

WisLTE Quick Start Guide V1.3

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1. General Description

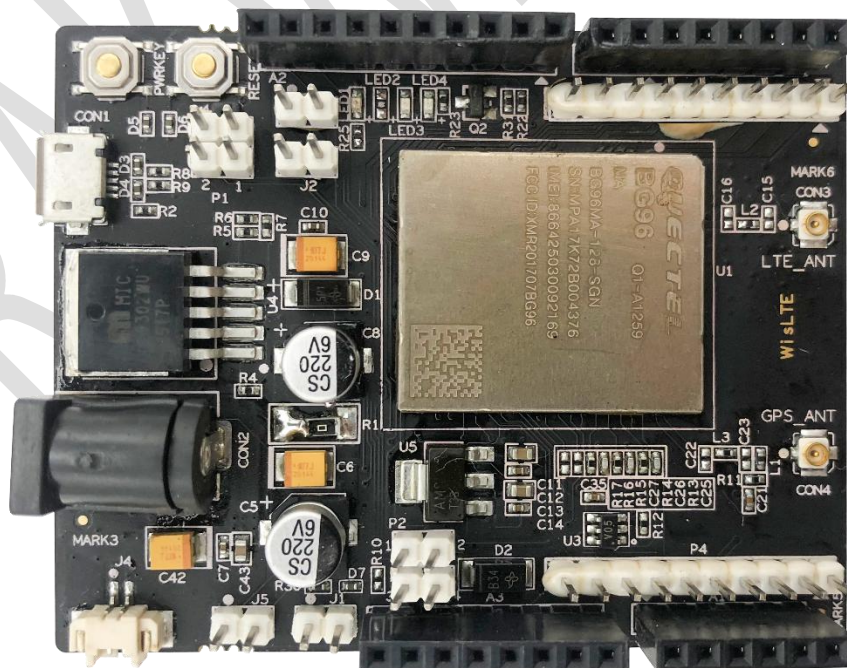
1.1 Overview

WisLTE development board is based on Quectel launched a new generation of Internet of things module BG96. BG96 is an embedded IoT (LTE Cat M1 and LTE Cat NB1) wireless communication module without receive diversity. It supports LTE-TDD and Half-Duplex LTE-FDD wireless communication, which provides data connectivity on LTE-TDD/FDD networks. It also provides GNSS1) and voice2) functionalities to meet customers' specific application demands. The following table shows the frequency bands of BG96 module.

BG96 is a series of LTE Cat M1 and Cat NB1 module offering a maximum data rate of 375kbps downlink and uplink. It features ultra-low power consumption, and provides pin-to-pin compatibility with Quectel LTE module EG91, Cat NB1 (NB-IoT) module BC95, UMTS/HSPA modules UG95/UG96 and GSM/GPRS module M95.

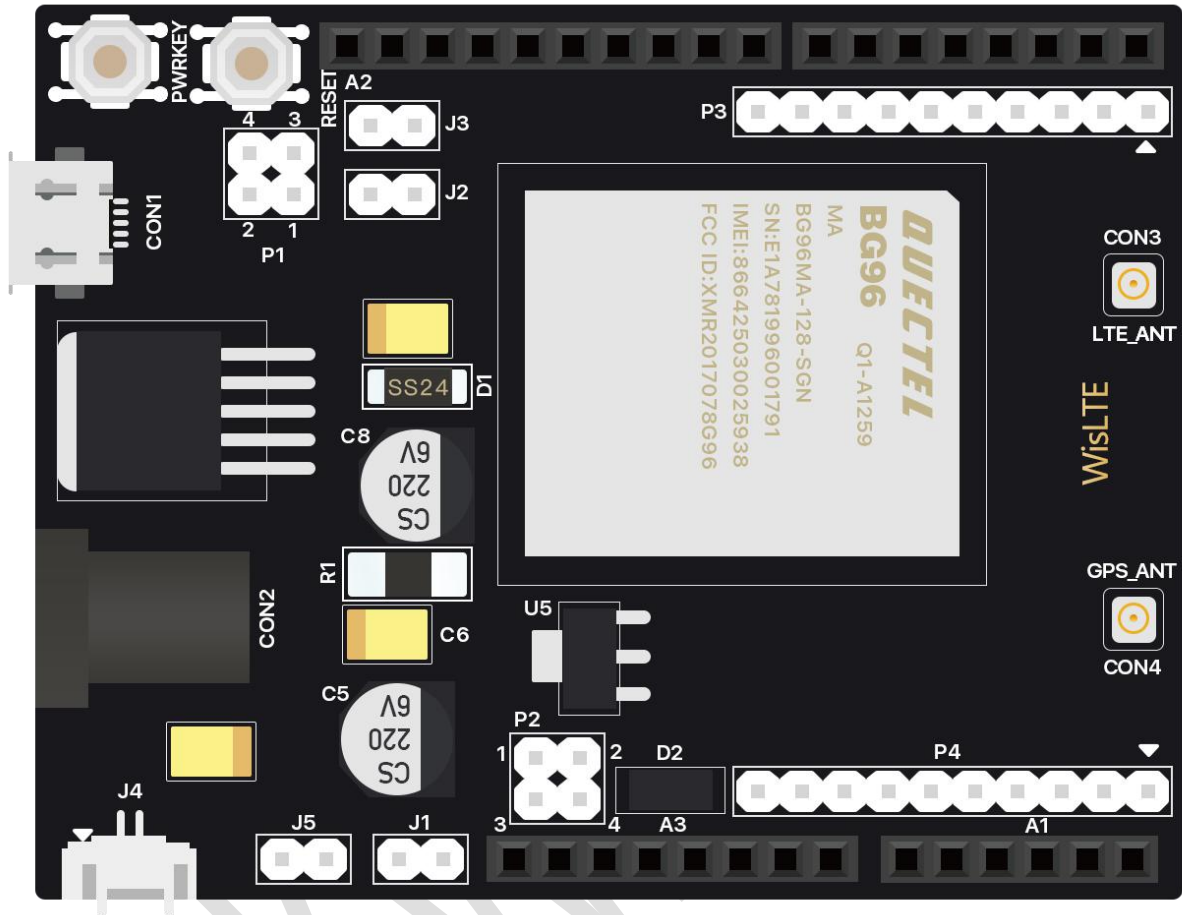
With cost-effective SMT form factor of 22.5mm × 26.5mm × 2.3mm and high integration level, BG96 enables integrators and developers to easily design their applications and take advantage from the module's low power consumption and mechanical intensity. Its advanced LGA package allows fully automated manufacturing for high-volume applications.

A rich set of Internet protocols, industry-standard interfaces (USB/UART/I2C/Status Indicator) and abundant functionalities (USB drivers for Windows XP, Windows 7/8/10, Linux and Android) extend the applicability of the module to a wide range of M2M applications such as wireless POS, metering, tracking, etc.



