蓝牙信标
VDB1611使用手册
Bluetooth Beacon
VDB1611 User manual

文档信息		
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版本号/Revision	更新内容/Remark	制作人/Maker	日期/Date
V1.01	初始文档/The initial version	Sherman	20200414
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设备清单/Product List

名称/Item	型号/Model Number	数量/Number	备注/Remark
蓝牙 Beacon	VDB1611	1 个	面壳有开孔透气，方便温湿度测试
电池	SIZE AA(5 号)	2 个	南孚 Excell 工业装，2600mAh

目录

1. 产品介绍/Product Induction

VDB1611 是一款带加速度传感器和温湿度传感器的蓝牙信标。其广播协议符合蓝牙 BLE 广播协议，包括 iBeacon（Apple）和 Eddystone（Google）两种协议。它通常被安装在一个合适的位置，采样温湿度及加速度信息，并周期性地向它的周围环境进行广播，从而被其他蓝牙设备如蓝牙网关扫描并采集到其传感器信息。通常它是不会被其他 BLE 的主机设备连接上的，但是可以通过手机 APP 进行连接，并修改其广播参数等内容。

The VDB1611 is a Bluetooth beacon with an acceleration sensor and a temperature and humidity sensor. Its broadcast protocol conforms to bluetooth BLE broadcast protocol, including iBeacon (Apple) and Eddystone (Google) two protocols. It is usually installed in a suitable location, sampling temperature, humidity and acceleration information, and periodically broadcast to its surrounding environment, so that other Bluetooth devices such as Bluetooth gateways can scan and collect their sensor information. It is usually not connected by other BLE host devices, but can be connected through mobile APP, and modify its broadcast parameters and other contents.

Skylab_xBeacon 是一款 SKYLAB 研发团队研发用于配置 VDB1611 参数的手机 APP。 用这款 APP 去连接 VDB1611，可以修改它的广播频率、功率，UUID, Major, Minor 和设备名称等等参数。当 VDB1611 处于广播状态时这些参数将被广播出来。

Skylab_xBeacon is a mobile phone APP developed by SKYLAB technical team for configuring VDB1611 parameters. Using this APP to connect to VDB1611, you can modify its broadcast frequency, power, UUID, Major, Minor, device name and other parameters. These parameters will be broadcast when VDB1611 is in broadcast state.

VDB1611 正视图 / VDB1611 Top view

1.1 VDB1611 内部模块介绍/ VDB1611 Internal Modules

VDB1611 基于 Nrodic nRF52832 芯片平台，使用 LIS2DH12 三轴加速度传感器和 SH31 温湿度传感器，实现运动状态，温湿度信息的广播。

Based on Nrodic nRF52832 chip platform, VDB1611 uses LIS2DH12 triaxial acceleration sensor and SH31 temperature and humidity sensor to broadcast motion state and temperature and humidity information.

VDB1611 用两节 5 号电池（南孚 Excell 工业装）串联供电，方便更换电池。

VDB1611 is powered by two no. 5 batteries (Nanfu Excell Industrial) in series for easy battery replacement.

此外，VDB1611 内部的 PCB 板上留有用于节省电量的开关、用于调试的烧录口和一对 UART 串口。

In addition, the PCB board inside the VDB1611 has a switch for saving power, a firing port for debugging and a pair of UART serial ports.

1.2 VDB1611 特性/features

低功耗/ Low Power Consumption

加速度和温湿度数据采集/Acceleration and temperature and humidity data collection

应用灵活/Application of flexible

安装便捷/Easy to Install

广播距离可达 70 米/Broadcasting distance can reach 70 meters

符合 RoHS, FCC, CE 标准/FCC,CE compliance

1.3 VDB1611 应用/application

分布式传感器/Distributed sensor

室内定位/ Indoor Positioning

信息推送/ Information Push

身份识别/ Identification

微信摇一摇/ WeChat Shake

2. 硬件参数/Hardware parameters

产品参数 Product Parameter	
尺寸/Dimension	72*45*26mm（L*W*H）
电池型号/Battery	Size AA（5 号电池）
工作温度/Operating temperature	-20℃~70℃

