5GDM03-EV EVB
User Guide

5G Module Series

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Safety Information

The following safety precautions must be observed during all phases of operation, such as usage, service or repair of any terminal or mobile incorporating the module. Manufacturers of the terminal should notify users and operating personnel of the following safety information by incorporating these guidelines into all manuals of the product. Otherwise, Quectel assumes no liability for customers' failure to comply with these precautions.

	Full attention must be paid to driving at all times in order to reduce the risk of an accident. Using a mobile while driving (even with a handsfree kit) causes distraction and can lead to an accident. Please comply with laws and regulations restricting the use of wireless devices while driving.
	Switch off the terminal or mobile before boarding an aircraft. The operation of wireless appliances in an aircraft is forbidden to prevent interference with communication systems. If there is an Airplane Mode, it should be enabled prior to boarding an aircraft. Please consult the airline staff for more restrictions on the use of wireless devices on an aircraft.
	Wireless devices may cause interference on sensitive medical equipment, so please be aware of the restrictions on the use of wireless devices when in hospitals, clinics or other healthcare facilities.
	Terminals or mobiles operating over radio signal and cellular network cannot be guaranteed to connect in certain conditions, such as when the mobile bill is unpaid or the (U)SIM card is invalid. When emergency help is needed in such conditions, use emergency call if the device supports it. In order to make or receive a call, the terminal or mobile must be switched on in a service area with adequate cellular signal strength. In an emergency, the device with emergency call function cannot be used as the only contact method considering network connection cannot be guaranteed under all circumstances.
	The terminal or mobile contains a transceiver. When it is ON, it receives and transmits radio frequency signals. RF interference can occur if it is used close to TV sets, radios, computers or other electric equipment.
	In locations with explosive or potentially explosive atmospheres, obey all posted signs and turn off wireless devices such as mobile phone or other terminals. Areas with explosive or potentially explosive atmospheres include fuelling areas, below decks on boats, fuel or chemical transfer or storage facilities, and areas where the air contains chemicals or particles such as grain, dust or metal powders.

About the Document

Revision History

Version	Date	Author	Description
-	2023-06-21	Kimi CHEN	Creation of the document
1.0.0	2023-06-21	Kimi CHEN	Preliminary

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1 Introduction

This user guide describes the application details of 5GDM03-EV EVB (evaluation board), which is an assistant tool for developers to develop applications and test basic functionalities of applicable modules.

1.1. Applicable Modules

For details about the applicable modules of this EVB, see *document [1]*.

1.2. Special Mark

Table 1: Special Mark

Mark	Definition
*	Unless otherwise specified, when an asterisk (*) is used after a function, feature, interface, pin name, AT command, or argument, it indicates that the function, feature, interface, pin, AT command, or argument is under development and currently not supported; and the asterisk (*) after a model indicates that the sample of such model is currently unavailable.

2 Product Overview

2.1. Top and Bottom Views

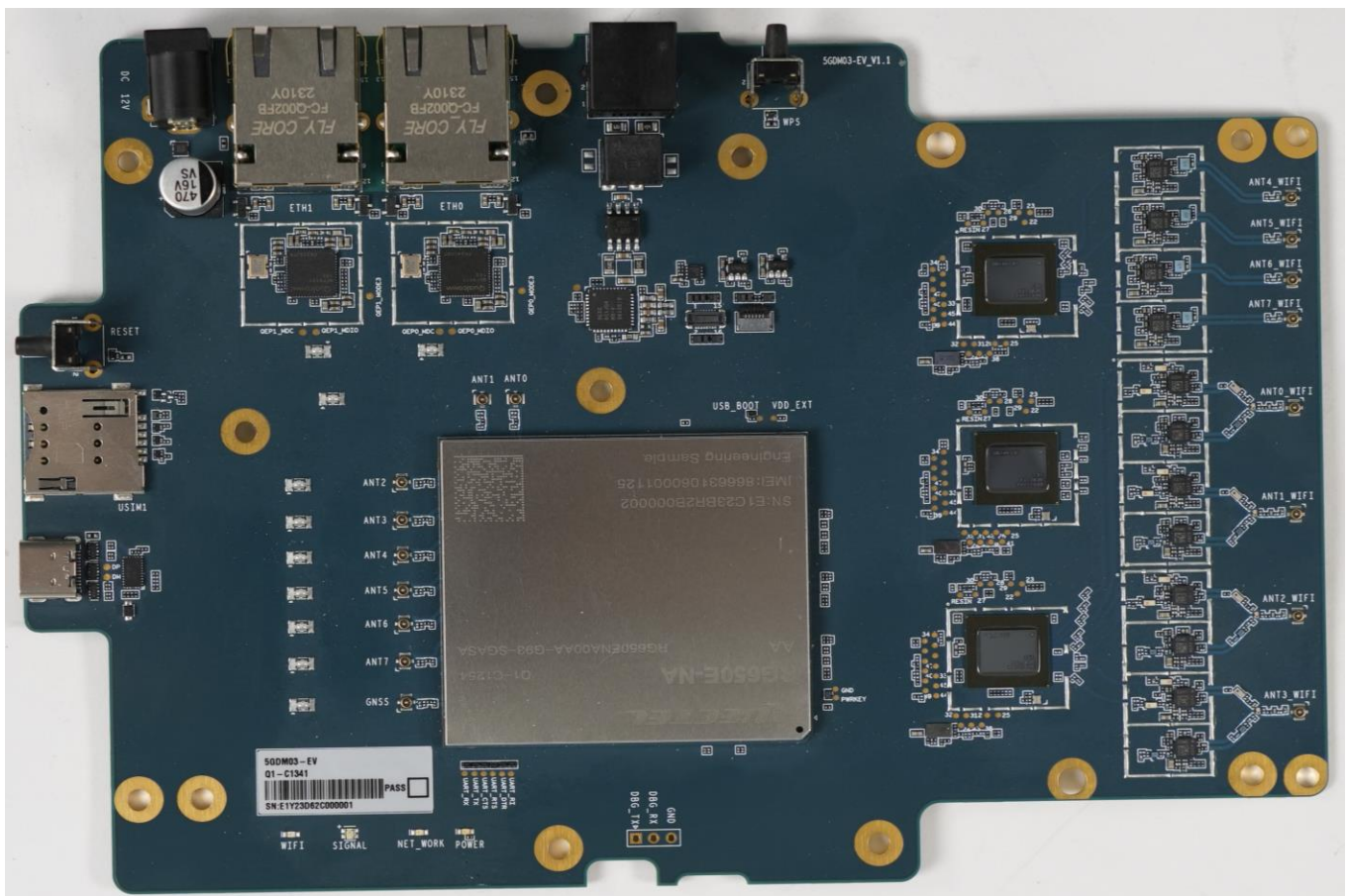The size of 5GDM03-EV EVB is 187 mm × 130 mm, and the top and bottom views are shown as below:
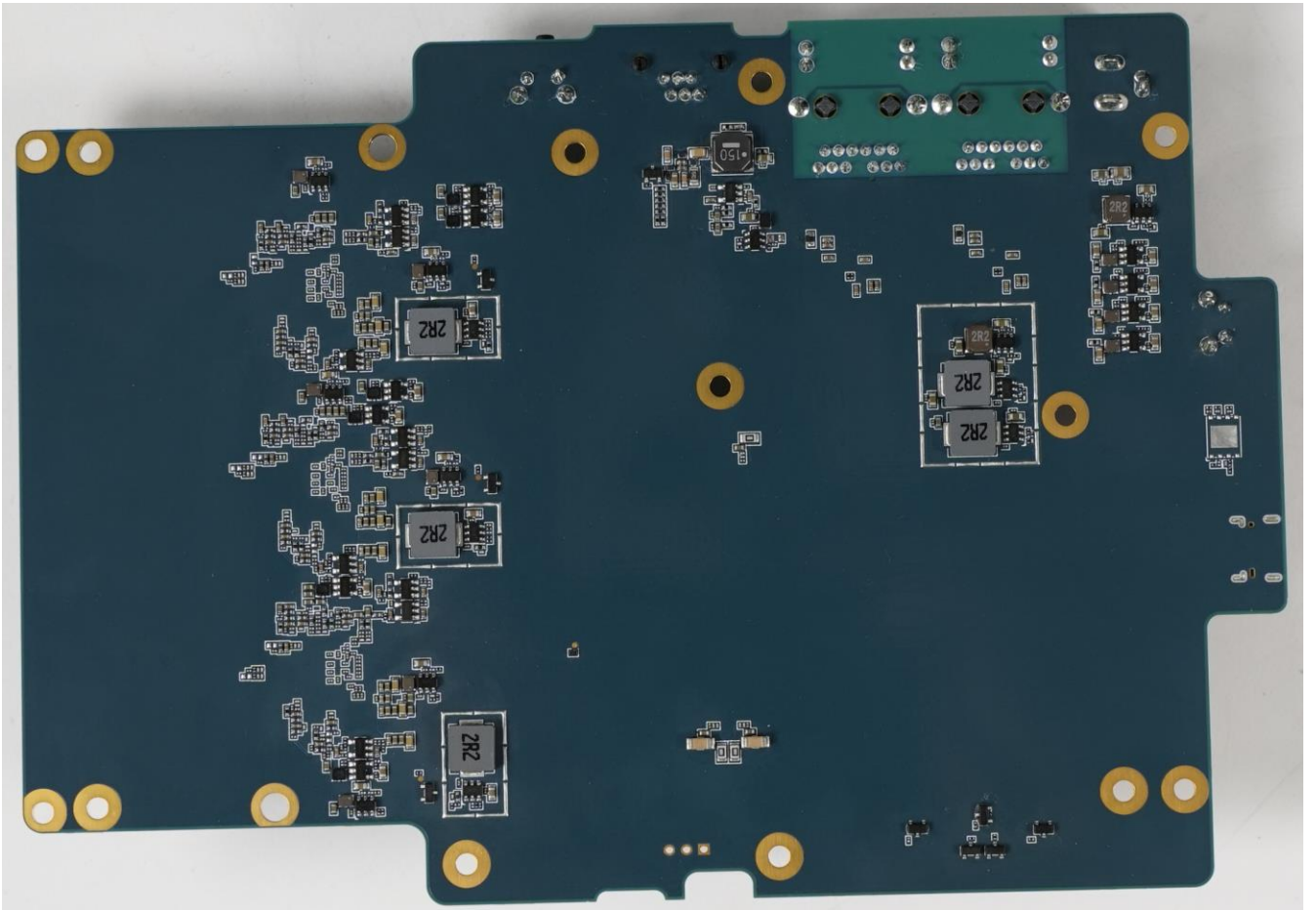

