SIM7090G-EVB Kit User Guide

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:	SIM7090G-EVB Kit User Guide
Version:	1.00
Date:	2020-05-09
Status:	Release

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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

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Version History

Date	Version	Description of change	Author
2020-5-9	1.00	Origin	Tu Hongjun

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SCOPE

THIS DOCUMENT DESCRIBES HOW TO USE SIMCOM EVB AND TE BOARDS TO DO TEST; USER CAN GET USEFUL INFO ABOUT SIM7090G QUICKLY THROUGH THIS DOCUMENT.

THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE AT ANY TIME.

1. SIM7090G-EVB Overview

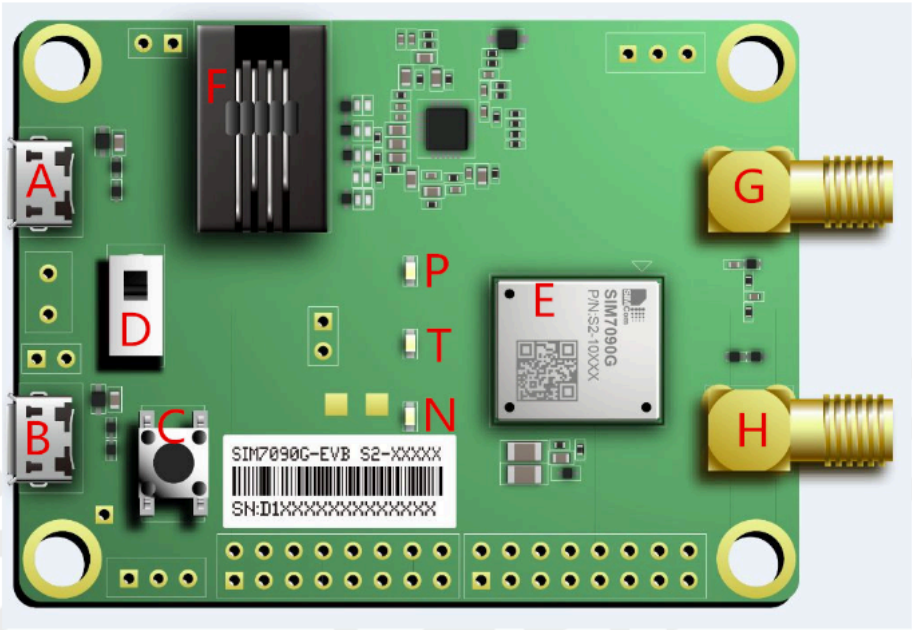

Figure 1: SIM7090G-EVB TOP view

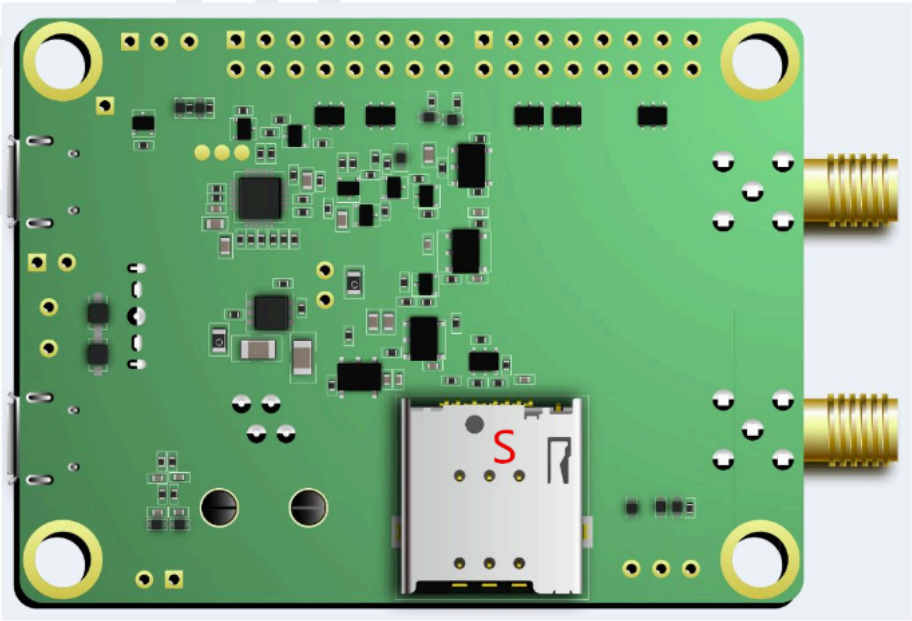

Figure 2: SIM7090G-EVB BOTTOM view

A: Micro USB Connector
B: UART Port jack
C: PWRKEY
D: Power switch
E: MODULE
F: Handset jack
G: GNSS ANT Interface
H: LTE ANT Interface
P: POWER LED indicator
T: STATUS LED indicator
N: NETLIGHT LED indicator
S：SIM Card holder