传感器参数/Sensor parameter	
加速度传感器/Acceleration sensor	3 轴，±2g/4g/8g/16g 四档可调
湿度传感器/Humidity sensor	0%RH~100%RH（±%2RH）
温度传感器/Temperature sensor	-20℃~70℃（±0.2℃）

蓝牙参数/Bluetooth parameters	
无线标准/Wireless standards	蓝牙®4.2/5.0(不支持 long-range)
频率范围/frequency range	2400MHz——-2483.5MHz
数据速率/data rate	250 kbps / 1 Mbps / 2 Mbps
调制技术/modulation technique	GFSK 调制
无线安全/Wireless security	AES
传输功率/transmission power	-20~+4dBm（4 dB 递增）
灵敏度/sensitivity	-93dBm at 1Mbps BLE
工作模式/operating mode	从机 Peripheral

电池使用寿命/Battery life			
广播功率/broadcasting power	覆盖范围 /coverage area	广播间隔/Broadcast interval	电池使用时间（月） /Battery life (month)
+4dBm	70m	100ms	10.2
		200ms	19.7
		500ms	45.1
		1000ms	78.9
+0dBm	50m	100ms	13.8
		200ms	26.5
		500ms	58.9
		1000ms	99.2

注：

功耗数据仅供参考,当计算寿命大于电池寿命（5 年）时，以电池寿命为准；

加速度传感器默认工作在中断模式（运动后就会给出中断），最后一次运动 10s 后认为进入静止状态；

温湿度采样频率默认每分钟采样一次。

Note：

Power consumption data is for reference only. If the calculated life is greater than the battery life (5 years), the battery life shall prevail.

By default, the acceleration sensor works in interrupt mode (interruption will be given after movement), and it is considered to be in static state after the last movement for 10 seconds.

By default, temperature and humidity sampling frequency is once every minute.

3. 软件使用说明/Software Instructions

3.1 VDB1611 开机/Power on

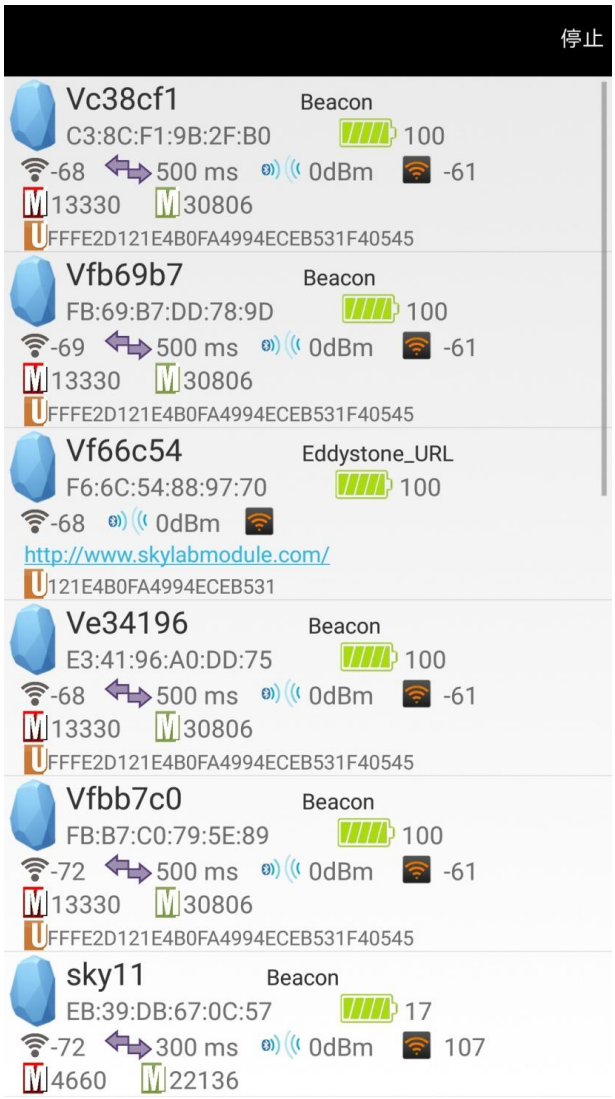
打开 VDB1611 的底壳，安装两个 Size AA 电池，再将开关拨到“ON”。此时，VDB1611 开始广播，再安装 VDB1611 的底壳。如未特殊要求，默认出货样机已提前拨到“ON”上，并装好电池打好螺丝。

