High-Precision UWB Anchors & Tags Introduction V1.4

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1 Introduction to anchor models and parameters

1.1 UWB wall-mounted anchor (PROANC-BG-F429).

PROANC-BG-F429 is a high-precision positioning anchor based on UWB. It uses STM32 MCU of ST Company as the main control chip, and carries the UWB high-power MAX2001-IPEX RF module and 10dB gain directional antenna independently developed by YCHIOT. The white curved surface design can be perfectly integrated with the indoor environment. The core patent radio frequency technology from YCHIOT enables PROANC to cover a wider range and have higher positioning accuracy.

1.1.1 UWB anchor PROANC basic parameters

Table 1.1 1 PROANC-BG-F429 positioning anchor specifications

Item	Specification
Power supply	DC 12V, > 1W
Built-in battery capacity	3000mAh (optional)
Product size	170mm * 86mm * 39mm
Radio frequency	3.7GHz – 4.2GHz， 6.2GHz – 6.7GHz
Support channels	500MHz Channel 2
Protocol standards	IEEE 802.15.4/FIRA standard
Typical transmit power	-22dBm
Data transfer rate	6.8Mbps
Antenna gain	10dBi
Data interface	Ethernet / USB
Ranging accuracy	The error is less than 10cm
Operating temperature	-40℃~60℃
Storage temperature	-40℃~85℃
Waterproof rating	IP67

1.1.2 User Guide

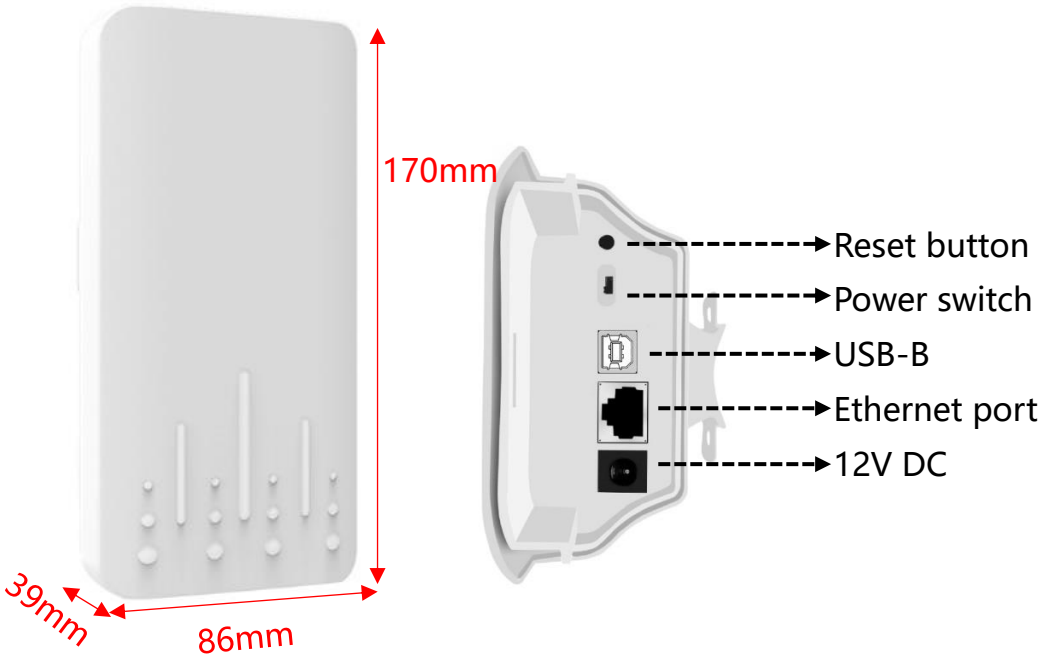


Table 1.1.2 Operation steps

	Procedure
Boot	Select USB or POE or 12V as the power supply mode, after the power is turned on, turn on the power switch, 4 LED indicators begin to flash, and the buzzer rings, indicating that the initialization is successful.
Work	The fourth work indicates that the LED light starts flashing for a short time, with a blink interval of 1 second.
Shutdown	Turn off the power switch and all LEDs turn off.
Ethernet access	The first command enables the Ethernet function, sets parameters such as I P, and when the first working indicator flashes, indicating that a TCPIP connection has been established.
Reset button	Long press and hold the reset button to restore initialization of the system.