2. EVB Accessory

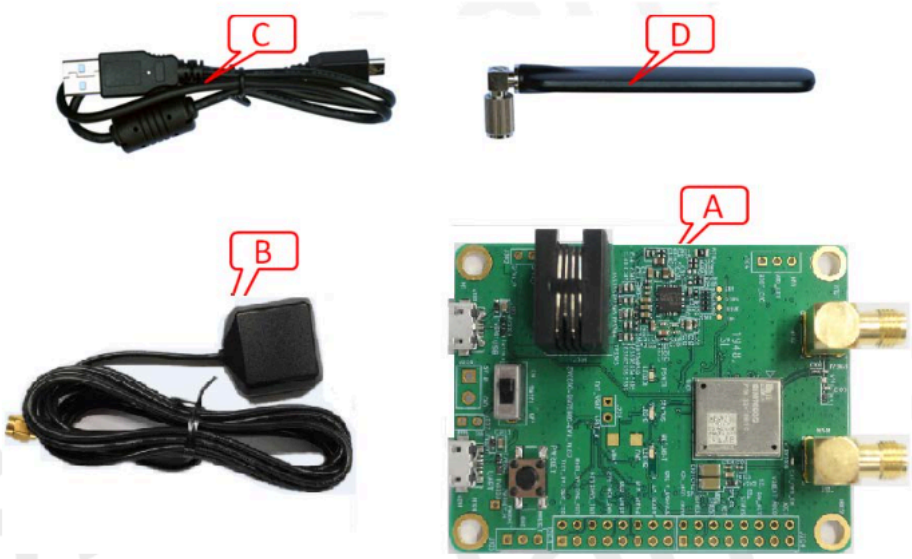

Figure 3: EVB Accessory

A: SIM7090G-EVB
B: GNSS antenna
C: USB Cable
D: LTE antenna

3. Accessory Interface

3.1 Power Interface

Both USB interface (A) and UART Port interface (B) provide power supply for EVB.

Pin	Signal	I/O	Description
A and B	USB power Input	I	5V/0.5A DC Source Input

3.2 Audio Interface

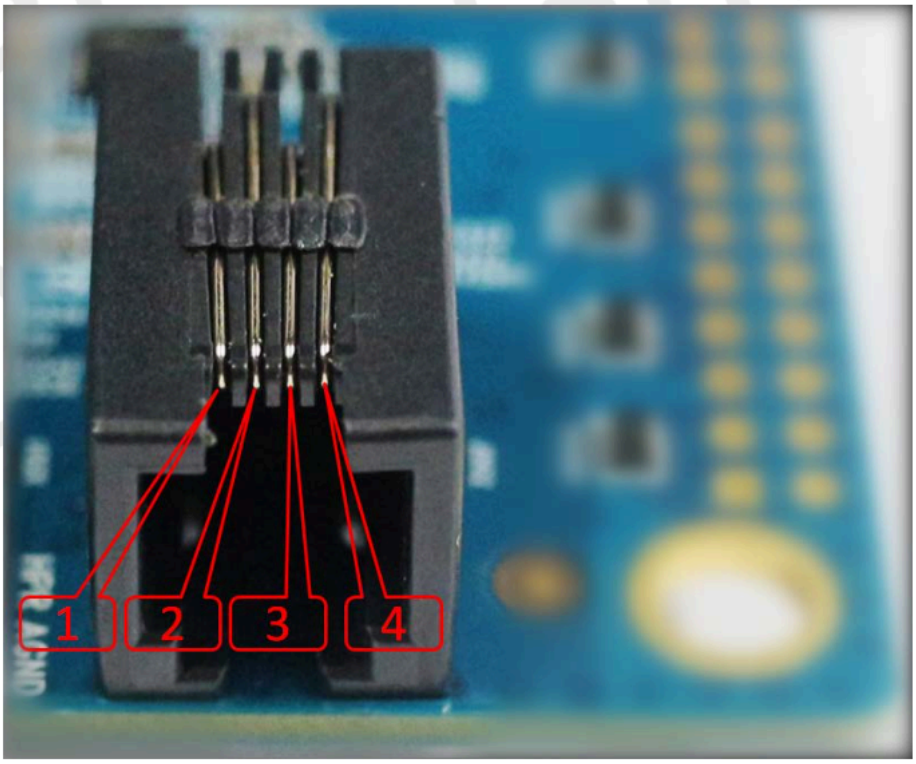

Figure 4: Audio Interface

Headset interface:

Pin	Signal	I/O	Description
1	MICN	I	Negative microphone input
2	SPKN	O	Negative receiver output
3	SPKP	I	Positive receiver output
4	MICP	O	Positive microphone input

3.3 SIM Card Interface

J202 is the Micro SIM Card holder.