Open the bottom shell of VDB1611, install two Size AA batteries, and then switch to "ON". At this point, VDB1611 starts to broadcast, and then install the VDB1611 chassis. If there is no special requirement, the delivery prototype has been dialed to "ON" in advance by default, and the battery has been installed and the screws have been made.

3.2 扫描蓝牙信标/Scan bluetooth beacons

打开 APP，如果手机提示打开蓝牙，请允许，手机自动开始扫描周围的蓝牙信标。

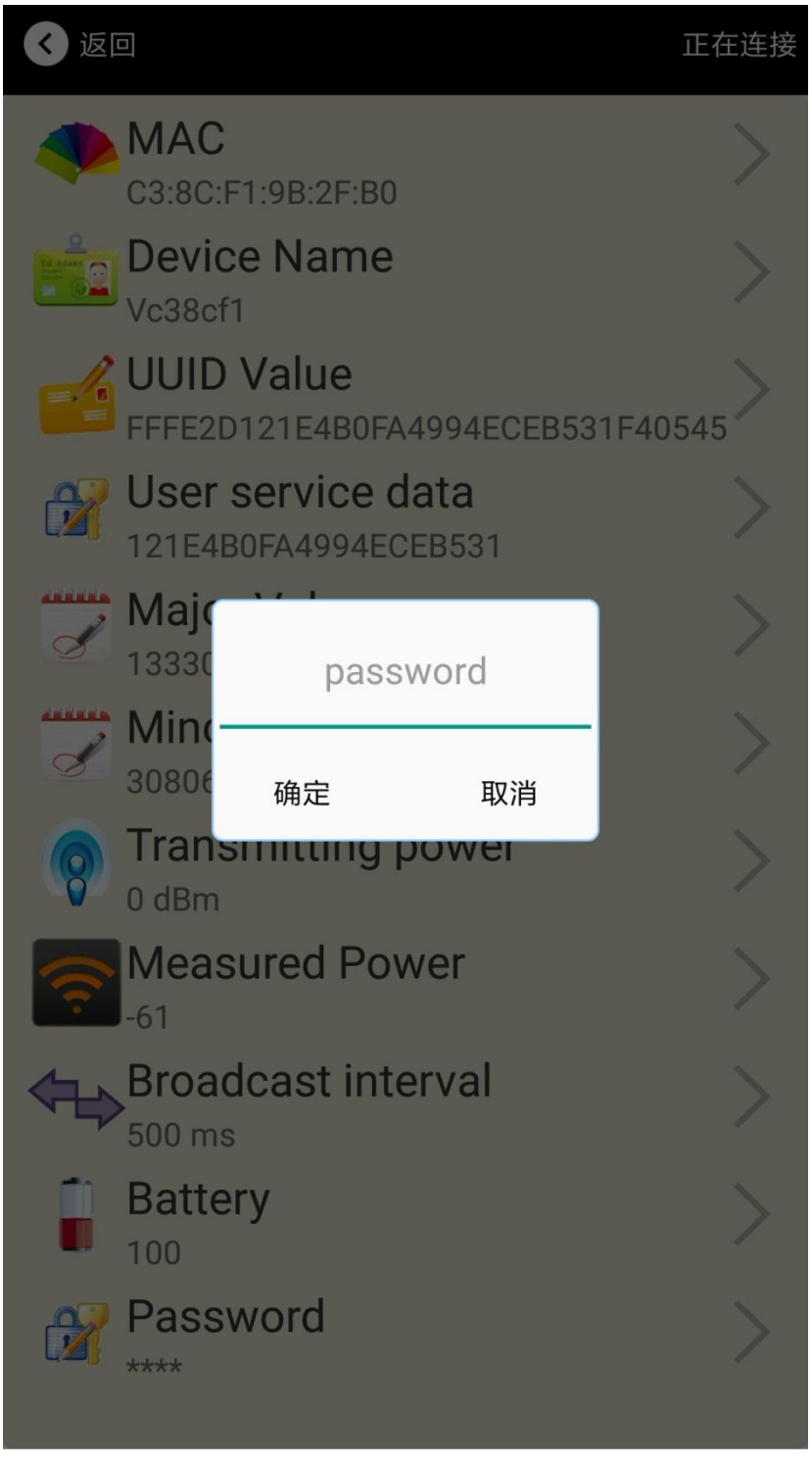
Open the APP. If the mobile phone prompts you to turn on Bluetooth, please allow. The mobile phone automatically starts to scan the bluetooth beacons around it.