1.2 UWB waterproof positioning anchor (PROANC-SD-F429).

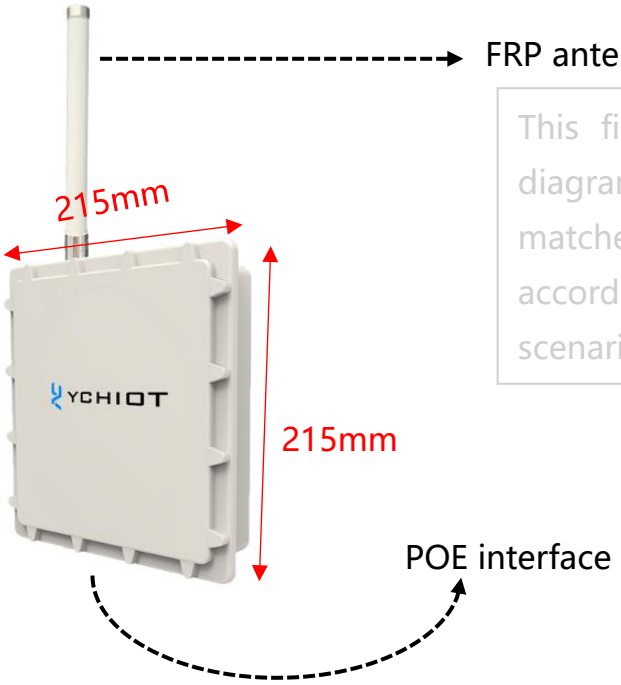
PROANC-SD-F429 is a high-precision positioning anchor based on UWB. It uses STM32 MCU of ST Company as the main control chip, and carries the UWB high-power MAX2001-IPEX radio frequency module and glass fiber reinforced plastic antenna independently developed by YCHIOT. This product is mainly used in harsh industrial control environments such as factories, mines, tunnels, and can also be used outdoors, with good waterproof and dust-proof effects.

1.2.1 UWB anchor PROANC basic parameters

Table 1.2.1 PROANC-SD-F429 positioning anchor specifications

Item	Specification
Power supply	DC 12V, > 1W / POE IEEE 802.3at
Product size	L=215mm * W=215mm * H=57mm
Radio frequency	3.7GHz – 4.2GHz， 6.2GHz – 6.7GHz
Support channels	500MHz Channel 2
Protocol standards	IEEE 802.15.4/FIRA standard
Typical transmit power	-22dBm
Data transfer rate	6.8Mbps
Antenna gain	10dBi
Data interface	Ethernet
Ranging accuracy	The error is less than 10cm
Operating temperature	-40℃~60℃
Storage temperature	-40℃~85℃
Waterproof rating	IP67

1.2.2 User Guide



This figure is only a schematic diagram, and the actual product matches the appropriate antenna according to the actual project scenario.

Table 1.2.2 UWB anchor PROANC-SD-F429 anchor operation steps

	Procedure
Boot	As soon as the POE is powered on, the system starts working immediately
Work	The LED is on
Shutdown	POE power down, the system into the shutdown state

1.3 UWB in-ceiling anchor (PROANC-XD-F429).

PROANC-XD-F429 is a high-precision positioning anchor based on UWB. It uses STM32 MCU of ST Company as the main control chip, and carries the UWB high-power MAX2001-IPEX RF module and directional antenna independently developed by YCHIOT. It is suitable for indoor positioning.

