AnkhMaway iBeacon Specification

User Guide V3.0

Firmware Version: V3.4b

● New features of the 3.4b version Beacon firmware

Improved Security

Add the brute force prevention measures of the password: Beacon would lock automatically when the input password error consecutive for ten times. The default lock time is half an hour, and the lock time can be dynamic configured up to ten hours.

Add four ways to get the battery information

(1) Using the highest one of Minor value among the Beacon parameters, and regarding the highest Minor value as the battery information. The battery information is divided into 15 levels that are 1-15 (1-F).

(2) Using the highest two of Minor value among the Beacon parameters, and regarding the highest two Minor value as the battery information. The battery information is divided into 100 levels that are 1-100.

(3) Using the UUID, Major, Minor values of the Beacon parameters as the Key, and broadcasting the key and the battery information to outside, which can be received by scanning. The data can be broadcasted twice every 50 seconds.

(4) Using Beacon's own ID as the Key, and broadcasting the key and the battery information to outside, which can be received by scanning. The data can be broadcasted twice every 50 seconds.

Connection Time Limit

Limiting the user's connection time, and the longest is within five minutes.

● Introduction

AnkhMaway offers complete indoor Bluetooth BLE solutions for indoor navigation with beacon tag hardware and open interface to support any indoor navigation deployment. We offer stand-alone tags and services or complete professional services, engineering, and custom beacon tag designs. You can do everything you want to without any limit of us. For the development documents matters, please contact us.

● Products Details

AnkhMaway iBeacon can work as an independent system, which developed and produced based on BLE 4.0, and lithium batteries supply power for these models. It has 3 different working modes, sleep mode, connectable mode and non-connectable mode. It makes the best use of the battery power. For developers, we provide the Android and IOS SDK, and our hardware interface developed completely by us, so the developers can develop it without using SDK. For iBeacon agreement, all of the parameters can be reconfigured, including Proximity UUID, Major, Minor and Power. In order to meet different customers' needs, broadcast interval can also be set, which ranges from 100 ms to 10 s. Besides, hardware transmitted power can be configured, configurable range is 4 dBm to -40 dBm. Low cost customizing housing would be provided to potential customers.

● Features

- 3 working modes: Sleep, Connectable, and Non-connectable. The modes can be switched freely.

- Built-in Beacon firmware, compatible with BLE.

- Built-in a coin battery (CR2032 or CR2450 or CR2477).

- Accurate digital RSSI, excellent link budget (up to 97 dB).

- Enable remote application, AES security coprocessor.

-Unique power management pattern, 5/16 years long standby time.

-Ultra wide range transmission power: 4Dbm to -40Dbm.

-Stable performance and controllable state.

-All hardware interfaces completely open. Developers do not need to rely on the SDK for development. The requirement of hardware interface can be customized (achieved a certain number).

-All the parameters can be configured (UUID, Major, Minor, Measured Power, TX Power, etc.). Encrypted parameter, a password is needed when access to configure.

- Encrypted Parameter: A password is needed when access to configure.

- Provide IOS and Android SDK.

- Apple iBeacon certified.

- Support 'Sleep' and 'Wake-up'.

- Support the background management of battery.

● iBeacon Parameter Default Setting

- UUID: EBEFD08370A247C89837E7B5634DF524

- Major and minor identifier: 0x0001, 0x0001

- Default pairing password: 0x666666

- Power Value: 0xCB

- Broadcast Interval: 0x0A

- It can be rang when starting or wake-up

- The default mode is sleep

● **How to Start Using**

Step 1: Use our IOS SDK or Android Source Code and its source file to build a demo APP to configure the Beacons.
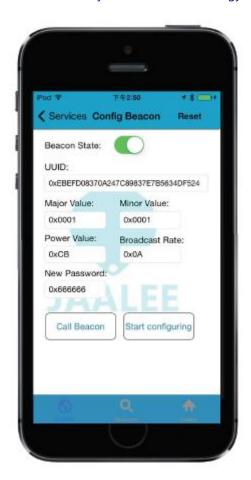
Step 2: Open the Bluetooth and Demo APP.