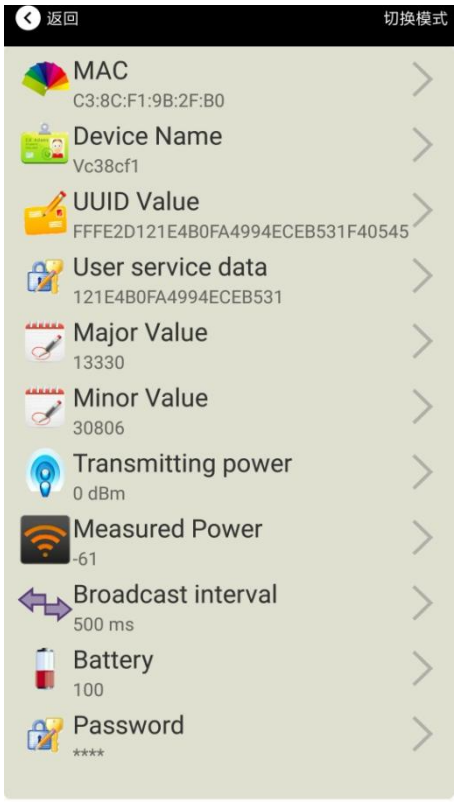
3.3 连接蓝牙信标/Connect bluetooth beacon

点击要连接的蓝牙信标，30 秒内输入密码，即可获得操作权限。(出厂密码:1234)

Click the Bluetooth beacon you want to connect to, enter your password within 30 seconds, and you will get the operation permission. (Factory password :1234)



3.4 配置介绍/Configuration is introduced



介绍:

MAC: MAC 地址

Name:所选蓝牙信标的名称。

UUID:按照 ISO/IEC11578:1996 标准的 128 位标识符(16 字节)

User service data:用户数据，24 个 16 进制数字

Major: 16 位标识符(0-65535)

Minor: 16 位标识符(0-65535)

Measured Power:距离 1 米时的参考信号强度

Transmit Power:VG05 发射功率

Advertise Interval:VG05 广播间隔

Battery Level:VG05 电池电量

Password:VG05 密码（默认 1234）

配置好信息后，蓝牙连接断开，配置将生效。

After the configuration is complete, the Bluetooth connection is disconnected and the configuration takes effect.

3.5 修改蓝牙信标名称/Modify the bluetooth beacon name

点击“Device Name”，出现以下 UI，然后在“输入一个名称”框中输入长度小于 12 位的英文字符名称，也可以在“或者选一个”里选一个名称。然后点击“确认修改”。

Click "Device Name", the following UI appears, and then enter the English character Name of less than 12 characters in the "Enter a Name" box, or select a Name in "Or Choose one". Then click "Confirm modification".

3.6 修改 UUID/Modify the UUID

点击“UUID”，出现以下 UI，然后在“输入一个 UUID 值”框中输满 16 个字节（32 个十六进制字符）作为 VG05 的 UUID。然后点击“确认修改”。

Click "UUID" to display the following UI, then enter 16 bytes (32 hexadecimal characters) as the UUID of VG05 in the "Enter a UUID value" box.Then click "Confirm modification".