3.4 UART Port Interface

EVB UART Port interface (B) can provide 5V power supply. This power supply is stepped down to 3.8V by LDO and then supplies power to VBAT of the module.

EVB UART Port interface (B) could be imaged to two virtual ports. Enhanced COM port is for main UART. And Standard COM port is for DEBUG UART.

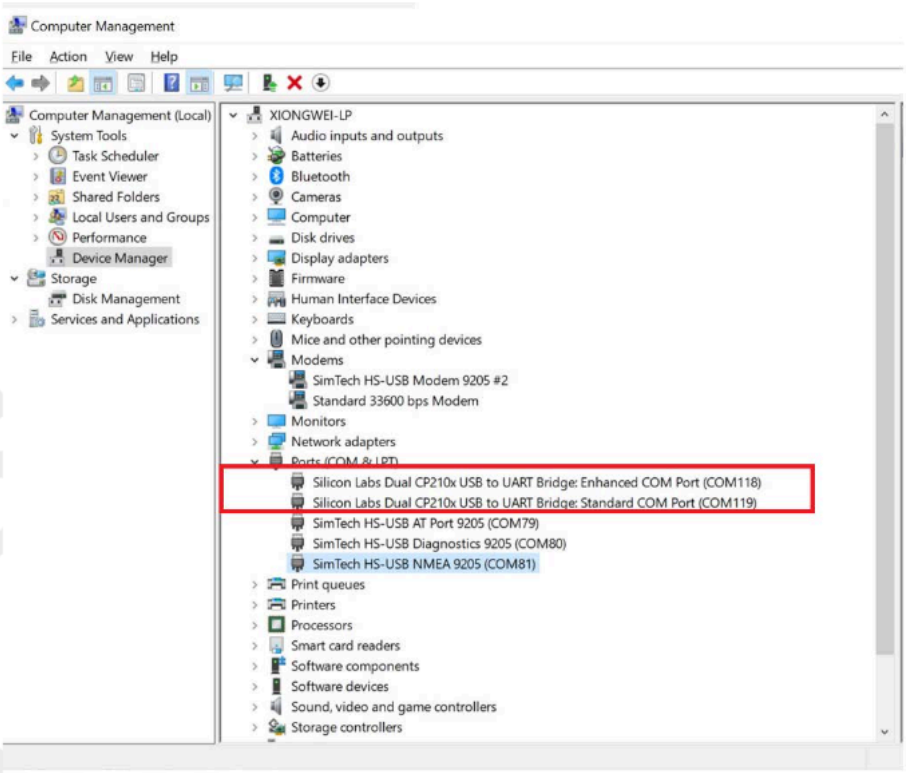

Figure 5: Virtual Serial Ports

Enhanced COM port: AT communication
Standard COM port: Debug
CP2105 driver is available here:
http://www.silabs.com/products/interface/usb-bridges/Pages/usb-bridges.aspx

3.5 USB Interface

EVB USB interface (A) can also provide 5V power supply. This power supply is stepped down to 3.8V by LDO and then supplies power to VBAT of the module.

This port is the USB2.0 interface of SIM7090G.