Step 3: Tapping the Beacon 3 – 5 times on hard things, the beacon can be connected at this moment when you heard buzzing.

Step 4: Click on the Beacon in Demo APP which need to be configured, and enter the password to connect.

Step 5: Now, you can configure and use Ankhmaway Beacon normally.

Warm tips: when testing new ibeacons using Nordic solution.

1. Our default mode is sleep mode. When you get it, please knock it for three or five times to be activated.

Please click the link to download the video.

https://docs.google.com/file/d/0B8HNQzgC-fd6V2lpLWN4QVg5T0E/edit?pli=1

2. After the beacon sound, there are only 45s for connection. If you don't connect the beacon, it will enter into sleep mode again. So please connect it in 45s, enter into Config interface to configure it, and open Beacon State.

3. After configured, it still has 45s for connection. Then it will enter into non-connectable mode, and it will broadcast ibeacon data all the time.

4. If you want to program it again, please just knock it for three times.

5. The connection of our ibeacons can last max. 5mins, and then will disconnect automatically.

6. The interval rate is 100ms in the connection mode, which easy to connect the App.

7. The default rate in non-connectable mode is 1s which can be programmed.

● **Working Mode Detail**

There are 3 types working mode of Beacons, the first is sleep mode, the second is

connectable mode, and the third is non-connectable mode. When hit Beacon will enter the connection mode, which can last for 45 seconds. When timeout Beacon will enter the connection mode or sleep mode according to the different configuration. After the disconnection Beacon will enter the connection mode, last for 45 seconds. It will return to sleep mode or disconnected mode after 45 seconds.

Sleep Mode

Beacon default stays as sleep mode, and this model waits for being waken-up.

Connectable Mode

Beacon can only be connected in this mode, which needs triggered by tapping Beacon, and it will last for 45 seconds. It means that Beacon can be connected in 45 seconds after being triggered. And Beacon will restore to sleep mode or non-connectable mode if it is not connected in 45 seconds.

Non-Connectable Mode

Beacon can radio Beacon's data properly in the non-connectable mode. Beacon will begin to work normally when configured to this mode and it cannot be connected. If you want connect it again, you must tap it five times, and it can be connected within 45 seconds. Once timeout, it will restore to non-connectable mode. If connection is needed, Beacon must be tapped again.

● **Services Introduction**

1. Service 0xFFF0

Characteristic	Property	Value Length	Function	Write example
0xFFF1	Read/Write	3 Byte	Input Password	0x666666
0xFFF2	Read/Write	16Bytes	Config UUID	0xEBEFD08370A247C89837 E7B5634DF524
0xFFF3	Read/Write	2Bytes	Config Major Value	0x0001
0xFFF4	Read/Write	2Bytes	Config Minor Value	0x0001
0xFFF5	Read/Write	1Bytes	Config Power Value	0xC5
0xFFF6	Read/Write	3Bytes	Config Interval Rate	0x0A
0xFFF7	Read/Write	2Bytes	Config Mfgr	0x0059
0xFFF8	Read/Write	3Bytes	Change Password	0x123456

Note: The default configuration password is 0x666666, broadcast interval in units of 100 milliseconds, 0x0A is equivalent to 10 * 100 (ms) = 1(s). When connected, the user must input the password to 0xfff1 port within 1 minute, otherwise the Beacon will disconnect with your phone.

2. Service 0xFF80

Characteristic	Property	Value Length	Function	Write example
0x2A90	Read/Write	18 Byte	Config Device Name	0x6A61616C6565

Note: The value needs to be input the port should be converted to hexadecimal ASCII characters. For example, the corresponding hexadecimal ASCII for Jaalee is {0x6A,0x61,0x61,0x6C,0x65,0x65}, then should input 0x6A61616C6565.

3. Service 0x1804

Characteristic	Property	Value Length	Function	Write example
0x2A07	Read/Write	1 Byte	Change TX Power	0x01

Note: The relationship between the value input and its corresponding TX Power is as following table.

