

# SQM5400

## UHF RFID 超高频读写模块 硬件使用手册

Rev 1.3



**With the English version following  
the Chinese version.**

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## 1.修订记录

文件编号	版本号	拟制人/ 修改人	拟制/修改日 期	更改理由	更改内容
	V1.0		2021-12-31	初始版本	无
	V1.1		2022-04-28		更改模块封装
	V1.2		2022-05-23		更新结构
	V1.3	林泳钦	2022-12-21		修正射频错误

## 2. 产品介绍

### 主要特点

- ☞ 工作频率：860~960MHz（选配）支持：
  - 北美 902MHz ~ 928MHz
  - 中国 920MHz ~ 925MHz
  - 欧洲 865MHz ~ 867MHz
- ☞ 支持协议：EPC GEN2 / ISO 18000-6C
- ☞ 最大射频输出功率：+27dBm (0.5W)
- ☞ 50\*50 陶瓷天线识别距离 >2 米
- ☞ 低电压工作：+3.6 ~ +5V
- ☞ 接口：UART (TTL) 串口通信
- ☞ 模块化封装：半邮票孔 (21x21x3.5mm)
- ☞ 提供 windows、windows mobile、windows CE、Android 操作系统下的 API

### 产品概述

SQM5400 UHF RFID 读写模块采用先进的 RFID 专用射频芯片设计，支持高达 27dBm 的射频输出。模块体积小，工作功耗低，抗干扰能力强，非常方便适用于各种移动设备。软件方面提供 windows、windows mobile、windows CE、Android 操作系统下的 API。

### 应用范围

- ☞ 手持便携设备
- ☞ 台式读写器
- ☞ 发卡器
- ☞ 一体机

### 3.电气特性

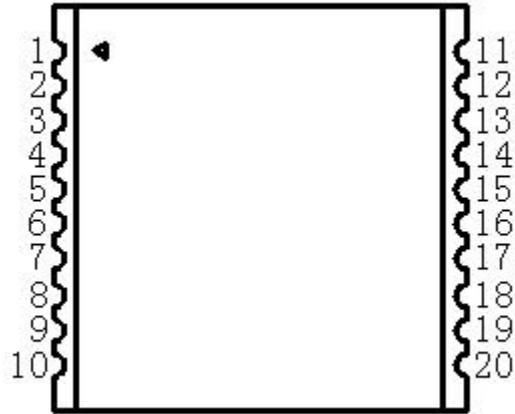
参数	条件	最小值	典型值	最大值	单位
<b>频率</b>					
频率范围	According Customization	840		960	MHz
频率步进值	According Customization		250/500		KHz
<b>输出</b>					
输出功率		5		27	dBm
输出功率精度			+/- 2		dB
输出功率平坦度			+/-1		dB
<b>标签</b>					
接收灵敏度	10%BER		-53		dBm
	1%BER		-51		dBm
盘存标签峰值速度			100		tag/s
标签缓存区	96 bit EPC		100		tag
<b>逻辑电平</b>					
VIL, Input Low Voltage		-0.5		0.8	V
VIH, Input High Voltage		2		Vdd+0.5	V
<b>温度范围</b>					
存储温度		-40		85	°C
工作温度		-20		55	°C
<b>输入电源</b>					
供电电压		3.6		5.0	V
待机模式	5V		25		mA
读卡模式	5V,Pout=27dBm,50 Ω Load		480		mA

