UMTS&LTE EVB R2.0 User Guide

LTE-A Module Series

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About the Document

History

Revision	Date	Author	Description
1.0	2018-04-11	Tiger CHENG/ King MA	Initial
1.1	2019-09-05	Oscar LIU	Added the applicable modules: EG12 and EG18

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1 Introduction

This document describes how to use the evaluation board of UMTS&LTE modules. It is an assistant tool for engineers to develop and test Quectel EG06/EG12/EG18 module.

1.1. Safety Information

The following safety precautions must be observed during all phases of the operation, such as usage, service or repair of any cellular terminal or mobile incorporating EG06, EG12 or EG18 module. Manufacturers of the cellular terminal should send the following safety information to users and operating personnel, and incorporate these guidelines into all manuals supplied with the product. If not so, Quectel assumes no liability for the customer's failure to comply with these precautions.

	Full attention must be given 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 cellular terminal or mobile before boarding an aircraft. The operation of wireless appliances in an aircraft is forbidden to prevent interference with communication systems. If the device offers an Airplane Mode, then it should be enabled prior to boarding an aircraft. Please consult the airline staff for more restrictions on the use of wireless devices on boarding the 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.
	Cellular terminals or mobiles operating over radio signals and cellular network cannot be guaranteed to connect in all possible conditions (for example, with unpaid bills or with an invalid (U)SIM card). When emergent help is needed in such conditions, please remember using emergency call. In order to make or receive a call, the cellular terminal or mobile must be switched on in a service area with adequate cellular signal strength.
	The cellular terminal or mobile contains a transmitter and receiver. When it is ON, it receives and transmits radio frequency signals. RF interference can occur if it is used close to TV set, radio, computer or other electric equipment.
	In locations with potentially explosive atmospheres, obey all posted signs to turn off wireless devices such as your phone or other cellular terminals. Areas with potentially explosive atmospheres include fuelling areas, below decks on boats, fuel or chemical transfer or storage facilities, areas where the air contains chemicals or particles such as grain, dust or metal powders, etc.

2 General Overview

Quectel supplies UMTS&LTE EVB R2.0 to engineers to develop applications based on EG06/EG12/EG18 module. This EVB can test module basic functionalities.

2.1. Key Features

The following table describes the detailed features of UMTS&LTE EVB R2.0.

Table 1: Key Features of UMTS&LTE EVB R2.0

Features	Description
Power Supply	DC power supply: 4.5V~5.5V, typically: 5.0V VBAT: 3.8V for J103
UMTS&LTE TE-A Connector	Support EG06/EG12/EG18 module
Wi-Fi & Ethernet TE-A Connector	Reserved
SD Card Connector	Support SD card
(U)SIM Connector	Support (U)SIM card insertion detection Support (U)SIM card: 3.0V/1.8V
Audio Connectors and Loudspeaker Test Points	● One digital audio codec board connector Support TI TLV320AIC3104 codec board ● Two analog connectors used for earphone and handset Two test points for loudspeaker
UART Connectors	Two UART connectors: ● COM1: serial interface for data communication Max baud rate: 460800bps ● COM2: serial interface for debugging purpose Max baud rate: 1Mbps
USB Connector	USB Type-C receptacle for USB 2.0 & 3.0 connectivity
Status Indicators	6 LEDs are available for signal indication

Switches and Buttons	Power ON/OFF Switch(S201), PWRDWN_N (S301), PWRKEY (S302), RESET (S303), PCM Function Switch (S901), SD Card & eMMC* Function Switch (S902)
Physical Characteristics	Size: 146.4mm × 115.0mm

NOTE

"*" means eMMC function is under development, and the eMMC component is not mounted.

2.2. Component Placement of UMTS&LTE EVB R2.0
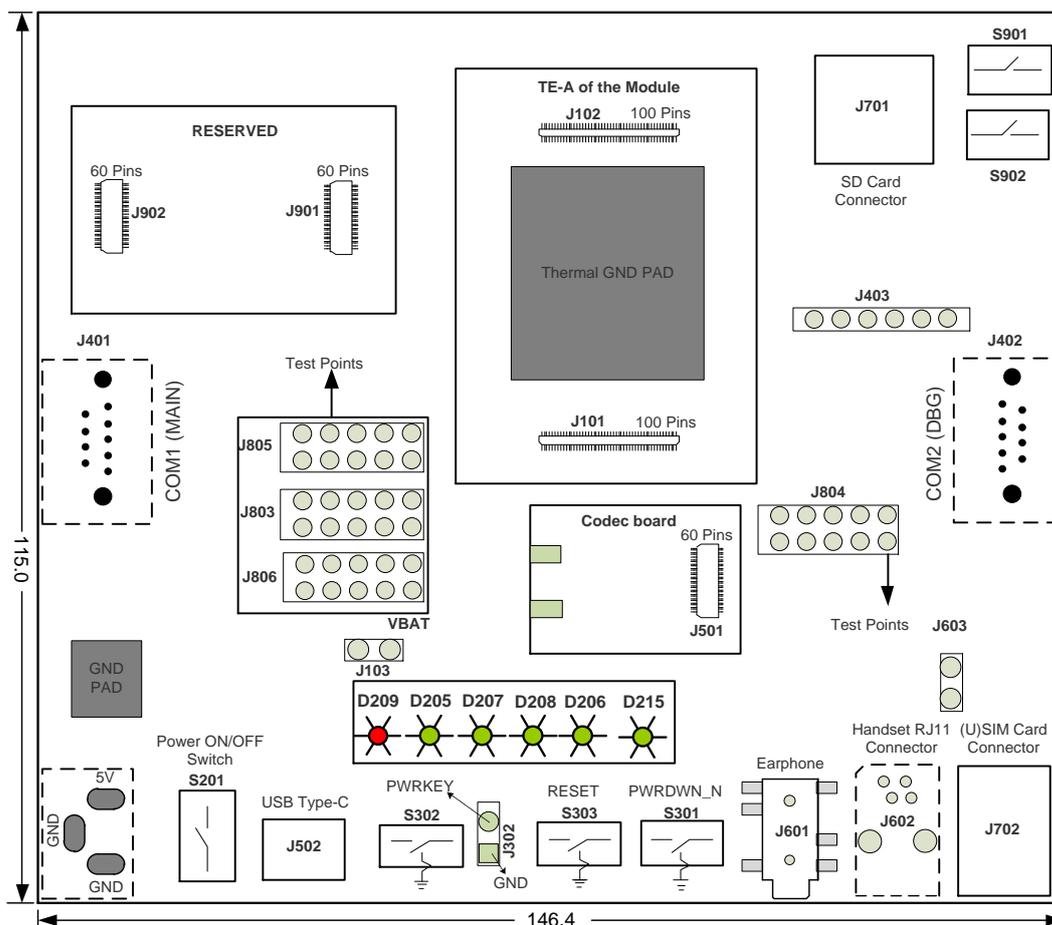
Figure 1: Component Placement of EVB Top Side (Unit: mm)
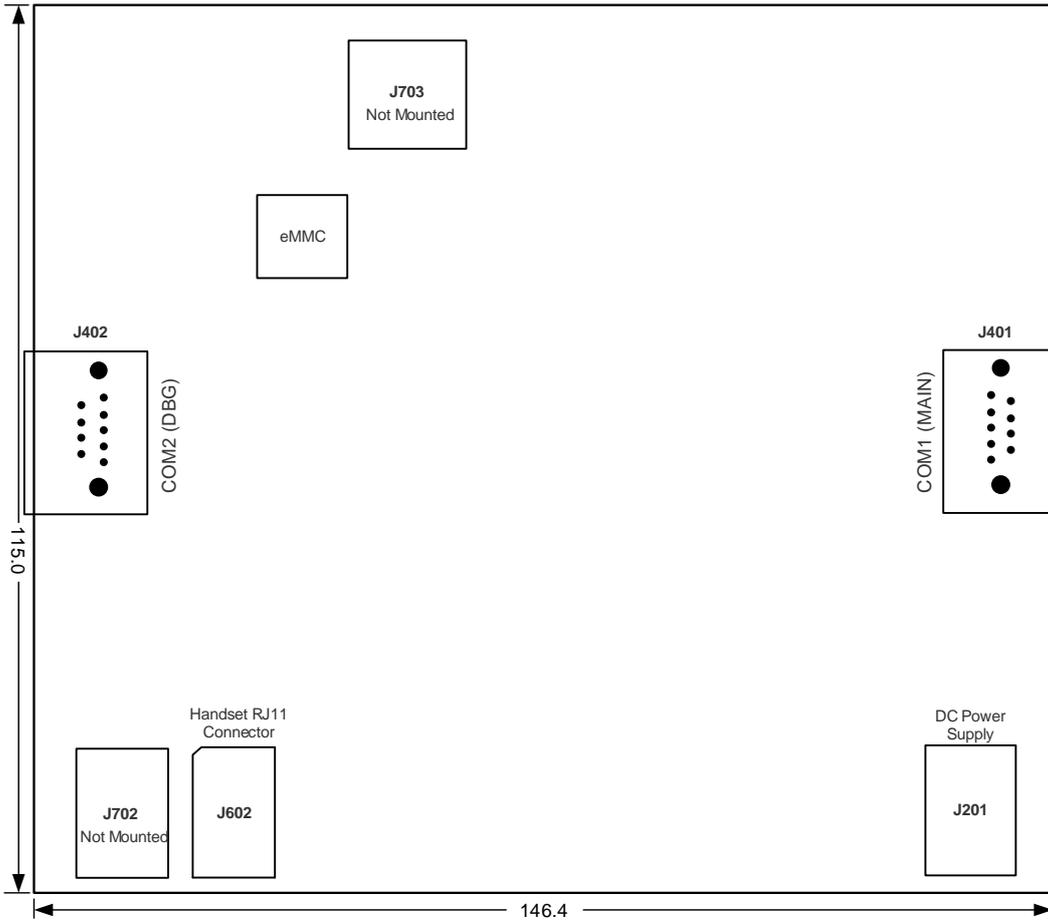
Figure 2: Component Placement of EVB Bottom Side (Unit: mm)

