



SIM8200G EVB

User Guide

5G Module

SIMCom Wireless Solutions Limited.

Building B, SIM Technology Building, No.633, Jinzhong Road

Changning District, Shanghai P.R.China

Tel: 86-21-31575100

support@SIMcom.com

www.SIMcom.com

Document Title:	SIM8200G EVB User Guide
Version:	V1.01
Date:	2020-08-28
Status:	Draft Version

GENERAL NOTES

SIMCOM OFFERS THIS INFORMATION AS A SERVICE TO ITS CUSTOMERS TO SUPPORT THE APPLICATION AND ENGINEERING EFFORTS THAT USE THE PRODUCTS DESIGNED BY SIMCOM. THE INFORMATION PROVIDED IS BASED ON THE REQUIREMENTS SPECIFICALLY FROM THE CUSTOMERS. SIMCOM HAS NOT UNDERTAKEN ANY INDEPENDENT SEARCH FOR ADDITIONAL RELEVANT INFORMATION, INCLUDING ANY INFORMATION THAT MAY BE IN THE CUSTOMER'S POSSESSION. FURTHERMORE, THE SYSTEM VALIDATION OF THE PRODUCT DESIGNED BY SIMCOM WITHIN A LARGER ELECTRONIC SYSTEM REMAINS THE RESPONSIBILITY OF THE CUSTOMER OR THE CUSTOMER'S SYSTEM INTEGRATOR. ALL SPECIFICATIONS SUPPLIED HEREIN ARE SUBJECT TO CHANGE WITHOUT NOTICE.

COPYRIGHT

THIS DOCUMENT CONTAINS THE PROPRIETARY TECHNICAL INFORMATION WHICH IS THE PROPERTY OF SIMCOM LIMITED, COPYING OF THIS DOCUMENT, GIVING IT TO OTHERS, THE USING OR COMMUNICATION OF THE CONTENTS THEREOF ARE FORBIDDEN WITHOUT THE OFFICIAL AUTHORITY BY SIMCOM. OFFENDERS ARE LIABLE TO THE PAYMENT OF THE DAMAGES. ALL RIGHTS ARE RESERVED IN THE EVENT OF GRANT OF A PATENT OR THE REGISTRATION OF A UTILITY MODEL OR DESIGN. ALL SPECIFICATIONS SUPPLIED HEREIN ARE SUBJECT TO CHANGE WITHOUT NOTICE.

SIMCom Wireless Solutions Limited

Building B, SIM Technology Building, No.633 Jinzhong Road, Changning District, Shanghai P.R.China
Tel: +86 21 31575100
Email: SIMcom@SIMcom.com

For more information, please visit:

<https://www.SIMcom.com/download/list-863-en.html>

For technical support, or to report documentation errors, please visit:

<https://www.SIMcom.com/ask/> or email to: support@SIMcom.com

Copyright © 2020 SIMCom Wireless Solutions Limited All Rights Reserved.

Version History

Data	Version	Description of change	Author
1.00	2019.09.18	Draft Version	Changshun Tan Hong Yu
1.01	2020.08.28	Modify format	Yanping Yang

SIMCom
Confidential
Draft

Directory

Version History	3
Directory	4
1 The Purpose of This Article	5
2 Evaluation Board Set	6
2.1 SIM8200G Series Evaluation Suite Overview	6
2.2 Interface Introduction	9
2.2.1 Interface Introduction	10
2.2.2 Jumper Interface Introduction	12
2.2.3 Antenna Interface Introduction	15
2.2.3 Other Interface Introduction	16
3 Installation and Communication	19
3.1 Driver Installation	19
3.1.1 USB-to-UART Driver Installation	19
3.1.2 Module USB Interface Driver Installation	19
3.2 Program Download Process	20
3.3 Accessory Installation	22
3.4 AT Command Communication	23
3.4.1 Device Powered	23
3.4.2 UART Serial Communication	23
3.4.3 USB Communication	26

1 The Purpose of This Article

Based on the SIMCom development suite, developers will quickly become familiar with and validate each module's hardware and software capabilities.

The purpose of this article is to introduce the interface and usage of the development suite.

This document will be updated from time to time according to the debugging situation; Please make sure you are using the latest version.

SIMCom
Confidential
Draft

2 Evaluation Board Set

2.1 SIM8200G Series Evaluation Suite Overview

The evaluation suite includes the EVB suite and TE suite.

- 1) SIM8200G-EVB board;
- 2) SIM8200G-TE board
- 3) SIM8200G-WF-FB board (WIFI board)
- 4) SIM8200G-CODEC board (audio board)
- 5) SIM8200G-EN-FB board (Ethernet board)
- 6) 5V DC power adapter;
- 7) TYPE-C USB 3.1/2.0 (data cable);
- 8) Micro 5pin USB 2.0 (data cable);
- 9) Antenna cable.

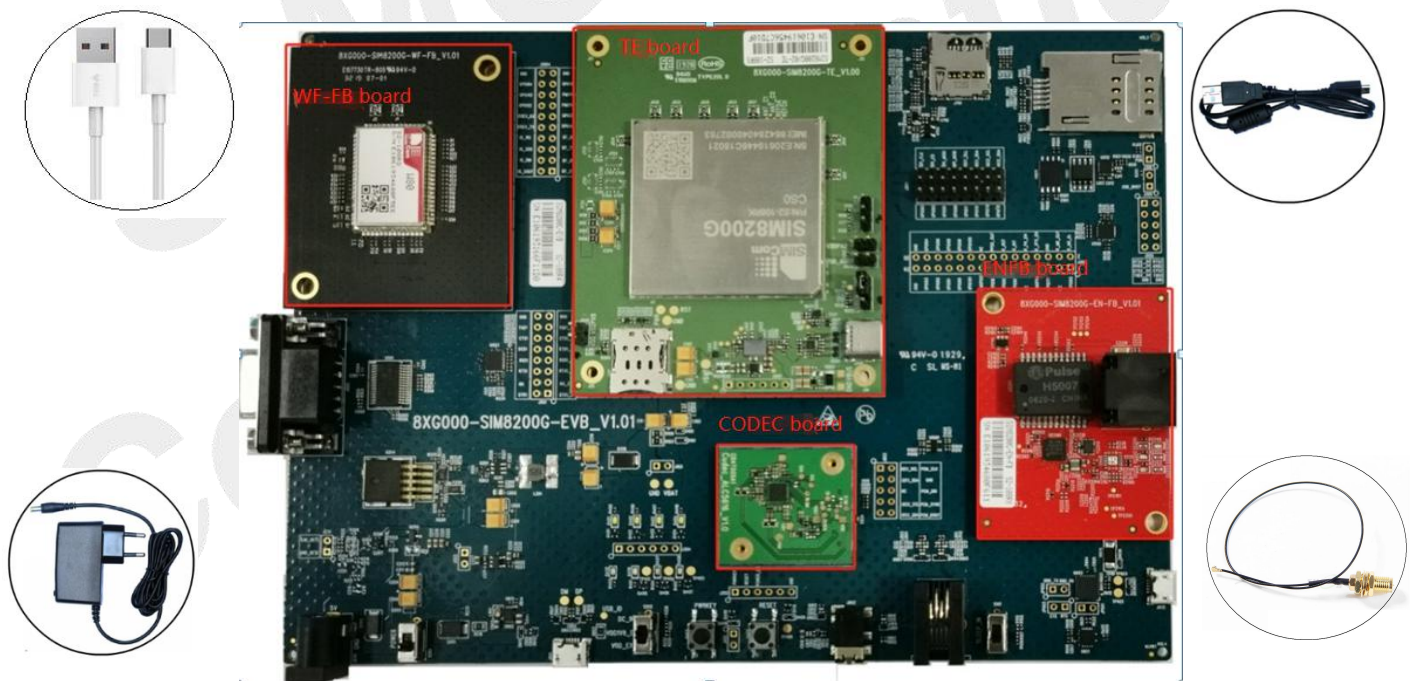


Figure 1 The EVB suite

SIM8200G EVB development board front figure (no installing function board).

