SIM8800 Serial EVB User Guidelines Manual

5G&CV2X Module

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1 Introduction

This document introduces the interface and use method of SIM8800 series EVB board (8XQ000-5G+V2X-EVB_V1.02). With the help of this document, customers can quickly use SIM8800 series modules.

2 General Overview

SIMCom supplies SIM8800 serial EVB KIT for customs to develop applications based on SIM8800 serial module.

2.1 3D Views of the SIM8800 serial EVB

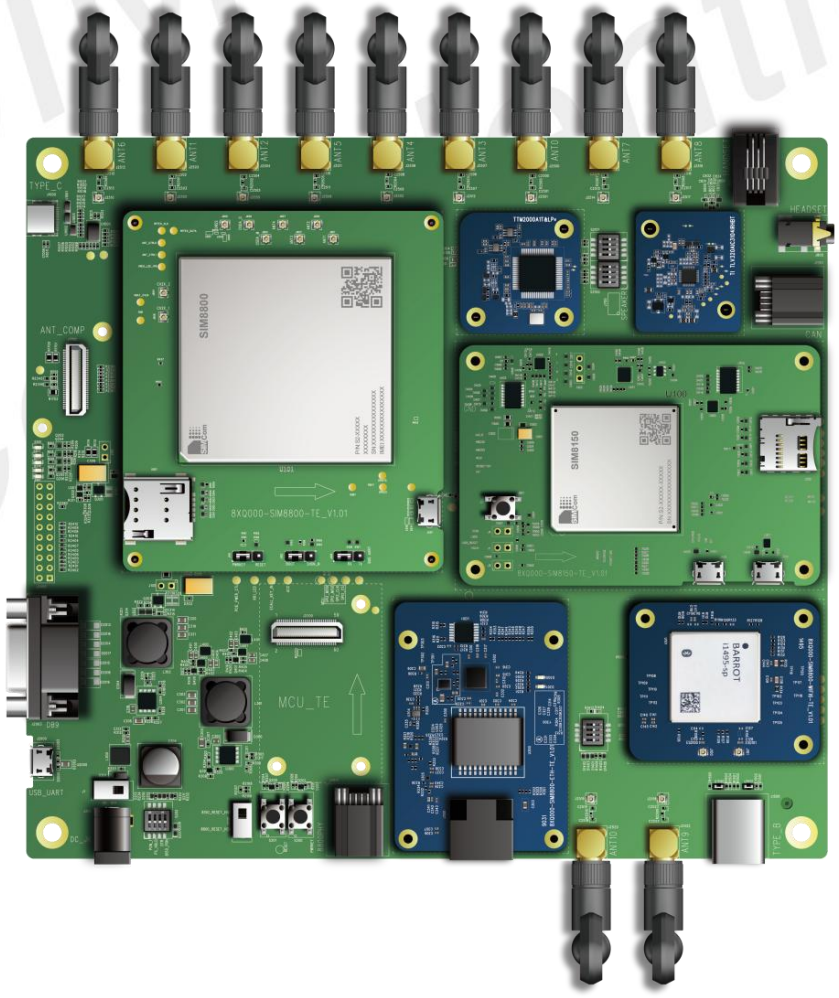

Figure 1: Front view of EVB board

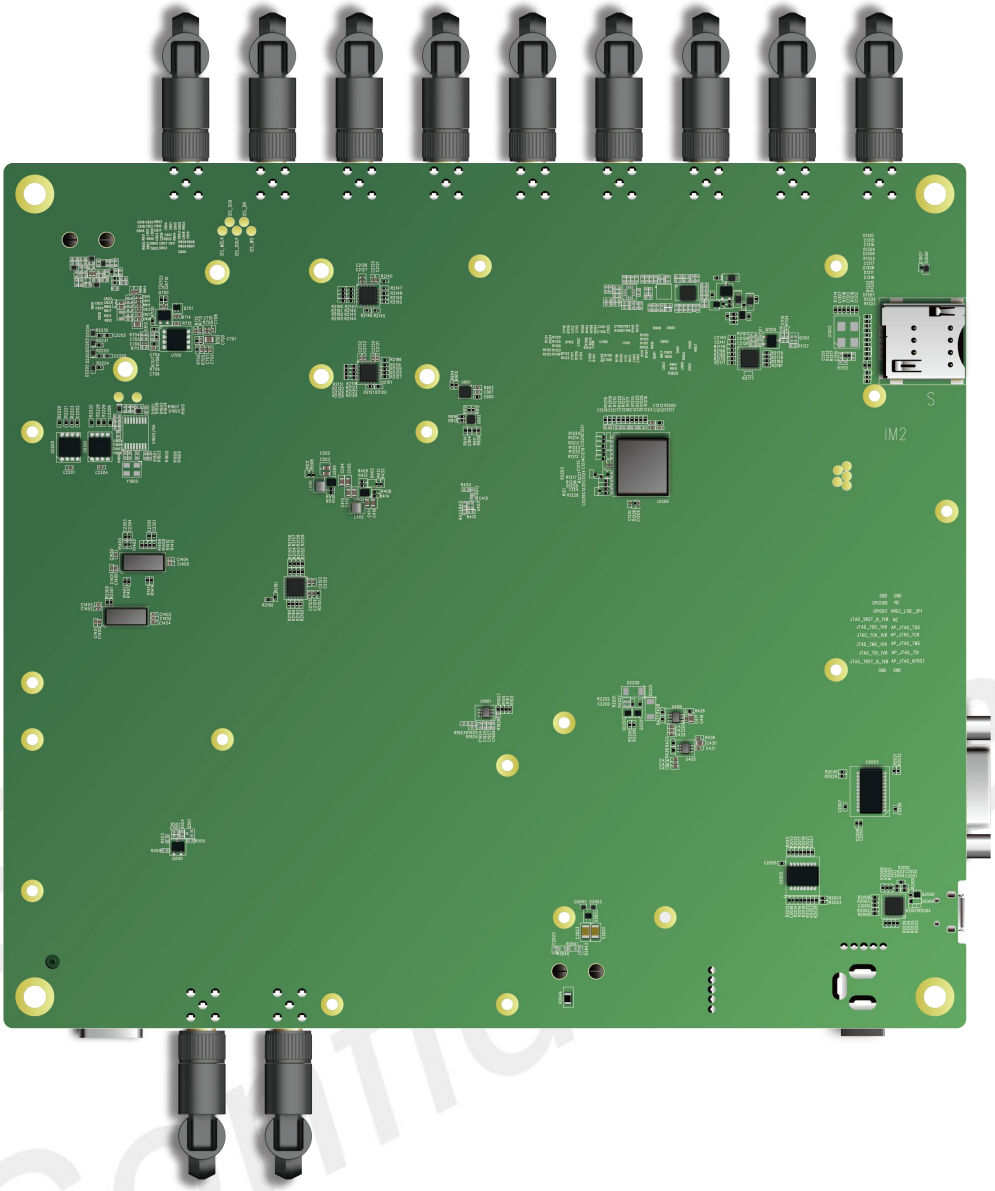

Figure 2: Back view of EVB board

2.2 Features Overview

The main characteristics of the corresponding functions of the 8XQ000 board interface are shown in the table below.

Table 1: key features

Features	Implementation
SIM8800-TE	
SIM8800-TE interface	Connect 8XQ000-5G+V2X-EVB_V1.02 SIM8800_TE
SIM card socket	SIM card: dual voltage1.8V/3.0V,Corresponding to SIM8800 SIM1 interface, with hot plug function
Micro USB interface[1]	Compliant with USB 2.0 specifications, data rate up to 480Mbps Used for SIM8800 AT command communication, data transmission, GNSS NMEA output, software debugging and firmware upgrade
Antenna interfaces	9 x IPEX antenna interfaces Including DSDA antenna, GNSS,5G, on-board CV2X RF system
3x3pin row needle	It is mainly used for switching on / off, reset, startup mode selection and debug serial port of sim8800 module. PWRKEY:1.1V(Low level active) RESET:1.8V(Low level active) Forced Download:1.8V(High level active) DEBUG Serial port:1.8V
8XQ000-5G+V2X-EVB_V1.02	
Power supply input interface (DJ_JK)	DC power supply:12V/6A
SIM card socket	SIM card: dual voltage1.8V/3.0V,Corresponding to SIM8800 SIM2 interface, with hot plug function
Micro USB(USB_UART) interface	SIM8800 UART1 and DEBUG dual serial port to USB
DB9 connector*	SIM8800 UART1 7-wire serial port (3.3V)
FLASH[2]	Support 4bit EMMC 1.8V voltage operation Up to 200 MHz clock rate
RJ11 connector (HANDSET)	For connecting handset
3.5mm earphone socket*	For connecting headphones
2Pin row needle hole (SPEAKER)*	For connecting speakers
CAN interface*	4Pin horizontal in-line connector,CAN1, CAN0 for external connection
8800PHY interface	4Pin horizontal in-line connector,8XQ000-5G+V2X-EVB_V1.02 integrated 88Q2112 PHY, 8800PHY is 88Q2112 PHY MDI media related interface MDI, which is used to connect MDI equipment (Ethernet converter)
TYPE_C interface	Compliant with USB3.1 Gen2, data rate up to 10Gbps
TYPE_B interface*	It can be switched to SIM8800 PCIe interface through the dial switch and

	supports PCIe 3.0
SIM8800-TE connector	Connect SIM8800-TE board connector
SIM8150-TE connector	Connect SIM8150-TE board connector
WIFI-TE connector	Connect WIF-TE board connector,Three types of WIFI-TE boards can be selected: WIFI5-i1465-TE, WIFI6-i1495-TE and WIFI6-i1496-TE
HSM_TE connector*	Connect HSM-TE board connector,Three types of HSM-TE boards can be selected: TTM2000-TE*,XDSM3276-TE* and CIU98-TE*
CODEC_TE connector	Connect TLV320AIC3104-TE board connector,Low-power audio encoder with multiple inputs and outputs.
RGMII_TE connector	Connect ETH-TE board connector,Two ETH-TE boards can be selected, Connect 88Q2112-TE:Ethernet transceiver, supporting IEEE 802.3bw and IEEE 802.3bp, conforming to 100/1000base-t1 standard. Connect KSZ9031-TE:It is a fully integrated three speed (10Base-T/100base-TX/1000BASE-T) ethernet physical layer transceiver, which is used to send and receive data through standard CAT-5 unshielded twisted pair cable. The simplified gigabit media independent interface (RGMII) can be directly connected to the RGMII MAC in gigabit Ethernet processor and switch to realize 10/100/1000 Mbps data transmission.
MCU_TE connector*	Connect MCU-TE* board connector
ANT_COMP connector*	Connect ANT-COMP-TE* board connector,Two ANT-COMP-TE boards can be selected, Connect ANT-COMP-TE-A* Connect ANT-COMP-TE-R*
Toggle switch	2x Toggle switch It is used to turn on and off the main power supply and reset HSM_TE control switch.
Dial switch	4x Dial switch Selection of compatible functions for EVB board
Tact Switch	2x Tact Switch For SIM8800 module startup/shutdown and reset
Status indicator	5x Status indicator It is used to indicate each status of the module
Antenna interface	5x Antenna interface It is used to switch the SIM8800-TE board and the antenna interface on WIFI-TE
TLV320AIC3104-TE	
TLV320AIC3104-TE connector	Connect 8XQ000-5G+V2X-EVB_V1.02 CODEC_TE
KSZ9031-TE	
KSZ9031-TE connector	Connect 8XQ000-5G+V2X-EVB_V1.02 RGMII_TE
RJ45 connector	For connecting standard CAT-5 twisted pair cable
88Q2112-TE	
88Q2112-TE connector	Connect 8XQ000-5G+V2X-EVB_V1.02 RGMII_TE
4Pin horizontal in-line connector	Media related interface MDI, which is used to connect MDI equipment (Ethernet converter)