1.3.1 UWB anchor PROANC basic parameters

Table 1.3.1 PROANC-XD-F429 positioning anchor specifications

Item	Specification
Power supply	DC 12V, > 1W / POE IEEE 802.3at
Product size	D=204mm, H=45mm
Radio frequency	3.7GHz – 4.2GHz， 6.2GHz – 6.7GHz
Support channels	500MHz Channel 2
Protocol standards	IEEE 802.15.4/FIRA standard
Typical transmit power	-22dBm
Data transfer rate	6.8Mbps
Antenna gain	3dBi
Data interface	Ethernet
Ranging accuracy	The error is less than 10cm
Operating temperature	-40℃~60℃
Storage temperature	-40℃~85℃
Waterproof rating	IP55

1.3.2 User Guide

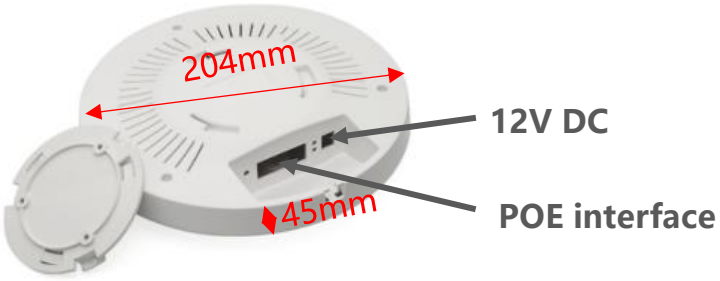


Table 1.3.2 UWB anchor PROANC-XD-F429 anchor operation steps

	Procedure
Boot	As soon as the POE is powered on, the system starts working immediately
Work	The LED is on
Shutdown	POE power down, the system into the shutdown state

2 Introduction to tag models and parameters

2.1 Locating tag (PROCARD-1T-NRF)

The UWB PROCARD indoor positioning card uses the NRF52832 MCU of Nordic Company as the main control chip, carries the UWB high-power MAX2001-CA radio frequency module independently developed by YCHIOT, and uses the indoor high-precision algorithm based on the UWB to realize the ultra-low power standby of the card, the receiving and sending control of the positioning package, etc. It can realize high-precision indoor positioning of the wearer. The built-in acceleration speed sensor of the work card can intelligently switch the positioning frequency of the personnel when they are moving or stationary to achieve standby with the lowest power consumption.

2.1.1 Specifications

Table 2 1.1 Locating tag specifications

Item	Specification
Battery capacity	800 mAh Li-ion
Charging interface	micro-usb
Endurance	2 months
Motion sensor	3-axis accelerometer
Motion refresh rate	1Hz
Quiescent refresh rate	0.2Hz
Product size	L=86mm * W=54mm * H=7mm
Radio Frequency	3.7GHz – 4.2GHz ， 6.2GHz – 6.7GHz
Support channels	500MHz Channel 2
Data transfer rate	6.8Mbps
Protocol standards	IEEE 802.15.4-2011 / FIRA standard
Position error	Positioning error within 10cm~20cm
Bluetooth	BLE 5.0

Operating temperature	-40℃~60℃
Storage temperature	-40℃~85℃
Waterproof rating	IP65

