LW004-PB User Manual





# LW004-PB

User Manual

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# CONTENT

1 About this Manual	3
2 Product Introduction	3
2.1 Overview	
2.2 Application	
2.2.1 Working Principle	
2.2.2 Track people's movements	
2.2.3 Emergency button	
2.2.4 Motion Detect	
2.2.5 NFID Function	
2.3 Product Specifications	
2.3.1 Appearance	
2.3.2 LED Indicators and Button	
2.3.3 Product Datasheet	6
3 Set up Instruction	7
3.1 Turn on /off	7
3.2 Join Into Lora Network	7
3.3 Gateway Setup	
3.4 Parameters Configuration	
4 Standby mode	8
5 Alarm Mode	8
6 Advertising Packet	8
7 Uplink Payload	
8 Downlink Command	
8.1 Get Device Information	
8.1.1 Format	
8.1.2 Get Device Information Command Code List	12
8.2 Configure Device Information	15
8.2.1 Format	15
8.2.2 Configure Device Information Command Code List	15
9 MOKO LoRa APP	17
9.1 Install MokoLora APP	
9.2 Scan and Connect LW004-PB	
9.3 Main Page	
9.4 Get and Configure LoRaWAN Data	
9.5 Get and Configure Alarm Parameters	
9.6 Get and Configure GPS Parameters	
9.7 Get and Configure Scan Parameters	22
9.8 Uplink Data Test	
9.9 Device Info	
9.10 OTA	
9.11 Log	
10 Revision History	25

# **1 About this Manual**

The purpose of this manual is to outline how to apply LW004-PB in suitable scenarios, as well as how to configure and join into LoRa network.

# **2 Product Introduction**

## 2.1 Overview

The LW00-PB is a long-range panic button device for Class A type devices based on the LoRaWAN open protocol and is compatible with the LoRaWAN protocol. It is small, compact, and easy to use. The LW004-PB has Bluetooth and GPS for positioning and can be used for both indoor and outdoor tracker objects.

LW004-PB also has built in RFID and 3-axis accelerometer sensor. It can be used to employee attendance, access control, identity identification and motion detection.

## 2.2 Application

#### 2.2.1 Working Principle



#### 2.2.2 Track people's movements

LW004-PB can be used with BLE Beacons and GPS system. In general, the beacons position is fixed. No matter what mode the device is, the device will scan the beacons for at least 10 seconds(up to 600s) and turn on GPS for 3 minutes at the end of each reporting interval .Then device will select

the closest MAC beacon(up to four closest MAC beacon) which is based on your filter conditions before sending the data to the server. Finally, the beacon's information and gps data will be uploaded to server at the reporting timing.

Through the beacon information and GPS data, we can roughly know the position and moving trajectory of the people who wear the device.

Note: GPS data is only available outdoors.

#### 2.2.3 Emergency button

There is a red button on the front of the device. When people who wear the lw004-pb are in emergency, they can press the red button for alert, the device will come into alarm mode. In alarm mode, the yellow led of device will keep on blinking and the device motor will vibrate unless the device exit alarm.

Meanwhile, the device will report the GPS data and surrounding beacon's information. Through the beacon information and GPS data, we can roughly know the position and moving trajectory of the people who are in emergency and find and help the people faster.

Note: GPS data is only available outdoors.

#### 2.2.4 Motion Detect

LW004-PB built in 3-axis. There is 3-Axis sensor data in every uplink payload. It includes the acceleration value of X,Y,Z axis and the angle of relative to the X-axis and the Y-axis. Based on the value, user can judge the motion status and relative direction of device.

#### 2.2.5 RFID Function

LW004-PB built in RFID, it can be applied to access control, attendance applications, such as office buildings, residential areas, etc.

## **2.3 Product Specifications**

2.3.1 Appearance



#### 2.3.2 LED Indicators and Button

ltems	Indicator	Operation	Remark
Turn ON	Solid blue and keep 3S	Press and hold the power button for 5 seconds till the LED indicate blue and release. The LED will indicate blue for 3 seconds to show the LW004-PB is turned on.	
Turn OFF	Red LED Blink 3S	Press and hold the	

		power button for 5 seconds till the red indicator flashes quickly and release. The indicator will flash red for 3 seconds to show the LW004-PB is turned off.	
Join LoRa Network	Solid green and keep 3S	If the device had never Joined any network, after turning on, the device automatically sends join request	It will send join request automatic after power on the device or send "connect" request in APP
Login in	Green LED Blink 1S	Connect to the device via APP successfully	
Login out	Red LED Blink 1S	APP disconnect to the device	When the device in alarm status the indicator may be not visible
Trigger Alarm	Yellow LED Blink	Double click the alarm button	Either enters the alarm mode or send alarm message to server, there will also have vibration reminder
Exit Alarm	Alarm indicator LED turn off	Press alarm button and hold on 15S or send downlink command to exit alarm	
Firmware Upgrade	Green LED Blink during the upgrade Solid Blue and keep 3S after upgrade successfully Solid Red and keep 3S after upgrade failed	Firmware upgrade via OTA in DFU mode	
Charging	Blue LED blink	Plug in type-c charger	
Full Charged	Solid blue	Plug in type-c charger	
Low Battery Reminder	Red LED blink	Battery level lower than the set value	

#### 2.3.3 Product Datasheet

Please refer to the LW004-PB Datasheet for more details.