SIM8150-TE	
SIM8150-TE connector	Connect 8XQ000-5G+V2X-EVB_V1.02 SIM8150_TE
Micro USB interface	2x Micro USB J305：Compliant with USB 2.0 specifications, data rate up to 480Mbps Used for SIM8150 AT command communication, data transmission, GNSS NMEA output, software debugging and firmware upgrade J400：SIM8150 debug debug serial port and BLSP1_ UART dual serial port to USB
SD card slot	Support 4-bit EMMC TF Card
3x2Pin row needle hole	For sim8150 forced download and fast boot Forced download：1.8V Fast boot：1.8V
Tact Switch	For starting up sim8150 module
WIFI5-i1465-TE	
i1465-TE connector	Connect 8XQ000-5G+V2X-EVB_V1.02 WIFI-TE
Antenna interface	Antenna 2 x IPEX
WIFI6-i1495-TE	
i1495-TE connector	Connect 8XQ000-5G+V2X-EVB_V1.02 WIFI-TE
Antenna interface	Antenna 2 x IPEX
WIFI6-i1496-TE	
i1496-TE connector	Connect 8XQ000-5G+V2X-EVB_V1.02 WIFI-TE
Antenna interface	Antenna 2 x IPEX
TTM2000-TE*	
TTM2000-TE connector	Connect 8XQ000-5G+V2X-EVB_V1.02 HSM_TE
XDSM3276-TE*	
XDSM3276-TE connector	Connect 8XQ000-5G+V2X-EVB_V1.02 HSM_TE
CIU98-TE*	
CIU98-TE connector	Connect 8XQ000-5G+V2X-EVB_V1.02 HSM_TE
MCU-TE*	
MCU-TE connector	Connect 8XQ000-5G+V2X-EVB_V1.02 MCU_TE
ANT-COMP-TE-A*	
ANT_COMP-TE-A connector	Connect 8XQ000-5G+V2X-EVB_V1.02 ANT_COMP
Antenna interface	Connect coaxial cable
ANT-COMP-TE-R*	
ANT_COMP-TE-R connector	Connect 8XQ000-5G+V2X-EVB_V1.02 ANT_COMP
Antenna interface	Connect coaxial cable

NOTE

"*"：To be developed.
"[1]"：If the SIM8800-TE board is inserted into 8XQ000-5G+V2X-EVB_V1.02 after,the Micro USB interface of SIM8800-TE board will fail.
"[2]"：Flash integrated in 8XQ000-5G+V2X-EVB_V1.02, there is no external interface.

2.3 Interface Overviews

8XQ000 interface connection and function description are shown in the table below.

Table 2: Interface connection and function description

Interface	Reference number	Description
SIM8800-TE		
SIM8800-TE connector	CON401 CON402	Connect 8XQ000-5G+V2X-EVB_V1.02 SIM8800_TE
SIM card socket	U501	SIM8800 SIM1 card slot
Micro USB interface[1]	J501	Micro USB cable to PC
Antenna interface	J601~J609	Connect 8XQ000-5G+V2X-EVB_V1.02 antenna interface or antenna
3x3Pin row needle	J101	In the shutdown state, short circuit pwrkey and 2Pin pins for more than 2 seconds to start SIM8800. In the power on state, short circuit pwrkey and 2Pin pins for more than 2 seconds and then release to shut down the SIM8800. In the power on state, short circuit the reset and 2Pin pins and release to reset the SIM8800.
	J102	After the BOOT is short circuited, then powered on, the SIM8800 will enter the forced download mode and enter the 9008 port through Micro USB
	J103	SIM8800 debug UART
8XQ000-5G+V2X-EVB_V1.02		
Power supply input interface	J300	DC power supply:12V/6A
SIM card socket	U1304	SIM8800 SIM2 card slot
Micro USB(USB_UART) interface	J2000	Micro USB cable to PC
DB9 connector*	J2003	DB9 to USB connection to PC
FLASH[2]	U1200	SIM8800 EMMC read write
Audio interface	J801	For connecting handset
	J700	For connecting speakers
	J800	For connecting 3.5mm headphones
CAN interface	J2201	Connect to external CAN0，CAN1
8800PHY interface	J2601	Connect MDI on-board Ethernet converter
TYPE_C interface	J1000	TYPE-C cable to PC
TYPE_B interface*	J1500	TYPE-B cable to PCIe

TE board connector	CON101 CON100	Connect SIM8800-TE board connector
	J2301 J2300	Connect SIM8150-TE board connector
	J600 J601	Connect WIFI5-i1465-TE / WIFI6-i1495-TE / WIFI6-i1496-TE board connector
	J2100	Connect TTM2000-TE* / XDSM3276-TE* / CIU98-TE* board connector
	J1902	Connect TLV320AIC3104-TE board connector
	J1905 J1906	Connect KSZ9031-TE / 88Q2112-TE board connector
	J2200	Connect MCU-TE* board connector
	J1700	Connect ANT-COMP-TE-A* / ANT-COMP-TE-R* board connector
Toggle switch	J1	Main power supply switch
	J2101	Reset HSM control selection*
Dial switch	S202	Compatible function selection*
	S1400	PCIe channel switching, USB channel switching
	S2100	SPI channel selection*
	S2101	SPI channel selection*
Tact Switch	S201	SIM8800 reset button
	S200	SIM8800 startup and shutdown buttons
Status indicator	D201	Power supply indication
	D200	GPS status indication*
	D203	SIM8800 module ready indication
	D205	C-V2X status indicator*
	D206	Network status indicator
Antenna interface	J2520 J2521 J2522 J2516 J2515 J2500 J2507 J2508 J2511 J2504 J2503 J2513	12 x IPEX to SMA connector Connect SIM8800-TE、WIFI-TE IPEX antenna interface
TLV320AIC3104-TE		
TLV320AIC3104-TE connector	J0201	Connect 8XQ000-5G+V2X-EVB_V1.02 CODEC_TE
KSZ9031-TE		
KSZ9031-TE connector	J301 J302	Connect 8XQ000-5G+V2X-EVB_V1.02 RGMII_TE
RJ45 connector	J300	Connect standard CAT-5 twisted pair cable
88Q2112-TE		
88Q2112-TE connector	J0802 J0803	Connect 8XQ000-5G+V2X-EVB_V1.02 RGMII_TE
4Pin horizontal in-line connector	J0801	Connect MDI on-board Ethernet converter
SIM8150-TE		

SIM8150-TE connector	J200 J201	Connect 8XQ000-5G+V2X-EVB_V1.02 SIM8150_TE
Micro USB interface	J305	Micro USB cable to PC It is used for SIM8150 at command communication, data transmission, software debugging and firmware upgrade
	J400	Micro USB cable to PC DEBUG debug serial port and BLSP1_ UART dual serial port
SD card slot	J306	SIM8150 TF Card Holder
3x2Pin row needle hole	J1	SIM8150 startup mode selection
	J2	SIM8150 fast boot*
	J3	SIM8150 working mode selection*
Tact Switch	J301	SIM8150 power on button
WIFI5-i1465-TE		
i1465-TE connector	J202 J203	Connect 8XQ000-5G+V2X-EVB_V1.02 WIFI-TE
Antenna interface	J200	WIFI IPEX antenna interface
	J201	BT/WIFI IPEX antenna interface
WIFI6-i1495-TE		
i1495-TE connector	J103 J104	Connect 8XQ000-5G+V2X-EVB_V1.02 WIFI-TE
Antenna interface	J100	BT/WIFI IPEX antenna interface
	J101	WIFI IPEX antenna interface
WIFI6-i1496-TE		
i1496-TE connector	J403 J404	Connect 8XQ000-5G+V2X-EVB_V1.02 WIFI-TE
Antenna interface	J400	BT/WIFI IPEX antenna interface
	J401	WIFI IPEX antenna interface
TTM2000-TE*		
TTM2000-TE connector	J0401	Connect 8XQ000-5G+V2X-EVB_V1.02 HSM_TE
XDSM3276-TE*		
XDSM3276-TE connector	J0601	Connect 8XQ000-5G+V2X-EVB_V1.02 HSM_TE
CIU98-TE*		
CIU98-TE connector	J0700	Connect 8XQ000-5G+V2X-EVB_V1.02 HSM_TE
MCU-TE*		
ANT-COMP-TE-A*		
ANT-COMP-TE-R*		

NOTE

"*"：To be developed.
"[1]"：If the SIM8800-TE board is inserted into 8XQ000-5G+V2X-EVB_V1.02 after,the Micro USB interface of SIM8800-TE board will fail.
"[2]"：Flash integrated in 8XQ000-5G+V2X-EVB_V1.02, there is no external interface.

2.4 EVB Kit Accessories

All accessories of the 8XQ000-5G+V2X-EVB_V1.02 kit are shown in the follow figure. Please confirm all accessories are complete.(Note: accessories are subject to actual demand）

Figure 3: Accessories of the EVB kit

Table 3: The 8XQ000-5G+V2X-EVB_V1.02 kit list(Note: accessories are subject to actual demand）

Items	Description	Quantity
PCBA	8XQ000-5G+V2X-EVB_V1.02	1
Cables	Type-C USB 3.1Data cable	1
	RF cable SMA-IPEX-4 DC-6GHZ	11
	Micro 5 pins USB 2.0 Data cable	1
Antennas	RF antennas	11
Adapter	Adapter 12V/6A	1
	Adapter AC line	1

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

Table 4: PN of SIM8800 Serial EVB kit

Kit	Part number
8XQ000-5G+V2X-EVB_V1.02	S2-AVV

Table 5: PN of SIM8800 Serial function board

Function board description	Part number	Optional reference
SIM8800-TE	S2-10AVG	1
SIM8150-TE	S2-10AVC	1
WIFI5-i1465-TE	\	1 out of 3
WIFI6-i1495-TE	\	
WIFI6-i1496-TE	\	
TTM2000-TE*	\	1 out of 3
XDSM3276-TE*	\	
CIU98-TE*	\	
TLV320AIC3104-TE	\	1
88Q2112-TE	\	1
KSZ9031-TE	\	1
MCU_TE*	\	1
ANT-COMP-TE-A*	S2-AVW	1 out of 2
ANT-COMP-TE-R*		

NOTE

"*"：To be developed.

3 Interface Applications

3.1 TE plate butt joint

8XQ000-5G+V2X-EVB_ V1.02 supports 8XQ000 series TE boards, including SIM8800-TE, SIM8150-TE, encrypted TE(TTM2000-TE / XDSM3276-TE / CIU98-TE), WIFI-TE (WIFI5-i1465-TE / WIFI6-i1495-TE / WIFI6-i1496-TE), Ethernet TE (KSZ9031-TE / 88Q2112-TE), audio TE (TLV320AIC3104-TE), MCU-TE, skyline compensation TE (ANT-COMP-TE-A / ANT-COMP-TE-R).
Connect to each TE board through B2B connector. Using EVB board, customers can easily design products. 8XQ000-5G+V2X-EVB_V1.02 and B2B connectors are shown in the figure below.