2.1.2 User Guide

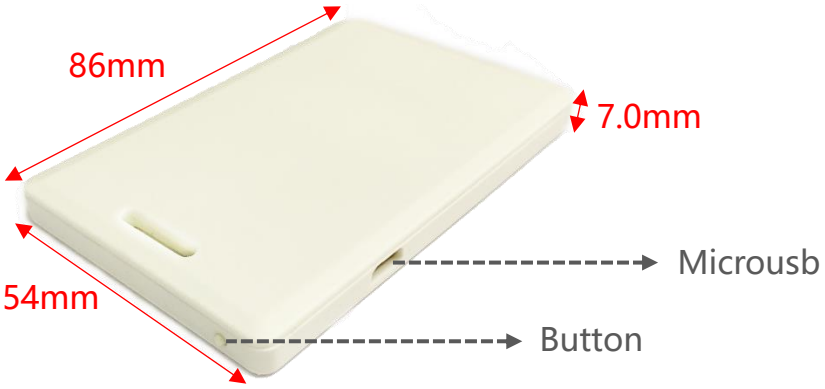


Table 2 1.2 UWB tag PROCARD tag operation steps

	Procedure
Boot	Press and hold the button for 3 seconds, the buzzer rings, release the button, and the work indicates that the LED light starts to flash, indicating that the boot is successful. The card will be powered on when charging.
Work	The operating indicator LED begins to blink briefly, at frequency consistent with the UWB ranging frequency.
Shutdown	In the power-on state, long press the button for 3 seconds, the buzzer sounds, release the button, indicating that the shutdown is successful.
charge	Charging wiring method: Insert one end of the supporting charging cable into the 5V DC charging adapter or computer, and the other end is connected to the micro USB interface of the U WB work card.

2.2 Locating tag (PROTAG-M)

The UWB PROTAG material label uses the NRF52832 MCU of Nordic Company as the master chip, carries the UWB high-power MAX2001-CA RF module independently developed by YCHIOT, and uses the indoor high-precision algorithm based on the UWB to realize the ultra-low power consumption standby of the work card, the receiving and sending control of the positioning package, etc. It can realize high-precision indoor positioning of the wearer. The built-in acceleration speed sensor of the work card can intelligently switch the positioning frequency of the personnel when they are moving or stationary to achieve standby with the lowest power consumption. Sensor, which can intelligently switch the positioning frequency when people are moving or stationary, to achieve standby with the lowest power consumption.

2.2.1 Specifications

Table 2 2.1 Locating tag specifications

Item	Specification
Battery capacity	370 mAh Li-ion
Charging interface	micro-usb
Endurance	1 months
Motion sensor	3-axis accelerometer
Motion refresh rate	1Hz
Quiescent refresh rate	0.2Hz
Product size	L=49mm * W=46mm * H=16mm
Radio Frequency	3.7GHz – 4.2GHz ， 6.2GHz – 6.7GHz
Support channels	500MHz Channel 2
Data transfer rate	6.8Mbps
Protocol standards	IEEE 802.15.4-2011 / FIRA standard
Position error	Positioning error within 10cm~20cm
Bluetooth	BLE 5.0
Operating temperature	-40℃~60℃
Storage temperature	-40℃~85℃

Waterproof rating	IP67

2.2.2 User Guide

Table 2 2.2 UWB tag PROTAG tag operation steps

	Procedure
Boot	Press and hold the button for 3 seconds, the buzzer rings, release the button, and the work indicates that the LED light starts to flash, indicating that the boot is successful. The card will be powered on when charging.
Work	The operating indicator LED begins to blink briefly, at frequency consistent with the UWB ranging frequency.
Shutdown	In the power-on state, long press the button for 3 seconds, the buzzer sounds, release the button, indicating that the shutdown is successful.
charge	Charging wiring method: Insert one end of the supporting charging cable into the 5V DC charging adapter or computer, and the other end is connected to the micro USB interface of the U WB work card.

2.3 Locating tag (PROTAG-N)

The UWB PROTAG shoulder plate type uses the NRF52832 MCU of Nordic Company as the main control chip, carries the UWB high-power MAX2001-CA radio frequency module independently developed by YCHIOT, and uses the indoor high-precision algorithm based on the UWB to realize the ultra-low power standby of the work card, the receiving and sending control of the positioning package, etc. It can realize high-precision indoor positioning of the wearer. The built-in acceleration speed sensor of the work card can intelligently switch the positioning frequency of the personnel when they are moving or stationary to achieve standby with the lowest power consumption.