Table 2: Component Functions of UMTS&LTE EVB R2.0

Functions	Component No.	Description
Power Supply*	J201 (bottom side)	The power jack on the EVB Typical voltage supply: +5V
	J502	USB Type-C connector Typical voltage supply: +5V
Power ON/OFF Switch	S201	VBAT power ON/OFF control
PWRKEY	S302	Power key (push button) Used to turn on/off the module
	J302	Used to connect PWRKEY to GND
PWRDWN_N	S301	Reserved

RESET	S303	Reset button (push button) Used to reset the module
PCM Function Switch	S901	● Switched to the left: function reserved ● Switched to the right: connect the codec board connector on EVB to the module, for testing the codec's PCM function
SD Card & eMMC Function Switch	S902	● Switched to the left: test the SD card function of the module ● Switched to the right: test the eMMC* function of the module
USB Connector	J502	USB Type-C receptacle Can also be used to supply power for EVB
Audio	J501	Codec board connector
	J603	Test points for loudspeaker Used to test the analog audio function of the module
	J601	Earphone connector Used to test the analog audio function of the module
	J602 (bottom side)	Handset connector Used to test the analog audio function of the module
(U)SIM	J702	(U)SIM card connector
COM1	J401 (bottom side)	Main UART port
COM2	J402 (bottom side)	Debug UART port
Status Indicators	D209, D205, D207, D208, D206, D215	● D209 (VBAT power ON/OFF indicator) is used to indicate whether the module is powered on ● D205 (turn ON/OFF indicator) is used to indicate whether the module is turned on ● D207 (sleep status indicator) is used to indicate whether the module is in sleep mode. ● D208 (Network mode indicator) is used to indicate the network mode of the module ● D206 (network status indicator) is used to indicate the network status of the module ● D215 is reserved
TE-A Connectors	J101, J102	Connectors for TE-A of the module
	J901, J902	Reserved
SD Card Connector	J701	SD card connector

VBAT	J103	Used for VBAT voltage test
Test Points	J803, J804, J805, J806, J403	Test points

NOTE

"*" means under development, and the eMMC component is not mounted.

2.3. Top and Bottom Views of UMTS&LTE EVB R2.0

The top and bottom views of the UMTS&LTE EVB R2.0 are shown as below.
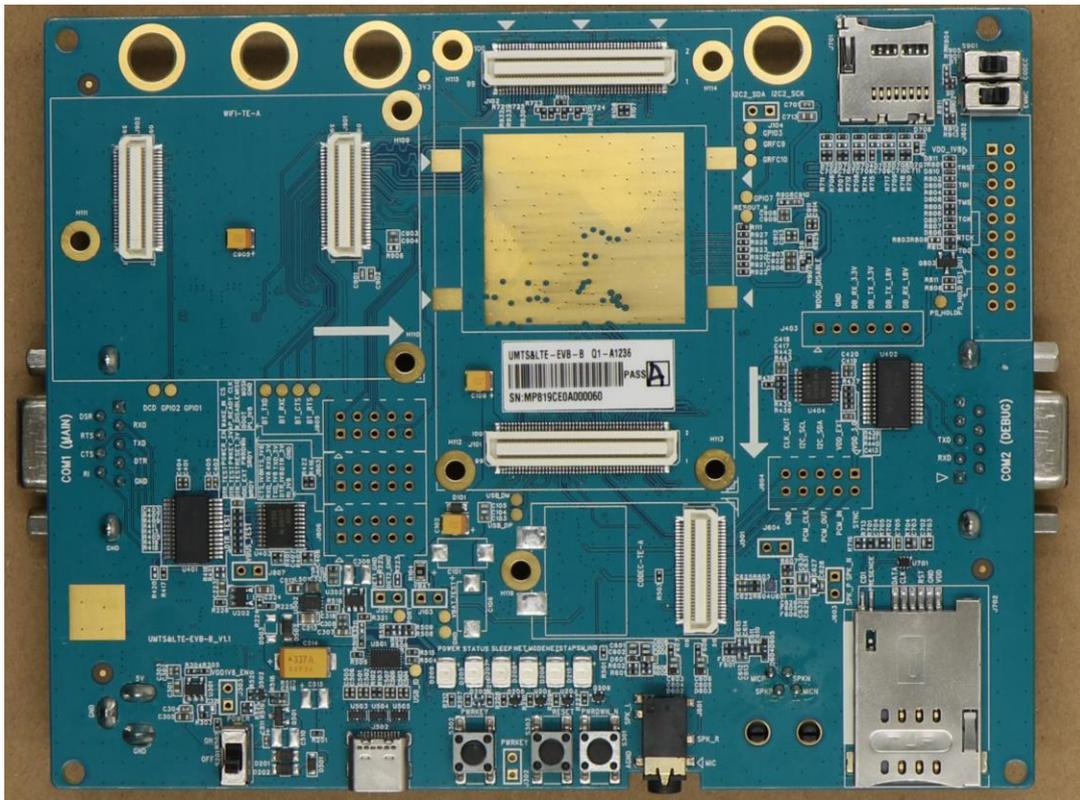
Figure 3: EVB Top View
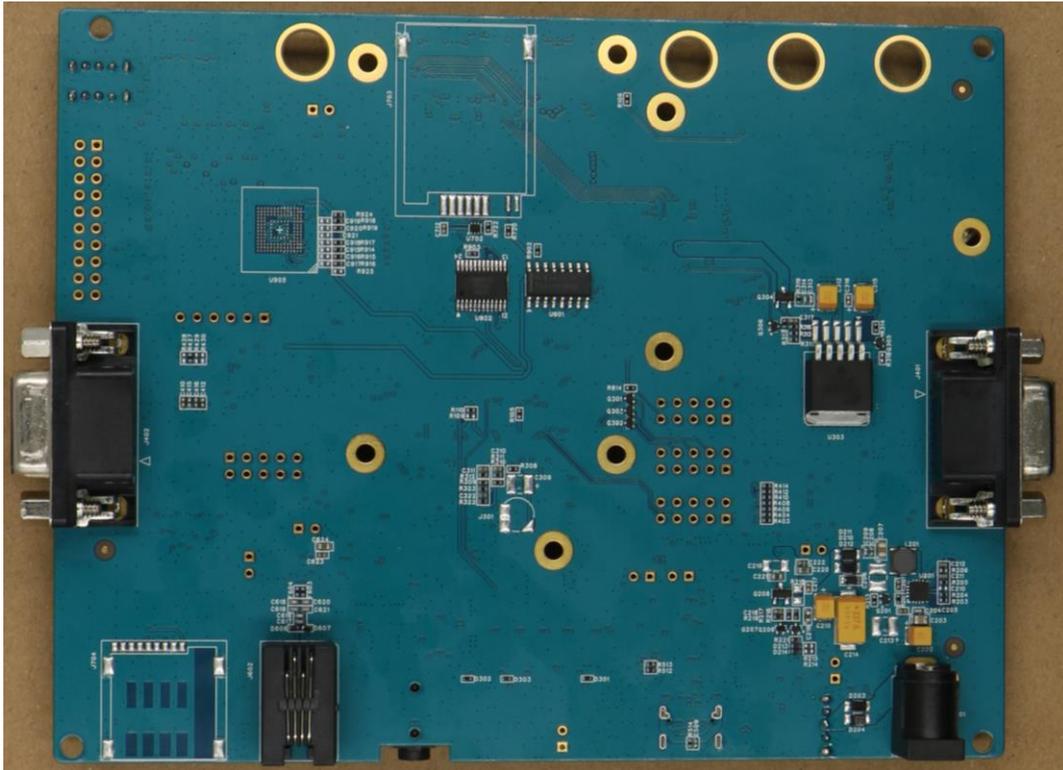
Figure 4: EVB Bottom View

2.4. EVB Kit Accessories

All accessories of the EVB kit are listed as below.