1.2 Hardware introduce

The following image is RAK WisLTE development board, and it compatible Arduino development board, It also can be used as an extension board development with Arduino. The interface resource are as follow:



J4	Battery powered	Battery-powered interface
J1	USB BOOT	Can force the module to boot from USB port for firmware upgrade
J5	Functional interface	64,63 pins for BG96, reserved for function pins
P2	UART voltage switch	Can be used to switch the voltage on the UART pin of the device to adapt to different Arduino devices
P3,P4	Functional interface	Reserved for function pins

P1 (UART Switch)		
Pin	Name	Description
1	M_TXD	UART TXD pin for BG96
2	M_RXD	UART RXD pin for BG96
3	A_RXD	UART RXD pin for Arduino device
4	A_TXD	UART TXD pin for Arduino device

P2 (UART voltage switch)		
Pin	Name	Description
1	VCC_MCU	BG96 UART voltage pin
2	VCC_3V3	3.3V supply voltage
3	VCC_MCU	BG96 UART voltage pin
4	VCC_5V	5V supply voltage

P3 (Functional interface)		
Pin	Name	Description
1	PSM_IND	Power saving mode indicator
2	ADC1	General purpose analog to digital converter interface
3	PCM_CLK	PCM clock output
4	PCM_SYNC	PCM frame synchronization output
5	PCM_IN	PCM data input
6	PCM_OUT	PCM data output

7	W_DISABLE#	Airplane mode control
8	AP_READY	Application processor sleep state detection
9	DBG_RXD	Receive data
10	DBG_TXD	Transmit data

P4 (Functional interface)		
Pin	Name	Description
1	ADC0	General purpose analog to digital converter interface
2	GPIO/SPI_CLK	GPIO/SPI master clock
3	UART3_TXD/SPI_MOSI	Transmit data/ Master Out Slave In of SPI interface
4	UART3_RXD/SPI_MISO	Receive data/ Master In Slave Out of SPI interface
5	DTR	UART1 DTR: Data terminal ready. Sleep mode control
6	RI	UART1 RI: Ring indicator
7	DCD	UART1 DCD: Data carrier detection
8	RTS	UART1 RTS: Request to send
9	CTS	UART1 CTS: Clear to send
10	USIM_PRE	(U)SIM card insertion detection

2. Quick Start Guide

2.1 Install USB driver

1. When you the first use WisLTE,you shoulu install the BG96 USB driver. you can download the driver in: <http://www.rakwireless.com/en/download/WisLTE/Tools>

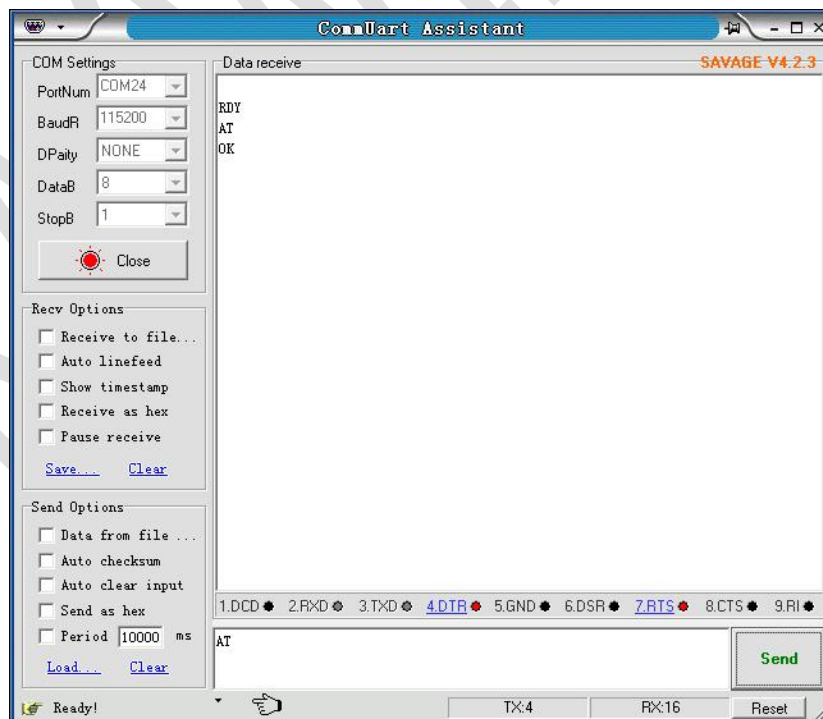
2. After the installation driver is complete, connect WisLTE to the computer , and you will see this in your Computer's Device Manager:



2.2 Send AT Command

1. Select USB AT Port corresponding to the COM port, open the serial port tools.

2. When send AT\r\n, The module will return AT\r\nOK, this means module works normal.You can send more AT commands to control the module. More AT commands, pls visit the documents [BG96 AT Commands Manual](#).