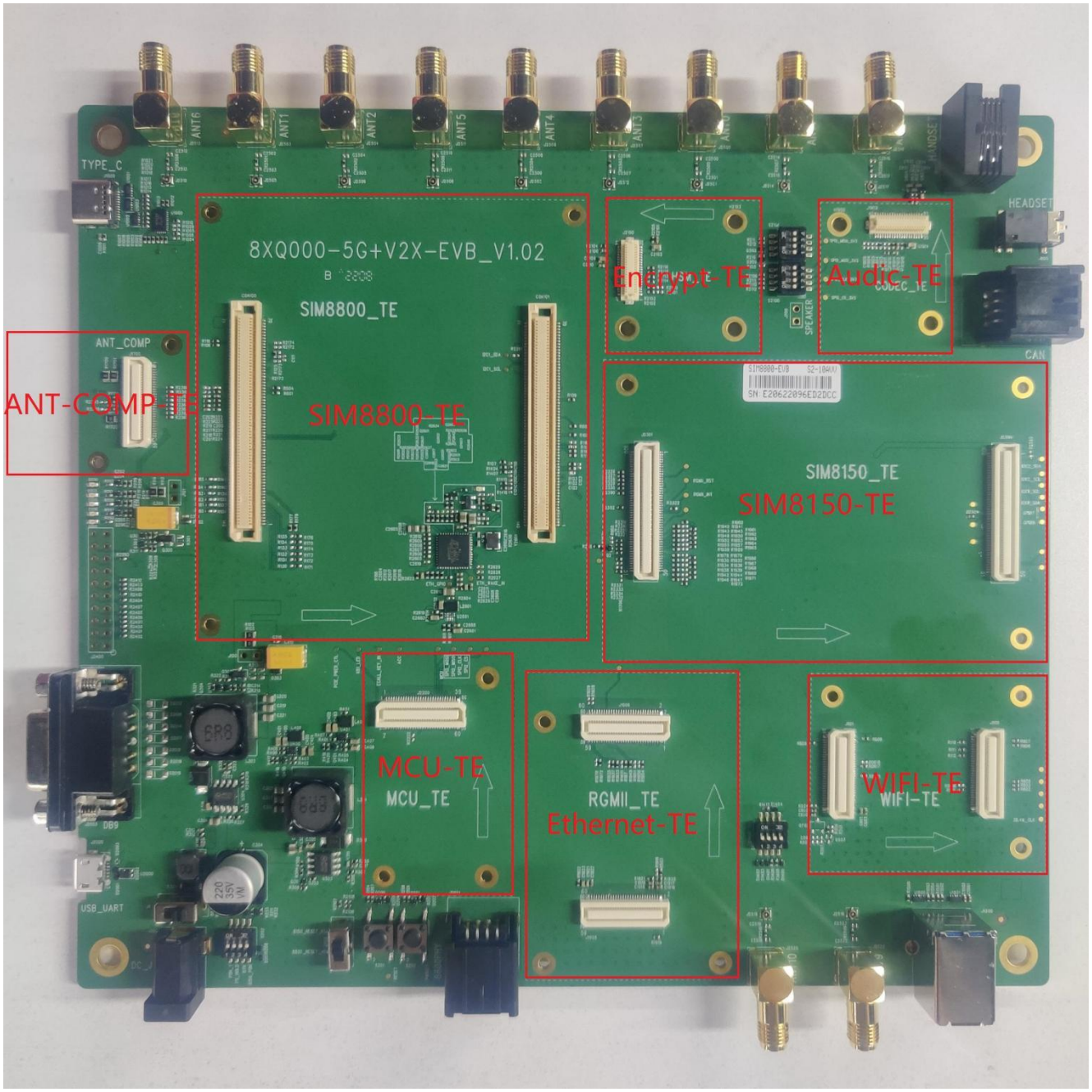

Figure 4: 8XQ000-5G+V2X-EVB_V1.02 TE docking and front view

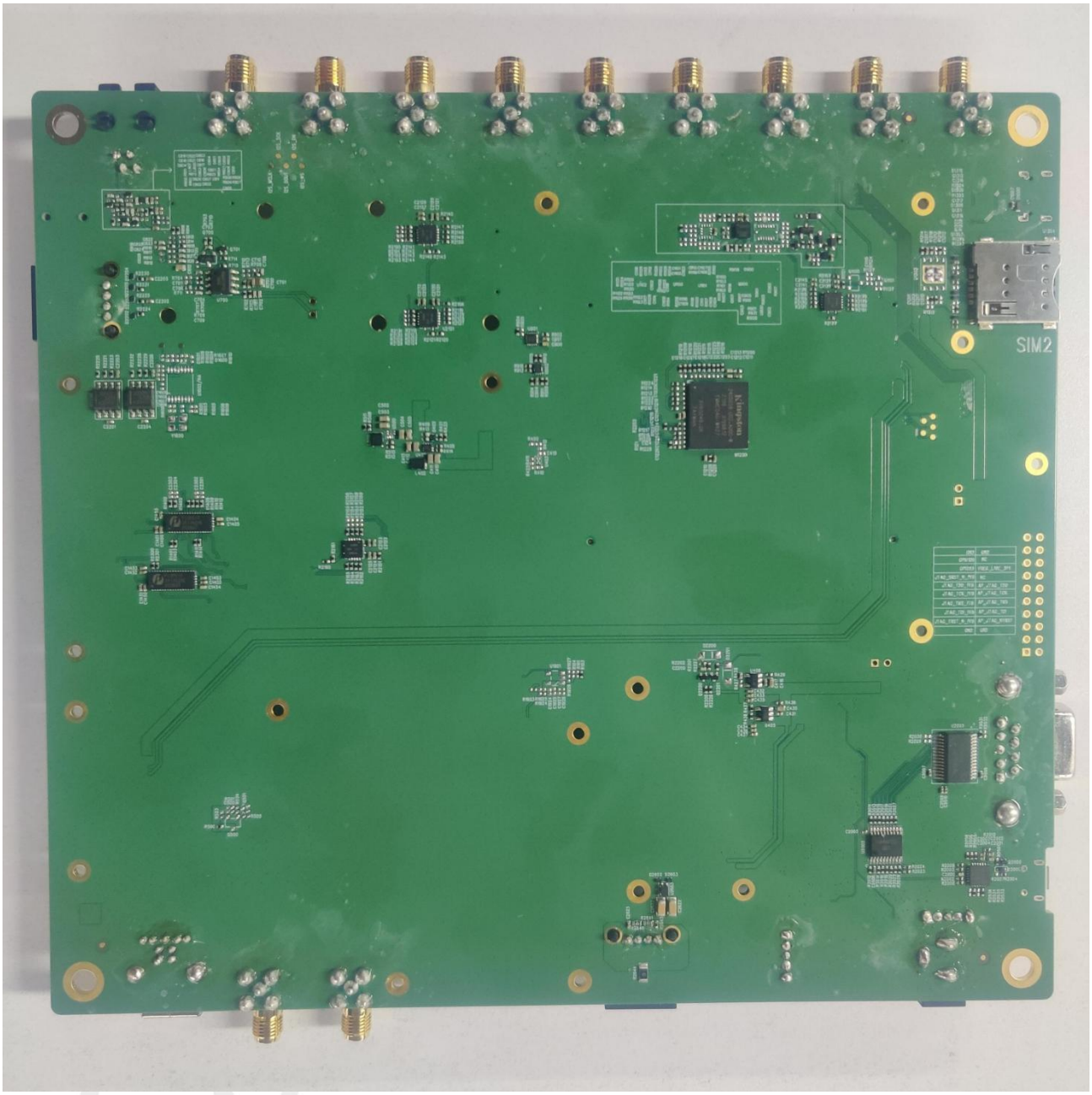

Figure 5: The bottom view of 8XQ000-5G+V2X-EVB_V1.02

3.2 Power Supply

12V/6A power adapter through power supply input interfaceDC_ JK (J300) for power supply 8XQ000-5G+V2X-EVB_V1.02. After inserting the adapter, turn on and off the main power supply through the dial switch J1. The following figure shows the power supply input interface J300 and the dial switch J1.

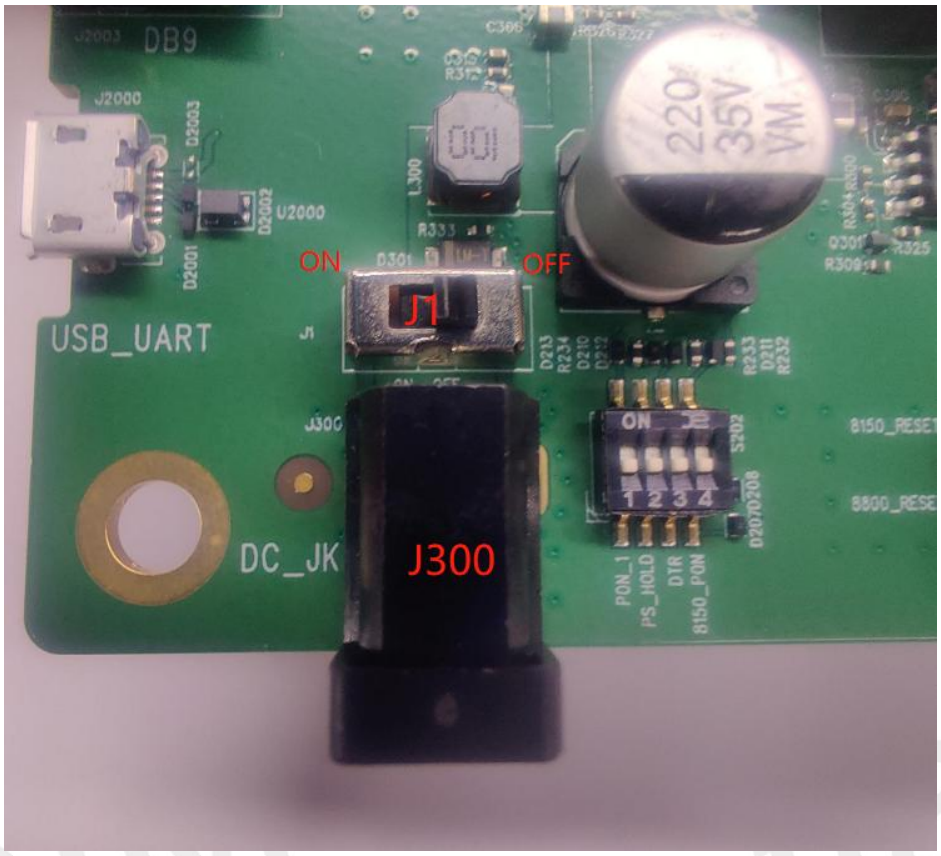

Figure 6: Power supply input interface

3.3 SIM card socket

8XQ000-5G+V2X-EVB_V1.02 provides a SIM card socket (U1304), which corresponds to the SIM2 interface of SIM8800. The CD pin signal of SIM card slot is low by default. After inserting the SIM card, the CD pin signal changes to high level. The following figure shows the SIM card socket and its pins.