Write Value	0x01	0x02	0x03	0x04	0x05	0x06	0x07	0x08	0x09
TX Power(dBm)	4	0	-4	-8	-12	-16	-20	-30	-40

4. Service 0xFF70

Characteristic	Property	Value Length	Function	Write example
0x2A80	Read/Write	1 Byte	Change Beacon State	0x01: Disable 0x02: Enable

Note: When the state is disable, it will not broadcast Beacon's data. To set as enable, Beacon can work normally.

5. Service 0xFF60

Characteristic	Property	Value Length	Function	Write example
0x2A70	Read/Write	1 Byte	Control Beacon Audio State	0x01

Note: When the value is 0x01, it means to allow the Beacon buzzing when wake-up or reset;

0x01: Buzzing when starting or tapped (default state).

0x02: Buzzing when starting, not when tapped.

0x03: Buzzing when tapped, not when starting.

0x04: No buzzing when starting or tapped.

6. Service 0x1802

Characteristic	Property	Value Length	Function	Write example
0x2A06	Read/Write	1 Byte	Call Beacon	0x01

Note: When input value 0x01 to this port, it buzzing.

7. Service 0x180F

Characteristic	Property	Value Length	Function	Write example
0x2A19	Read/Notify	1 Byte	Battery Level	0x64 (100%)

Note: Read the battery level.

8. Service 0xFF50

Characteristic	Property	Value Length	Function	Write example
0x2A60	Read/Notify	1 Byte	Configure lock time	0x01

Note: The service is used to configure the lock time when the user input the wrong password for 10 times, can be configured: 0 x01-0 x14. The unit of the lock time is half an hour that is 30 minutes to 10 hours.

9. Service 0xFF40

Characteristic	Property	Value Length	Function	Write example
0x2A50	Read/Notify	1 Byte	Configure the type of get battery level	0x01

Note: The service is used to configure the way to add data of the Beacon battery. The following details:

0x01: Add the battery information at the end of the broadcast data. User can obtain it by scanning.

0x02: Using the highest two Minor values to show the battery, and divide it into 15 levels.

0x03: Using the highest two Minor values to show the battery.

0x04: Using UUID,Major,Minor of the Beacon parameters as the Key, and broadcasting the key and the battery information to outside, which can be received by scanning. The data can be broadcasted twice every 50 seconds.

0x05: Using Beacon's own ID as the Key, and broadcasting the key and the battery information to outside, which can be received by scanning. The data can be broadcasted twice every 50 seconds.

● **Key Words**

Power Value: This value represents the power value mobile scanned when the distance between Beacon and phone is within a meter.

TX Power: This value represents the Beacon's firmware Transmit Power.

RSSI: The value is the signal strength of the scanned device which can be used to measure the distance

● **Electronic Parameters**

Item	Test Data	Remarks
Chip	nRF51822	Nordic Semiconductor 256k
Battery model	CR2032 or 2450 or 2477	Coin battery, 3.0Vdc, 1pc
Operation Voltage	1.8-3.6V	DC
Operation Frequency	2400-2483.5MHz	Programmable
Frequency Error	+/- 20KHz	Null
Modulation	Q-QPSK	Null
Sleep current	Around 3.6 uA	Null
Output Power	4 dBm - -40dBm	Programmable
Receiving Sensitivity	-93dBm	High gain mode
Transmission distance	40 or 70 or 100 meters	BER<0.1%, Open space
Antenna	50ohm	Onboard
Size	27 x 27 x 7.6 mm 40 x 40 x 13.6 mm 40 x 40 x 16.5 mm	Null

● **Operation state and power consumption**

State	Operation Current (uA)
Sleep Mode	Around 3.6
Connectable Mode	Around 142
Non-Connectable Mode(Broadcast Interval: 1s)	Around 22.5

Battery life in non-connectable mode:

CR2032: 12months based on interval rate 1s.

CR2450: 33months based on interval rate 1s.

CR2477: 55months based on interval rate 1s.

● **Important Notice**

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