

# Bluetooth beacon

## Products Introduction

Model : CJ-IB10-EX

### **1. Product Overview :**

The Bluetooth-beacon sends its own information to work-card, including MAC address and battery quantity of electricity etc., for marking the position of geographical, its message will be collected by work-card and uploaded to base station by network.

### **2 . Product technical data :**

#### **Technology background :**

The advanced Bluetooth localization (ranging) technology is adopted. The chip is Nordic company nRF52810AA, and the development platform use V15.3. The protocol stack file is s12\_nrf52\_6.1.1\_softdevice, and the SDK supports Bluetooth V4.1 to 5.0

#### **Bluetooth technology characteristics :**

Old version UUID :

0xB5,0xB1,0x82,0xC7,0xEA,0xB1,0x49,0x88,0xAA,0x99,0xB5,0xC1,0x51,0x70,0x08,**0xD9** ( voltage free data )

New version UUID :

0xB5,0xB1,0x82,0xC7,0xEA,0xB1,0x49,0x88,0xAA,0x99,0xB5,0xC1,0x51,0x70,0x08,**0xDA** (Voltage data )

Legal: Bluetooth works in the 2.4GHz ISM band, which does not require a license from the IEEE 802.15.4 standard

Transmission mode: Asynchronous connection-less (ACL) advertising, synchronous connection-oriented (SOC) link

Transmit data: The status of the main device of the product. The cycle (default: 200ms) transmits broadcast data at the rate of 1MHz bps

Anti-interference: The network segment has 79 frequency points, spaced 1MHz, using frequency modulation technology, can change the frequency 1600 times per second, each time

lasting 625uS

Ultra-low power consumption: current below 6uA (3.6V 0dBm) while in sleep mode, sending current about 4.6mA, continuous 0.24ms

Comprehensive average current: 12uA (including 4uA sampling circuit)

Battery life: More than 10 years in theory, estimated battery life is about 8 years due to battery loss

Data security: Use Nordic Bluetooth protocol stack, AES HW encryption

Communication distance: 0-30 meters

Bluetooth chip: nRF52810-AA

#### **Physical design :**

This product is suitable for dangerous/pollution/damp/strong interference and other harsh environment.

Waterproof design: up to IP68 or above

Safety level: Primary safety level

Load-bearing grade: refer to manhole cover GB/T23858-2009, choose E600 type

#### **Direction of technology :**

**Positional accuracy :** The hardware is compatible with Bluetooth version 5.1, intend to adopt direction finding technology, thus the beacon can use AoD (emission Angle) to transmit multi-antenna array data; The work card is received by AoA and contains multiple antenna array data, it's positioning angles and distances through different arrival times. In theory, the accuracy can reach centimeter level, which makes preparation for the study of AoD & AoA algorithm.

### **3 . Product function description :**

The main components description as above and specific software design and functional requirements as follows:

In order to achieve the overall design goal system of personnel positioning, the system will use some beacon to be fixed where the human will pass, it own unique MAC

address or Device EUI (each MAC/ EUI address corresponds to a certain point in the map location) and battery voltage information.

In addition to the MAC/EUI address and battery capacity, UUID, major, and minor information are also sent for flexible configuration and sorting of the cloud computer.

Beacons themselves are major and minor (unique), which can be written at production time (Jlink command) and stored permanently

Active detection of beacon voltage (see "CJ-LB10G positioning card data manual V3.2"), battery shall be replaced if the battery's power energy is less.

It's strong and can withstand all kinds of harsh/dangerous environment, suitable for chemical, mining, medical and other industries.

Easy to install, reliable structure design, can be installed on the wall/road/ceiling, etc.

The uploaded data can be encrypted using the DES encryption standard and cannot be identified by other systems.

Extensible RFID function for clocking/identification.