3.7 修改 User service data/Modify User service data

点击“User service data”，出现如下界面，在“输入用户数据”中输入 24 个 16 进制字符。然后点击“确认修改”。

Click User Service Data. The following interface appears. Enter 24 hexadecimal characters in Enter User Data.Then click "Confirm modification".

3.8 修改 Major、Minor/Modify Major and Minor

点击“Major”，出现如下界面，设置 0~65535 为设备的 Major 值。然后点击“确认修改”。

Click Major. The following screen is displayed. Set the Major value from 0 to 65535.Then click "Confirm modification

修改 Minor/Modify the Minor

同上面 Major 类似，点击 Minor 进入修改即可。

Just like the Major above, click Minor to enter the modification.

3.9 修改 Measured Power

点击“Measured Power”，出现如下 UI，在距离 VG05 1 米远处，设置测量功率，可调范围-100dBm~-30dBm，默认为-61dBm。然后点击“确认修改”。

Click "Measured Power" and the following UI will appear. At a distance of 1 meter from VG05, set the Measured Power in the adjustable range of -100dbm ~ -30dbm, and the default is -61dbm.Then click "Confirm modification".

Measured Power 含义为，当接收设备接收到的信号强度为-61dBm 时，可认为该设备距离 VG05 约为 1 米。

Measured Power means that when the signal intensity received by the receiving equipment is -61dbm, it can be considered that the distance of the equipment from VG05 is about 1m.

