Bluetooth Beacon
VG05 User Manual

Document Information

<table>
<thead>
<tr>
<th>Title</th>
<th>VG05 Bluetooth Beacon User Manual</th>
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</thead>
<tbody>
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Revision History

<table>
<thead>
<tr>
<th>Revision</th>
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<tbody>
<tr>
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<td>Sherman</td>
<td>10-June-2019</td>
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This document applicable to the following products:

<table>
<thead>
<tr>
<th>Product name</th>
<th>Type number</th>
<th>Product status</th>
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<tbody>
<tr>
<td>Beacon</td>
<td>VG05</td>
<td>Mass Production</td>
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</table>

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<th>Device No.</th>
<th>Number</th>
<th>Remark</th>
</tr>
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<tbody>
<tr>
<td>Bluetooth 4.2</td>
<td>VG05</td>
<td>1 PCS</td>
<td></td>
</tr>
<tr>
<td>Beacon</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Battery</td>
<td>ER14250</td>
<td>2 PCS</td>
<td>Inside VG05</td>
</tr>
</tbody>
</table>
1. Product Introduction

VG05 is a Bluetooth Beacon device. It uses a broadcasting protocol which is based on BLE (Bluetooth Low Energy). VG05 broadcasts its general config parameters like UUID, Major, Minor, RSSI etc. to surroundings over 37, 38 and 39 BLE channels continuously and non-directionally. The broadcasting information can be read by “Skylab_xbeacon” APP, which is designed by Skylab R&D Team.

1.1 VG05 Internal Module Introduction

VG05 is based on Nordic Bluetooth 4.2 chip. It is powered by 2 ER14250 batteries. Its battery life is related to the internal broadcasting parameters.

1.2 VG05 Features

- Low Power Consumption
- Small, Lightweight, Beautiful appearance
- Flexible Application
- Easy to Install (use 3M sticky tape)
- Advertise Range up to 100 Meters
- RoHS compliance (Lead-free)
- FCC, CE compliance

1.3 VG05 Application

- Indoor Positioning
- Information Push
- Identification
- WeChat Shake
# 2. Hardware Parameter

## Product Parameter

<table>
<thead>
<tr>
<th>Hardware Features</th>
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<tbody>
<tr>
<td><strong>Model</strong></td>
<td>VG05</td>
</tr>
<tr>
<td><strong>Antenna Type</strong></td>
<td>PCB Antenna</td>
</tr>
<tr>
<td><strong>Battery</strong></td>
<td>ER14250  2*1200mAh</td>
</tr>
<tr>
<td><strong>Voltage</strong></td>
<td>3.6V</td>
</tr>
<tr>
<td><strong>Dimension(D×H)</strong></td>
<td>52.1*23.1(±0.3)mm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Wireless Features</th>
<th></th>
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<tbody>
<tr>
<td><strong>Wireless Standards</strong></td>
<td>Bluetooth ® 4.2</td>
</tr>
<tr>
<td><strong>Frequency Range</strong></td>
<td>2400MHz---2483.5MHz</td>
</tr>
<tr>
<td><strong>Data Rates</strong></td>
<td>250kbps/1Mbps/2Mbps</td>
</tr>
<tr>
<td><strong>Modulation Technique</strong></td>
<td>GFSK Modulation</td>
</tr>
<tr>
<td><strong>Wireless Security</strong></td>
<td>AES HW Encryption</td>
</tr>
<tr>
<td><strong>Transmit Power</strong></td>
<td>Tx Power -20 to +4 dBm in 4 dB Steps</td>
</tr>
<tr>
<td><strong>Sensitivity</strong></td>
<td>-93dBm at 1 Mbps BLE</td>
</tr>
<tr>
<td><strong>Work Mode</strong></td>
<td>Peripheral</td>
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<table>
<thead>
<tr>
<th>Others</th>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>Environment</strong></td>
<td>Operating Temperature: -40℃~85℃</td>
</tr>
<tr>
<td></td>
<td>Storage Temperature: -40℃~85℃</td>
</tr>
<tr>
<td></td>
<td>Operating Humidity: 10%~90% Non-condensing</td>
</tr>
<tr>
<td></td>
<td>Storage Humidity: 5%~90% Non-condensing</td>
</tr>
</tbody>
</table>
### Battery Life