注：电流会因负载不同而有所变化。

#### 绝对最大额定参数

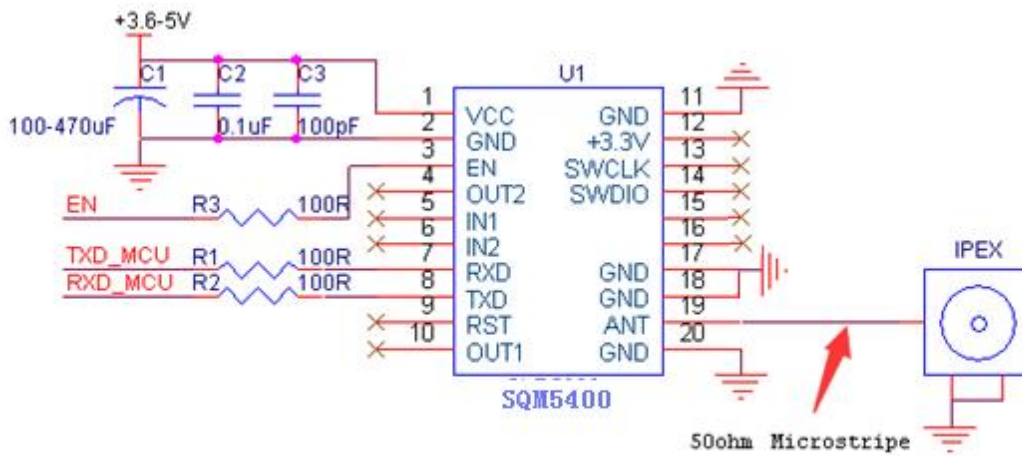
参数	额定值
供电电压	+3.6 ~ +5V
Digital I/O Voltage to GND	+3.3V
工作温度	-20 ~ +55°C
存储温度	-40 ~ +85°C

#### 4. 引脚配置及功能说明



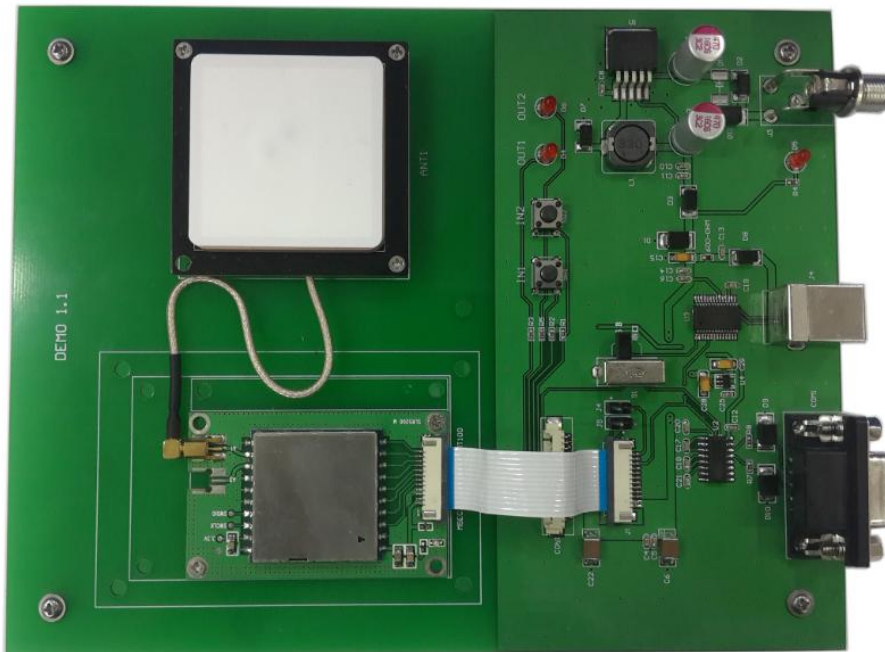
引脚	定义
1	VCC(+3.6 - 5V)
2	GND
3	EN 模块电源使能:LOW(POWER DOWN) HIGH&DISCONNECT(ACTIVE)
4	Digital Output 2 (GPIO OUT2)
5	Digital Input 1 (GPIO IN 1)
6	Digital Input 2 (GPIO IN 2)
7	RXD (DATA INPUT, TTL 电平)
8	TXD (DATA OUTPUT, TTL 电平)
9	RST (LOW ACTIVE, 不用请悬空)
10	Digital Output 1 (GPIO OUT1)
11	GND
12	模块 3.3V 输出
13	SWCLK SWD 烧录接口时钟线
14	SWDIO SWD 烧录接口数据线
15	RFU
16	RFU
17	GND
18	GND
19	ANT
20	GND