# **3 Set up Instruction**

## 3.1 Turn on /off

Items	Operation
Turn ON	Press and hold the power button for 5 seconds till the LED indicate blue and release. The LED will indicate blue for 3 seconds to show the LW004-PB is turned on.
Turn OFF	Press and hold the power button for 5 seconds till the red indicator flashes quickly and release. The indicator will flash red quickly for 3 seconds to show the LW004-PB is turned off.

### 3.2 Join Into Lora Network

To join LW004-PB into LoRa network to communicate with LoRa gateway. The network operation is as following:

1) If LW004-PB had never joined any network:

First, turn on the device.

**Second**, use Mokolora APP to connect the device then get required ID and Keys.

Default join ID and Keys as following:

DevEUI: BLE MAC+ FFFF,example:MAC:112233445566 DevEUI:112233FFFF445566 AppEUI: 526973696e674846 AppKey: 2b7e151628aed2a6abf7158809cf4f3c DevAddr: The last four bytes of BLE MAC address AppSKey: 2b7e151628aed2a6abf7158809cf4f3c NwkSkey: 2b7e151628aed2a6abf7158809cf4f3c

Third, register the device on Lora server

**Forth**, click connect on Mokolora APP to send a join request to Lora server, it will search an available LoRa network to join. The green indicator will stay on for 5 seconds to show it joins into the network, otherwise, the indicator will be off.

(2) If LW004-PB had been joined into a LoRa network, turn off and turn on the device, the green indicator will stay on for 5 seconds to show it joins into the network.

Note: About MokoLora APP details, please check the instructions in Chapter 9 Moke Lora APP

### 3.3 Gateway Setup

Before the gateway communicate with the LW004-PB Panic Button, please refer to your

gateway's user manual. If you use Moko LoRaWAN gateway MKGW2-LW, please refer to the *MOKO LoRaWAN Gateway MKGW2-LW Configuration Guide*.

## **3.4 Parameters Configuration**

Before you start configuring, prepare MokoLora APP.

1. To configure parameters through MokoLora APP, follow the instructions in *Chapter 9 Moke Lora* APP

2. To configure parameters through downlink command, follow the instructions in *Chapter 8 Downlink Command* 

# 4 Standby mode

After joining the network, the device will upload the device location information to the server within three minutes. The device will then be placed in standby mode or non-alarm mode, and the device location information can be uploaded according to the configured reporting interval.

In each cycle, the device will check the network connection via *LinkcheckReq Command*. If the LoRa network detects that it is disconnected, the device will first join the LoRa network and then send the device location information.

The longest battery life is more than one month in standby mode when the reporting interval is 720min and GPS search satellite time is 1min.

*LinkCheckReq: Used by an end-device to validate its connectivity to a network.It is from LoRaWAN standard protocol stack.* 

# **5** Alarm Mode

After the device is turned on and the alarm is triggered, the device motor will vibrate and Yellow indicator LED Blink. The alarm mode will remain until the "stop alarm" command is received, or the user presses and hold the alarm button for 15 seconds to exit the alarm mode.

In the alarm mode, the device uploads location information to the server every 10 seconds by default., and the user can configure the alarm mode reporting interval through the APP and downlink commands.

The shortest battery life is about 14hours in alarm mode when reporting interval is 10s, GPS and vibration are turn on.

# **6 Advertising Packet**

8	LW004-PB-85C5         CONNECT           E0:80:EC:C0:85:C5         NOT BONDED           NOT BONDED         ▲-51 dBm ↔ 890 ms	30E	20106	09FFE080ECC085C5630
	Device type: LE only	Detai	ls:	
	Advertising type: Legacy	LEN.	TYPE	VALUE
	Flags: GeneralDiscoverable,	2	0x01	0x06
	0	9	0xFF	0xE080ECC085C56303
	BrEdrNotSupported Manufacturer data (Bluetooth Core 4.1):	14		0x4C573030342D50422D383 54335
	Company: Reserved ID <0x80E0>	3	0x03	0xC3FF
	0xECC085C56303 Complete Local Name: LW004-PB-85C5 Complete list of 16-bit Service UUIDs: 0xFFC3	LEN length of EIR packet (Type + Data) in bytes, TYPE - the data type as in <u>https://www</u> .bluetooth.org/en-us/specification/assigned -numbers/generic-access-profile		

- MAC address-0XE0 80 EC C0 85 C5
- Battery level-0X63 (99%)
- Device type-0x03
- Device advertising name-0x4C 57 30 30 34 2D 50 42 2D 38 35 43 35(LW004-PB-85C5)
- server UUID-FFC3

# 7 Uplink Payload

The uplink data packet includes battery levels, alarm status, GPS data, and the nearest MAC beacon, 3- axis data. 3-axis data can be used to judge the status of the device.