Figure 1: Top View

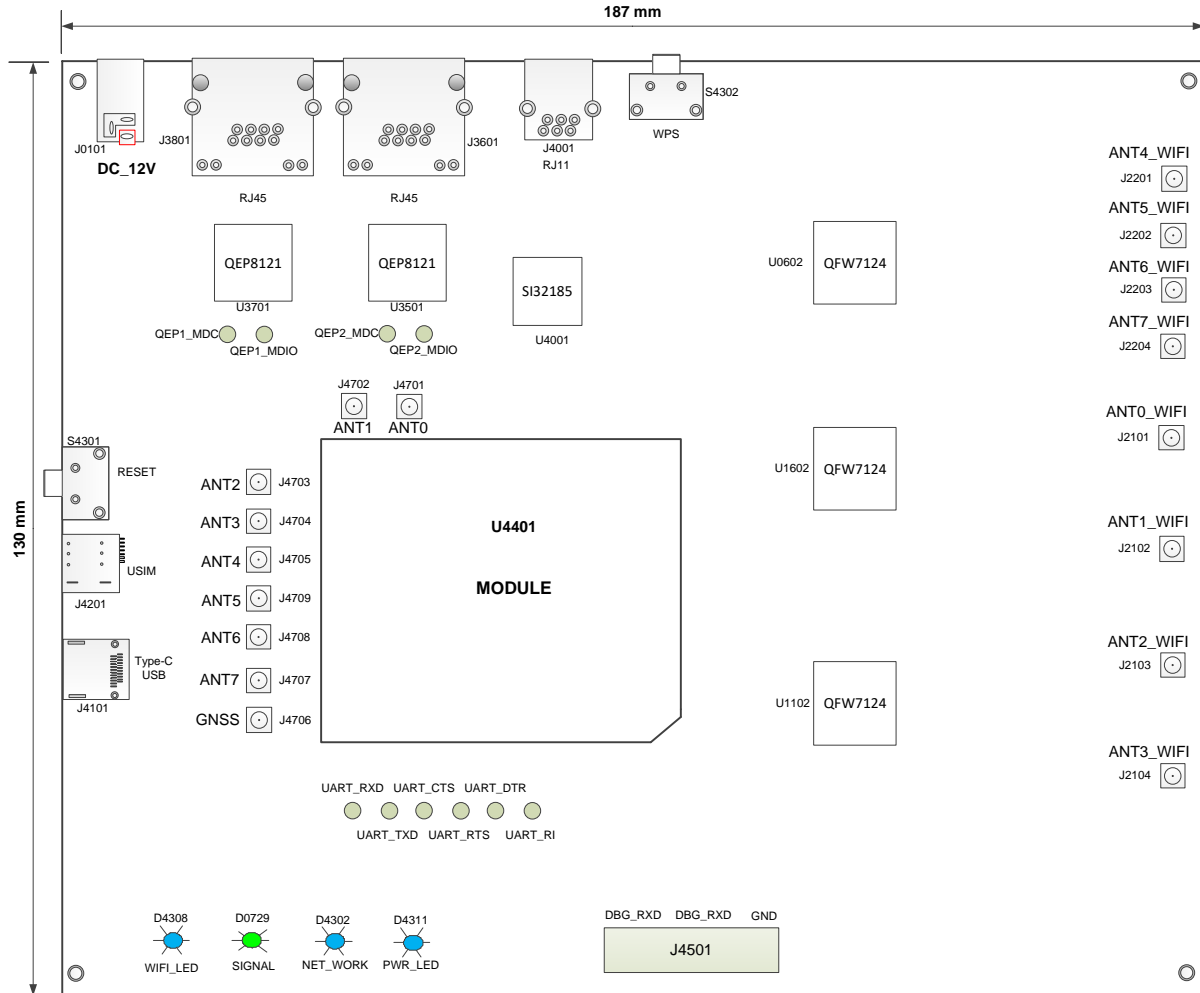**Figure 2: Bottom View**

2.2. Component Placement

Figure 3: Top View for Component Placement
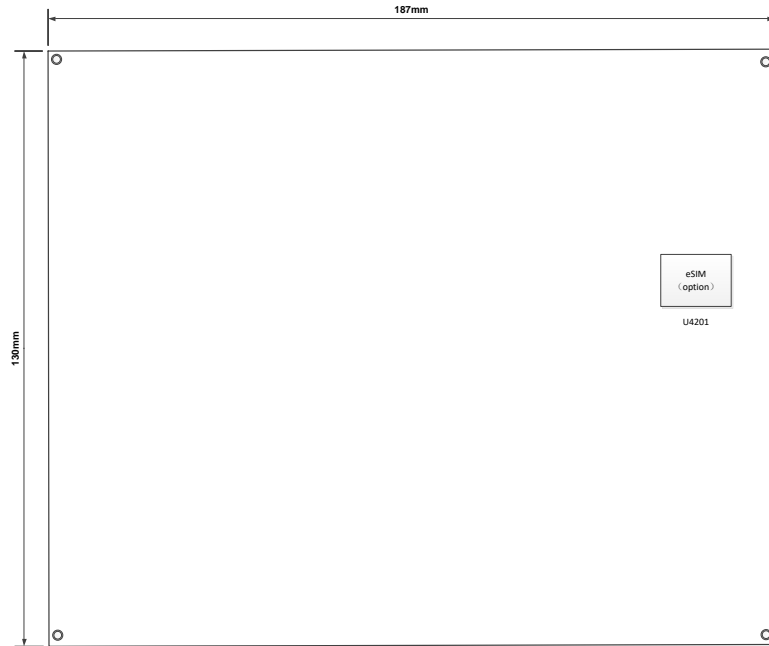
Figure 4: Bottom View for Component Placement

Table 2: Components & Functions

Component	RefDes.	Description	Comment
Power Supply	J0101	Power jack on the EVB	● DC power supply: 12–14 V ● Typical supply power: +12V/ 3 A
RESET	S4301	● Reset button (push button) ● Used to reset the module	Button
WPS*	S4302	WPS	
USB Interface	J4101	USB Type-C interface	USB 3.0 and USB 2.0 communication
Debug UART	J4501	DBG_UART for debugging	Default baud rate: 115200 bps
(U)SIM Card Interface	J4201	(U)SIM card connector	● Supports (U)SIM card insertion detection. ● Supports (U)SIM card: 1.8 V and 2.95 V ● Supports NANO (U)SIM
eSIM Card*	U4201	eSIM Card	Optional
LAN Interfaces	J3801 J3601	Connects to PC with LAN cable	RJ45 port