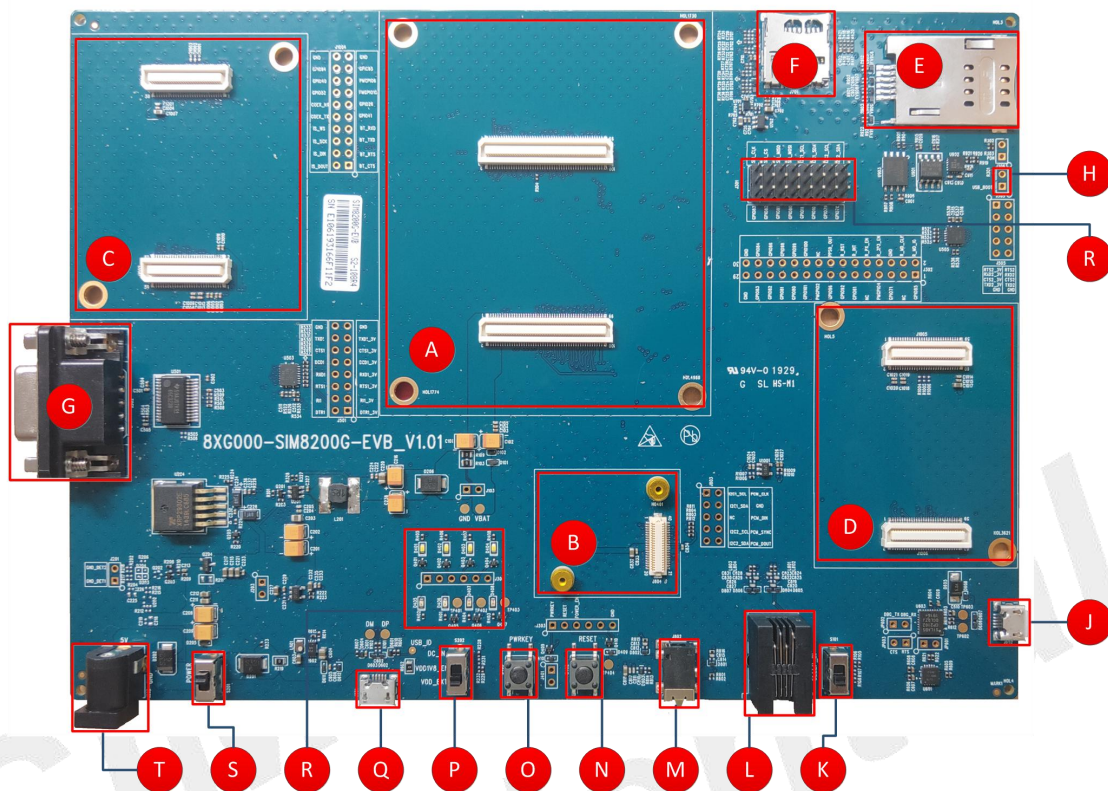


Figure 2 SIM8200G EVB without installing function board (front view)

The following is the diagram on the back of the SIM8200G EVB development board.

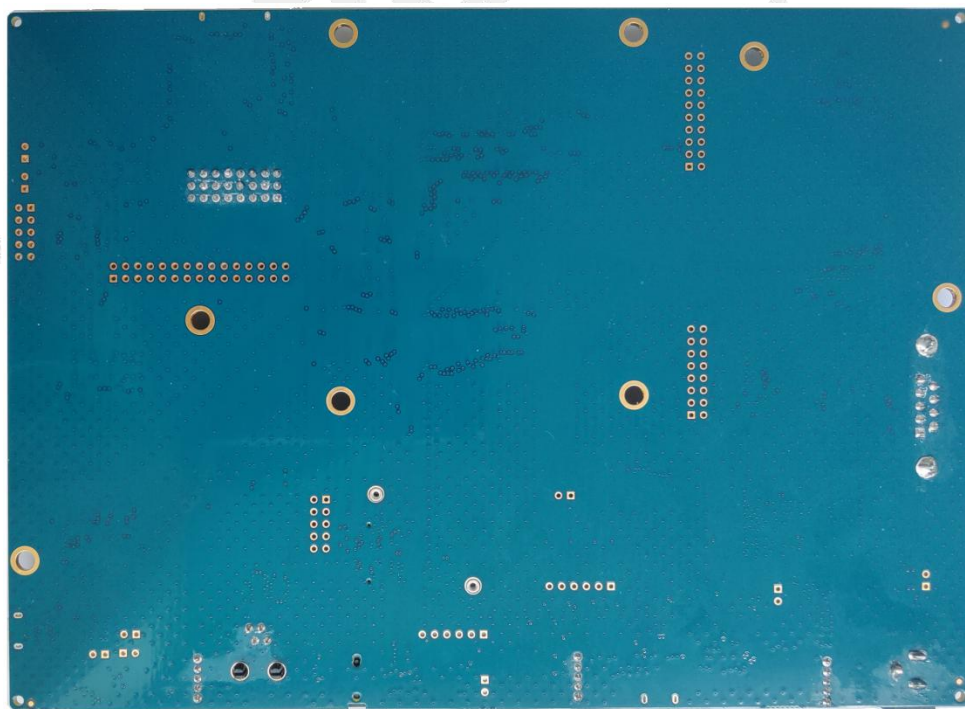


Figure 3 SIM8200G EVB without installing function board (back view)

The following shows the front and back of the SIM8200G TE board:



Figure 4 SIM8200G TE (front view)