### 5.应用电路示意图



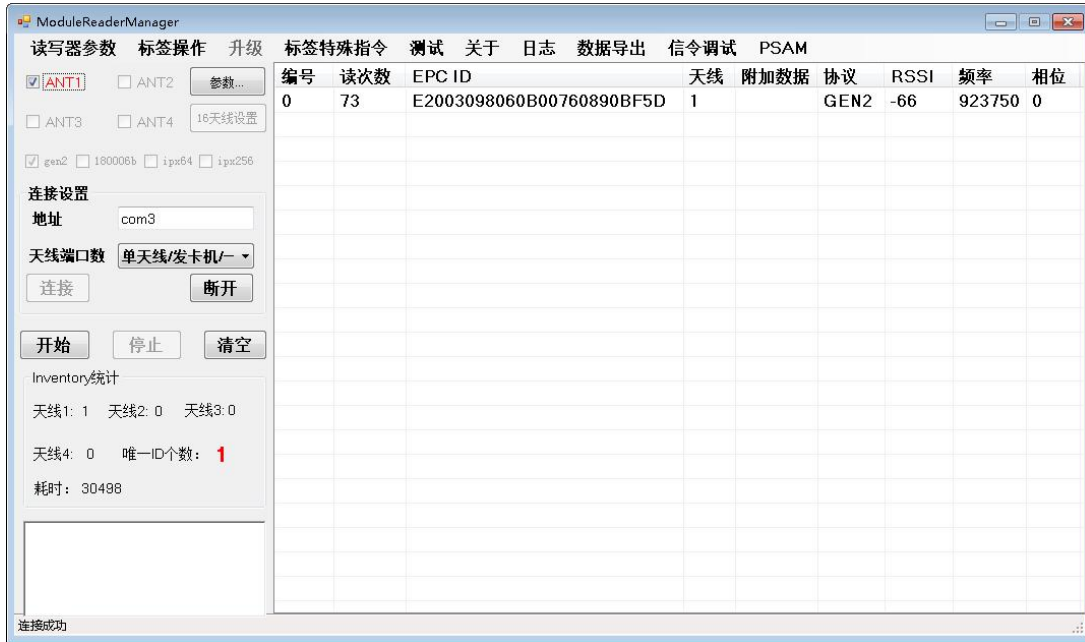
If VSWR of the antenna is high(>1.4), please increase the PI matching.

### 5.1 SQM5400 评估板



## 5.2 连接设备

通过串口线或 USB 线连接好设备，给设备上电，（桌面右键计算机-管理-设备管理器-查看可用 COM 口号）。连接设置：地址填写 COM 口号，天线端口数选择单天线。具体的功能操作请参考演示软件使用说明。