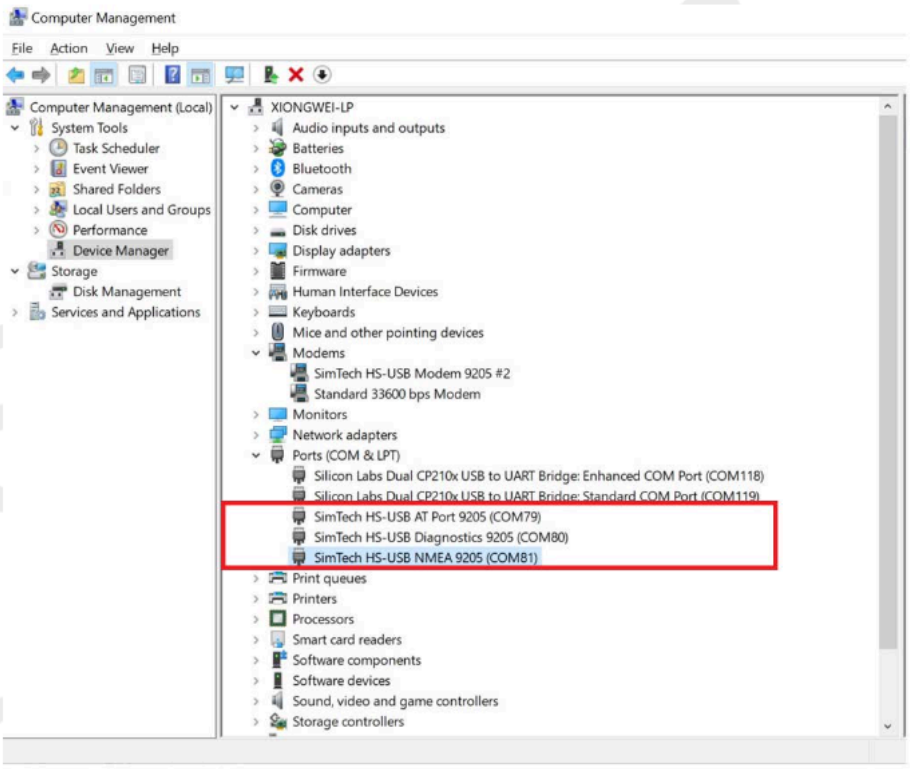

Figure 6: Micro USB Port

HS-USB AT Port 9205 is used for AT communication.
HS-USB Diagnostics 9205 is used for software debug or RF tool connection.
HS-USB NMEA 9205 is used for GNSS NMEA log output.

3.5 Power Switch

Both USB interface (A) and UART Port interface (B) provide power supply for EVB. After plugging in either USB cable, switch on SW201, then power indicator LED (LED201) will be keeps on.

3.6 PWRKEY Button

After power on EVB, press the PWRKEY button for more than 1.5 seconds and release, the module will be powered up, and the STATUS LED (LED101) will be keeps on. The network LED (LED102) will blink.
Please note that the time to press the PWRKEY key cannot exceed 12s(please get more details from Hardware Design Manual).

3.8 LED Indicator

The working behavior of the LED indicator is as following.

Name	Description	Status
LEDD201	Power ON/OFF indicator	Bright：EVB Power ON; Extinct: EVB Power OFF
LED102	NET status indicator	Blinking at a certain frequency according various net status
LED101	Module status indicator	Bright: Module runs normally Extinct: System is powered down

NETLIGHT Pin Status	Module Status
Always ON	Searching Network/Call Connect
200ms ON, 200ms OFF	NET status indicator
800ms ON, 800ms OFF	Registered network
OFF	Power off / Sleep

4. Driver Installations

4.1 EVB KIT USB driver installation

When USB Cable is plugged to a PC and connected,there should be several SimTech SIM7090 devices listed under other devices in Device manager like the following Figure.

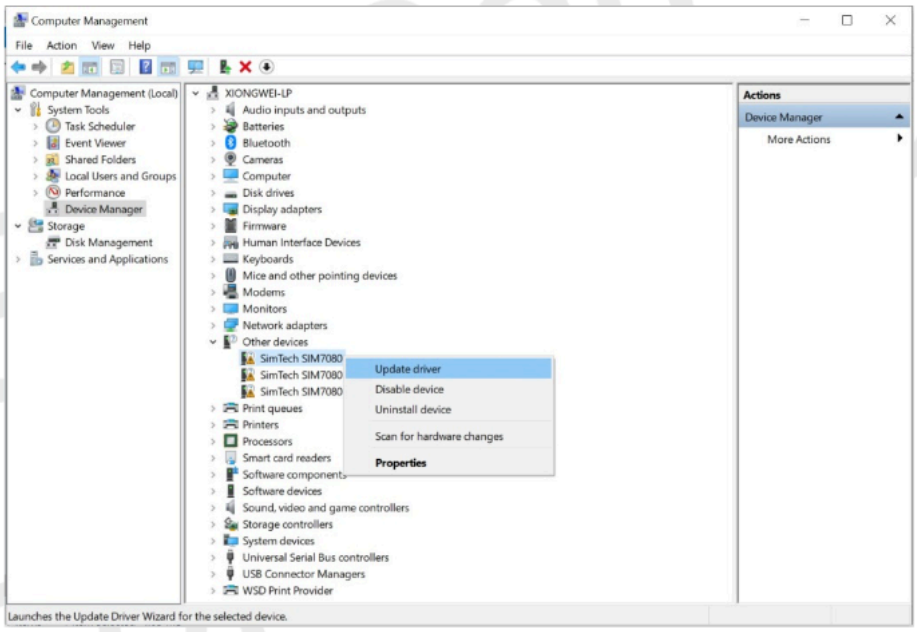

Figure 7: SIM7090 Devices Recognized by the Operating System

Please right click on each of the “SimTech SIM7090” devices and select “Update driver” (Figure7). Please select “Browse my computer for driver software”. Please click “Browse” and manually search and point to the driver folder “SIM7070_SIM7080 _SIM7090 Series Windows USB Driver_V1.00” (Figure8) and confirm by clicking “Next”.