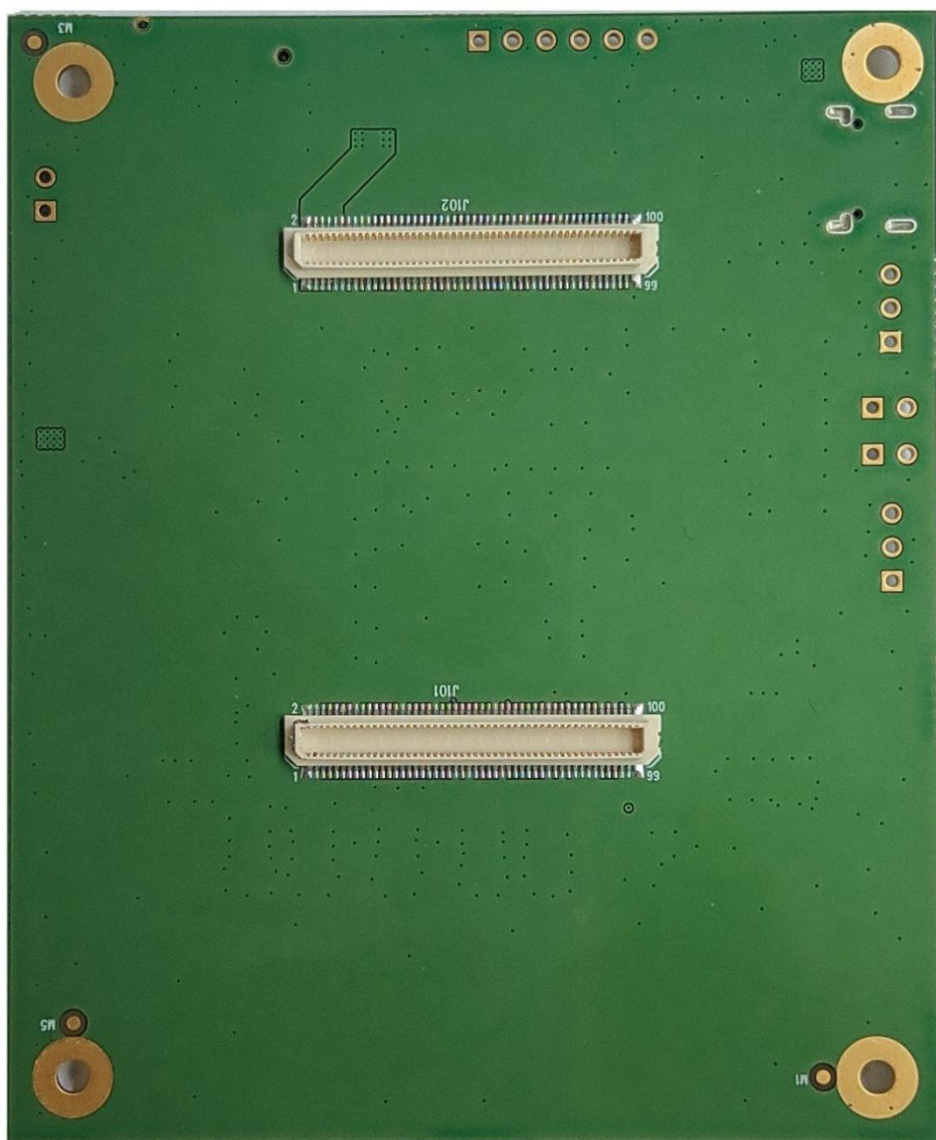


Figure 5 SIM8200G TE (Back view)

To ensure proper validation of module functions, please purchase the correct kit model. The order information for the SIM8200G module development suite is as follows:

Table 1: The order information for the SIM8200G module development suite

Kit	Part number	Remark
8XG000-SIM8200G-EVBKIT	S2-108RH	SIM8200G model EVB development kit
8XG000-SIM8200G-TEKIT	S2-108RG	SIM8200G model TE development kit

2.2 Interface Introduction

Through the introduction of the above section, we can see that many interfaces and signal test points are

reserved on the EVB baseplate, and this section mainly introduces the corresponding feature description.

2.2.1 Interface Introduction

1) The following table is a brief description of the interface functions of the SIM8200G-EVB board.

Table 2: Description of SIM8200G-EVB interface functions

Position	Description 1	Description 2	Position	Description 1	Description 2
A	SIM8200G TE board interface	The installation direction is as shown in the picture, disassemble horizontally and vertically.	B	CODEC board interface	The installation direction is as shown in the picture, disassemble horizontally and vertically.
C	WF-FB board interface	WIFI/BT function board. The installation direction is as shown in the picture, disassemble horizontally and vertically.	D	EN-FB board interface	AR8035 RGMII Ethernet board. The installation direction is as shown in the picture, disassemble horizontally and vertically.
E	(U)SIM card interface	SIM8200 (U)SIM2 interface; Support for hot plug (insert high level)	F	SD card interface	SIM8200G SD card interface
G	DB9 serial port	SIM8200G uart1.	H	Forced download point	The two test points are short-connected and then powered on into forced download mode.
R	Jumper pIN	See the description in the next chapter for details	J	USB to UART	SIM8200G debug UART
K	SLEPP_IN switch	Default direction to the edge of the board	L	RJ11	Codec audio output interface for phone handle
M	Headphone	Codec audio	N	RESET key	SIM8200G

	jack	output interface, 3.5MM American standard			hardware reset signal
O	Power key	SIM8200G power key	P	1.8V LDO enable selector switch	By default, the rubber column is turned in the direction of the plate edge. The switch fluctuates to the direction of the board by default, 1.8V is turned on by default.
Q	USB2.0 interface	SIM8200G USB2.0 interface; Jumper selection is required, see jumper description of SIM8200G TE board p position for details.	R	LED lights area	See details in later chapters
S	Power enable switch	Development board power supply enable switch, power supply open ON gear.	T	The power supply interface	Development board power supply interface, 4.5 ~ 5.5V / 3A

2) The following table describes the functions of the SIM8200G_TE board interface.

Table 3: Description of SIM8200G-TE interface functions

Position	Description1	Description 2	Position	Descriptio 1	Description 2
a	SIM8200G module		b	USB3.1/2.0 interface	SIM8200G USB interface; Need to confirm the jumper at p position.
c	(U)SIM card interface	SIM8200G (U)SIM1 interface; With Cato, support hot plug (high when	d	Battery interface	SIM8200G Battery circuit interface, See the battery interface

		inserted).			description section for details.
e	RF port	ANT3	f	RF port	ANT7
g	RF port	ANT2	h	RF port	ANT4
i	RF port	ANT1	j	RF port	ANT5
k	RF port	ANT6	l	RF port	ANT0
m	Jumper test points	SLEEP signal jumper, floating by default.	n	Jumper test points	VDDPX2 jumper; floating by default.
o	Jumper test points	Forced download point, the two test points are short-connected and then powered on into forced download mode.	p	Jumper test points	USB 2.0 selection jumper, see description in later chapters for details.
q	Jumper test points	VDDPX8 jumper; floating by default.	r	Test points	RST:SIM8200G hardware reset test point. PWR: SIM8200G Power key test point.
s	Jumper test points	mmW			

Note

SIM8200G module VBAT voltage range is 3.3V to 4.3V, the typical value is 3.8V.
All GPIO (including UART) pin levels of the SIM8200G module are 1.8V. Pay attention to match the external master pin levels.

2.2.2 Jumper Interface Introduction

It mainly describes the interface with jumper selection or switch status. Please check the jumper selection and switch status according to the actual situation during use.

1) Position “S” is the main power supply switch for EVB, and the power supply in the direction of ON is turned ON, and the power supply in the direction of OFF is turned OFF.

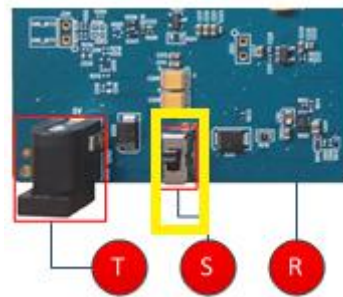


Figure 6 Power supply switch

- 2) Position “P” USB 2.0 channel selection: as shown in the figure below, the test points at the position “P” on the SIM8200G TE board are used to select the USB2.0 signal. When using the USB interface of the EVB board, please short-connect the yellow frame together, and use the TE version of the USB interface ,please short-connect the red frame with each other.

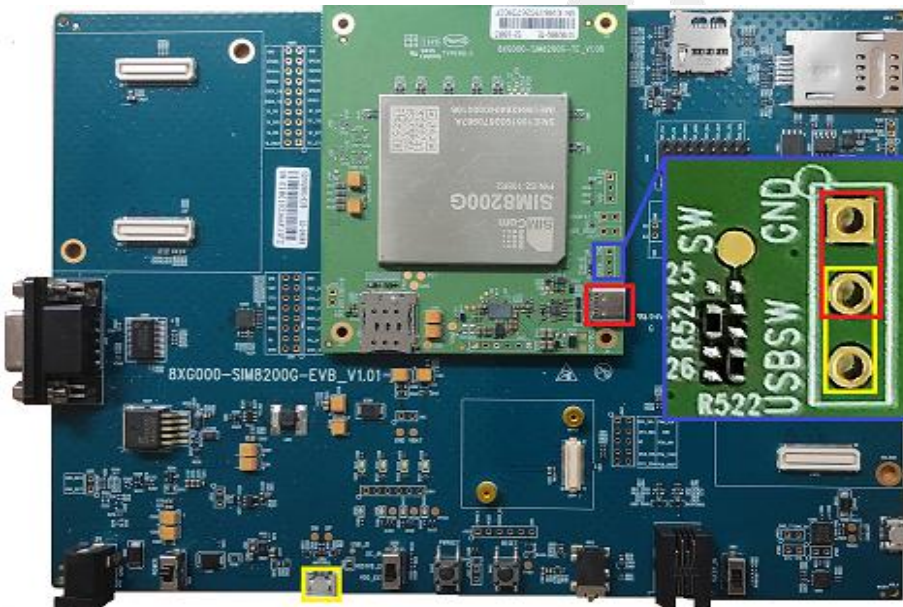


Figure 7 USB 3.1/2.0 channel selection

- 3) Position “I” codec I2C jumper: The I2C signals of the audio codec need to add a jumper cap to the position “I” on the EVB board. To use the audio function, you need to confirm whether the jumper at this position is correct.