Figure 5: EVB Kit Accessories

Table 3: List of Accessories

Items	Description	Quantity
Cables	USB to RS-232 converter cable	1
	USB Type-C cable	1
	RF cables	4
Antennas	Main Antennas	4
	GNSS Antenna (passive)	1
Audio	Earphone	1
USB Flash Drive	● USB 2.0 to RS-232 driver ● USB driver (including EG06/EG12/EG18 module related documents, tools, drivers, etc.)	1
Codec Board	TLV320AIC3104 codec board	1

Others	Bolts and nuts for assembling EVB	4 for each type
Instruction Sheet	A sheet of paper giving instructions for EVB connection, details of EVB accessories, etc.	1

NOTE

The main antennas can also be used for diversity reception.

3 EVB and Accessories Assembly

The following figure shows the assembly of UMTS&LTE EVB R2.0 and its accessories.

Figure 6: UMTS&LTE EVB R2.0 and Accessories Assembly

4 EVB Components Application

This chapter mainly describes the following EVB components application:

- Power supply
- UMTS&LTE TE-A connector
- USB connector
- Audio connector
- (U)SIM connector
- SD card connector
- UART connector

It also provides information about the buttons, switches, status indicators and test points to help customers use the EVB.

4.1. Power Supply (J201/J502)

The UMTS&LTE EVB R2.0 can be powered by an external power adapter through connected with the power jack (J201) or USB Type-C receptacle (J502) on the EVB. Please pay attention to the voltage value of the power adapter, and 5V/2A is recommended. The power adapter is designed to be connected to a step-down converter (U201), which can convert the supplied voltage into proper voltage (VBAT) for the module.

The following two figures show the simplified power supply block diagram and the EVB power supply interface.
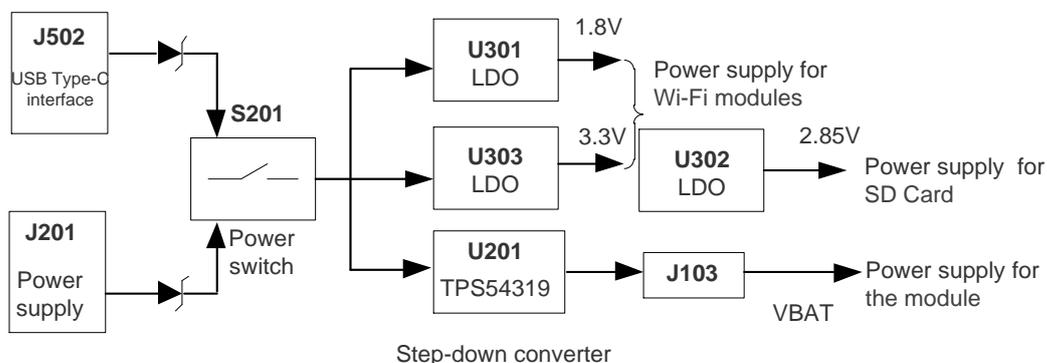
Figure 7: EVB Power Supply Block Diagram
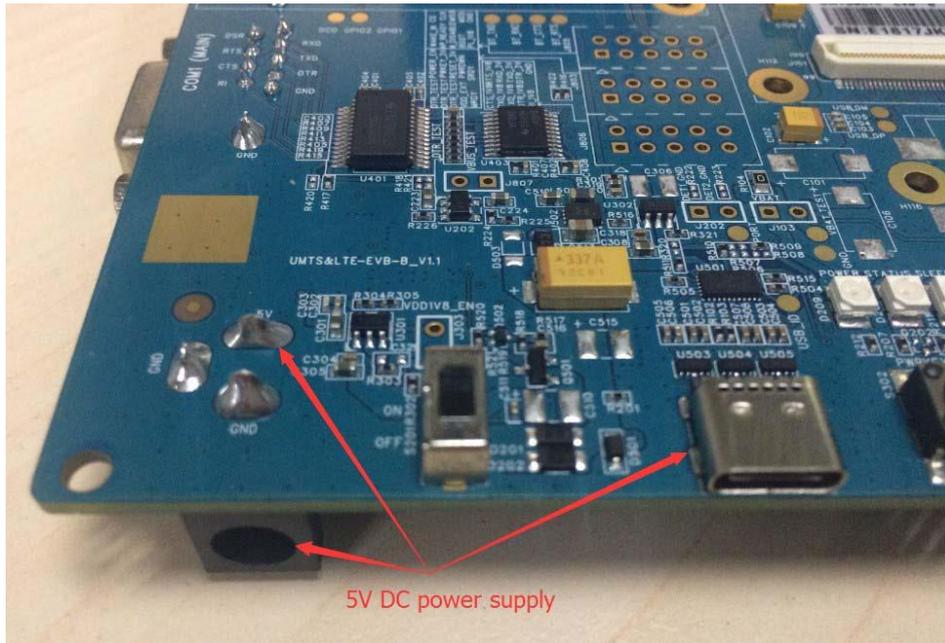
Figure 8: EVB Power Supply Interface

When using the power jack for power supply, the power plug design of the adapter is shown as below.
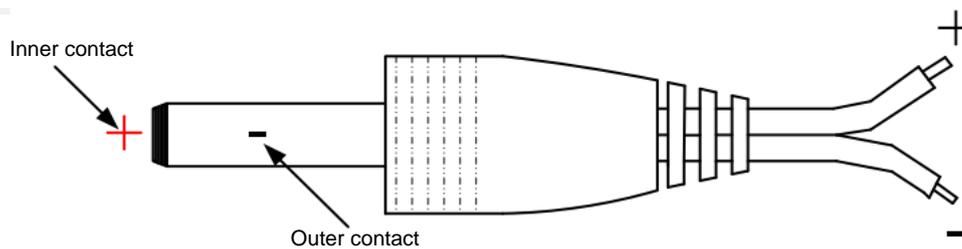
Figure 9: Power Plug Design

4.2. UMTS&LTE TE-A Connectors (J101/J102)

The UMTS&LTE TE-A connector is designed to accommodate the TE-A of the module. The TE-A is connected to the EVB via BTB connectors J101 and J102, which allows customers to easily test the functionalities of the module or develop applications based on the module.

The following figure shows the connection between the TE-A and the EVB.

Figure 10: Connection between TE-A and EVB

4.3. USB Connector (J502)

The UMTS&LTE EVB R2.0 provides a USB Type-C receptacle J502 for connection with the module. The USB data lines D+ and D- are connected directly to the module. The CC1 and CC2 lines can be used to configure Type-C channel signals. The VBUS lines can be used for USB connection detection and EVB power supply.