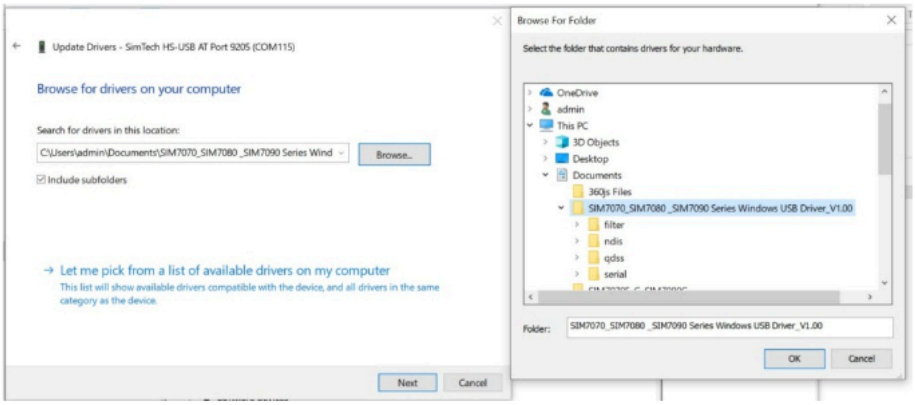

Figure 8: Browse for the drivers

Please repeat same procedure for each of the listed “SimTech 7090” devices under “Other devices” until getting listed three SimTech devices under “Ports (COM & LPT) , one SimTech device under Modems and one SimTech device under Network Adapters as shown on the following figure.

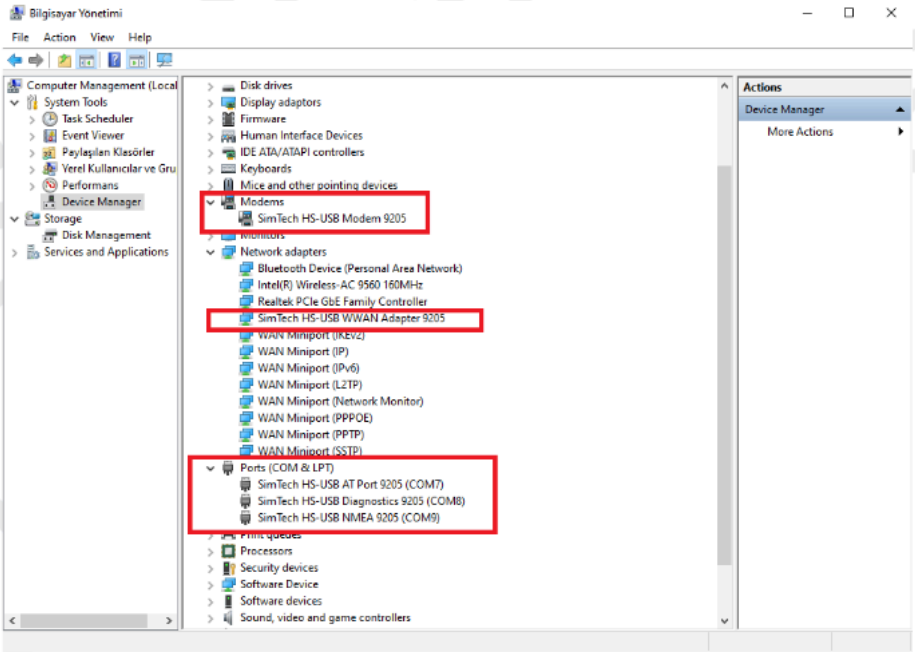

Figure 9: All drivers installed

After driver installs, Ports can use for purposes bellow;
HS-USB AT Port: AT Command Communication Port
HS-USB Diagnostics: Diagnostics and FW Update Port
HS-USB NMEA: GNSS NMEA Output Port.