	D4311	Power supply ON/OFF indicator	
Status Indicators*	D4302	Network indicator	4 LEDs available for signal indication
	D4308	Wi-Fi status indicator	
	D0729	TBD*	
PHY Interface	U3701, U3501	● Supports PHY QEP8121 (10/100/1000/2500 Mbps) ● Supports PHY QEP8121/QEP8111 (10/100/1000 Mbps)	
Wi-Fi Interfaces	U0602, U1102, U1602	● Supports Wi-Fi QFW7124 Wi-Fi 6 GHz* ● Supports Wi-Fi QFW7124 Wi-Fi 5 GHz ● Supports Wi-Fi QFW7124 Wi-Fi 2.4 GHz	
Module Interface	U4401	Module interface	Module
SLIC Interface*	U4001, J4001	● RJ11 Connector ● Supports SLIC SI32185	
Wi-Fi Antenna Interfaces	J2101, J2102, J2103, J2104, J2201, J2202, J2203, J2204	8 Wi-Fi antenna connectors	Reserved
Sub-6 Antenna Interfaces	J4701, J4702, J4703, J4704, J4705, J4707, J4708, J4709	8 Sub-6 antenna connectors	
GNSS Antenna Interface	J4706	1 GNSS antenna connector	

3 Kit Accessories & Assembly

3.1. Accessories Assembly

This chapter will be offered in the next version.

3.2. Accessories List

All accessories of the 5GDM03-EV EVB kit are listed as below. Please contact the supplier if there is something missing.

Table 3: Accessories List

Items	Description	Quantity (pcs)
Power Adapter	+12 V/ 3 A power adapter	1
Cables	CAT6 ethernet cable	1
	USB Type-C cable	1
U Disk	8 GB U Disk	1
Instruction Sheet	A sheet of paper giving instructions for EVB connection, details of EVB accessories, etc.	1

4 Application Interfaces

This chapter describes the hardware interfaces of the 5GDM03-EV EVB, as listed below:

- Power supply
- USB interface
- (U)SIM card interface
- Status indicators*
- Module Interface
- LAN interfaces
- Wi-Fi interfaces
- SLIC interface*
- Antenna Interfaces
- Buttons*
- Test points

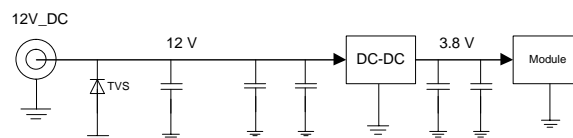## 4.1. Power Supply

The EVB can be powered by an external power adapter through the power jack on the EVB.

Table 4: Description of Power Supply

RefDes.	Description
J0101	Power jack on the EVB

The following figures show the simplified power supply block diagram of the EVB.

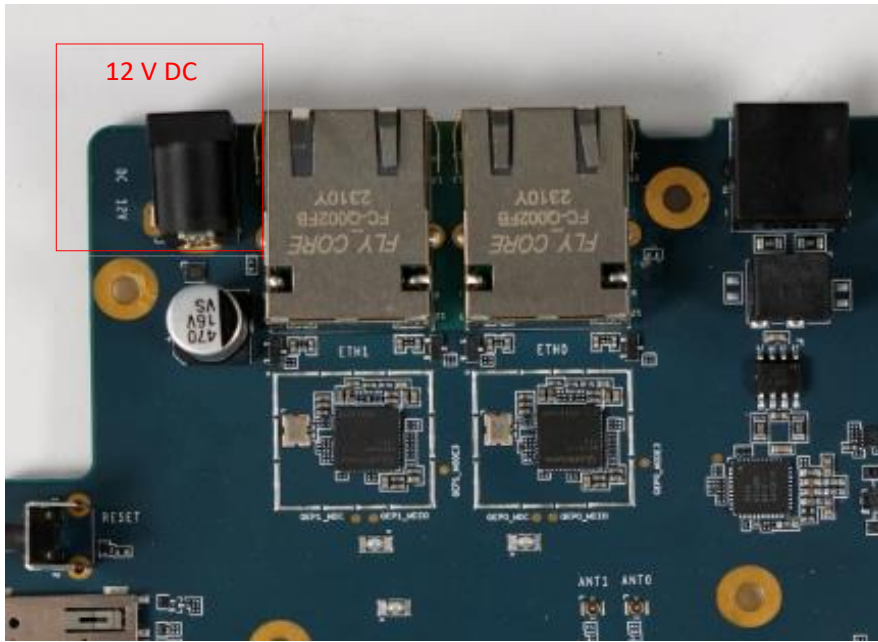**Figure 5: Block Diagram of EVB Power Supply**

Figure 6: EVB Power Supply Interface

If the power jack is used for power supply, the power plug design of the adapter is shown as below:
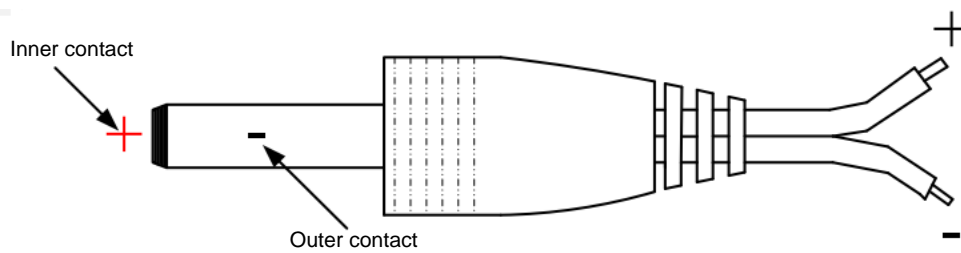
Figure 7: Power Plug Design

4.2. USB Interface

The EVB provides a USB 3.1/2.0 Type-C interface and supports high-speed (480 Mbps) and full-speed (12 Mbps) for connection with a host device, as shown in *Figure 8* and *Figure 9*. This USB interface is used for AT command communication, data transmission, GNSS NMEA sentence output, software debugging, firmware upgrade and voice over USB.