Byte Index	Туре	Data Type	Value	Description
1	Battery Level	Unit	0X00-0X64	
2	Alarm Status	Unit	0X00,0X01	00: alarm off, 01:alarm on
3-6	GPS Latitude	Int	0X000000- 0XFFFFFF	The data format is little-endian. After the hex data converts to decimals, the calculation formula is (decimal value)x90/8388607 degree. Positive Value indicates northern latitude, Negative Value shows southern latitude
7-10	GPS Longitude	Int	0X000000- 0XFFFFFF	The data format is little-endian, after the hex data converts to decimals, the calculation formula is (decimal value)x180/8388607 degree. Positive Value indicates eastern longitude, Negative Value shows western longitude

11-16	1 <sup>st</sup> MAC Beacon	Unit	0X0000000000	If need
	Address		00- OXFFFFFFFFFFF F	
17	1 <sup>st</sup> MAC Beacon RSSI	Unit	0X00-0XFF	If need, convert the hex data to decimals, and then Minus 256
18-23	2 <sup>nd</sup> MAC Beacon Address	Unit	OX0000000000 OO- OXFFFFFFFFFF F	If need
24	2 <sup>nd</sup> MAC Beacon RSSI	Unit	0X00-0XFF	If need, convert the hex data to decimals, and then Minus 256
25-30	3rd MAC Beacon Address	Unit	OX000000000 OO- OXFFFFFFFFFF F	If need
31	3rd MAC Beacon RSSI	Unit	0X00-0XFF	If need, convert the hex data to decimals, and then Minus 256
32-37	4th MAC Beacon Address	Unit	OX000000000 OO- OXFFFFFFFFFF F	If need
38	4th MAC Beacon RSSI	Unit	0X00-0XFF	If need, convert the hex data to decimals, and then Minus 256
39-40	X-axis acceleration	Int	0X0000-0XFFFF	The data format is big- endian. After the hex data converts to decimals, the calculation formula is (decimal value)x2/32768,unit:g
41-42	Y-axis acceleration	Int	0X0000-0XFFFF	The data format is big- endian. After the hex data converts to decimals, the calculation formula is (decimal value)x2/32768,unit:g
43-44	Z-axis acceleration	Int	0X0000-0XFFFF	The data format is big- endian. After the hex data converts to decimals, the calculation formula is (decimal value)x2/32768,unit:g
45-46	Angular	Unit	0X0000-0XFFFF	The angular is relative to the X- axis and the Y-axis. The data format is a big-endian unit: degree

Example:2F 01 79 51 2B 00 77 66 51 00 D9 19 4D 75 0B 33 BF 00 D0 00 6C 03 A2 00 0E

2F: battery level 47%

01: alarm status on

79 51 2B 00: GPS Latitude, the normal byte order is 00 2B 51 79, the first byte 00 is sign bit, it is the convert to decimal is 2838905, the actual latitude is 2838905\*90/8388607=30.45814996458888 degree

77 66 51 00: GPS Longitude, the normal byte order 00 51 66 77, the first byte 00 is sign bit, it is the convert to decimal is 5334647, the actual latitude is 5334647\*180/8388607=114.4691198431396 degree

D9 19 4D 75 0B 33: the 1st Beacon MAC

BF: convert BF to 191, the 1st Beacon RSSI is 191 - 256 =-65 dbm

00 D0: X-axis acceleration, it is the convert to decimal is 208, the actual value is 208x2/32768=0.0126953125 g

00 6C: Y-axis acceleration, it is the convert to decimal is 108, the actual value is 108x2/32768=0.006591796875 g

03 A2: Z-axis acceleration, it is the convert to decimal is 930, the actual value is 930x2/32768=0.0567626953125 g

00 OE: The angular relative to the X-axis and the Y-axis, the actual value is 14 degree.

## **8 Downlink Command**

For the commands used to configure and read device information, please refer to the following details.

*Note:* LW004-PB supports downlink getting and configuring the device parameter in CLASS A.

### 8.1 Get Device Information

#### 8.1.1 Format

The response will be received after sending the message on LoRa server to get the device information. The response message has two types: get information success or failure. The message is sent in the downlink window, and the response information is displayed through the uplink window.

Message type	Direction	Header code	Command code	Data length	Data	End code
The message for getting device information	Downlink	0xED	See below 'Get device information code list'	none	none	OXEE
Response for getting device information success	Uplink	OXED		Read data length	Data value	None
Response for getting device information failure	Uplink	OXED	See below 'Get device information code list'	None	None	OXFF

**Note:** The wrong command code sent or the system is busy may cause to get device information fails. If the device RX window is not opened, or the message sends failed, it will no response.

