SIM8200-M2-EVB2
User Guidelines Manual

5G Module

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Version History

Date	Version	Description of change	Author
2020.9.10	1.00	Original	Chengbing.Wu Changshun.Tan Xin. Zhou
2021.02.23	1.01	Modify the error Update Firmware Update procedure	Yao.Chen

Scope of Application

This document applies to the following product models：

Module	Category	Frequency band	Size(mm)
SIM8200EA-M2	5G NR	5G NR (NSA/SA), LTE-FDD, LTE-TDD, and WCDMA	30*52*2.3
SIM8200CE-M2	5G NR	5G NR (NSA/SA), LTE-FDD, LTE-TDD, and WCDMA	30*52*2.3
SIM8202G-M2	5G NR	5G NR (NSA/SA), LTE-FDD, LTE-TDD, and WCDMA	30*42*2.3
SIM8202E-M2	5G NR	5G NR (NSA/SA), LTE-FDD, LTE-TDD, and WCDMA	30*42*2.3

NOTE

For the specific frequency band information of the above modules, please refer to the hardware design document or contact the FAE.

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1 Introduction

This document describes the interface and usage of the SIM8200-M2-EVB2. With the help of this document，customers can quickly use the SIM8200-M2-EVB2.

2 EVB Kit

2.1 SIM8200-M2-EVB2 Kit Overview

EVB kit includes EVB and some accessories.

SIM8200-M2-EVB2 kit list as follows:

(1) SIM8200-M2-EVB2;

(2) RF CABLE SMA-IPEX-4 DC-6GHZ;

(3) WCDMA \LTE external antennas;

(4) TYPE-A USB3.1 cable;

(5) ANT active GPS/GLONASS;

(6) 5V/2A DC power adapter;

(7) SUB6G WB ANT 90°HINGED SMA CONNECTOR;

The SIM8200-M2-EVB2 kit is shown in the following figure.

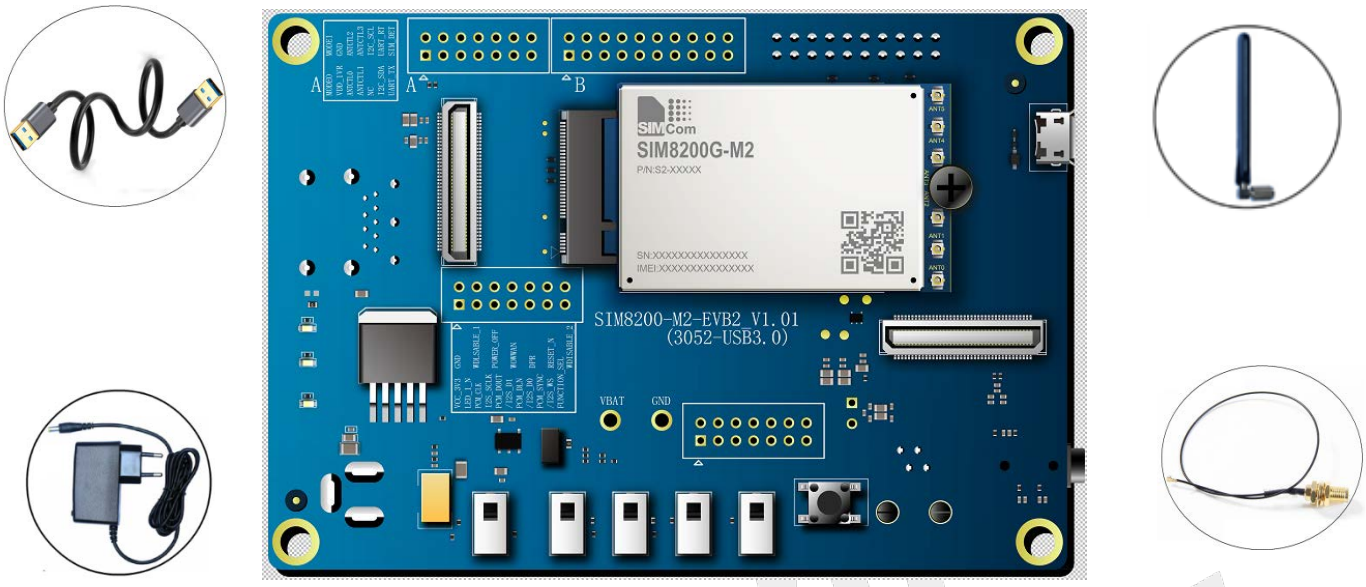

Figure 1: SIM8200-M2-EVB2 kit

Table 1: EVB kit

EVB kit	Quantity	Description
SIM8200-M2-EVB2	1	EVB
RF CABLE SMA-IPEX-4 DC-6GHZ	6	RF IPEX-4 line
WCDMA \LTE external antennas	1	WCDMA \LTE ANTENNA SMA
Type-A USB3.1 cable	1	USB3.1 cable
ANT active GPS/GLONASS	1	Active GPS/GLONASS
P-050B-B2152 adapter	1	5V/2A DC power adapter
SUB6G WB ANT 90°HINGED SMA connector	5	SUB 6G WB antenna SMA

The top view of the SIM8200-M2-EVB2 is shown in the following figure.