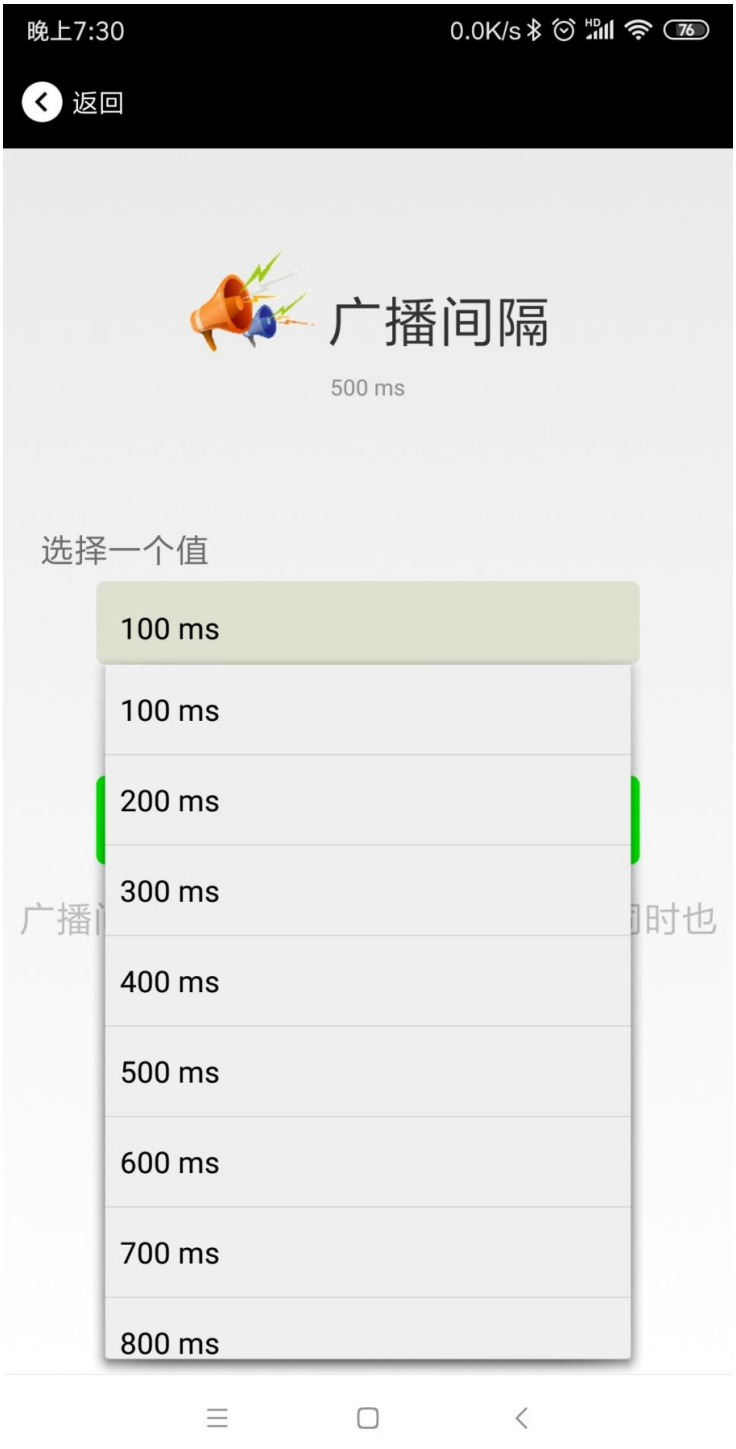
3.10 修改发射功率

点击“Transmission Power”出现如下 UI，设置 VG05 的发射功率。功率可设置为:-30dBm， -20dBm，-16dBm， -12dBm， -8dBm， -4dBm, 0dBm, 4dBm。默认是 0 dBm。然后点击“确认修改”。

3.11 修改广播间隔/Modifying broadcast intervals

点击“广播间隔”出现如下 UI，设置广播间隔，广播间隔可以设置为 100ms、200ms、300ms、400ms、500ms、600ms、700ms、800ms、900ms 和 1000ms。默认为 500ms。然后点击“确认修改”。

Click "Broadcast Interval" to appear the following UI, set the broadcast interval, the broadcast interval can be set to 100ms, 200ms, 300ms, 400ms, 500ms, 600ms, 700ms, 800ms, 900ms and 1000ms.The default value is 500ms.Then click "Confirm modification".



3.12 修改密码/Change password

点击“Password”，出现如下 UI，然后在“Password”框中输入 4 个字符作为连接密码，默认为 1234。然后点击“确认修改”。

Click "Password", the following UI appears, and then enter 4 characters in the "Password" box as the connection Password, the default is 1234.Then click "Confirm modification".

注意：

请提前保存好您的密码，一旦修改新密码，原密码将失效，必须用新密码才能登陆。

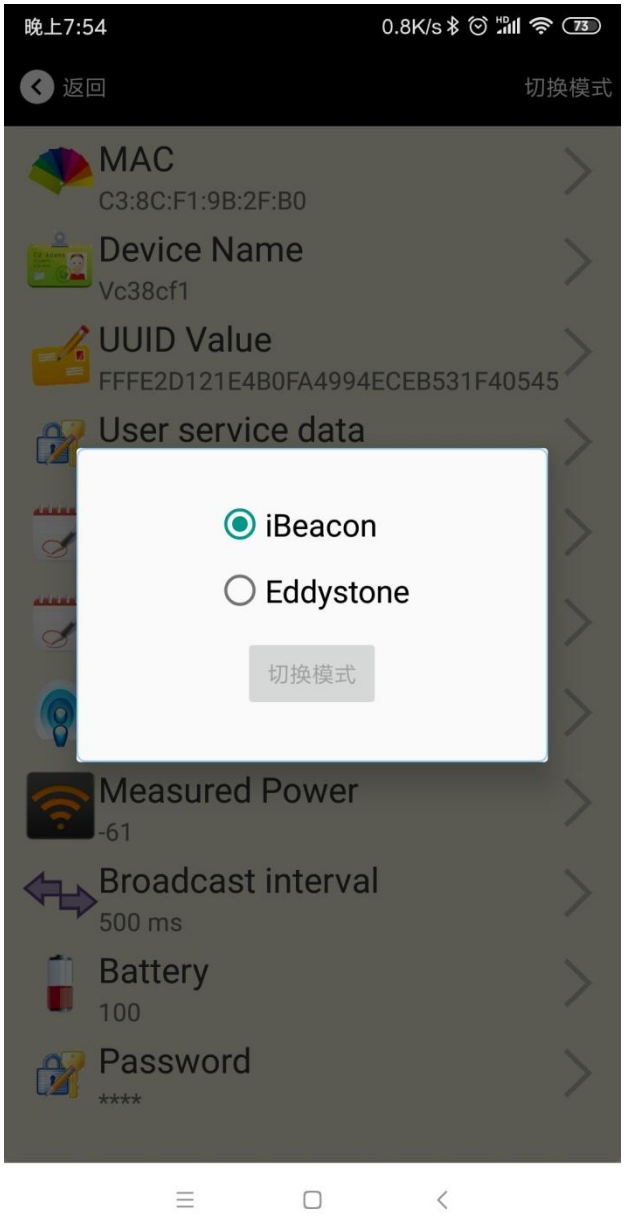
Note:

Please save your password in advance, once you change the new password, the old password will be invalid, you must use the new password to log in.

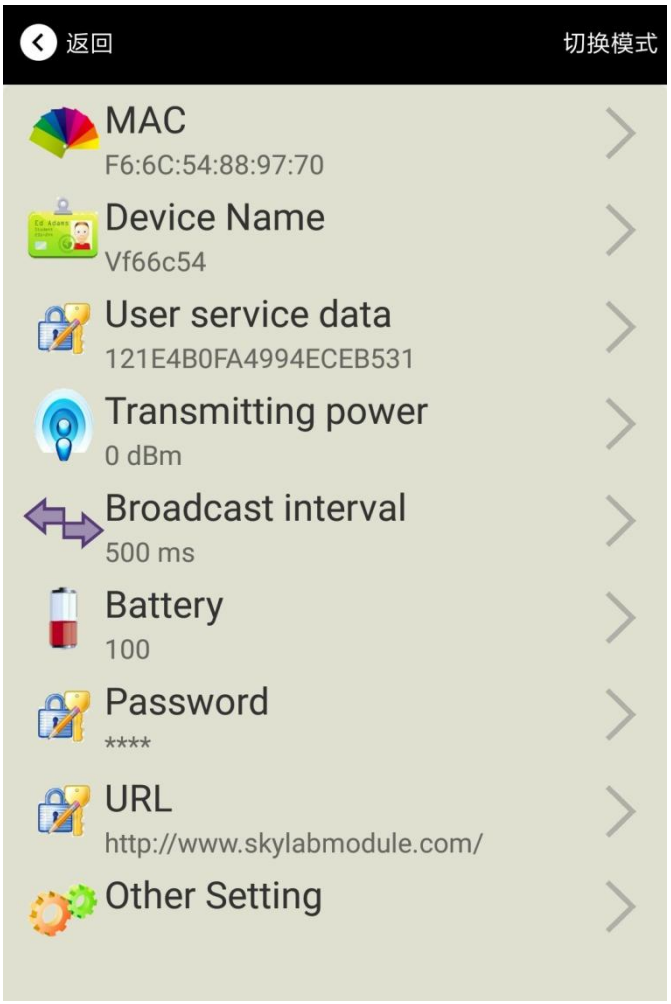
3.13 切换模式/Switching mode

点击右上角切换模式文字，出现模式选择窗口，点选 Eddystone。

Click on the upper right corner to switch mode text, the mode selection window appears, click Eddystone.



3.14 Eddystone 配置页面简介/Introduction to Eddystone configuration page



简介/Brief introduction:

MAC:MAC 地址

Name:蓝牙信标的名称，配置方式同 iBeacon 模式。

User service data:用户自定义的数据，配置方式同 iBeacon 模式。

Transmit Power:VG05 发射功率，配置方式同 iBeacon 模式。

Advertise Interval:VG05 广播间隔，配置方式同 iBeacon 模式。

Battery Level:VG05 电池电量

Password:VG05 连接密码，配置方式同 iBeacon 模式。

URL:修改 Eddystone 字段信息。默认格式是 URL。

Other Setting:用于选择 Eddystone 其他字段信息。

配置好信息后，蓝牙连接断开，配置将生效。

3.15 修改 URL/Modify the URL

点击“URL”，出现如下 UI，然后在“url”下划线上输入最多 16 字节的字符串，即可广播 URL.

Click "URL", the following UI appears, and then enter a string of up to 16 bytes on the underline of "URL" to broadcast the URL.