2.3.1 Specifications

Table 2.3.1 Locating tag specifications

Item	Specification
Battery capacity	370 mAh Li-ion
Charging interface	micro-usb
Endurance	1 months
Motion sensor	3-axis accelerometer
Motion refresh rate	1Hz
Quiescent refresh rate	0.2Hz
Product size	L=49mm * W=46mm * H=16mm
Radio Frequency	3.7GHz – 4.2GHz， 6.2GHz – 6.7GHz
Support channels	500MHz Channel 2
Data transfer rate	6.8Mbps
Protocol standards	IEEE 802.15.4-2011 / FIRA standard
Position error	Positioning error within 10cm~20cm
Bluetooth	BLE 5.0
Operating temperature	-40℃~60℃
Storage temperature	-40℃~85℃
Waterproof rating	IP67

2.3.2 User Guide

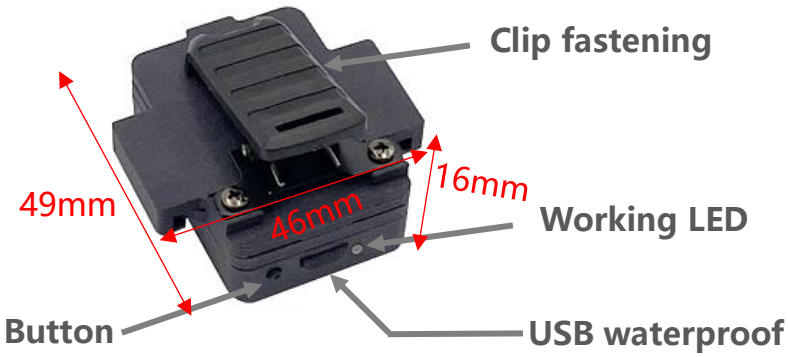


Table 2 3.2 UWB tag PROTAG-SL-3000 tag operation steps

	Procedure
Boot	Press and hold the button for 3 seconds, the buzzer rings, release the button, and the work indicates that the LED light starts to flash, indicating that the boot is successful. The card will be powered on when charging.
Work	The operating indicator LED begins to blink briefly, at frequency consistent with the UWB ranging frequency.
Shutdown	In the power-on state, long press the button for 3 seconds, the buzzer sounds, release the button, indicating that the shutdown is successful.
charge	Charging wiring method: Insert one end of the supporting charging cable into the 5V DC charging adapter or computer, and the other end is connected to the micro USB interface of the U WB work card.

2.4 Locating tag (PROTAG-H)

The UWB PROTAG safety helmet uses the NRF52832 MCU of Nordic Company as the main control chip, carries the UWB high-power MAX2001-CA radio frequency module independently developed by YCHIOT, and uses the indoor high-precision algorithm based on the UWB to realize the ultra-low power standby of the work card, the receiving and sending control of the positioning package, etc. It can realize high-precision indoor positioning of the wearer. The built-in acceleration speed sensor of the safety helmet can intelligently switch the positioning frequency of the personnel when they are moving or stationary to achieve standby with the lowest power consumption.

2.4.1 Specifications

Table 2 4.1 Locating tag specifications

Item	Specification
Battery capacity	370 mAh Li-ion
Charging interface	micro-usb
Endurance	1 months
Motion sensor	3-axis accelerometer
Motion refresh rate	1Hz
Quiescent refresh rate	0.2Hz
Product size	Locating tag: L=49mm * W=46mm * H=16mm Safety helmet: L=279mm * W=223mm * H=155mm
Radio Frequency	3.7GHz – 4.2GHz ， 6.2GHz – 6.7GHz
Support channels	500MHz Channel 2
Data transfer rate	6.8Mbps
Protocol standards	IEEE 802.15.4-2011 / FIRA standard
Position error	Positioning error within 10cm~20cm
Bluetooth	BLE 5.0
Operating temperature	-40℃~60℃
Storage temperature	-40℃~85℃
Waterproof rating	IP67

2.4.2 User Guide

Table 2 4.2 UWB cap PROTAG-SL-3000 operating steps

	Procedure
Boot	Press and hold the button for 3 seconds, the buzzer rings, release the button, and the work indicates that the LED light starts to flash, indicating that the boot is successful. The card will be powered on when charging.
Job	The operating indicator LED begins to blink briefly, at frequency consistent with the UWB ranging frequency.
Shutdown	In the power-on state, long press the button for 3 seconds, the buzzer sounds, release the button, indicating that the shutdown is successful.
charge	Charging wiring method: Insert one end of the supporting charging cable into the 5V DC charging adapter or computer, and the other end is connected to the micro USB interface of the U WB work card.