#### 8.1.2 Get Device Information Command Code List

Command code	Description	Data type	Data length	Example	Remark
0x05	Get BLE firmware	String (ASCII)	max 17 bytes	Send:ED05EE Response:ED050656312E302E34	
0x06	version Get LORA firmware version	Unit	max 17 bytes	(Get BLE version V1.0.4) Send:ED06EE Response:ED060401000300 (Get LoRa version 1.0.3)	
0x07	Get DevAddr	Unit	4 bytes	Send:ED07EE Response:ED0704ECC085C5 (Get DevAddr ECC085C5 )	
0x08	Get NwkSKey	Unit	16 bytes	Send:ED08EE Response:ED08102B7E151628AED 2A6ABF7158809CF4F3C (Get DevAddr 2B7E151628AED2A6ABF7158809C F4F3C)	
0x09	Get AppSKey	Unit	16 bytes	Send:ED09EE Response:ED09102B7E151628AED 2A6ABF7158809CF4F3C	

				(Get AppSKey 2B7E151628AED2A6ABF7158809C F4F3C )	
0x0A	Get DevEUI	Unit	8 bytes	Send:ED0AEE Response:ED0A08112233FFFF445 566 (Get DevEUI 112233FFFF445566)	
0x0B	Get AppEUI	Unit	8 bytes	Send:ED0BEE Response:ED0B0870B3D57ED002 6BE6 (Get AppEUI 70B3D57ED0026BE6 )	
0x0C	Get AppKey	Unit	16 bytes	Send:ED0CEE Response:ED0C102B7E151628AED 2A6ABF7158809CF4F3C (Get AppKey 2B7E151628AED2A6ABF7158809C F4F3C)	
0x0D	Get Region/Subn et	Unit	1 byte	Send:ED0DEE Response:ED0D0100 (Get Region/Subnet 00:EU868)	00:EU868 01:US915 03:CN779 04:EU433 05:AU915 07:CN470 08:AS923 0A:IN865
0x0E	Get LoRaWAN Class	Unit	1 byte	Send:ED0EEE Response:ED0E0101 (Get LoRaWAN Class 01:CLASS A)	
0x0F	Get activation mode	Unit	1 byte	Send:ED0FEE Response:ED0F0101 (Get activation mode 02:OTAA)	01:ABP 02:OTAA
0x10	Get GPS sleep time	Unit	4 bytes	Send:ED10EE Response:ED1004D0020000 (The data format is little-endian. Get GPS sleep time 02D0 convert to decimal is 720min)	Unit:min
0x11	Get network connection status	Unit	1 byte	Send:ED11EE Response:ED110101 (Get network connection status 01:connected)	00:disconnec ted 01:connected 02:connectin g
0x32	Get uplink message type	Unit	1 byte	Send:ED32EE Response:ED320100 (Get uplink message type 00:unconfirmed message)	00:unconfirm ed 01:confirmed
0x2B	Get BLE scan filter name	String (ASCII)	Max 11 bytes	Send:ED2BEE Response:ED2B00	

				(Get scan filter name empty)	
0x2C	Get BLE scan	Unit	1 byte	Send:ED2CEE	unit:-dBm
	filter RSSI			Response:ED2C0164	
				(Get scan filter RSSI 64 convert to	
				decimal is 100)	
0xC0	Get alarm	Unit	1 bytes	Send:EDC0EE	alarm on: 01
	status			Response:EDC00100	alarm off: 00,
				(Get alarm status 00:alarm off)	
0xC1	Get alarm	Unit	2 byte	Send:EDC1EE	unit:s
	report		,	Response:EDC1020A00	
	interval			(Get alarm report interval 000A	
				convert to decimal is 10)	
0xC2	Get alarm	Unit	1 bytes	Send:EDC2EE	01:single click
	trigger mode			Response:EDC20102	02:double
				(Get alarm trigger mode	click
				02:double click)	03:long press
0xC3	Get vibration	Unit	1 bytes	Send:EDC3EE	00:vibration
UNCS	sensor switch		1 bytes	Response:EDC30100	off
	status			(Get vibration sensor switch status	-
				00:off)	on
0xC4	Get GPS	Unit	1 bytes	Send:EDC4EE	00:GPS off
UNC-	switch status		1 bytes	Response:EDC40101	01:GPS on
				(Get GPS switch status 01:on)	01.01.5 011
0xC5	GPS search	Unit	1 bytes	Send:EDC5EE	
0,00	satellite time		LOYCES	Response:EDC50103	
				(Get GPS search satellite time 03)	
0xC7	Get MAC	Unit	0-6 hvtes	Send:EDC8EE	
UNC/	Address filter		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Response:EDC70299E7	
	condition			(MAC Filter : 99 E7)	
0xC8		Unit	0/4	Send:EDC8EE	Convert to
UNCO	filter		bytes	Response:EDC8040A001E00	decimal
	condition		bytes	(Major Filter : 10-30)	0A00: 10
	condition				1E00: 30
0x C9	Get Minior	Unit	0/4	Send:EDC9EE	Convert to
	filter		bytes	Response:EDC9040A001E00	decimal
	condition		bytes	(Minor Filter : 10-30)	0A00: 10
	condition				1E00: 30
0xCA	Get UUID	Unit	0-16	Send:EDCAEE	1200.30
	filter		bytes	Response:EDCA04000A001E	
	condition		bytes	(UUID Filter : 00 0A 00 1E )	
0xCC	Get Low	Unit	1 byte	Send:EDCCEE	Convert to
UNCC	power		Loyce	Response:EDCC010A	decimal
	prompt value			(Low power prompt value : 10%)	0A: 10
			1 buto	Send:EDCDEE	
0xCD	Get Motor	Unit	1 byte		Convert to
	vibration			Response: EDCD010A	decimal
0	intensity	1.1	4 1- 1	(Motor vibration intensity : 10% )	0A: 10
0xCF		Unit	1 byte	Send:EDCFEE	Convert to
	of reported			Response:EDCF0101	decimal