## 6.应用信息

### 输入电源

VCC端口建议使用47~470uF的钽电容来滤波，以减少射频发射时功放的快速开启和关闭对电源的牵引。0.1uF和100pF电容分别滤出不同频段的电源纹波。

### 使能/复位

EN使能，内置上拉电阻到VCC，高电平或悬空时模块上电，接低电平时模块掉电（低电平应当小于0.4V，高电平应当大于0.9V小于VCC）。

RST复位，内置上拉电阻到3.3V，接低电平时复位。

### GPIO接口

输入：

Logic low <0.8 V 最小0V  
Logic high >2V 最大3.3V

输出：

Logic low 最大0.4V  
Logic high 最小2.9V，最大3.3V

I/O口最大输出电流 5mA。

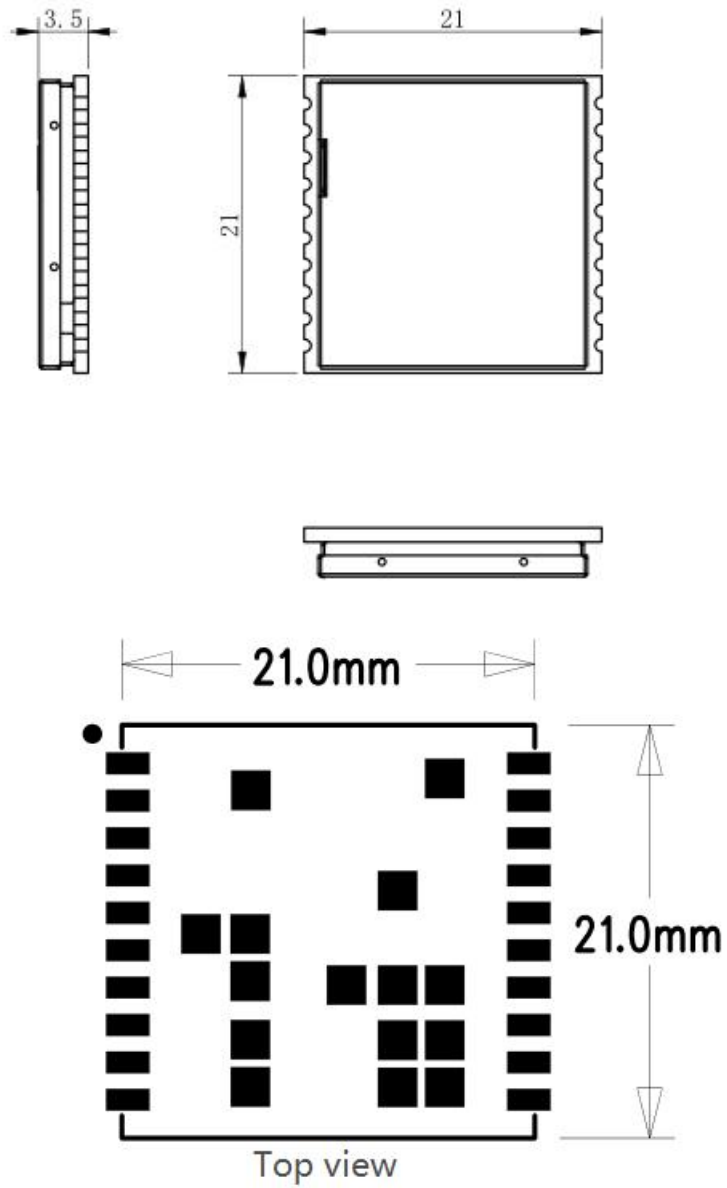
### 天线连接

天线端口输出阻抗50欧姆，PCB连接请使用50欧姆微带线或者带状线。天线的阻抗也应该是50欧姆，天线驻波比建议小于1.5，更好的天线驻波比可以得到更好的读卡效果。

### 通信接口 (RXD/TXD)

通信接口RXD和TXD都是TTL电平，连接方式建议参照上面的应用原理图来连接。通信波特率为115200bps

7.尺寸参数



(SMD\_5000)

尺寸单位：毫米

注：Exposed Thermal Pad (裸露散热焊盘) 条件允许最好保留散热焊盘并接地以利于模块散热。



电敏感器件  
遵循操作注意事项

# **SQM5400**

## **UHF RFID Module**

### **Hardware User Manual**

#### **Rev 1.3**



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## 1. Revision History

File Number	Version Number	Modified By	Modified Date	Revision Reason	Revision Contents
	V1.0		2021-12-31		None
	V1.1		2022-04-28		Change Module Packaging
	V1.2		2022-05-23		Change Structure
	V1.3		2022-12-21		Modify RF Error

## 2. Product Description

### Main Features

- ⊗ Working Frequency: 860~960MHz  
(Adjustable):
  - NA 902MHz ~ 928MHz
  - CN 920MHz ~ 925MHz
  - Eu 865MHz ~ 867MHz
- ⊗ Air Protocol: EPC GEN2 / ISO 18000-6C
- ⊗ Max RF Output Power: +27dBm (0.5W)
- ⊗ Reading Range: >2Meters  
(test with 2.5dbi Ceramic Antenna)
- ⊗ Low Voltage: +3.6~ +5V
- ⊗ Connector: UART (TTL) Serial Port
- ⊗ Packaging: Half Stamp Hole (21x21x3.5mm)
- ⊗ Host API: windows 、 windows mobile 、 windows CE 、 Android

### General Description

The SQM5400 UHF RFID read-write module adopts advanced RFID-specific radio frequency chip design and supports radio frequency output up to 27dBm. The module is small in size, has low operating power consumption, and has strong anti-interference ability. It is very convenient and suitable for various mobile devices. In terms of software, it provides APIs under windows, windows mobile, windows CE, and Android operating systems.