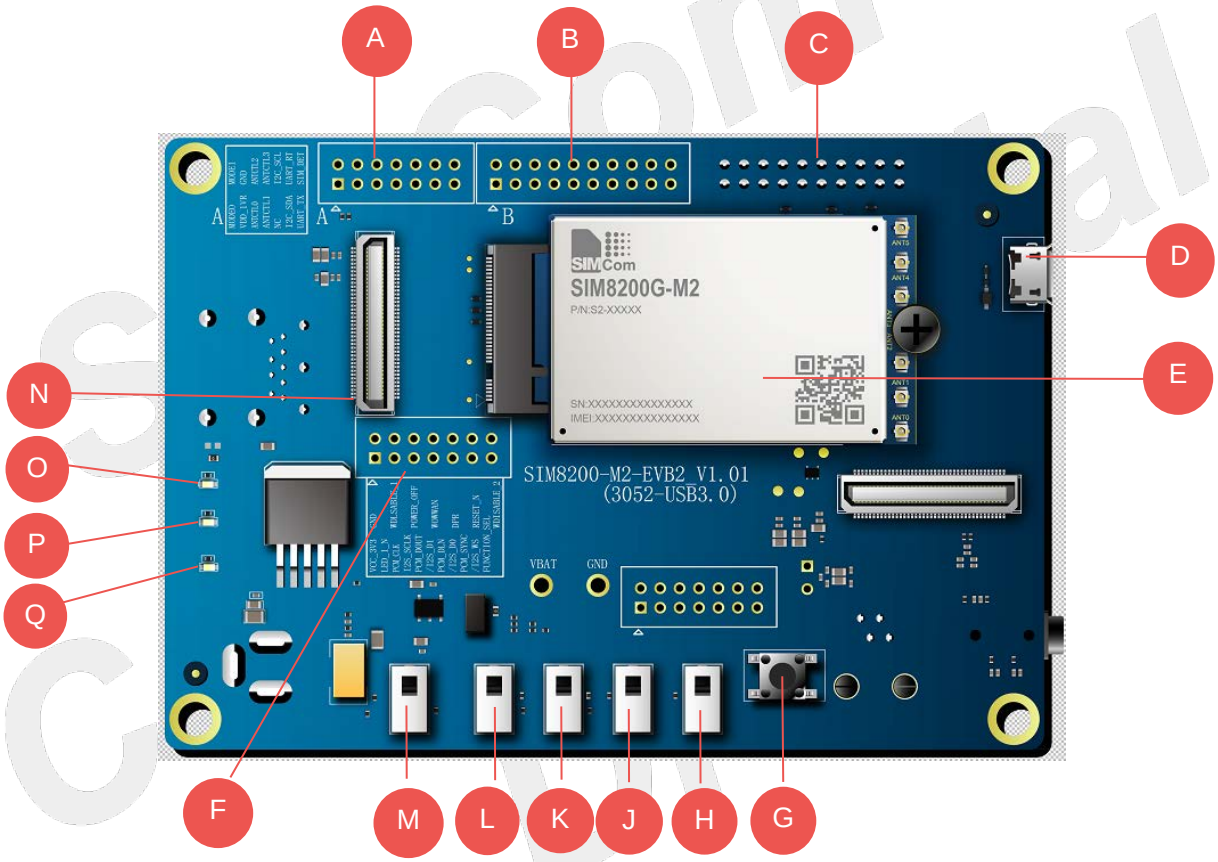

Figure 2: EVB top view

The bottom view of the SIM8200-M2-EVB2 is shown in the following figure.

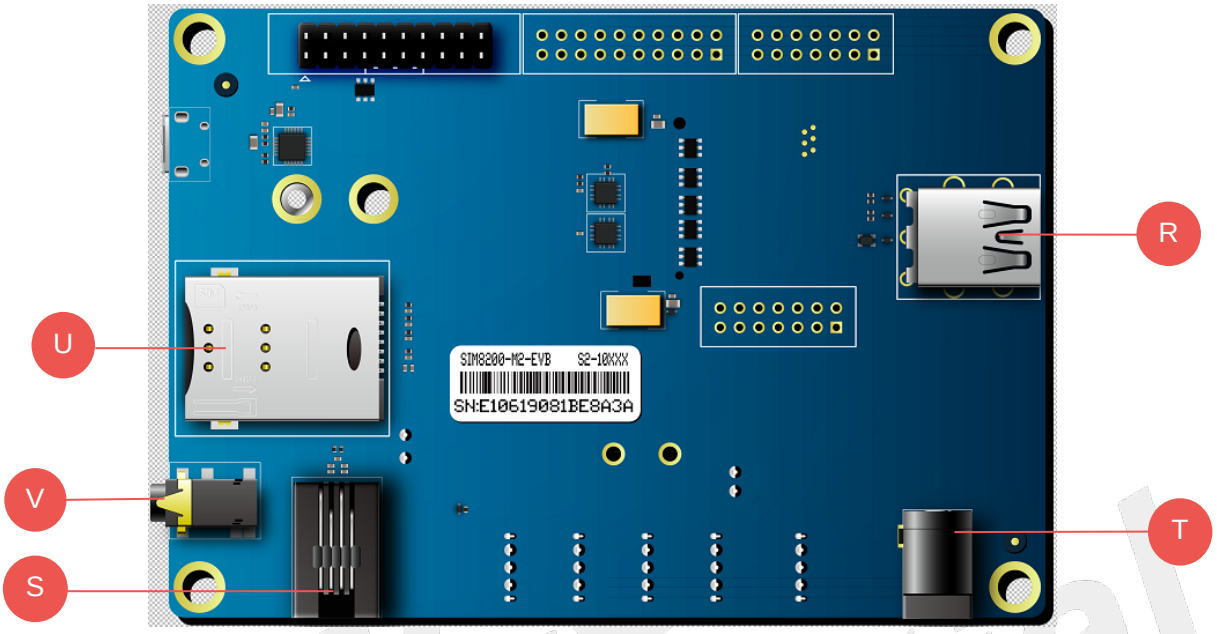

Figure 3: EVB bottom view

NOTE

1. The SIM card position of SIM8200-M2-EVB2 is position "**U**" in the effect diagram, after powering on the module, if the module can't identify the SIM card, please make sure the SIM card hot swap function of the module is closed condition.

2. Using "AT+UIMHOTSWAPON=0 or 1" and "AT+UIMHOTSWAPLEVEL=0 or 1"AT command to set module SIM card hot swap function and SIM card detection level, for more details, please refer to **SIM8200 Series_AT Command Manual** document or contact SIMCom support teams.

The top view of the SIM8200EA-M2 module is shown in the following figure (For details, please refer to the SIM8200EA-M2 Antenna Design Guide).

Figure 4: SIM8200EA M2 top view

Table 2: SIM8200EA-M2 ANT description

ANT name	ANT function	Frequency range	Description
ANT0	LTE_LMHB_TRX	617MHz~960MHz, 1710MHz~2690MHz	Signal transmission & reception
ANT1	SUB6_TRX N41_TRX	3300MHz~5000MHz 2496MHz~2690MHz,	Signal transmission & reception
ANT2	LTE_LMHB_PRX	617MHz~960MHz, 1710MHz~2690MHz	Signal reception
ANT3	LTE_MHB_DRX1 SUB6_PRX	1710MHz~2690MHz, 3300MHz~5000MHz	Signal reception Signal reception
ANT4	LTE_MHB_DRX2 SUB6_DRX #1	1710MHz~2690MHz 3300MHz~5000MHz	Signal reception
ANT5	SUB6_DRX #2 GNSS	3300MHz~5000MHz 1166MHz~1610MHz	Signal reception GNSS Signal reception

The top view of the SIM8200CE-M2 module is shown in the following figure (For details, please refer to the SIM8200CE-M2 Antenna Design Guide).

Figure 5: SIM8200CE M2 top view

Table 3: SIM8200CE-M2 ANT description

ANT name	ANT function	Frequency range	Description
ANT0	3G/4G/5G LB/MHB TRX 5G n41 UL/DL–MIMO1 5G/4G n77/n78/n79/UHB DL–MIMO2	TBD	3G/4G/5G signal send and receive
ANT1	5G/4G n78/n79/UHB DL–4G MIMO1 4G MHB DL–MIMO1 4G LAA PRX	TBD	4G/5G signal send and receive
ANT2	5G/4G n77/n78/n79 UL–MIMO 4G LMHB/LAA DRX 4G UHB DL–MIMO3	TBD	4G/5G signal send and receive
ANT3	5G/4G n41/n77/n78/n79/UHB TRX 4G MHB DL–MIMO2	TBD	4G/5G signal send and receive
GNSS	GNSS L1/L5	TBD	GNSS Signal reception

The top view of the SIM8202G-M2 module is shown in the following figure (For details, please refer to the SIM8202G-M2 Antenna Design Guide).