3.16 修改 Other Setting/Modify Other Setting

选择并设置 UID 信息/ Select and set the UID information:

分别设置 NameSpace(10 字节)和 Instance(6 字节)。

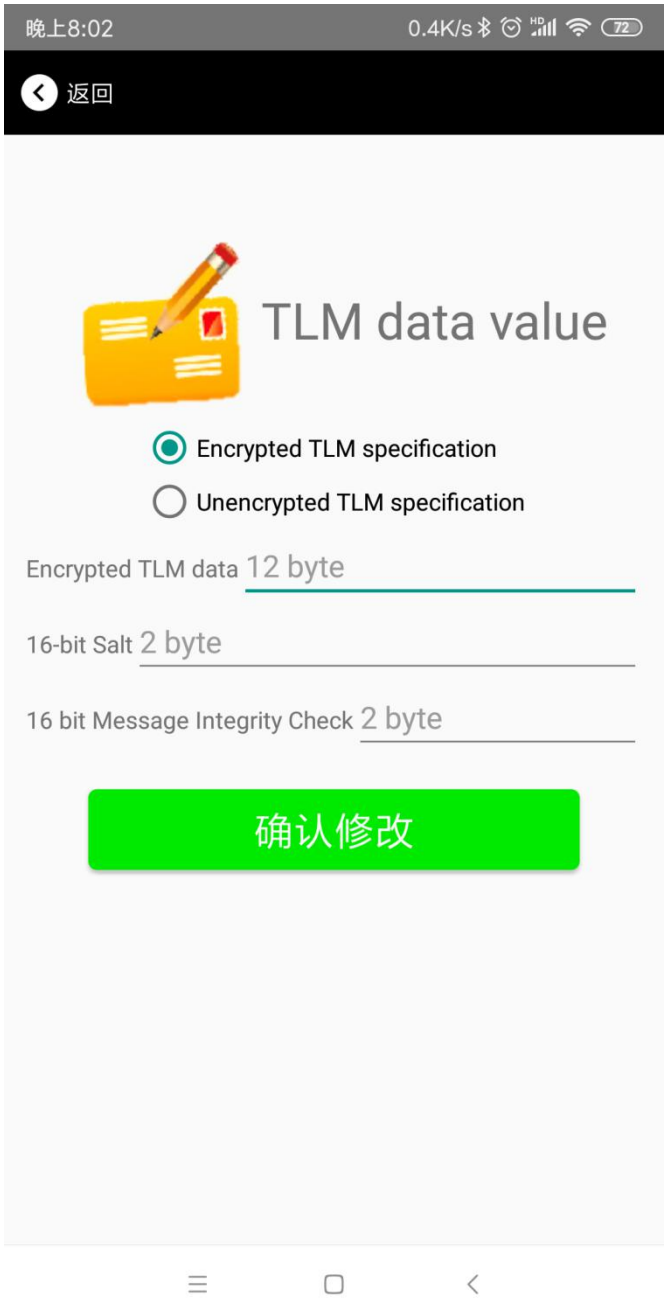
Set NameSpace(10 bytes) and Instance(6 bytes) respectively.

选择并设置 EID 信息/Select and set EID information:

设置 EID 信息，最多 8 个字节。

The EID information is a maximum of 8 bytes.

选择并设置 TLM 信息/Select and set TLM information:



推荐选择 Encrypted TLM specification（加密的 TLM 规范），然后输入分别输入最多 12 字节的 Encrypted TLM data（加密 TLM 数据），2 字节的 16-bit Salt，以及 2 字节的 16 bit Message Integrity Check.
It is recommended to select Encrypted TLM Specification and enter the maximum 12-byte Encrypted TLM Data, 2-byte 16-bit Salt.And a 2-byte 16-bit Message Integrity Check.

3.17 APP 下载/Download the APP

目前最新 APP 尚未上架，请联系销售人员提供，APP 名称 Skylab_xbeacon。

At present, the latest APP has not been put on the shelves, please contact the sales staff to provide the APP name Skylab_xbeacon.

4. 联系方式/Content

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