### Application Range

- ⊗ Handheld
- ⊗ Desktop Reader
- ⊗ UHF Card Writer
- ⊗ Integrated Reader

### 3. Electrical Features

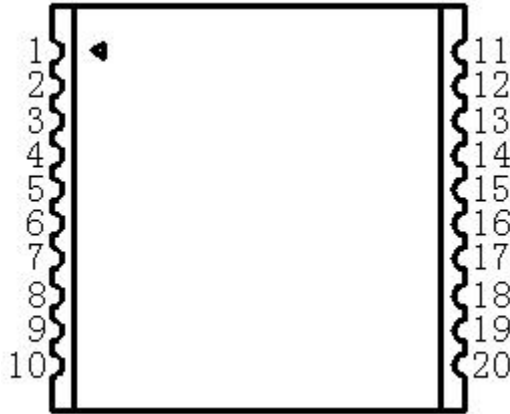
Parameters	Condition	Mini.	Standard	Max.	Unit
<b>Frequency</b>					
Frequency Range	According Customization	840		960	MHz
Frequency Step Value	According Customization		250/500		KHz
<b>Output</b>					
Output Power		5		27	dBm
Output Precision			+/- 2		dB
Output Flatness			+/-1		dB
<b>Tag</b>					
Receive Sensitivity	10%BER		-53		dBm
	1%BER		-51		dBm
Inventory Tag Peak Speed			100		tag/s
Tag Cache Area	96 bit EPC		100		tag
<b>Logical Electricity Flat</b>					
VIL, Input Low Voltage		-0.5		0.8	V
VIH, Input High Voltage		2		Vdd+0.5	V
<b>Temperature Range</b>					
Storage Temp.		-40		85	°C
Working Temp.		-20		55	°C
<b>Input Power</b>					
Power Supply Voltage		3.6		5.0	V
Standby Mode	5V		25		mA
Enable Mode	5V,Pout=27dBm,50 Ω Load		480		mA

Note: The electric current will vary depending on the load.

#### Absolute Max Ratings

Parameters	Rated Value
Power Supply voltage	+3.6 ~ +5V
Digital I/O Voltage to GND	+3.3V
Working Temp.	-20 ~ +55°C
Sotrage Temp.	-40 ~ +85°C

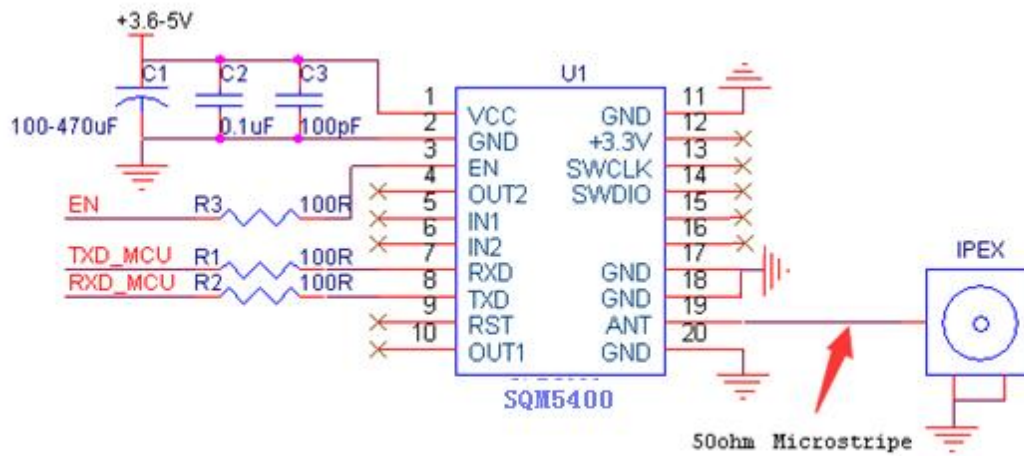
## 4. Pin Configuration and Function Description



Pin	Definition
1	VCC(+3.6 - 5V)
2	GND
3	EN Module Power Enable: LOW(POWER DOWN) HIGH&DISCONNECT(ACTIVE)
4	Digital Output 2 (GPIO OUT2)
5	Digital Input 1 (GPIO IN 1)
6	Digital Input 2 (GPIO IN 2)
7	RXD (DATA INPUT, TTL Electricity Flat)
8	TXD (DATA OUTPUT, TTL Electricity Flat)
9	RST (LOW ACTIVE, leave empty when not in use)
10	Digital Output 1 (GPIO OUT1)
11	GND
12	Module 3.3V Output
13	SWCLK SWD Programming Interface Clock Line
14	SWDIO SWD Programming Interface Data Line
15	RFU
16	RFU
17	GND
18	GND
19	ANT
20	GND