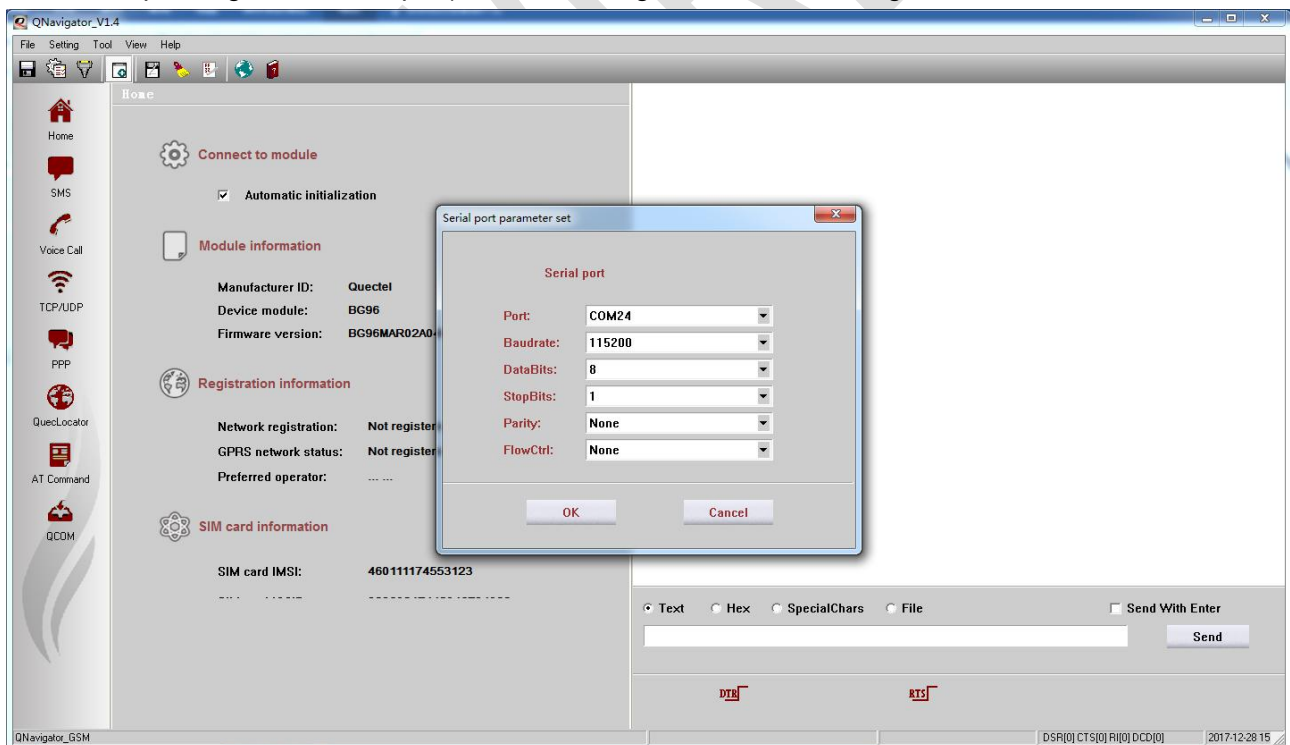


2.3 Use QNavigator to Control the Module

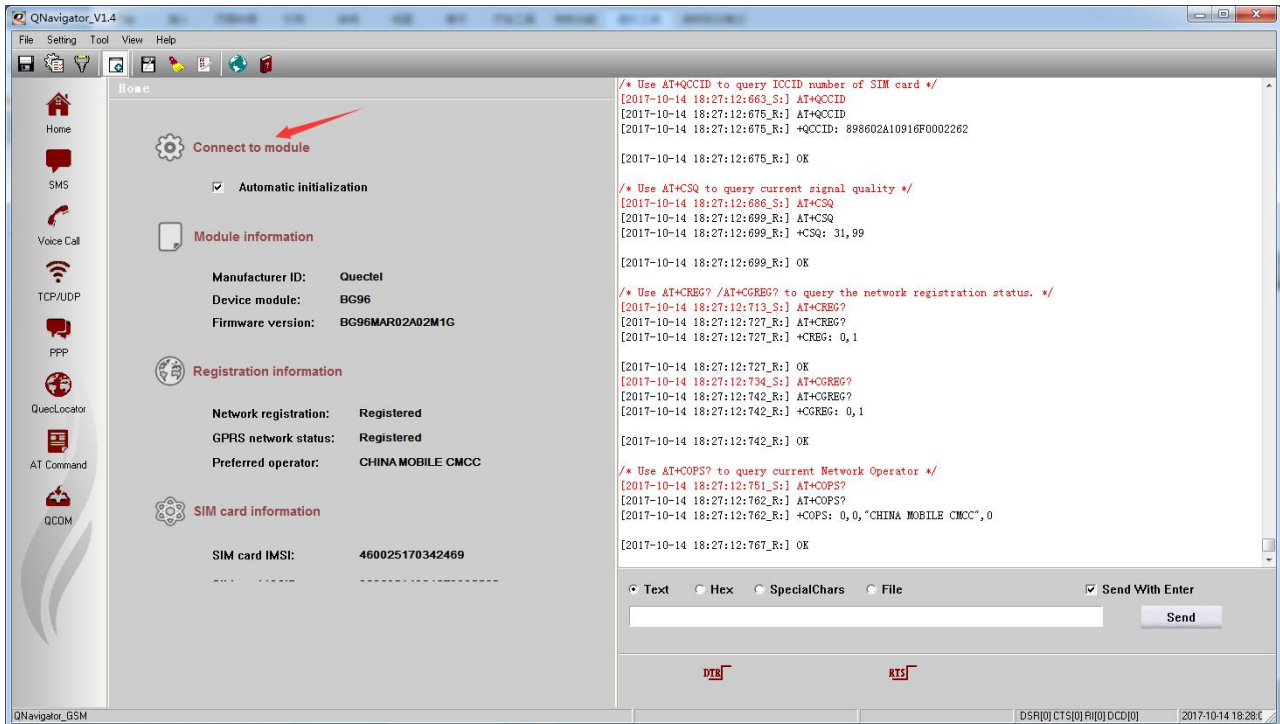
1. Download the testing tools of QNavigator, The download link:
<http://www.rakwireless.com/en/download/WisLTE/Tools>
2. Open the QNavigator, Click the Next, Choose GSM/GPRS, Then click Next, will be ready.



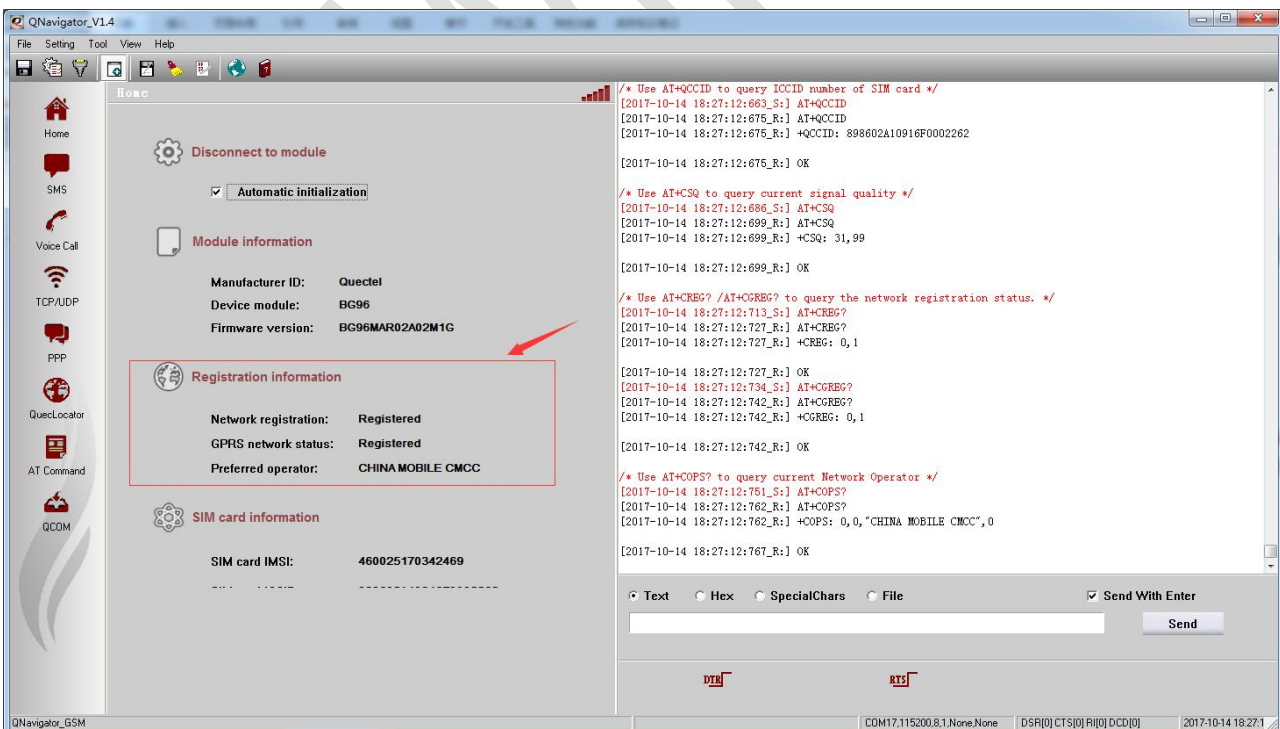
3. Click the UART button in Top left, set the UART with Baudrate as 115200(Also select USB AT Port corresponding to the COM port), the rest config info like below image:



4. Click the Connect to module, The tools will send command to get the module info automatically.



5. In the backend side, you can insert your SIM card to connect the 4G network, click the connect to module, the module will return the registration successful info. If you just insert the SIM card, you may wait few minutes and get connect the antenna. (This example is connected to the 2G network, if you want to connect NB network, you must use the NB's SIM card)

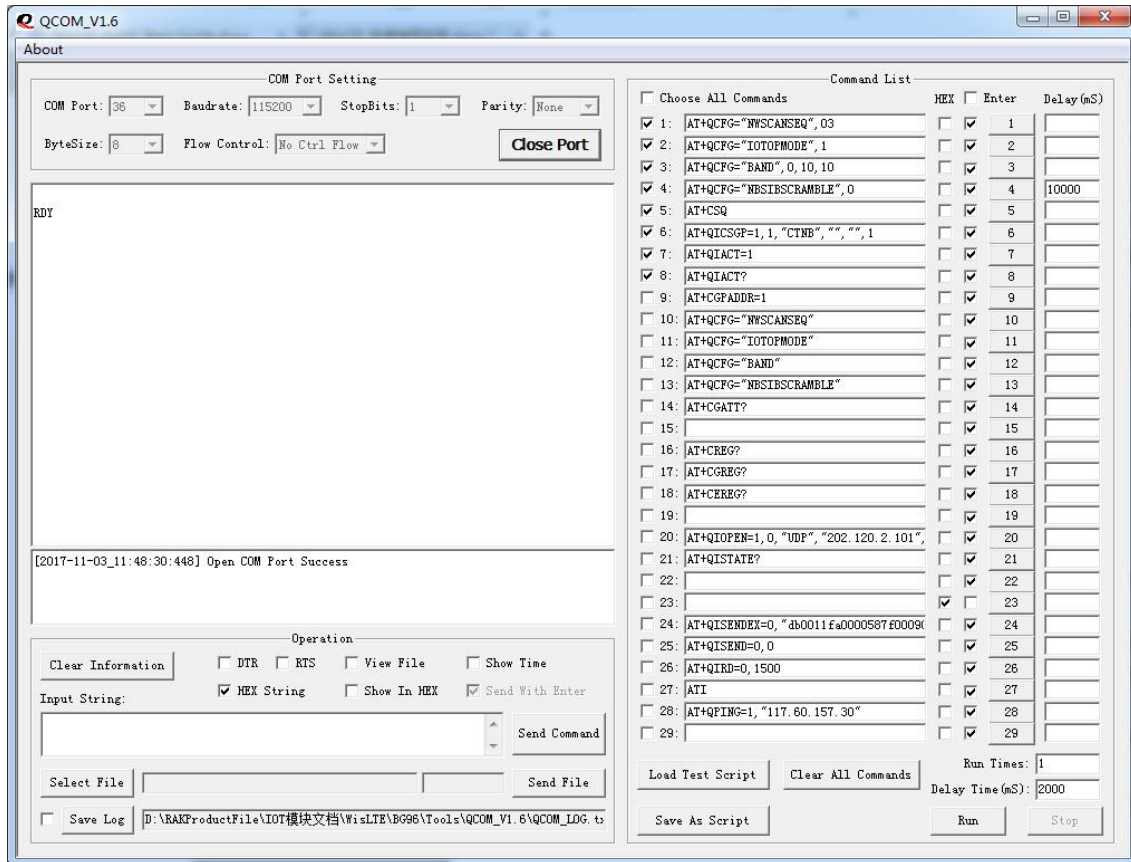


2.4 NB-IOT UDP communication test

1. Plug in the module to support NB-IOT network SIM card.

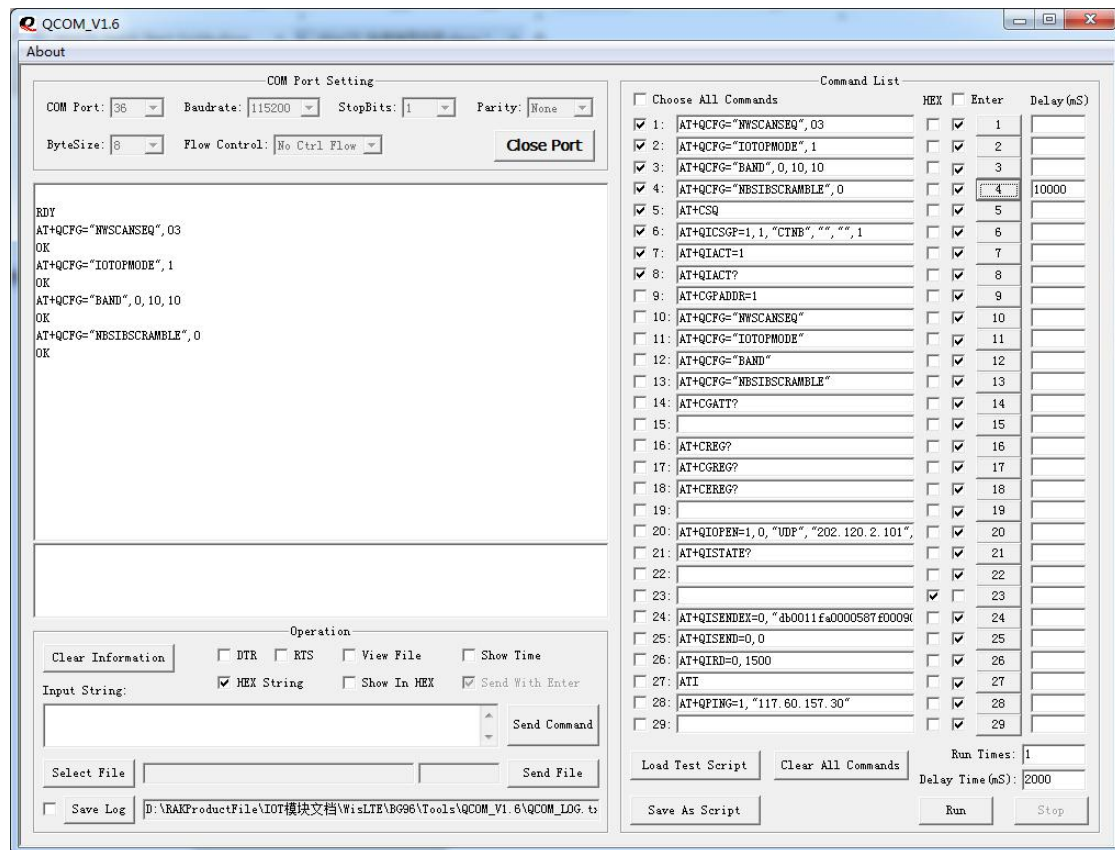
2. Through the Micro USB interface to the computer, Select USB AT Port corresponding to the COM port, open the serial port tools.