	device			(Quantity of reported device : 1)	01: 1
0xD2	Get network	Unit	1 byte	Send:EDD2EE	Convert to
	check cycle			Response:EDD20104	decimal
				(Network check cycle : 4 H )	04: 4

## 8.2 Configure Device Information

#### 8.2.1 Format

The response will be received after sending the message on LoRa server to get the device information. The response message has two types: configure device parameter success or failure. But the format is same. The message is sent in the downlink window, and the response information is displayed through the uplink window.

Message type	Direction	Header code	Command code	Data Length	Data
The message for configuring device information	Downlink	0xED	See below configure command code list	The total length of the configure data	Data value
Response	Uplink	OXED	See below configure command code list	0X01	OXAA: configure success OXFF: configure failed

**Note:** The wrong command code sent or the system is busy may cause to configure device information fails. If the device RX window is not opened, or the message sends failed, it will no response.

#### 8.2.2 Configure Device Information Command Code List

Command	Description	Data	Data	Example	Remark
code		type	length		
0x37	Configure	Unit	4	Send:ED370401959C	
	DevAddr		bytes	F3	
				Response:ED3701AA	
0x38	Configure	Unit	16	Send:ED38102B7E15	
	NwkSKey		bytes	1628AED2A6ABF715	
				8809CF4F3C	
				Response:ED3801AA	
0x39	Configure	Unit	16	Send:ED39102B7E15	
	AppSKey		bytes	1628AED2A6ABF715	

