a compact PCB design. It should be installed and operated with host or other minimum distance of 20 centimeters between the radiator and your body." To comply with FCC regulations limiting both maximum RF output power and human exposure to RF radiation, the maximum antenna gain including cable loss in a mobile-only exposure condition must not exceed -3.75dBi in the 2.4G band. The module uses PCB Antenna, this antenna is sold with the module.

10.1. Notice to OEM integrator

The end user manual shall include all required regulatory information/warning as shown in this manual. The OEM integrator is responsible for testing their end product for any additional compliance requirements required with this module installed. If the final product contains circuits of other FCC PART 15 Subparts, the final host product still requires



Part 15 Subpart B compliance testing with the modular transmitter installed. The intended use is generally not for the general public, it is generally for industry/commercial use. The connector is within the transmitter enclosure and can only be accessed by disassembly of the transmitter that is not normally required, the user has no access to the connector. Installation must be controlled. Installation requires special training.

This device complies with Part 15 of the FCC Rules.

This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and your body

2.4G WIF/BLE:

The max antenna gain (in dBi): 3.75 dBi

Antenna type: PCB Antenna



11. CE Conformity

Declaration of conformity

This product complies with the radio interference requirements of the European community. Hereby, Chengdu E-LINTER Information Technology Co., Ltd. declares that the product is in compliance with the essential requirements and other relevant provisions of RE Directive 2014/53/EU. You can find the Declaration of Conformity on www.e-linter.com.

RF frequency:

2.4G WIFI: 2412 MHz to 2472 MHz

BLE: 2402 MHz to 2480 MHz

RF power:

2.4G WIFI: 17.92 dBm

BLE: 8.03dBm

Manufacturer Name: Chengdu E-LINTER Information Technology Co., Ltd.

Address: No. 505, Building 6, Zone D, Tianfu Software Park, No. 599, Century City South Road, CDHT, Chengdu, Sichuan, China

* Applicable to Isolated Products