5. FW Update

5.1 Select module platform and firmware path

SIM7090G can be updated from USB ports through SIMCom QDL tool on Windows PC. Open QDL tool and choose SIM7080-7900-8100-8200 Series option, then browse correct FW package folder.

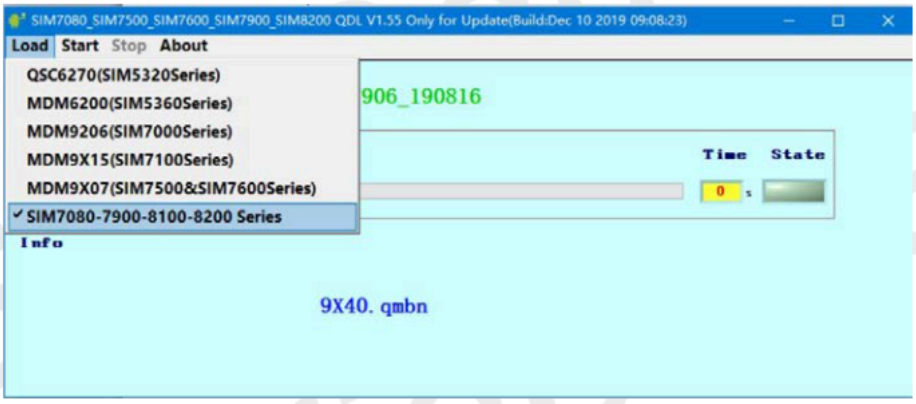

Figure 10: Select Platform Using Load Section

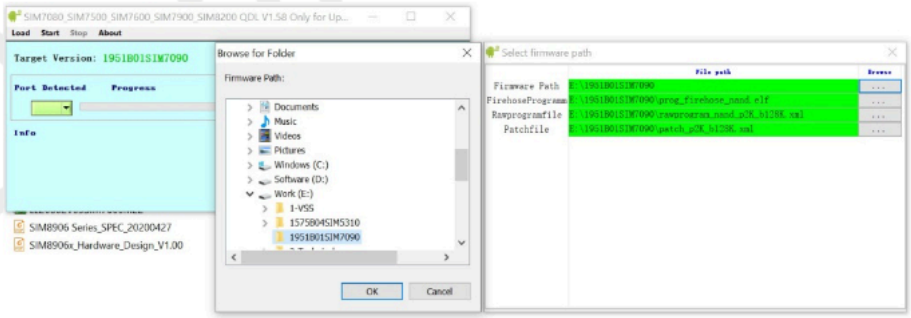

Figure 11: Browsing FW Location

Click start button, and power up the module, the tool will automatically detect the module port and start to download.

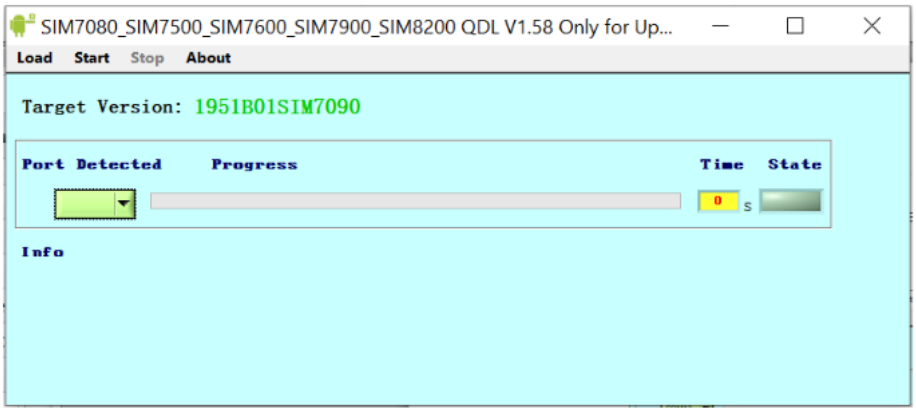

Figure 12: Start the update

After FW update finished, QDL shows updating succeed like on the following figure.

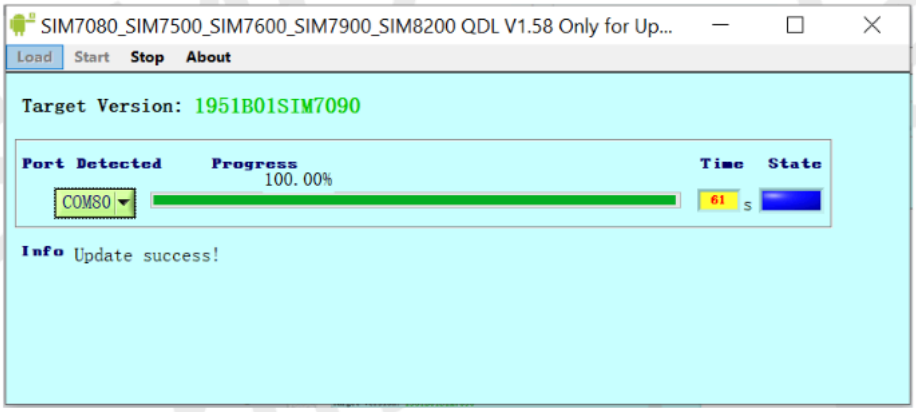

Figure 13: Update Success will be appear.