(The tool you can download in: <http://www.rakwireless.com/en/download/WisLTE/Tools>)

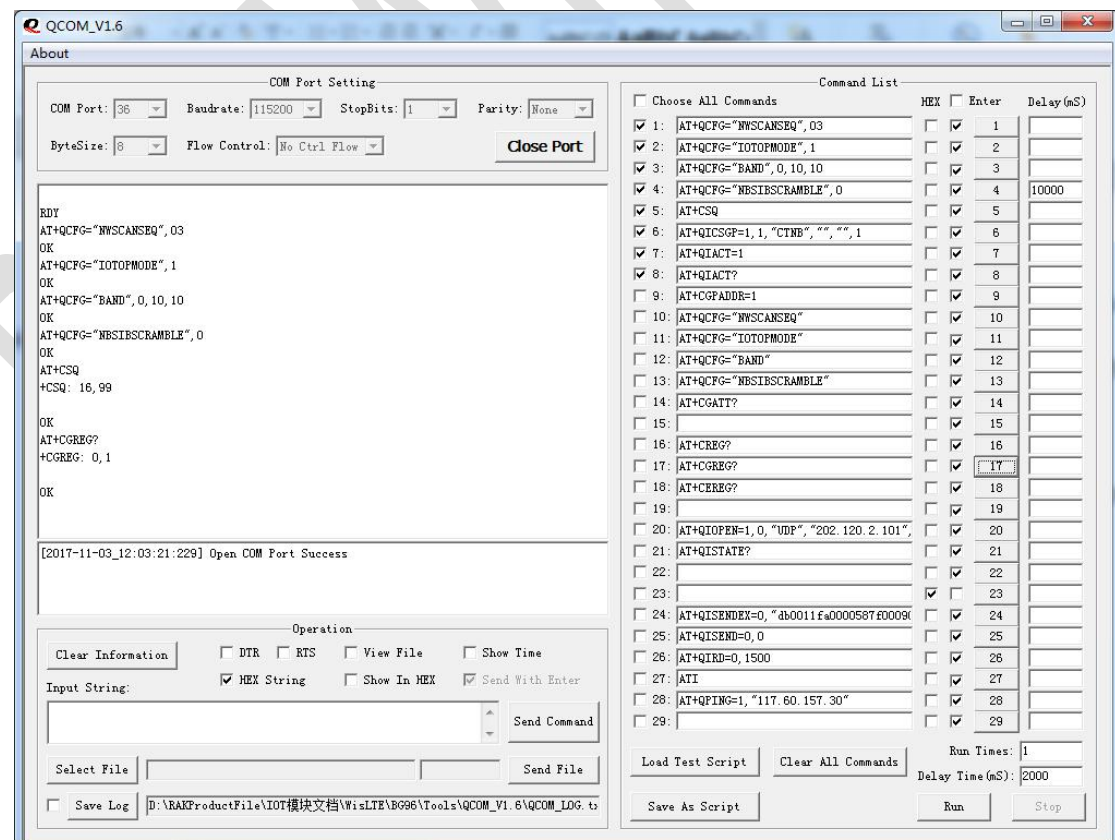


3. Send the AT commands listed below to have the module find the NB's network. (This test is used in China Telecom's NB card, such as the different regions, please make changes in accordance with the various regions. AT command details refer to: [Quectel BG96 Network Searching Scheme Introduction](#) document operation)

```
AT+QCFG="NWSCANSEQ",03    // Set the scanning network to NB network
AT+QCFG="IOTOPMODE",1
AT+QCFG="BAND",0,10,10    // Set the scan channel to BAND5
AT+QCFG="NBSIBSCRAMBLE",0
```

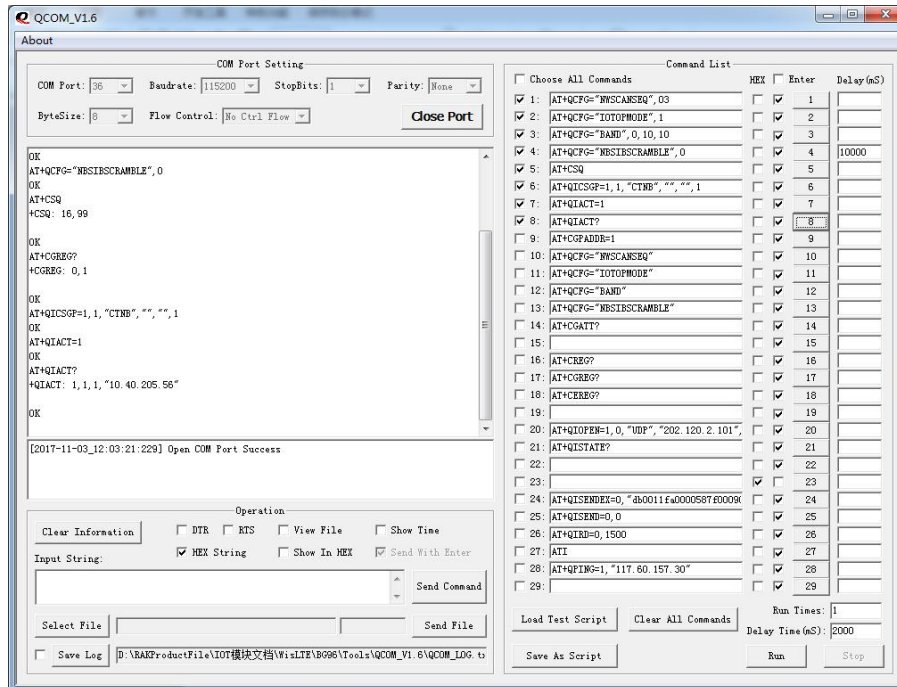


4. After setting, send AT + CSQ to check network signal strength, if there is signal value, it indicates that it has connected to NB network. You can also send AT + CGREG? To check the connection status of the network, to determine whether to connect to the network.