Table 5: Description of USB Interface

RefDes.	Description
J4101	USB Type-C interface
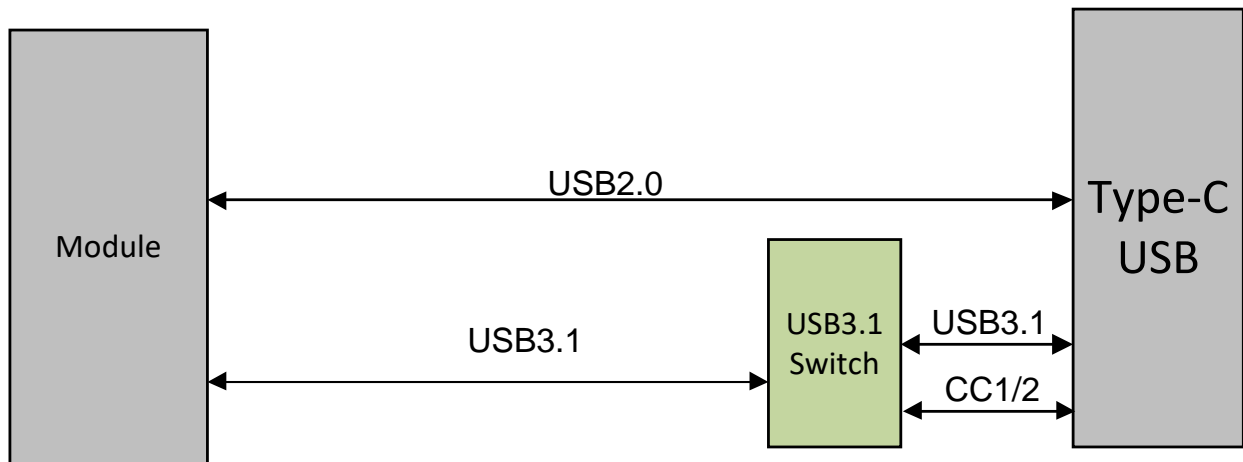
Figure 8: Connection Between Module and USB Type-C Interface
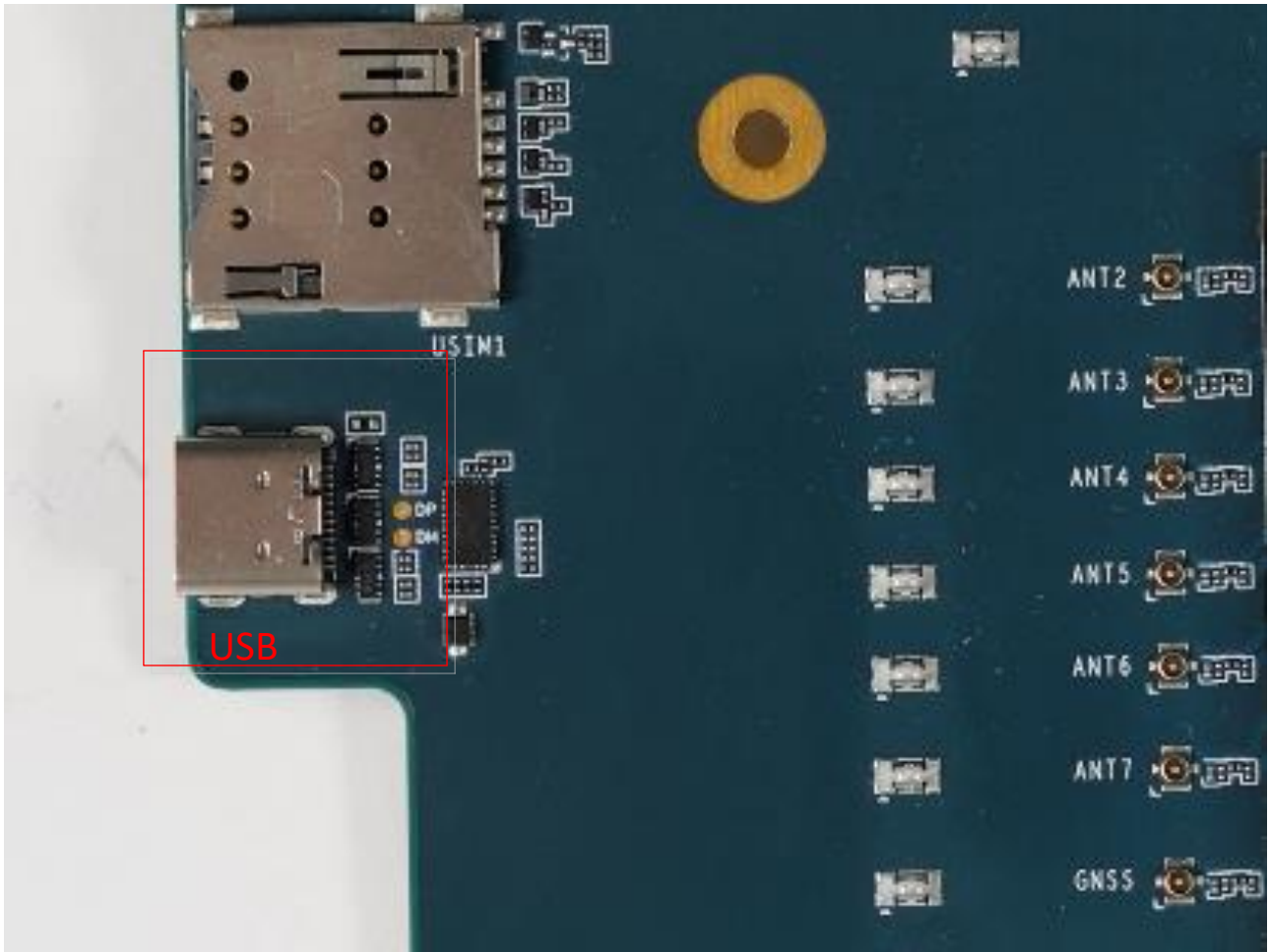
Figure 9: USB Interface Connection

4.3. (U)SIM Card Interface

The EVB has a 7-pin push-push type (U)SIM card (1.8/3.0 V) interfaces which support 1.8/3.0 V (U)SIM card.

Table 6: Description of (U)SIM Card Interfaces

RefDes.	Description
J4201	(U)SIM card connector

The following figure shows a simplified connector schematic for this connector.

Figure 10: Simplified Connector Schematic for (U)SIM Card Connector

The figure and table below illustrate the pin assignment and definition of (U)SIM card connector J4201.
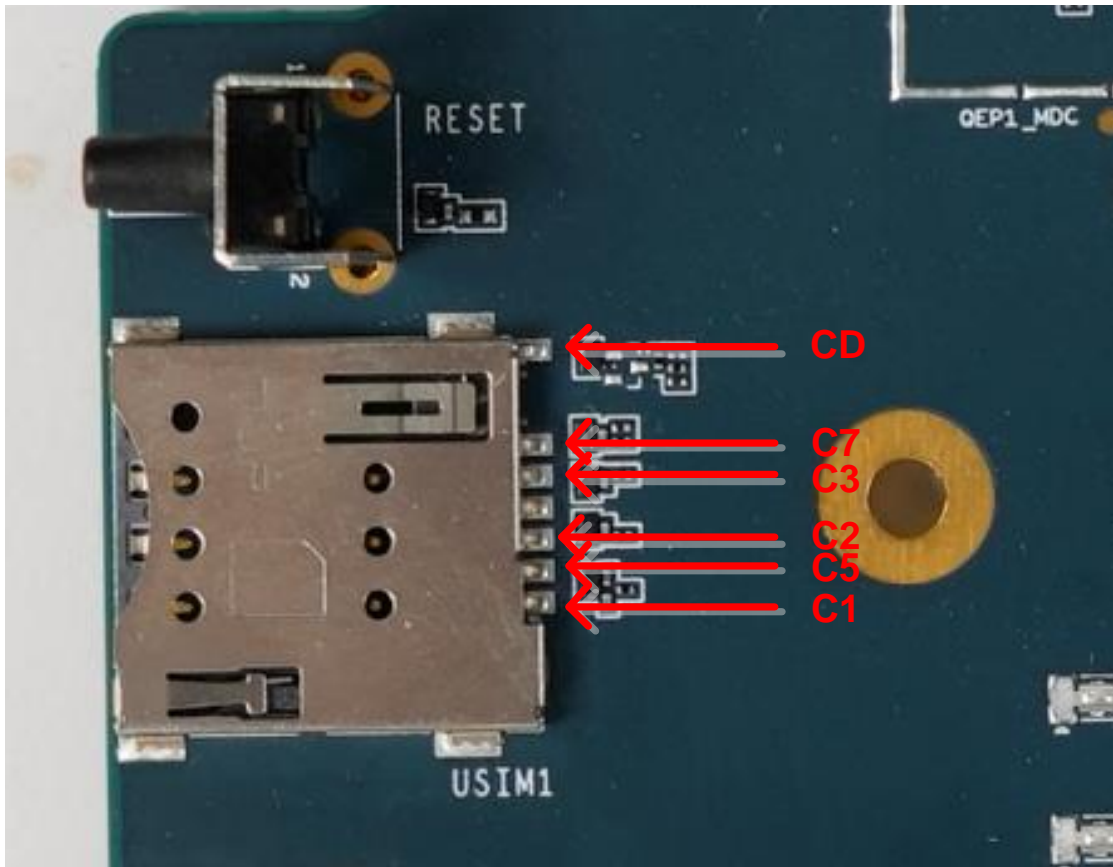
Figure 11: Pin Assignment of (U)SIM Card Connector J4201