DevEUIbytes696E674846 Response:ED3A01AA0x3BConfigure AppEUIUnit8Send:ED3808526973 696E674846 Response:ED3801AA0x3CConfigure AppKeyUnit16Send:ED3C01287215 1628AED2A6ABF715 8809CF432C Response:ED30101A0x3DConfigure Frequency planUnit1 bytesSend:ED300101 00:EU868 01:US915 07:CN470 08:AS923 0A:IN8650x3FConfigure Frequency planUnit1 byteSend:ED300101 Response:ED30010401:EU868 01:US915 07:CN470 08:AS923 0A:IN8650x3FConfigure activation modeUnit1 byteSend:ED300101 Response:ED3001AA01:ABP mode; 02:OTAA mode0x40Configure GPS sleep timeUnit4Send:ED40043C0000 DytesThe data format is 00 00 11:Itle-endian, Unit: Response:ED3001AA0x6AConfigure scan filter nameString(A SCII)Max. 11 bytesSend:ED6A044D4F48 Response:ED6A01AAIf no need filter name, send data Response:ED6A01AA0x6BConfigure configure UUnit1 byteSend:ED6F0101 Response:ED6B01AAO1: Confirmed O1: confirmed0x74Configure U uplinkUnit1 byteSend:ED75023C00 Response:ED701AAUnit :s 01: confirmed0x75Configure uplinkUnit1 bytesSend:ED75023C00 Response:ED7501AAUnit :s 01: confirmed0x76Configure uplinkUnit1 bytesSend:ED75023C00 Response:ED7501AAUnit :s 01: confirmed0x76Configure <br< th=""><th></th><th colspan="2"></th><th></th><th></th><th></th></br<>						
Dx3AConfigure DevEUIUnit bytes8 bytesSend:ED3A08526973 696E674846 Response:ED3A01AADx3BConfigure AppEUIUnit bytes8 696E674846 Response:ED3B08526973 696E674846 Response:ED3B01AADx3CConfigure AppKeyUnit bytes16 1628AED2A6ABF715 8809Cr4F3C Response:ED3D01AADx3DConfigure Frequency planUnit Unit I1 byteSend:ED3D0101 Send:ED3D0101 00:EU868 01:US915 Response:ED3D01AADx3FConfigure Frequency planUnit I1 byteSend:ED3D0101 Response:ED3D01AADx3FConfigure GPS unitUnit I1 byteSend:ED40043C0000 Response:ED3D01AADx40Configure GPS unit activation modeString(A Mx11Send:ED40043C0000 Response:ED3D01AADx6AConfigure String(A unit unitMx11Send:ED40043C0000 Response:ED3D01AADx6AConfigure scan filter scan filter RSIString(A Mx11Mx11Dx6FConfigure uplink message typeUnit 1 byte1 byte Send:ED670101 Response:ED6801AADx74Configure to uplink message typeUnit 1 byte1 byte Send:ED7501AAADx75Configure uplink metronUnit 1 byteSend:ED750101 Response:ED7501AADx76Configure uplink metronUnit 1 byte1 byte Send:ED7501AADx76Configure uplink metronUnit 1 byte1 byte Send:ED7501AADx77Configure uplink metronUnit 1						
DevEUIbytes696E674846 Response:ED3A01AA0x38Configure AppEUIbytesSend:ED3808526973 696E674846 Response:ED301AA0x3CConfigure AppKeyUnit16Send:ED3C0287E15 1628AED2A6ABF715 8809CF4F3C Response:ED301AA0x3DConfigure planUnit1 bytesSend:ED3D01AA0x3DConfigure requency planUnit1 bytesSend:ED3D01AA0x3DConfigure activation modeUnit1 bytesSend:ED3D01A10x3FConfigure activation modeUnit1 bytesSend:ED3D01A10x40Configure GPS unitUnit activation mode1 bytesSend:ED3D01A10x40Configure GPS unitUnit activation mode1 bytesSend:ED3D01A10x6AConfigure GPS unitUnit bytes1 bytesSend:ED3D01A10x6AConfigure GPS unitUnit bytes1 bytesSend:ED40043C0000 Response:ED3D01AAThe data format is intel-endian, Unit: Response:ED3D01AA0x6AConfigure scan filter RSSIUnit bytes1 bytesSend:ED6A01AAED6A000x6FConfigure uplink message typeUnit unit1 byteSend:ED66013C Response:ED601AAUnit:-dBm canificer Response:ED6701A0x76Configure du unit intervalUnit unit1 byteSend:ED7501AA01: confirmed Response:ED7501AA0x77Configure unit unitrion intervalUnit unit1 byteSend:ED770100 Response:ED750					Response:ED3901AA	
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0x77Configure vibration statusUnit1 byteSend:ED770100 Response:ED7701AA00:vibration off 01: vibration on0x78Configure GPSUnit1 byteSend:ED78010000:GPS off		-			Response:ED7601AA	02:double click
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vibration statusResponse:ED7701AA vibration on0x78Configure GPSUnit1 byteSend:ED78010000:GPS off	0x77	Configure	Unit	1 byte	Send:ED770100	
statusSend:ED780100O0:GPS off0x78Configure GPS Unit1 byteSend:ED78010000:GPS off		-				vibration on
0x78 Configure GPS Unit 1 byte Send:ED780100 00:GPS off						
	0x78		Unit	1 bvte	Send:ED780100	00:GPS off

0x79	Configure GPS search satellite time	Unit	1 byte	Send:ED790101 Response:ED7901AA	Range:1-10 Unit :min
0x81	Configure mac address filter condition	Unit	0-6 bytes	Send:ED810299E7 Response:ED8101AA	MAC filter :99 E7
0x82	Configure major filter condition	Unit	0/4 bytes	Send:ED82040A001E 00 Response:ED8201AA	Convert to decimal
0x83	Configure minor filter condition	Unit	0/4 bytes	Send:ED83040A001E 00 Response:ED8301AA	Little-Endian Convert to decimal
0x84	Configure UUID filter condition	Unit	0-16bytes	Send:ED84040A0B0C 1D Response:ED8401AA	UUID filter: 0A 0B 0C 0D
0x86	Configure low power prompt value		1	Send:ED86010A Response:ED8601AA	Convert to decimal 0A:10 low power prompt value :10%
0x87	Configure motor vibration intensity	Unit	1	Send:ED870132 Response:ED8701AA	Convert to decimal 32:50 Motor vibration intensity: 50%
0x89	Configure quantity of reported device	Unit	1	Send:ED890101 Response:ED8901AA	Quantity of reported device: 1
0x8B	Configure network check cycle	Unit	1	Send:ED8B0104 Response:ED8B01AA	Convert to decimal 04: 4 Network check cycle:4H

# 9 MOKO LoRa APP

For the detailed operation of the Moko Lora app to configure and read device information, please refer to the following instructions:

## 9.1 Install MokoLora APP

User can get the APP download link from below QR code,or search "MokoLora" in your phone APP store: Please allow bluetooth to be enabled during the installation process. This APP communicates with the device through bluetooth, and it only supports above android4.4 and IOS9.0 system.



## 9.2 Scan and Connect LW004-PB

After the device is turned on, the device Bluetooth starts broadcasting. Open the APP, and you can search the LW004-PB device by pulling down the APP screen. The distance between the phone and the device should be kept within 10m without wall obstruction. Otherwise, the device will not be searched. After searching for the device, click the device name to connect the device. The default broadcast name of the device: LW004-PB-XXXX, XXXX is the last 4 bits of device MAC addresses.





click the device name to connect the device that you want to configure. Then you should enter the password, the default password is "Moko4321".