Figure 6: SIM8202G M2 top view

Table 4: SIM8202G-M2 ANT description

ANT name	ANT function	Frequency range	Description
ANT0	3G/4G/5G LB/MHB TRX 4G UHB DIV 5G n41 DL-MIMO1 5G n77/n78/n79 DIV	617MHz~2690MHz 3400MHz~3700MHz 2496MHz~2690MHz 3300MHz~5000MHz	3G/4G/5G signal send and receive
ANT1	3G/4G/5G MHB DL-MIMO1 4G UHB DL-MIMO2 4G LAA DIV 5G n41 TRX 5G n77/n78/n79 DL-MIMO2	1710MHz~2690MHz 3400MHz~3700MHz 5150MHz~5925MHz 2496MHz~2690MHz 3300MHz~5000MHz	3G/4G/5G signal send and receive
ANT2	3G/4G/5G MHB DL-MIMO2 4G UHB DL-MIMO1 4G LAA PRX 5G n41 DIV 5G n77/n78/n79 DL-MIMO1 GNSS	1710MHz~2690MHz 3400MHz~3700MHz 5150MHz~5925MHz 2496MHz~2690MHz 3300MHz~5000MHz 1166MHz~1610MHz	3G/4G/5G/GNSS signal receive
ANT3	3G/4G/5G LB/MHB DIV 4G UHB TRX 5G n41 DL-MIMO2 5G n77/n78/n79 TRX	617MHz~2690MHz 3400MHz~3700MHz 2496MHz~2690MHz 3300MHz~5000MHz	3G/4G/5G signal send and receive

The top view of the SIM8202E-M2 module is shown in the following figure (For details, please refer to the SIM8202E-M2 Antenna Design Guide).

Figure 7: SIM8202E-M2 top view

Table 5: SIM8202E-M2 ANT description

ANT item	ANT function	Frequency range	Functional description
ANT0	3G/4G/5G LB/MHB TRX 5G n41 DL-MIMO1 5G n77/n78/n79 DIV	617MHz~2690MHz 2496MHz~2690MHz 3300MHz~5000MHz	3G/4G/5G signal send and receive
ANT1	3G/4G/5G MHB DIV 5G n41 DL-MIMO2 5G n77/n78/n79 DL-MIMO2	1710MHz~2690MHz 3400MHz~3700MHz 3300MHz~5000MHz	3G/4G/5G signal send and receive
ANT2	3G/4G/5G MHB DL-MIMO2 5G n41 DIV 5G n77/n78/n79 DL-MIMO1 GNSS	1710MHz~2690MHz 2496MHz~2690MHz 3300MHz~5000MHz 1166MHz~1610MHz	3G/4G/5G/GNSS signal receive
ANT3	3G/4G/5G LB DIV LB TRX1 4G UHB TRX 3G/4G/5G MHB DL-MIMO1 5G N41 TRX 5G n77/n78/n79 TRX	617MHz~2690MHz 3400MHz~3700MHz 2496MHz~2690MHz 3300MHz~5000MHz	3G/4G/5G signal send and receive

Ensure the module normally use, it is recommended to use the correct kit model. The following table shows each kit part number.

Table 6: Kit part number

Kit	PN number	Description
SIM8200-M2-EVB2 KIT	S2-108RE	

2.2 Interface Introduction

This chapter mainly introduces these mainly signal test points of SIM8200-M2-EVB2.
The pin assignment of location **A** is shown in the following figure.

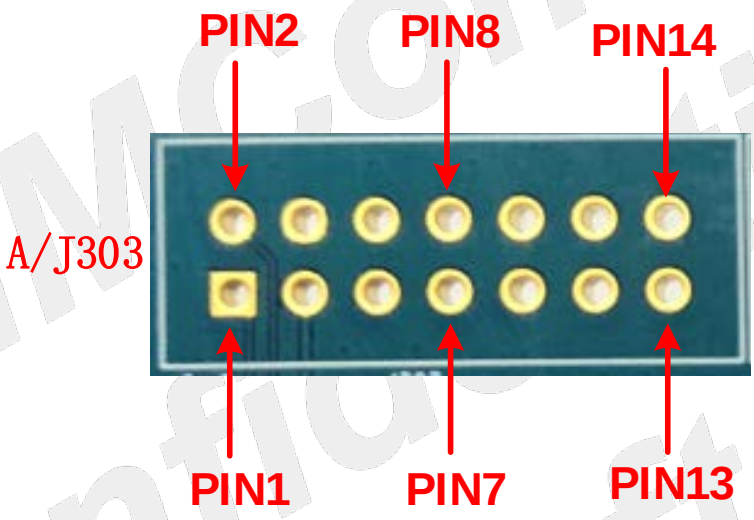

Figure 8: Pin assignment of location A on EVB

Table 7: Location A description on the EVB test point

Location	EVB signal description	EVB test points	Module pin number	Module pin name
A	MODE0	J303_PIN1	-	-
	MODE1	J303_PIN2	-	-
	VDD_1V8	J303_PIN3	-	-
	GND	J303_PIN4	73	GND
	ANTCTL0	J303_PIN5	59	ANTCTL0
	ANTCTL2	J303_PIN6	63	LAA_TX_EN
	ANTCTL1	J303_PIN7	61	ANTCTL1
	ANTCTL3	J303_PIN8	65	WL_TX_EN

	UIM2_RESET_N	J303_PIN9	46	(U)SIM2_RESET
	UIM2_PRESENT	J303_PIN10	40	(U)SIM2_DET
	UIM2_DATA	J303_PIN11	42	(U)SIM2_DATA
	RFFE0_DATA	J303_PIN12	58	RFFE_SDATA
	I2S_MCLK	J303_PIN13	60	I2S_MCLK(IO)
	UIM1_PRESENT	J303_PIN14	66	(U)SIM1_DET

The pin assignment of location **B** is shown in the following figure.

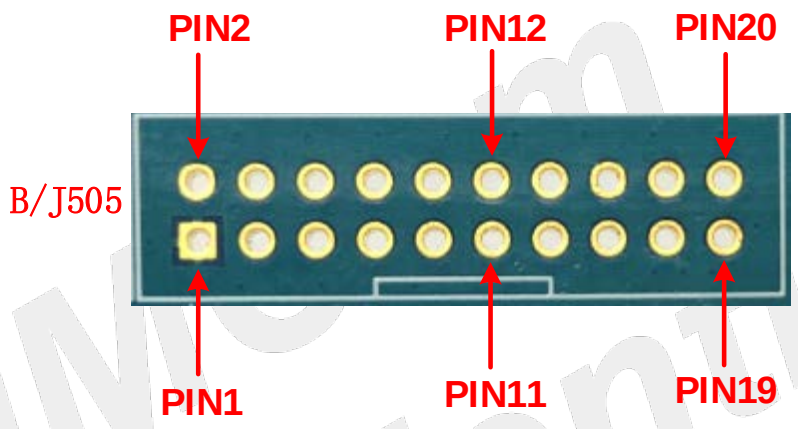

Figure 9: Pin assignment of location B on EVB

Table 8: Location B description on the EVB test point

Location	EVB signal description	EVB test points	Module pin number	Module pin name
B	GND	J505_PIN1	71	GND
	GND	J505_PIN2	57	GND
	PCIE_WAKE_N	J505_PIN3	54	PEWAKE#
	I2C_SDA	J505_PIN4	68	I2C_SDA(IO)
	PCIE_CLKREQ	J505_PIN5	52	CLKREQ#
	NC	J505_PIN6	-	-
	PCIE_RESET	J505_PIN7	50	PERST#
	NC	J505_PIN8	-	-
	NC	J505_PIN9	-	-
	NC	J505_PIN10	-	-
	NC	J505_PIN11	-	-
	NC	J505_PIN12	-	-
	NC	J505_PIN13	-	-

	UIM2_PWR	J505_PIN14	48	(U)SIM2_PWR
	NC	J505_PIN15	-	-
	GND	J505_PIN16	51	GND
	COEX_RXD	J505_PIN17	62	COEX2
	UIM2_CLK	J505_PIN18	44	(U)SIM2_CLK
	COEX_TXD	J505_PIN19	64	COEX1
	I2C_SCL	J505_PIN20	38	I2C_SCL(IO)

The pin assignment of location **F** is shown in the following figure.