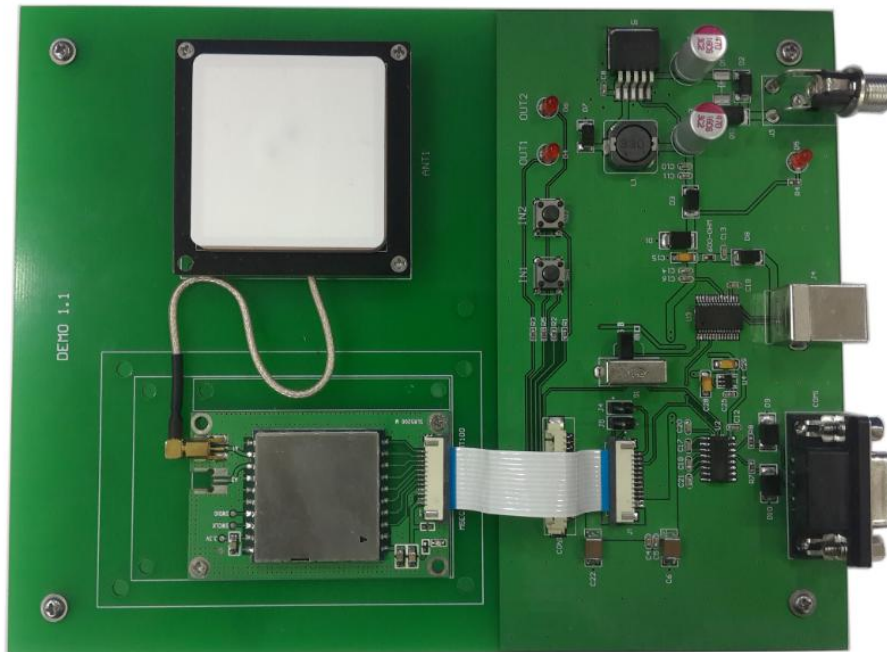


## 5. Application Circuit Diagram



If VSWR of the antenna is high (>1.4), please increase the PI matching.

### 5.1 SQM5400 Testing Board

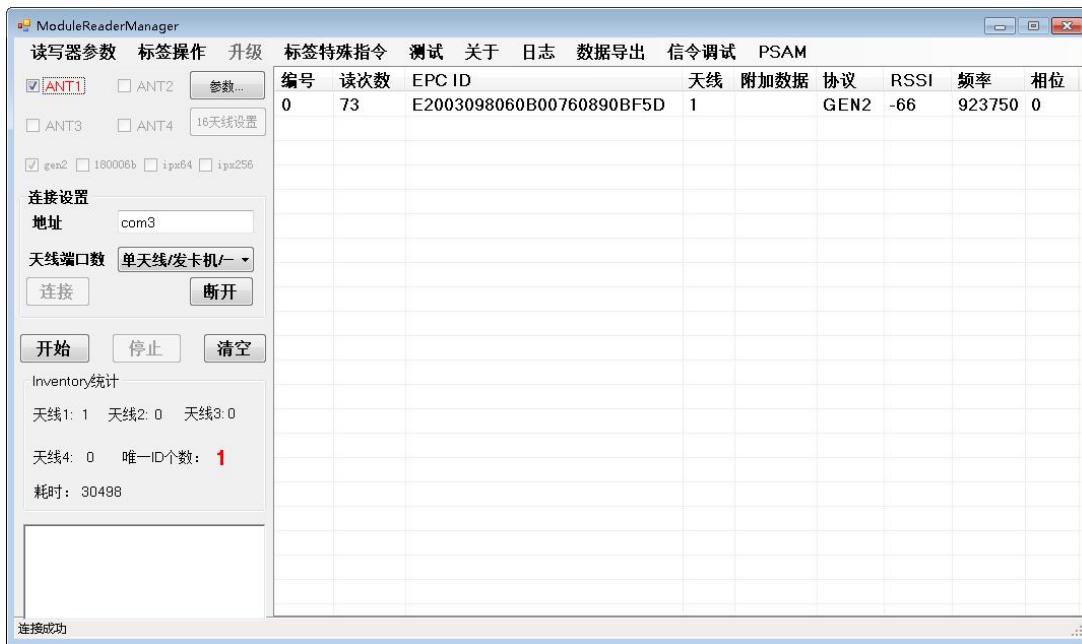


## 5.2 Connection

Connect the device through the serial port cable or USB cable, power on the device, and check the generated COM number through the computer's device manager.

Connection settings: Fill in the COM number in the 'Address' space, and select single antenna for the number of antenna ports.

For specific function operations, please refer to the instructions for use of the demo software.



## 6. Application Information

### Input Power

It is recommended to use a 47~470uF tantalum capacitor for VCC port filtering to reduce the pull on the power supply caused by the rapid turning on and off of the power amplifier during RF transmission. 0.1uF and 100pF capacitors filter out power supply ripples in different frequency bands respectively.