Table 7: Pin Definition of J4201

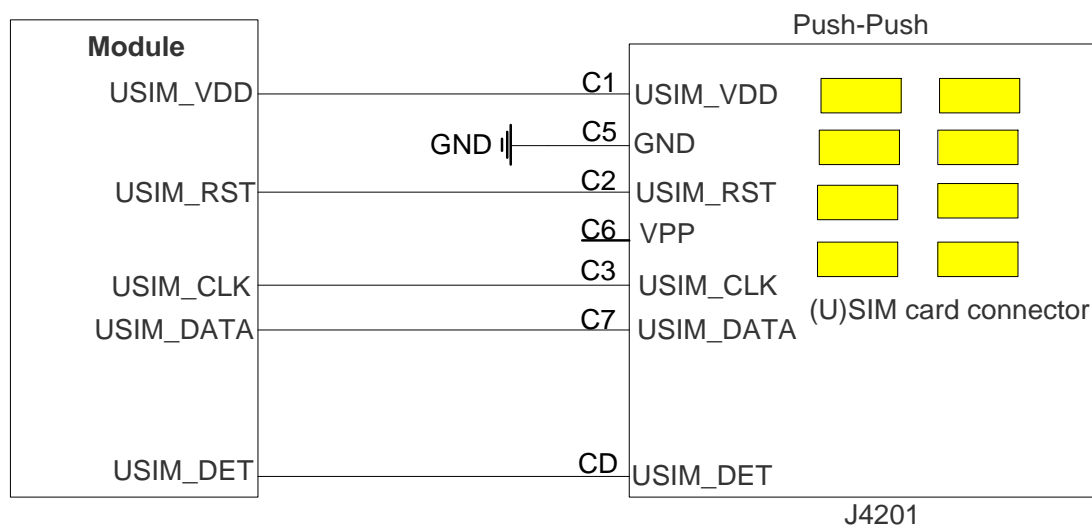| Pin No.	Pin Name	I/O	Description
C1	USIM_VDD	PO	(U)SIM card power supply
C2	USIM_RST	DO	(U)SIM card reset
C3	USIM_CLK	DO	(U)SIM card clock
C5	GND	-	Ground
C6	VPP	-	NC
C7	USIM_DATA	DIO	(U)SIM card data
CD	USIM_DET	DI	(U)SIM card hot-plug detect

4.4. Status Indicators*

There are four status indication LEDs on the EVB. The following figure shows the positions of these LED indicators.

Table 8: Description of Status Indication LEDs

RefDes.	Description
D4311	Indicates power supply readiness. ● ON: VBAT on ● OFF: VBAT off
D4302*	Indicates the module's network registration mode. ● ON: registered in Sub-6 network ● OFF: others
D4308*	Indicates the status of Wi-Fi. ● ON: Wi-Fi is turned on ● OFF: Wi-Fi is turned off
D0729*	TBD

Figure 12: Status Indicators

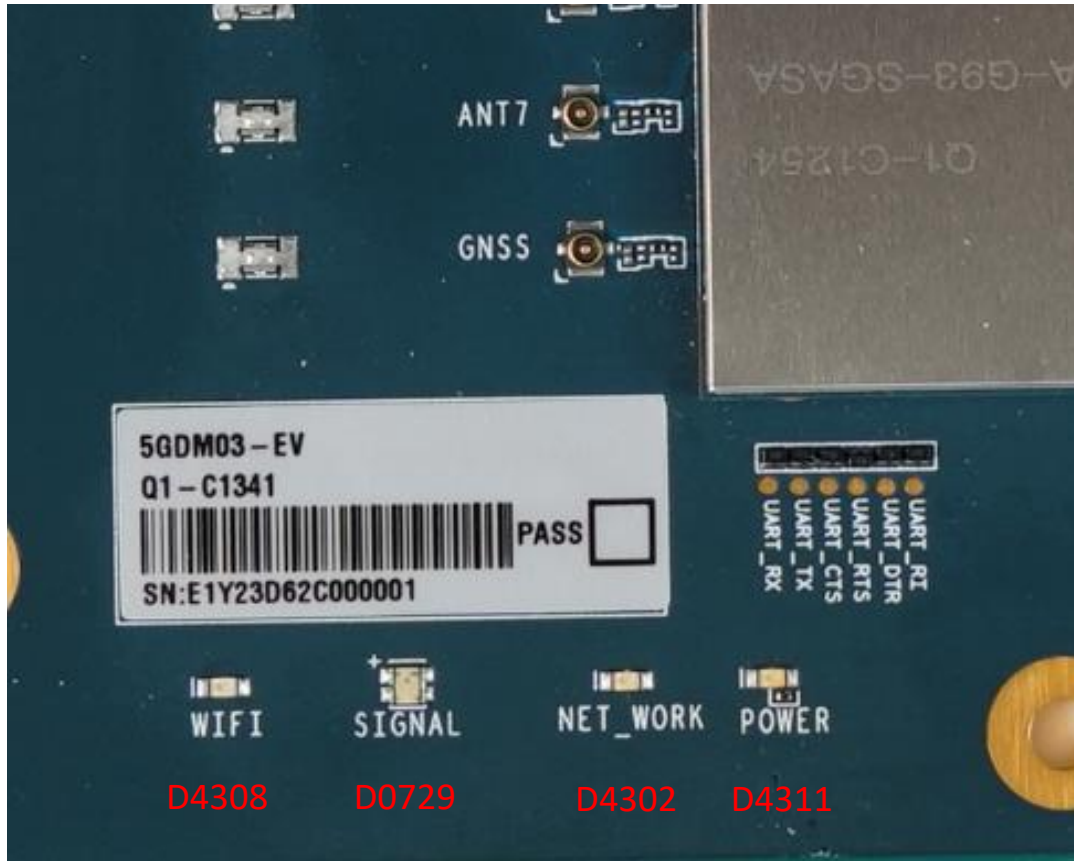## 4.5. Module Interface

Module interface is designed to accommodate applicable modules. The developer will be able to test the functionalities of the modules easily.

Table 9: Description of Module Interface

RefDes.	Description
U4401	Module interface

The following figure shows the module on the EVB board.

Figure 13: Module Interface on the EVB Board

4.6. LAN Interfaces

The 5GDM03-EV EVB provides two LAN interfaces to connect with PC. The following table shows the location of the LAN connector.

Table 10: Description of LAN Interfaces

RefDes.	Description
J3601	Connects to PC with LAN cable
J3801	
U3501	Supports PHY QEP8121/QEP8111 (10/100/1000 Mbps)
U3701	Supports PHY QEP8121 (10/100/1000/2500 Mbps)

The following two figures displays the connection between RJ45 and EVB.
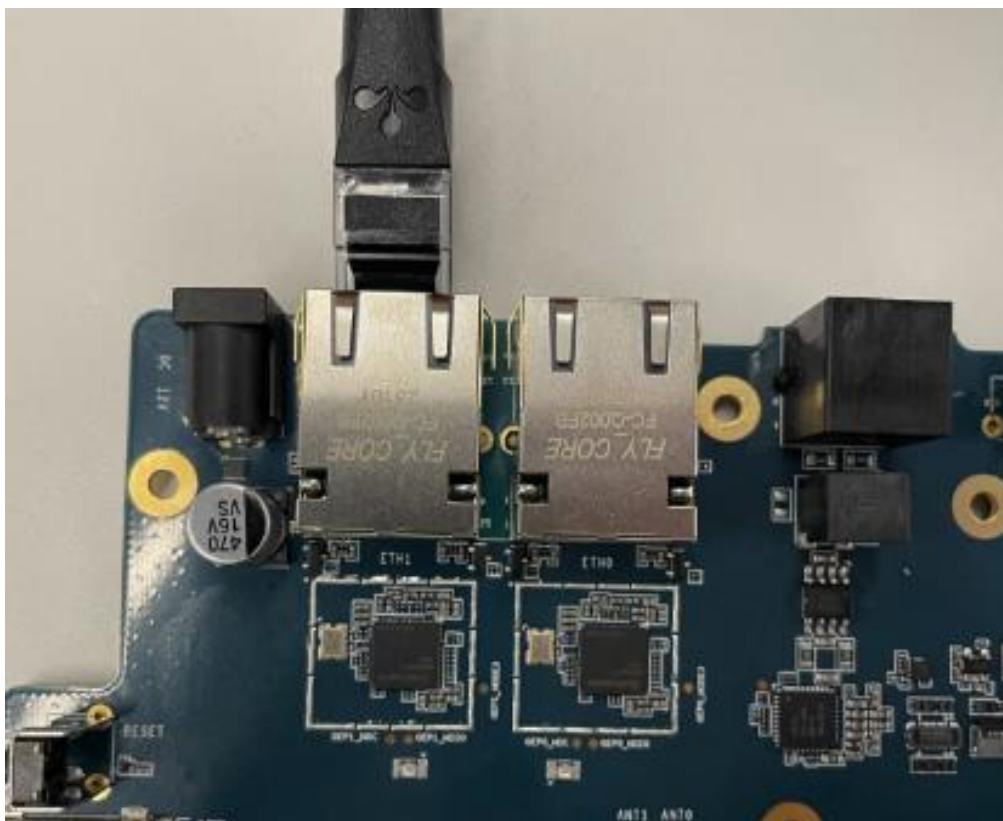
Figure 14: Connection Between RJ45 and EVB

4.7. Wi-Fi Interfaces

The Wi-Fi interface is designed to accommodate the module. The interface allows you to test the Wi-Fi function of the module or to develop applications with Wi-Fi function easily.