<table>
<thead>
<tr>
<th>Transmission Power (dBm)</th>
<th>Broadcast Distance (m)</th>
<th>Broadcast time interval (ms)</th>
<th>Power consumption per day (mAh)</th>
<th>Battery life (days)</th>
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<tbody>
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<td>4</td>
<td>70</td>
<td>100</td>
<td>8.70984</td>
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<td></td>
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<td>2.23146</td>
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<td></td>
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<td>1.799568</td>
<td>1334</td>
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<tr>
<td></td>
<td></td>
<td>1000</td>
<td>0.935784</td>
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<td>1.223568</td>
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</table>

**Attention:**

The above data may differ from different environments. It is calculated by current-test (Battery Loss not included) and just for reference.
3. Hardware Guide

3.1 VG05 Power on

VG05 will power on as soon as any one of its 2 batteries is correctly installed. By default, 2 ER14250 battery will be pre-installed before it arrives at customers’ hand.

If you need to change its batteries, please follow the instruction below.

a. Remove 4 screws with a Phillips screwdriver
b. Open the bottom shell of the VG05, follow the Battery polarity on the bottom of the battery cell, and replace its 2 ER14250 Li-Batteries.

c. Close the bottom shell with its rubber needling aligned to the sink around the side-shell.

d. Install 4 screws with a Phillips screwdriver.

3.2 VG05 Installation instructions
a. Clean up VG05 bottom side (screw side).

b. Tear off 3M round tape from the oil-paper and sticky it to the bottom side.
c. Press evenly for 5-10 seconds, make VG05 bottom side and 3M tape fully bonded.

d. Remove the protective oilpaper on the other side of the 3M tape and install VG05 to target installation location (if there is dust or grease stain in the target location, it needs to be cleaned and dried in before install). Press evenly for 5-10 seconds.
4. Software Application Guide

4.1 Download APP

Skylab_xbeacon hasn’t been put into the market yet. Please contact our salesman for this APP.

4.2 Scan Bluetooth 4.2 Beacon

Open the APP, if cell phone ask for permission to open bluetooth, please select yes. Then it will begin to scan the surrounding Bluetooth 4.2 Beacons.
4.3 Connect Bluetooth 4.2 Beacon
Click the Bluetooth 4.2 Beacon to be connected, enter the password within 30 seconds, in order to obtain operating privileges. (Factory Password: 1234)
### 4.4 Configuration Introduction

**Introductions:**

MAC: Chip MAC address

Name: The name of the Bluetooth 4.2 Beacon which is selected.

UUID: 128-bit identifier according to ISO/IEC11578:1996 standard (32 hexadecimal digits)

Major: set 16-bit identifier (0-65535)

Minor: set 16-bit identifier (0-65535)

Measured Power: Signal strength at 1 meter (VG05 transmission power is 0dBm)

Transmit Power: VG05 transmit power

Advertise Interval: VG05 advertise interval

Battery Capacity: VG05 battery Capacity

Password: VG05 connection password
After the information is configured, the configuration will take effect after the Bluetooth connection is disconnected.

4.5 Modify Bluetooth 4.2 Beacon Name

Click the “Device Name”, the following UI will be opened. Then enter a length of less than 12-bit English characters as VG05 device name in the following “Enter a Name” box. Then click “confirm to modify”.

![Beacon name Interface]

Use less than 8 English characters, Chinese is not suggested.
4.6 Modify UUID
Click the “UUID”, the following UI will be opened. Then and then enter a 32-byte string of sixteen as the UUID of VG05 in the following “Enter an UUID” box. Then click “confirm to modify”.