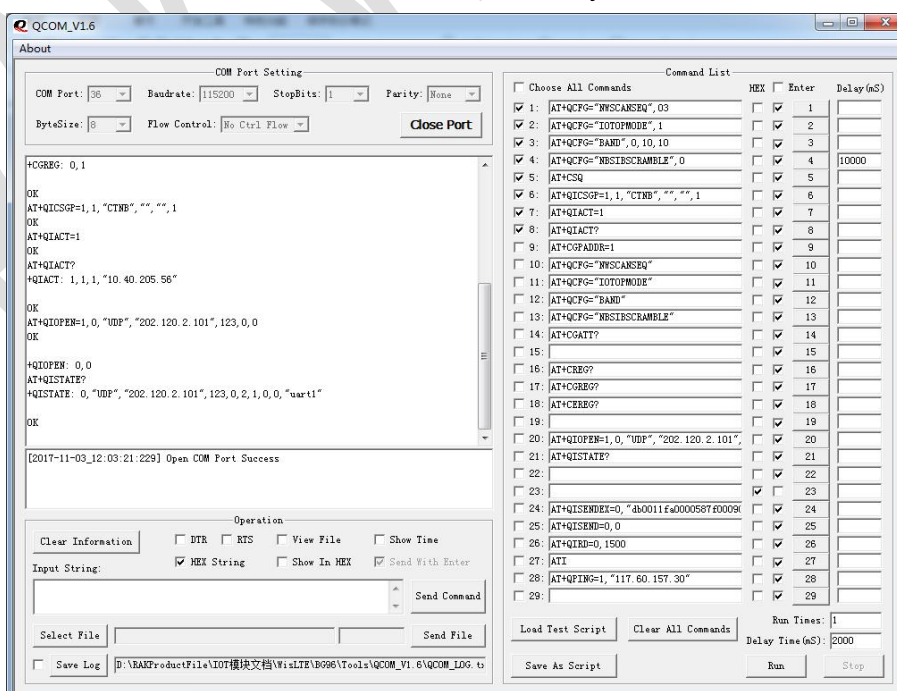
5. After connecting to the network, you need to set up the APN and activate the APN network. You can set the APN by sending the following command. (For command details, refer to [Quectel BG96 TCP \(IP\) AT Commands Manual](#) documentation)

```
AT+QICSGP=1,1,"CTNB","",1 // Set APN parameters
AT+QIACT=1 // Activate APN
AT+QIACT? // Query the APN assigned IP address
```



6. Activate the APN, you can establish a UDP connection (In China, NB network must first inform the operator your server IP address, the operator to help you bind before the connection is successful. Other regions have been the standard of each area)

```
AT+QIOPEN=1,0,"UDP","202.120.2.101",123,0,0 // Establish a UDP connection
AT+QISTATE? // Query connection is successful
```

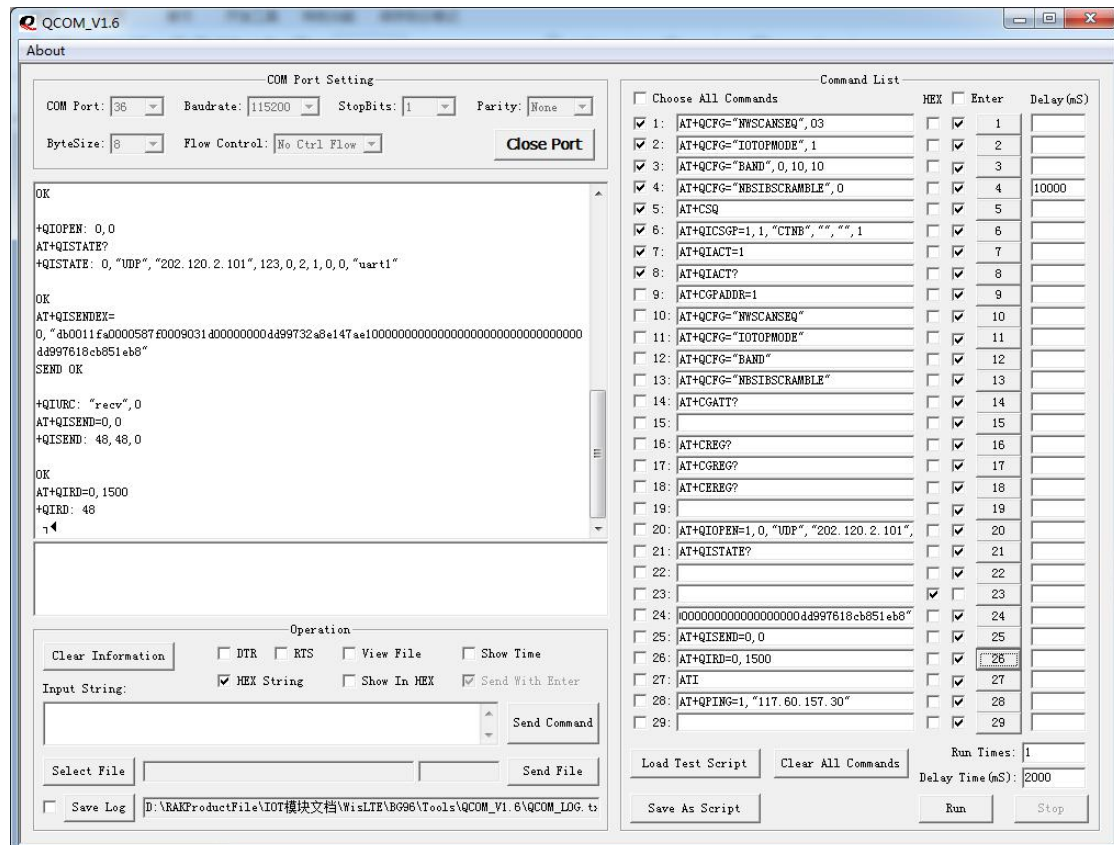


7. Send data to the server, there will be prompted to receive data "recv", if there is no prompt, you can send commands to check whether there is data reception.

```
AT+QISENDEX=0,"db0011fa0000587f0009031d00000000dd99732a8e147ae100000000000000000000000000dd997618cb851eb8" // send data
```

```
AT+QISEND=0,0 // Query data is sent successfully
```

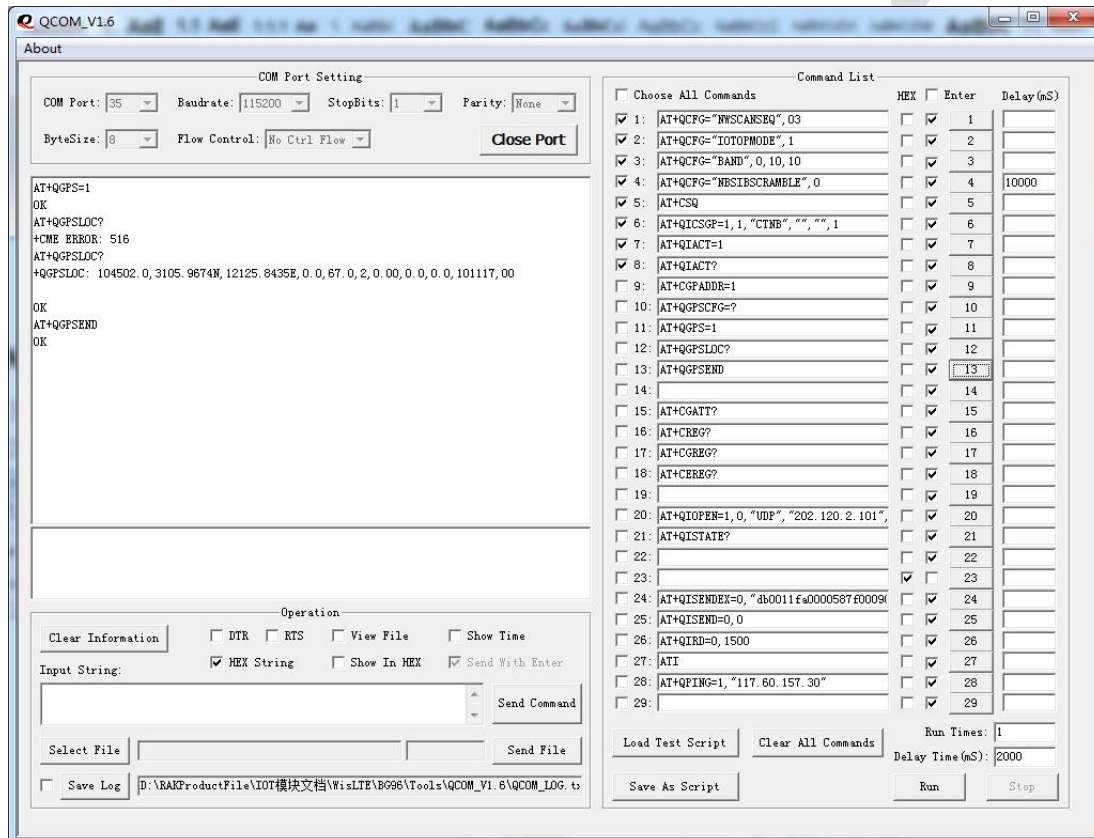
```
AT+QIRD=0,1500 // Check whether there is data received, if there is data received, print it out directly
```