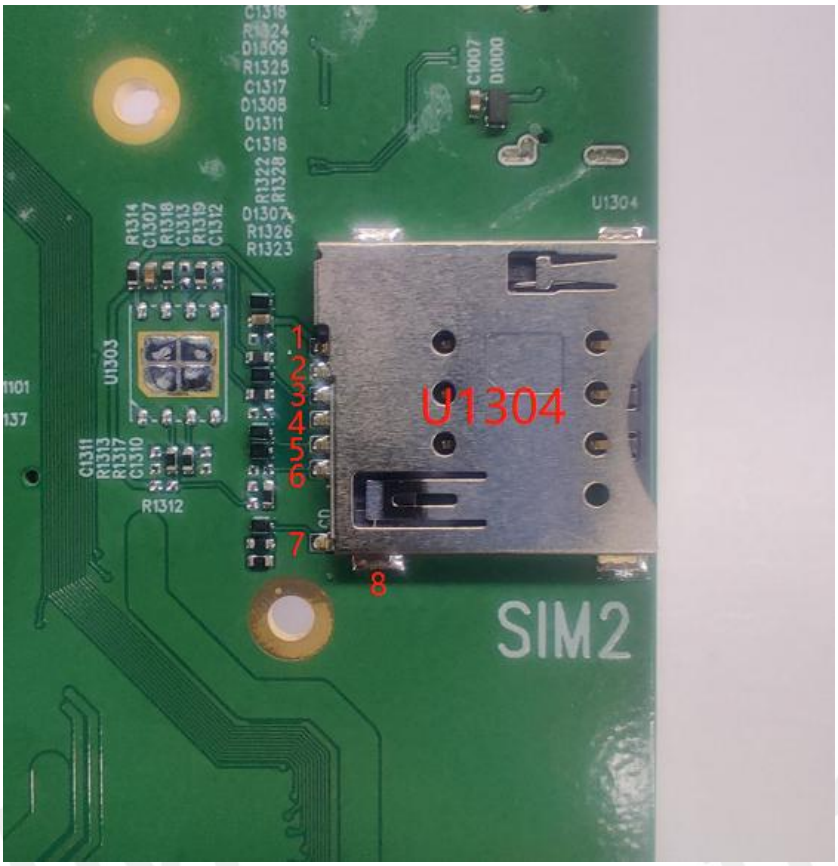

Figure 7: SIM card socket and its pin

Table 6: SIM card socket pin definition

Pin no.	Pin name	IO	Functional description
1	VCC	PI	SIM card power supply
2	RST	DO	SIM card reset
3	CLK	DO	SIM card clock
4	GND	GND	GND
5	VPP	-	-
6	I/O	DIO	SIM card data signal
7	CD	DI	SIM card hot plug detection signal
8	GND	GND	Shell

Refer to <SIM8800 Series_AT Command Manual_V1.00> for the specific operation of at command corresponding to the function of SIM card.

The following figure shows the AT instruction table of SIM card.

Table 7: SIM card partial instruction set

	AT command	Description
1	AT+UIMHOTSWAPON?	Turn on / off the hot plug function (restart is required to take effect)
2	AT$QCSIMAPP=0	Switch to SIM1
3	AT$QCSIMAPP=1	Switch to SIM2
4	AT+UIMHOTSWAPLEVEL=0,1	SIM1 card low level detection

5	AT+UIMHOTSWAPLEVEL=1,1	SIM1 card high level detection
6	AT+UIMHOTSWAPLEVEL=0,2	SIM2 card low level detection
7	AT+UIMHOTSWAPLEVEL=1,2	SIM2 card high level detection

NOTE

SIM8800 series modules support DSDA, and SIM1 is selected by default after startup.

3.4 Micro USB interface

Plug in USB_UART(J2000) using Micro USB cable is connected to PC, and Micro USB realizes dual serial ports of SIM8800 UART1 and debug serial ports. The following figure shows the Micro USB interface.

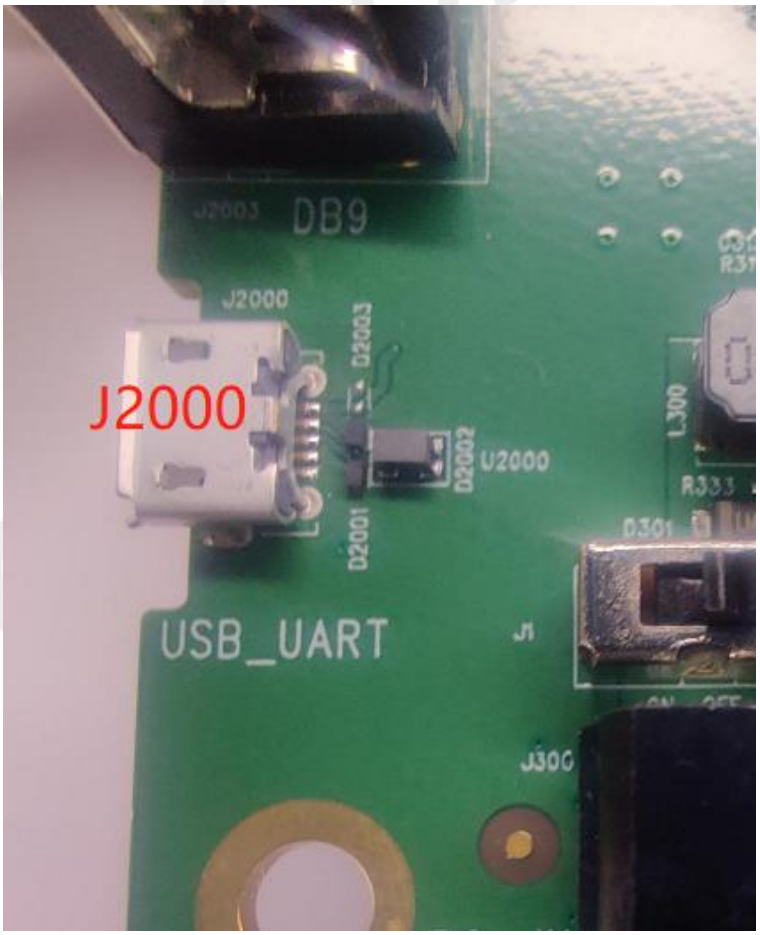

Figure 8: Micro USB interface

3.5 DB9 interface

Use the USB to DB9 connection cable to plug into the DB9(J2003) interface and connect to the PC. the following figure shows the DB9 interface.

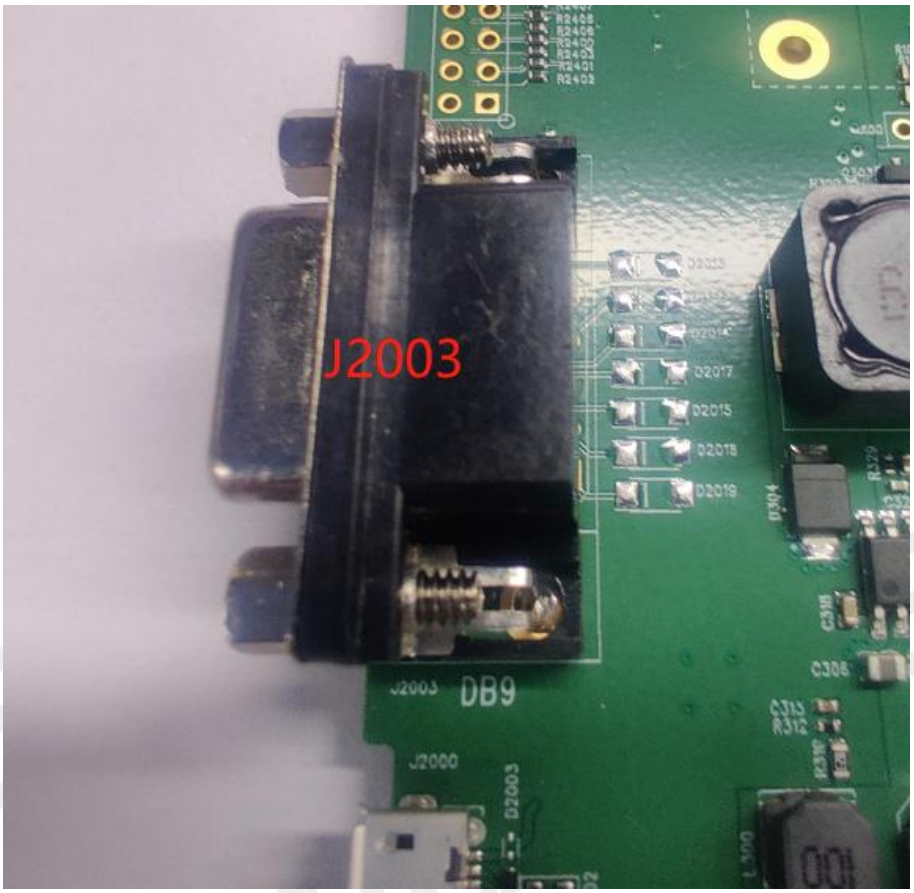

Figure 9: DB9 interface

3.6 FLASH

SIM8800 supports 4-bit EMMC read / write FLASH(U1200), which is integrated in 8XQ000-5G+V2X-EVB_ V1.02, the following figure is a readable and writable FLASH.

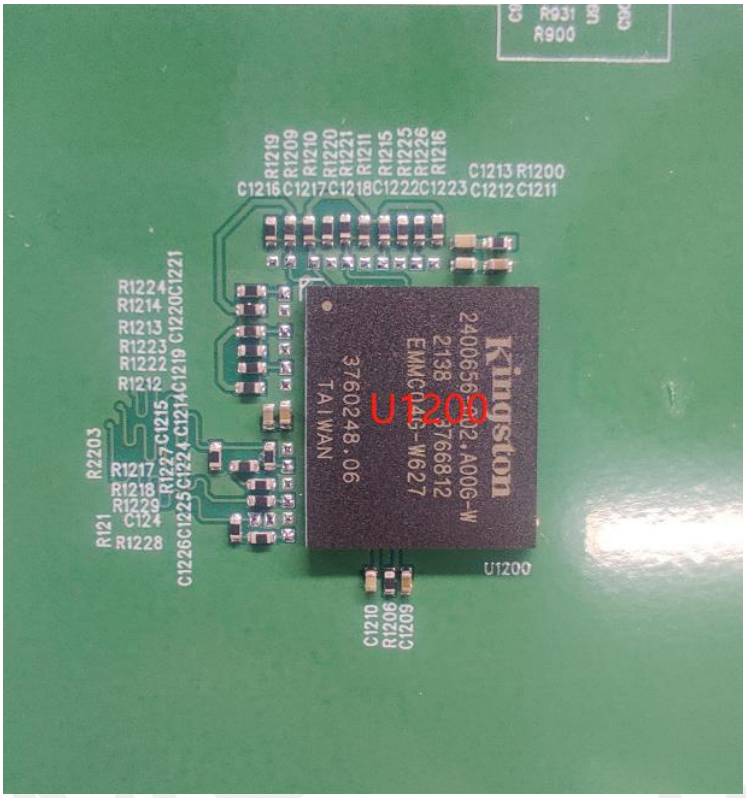

Figure 10: FLASH

3.7 Audio interface

8XQ000-5G+V2X-EVB_V1.02 audio interface includes RJ11 connector(HANDSET),3.5mm earphone socket (J800), 2Pin row pin hole (SPEAKER) (J700). The following figure shows the audio interface.

