



NRF51822-Beacon



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1. product description

1.1 Overview

The 51822-iBeacon wireless module is developed using Nordic's high-performance wireless SOC chip NRF51822.

It is a complete low cost, low power design for Bluetooth low energy applications.

The NRF51822 integrates a high-performance and low-power CortexM0 microcontroller core, and supports the BLE4.0 protocol stack for Bluetooth applications and a wealth of peripheral interfaces.

The module is equipped with an independent programming interface to facilitate user programming and debugging.

Equipped with buttons, long press can control module broadcast and sleep, mobile phone APP can modify module parameters.

1.2 Features

- 2.4-GHz low-power compliance and proprietary RF on-chip system
- Programmable output power up to 4 dBm
- Support IOS7.0, Android 4.3 or above
- Distance: 30 meters
- When it is not broadcasting, the current is only about 2.7uA
- High-performance and low-power enhanced CortexM0 microcontroller core
- Adopt Bluetooth Low Energy Compatible Bluetooth v4.0 protocol stack
- 256KB system program flash and 16KB SRAM
- Small size diameter: 25.0mm, thickness: 4.6mm
- PCB antenna
- Working voltage: 1.8V ~ 3.6V

1.3 Application scenario

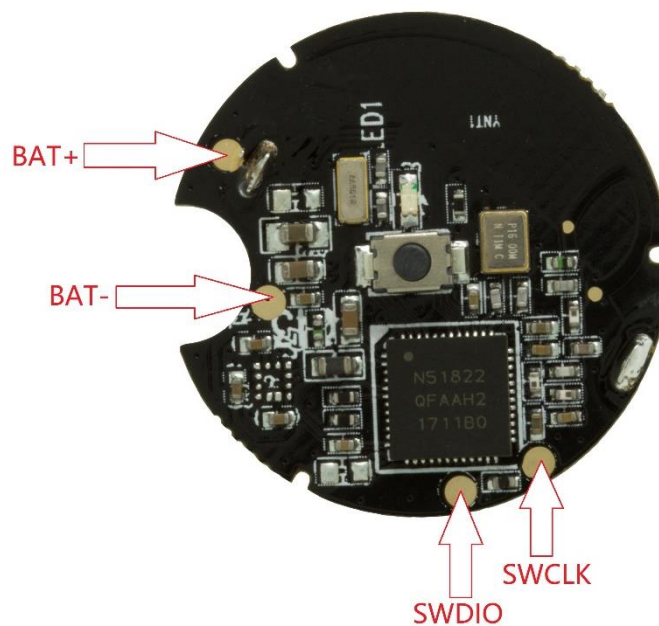
- Indoor navigation
- Mobile payment
- In-store shopping guide
- Flow analysis

1.4 Technology parameter

Item	nRF51822	Item	nRF51822
Supply voltage	1.8-3.6V	Receiving current	9.7mA
Frequency	2402~2480MHz	Stand-by current	3.1uA
Selectable Channel	40	Transmission rate	1 Mbps
Modulation	GFSK	Chip flash	256KB
Output Power	-30dBm~4dBm	Chip RAM	16KB
Emission current (0dBm)	8mA	Antenna form	PCB antenna
Receiving sensitivity	-93dBm	Communication distance	>50m

2. Module introduction

2.1 Module pin



Pin No.	Item	Pin Function
1	BAT+	3.3V
2	BAT-	Ground
3	SWCLK	Digital pin module clock
4	SWDIO	Digital pin module data

2.2 Module size



Size: 30.00mm*10mm (The case)

3. Interface

Service UUID: 00001803-494c-4f47-4943-544543480000

Description	UUID	Attribute	Length
mobile->ibeacon	00001805-494c-4f47-4943-544543480000	notify/read+notify	20(Max)
ibeacon->mobile	00001804-494c-4f47-4943-544543480000	write	20(Max)

nRF51822 Power Comparison Table		
Power	Parament	1m RSSI reference value
0dBm	0x00	-54
4dBm	0x04	-50
-30dBm	0xD8	-89
-20dBm	0xEC	-77
-16dBm	0xF0	-72
-12dBm	0xF4	-65
-8dBm	0xF8	-62
-4dBm	0xFC	-58



Num	APP Command	Return	Description
1	Change name: 0x11+name(length<=8)	0x11	The first connectable version reboot takes effect other versions take effect immediately all versions are saved
2	Change UUID: 0x12+16byte UUID	0x12+16byte UUID	Immediate effect, save power Eg: 0x12 0x11 0x11... 0x99 0x99 <-- totle16 -->
3	Read UUID: 0x13	0x13+16byte UUID	
4	Change Major,Minor battPower: 0x14+Major+Minor+BattPower	0x14+Major+Minor +BattPower	Immediate effect, save power Major : 2byte(eg:0x00 0x0a is10) Minor: 2byte(eg:0x00 0x0b is 11) BattPower: This position is the battery power, see note 1 for details 1byte(eg:0x01)
5	Find Major,Minor,BattPowe: 0x15	0x15+Major+Minor +BattPower	
6	Modify the broadcast interval: 0x16+1byte(0x00-0xC8)	0x16+4byte	Immediate effect (eg:0x02 is 100ms)
7	Modify the transmit power: 0x17+1byte	2byte	Immediate effect 2541 can write : 0x01,0x02,0x03 51822 can write: 0x00, 0x04, 0xD8, 0xEC,0xF0,0xF4,0xF8,0xFC See note 2 for details