Table 11: Description of Wi-Fi Interfaces

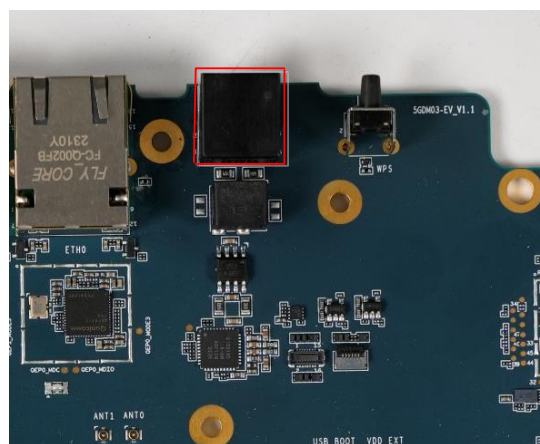| RefDes.	Description
U0602	Supports QFW7124 Wi-Fi 6 GHz*
U1102	Supports QFW7124 Wi-Fi 5 GHz
U1602	Supports QFW7124 Wi-Fi 2.4 GHz

4.8. SLIC interface*

The 5GDM03-EV EVB provides a SLIC interface.

Table 12: Description of SLIC Interface

RefDes.	Description
J4001	● RJ11 connector ● Supports SLIC SI32185

Figure 15: RJ11

4.9. Antenna Interfaces

The EVB includes 8 Wi-Fi antenna connectors, 8 Sub-6 antenna connectors, and 1 GNSS antenna connector.

Table 13: Wi-Fi, Sub-6 and GNSS Antenna Interfaces

Antenna Type	RefDes.	Description
Wi-Fi Antenna Interfaces	J2101, J2102, J2103, J2104, J2201, J2202, J2203, J2204	8 Wi-Fi antenna connectors
Sub-6 Antenna Interfaces	J4701, J4702, J4703, J4704, J4705, J4707, J4708, J4709	8 Sub-6 antenna connectors
GNSS Antenna Interface	J4706	1 GNSS antenna connector

Figure 16: Sub-6 and GNSS Antenna Interfaces
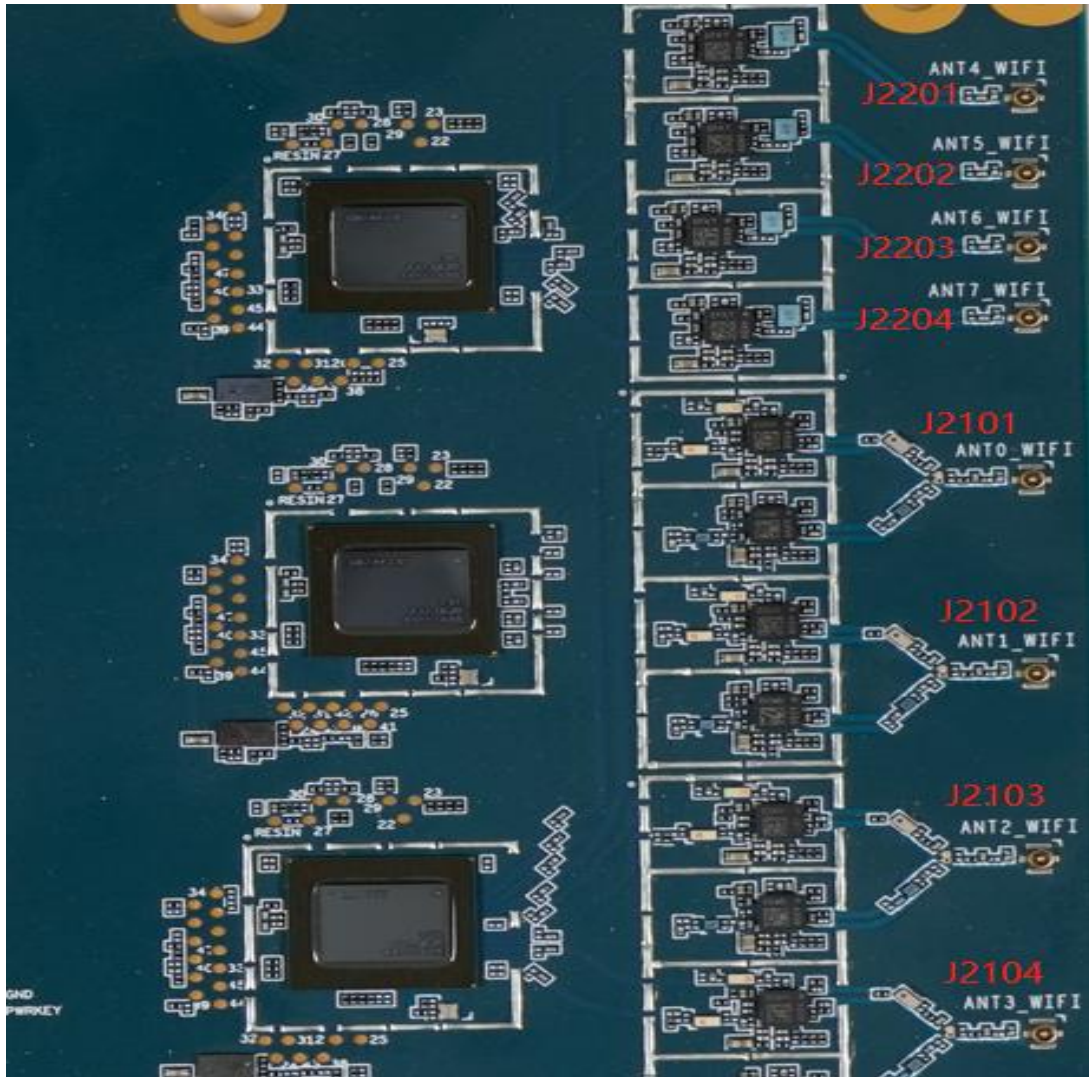
Figure 17: Wi-Fi Antenna Interfaces

4.10. Buttons*

The EVB includes two buttons, as shown in the following table and figures:

Table 14: Description of Buttons

RefDes.	Description
S4302*	WPS
S4301	● Reset button (push button) ● Used to reset the module
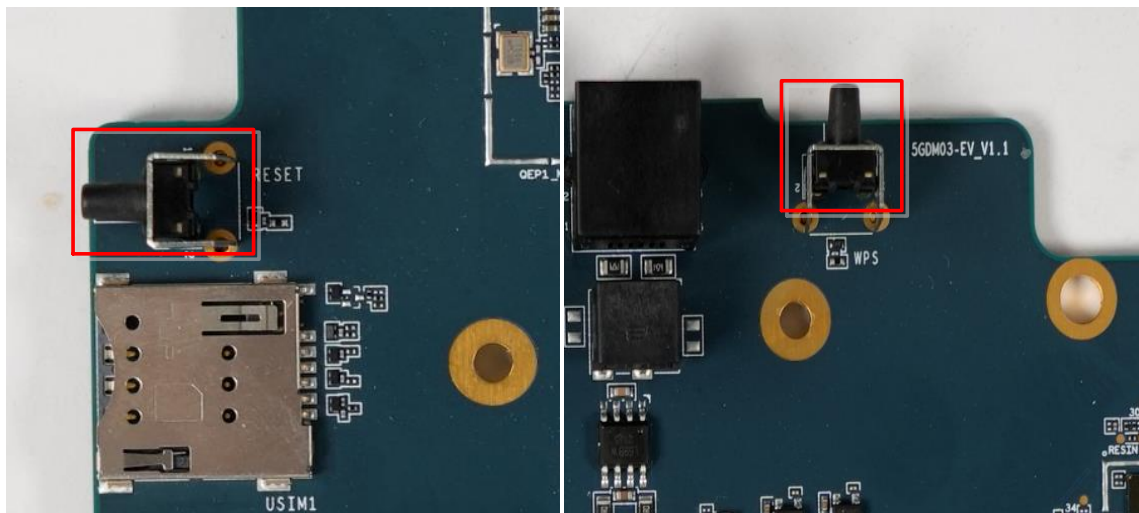
Figure 18: WPS and Reset

4.11. Test Points

The EVB provides test points which help you obtain the corresponding waveforms of some signals. The following figures show the details of partial test points.