2.5 Locating alarming light (PROTAG-A)

The UWB alarm light uses the NRF52833 single-chip computer of Nordic Company as the main control chip, carries the UWB DW1000 RF module independently developed by YCHIOT, indoor high-precision algorithm based on UWB, and the receiving and sending control of ranging packets. It can realize the anti-collision function between forklifts.

2.5.1 Specifications

Table 2.5.1 Locating alarming light specifications

Item	Specification
Battery capacity	1200mAh Li-ion
Charging interface	DC socket
Silent working current	65mA
Alarm working current	200mA
Sound decibel	105dB
Motion sensor	3-axis accelerometer
Motion refresh rate	1Hz
Quiescent refresh rate	0.2Hz
Product size	D=96mm，H=165mm
Radio Frequency	3.7GHz -4.2GHz，6.2GHz – 6.7GHz
Support channels	500MHz Channel 2
Data transfer rate	6.8Mbps
Protocol standards	IEEE 802.15.4-2011 / FIRA standard
Position error	Positioning error within 10cm~20cm
Bluetooth	BLE 5.0
Operating temperature	-40℃~60℃
Storage temperature	-40℃~85℃
Waterproof rating	IP65

2.5.2 User Guide

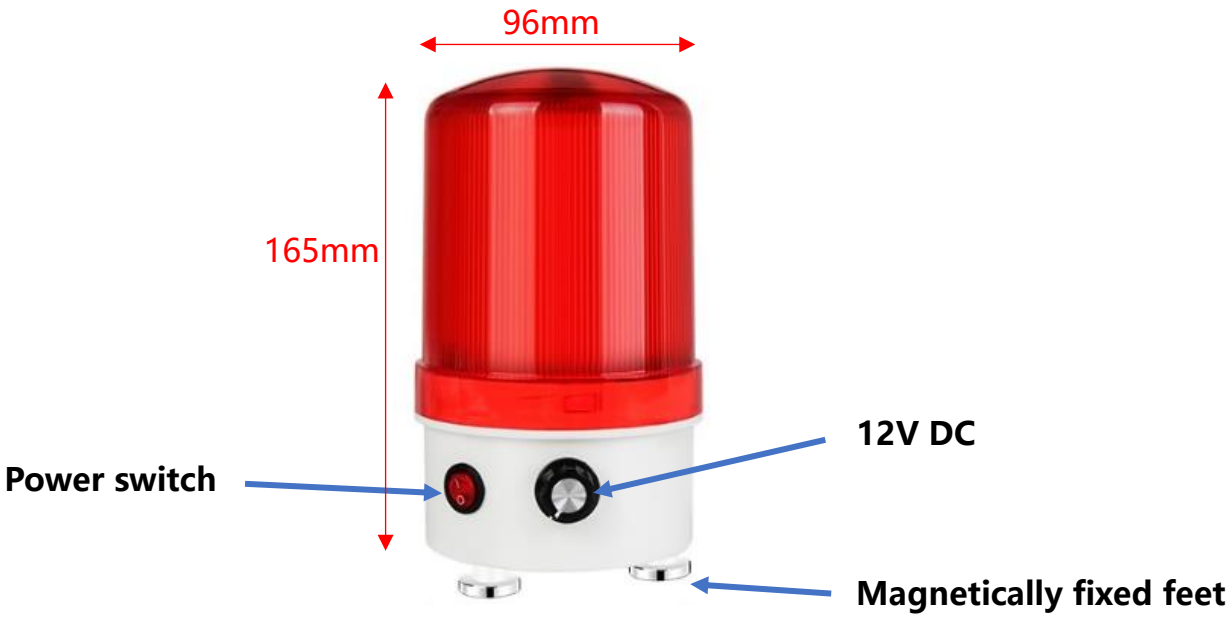


Table 2 5.2 UWB alarm light operation steps

	Procedure
Boot	Toggle the power switch to ON
Work	When the distance between the two UWB alarm lights is less than 1m from the set alarm distance, the alarm light will produce an audible and visual alarm
Shutdown	Toggle the power switch to OFF
Charge	Charging wiring method: Insert one end of the matching charging cable into a 220V socket, and the other end is connected to the UWB alarm light 12VDC interface.

2.6 Locating watch (PROTAG-B)

The positioning watch's main control chip uses NRF52832 to achieve low-power standby. The positioning scheme adopts DW1000 to achieve high-precision indoor TDOA algorithm based on UWB, which can achieve high-precision indoor positioning of wearers on the platform. The watch is equipped with an acceleration sensor, which intelligently switches the positioning frequency between moving and stationary personnel, achieving the lowest power consumption for standby. In addition, the watch is equipped with a heart rate sensor to periodically transmit the heart rate data of the monitored person. At the same time, the watch has an SOS distress function, which can achieve personnel positioning in safe monitoring situations such as nursing homes, construction sites, factories, mines, hospitals, prisons, etc.