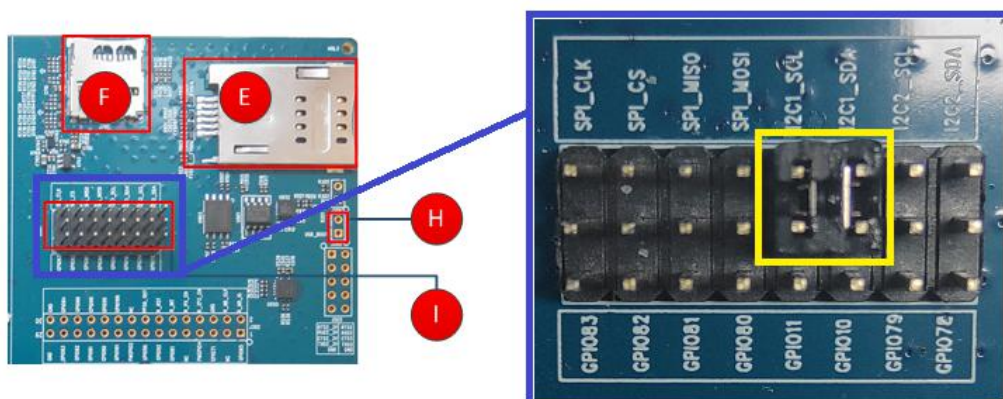


Figure 8 Codec I2C jumper

4) Position "I" for the I2C2 interface jumper of the sensor peripheral of EVB, Insert the jumper cap as shown in the figure below, and you can also debug other peripherals here.

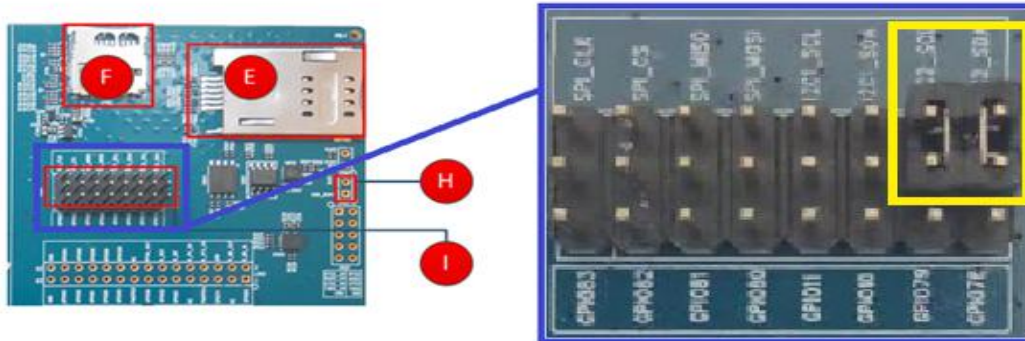


Figure 9 Sensor I2C jumper

5) Position "I", the SPI interface of the EVB board needs to be jumpered according to the following jumper to connect with the SPI FLASH on the EVB board; You can also connect other peripherals for debugging.

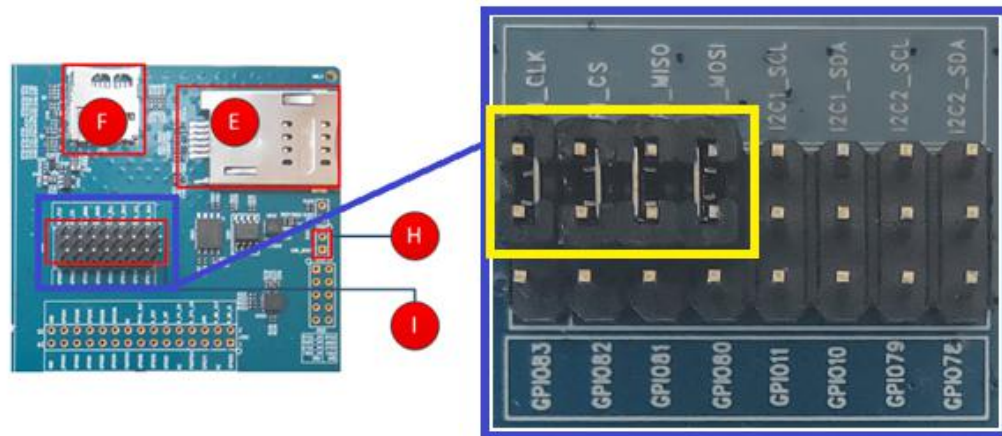


Figure 10 SPI jumper

6) Forced download point: Both TE board and EVB board, as shown in the following figure (in the yellow frame), the two test points in the frame are shorted together and then powered on, and the SIM8200G enters the download mode.

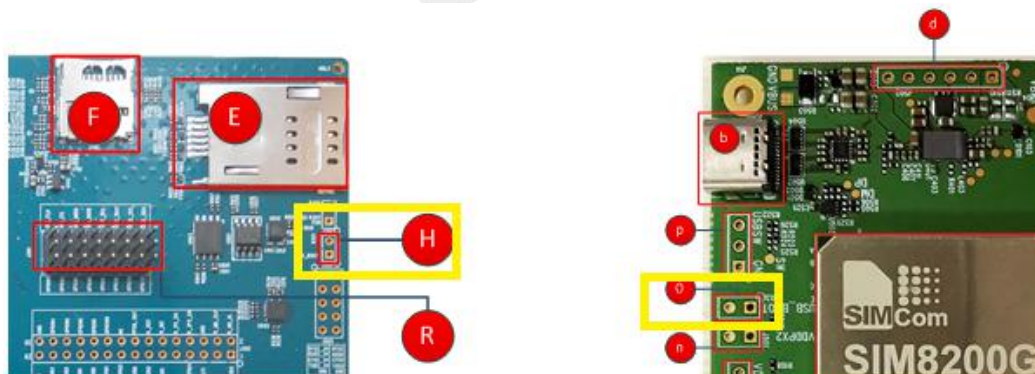


Figure 11 Forced download point

7) Position “K” is a SLEEP switch. Turning to the side of the board triggers SIM8200G to enter SLEEP. Turning to the other side of the board triggers SIM8200G to wake up.

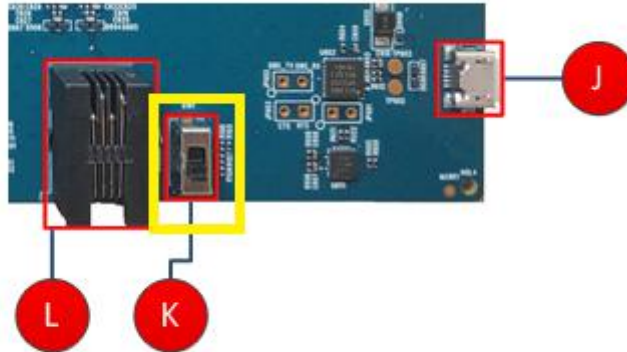


Figure 12 SLEEP switch

2.2.3 Antenna Interface Introduction

For detailed antenna design, please refer to the document SIM8200G_LGA Antenna Port Mapping and Design Guide_V1.00; The antenna interface of SIM8200G is briefly described in the following picture and table:

Table 4: SIM8200G antenna interface

Position	Description 1	Description 2	Position	Description 1	Description 2
e	RF port	ANT3	f	RF port	ANT7
g	RF port	ANT2	h	RF port	ANT4
i	RF port	ANT1	j	RF port	ANT5
k	RF port	ANT6	l	RF port	ANT0