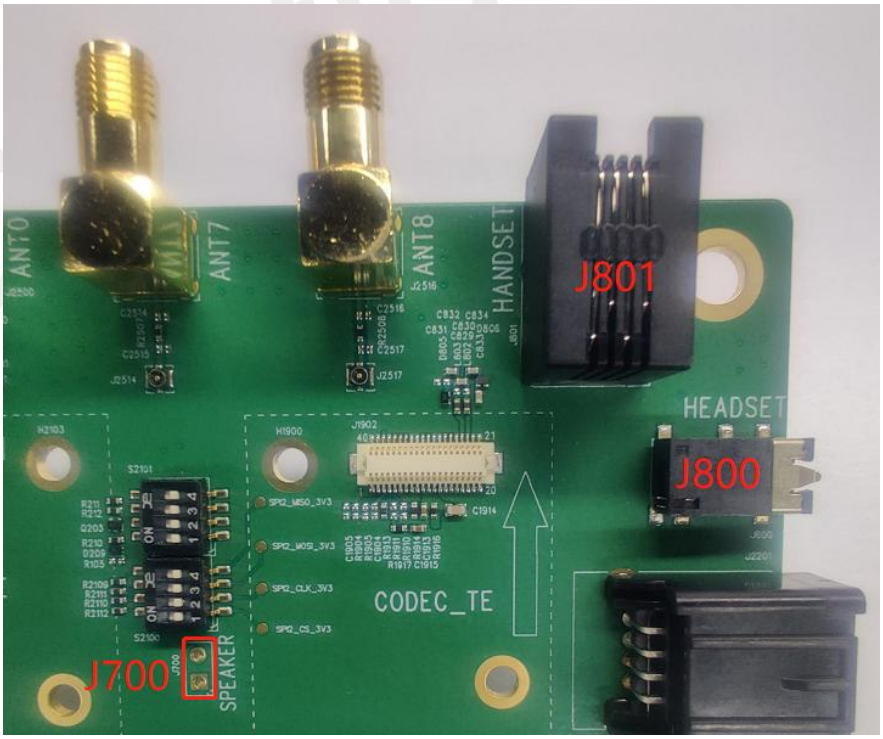

Figure 11: Audio interface

3.8 CAN interface

Connect to external CAN1 and CAN2 through 4Pin horizontal in-line connector(J2201). The following figure shows the CAN interface.

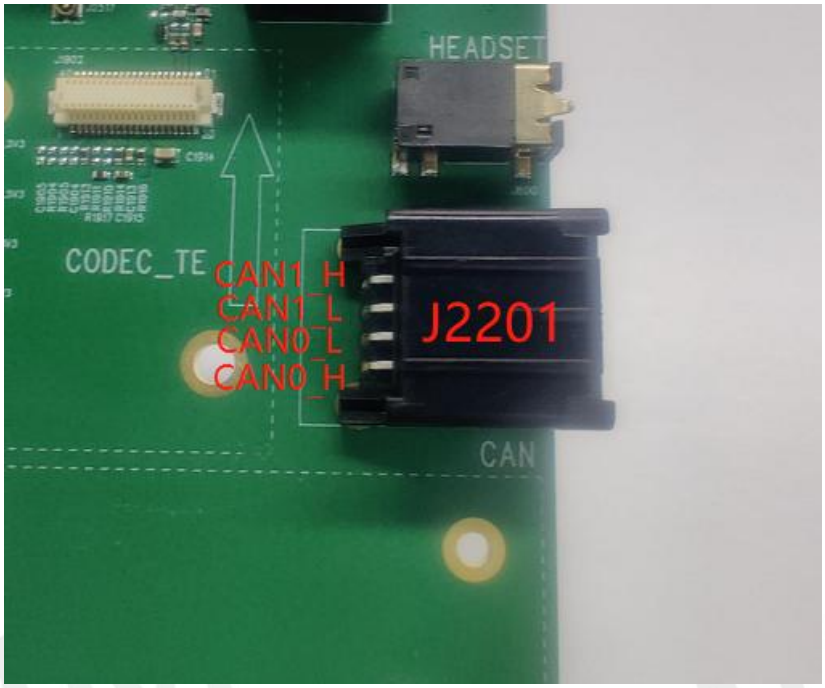

Figure 12: CAN interface

3.9 8800PHY interface

8800PHY(J2601) is 8XQ000-5G+V2X-EVB_V1.02 integrates the MDI interface of 88Q2112, which is used to connect the on-board ethernet converter. The figure below shows the 8800PHY interface.

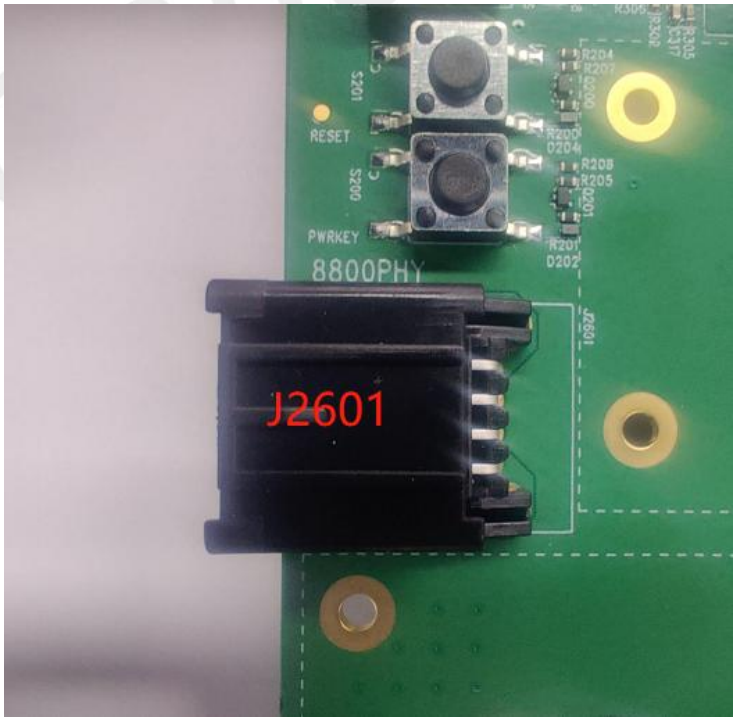

Figure 13: 8800PHY interface

3.10 TYPE_C interface

Insert TYPE_C interface (J1000) using TYPE-C connector is connected to PC, and the figure below shows TYPE_C interface.

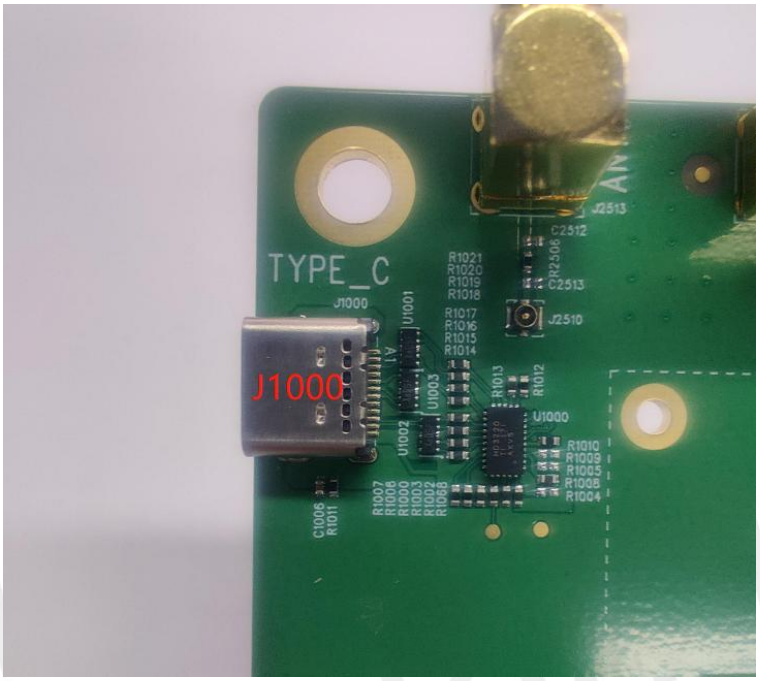

Figure 14: TYPE_C interface

3.11 TYPE_B interface

SIM8800 PCIe 3.0 port can be used only after the PCIe channel is switched through the dial switch. The figure below shows TYPE_ B interface(J1500).

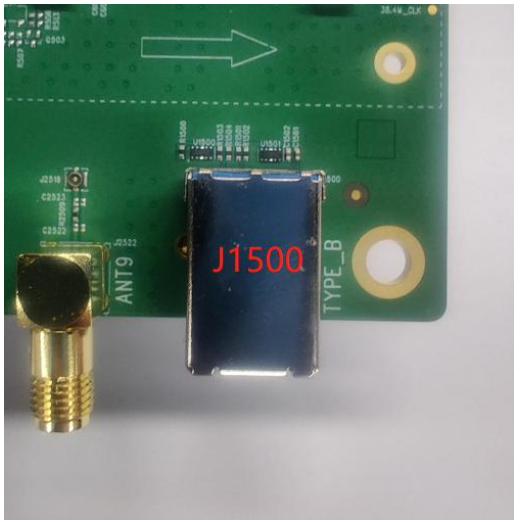

Figure 15: TYPE-B interface

3.12 Toggle switch

8XQ000-5G+V2X-EVB_V1.02 has two toggle switches, J1 and J2101, of which J1 is the main power switch and J2101 is used as the reset channel selection of encrypted TE(not yet developed). The following figure is the toggle switch.

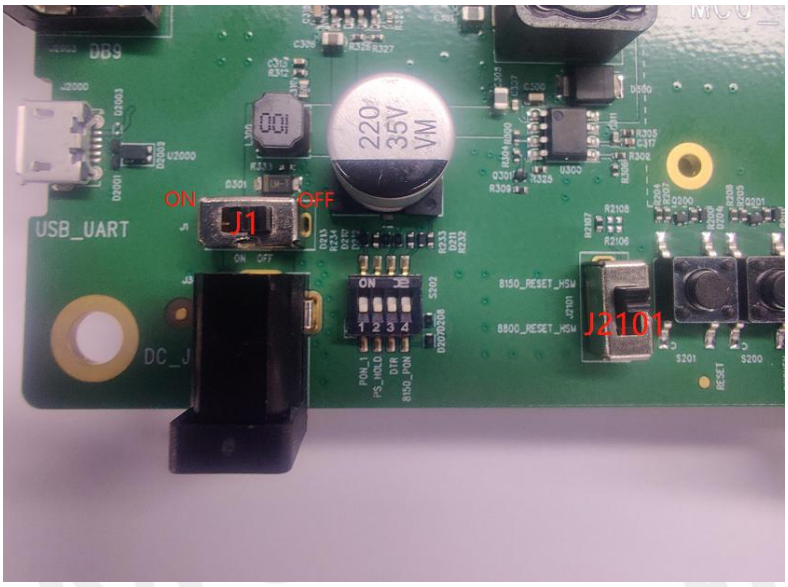

Figure 16: Toggle switch

3.13 Dial switch

8XQ000-5G+V2X-EVB_V1.02 has four dialing switches, S202, S1400, S2100 and S2101. S202 is used for SIM8800 compatible function selection, which is unnecessary for customers,all four pins need to be turned off, S1400 is used for PCIe channel selection and USB channel selection, S2100 and S2101 are used for SPI channel and level selection, which is unnecessary for customers,all eight pins need to be turned off. The following figure is the dialing switch.

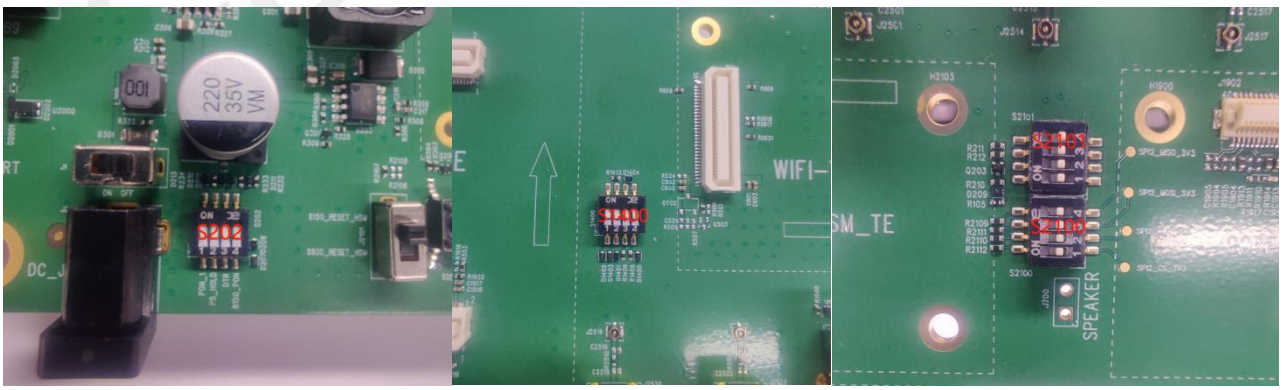

Figure 17: Dial switch

The S1400 channel selection dialing code is shown in the table below.