![UUID value](image)

**enter UUID**

or choose one

- FFFE2D121E4B0FA4994ECEB531F40545
- AABBCCDDEEFF00112233445566778899
- 00112233445566778899AABBCCDDEEFF
- 12345678123456781234567812345678

**confirm to modify**

UUID is 16 bytes long. Use the 16 decimal data format.
4.7 Modify User service data

Click the "User service data", the following interface will be opened. Then enter a Hexadecimal string of 24 word. Then click "confirm to modify".

![User data interface](image)

- enter user data
- or choose one
  - AABCCDDEEFF001122334455
  - 00112233445566778899AABB
  - 123456781234567812345678

The length of user data can not over 13 bytes, please use Hexadecimal format.
4.8 Modify Major/Minor
Click the "Major"/"Minor", the following UI will be opened. Then set a value between 0~65535 as the Major/Minor value of the device. Then click “confirm to modify”.

From 1 to 65535 choose a value to match Major

From 1 to 65535 choose a value to match Minor
4.9 Modify Measured Power

Click the “Measured Power”, , the following UI will be opened. Then select a measured power range from -100dBm to -30dBm. The default is -61dBm. Then click “confirm to modify”.

Measured Power means, when a phone's RSSI is -61dBm, it is about 1 meter from VG05.
4.10 Modify Transmitting Power

Click the "Transmitting Power", the following UI will be opened. Then set a transmitting power, which can be set to: -30dBm, -20dBm, -16dBm, -12dBm, -8dBm, -4dBm, 0dBm, 4dBm and 8dBm. Default Power is 0dBm. Then click "confirm to modify".

![Image of wireless transmit power setting interface]

Choose value: 4 dBm

Confirm to modify

Choose a value to match EIRP from -30dBm to +4dBm
4.11 Modify Advertise Interval

Click the "Advertise Interval" , the following UI will be opened. Then set a advertise interval. Broadcasting interval can be set to 100ms, 200ms, 300ms, 400ms, 500ms, 600ms, 700ms, 800ms, 900ms and 1000ms. The default is 500ms. Then click “confirm to modify”.

Broadcast interval is shorter, Beacon will be found faster, the battery drain faster.
4.12 Modify Password

Click the “Password”, the following UI will be opened. Then enter the 4 characters as a connection password in the “Password” box, the default is 1234. Then click “confirm to modify”.

Password consist of 4 English characters or Arabic numerals, don’t enter Chinese or the other symbol.
4.13 Switch mode
Click “switch mode” on the upper right corner, the mode selection window will be opened. Then you can choose iBeacon or Eddystone mode. Default mode is iBeacon.
4.14 Eddystone configuration page Introduction

Introduction:

MAC: Chip MAC address

Name: The name of the Bluetooth 4.2 Beacon which is selected.

User service data: User-defined data in broadcasting

Transmit Power: VG05 transmit power

Advertise Interval: VG05 advertise interval

Battery Capacity: VG05 battery Capacity

Password: VG05 connection password

URL: modify the Frame field information in Eddystone. The default format is URL. Other Formats can be selected by other setting

Other setting: Format selection of Frame field information in Eddystone.

After the information is configured, the configuration will take effect after the Bluetooth connection is disconnected.
4.15 Modify URL

Click “URL”, the following UI will be opened. Then input at most 16 characters as broadcasting URL. Then click “confirm to modify”.

![Modify URL Interface]

4.16 Other Setting
Click “Other setting”, the following UI will be opened. The following three options are UID, EID and TLM.

Select and set UID information:
NameSpace(10 bytes) and Instance(6 bytes) are set, respectively.

Select and set EID information:

EddyStone Uid Value

enter NameSpace value

10 byte input 16 hexadecimal format

enter Instance value

6 byte input 16 hexadecimal format

CONFIRM TO MODIFY
Set EID information, maximum 8 bytes.

Enter Encrypted

or choose one

AABBCCDDEEFF0011
0011223344556677
1234567812345678

CONFIRM TO MODIFY

Use less than 8 English Charaters, Chinese is not suggested

Select and set TLM information:
Select “Encrypted TLM specification” (suggested), and input encrypted TLM data (at most 12 byte), 16-bit Salt (2 byte) and 16-bit Message Integrity check (2 byte).
5. Contact Information

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