Table 4: Pin Assignment of J502

A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12
GND	TX1+	TX1-	VBUS	CC1	D+	D-	SBU1	VBUS	RX2-	RX2+	GND
GND	RX1+	RX1-	VBUS	SBU2	D-	D+	CC2	VBUS	TX2-	TX2+	GND
B12	B11	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1

The following figure shows the connection of the module and the USB Type-C receptacle.
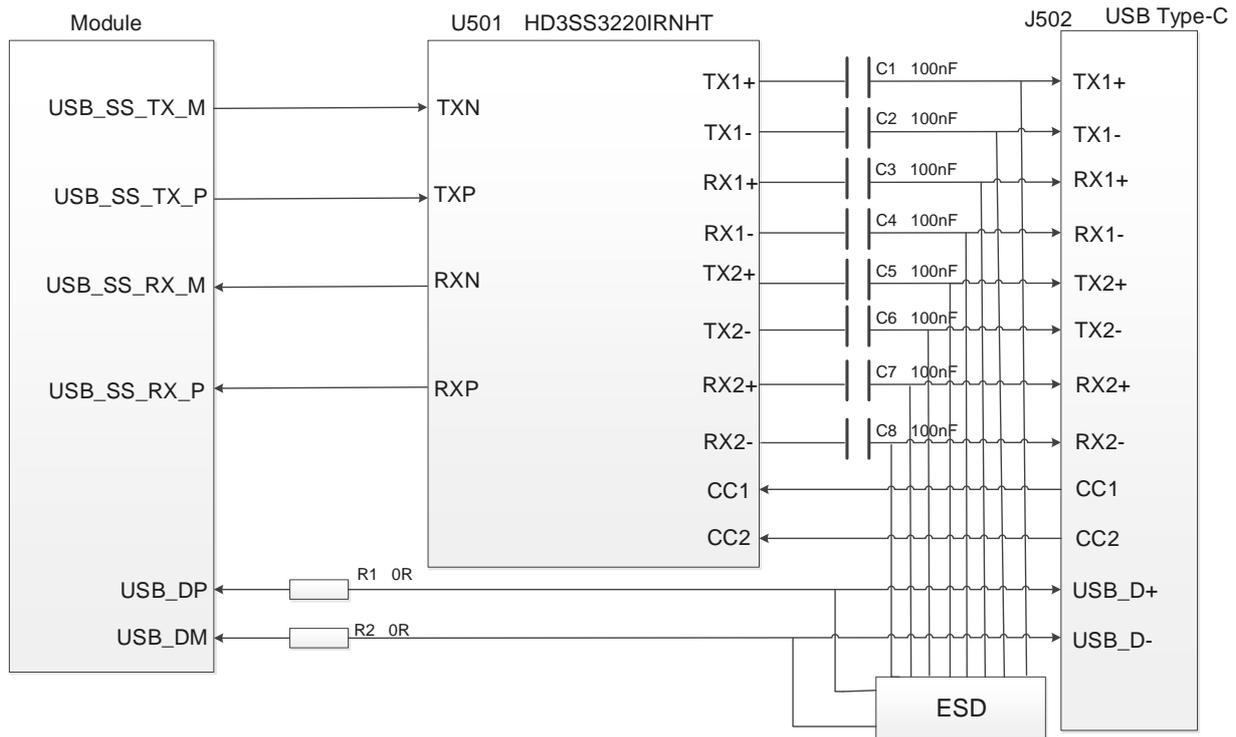
Figure 11: Diagram for Module and USB Type-C Receptacle Connection

4.4. Audio Connectors

The UMTS&LTE EVB R2.0 provides one digital audio codec board connector (PCM) J501, two analog audio connectors J601 and J602, and loudspeakers test points J603.

4.4.1. Digital Audio Codec Board Connector (J501)

The digital audio codec used on the codec board is TLV320AIC3104. The codec board can be connected to the EVB through the BTB connector J501.

The following figures show the connection between the digital audio codec board and the EVB.
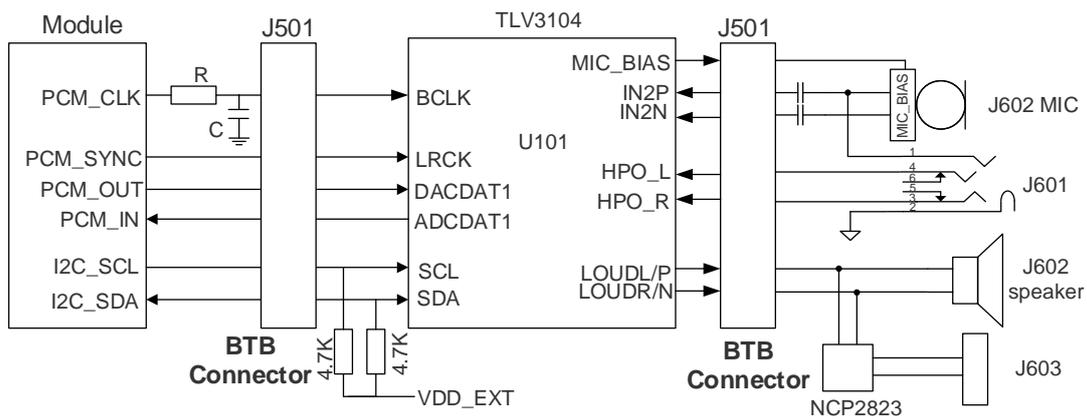
Figure 12: Diagram for Codec Board and EVB Connection
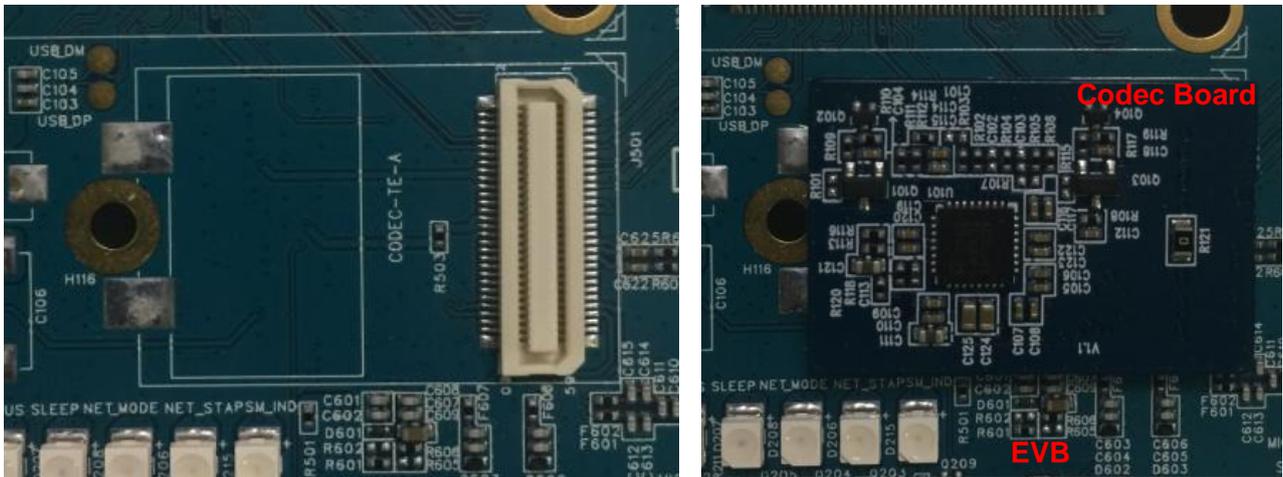
Figure 13: Connection between Codec Board and EVB

4.4.2. Analog Audio Connectors (J601/J602)

4.4.2.1. Earphone Connector (J601)

Audio connector J601 is designed for earphones. Its diagram is shown in the following figure.
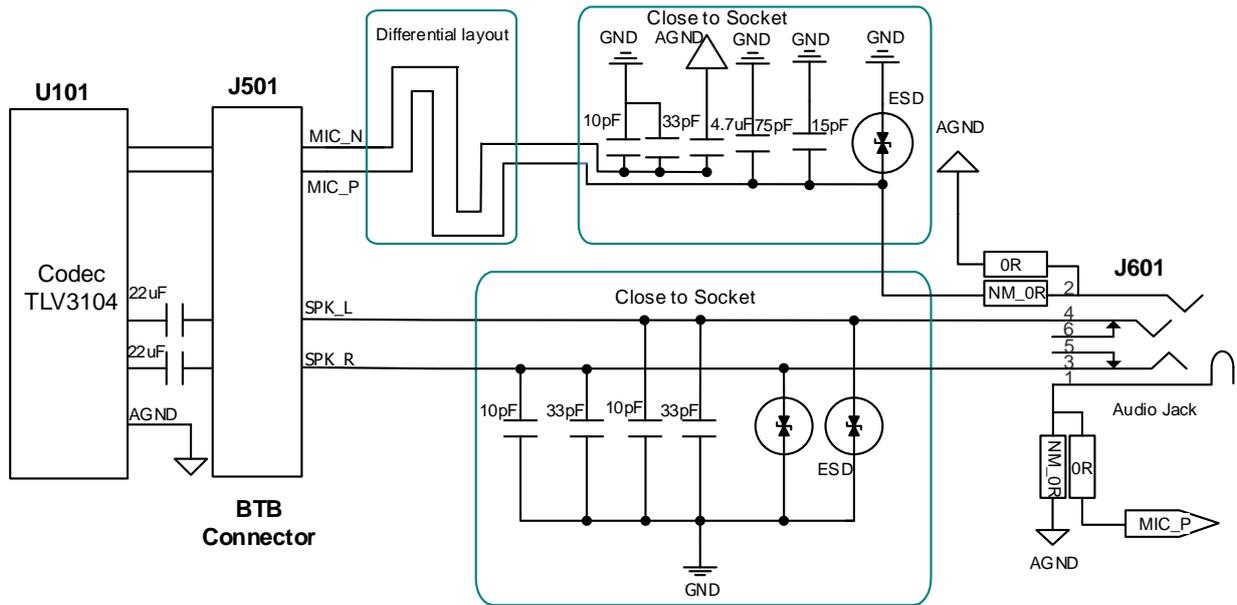
Figure 14: Diagram for Earphone Connector J601