4. Beacon remark

4.1 Broadcast data format

Position	0	1	2	3	4	5	6	7	8	9-24	25-26	27-28	29
Data	0x02	0x01	0x06	0x1A	0xFF	0x4C	0x00	0x02	0x15	uuid	major	minor	rssi at 1m

4.2 Button and LED description

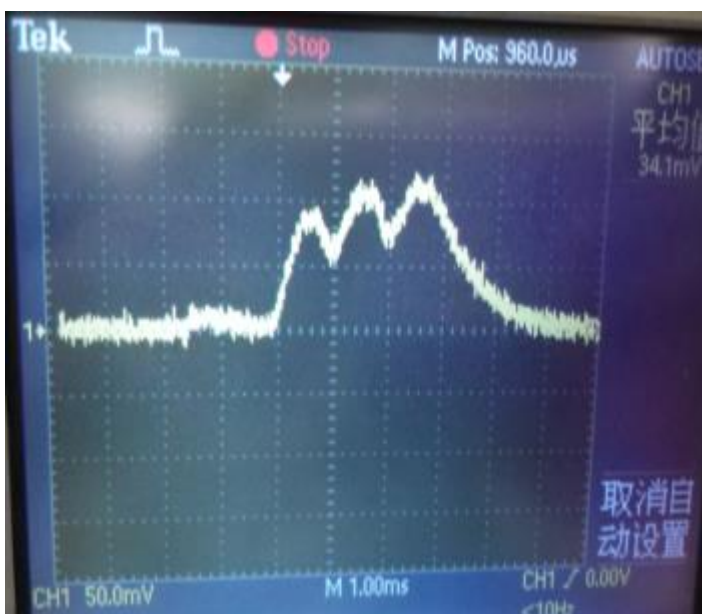
1. LED lights flash three times when Beacon is powered on
2. In the power-on state, long press the button 3S, the LED flashes once, and the beacon shuts down. In the off state, press and hold the 3S button to start the beacon.

5. Beacon power consumption

Broadcast current test method: Beacon broadcasts a 10 ohm resistor in series, and connects the oscilloscope to the voltage across the resistor.

Static current test method: Connect the beacon in series with a multimeter to check the current

Sensorless power consumption:



Power consumption:

Quiescent Current: 2.6uA

Broadcast current: 14mA

Broadcast time: 5ms

Broadcast interval: 1000ms

$$\text{Average current} = \frac{2.6\mu\text{A} \cdot 995\text{ms} + 14\text{mA} \cdot 5\text{ms}}{1000\text{ms}} = 0.0718905\text{mA}$$

$$\text{Use time of 2032 battery} = \frac{200\text{mA} \cdot h}{0.0718905\text{mA}} \approx 2782h$$

Remark:

SDK download:

<https://www.nordicsemi.com/api/sitecore/Products/MedialibraryZipDownload2>

6. Certification



Shenzhen CTL Testing Technology Co., Ltd.
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TEST REPORT

FCC PART 15.247

Report Reference No.: **CTL1612094501-WF**

Compiled by: Allen Wang
(position+printed name+signature) (File administrators)

Tested by: Nice Nong
(position+printed name+signature) (Test Engineer)

Approved by: Tracy Qi
(position+printed name+signature) (Manager)



Product Name.....: bluetooth tag
Model/Type reference: NRF51822B1, NRF51822A1, NRF51822S1, NRF51822B2, NRF51822T1, NRF51822G1
Trade Mark: Radioland
FCC ID: 2AGUT-NRF51822B1
Applicant's name: **SHENZHEN RADIOLAND TECHNOLOGY CO.,LTD**
Address of applicant: 5F, Block A2, Chentian Hangcheng Industry Zone, Xixiang Town, Bao'an District, Shenzhen, P.R.C
Test Firm: **Shenzhen CTL Testing Technology Co., Ltd.**
Address of Test Firm: Floor 1-A, Baisha Technology Park, No.3011, Shahexi Road, Nanshan District, Shenzhen, China 518055
Test specification.....:
Standard.....: **FCC Part 15.247**: Operation within the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz.
TRF Originator: Shenzhen CTL Testing Technology Co., Ltd.
Master TRF: Dated 2011-01
Date of Receipt.....: Dec. 09, 2016
Date of Test Date.....: Dec. 09, 2016 –Jan. 06, 2017
Data of Issue.....: Jan. 06, 2017
Result.....: Pass

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