Table 8: S1400 dialing selection

Dial switch channel	ON/OFF	Functional description
1	\	Not used
2	OFF	SIM8800 USB2.0/USB3.0 connect TYPE_C
	ON	SIM8800 USB2.0/USB3.0 connect SIM8150
3 4	If 3 is OFF，4 is OFF	SIM8800 PCIe no connect
	If 3 is ON，4 is OFF	SIM8800 PCIe connect SIM8150 PCIe
	If 3 is OFF，4 is ON	SIM8800 PCIe connect TYPE_B
	If 3 is ON，4 is OFF	SIM8800 PCIe connect WIFI-TE

3.14 Tact Switch

8XQ000-5G+V2X-EVB_V1.02 provides two touch switches, S200 and S201, of which S200 is used for the start-up and shutdown of SIM8800 module and S201 is used for the reset of SIM8800 module. The touch switch is shown in the figure below.

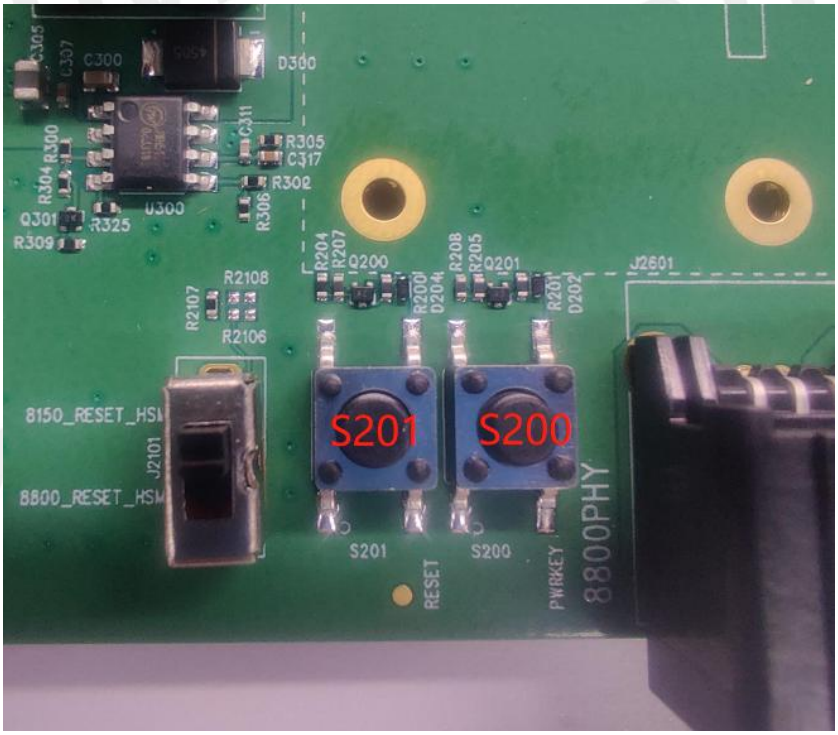

Figure 18: Tact switch

Table 9: Tact switch description

	Name	Description
S201	RESET	Press and hold RESET for more than 2 seconds in the power on state, and then release to reset the SIM8800

S200	PWRKEY	Press and hold PWRKEY for more than 2 seconds to start the SIM8800 in the shutdown state In the power on state, press PWRKEY for more than 2 seconds and release it to shut down the SIM8800

3.15 Status indicator

8XQ000-5G+V2X-EVB_V1.2 have 5 status indicators.
The following figure shows five status indicators.

Figure 19: Indicator light

Table 10: Indicator description

LEDs name	LEDscolor	Description
D201	Red	8XQ000-5G+V2X-EVB_V1.02 power supply indicator Always on：powered on Off：no power supply
D200*	Yellow green	GPS working status indication
D203	Yellow green	SIM8800 module ready indication Always on：Ready Off：Not ready
D205*	Yellow green	C-V2X working state indication
D206	Yellow green	Network status indicator Always on：Search network 100ms on，100ms off：Register as 5G on the network 200ms on，200ms off：Register as 4G on the network 800ms on，800ms off：Register as 3G on the network Off：Shutdown / hibernation

NOTE

"*"：To be developed.

3.16 Antenna interface

8XQ000-5G+V2X-EVB_V1.02 provides 12 IPEX to SMA antenna interfaces, J2500, J2503, J2504, J2507, J2508, J2511, J2513, J2515, J2516, J2522, J2520 and J2521, which are used to connect IPEX interfaces on SIM8800-TE and WIFI-TE.

The figure below shows the antenna SMA interface.

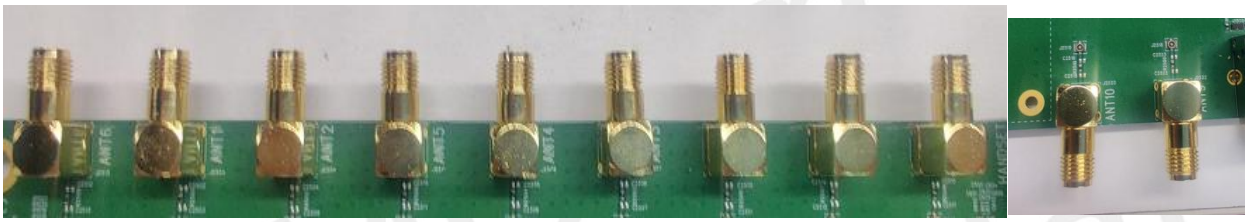

Figure 20: SMA antenna interface

The figure below shows the antenna IPEX interface.

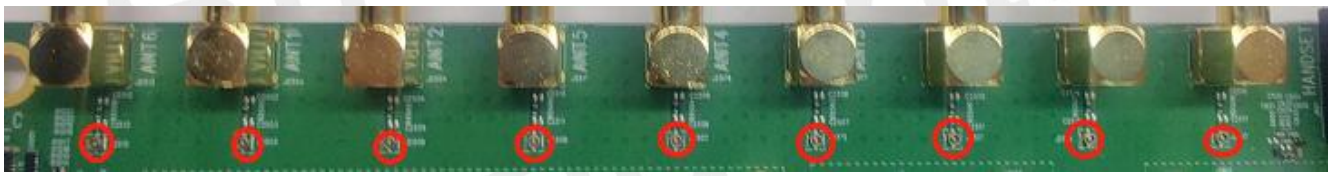

Figure 21: IPEX antenna interface

Users can use RF cables to connect the SIM8800-TE board J601-J609 IPEX port and WIFI-TE board IPEX port to 8XQ000-5G+V2X-EVB_V1.02 has 12 antenna IPEX interfaces, and the antenna interface assembly drawing is shown in the figure below.

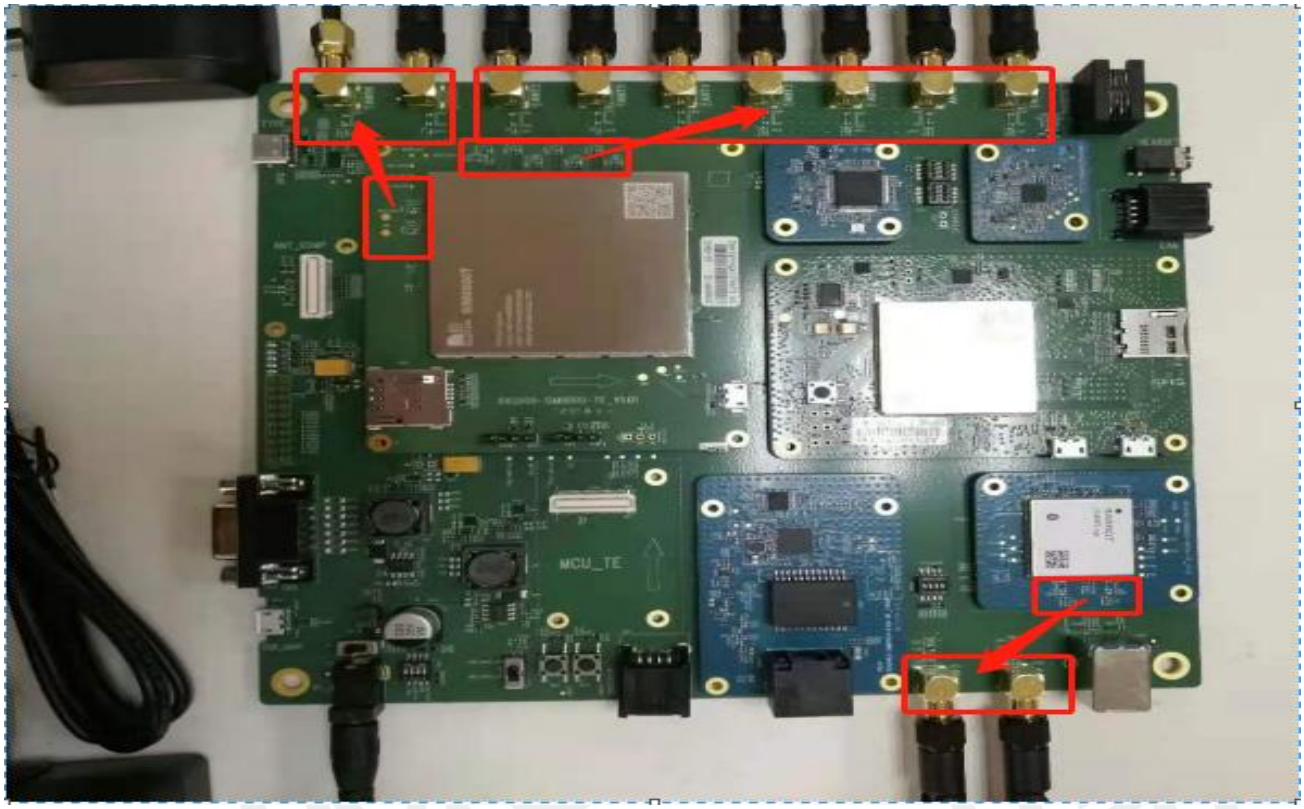

Figure 22: Antenna interface assembly drawing

3.17 Test point

8XQ000-5G+V2X-EVB_V1.02 has many test points.Only the test points of I2S and I2C are listed here. The test points of SIM8800 I2S and I2C are shown in the figure below.