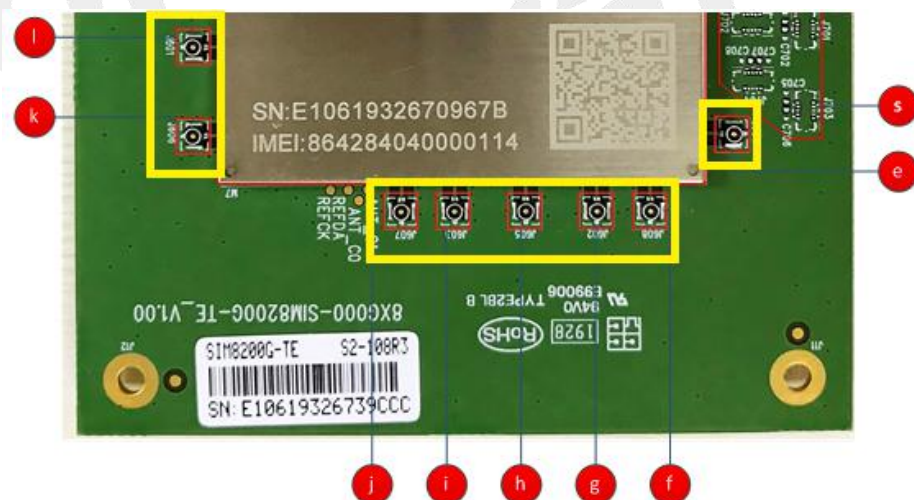


Figure 13 Antenna interface

Table 5: Description of SIM8200G antenna interface

ANT interface					
ANT0	AL1	AIO		LTE low/middle/high band signal send and receive; N41 signal send and receive; N79 signal diversity receive	617MHz~960MHz 1710MHz~2690MHz 4400MHz~5000MHz
ANT1	BA25	AI		LTE middle/high band signal diversity receive; N41&N77 signal diversity receive	1710MHz~2690MHz 3300MHz~4200MHz
ANT2	BA41	AIO		LTE low/middle/high band signal diversity receive; N79 signal send and receive	617MHz~960MHz 1710MHz~2690MHz 4400MHz~5000MHz
ANT3	AY51	AIO		LTE middle/high band signal diversity receive; N41 signal diversity receive; N77 signal send and receive	1710MHz~2690MHz 3300MHz~4200MHz
ANT4	BA33	AIO		N41 signal send and receive; N77 signal diversity receive	2496MHz~2690MHz 3300MHz~4200MHz
ANT5	BA19	AIO		N77 signal send and receive	3300MHz~4200MHz
ANT6	AY1	AI		N79 signal diversity receive; GNSS signal receive ;	1166MHz~1229MHz 1565MHz~1610MHz 4400MHz~5000MHz
ANT7	BA47	AIO		N79 signal send and receive	4400MHz~5000MHz

2.2.3 Other Interface Introduction

1) The definition of the RJ11 interface of the EVB board “L” is shown in the figure below. Connect the phone handle to verify the audio. Please check whether the definitions match.

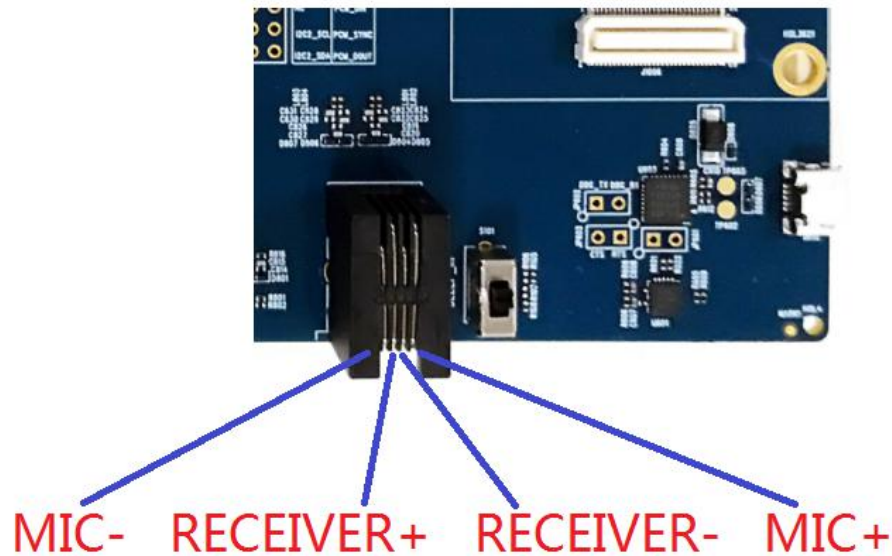


Figure 14 RJ11 interface

2) The definition of the battery interface on the TE board is as follows.

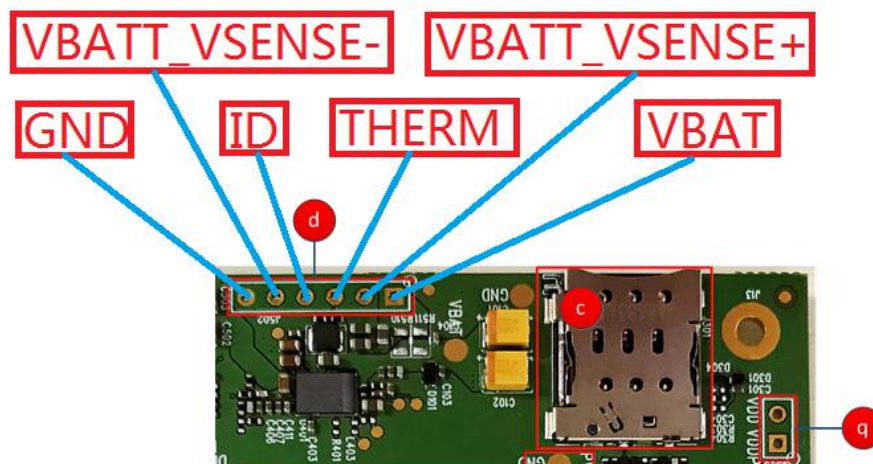


Figure 15 battery interface

3) The LED light is briefly described below (the indicator software on the EVB board is not tuned and cannot be used temporarily).

- LED-1: EVB Power signal light
- LED-2: WAKEUP_OUT signal light
- LED-3: STATUS signal light
- LED-4: NET_STATUS signal light
- LED-5~8: Reserved

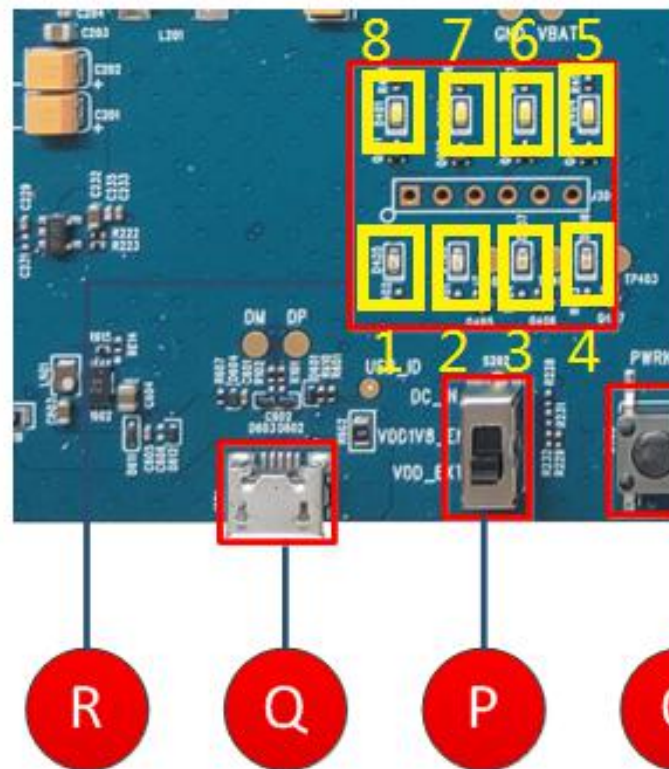


Figure 16 LED light

3 Installation and Communication

3.1 Driver Installation

The USB interface position on the EVB board is point “J”, and USB to UART interface, Debug Uart interface for SIM8200G. The true USB physical interface of SIM8200G module is the USB interface on TE board and the location is point “b” or point “Q” on EVB board.