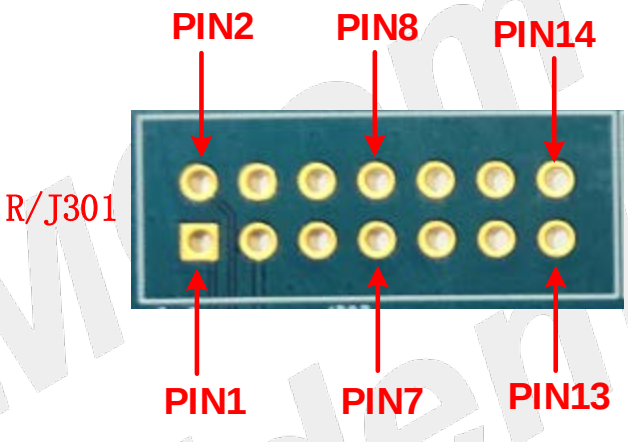

Figure 10: Pin assignment of location F on EVB

Table 9: Location F description on the EVB test point

Location	EVB signal description	EVB test points	Module pin nnumber	Module pin name
F	VCC_3V3	J301_PIN1	56	-
	GND	J301_PIN2	-	-
	LED_1_N	J301_PIN3	10	LED1#
	W_DISABLE_1_N	J301_PIN4	8	W_DISABLE1#
	PCM_CLK /I2S_SCLK	J301_PIN5	28	I2S_WA
	FULL_CARD_POWER_OFF_N	J301_PIN6	6	FULL_CARD_POWER_OFF#
	PCM_DOUT/ I2S_D1	J301_PIN7	22	I2S_RX
	WOWWAN	J301_PIN8	23	WoWWAN#
	PCM_DIN/I2S_D0	J301_PIN9	24	I2S_TX
	DPR	J301_PIN10	25	DPR

	PCM_SYNC /I2S_WS	J301_PIN11	20	I2S_CLK
	RESET_N	J5301_PIN12	67	RESET_N
	FUCTION_SEL	J502_PIN13	-	-
	W_DISABLE_2_N	J502_PIN14	26	W_DISABLE2#

Table 10: Symbol location description on the EVB test point

Symbol	Tag	Description
D	J504	Micro USB interface
E	TE_J106	SIM8200 module
L	S102	Power key switch
G	S105	Reset button
M	S103	Power switch
R	J501	USB3.1
U	J300	SIM holder
T	J101	5V/2A DC power supply
O	LED202	Module wake up host signal indicator
P	LED201	Module register the network status indicator
Q	LED101	VBAT supply indicator
K	S101	WWAN RF switch
J	S104	GNSS switch
H	S100	NC
S	X400	Handset jack
V	X501	Audio jack

NOTE

The recommended power supply of SIM8200 M2 series module is 3.8V and the voltage ranges from 3.135 V to 4.4 V.
The pin level is 1.8V of the module all GPIO (including UART), please ensure match the pin level.

3. Operation Procedures

3.1 Power on Module

3.1.1 The Module Single Power Supply

The b position on the EVB is the R203. If the module needs single power supply, it should be disconnected R203 resistance and J203 before using, and then VBAT and GND test points of the a position connect to the external power supply.

As shown in the following figure.

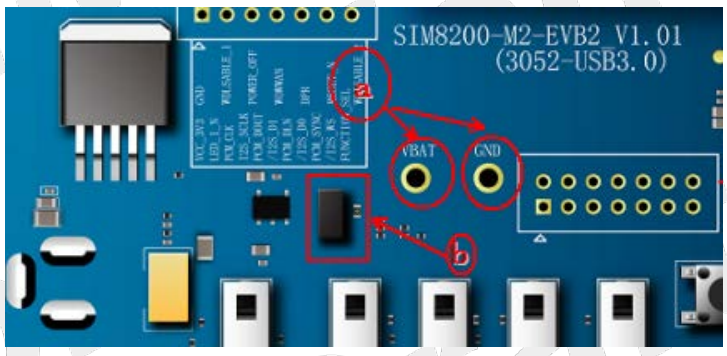

Figure 11: The module single power supply

3.1.2 Power on Operation Procedures

The module power on procedure as is shown in the following:

(1) Connect the DC adapter.

(2) Connect the module to J101 on SIM8200-M2-EVB2.

(3) Pull S103 to ON state, the LED101 will be lighted.

(4) Pull S102 to ON state, and the module will be powered on, if the module registered the net, the LED201 will be lighted flash, if no registered the net, the LED201 will be lighted all the time.

3.2 Driver Installation

3.2.1 USB-to-UART Driver Installation

The following link can get USB to UART 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.

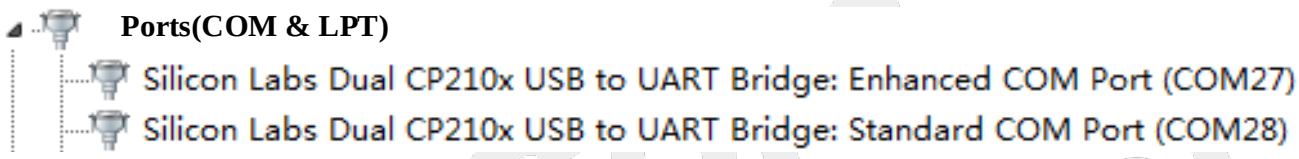

Figure 12: USB to UART port

Table 11: USB to UART port

Interface type	Port number	Module serial port	Remark
ECI	COM 27	Enhance UART	Used to UART communication
SCI	COM28	Standard UART	Used to capture the serial port log

3.2.2 Module Driver Installation

Please contact SIMCom technical support for the correct driver file, SIMCom driver.

After obtaining the SIMCom **SIMCOM_5G_Windows_DriverInstall_V1.0x.exe** driver, and installing the driver correctly, there will be 4 virtual USB ports under the device manager port.

Table 12: Virtual USB port

Port name	Description
AT port	For the communication with AT command
Audio port	For Audio function
Diagnostics	For debug
NMEA port	For GPS service

The following figure shows USB port.