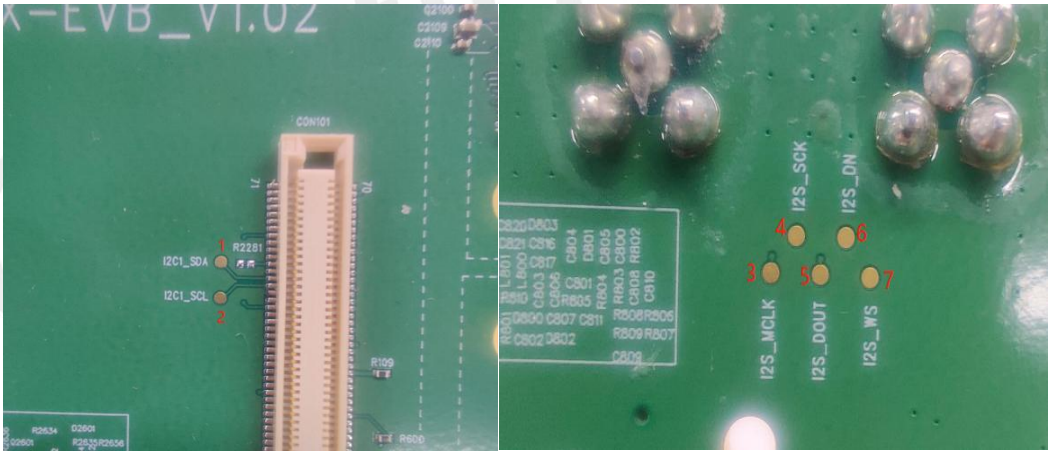

Figure 23: SIM8800 I2S and I2C test points

Table 11: SIM8800 I2C and I2S test point definition

Pin no.	Pin name	Functional description
1	I2C1_SDA	I2C1 data signal
2	I2C1_SCL	I2C1 clock signal
3	I2S_MCLK	I2S master clock output
4	I2S_SCK/PCM_CLK	I2S/PCM clock output

5	I2S_DOUT/PCM_DOUT	I2S/PCM data output
6	I2S_DIN/PCM_DIN	I2S/PCM data input
7	I2S_WS/PCM_SYNC	PCM frame synchronization signal

SIM8150-TE I2C test points are shown in the figure below.

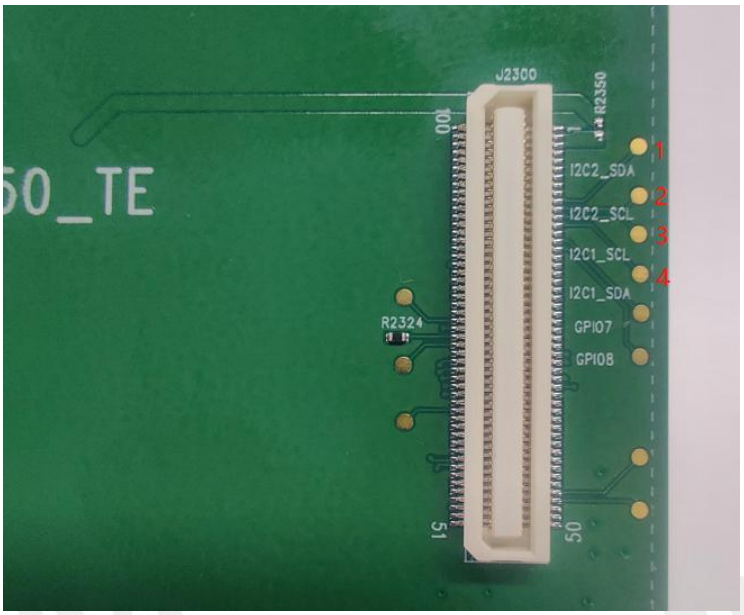

Figure 24: SIM8150 I2C test points

Table 12: SIM8150 I2C test point definition

Pin no.	Pin name	Functional description
1	I2C2_SDA	I2C2 data signal
2	I2C2_SCL	I2C2 clock signal
3	I2C1_SDA	I2C1 data signal
4	I2C1_SCL	I2C1 clock signal

4 Operation Procedures

4.1 Driver Installation

4.1.1 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 after connecting 8XQ000-5G+V2X-EVB_V1.02 Micro USB .

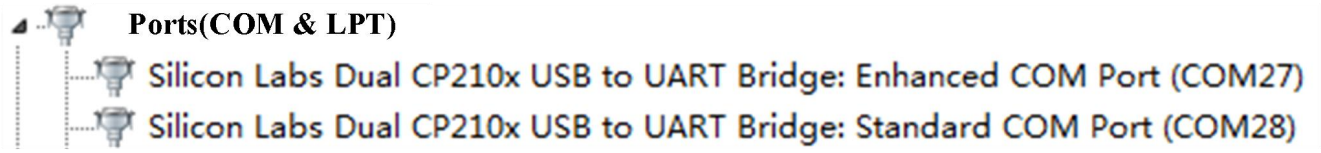

Figure 25: USB to UART port

Table 13: USB to UART port

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

4.1.2 Module Driver Installation

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

After obtaining the SIMComSIMCOM_5G_Windows_DriverInstall_V1.0x.exedriver,and installing the driver correctly, there will be 4 virtual USB ports under the device manager port.

Table 14: 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.

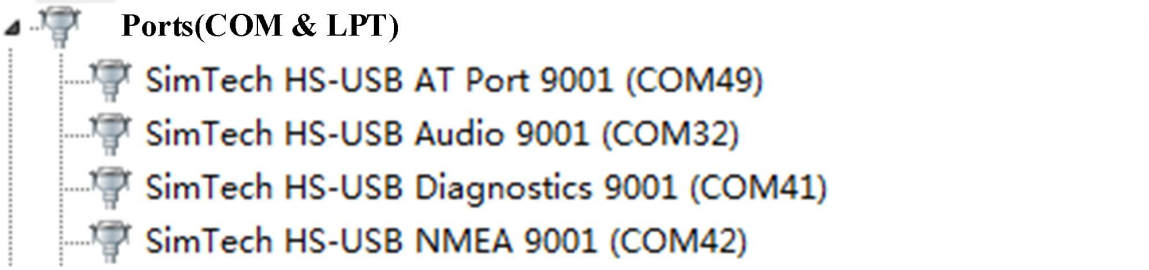

Figure 26: USB port

4.1.3 Firmware Update Procedure

Before power on, short circuit the BOOT and the second pin on SIM8800-TE J102 to make SIM8800 enter forced download mode and connect 8XQ000-5G+V2X-EVB_V1.02 TYPE_ C interface.

For how to make the module enter the forced download mode, please refer to chapter 4.3.1.

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 SIM8800 MQDL(Factory) V1.xx.exe, click Configuration.

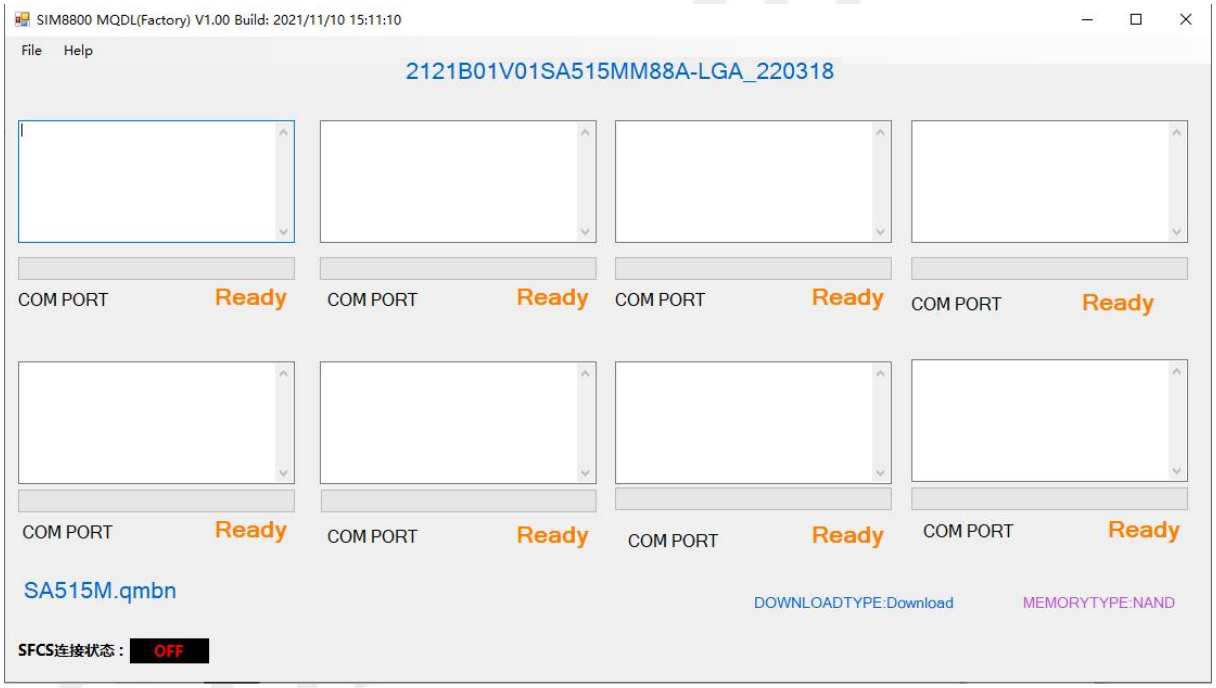

Figure 27: MQDL main page

(2).Click the "File / Configuration" button in the tool menu bar, and then select the firmware path.
SFCS sets whether MES is connected, and MES parameters are set according to SN or IMEI transit.
Note: For factory code setting, refer to tool config.XML comments, such as
<!--0:SIM,1:SINTAVE,2:DBG,3:BYD,4:SPROCOMM,5:TOPWISE,6:BIRD,7:HEG ,8:BSJ-->

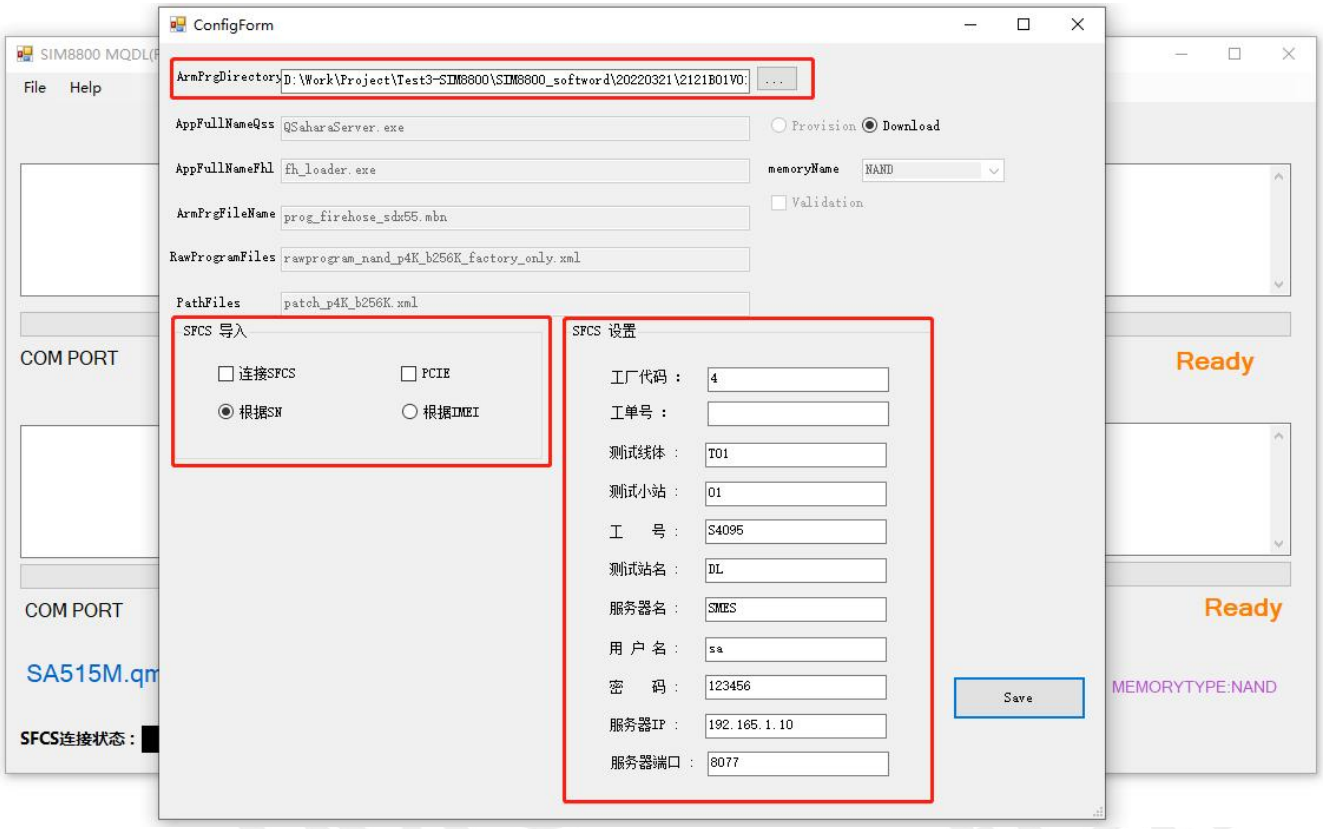

Figure 28: Select firmware path

(3) The tool will automatically detect the module port and start to download.