The figure and table below illustrate the pin assignment and pin definition of earphone connector J601.
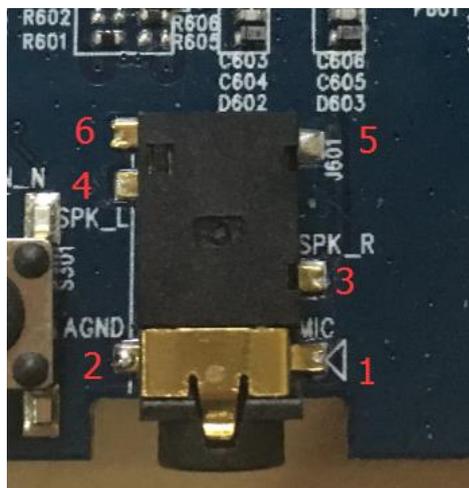
Figure 15: Pin Assignment of Earphone Connector J601

Table 5: Pin Definition of J601

Pin No.	Pin Name	Description
1	MIC	Microphone input
2	AGND	Dedicated GND for audio

3	SPK_R	Right channel of stereo audio output
4	SPK_L	Left channel of stereo audio output
5, 6	NC	Not connected

The following figure shows the design sketch of audio plug which suits the audio jack on UMTS&LTE EVB R2.0.
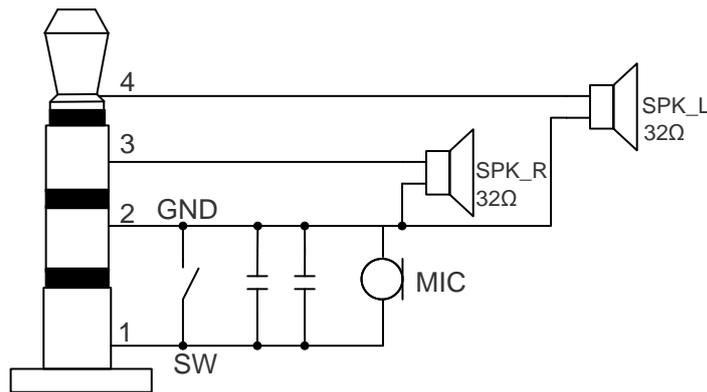
Figure 16: Sketch Design of Audio Plug

4.4.2.2. Handset Connector (J602)

Audio connector J602 is designed for handsets. Its diagram is shown as below.
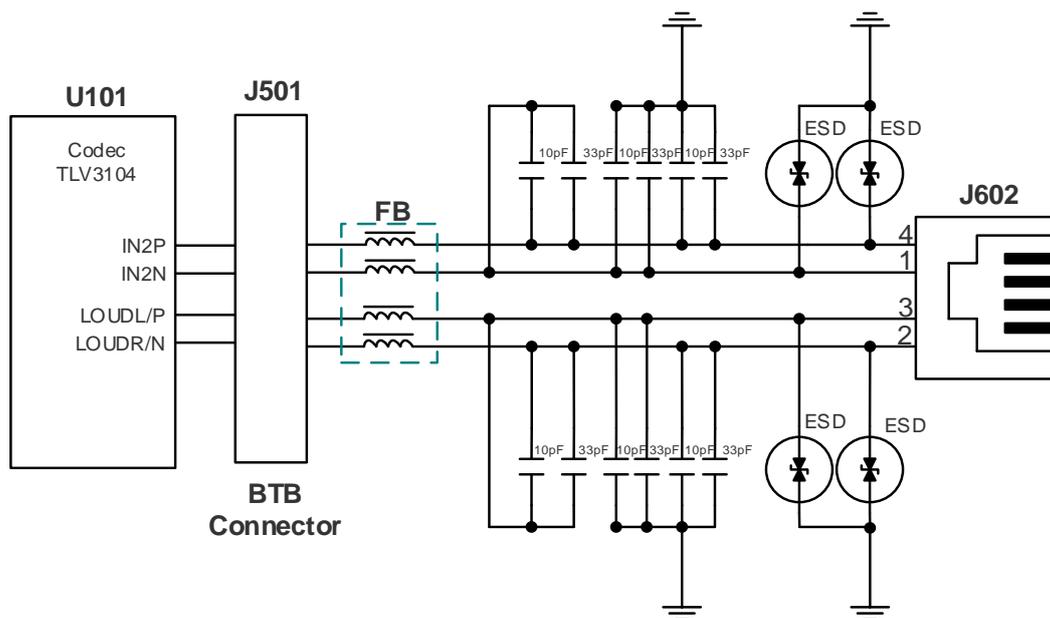
Figure 17: Diagram for Handset Connector J602

The figure and table below illustrate the pin assignment and pin definition of handset connector J602.
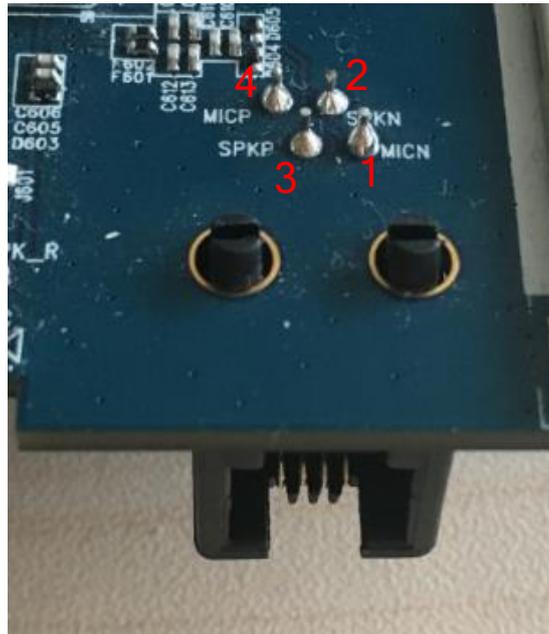
Figure 18: Pin Assignment of Handset Connector J602

Table 6: Pin Definition of J602

Pin No.	Pin Name	Function
1	MICN	Negative microphone input
2	SPKN	Negative loudspeaker output
3	SPKP	Positive loudspeaker output
4	MICP	Positive microphone input

4.4.3. Test Points for Loudspeaker (J603)

The two test points (J603) are designed for loudspeaker and the following figure shows the loudspeaker with an external Class-D audio amplifier.
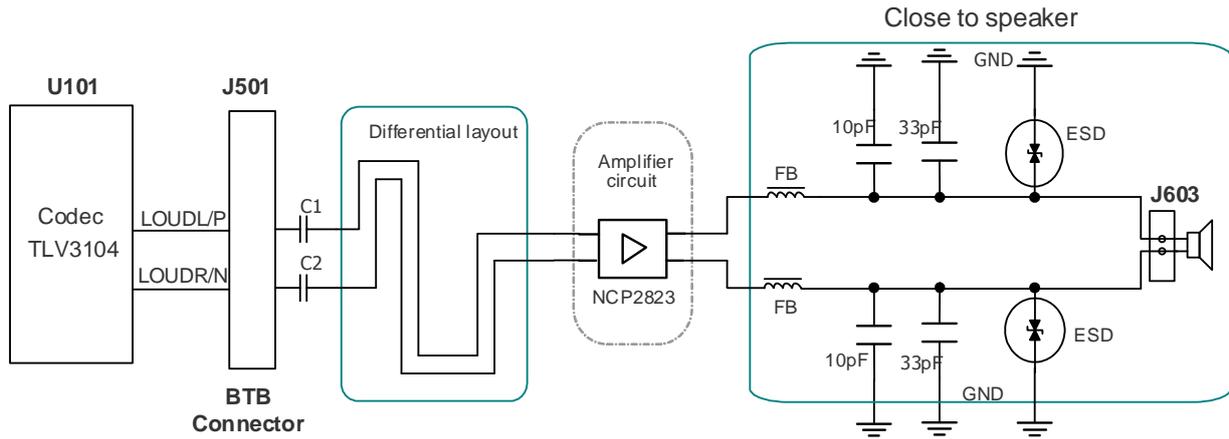
Figure 19: Diagram for Loudspeaker Connector J603