**Noted:** If a password is not entered within one minute, the login box will disappear, you should click "CONNECT" again.

## 9.3 Main Page

The APP main page will be displayed as below after the APP connects with the device successful.

< LW004-	РВ
LoRaWAN Status	Disconnected
Alarm status	Off
Setting	>
Uplink Data Test	>
Device Info	>
OTA	>
Log	>

LoRaWAN Status: There are three different network status Disconnected,Connecting and Connected Alarm status: On or Off Function menu bar: Setting,Uplink Data Test,Device Info,OTA,Log

**Noted:** If there is no action within two minutes after login, the system will automatically login out.

### 9.4 Get and Configure General Device Parameter

< s	etting	C Device Setting	
Device Setting	>	Low Power Prompt Setting	10%
LoRa Setting	OTAA/CN779/ClassA 〉	"When the battery is less than or equal to 10%, flashe once every 30 seconds.	
Alarm Setting	>	Change Password	>
GPS Setting	>	Network Check Cycle	255 Н
Scan Setting	>		

Come into setting interface. In the Device Setting page we can get and configure some general parameter.

Low power prompt setting: The default value is 10%. There are 6 options: 10%,20%,30%,40%,50%,60%

Change password: The default password is "Moko4321".Length of password: 8 characters (ASCII visible characters).Users need to enter the same contents twice to modify password.

Network check cycle: The default is 255. The value ranges from 0-255. 255 means that the device will check the network connection before every message is uploaded.0 means that the device will never check the network connection. 1-254 means that the device will check the network connection (1-254) hours.

**Noted:** Some LoRa Server platforms did not support this network check function, for example TTN server, if you want use device in these platforms, should set the network check cycle to 0.

abf7158809cf4f3d

O Confirmed

must greater than the

dvanced settings

Min

l 720

nal)

## 9.5 Get and Configure LoRaWAN Data

OTAA/CN779/Class	<ul> <li>A</li> <li>A</li></ul>	AppEUI AppKey Region/S	cf4877ffff7668a 526973696e674 2b7e151628aed
OTAA/CN779/Class	>	AppEUI AppKey Region/S	526973696e674 2b7e151628aed
	>	AppKey Region/S	2b7e151628aed
		Region/S	
	>		Subnet
		Message	e Type 🛛 🖲 Unconfi
		Non-Ala	Irm Reporting inte
			m reporting inter ellite search time.
		Advand	ced Setting(O
			ease do not modi ecessary.
			*No-alar GPS sate Advanc Note:Ple

Come into set interface. In the LoRa setting page we can get and configure the LoRaWAN Mode,DevEUI,AppEUI,AppKey,D evAddr,AppSKey,NwkSKey,Regio n/Subnet,Message Type,Reporting interval.

Please notes the reporting interval in this page is no-alarm mode reporting interval. And it must greater than the GPS satellite search time.

The default non-alarm reporting interval is 720min.The value ranges from 1-14400mins

	LoRa Setti	
LoRaWA	AN Mode O ABP	οταα
DevEUI	cf4877ffff7668a0	
AppEUI	526973696e674846	
АррКеу	2b7e151628aed2a6ab	of7158809cf4f3c
Region/	Subnet	CN779
Message	e Type 🛛 Unconfirmed	O Confirmed
	arm Reporting interval rm reporting interval m	
	ellite search time.	
	ced Setting(Optior	
	ease do not modify adv necessary.	vanced settings
	Connect	

Click the Advanced Setting (Optional) button, you can set some advanced parameters( CH, DR, ADR ).

**Noted:** Please do not modify advanced settings unless necessary.

## 9.6 Get and Configure Alarm Parameters

<	Setting	< Alarm Setting	
Device Setting	>	Vibration Switch	
LoRa Setting	OTAA/CN779/ClassA >	Trigger Mode Double click	
Alarm Setting GPS Setting	>	Alarm Report Interval 10	s
Scan Setting	>	BLE Scan time     10       * 10s before each data upload, the Bluetoo begins to scan.     Quantity of Reported Device       Quantity of Reported Device     1	S
		Save	

Alarm Report Interval: configure the report interval in alarm mode. The default setting is 10s, the range is 10-600s.

BLE Scan time: The default setting is 10s, 10s before each data upload, the Bluetooth begins

Come into setting interface. In the Alarm Setting page we can get and configure some alarm parameter.

Vibration Switch: configure the vibration on or off in alarm mode. The default setting is on.

Trigger Mode: configure the alarm button trigger mode single click, double click or long press. The default setting is double click.

Quantity of reported device: The number of devices reported in a single scan cycle can be configured from 1 to 4, and the default is 1.

## 9.7 Get and Configure GPS Parameters

< Setting	<	GPS Settir	ng
Device Setting	> GPS	S Switch	
oRa Setting OT	AA/CN779/ClassA >	ellite Search Time	3
Alarm Setting	>	enite Search Thine	5
GPS Setting	>		
Scan Setting	>		
		Save	

Come into setting interface. In the Alarm Setting page we can get and configure some GPS parameter.