2.5 GNSS Function Test

1. Plug in the module GNSS antenna, and then connect to the computer.
2. Select USB AT Port corresponding to the COM port, open the serial port tools.
3. Send the commands listed below to control the module's GNSS capabilities. (Detailed GNSS command description, please refer to: [Quectel BG96 GNSS AT Commands Manual](#))

AT+QGPS=1 // Turn on GNSS
 AT+QGPSLOC? // Acquire Positioning Information
 AT+QGPSEND // Turn off GNSS



3. Used with Arduino

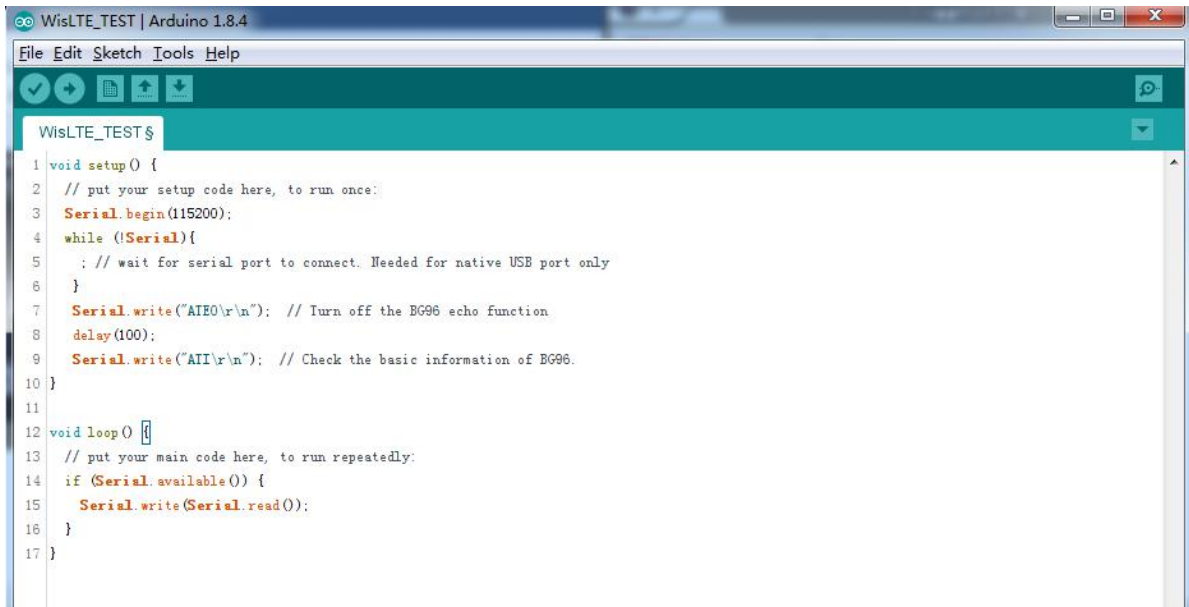
WisLTE also support work with Arduino. If you want to work with Arduino, you should note that the points shown in the following figure need to be connected using a jumper cap.



Here is a test communication program to test Arduino and WisLTE communication. In the future we will provide WisLTE's Arduino library for users to use.

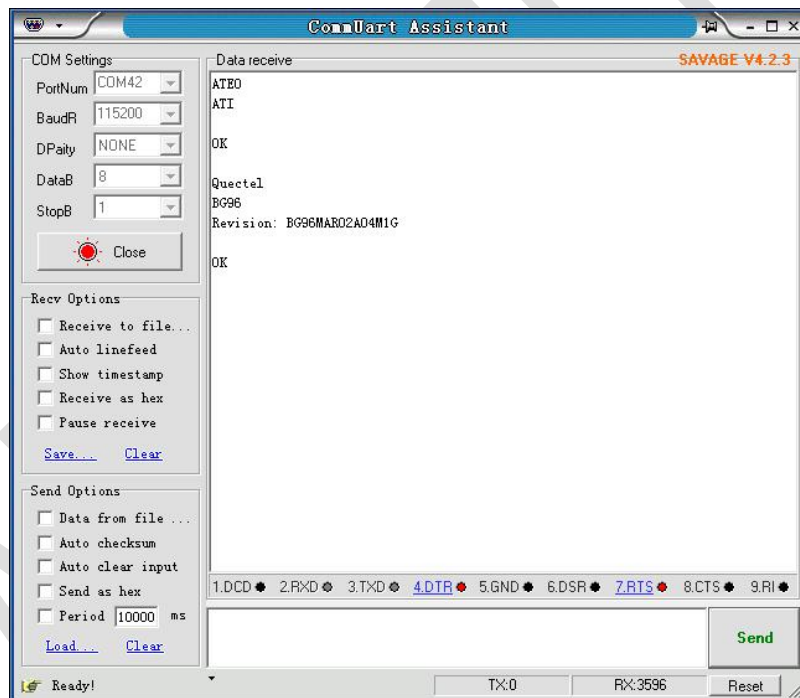
```
void setup() {
    // put your setup code here, to run once:
    Serial.begin(115200);
    while (!Serial){
        ; // wait for serial port to connect. Needed for native USB port only
    }
    Serial.write("ATE0\r\n"); // Turn off the BG96 echo function
    delay(100);
    Serial.write("AT\r\n"); // Check the basic information of BG96.
}

void loop() {
    // put your main code here, to run repeatedly:
    if (Serial.available()) {
        Serial.write(Serial.read());
    }
}
```