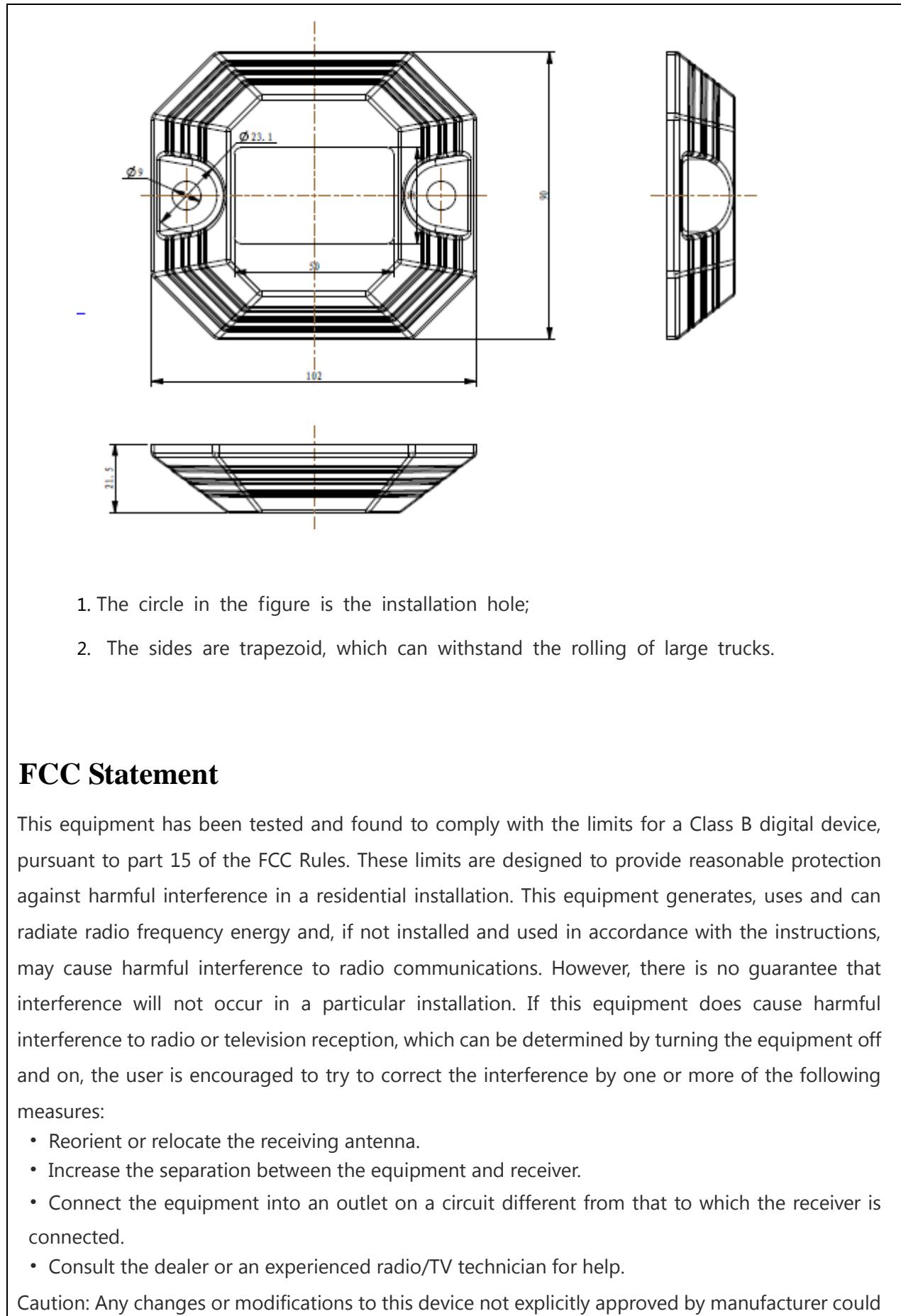
## **4 . Specific implementation methods and attached**

### **drawings:**

Product structure is compact, appearance meets user needs, beacon construction is light, easy installing, maintenance-free;

There are 2 mounting holes, use threaded screws, and fixed to the ground/wall or ceiling, with strong load-bearing/compressive capacity.

Such as the picture below :



## FCC 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 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.

Caution: Any changes or modifications to this device not explicitly approved by manufacturer could

void your 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) this device must accept any interference received, including interference that may cause undesired operation.

#### RF Exposure Information

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.