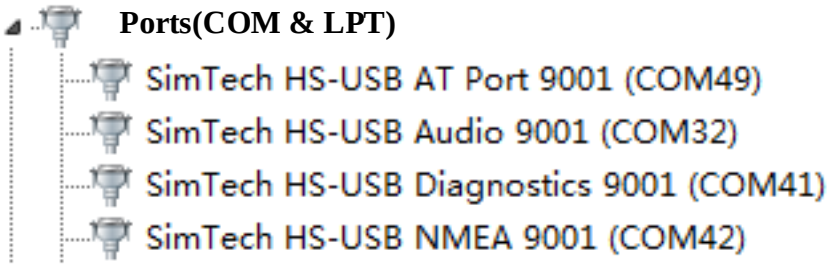

Figure 13: USB port

The test points of SIM8200EA-M2 are shown in the following figure:

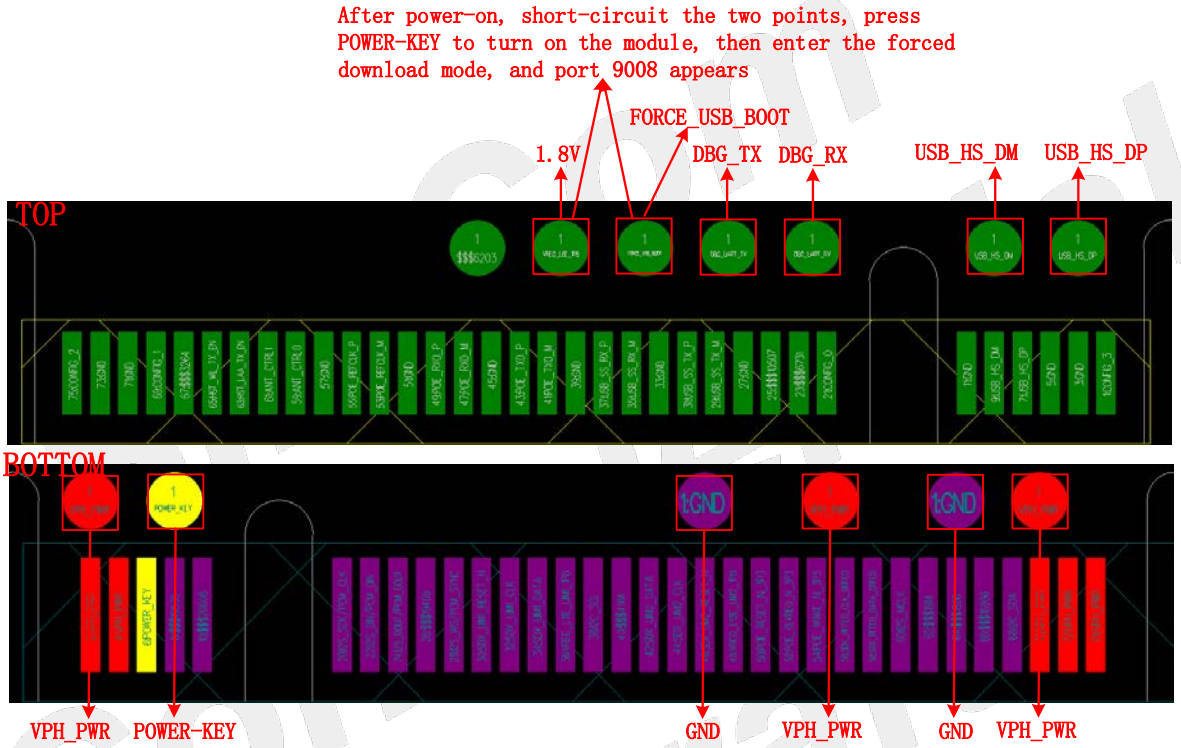

Figure 14: SIM8200EA-M2 test points

The test points of SIM8200CE-M2 are shown in the following figure:

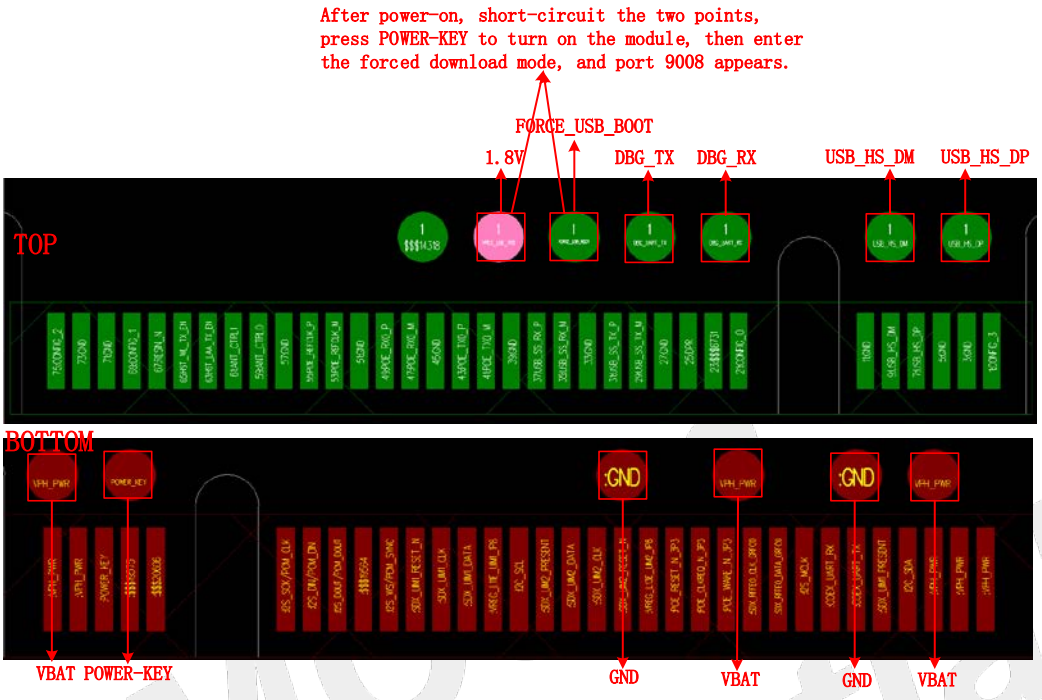

Figure 15: SIM8200CE-M2 test points

The test points of SIM8202G-M2 and SIM8202E-M2 are shown in the following figure:

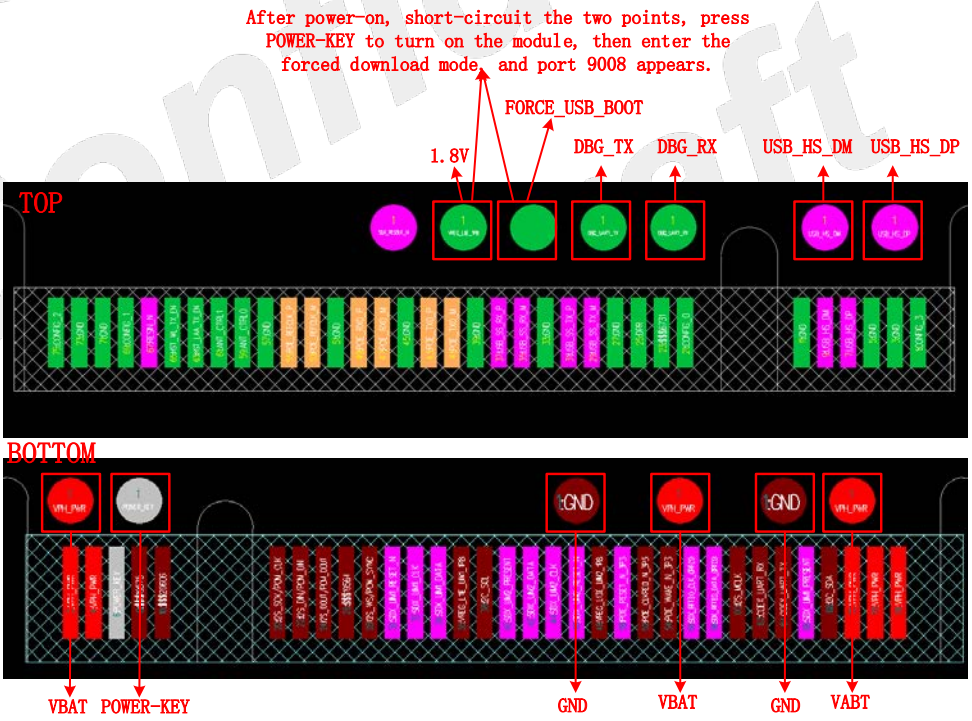

Figure 16: SIM8202G-M2 and SIM8202E-M2 test points

NOTE

1. Both **1.8V** and **FORCE_USB_BOOT** signal test points' relative positions of SIM8200-M2 series module are the same.
2. If need to firmware update in forced download mode, please contact SIMCom FAE obtain the update process.

3.3 Firmware Update Procedure

For how to make the module enter the forced download mode, please refer to Figure14, Figure15, Figure16.

Before firmware update, please confirm obtain correct firmware update file from SIMCom FAE and supplier.

The following procedures show the module firmware update in the normal download mode.

(1)After powering on the module, open the software **sim7080_sim7500_sim7600_sim7900_sim8200 qdl v1.61 only for update Click.exe,** click **Load**.