4.5. (U)SIM Card Connector (J702)

The UMTS&LTE EVB R2.0 provides a 6-pin push-push type (U)SIM card connector J702 which supports 1.8V/3.0V (U)SIM card. Its diagram is shown as below.
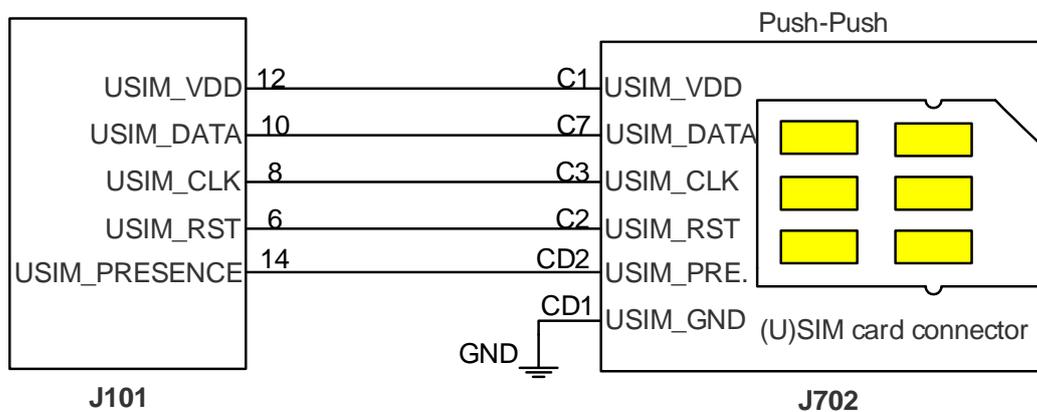
Figure 20: Diagram for (U)SIM Card Connector J702

The following are the pin assignment and pin definition of J702.
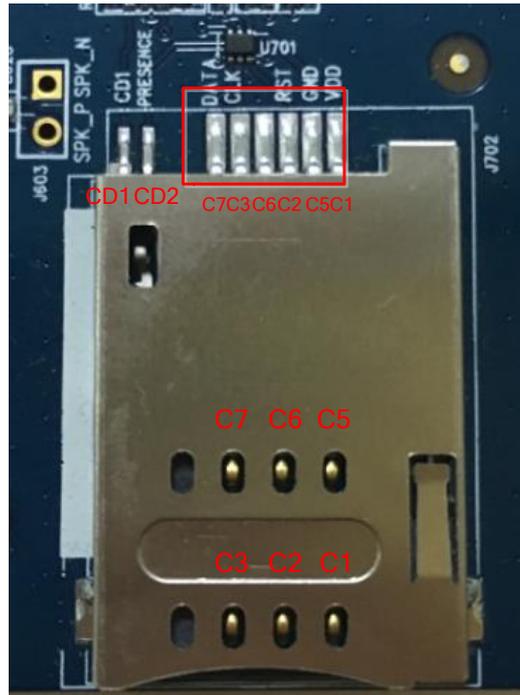
Figure 21: Pin Assignment of (U)SIM Card Connector J702

Table 7: Pin Definition of J702

Pin No.	Signal Name	I/O	Function
C1	USIM_VDD	PO	(U)SIM card power supply, provided by UMTS&LTE EVB R2.0
C2	USIM_RST	DO	(U)SIM card reset
C3	USIM_CLK	DO	(U)SIM card clock
C5	GND	/	Ground
C6	NC	/	Not connected
C7	USIM_DATA	IO	(U)SIM card data
CD1	GND	/	ground
CD2	USIM_PRESENCE	DI	(U)SIM card insertion detection. Active low.

4.6. SD Card Connector (J701)

The UMTS&LTE EVB R2.0 provides an SD card connector that supports Micro SD card with maximum 32GB storage capacity. With the SD card interface, customers can easily increase the storage capacity of EG06/EG12/EG18 module.

The diagram for J701 is shown as below.
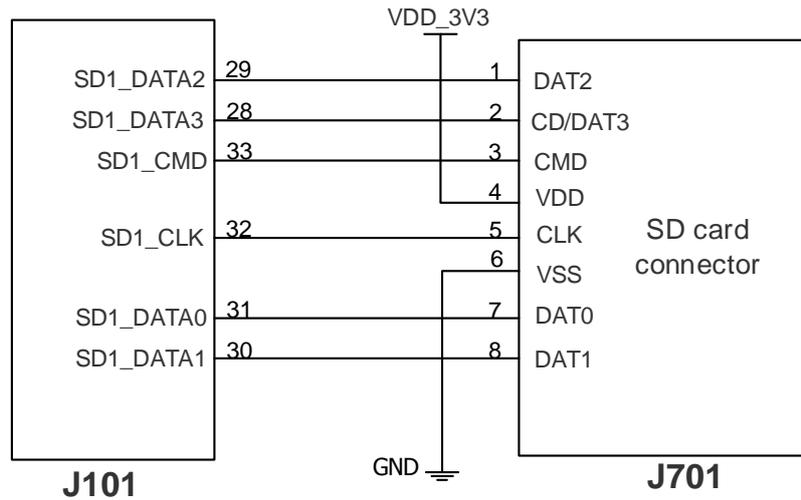
Figure 22: Diagram for SD Card Connector J701

Figure 23: Pin Assignment of SD Card Connector J701

Table 8: Pin Definition of J701

Pin No.	Pin Name	I/O	Description
1	DAT2	IO	SDIO data (bit 2)
2	CD/DAT3	IO	SDIO data (bit 3)
3	CMD	DI	SDIO command
4	VDD	PO	SD card power supply
5	CLK	DI	SDIO clock
6	VSS		Ground
7	DAT0	IO	SDIO data (bit 0)
8	DAT1	IO	SDIO data (bit 1)

4.7. UART Connectors (J401/J402)

The UMTS&LTE EVB R2.0 offers two UART ports (COM1 and COM2) via two UART connectors J401 and J402.

The main UART port COM1 is intended for the communication between the module and the host application. It can be used for data transmission and AT command communication.

The debug UART port COM2 supports 115200bps baud rate by default. It can be used for Linux console and log output.

The following figure shows the block diagram of UART connectors on UMTS&LTE EVB R2.0.
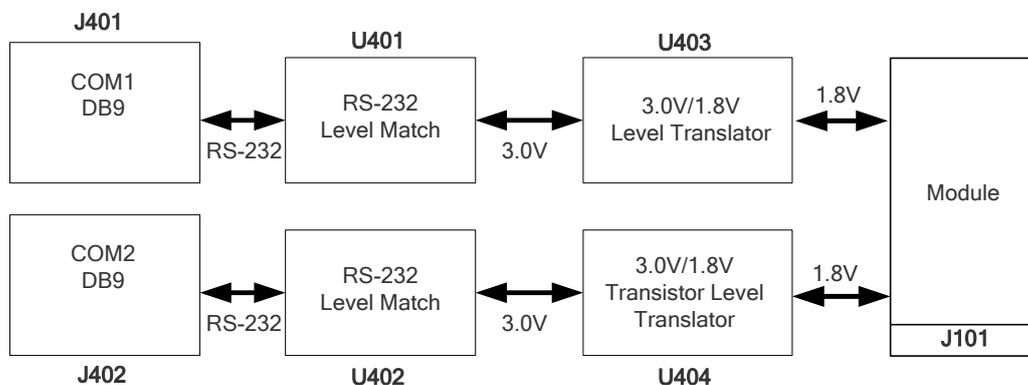
Figure 24: UART Block Diagram

The figure and table below illustrate the pin assignment and pin definition of J401 and J402.