Note: Before running QDL tool, please install QPST tool first.

Attention:

1) During upgrade procedure, please do not power down module or unplug USB port to avoid damaging module .

2) Any update failure, please send back the dut1.log to SIMCom for analyzing.

3) Firmware path must be ASCII string.

Error code description:

1) Download failed! Partition diff!------you need change BacupRestorQcn = True in cfg.ini ,and put correct QMBN file into the firmware path(please contact SIMCom FAE for QMBN file).

2) Unable to download Flash Programmer using Sahara Protocol------Please re-power No1 DUT. If re-power modular still display this message, you can try re-install the VC run timer library in tools

directory.

3) Tool display “Waiting switch To Download Mode” long time, Please check the module driver in your device manager is all installed.

4) When you Select BacupRestorQcn, the qcn file will be backup into firmware path.

6. Using SIMCom Serial Port Tool

SIMCom provides a serial port tool(SIMCom Serial Port Tool) for customer to test module through AT Commands. Serial Port Tool can communicate with modules after opening COM Ports on list. On following figure, every section of serial tool can be seen.

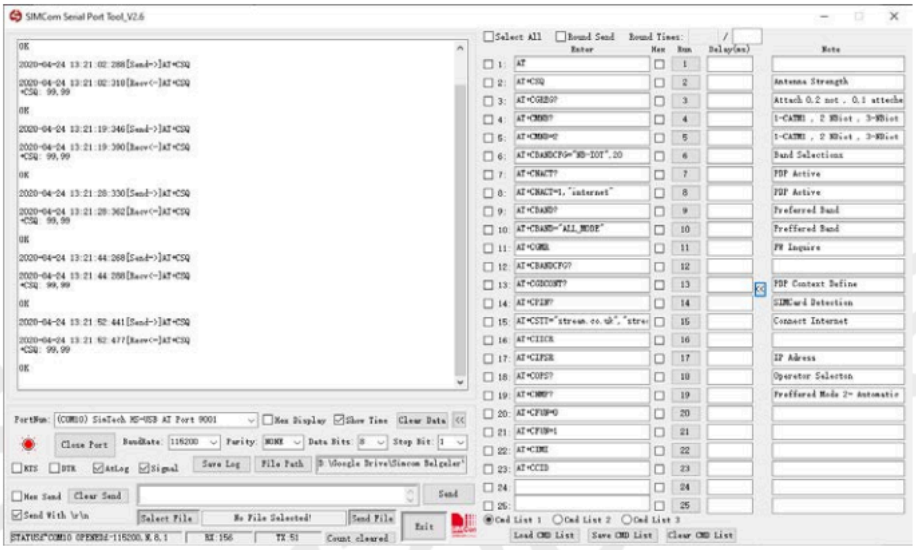

Figure 14: SIMCom Serial Port Tool Introduction

Also, SIMCom Serial Port Tool may take some log records and save these command list to use later again. Tool has a 3 CMD List sections and holds AT Commands with their notes and saves under .ini format on PC to import it back.

7. Test Case

Following will show some basic test with SIM7090 EVB,for more information, please refer to AT Command Manual.

7.1 PDN Auto- activation

AT Command	Response	Description
AT+CPIN?	+CPIN: READY OK	Check SIM Card Status
AT+CSQ	+CSQ : 27,99 OK	Check RF Signal
AT+CGATT?	+CGATT:1 OK	Check PS Service 1 Indicates PS has attached.
AT+COPS?	+COPS:0,0,"CHN-CT",0 OK	Query Network information, operator and network mode 9, NB-IOT network
AT+CGNAPN	+CGNAPN: 1,"ctnb" OK	Query CAT-M or NB-IOT network after the successful registration of APN
AT+CNACT=1	OK +APP PDP : 0, ACTIVE	Activate network, Activate 0th PDP.