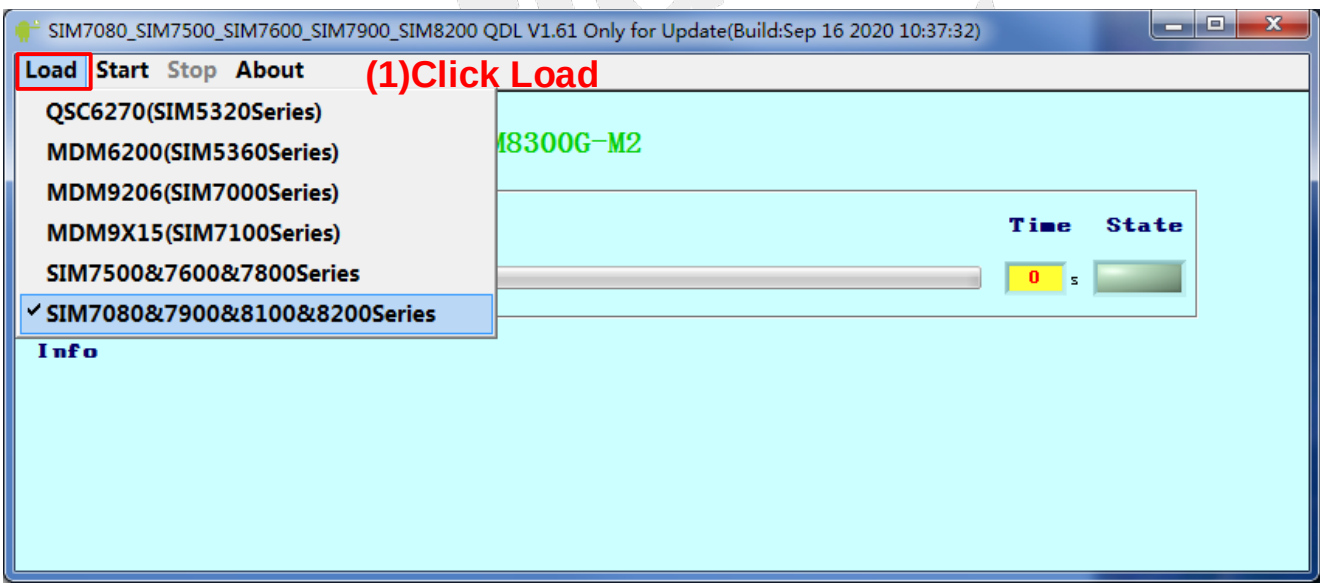

Figure 17: Click load

(2).Select module platform

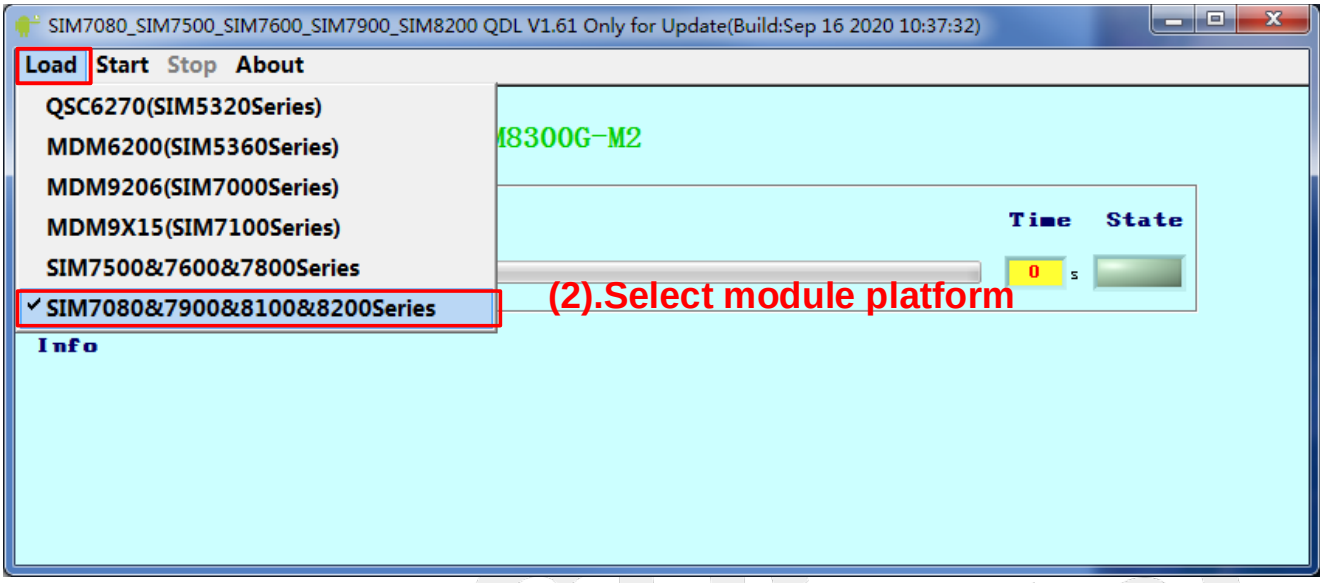

Figure 18: Select module platform

(3).Select firmware path

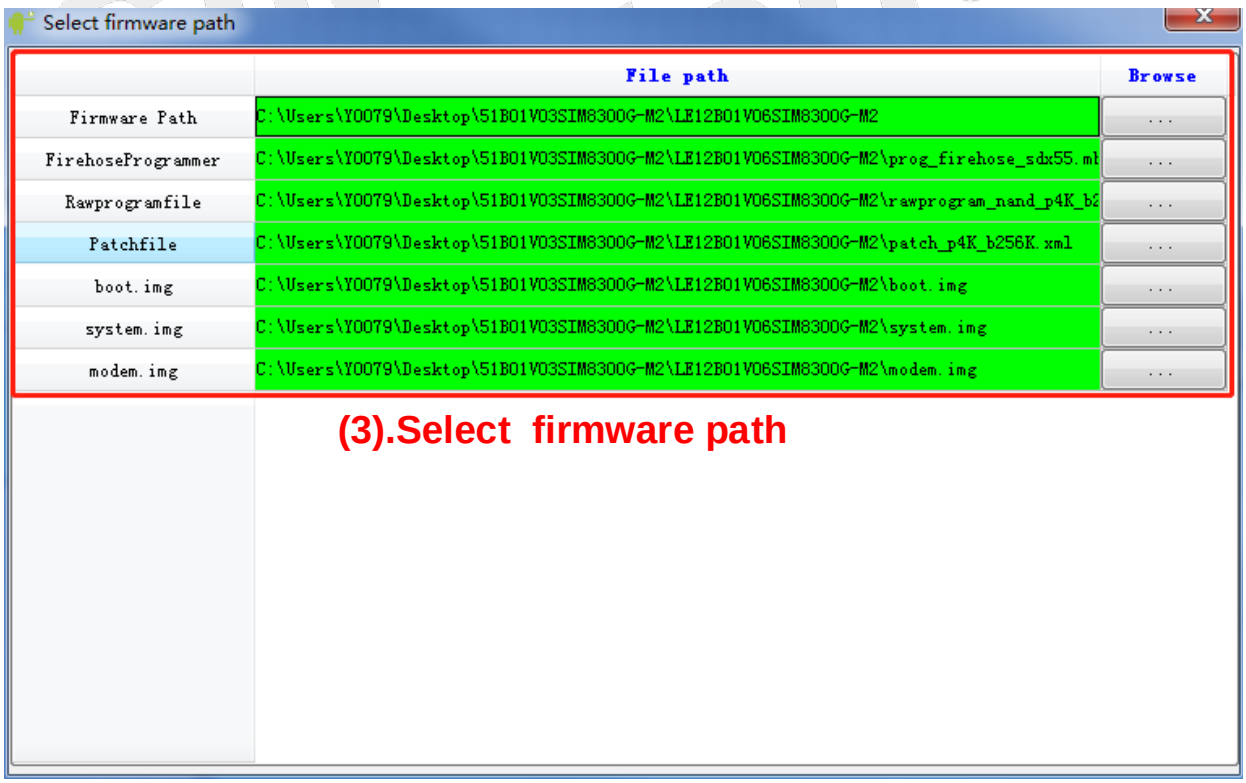

Figure 19: Select firmware path

(4). Click **Start** button, the tool will automatically detect the module port and start to download.

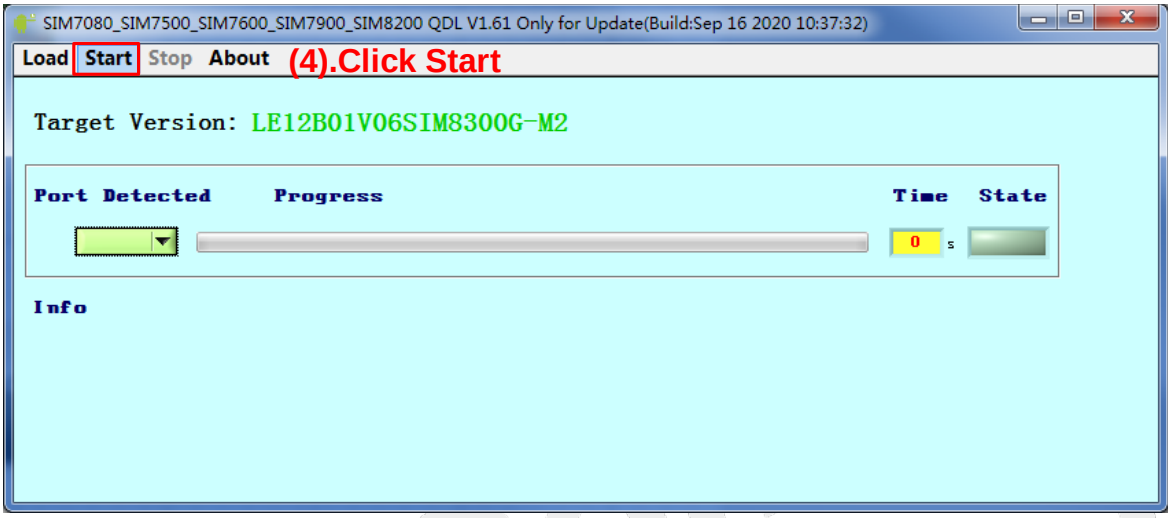

Figure 20: Click start

(5).Update success

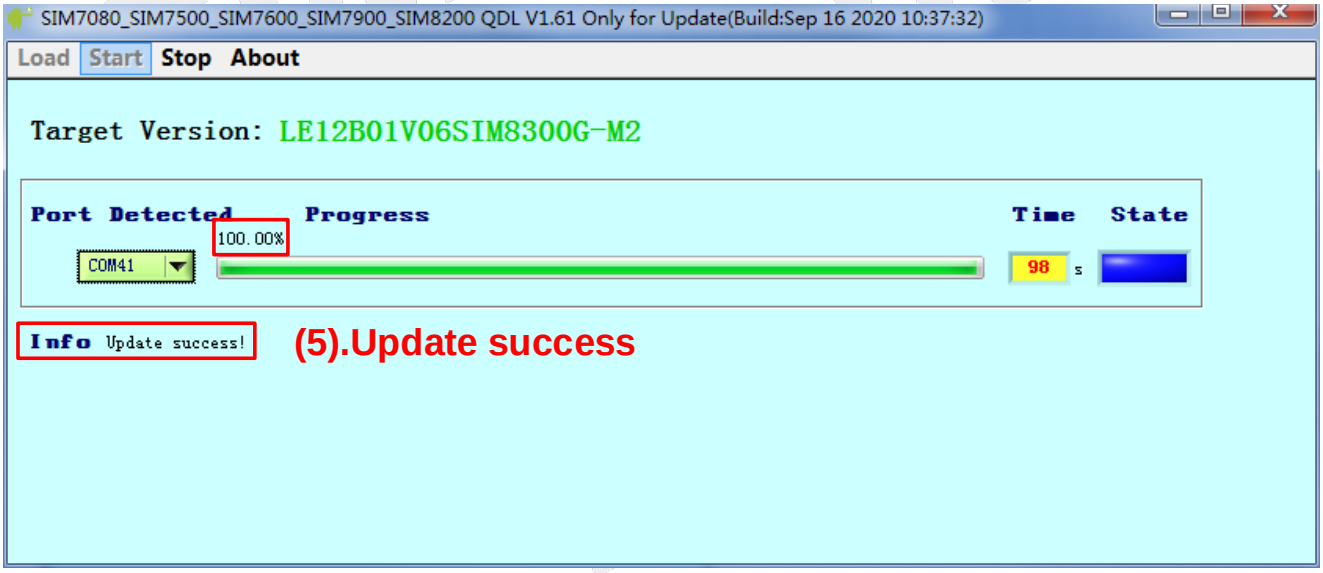

Figure 21: Update succeed

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 UART Serial Communication

SIM8200 series module 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
SIM8200 series module supports multiple serial data frame formats. The default data frame format is 8 data bits, 1 stop bit, and no parity bit.