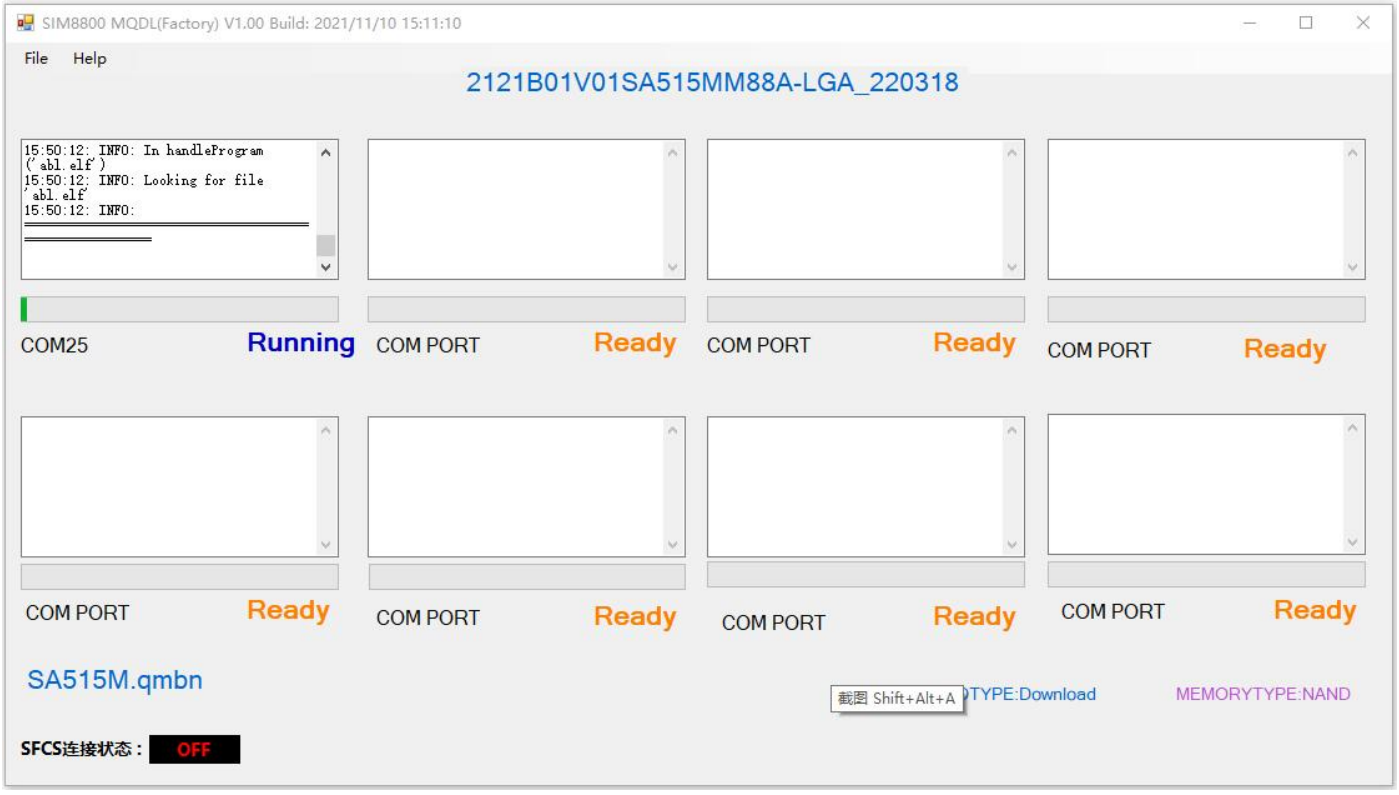

Figure 29: start download

(4).Update success

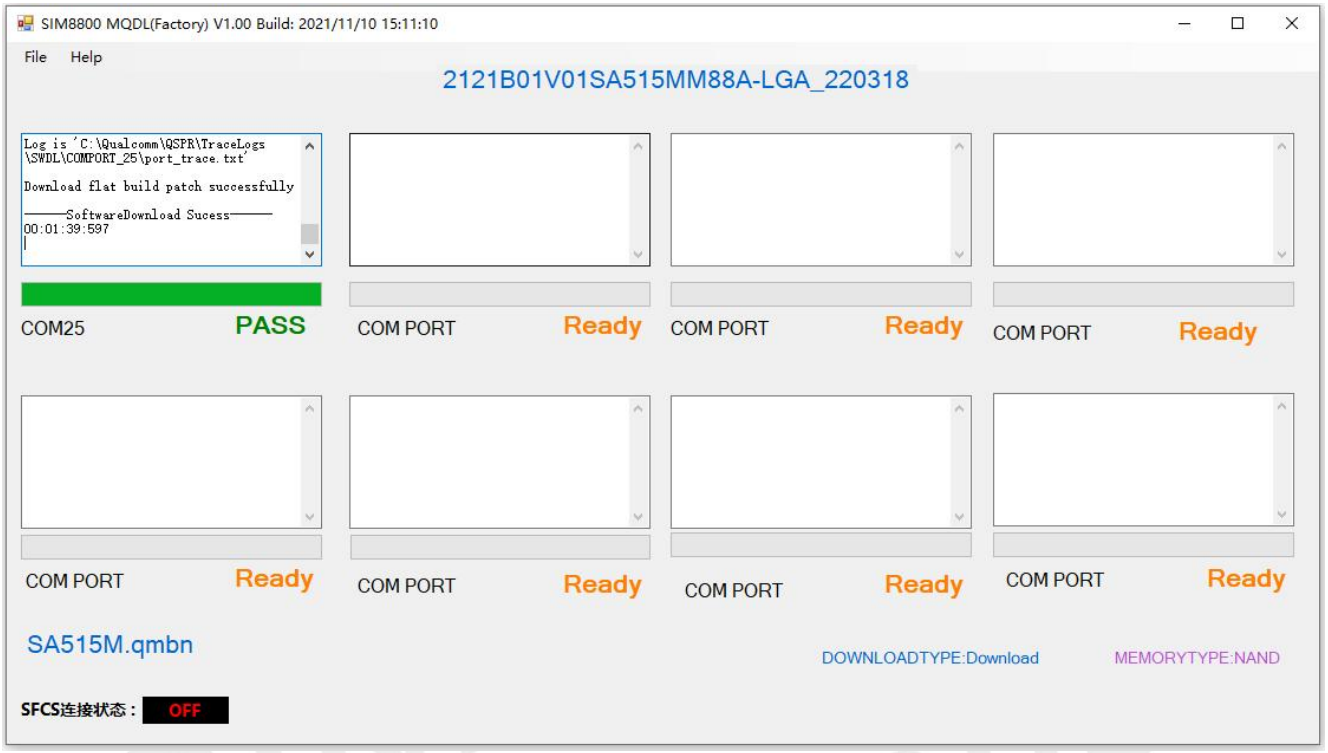

Figure 30: Update succeed

4.2 AT Command Communication

See <SIM8800 Series_AT Command Manual_V1.00> for specific operation of at instruction.

4.2.1 UART Serial Communication*

SIM8XQ000 Serial 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
SIM8XQ000 Serial module supports multiple serial data frame formats. The default data frame format is 8 data bits, 1 stop bit, and no parity bit.

Table 15: 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 16: UART format setting

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
SIM8XQ000 Serial 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 17: 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 18: 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 SIM8XQ000 Serial module adopts RTS / CTS flow control mode, but the full-featured serial port of SIM8XQ000 Serial 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 19: 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.

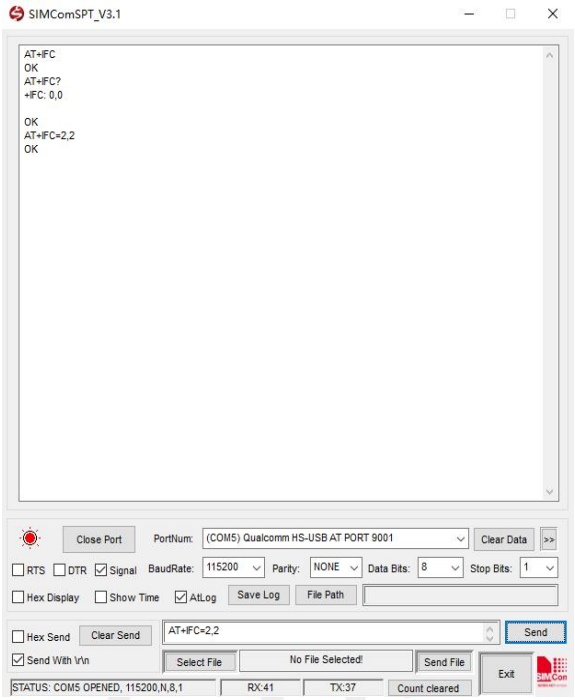

Figure 31: UART flow control method 1

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

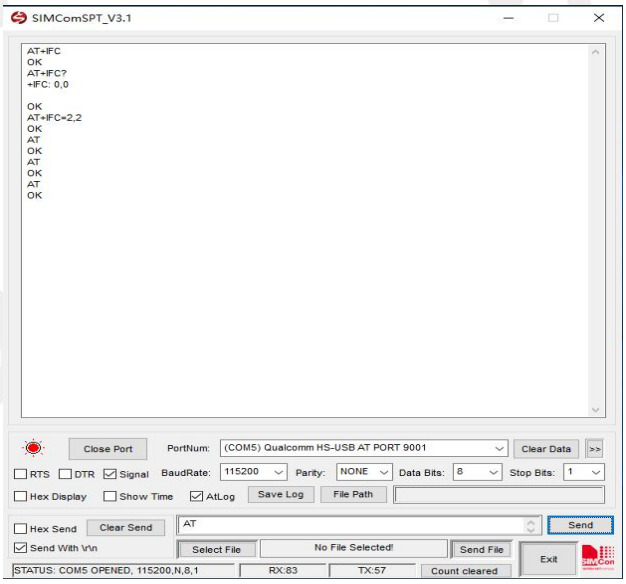

Figure 32: UART flow control method 2

4.2.2 USB Communication

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

4.3 Terms and Abbreviations

Table 20: 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
NMEA	National Marine Electronics Association
ZIF	Zero Intermediate Frequency
(U)SIM	Universal Subscriber Identity Module
UART	Universal Asynchronous Receiver Transmitter

4.4 Safety Caution

Table 21: 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.