GPS Switch: configure the GPS function on or off. The default setting is on.

Satellite Search Time: Configure the GPS search satellite time, it is also the time of GPS turn on in one no-alarm report interval. It is recommended to configure GPS search satellite time

### **9.8 Get and Configure Scan Parameters**

		< Scan Setting		< Scan Setting	
< Setting		RSSI FILTER (-127dBm-0dBm)			
Device Setting	>	•	-127dBm	Filter by MAC Address	
LoRa Setting OTAA/0	CN779/ClassA >	*The Beacon will store valid ADV data with RSSI -127dBm.	no less than		
Alarm Setting	>	Filter by MAC Address		Filter by ADV Name	
GPS Setting	$\geq$	Filter by ADV Name		Filter by iBeacon Proximity UUID	
Scan Setting	>	Filter by iBeacon Proximity UUID			
		Filter by iBeacon Major		Filter by iBeacon Major	
		Filter by iBeacon Minor		From 0-65535 To 0-65533	
		Filter by Raw ADV Data		From <u>0-65535</u> To <u>0-6553</u>	
				Filter by Raw ADV Data +	- 💽
				Data Type	Byte
		Save		, Save	

Come into setting interface. In the Alarm Setting page we can get and configure some scan parameter.

RSSI FILTER: The default value is -127 dBm, the range of this value is from -127dBm to 0 dBm. For example, if user set this value to -100dBm, the device will store valid ADV data with RSSI from 0 to - 100dBm.

Filter by MAC Address: The default status is off. When we click the button on the right, the status will be on and user can edit the Keyword that include part or all of MAC Address. The device will store valid ADV data that meets the filter conditions.

Filter by ADV Name: The default status is off. When we click the button on the right, the status will be on and user can edit the Keyword that include part or all of ADV name. The device will store valid ADV data that meets the filter conditions.

Filter by iBeacon major: The default status is off. When we click the button on the right, the status will be on and user can set the min value and max value of iBeacon Major. Both of these values range from 0-65535, and the max value must be no less on the min value. The device will store valid ADV data whose major value meets the scope requirements.

Filter by iBeacon minor: The default status is off. When we click the button on the right, the status will be on and user can set the min value and max value of iBeacon Minor. Both of these values range from 0-65535, and the max value must be no less on the min value. The device will store valid ADV data whose minor value meets the scope requirements.

Filter by Raw ADV Data: The default status is off. When we click the button on the right, the status will be on, and it can add five different filter data types in total when click "+". Data Type: 1byte, the data type value should meet Bluetooth Generic Access Profile.Data type definitions please refer to <u>https://www.bluetooth.com/specifications/assigned-numbers/generic-access-profile/</u>.

Byte: the byte range under the data type, the max range is 29 bytes. Raw data field: the length should match with the byte range.

## 9.9 Uplink Data Test

< LW	004-PB
LoRaWAN Status	Disconnected
Alarm status	Off
Setting	$\rightarrow$
Uplink Data Test	$\rightarrow$
Device Info	$\rightarrow$
OTA	$\rightarrow$
Log	>

Uplink data test: When LoRaWAN Status on the main page shows connected, but no Data has been transmitted, a real-time message (the default is the current date and time) can be sent to the server through the Uplink Data Test interface of the APP. If the server fails to receive the message, it indicates that the network connection is abnormal.

## 9.10 Device Info

< LW004-PB		C Device Info	
LoRaWAN Status	Disconnected	Company Name	МОКО
Alarm status	Off	Model Name	LW004-PB
Setting	>	BLE Firmware Version	V1.0.9
Uplink Data Test	>	Lora Firmware Version	1.0.3
Device Info	>		
ΟΤΑ	>		
Log	>		

# Device Info: get device information and firmware version

## 9.11 OTA

< LW004-F	Р	< ота
LoRaWAN Status	Disconnected	
Alarm status	Off	$\sim$
Setting	>	MOKO LoRa
Uplink Data Test	>	<b>S</b>
Device Info	>	
ΟΤΑ	>	Firmware
Log	>	
		Upgrade Module BLE
		Upgrade

OTA: over the air to upgrade the firmware.

It only supports to upgrade the ZIP upgrade firmware file that provide by MOKO.

Upgrade module is BLE chip.

## 9.11 Log

Main Page	Log Page	Remark		
< LW004-PB	< Log	Through the log page, user can		
LoRaWAN Status Disconnected		send the last time join request information of the device to our RD engineer by email in case user need help when there is join network issues.		
Alarm status Off				
Setting >				
Uplink Data Test	send log			
Device Info				
OTA >	Email			
Log				

# **10 Revision History**

Version	Description	Editor	Date
1.0	Initial version create	iris	2020-07-08
1.1	Suitable for firmware version V1.0.11	iris	2020-08-24
1.2	Suitable for firmware version V2.2.3 &HW Version V1.0.4	Allen	2021-01-18

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