3.1.1 USB-to-UART Driver Installation

The USB-to-UART chip on the EVB board is a product of Silicon Labs. The following link can get its driver.
<https://www.silabs.com/products/development-tools/software/usb-to-uart-bridge-vcp-drivers>
 After installing the driver correctly, you can see the following virtual USB port, COM27, COM28.

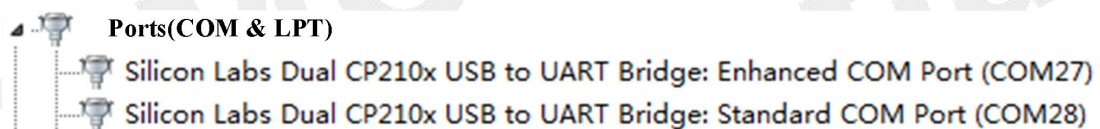


Figure 17 UART port

Table 6: UART interface description

Interface type	Port number	module serial port	Remark
SCI	COM 21	Debug UART	Used to capture the serial port LOG

3.1.2 Module USB Interface Driver Installation

Please contact SIMCom technical support for the correct driver file, SWD and SIMCom USB driver. Install the SIMCom USB driver. After the module is powered on, the port COM will have 3 driver ports to install. You can install them by browsing SIMCom_USB_Driver \ Windows7. After the driver is properly installed, there will be 4 virtual USB ports under the device manager port.

ADB port: Use ADB commands and software updates

AT port: For the communication with AT command

Audio port: For Audio function

Diagnostics port: For debug

NMEA port: For GPS service

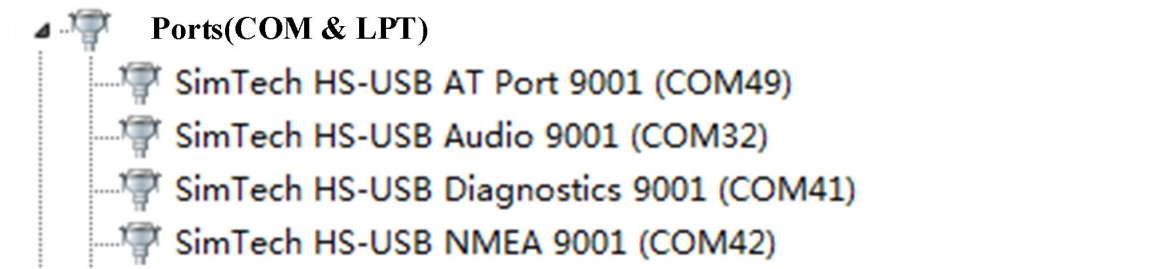


Figure 18 Device manager port

3.2 Program Download Process

1) First enter the download mode according to the method described in Article (6) of 2.2.2, and connect the USB2.0 interface on the EVB board or TE board (for detailed jumper selection, please refer to the method selection of Article (2.2) of 2.2.2), 9008 is displayed on the USB port.

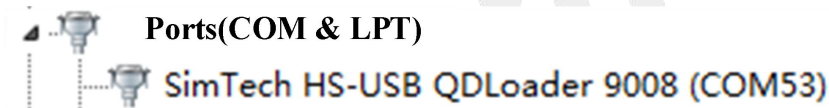
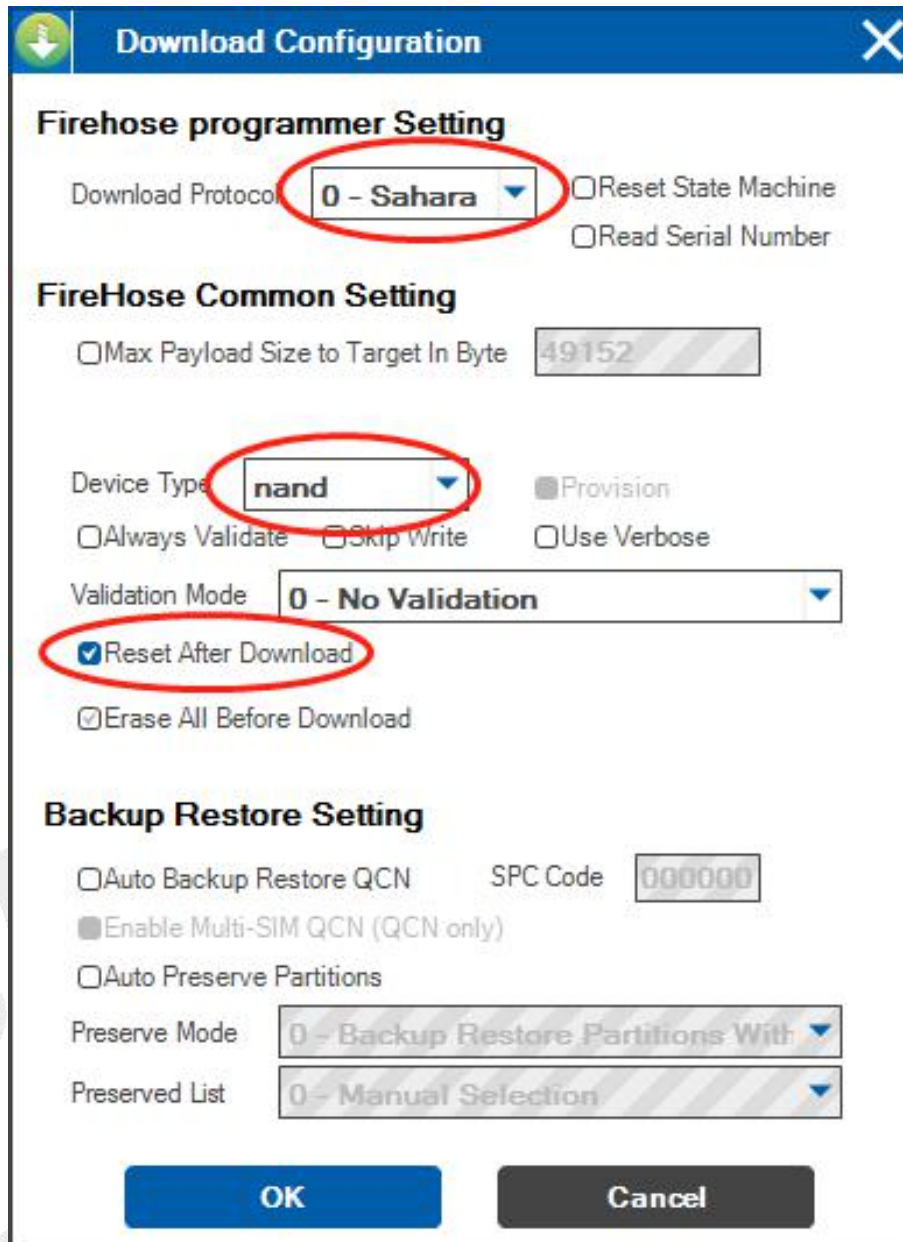


Figure 19 download mode port

2) QFIL tool settings

Select Configuration-> FireHose Configuration. The following Download Configuration screen appears. Please select Device Type as nand, if you need to wipe all, please check "Erase All Before Download".