Figure 19: Test Points of USB Boot and Power Key

Figure 20: Test Points of USB and UART

Figure 21: Test Points of Debug UART

Table 15: Definition of Test Points

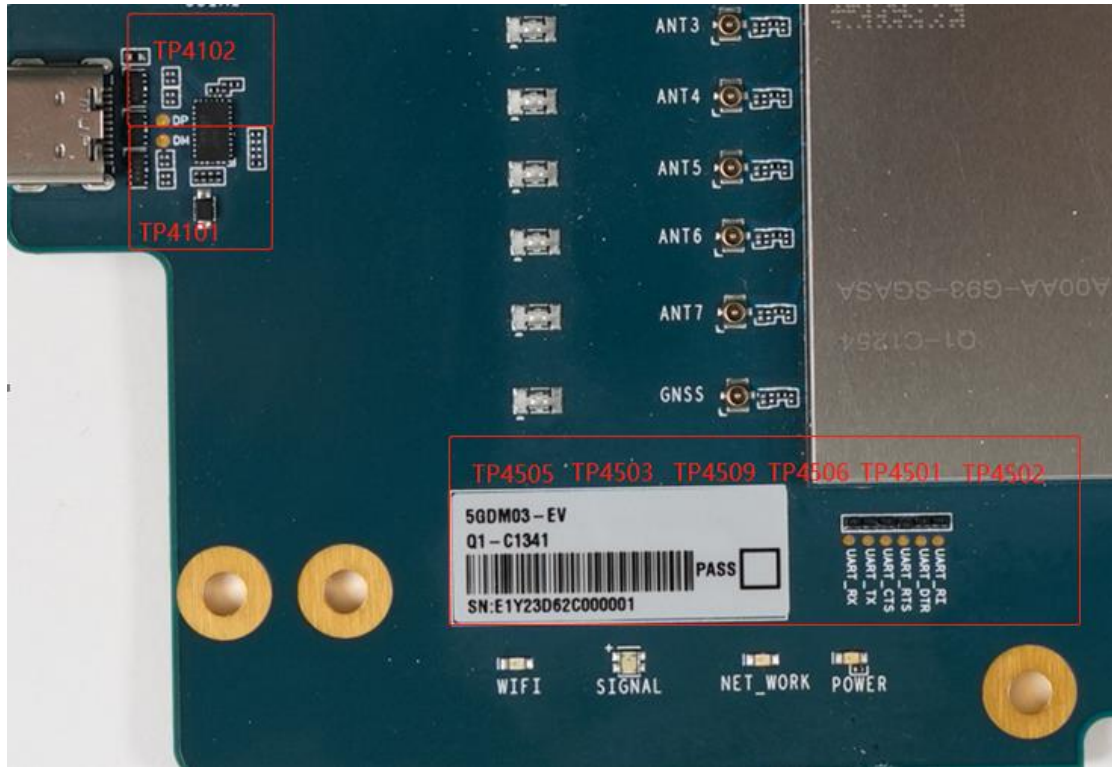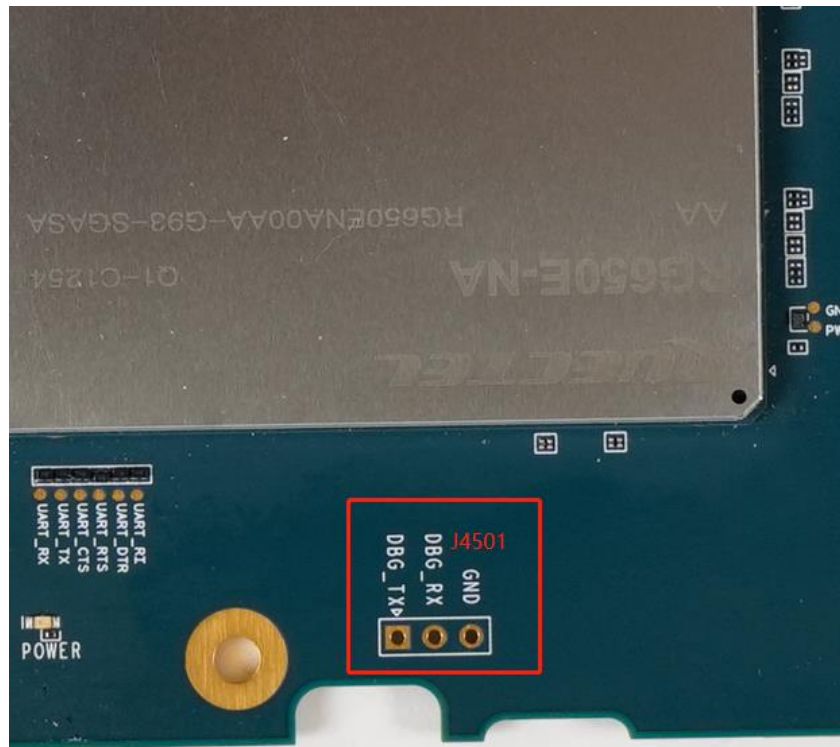| Power and Power Key			31 / 37
Pin Name	**Reference**	**Test Point Description**	
GND	TP4510	Ground	
USB_BOOT	TP4504	Emergency download	
VDD_EXT	TP4508	VDD_EXT 1.8 V of the module	
PWRKEY	TP4507	Turn ON/OFF test points	
USB and UART			
Pin Name	**Reference**	**Test Point Description**	
USB_DP	TP4102	DP pin of the USB	
USB_DM	TP4101	DM pin of the USB	
UART CTS*	TP4509	The CTS of the main UART 1.8 V	
UART_RXD*	TP4505	The RXD of the main UART 1.8 V	
UART_TXD*	TP4503	The TXD of the main UART 1.8 V	
UART_RTS*	TP4506	The RTS of the main UART 1.8 V	
UART_DTR*	TP4501	The DTR of the main UART 1.8 V	
UART_RI*	TP4502	The RI of the main UART 1.8 V	
DBG_RXD		The RXD of the debug UART 1.8 V	
DBG_TXD	J4501	The TXD of the debug UART 1.8 V	
GND		Ground	

5 Operation Procedures

This chapter introduces how to use the 5GDM03-EV EVB for testing and evaluation of applicable modules. Before the procedures below, please ensure modules and the EVB are correctly assembled.
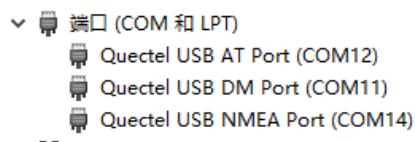
5.1. Turn On the Module

1. Insert a (U)SIM card into the USIM card connector (J4201) on the EVB.
2. Use cellular cables to connect antennas to the EVB.
3. Connect the EVB to a 12 V/ 3 A power. Then D4311 (Power supply ON/OFF indicator) will light up, which indicates that the power supply for the whole EVB is ready. The EVB will turn on automatically.

NOTE

The module and the EVB will turn on automatically when the power adapter is connected. The PWRKEY is invalid. It is reserved only.

5.2. Communication via USB

1. Turn on the module according to the procedure in *Chapter 5.1*.
2. Connect the EVB and a PC with USB cable through USB Type-C interface, and then run the driver disk on the PC to install the USB driver. For details about USB driver installation, see *document [2]*. The USB port numbers can be viewed in Device Manager of the PC when the USB driver is installed, as shown below.

> ∨ 🖥 端口 (COM 和 LPT)
>   🖥 Quectel USB AT Port (COM12)
>   🖥 Quectel USB DM Port (COM11)
>   🖥 Quectel USB NMEA Port (COM14)

Figure 22: USB Ports

3. Install and then use QCOM provided by Quectel to realize the communication between the module and the PC.

The following figure shows the COM Port Setting of QCOM: select the correct "**COM Port**" (USB AT Port, which is shown in figure above) and set correct "**Baudrate**" (e.g. 115200 bps). For more details about QCOM usage and configuration, see *document [3]*.