7.2 Ping Tests

AT Command	Response	Description
AT+CNACT=0,1	OK +APP PDP: 0,ACTIVE	App Network Active.
AT+SNPDPID=0	OK	Select PDP Index for PING
AT+SNPING4="www.baidu.com",3,16,1000	+SNPING4: 1,180.97.33.108,147 +SNPING4: 2,180.97.33.108,546 +SNPING4: 3,180.97.33.108,278 OK	Sends IPv4 Ping request

7.3 TCP Functions

AT Command	Response	Description
AT+CNCFG=0,1,"ctnb"	OK	Configure PDP 0th,network type ipv4/v6,APN is "ctnb" PDP, this needs to set different APN values according to different cards.
AT+CNACT=0,1	OK +APP PDP: 0,ACTIVE	Activate network, Activate 0th PDP.
AT+CNACT?	+CNACT:0,1,"10.181.182.177" +CNACT: 1,0,"0.0.0.0" +CNACT: 2,0,"0.0.0.0" +CNACT: 3,0,"0.0.0.0" OK	Get local IP.
AT+CASSLCFG=0,"SSL",0	OK	Set the 0th connection's SSL enable option. If TCP/UDP connection, the parameter is 0.
AT+CAOPEN=0,0,"TCP",	OK	Create a TCP connection with 0th PDP

"117.131.85.139",6004	+CAOPEN: 0,0	on 0th connection. Return to URC the first parameter is the identifier, the second parameter is the result of the connection, and the 0 indicates success.
AT+CASEND=0,5	> Hello OK +CASEND: 0,0,5	Request to send 5 bytes of data Input data Data sent successfully
	+CADATAIND: 0	Data come in on 0th connection.
AT+CARECV=0,	+CARECV: 10,GET / HTTP OK	100 Request to get 100 byte data sent by the server. Output received data
AT+CACLOSE=0	OK	Close the connection with an identifier of 0.
AT+CNACT=0,0	OK +APP PDP: 0,DEACTIVE	Disconnect 0th data connection

7.4 MQTT Functions

AT Command	Response	Description
AT+CNACT=0,1	OK +APP PDP: 0,ACTIVE	Open wireless connection parameter 0 is PDP Index, parameter 1 means active.
AT+CNACT?	+CNACT:0,1,"10.181.182.177" +CNACT: 1,0,"0.0.0.0" +CNACT: 2,0,"0.0.0.0" +CNACT: 3,0,"0.0.0.0" OK	Get local IP.
AT+SMCONF="URL",117.131. 85 .139,6000	OK	Set up server URL
AT+SMCONF="KEEPTIME",60	OK	Set MQTT time to connect server
AT+SMCONN	OK	

AT+SMSUB="information",1	OK	Subscription packet
AT+SMPUB="information",5,1,1	>hello OK +SMSUB: "information","hello"	Send packet, 5 is packet length. Get data on server
AT+SMUNSUB="information"	OK	Unsubscription packet
AT+SMDISC	OK	Disconnect MQTT
AT+CNACT=0,0	OK +APP PDP: 0,DEACTIVE	Disconnect wireless

7.5 GNSS Function Test

➢ **Open GNSS function**

AT Command	Response	Description
AT+CGNSPWR=1	OK	Turn on GNSS power(UART or USB AT port)
AT+CGNSINF	+CGNSINF: 1,1,20191024051848.000,31.221946,121.355565,3.417,0.00,,0,,1.4,1.7,0.9,,6,,12.4,12.0 OK	Read GNSS navigation information

➢ **Configure GNSS output NMEA data to USB's NMEA Port**

AT Command	Response	Description
AT+SGNSCFG="NMEAOUTPORT",1	OK	Configure GNSS out to USB NMEA port before GNSS power on
AT+SGNSCMD=2,1 000,0,1	OK	Turn on GNSS power
	$GPGSV,3,1,12,03,04,243,32,04,00,000,41,08 ,17,207,38,09,15,316,40,1*6A $GPGSV,3,2,12,14,16,162,34,16,63,346,40,21 ,17,075,34,23,42,294,43,1*6E	NMEA data output from USB's NMEA port

	$GPGSV,3,3,12,26,49,034,45,27,60,187,43,31 ,37,103,45,22,00,000,,1*67 $GLGSV,3,1,10,10,13,300,22,18,11,027,24,09 , 48,011,34,16,16,079,26,1*79 $GLGSV,3,2,10,20,35,150,29,19,44,068,23,07 , 27,233,31,08,28,291,24,1*78 $GLGSV,3,3,10,06,02,191,,01,06,329,,1*7B $GAGSV,1,1,0,7*43 $PQGSV,1,1,0,1*42