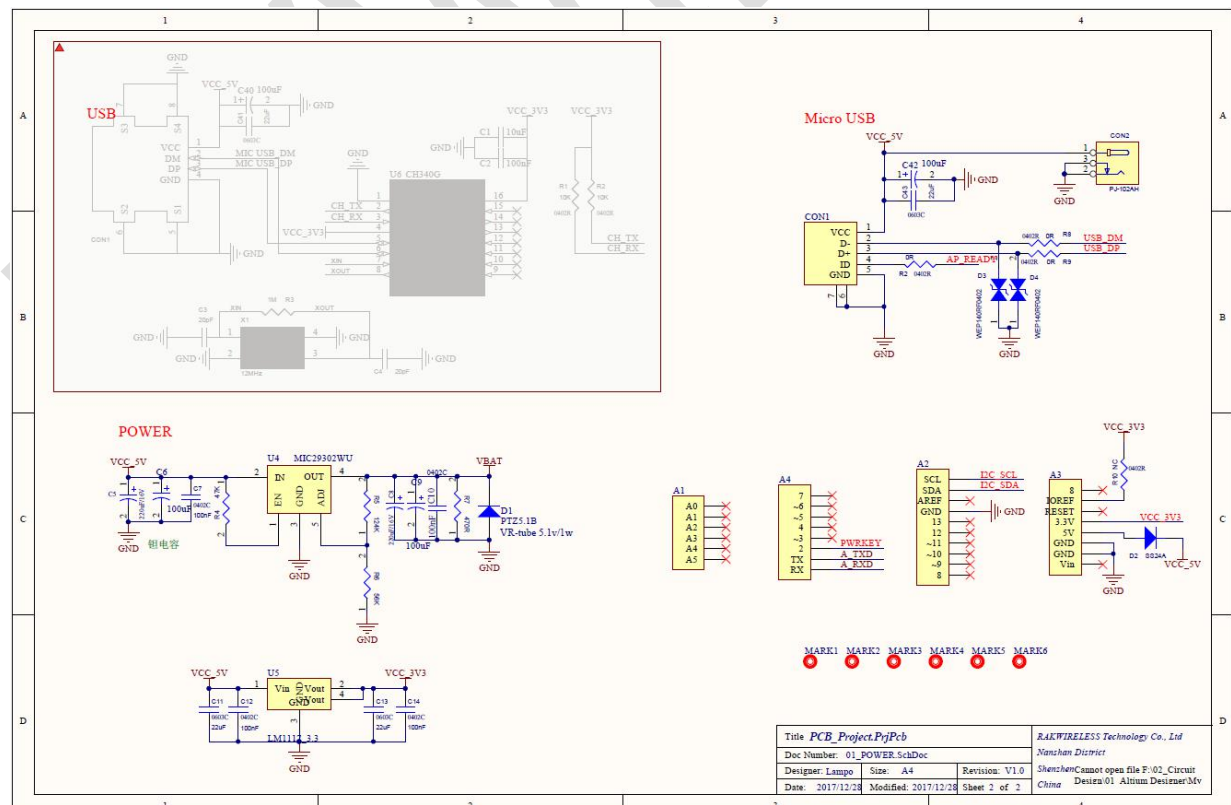
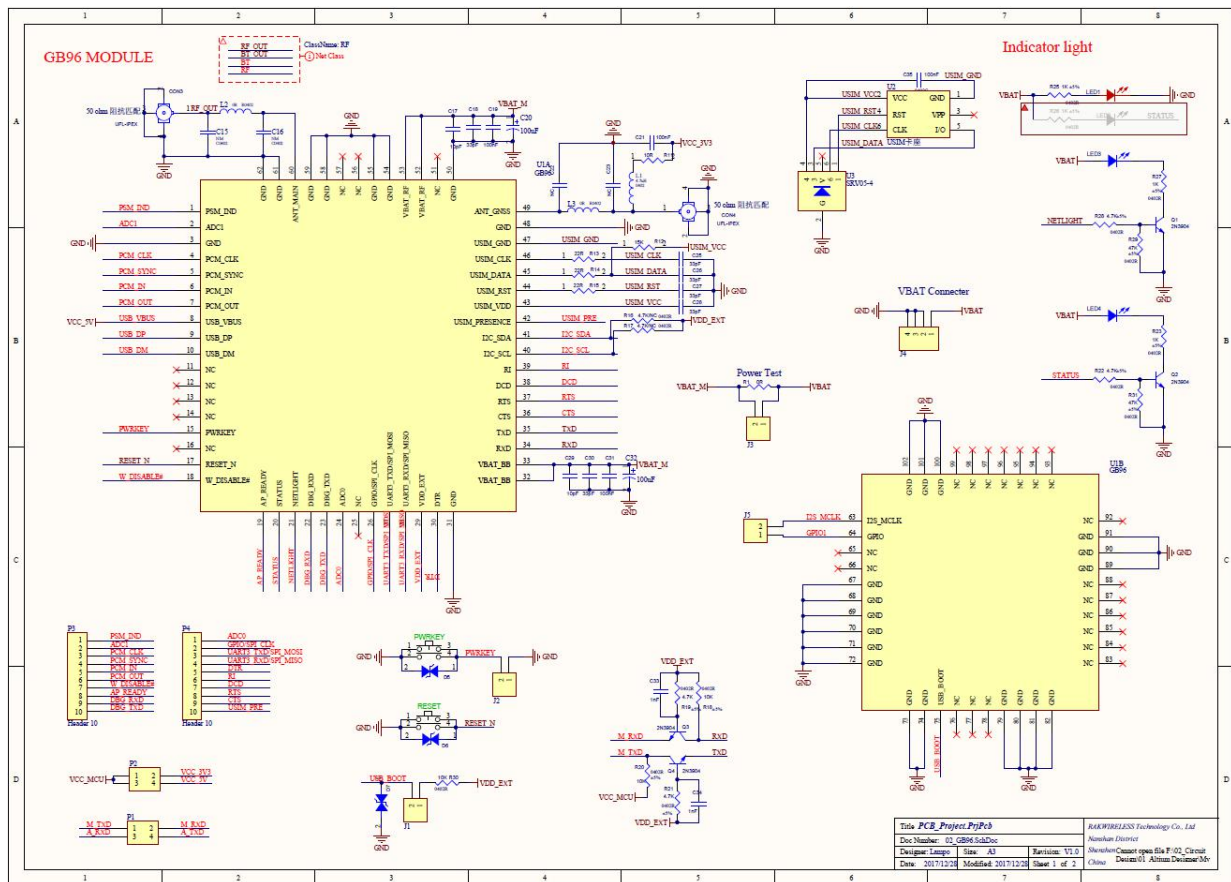


```

1 void setup() {
2   // put your setup code here, to run once:
3   Serial.begin(115200);
4   while (!Serial){
5     ; // wait for serial port to connect. Needed for native USB port only
6   }
7   Serial.write("ATE0\r\n"); // Turn off the BG96 echo function
8   delay(100);
9   Serial.write("ATI\r\n"); // Check the basic information of BG96.
10 }
11
12 void loop() {
13   // put your main code here, to run repeatedly:
14   if (Serial.available()) {
15     Serial.write(Serial.read());
16   }
17 }
  
```



4. Appendix



5. Contact information

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6. Modify Record

Version	Author	Data	Modify content
V1.0	Chace	2017/10/16	Create Document
V1.1	Chace	2017/11/03	Add the UDP communication test
V1.2	Chace	2017/11/10	Add the GNSS function test
V1.3	Chace	2017/12/27	Update the hardware version, modify the schematic design