Download Configuration

Firehose programmer Setting

Download Protocol: **0 - Sahara** ☐ Reset State Machine
☐ Read Serial Number

FireHose Common Setting

☐ Max Payload Size to Target In Byte: 49152

Device Type: **nand** ☐ Provision
☐ Always Validate ☐ Skip Write ☐ Use Verbose

Validation Mode: **0 - No Validation**

☒ Reset After Download
☐ Erase All Before Download

Backup Restore Setting

☐ Auto Backup Restore QCN SPC Code: 000000
☐ Enable Multi-SIM QCN (QCN only)
☐ Auto Preserve Partitions

Preserve Mode: **0 - Backup Restore Partitions With**
Preserved List: **0 - Manual Selection**

OK Cancel

Figure 20 QFIL tool settings

- 3) The QFIL tool loads the software that needs to be downloaded
 - a. select port: select 9008 port;
 - b. select build type: select Flat Build;
 - c. select programmer: Select the firehose.mbn file in the path of the software we want to download;
 - d. select rawprogram andpatch xml file,Note Please select xml with all.

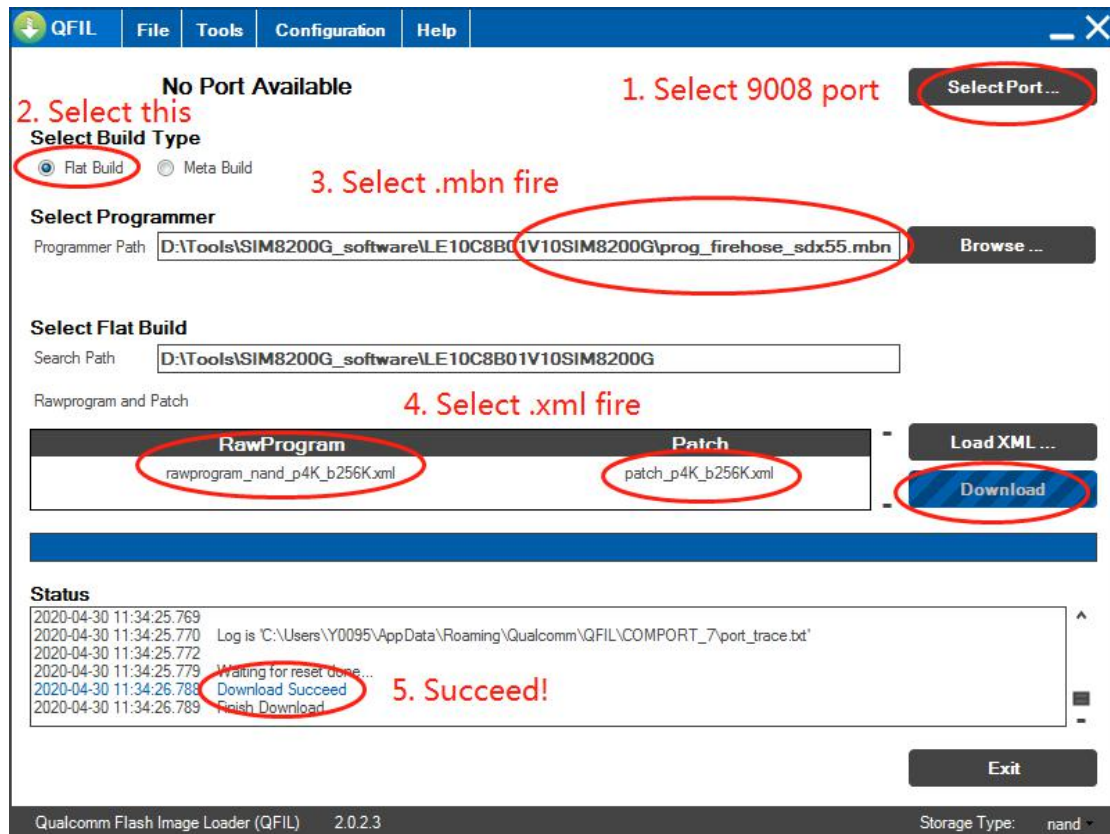


Figure 21 QFIL tool download step

- 4) Click Download to upgrade the software

3.3 Accessory Installation

Install necessary accessories for functional testing

- 1) The position “C” on TE board is SIM1 card holder (SIM8200G (U)SIM1 interface); the SIM1 card holder is a small card holder; First put the SIM card into the card and then insert the card and card together; There are cat0 in the development suite.

The position “E” on EVB board is SIM2 cassette; a large card needs to be inserted (SIM8200G (U)SIM2 interface);

Currently only the SIM1 card function can be used; the SIM2 card function is still being debugged.

- 2) The antenna is installed at the position “e~l” of the TE board; For specific antenna definition, please refer to the frequency band description of ANT0 ~ ANT7.
- 3) To connect the USB channel of the SIM8200G module, insert the USB cable into the USB interface on the TE board at point “b” or point “Q” on the EVB board (The jumper on the TE board should be correct); If you want to connect the SIM8200G module Debug UART interface, insert the USB cable into the (USB to UART) point “J” on the EVB board.

- 4) Insert 5V DC power to the position “T” of EVB board.

3.4 AT Command Communication

AT command currently has incomplete functions to be updated after development;The content of this chapter is still being updated according to the actual debugging situation.

3.4.1 Device Powered

- 1) Slide the Power switch “S” to the ON position;
- 2) Short press the POWER_ON button “O” (>2s) .

After powering on, the power LED will be on continuously, and the network LED will flash according to the network conditions according to the following table.

Table 7: Network LED description

Network LED light	Status description
always on	Cfun=0/Searching the web/ Telephone service
800ms on, 800ms off	Successfully registered 2G / 3G network
200ms on, 200ms off	Data transmission (TCPIP, PPP), or LTE network
OFF	Shutdown / sleep state

3.4.2 UART Serial Communication

SIM8200G provides a full-featured serial port. By default, when used as an ordinary serial port, we can set the data frame format of the serial port and set the baud rate and other operations.

- 1) Set the serial data frame format

SIM8200G supports multiple serial data frame formats. The default data frame format is 8 data bits, 1 stop bit, and no parity bit.

Table 8: UART frame format

UART frame format	Supported formats
Data bit	8bit,7bit
Stop bit	1bit
Parity bit	Odd,Even,None

If you need to modify the data frame format, please refer to the instruction AT + ICF. Common data frame format settings are as follows:

Table 9: UART common data frame format settings

UART format	Setting instructions
8 Data bit 1 Stop bit No parity	AT+ICF、 AT+ICF=2、 AT+ICF=2,2
8 Data bit 1 Stop bit odd check	AT+ICF=1,0
8 Data bit 1 Stop bit even check	AT+ICF=1,1
7 Data bit 1 Stop bit No parity	AT+ICF=4、 AT+ICF=4,2
7 Data bit 1 Stop bit No parity	AT+ICF=3,0
7 Data bit 1 Stop bit even check	AT+ICF=3,1

2) Set the serial port baud rate

SIM8200G supports a variety of common baud rates. The standard factory default baud rate is 115200, and it supports automatic baud rate adaptation. There are two methods to modify the baud rate. For temporary modification and long-term modification, please refer to the instruction AT + IPR for temporary modification. Please refer to AT + IPREX for long-term modification of the baud rate. The serial port baud rate is modified for a long time, and the baud rate will be saved locally, so it will continue to take effect after the next boot. The temporary modification of the serial port baud rate will be invalidated after restart. The baud rate will be restored to the locally saved baud rate.