Figure 25: Pin Assignment of UART Connector J401

Table 9: Pin Definition of J401

Pin No.	Pin Name	I/O	Description
1	DCD	DO	Data carrier detection
2	RXD	DI	Receive data
3	TXD	DO	Transmit data
4	DTR	DI	Data terminal ready
5	GND	/	GND
6	DSR	/	Not connected
7	RTS	DI	Request to send
8	CTS	DO	Clear to send
9	RI	DO	Ring indication
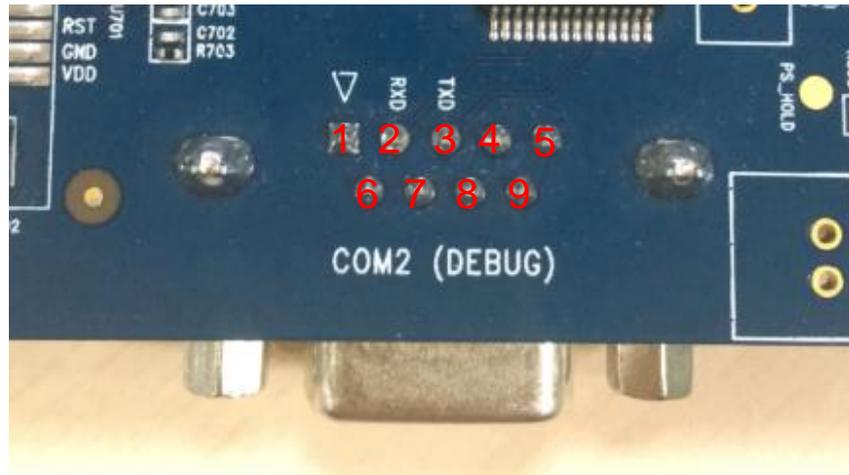
Figure 26: Pin Assignment of UART Connector J402

Table 10: Pin Definition of J402

Pin No.	Pin Name	I/O	Description
1, 4, 6, 7, 8, 9	NC		Not connected
2	RXD	DI	Receive Data
3	TXD	DO	Transmit data
5	GND		Ground

4.8. Switches and Buttons

The UMTS&LTE EVB R2.0 includes three switches (S201, S901 and S902) and three buttons (S301, S302 and S303), as shown in the following figures.
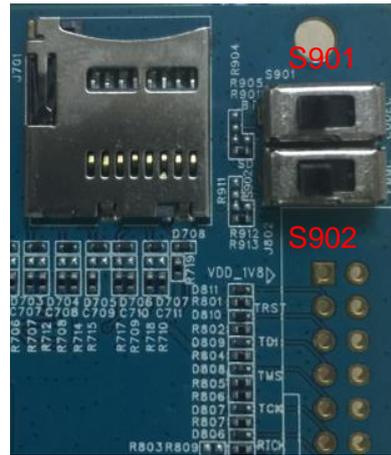
Figure 27: S901 and S902 Switches
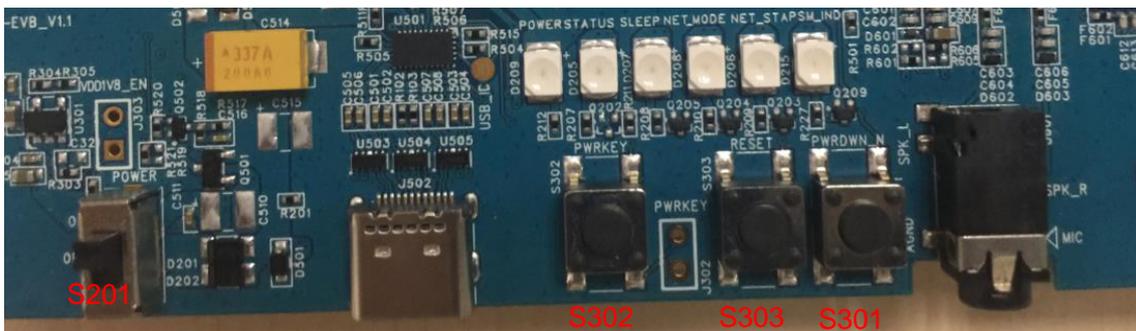
Figure 28: S201 Switch and S301/S302/S303 Buttons

Table 11: Description of Switches and Buttons

Reference No.	Description
S201	VBAT Power ON/OFF control
S901	● Switched to the left: function reserved. ● Switched to the right: connect the codec board connector on EVB to the module, for testing the codec's PCM function.
S902	● Switched to the left: connect SD card connector to the module, for testing the SD card function of the module. ● Switched to the right: connect the eMMC connector to the module, for testing the eMMC* function.
S302	Used to turn on/off the module

S303	Used to reset the module
S301	Reserved

NOTE

"*" means eMMC function is under development, and the eMMC component is not mounted.

4.9. Status Indicators

The UMTS&LTE EVB R2.0 provides six status indicators (D209, D205, D207, D208, D206 and D215). The following figure shows the location of these LED indicators.

Figure 29: Status Indicators

Table 12: Description of Status Indicators

Reference No.	Description
D209	VBAT power ON/OFF indicator. Indicates whether the module is powered on. Bright: VBAT ON Extinct: VBAT OFF
D205	Turn ON/OFF indicator. Indicates the operation status of the module. Bright: The module is turned on.

	Extinct: The module is turned off.
D207	Sleep status indicator. Indicates the sleep status of the module. Bright: The module is in sleep mode. Extinct: The module is not in sleep mode.
D208, D206	Network status indicator. Indicates the network status of the module.

The following table shows the module's network status and mode which are indicated via D206 and D208.

Table 13: Indication of D206 and D208

Status Indicators	State	Network Status
D206 NET_STATUS	Flicker slowly (200ms ON/1800ms OFF)	Network searching
	Flicker slowly (1800ms ON/200ms OFF)	Idle mode
	Flicker slowly (125ms ON/125ms OFF)	Data is being transferred over network
	Always ON	Voice calling
D208 NET_MODE	Always ON	Registered on 3G/4G network successfully
	Always OFF	Others

4.10. Test Points

The UMTS&LTE EVB R2.0 provides a series of test points. They can help customers to obtain the corresponding waveform of some signals. The following three figures show test points J803, J804, J805, J806 and J403.
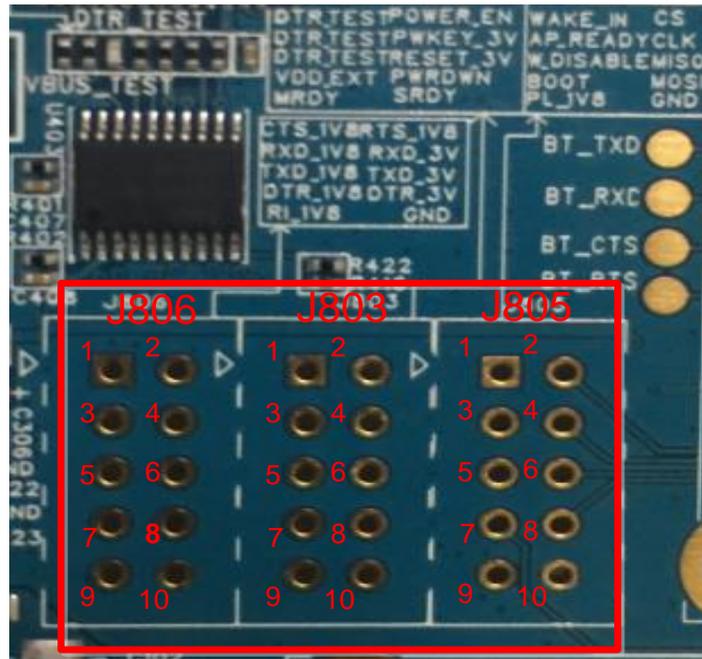
Figure 30: Test Points (J803, J805 and J806)
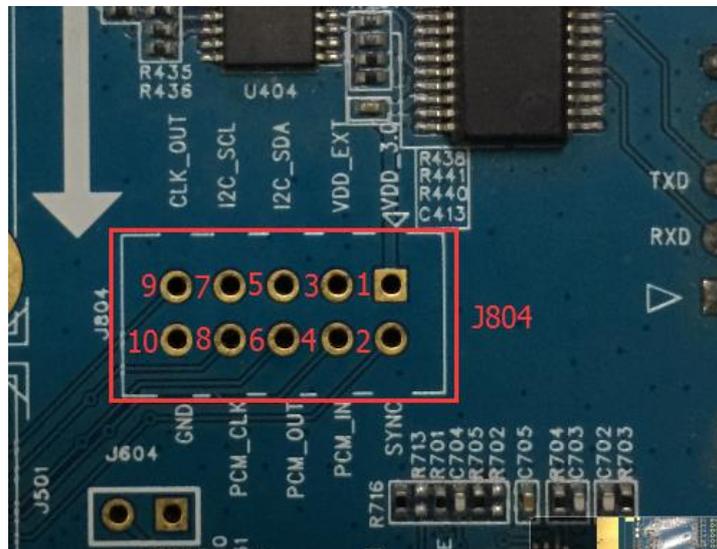
Figure 31: Test Points of J804
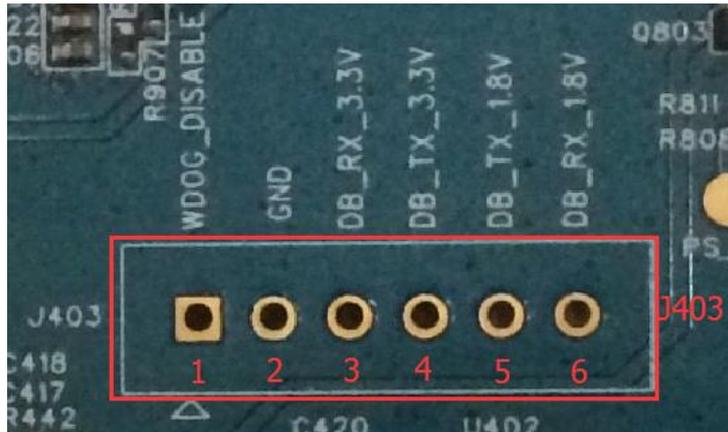
Figure 32: Test Points of J403