### Enale/Reset

EN is short for enable, with a built-in pull-up resistor to VCC. The module is powered on when the level is high or floating, and the module is powered off when the level is connected to the low level (the low electricity flat should be less than 0.4V, and the high electricity flat should be greater than 0.9V and less than VCC).

RST reset, built-in pull-up resistor to 3.3V, reset when connected to low electricity flat.

### GPIO Connector

Input:

Logic low <0.8 V	Mini.	0V
Logic high >2V	Max.	3.3V

Output:

Logic low	Max.	0.4V
Logic high	Mini.	2.9V, Max. 3.3V

GPIO port Max. Output electric current 5mA.

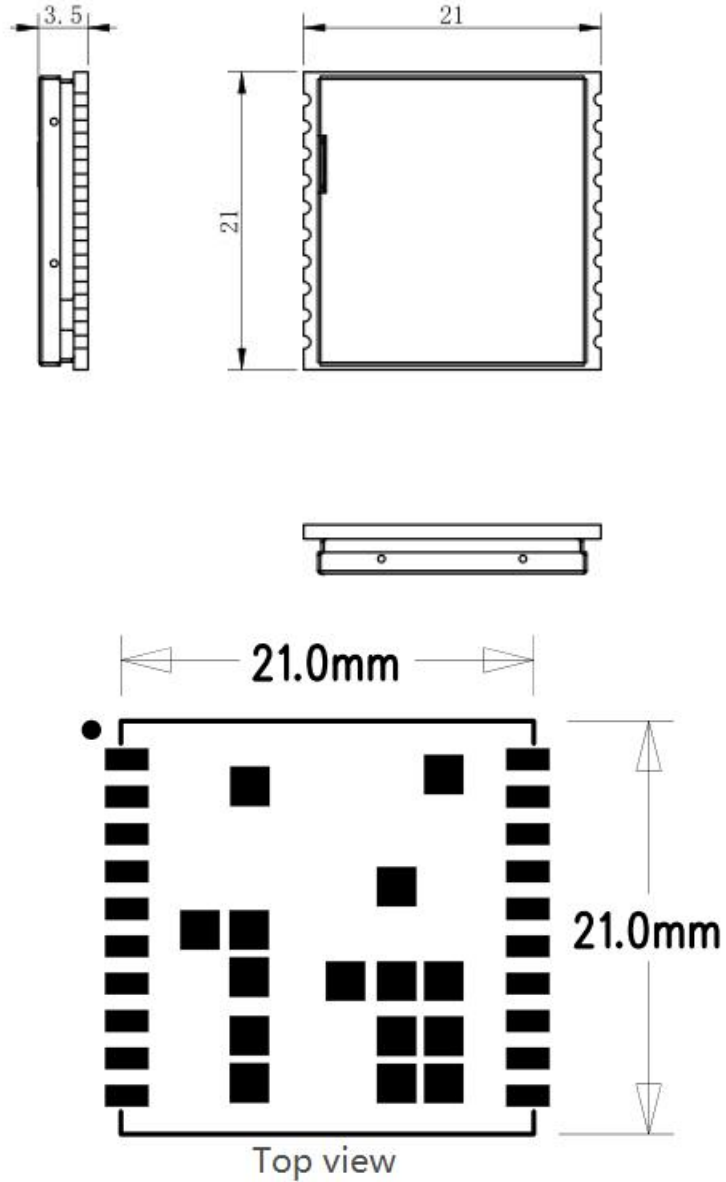
### Antenna Connector

The output impedance of the antenna port is 50 ohms. Please use 50 ohm microstrip lines or strip lines for PCB connection. The impedance of the antenna should also be 50 ohms, and the standing wave ratio of the antenna is recommended to be less than 1.5. A better standing wave ratio of the antenna can get better card reading effect.

### Communication Interface (RXD/TXD)

The communication interfaces RXD and TXD are both TTL electricity flat. It is recommended to refer to the application schematic diagram above for the connection method. Communication baud rate is 115200bps.

### 7. Dimension Parameters



(SMD\_5000)

Dimension Unit: Millimeter



Electrically sensitive devices  
Follow operating precautions

**Note:** Exposed Thermal Pad

If conditions permit, please retain the heat dissipation pad and connect it to ground to facilitate module heat dissipation.