Table 10: UART baud rate support

UART baud rate support	Supported rate
Serial communication baud rate	300,600,1200,2400,4800,9600,19200,38400,57600,115200,230400,460800,921600
Serial port adaptive baud rate	9600,19200,38400,57600,115200

2) Common baud rate instructions for serial ports:

Table 11: UART common baud rate operations

UART common baud rate operations	Related instructions
Query the current boot baud rate	AT+IPREX?
Query the current baud rate	AT+IPR?
Query module supports baud rate	AT+IPR=?、 AT+IPREX=?
Set the boot default baud rate to 9600	AT+IPREX=9600
Set temporary baud rate to 9600	AT+IPR=9600
Set auto baud rate matching	AT+IPREX=0
Set temporary baud rate to match automatically	AT+IPR=0

3) Set serial data flow control The serial port of SIM8200G adopts RTS / CTS flow control mode, but the

full-featured serial port of SIM8200G works by common serial mode by default. If we need to set the working mode of serial flow control, please refer to AT + IFC.

Serial flow control configuration instruction setting method:

Table 12: UART flow control method

UART flow control method	Setting instructions
No flow control, normal mode	AT+IFC、 AT+IFC=0,0
RTS/CTS Flow control method	AT+IFC=2,2
RTS Flow control method	AT+IFC=2,0
CTS Flow control method	AT+IFC=0,2

The method of using serial port RTS flow control can be verified by using the serial port tool. When RTS flow control is set, if RTS is not checked, it means that RTS does not take effect. At this time, two consecutive ATs are sent. It is found that the window of the serial port tool does not show AT and return value.

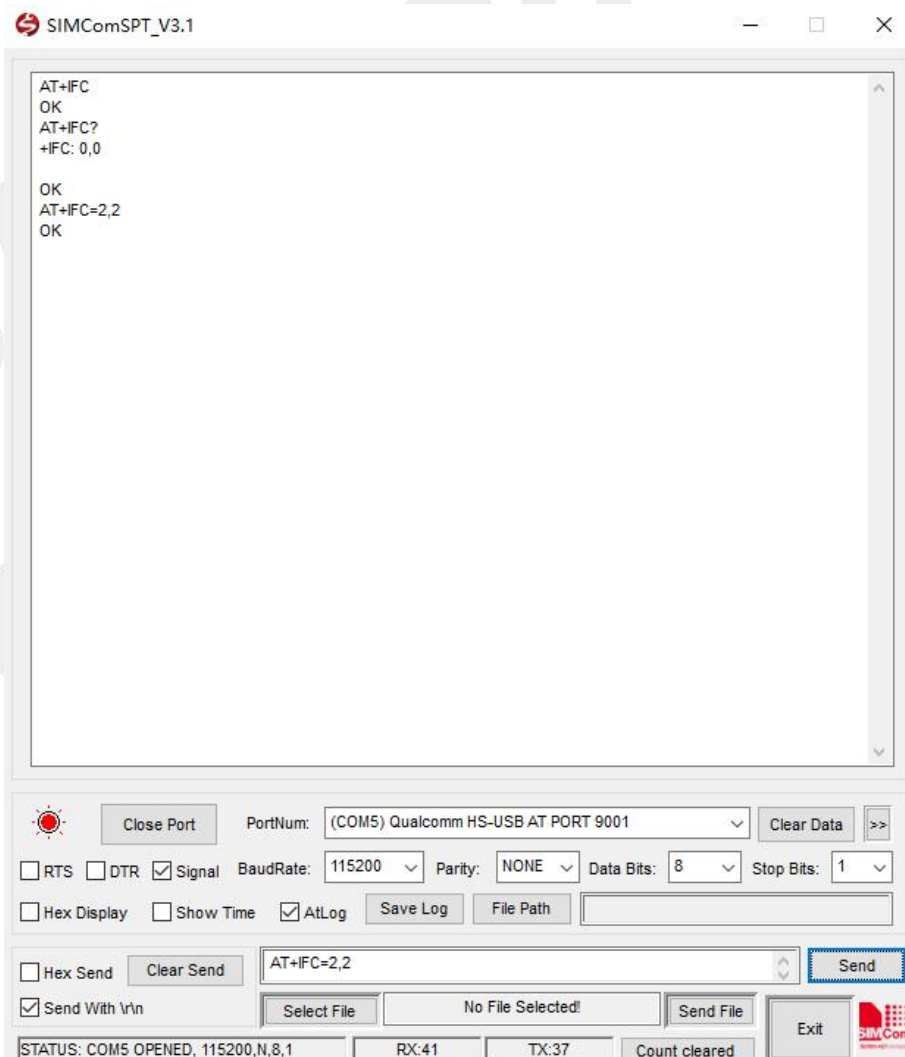


Figure 22 serial port tool without AT and return value

Then check RTS to make RTS take effect, and then the window of serial tool will display AT and return value.

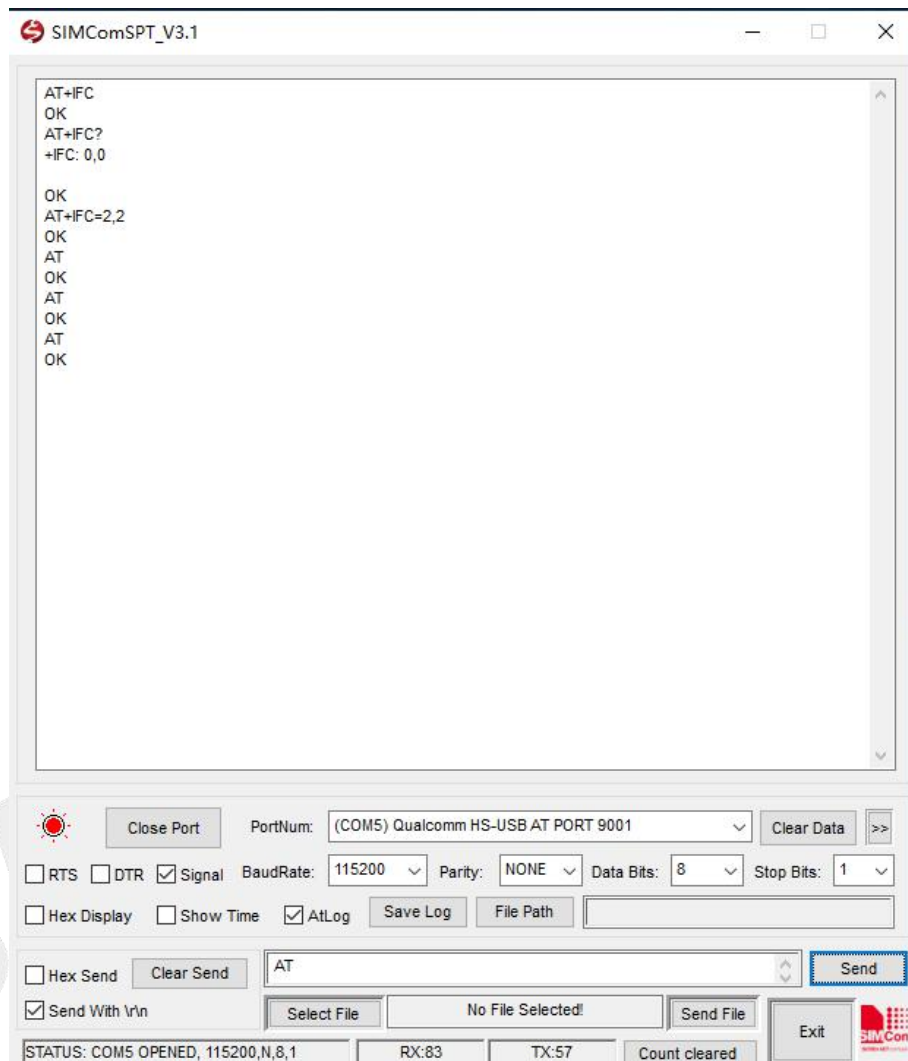


Figure 23 serial port tool with AT and return value

3.4.3 USB Communication

After installing the driver according to section 3.1.2, send the AT command through the AT port. The baud rate is applicable in USB mode.

For software upgrade and log capture, please refer to other corresponding documents.