Table 13: 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 14: UART format

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 odd check	AT+ICF=3,0
7 Data bit 1 Stop bit even check	AT+ICF=3,1

(2) Set the serial port baud rate
SIM8200 series module 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 15: 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

Common baud rate instructions for serial ports：

Table 16: 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 SIM8200 series module adopts RTS / CTS flow control mode, but the full-featured serial port of SIM8200 series module 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 17: 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.

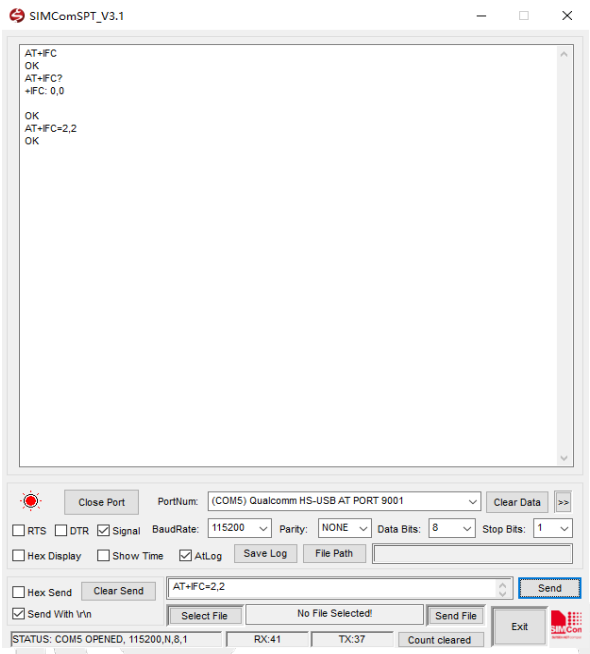

Figure 22: UART flow control method 1

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

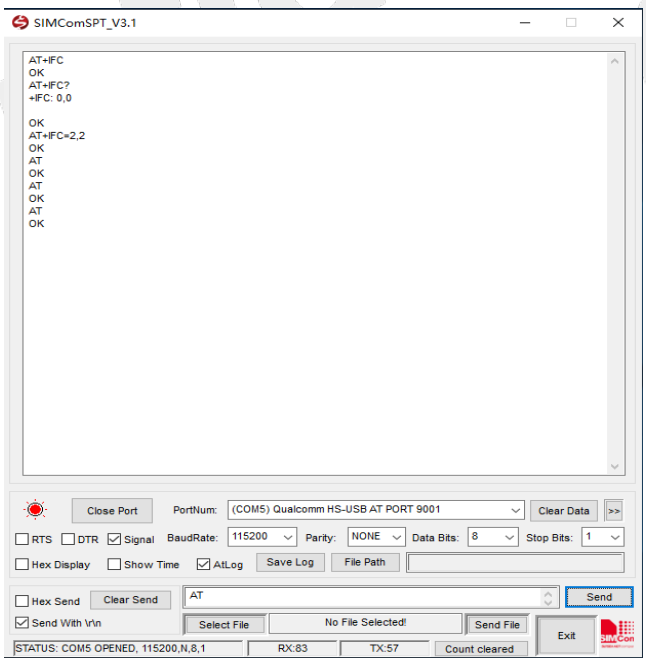

Figure 23: UART flow control method 2

4.4.2 USB Communication

After installing the USB driver correctly, send the AT command through **SimTech HS-USB AT Port 9001**.

4. Appendix

4.1 Related Documents

Table 18: Related documents

No.	Title	Description
[1]	SIM8200 Series_AT Command Manual	AT Command Manual
[2]	SIM8200EA-M2-ANT6 Hardware Design	SIM8200EA-M2-ANT6 HD document
[3]	SIM8200EA-M2-ANT4 Hardware Design	SIM8200EA-M2-ANT4 HD document
[4]	SIM8202G-M2 Hardware Design	SIM8202G-M2 HD document
[5]	SIM8300G-M2 Hardware Design	SIM8300-M2 HD document
[6]	SIM8200CE-M2 Hardware Design	SIM8200CE-M2 HD document
[7]	SIM8200EA-M2 Antenna Port Mapping and Design Guide	SIM8200EA-M2 Antenna document
[8]	SIM8202G-M2 Antenna Port Mapping and Design Guide	SIM8202G-M2 Antenna document
[9]	SIM8300G-M2 Antenna Port Mapping and Design Guide	SIM8300G-M2 Antenna document
[10]	SIM8200CE-M2 Antenna Port Mapping and Design Guide	SIM8200CE-M2 Antenna document

4.2 Terms and Abbreviations

Table 19: Terms and abbreviations

Abbreviation	Description
EMC	Electromagnetic Compatibility
ESD	Electrostatic Discharge
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
I2C	Inter-Integrated Circuit
I2S	Inter-IC Sound
IMEI	International Mobile Equipment Identity
LTE	Long Term Evolution
MSB	Most Significant Bit
PCB	Printed Circuit Board
PCIe	Peripheral Component Interface Express
RF	Radio Frequency
SIM	Subscriber Identification Module
SMPS	Switched-Mode Power Supply
NC	Not connect
ZIF	Zero Intermediate Frequency
(U)SIM	Universal Subscriber Identity Module
UART	Universal Asynchronous Receiver Transmitter

4.3 Safety Caution

Table 20: Safety caution

Marks	Requirements
	When in a hospital or other health care facility, observe the restrictions about the use of mobiles. Switch the cellular terminal or mobile off, medical equipment may be sensitive and not operate normally due to RF energy interference.
	Switch off the cellular terminal or mobile before boarding an aircraft. Make sure it is switched off. The operation of wireless appliances in an aircraft is forbidden to prevent interference with communication systems. Forgetting to think much of these instructions may impact the flight safety, or offend local legal action, or both.
	Do not operate the cellular terminal or mobile in the presence of flammable gases or fumes. Switch off the cellular terminal when you are near petrol stations, fuel depots, chemical plants or where blasting operations are in progress. Operation of any electrical equipment in potentially explosive atmospheres can constitute a safety hazard.
	Your cellular terminal or mobile receives and transmits radio frequency energy while switched on. RF interference can occur if it is used close to TV sets, radios, computers or other electric equipment.
	Road safety comes first! Do not use a hand-held cellular terminal or mobile when driving a vehicle, unless it is securely mounted in a holder for hands free operation. Before making a call with a hand-held terminal or mobile, park the vehicle.
	GSM cellular terminals or mobiles operate over radio frequency signals and cellular networks and cannot be guaranteed to connect in all conditions, especially with a mobile fee or an invalid SIM card. While you are in this condition and need emergent help, please remember to use emergency calls. In order to make or receive calls, the cellular terminal or mobile must be switched on and in a service area with adequate cellular signal strength. Some networks do not allow for emergency call if certain network services or phone features are in use (e.g. lock functions, fixed dialing etc.). You may have to deactivate those features before you can make an emergency call. Also, some networks require that a valid SIM card be properly inserted in the cellular terminal or mobile.