2.6.1 Specifications

Table 2.6.1 Locating watch specifications

Item	Specification
Battery capacity	370 mAh Li-ion
Charging interface	Magnetic suction charging interface
Endurance	1 months
Motion sensor	3-axis accelerometer
Motion refresh rate	1Hz
Quiescent refresh rate	0.2Hz
Product size	Watch dial: L=44mm * W=46mm * H=19.5mm
Radio Frequency	3.7GHz – 4.2GHz， 6.2GHz – 6.7GHz
Support channels	500MHz Channel 2
Data transfer rate	6.8Mbps
Protocol standards	IEEE 802.15.4-2011 / FIRA standard
Position error	Positioning error within 10cm~20cm
Bluetooth	BLE 5.0
Operating temperature	-40℃~60℃

Storage temperature	-40℃~85℃
Waterproof rating	IP67

2.6.2 User Guide

表 2.6.2 Locating watch operation steps

	Procedure
Boot	Turn the power switch to ON
SOS	After the watch is successfully turned on, pressing and holding the 3s button will trigger an emergency call for help, and the watch will send the SOS call information to the background.
Shutdown	After turning on the computer, press the button 4 times continuously, with an interval of 1 second each time. Finally, press and hold until the screen disappears, indicating successful shutdown.
Charging	Connect the charging cable to the 5V DC charging adapter, and align the other end with the magnetic charging interface. The battery level is dynamically displayed when charging, and statically displayed when fully charged.
Heart rate detection	After turning on, a heart rate test will be performed every 8 minutes for about 20 seconds, and the test data will be transmitted to the background.

3 Document Management Information Table

Topic	YCHIOT High-Precision UWB Anchor & Tag Introduction
Version	V1.4
Reference	dw1000-datasheet-v2.08, QORVO DW1000_Software_API_Guide_rev2p7, QORVO UM004-UWB_MAX2001 User Manual _V1.6
Creation time	2020/7/14
Creator	Lynn
Latest release date	2022/09/01

Person	Modified Date	Document Change Record
Lynn	July 14th, 2020	V1.0 Product Brief
Lynn	Sept. 1st, 2020	V1.1 New product Alarming Light is introduced
Lynn	June 1st, 2021	V1.2 Add an introduction to locating watch
Lynn	Sept. 1st, 2022	V1.3 Errata
Lynn	Sept. 1st, 2023	V1.4 Errata