Figure 23: COM Port Setting Field on QCOM (USB AT Port Connection)

5.3. Communication via USB Interface of UART and USB

1. Power up 5GDM03-EV.
2. Connect the EVB and a PC with USB cable through USB Type-C interface, and then run the driver disk on the PC to install the USB driver. For details about USB driver installation, see *document [2].* The USB port numbers can be viewed in Device Manager of the PC when the USB driver is installed, as shown below:
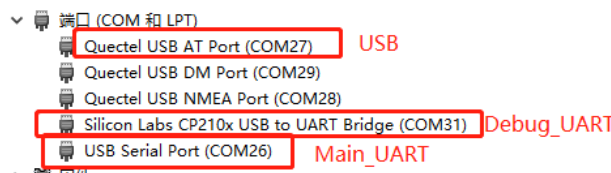

Figure 24: USB UART and USB Port

3. Configure AT Command Window, set correct baud rate (such as 115200 bps) and COM number which can be checked by the Device Manager on PC, then operate the module via AT commands.
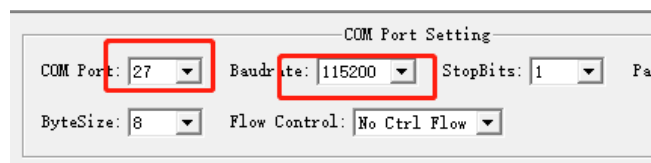

Figure 25: QCOM Configuration Under Main UART Port

4. Configure AT Command Window, set correct baud rate (such as 115200 bps) and COM number which can be checked by the Device Manager on PC, then the Debug UART will output log.
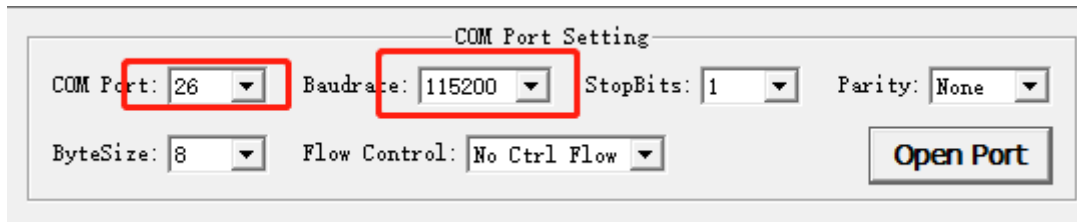

Figure 26: QCOM Configuration Under Debug UART Port

5.4. Firmware Upgrade

Firmware of the module is upgraded via USB port by default, and there are two methods for the upgrade: emergency download and normal download. Please refer to the following procedures to upgrade firmware through the EVB.

5.4.1. Emergency Download

1. Install the firmware upgrade tool QFIL on PC.
2. Connect the EVB and the PC through USB Type-C cable.
3. Connect TP4504 and TP4508.
4. Insert the DC power adapter and turn on the module.
5. Upgrade the firmware with QFlash. See *document [4]* for details about the use of QFIL.

5.4.2. Normal Download

1. Turn on the module according to the procedure in *Chapter 5.1*.
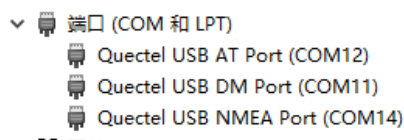2. Wait for the USB port to be found in Device Manager of the PC.

Figure 27: USB Ports in PC Device Manager

3. Open QFIL and upgrade the firmware.

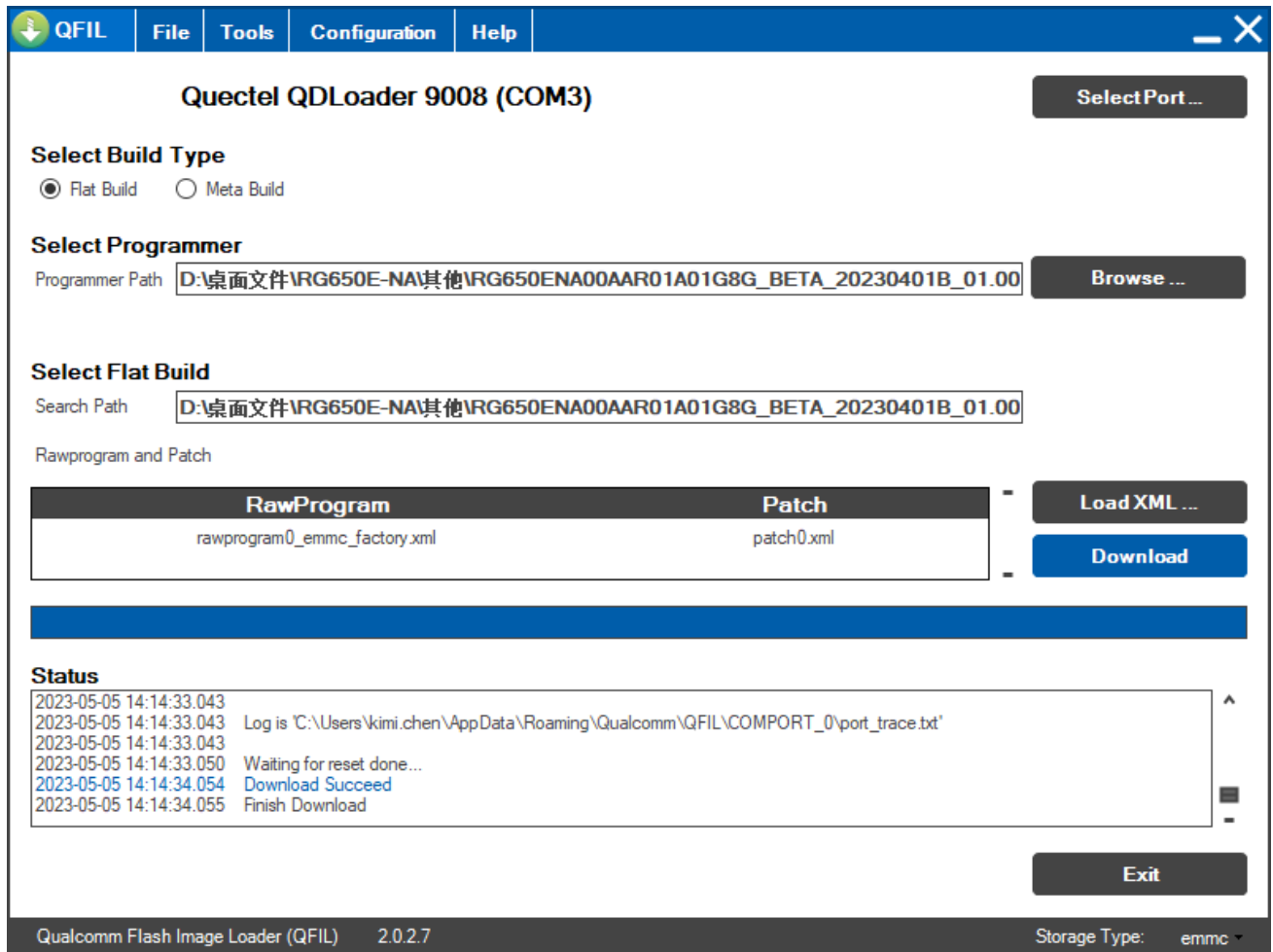**Figure 28: Firmware Download**

5.5. Reset the Module

Reset is only used in case of emergency or abnormality. For example, the software fails to respond for more than 5 seconds due to some serious problems.

Press the RESET button S4301 and then release it to reset the module. Note that this operation may cause loss of information in the memory as the module will be initialized after the resetting.

6 Appendix References

Table 16: Related Documents

Document Name
[1] Quectel_List_of_EVB_Applicable_Modules
[2] Quectel_Windows_USB_Driver(Q)_NDIS_Installation_Guide
[3] Quectel_QCOM_User_Guide
[4] Quectel_QFlash_User_Guide

Table 17: Terms and Abbreviations

Abbreviation	Description
BTB	Board to Board
COM	Cluster Communication Port
DC	Direct Current
DI	Digital Input
DO	Digital Output
eSIM	embedded Subscriber Identity Module
EV	Evaluation board
EVB	Evaluation Board
GND	Ground
GNSS	Global Navigation Satellite System
I/O	Input/Output

LED	Light Emitting Diode
LAN	Local Area Network
NC	Not Connected
OVP	Over Voltage Protection
PC	Personal Computer
PCB	Printed Circuit Board
PHY	Physical Layer
PO	Power Output
POE	Power Over Ethernet
RF	Radio Frequency
RJ	Register Jack
SIM	Subscriber Identity Module
SLIC	Subscriber Line Interface Circuit
UART	Universal Asynchronous Receiver & Transmitter
USB	Universal Serial Bus
USIM	Universal Subscriber Identity Module
VBAT	Voltage at Battery (Pin)
Wi-Fi	Wireless Fidelity