Table 14: Pin Definition of J803, J804, J805, J806 and J403

J803		
Pin No.	**Pin Name**	**Description**
1, 3, 5	DTR_TEST	Data terminal ready test pins
2	POWER_EN	VBAT enable pin
4	PWRKEY_3.0V	PWRKEY_3.0V test pin
6	RESET_3.0V	RESET_3.0V test pin
7	VDD_EXT	Connected directly to VDD_EXT of the module
8	POWER_OFF_3.0V	Reserved
9	SPI_MRDY	Reserved
10	SPI_SRDY	Reserved
J804		
Pin No.	**Pin Name**	**Description**
1	VDD_3.0V	3.0V power supply from LDO U303
2	PCM_SYNC	Connected directly to PCM_SYNC of the module
3	VDD_1V8	1.8V power supply from LDO U301

4	PCM_IN	Connected directly to PCM_IN of the module
5	I2C_SDA	Connected directly to I2C_SDA of the module
6	PCM_OUT	Connected directly to PCM_OUT of the module
7	I2C_SCL	Connected directly to I2C_SCL of the module
8	PCM_CLK	Connected directly to PCM_CLK of the module
9	CLK_OUT	I2S_MCLK
10	GND	Ground

J805		
Pin No.	**Pin Name**	**Description**
1	WAKE_IN	Connected directly to WAKEUP_IN of the module
2	SPI_CS_N	Not connected
3	AP_READY	Not connected
4	SPI_CLK	Not connected
5	W_DISABLE_N	Connected directly to W_DISABLE# of the module
6	SPI_MISO	Not connected
7	USB_BOOT	Connected directly to USB_BOOT of the module
8	SPI_MOSI	
9	VDD_1.8V	Connected to VDD_1.8V via a resistor
10	GND	Ground

J806		
Pin No.	**Pin Name**	**Description**
1	CTS_1.8V_UART	Connected directly to the voltage translator
2	RTS_1.8V_UART	Connected directly to the voltage translator
3	RXD_1.8V_UART	Connected directly to the voltage translator
4	RXD_3.0V	Connected directly to the voltage translator

5	TXD_1.8V_UART	Connected directly to the voltage translator
6	TXD_3.0	Connected directly to the voltage translator
7	DTR_1.8V	Connected directly to DTR of the module
8	DTR_3.0V	Connected directly to the voltage translator
9	RI_1.8V	Connected directly to RI of the module
10	GND	Ground
J403		
Pin No.	**Pin Name**	**Description**
1	WDOG_DISABLE	Not Connected
2	GND	Ground
3	DB_RX_3.3V	Connected directly to the voltage translator
4	DB_TX_3.3V	Connected directly to the voltage translator
5	DB_TX_1.8V	Connected directly to DBG_TXD of the module
6	DB_RX_1.8V	Connected directly to DBG_RXD of the module

5 Operation Procedures Illustration

This chapter introduces how to use the UMTS&LTE EVB R2.0 for testing and evaluation of EG06/EG12/EG18 module.

5.1. Turn on the Module

1. Connect the TE-A of the module to the EVB via connectors J101 and J102.

2. Insert a (U)SIM card into the (U)SIM card connector on EVB, and connect the antennas to the TE-A.

3. Connect the EVB to a 5V power adapter, or connect the EVB to PC via USB Type-C cable.

4. Switch S201 (VBAT Power ON/OFF Switch) to **ON** state, then D209 (VBAT ON/OFF indicator) will light up. Press the S302 (PWRKEY) for at least 100ms, then the module will be turned on and D205 (turn ON/OFF indicator) will light up.

5.2. Communication via USB or UART Interface

5.2.1. Communication via USB Interface

1. Turn on the module according to the procedures mentioned in *Chapter 5.1*.

2. Connect the EVB and the PC with USB Type-C cable through USB connector J502, and then run the driver disk on PC to install the USB driver. For details about USB driver installation, please refer to *document [7]* stored in USB drive disk. The USB port numbers can be viewed through the PC Device Manager, as shown below.

Figure 33: USB Ports

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

    The following figure shows the COM Port Setting field on QCOM: select the correct "**COM Port**" (USB AT Port which is shown in above figure) and set the correct "**Baudrate**" (such as 115200bps). For more details about QCOM tool usage and configuration, please refer to *document [6]*.
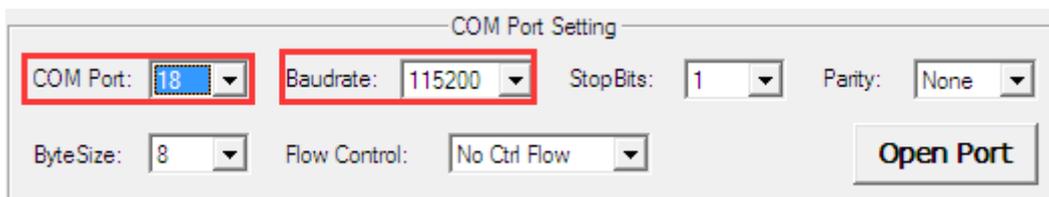
Figure 34: COM Port Setting Field on QCOM (USB AT Port Connection)

5.2.2. Communication via UART Interface

1. Run the driver disk on PC to install the USB to RS-232 driver.

2. Connect the EVB to PC with USB to RS-232 converter cable through the main UART connector, and the USB serial port number can be viewed through the PC Device Manager, as shown below.

Figure 35: USB Serial Port

3. Install and then use the QCOM tool provided by Quectel to realize the communication between the module and the PC. The following figure shows the COM Port Setting field on QCOM: select the correct "**COM Port**" (USB Serial Port) and set the correct "**Baudrate**" (such as 115200bps). For more details about QCOM tool usage and configuration, please refer to *document [6]*.
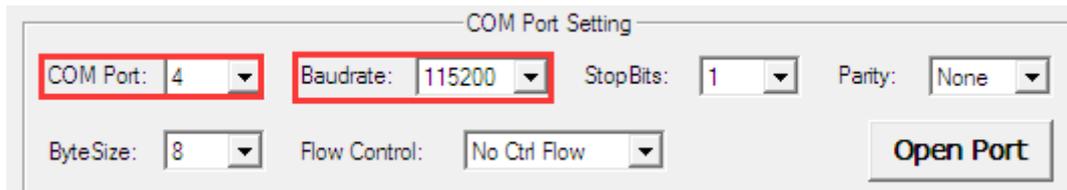
Figure 36: COM Port Setting Field on QCOM (USB Serial Port Connection)

5.3. Firmware Upgrade

The firmware of the module is upgraded via USB port by default. Please follow the procedures below to upgrade the firmware.

1. Install and open the firmware upgrade tool QFlash on PC and then turn on the module according to the procedures mentioned in **Chapter 5.1**. For more details about QFlash, please refer to **document [8]**.

2. Click the "**COM Port**" dropdown list and select the USB DM port.

3. Click the "**Load FW Files**" button to choose the firmware package.

4. Click the "**Start**" button to upgrade the firmware.
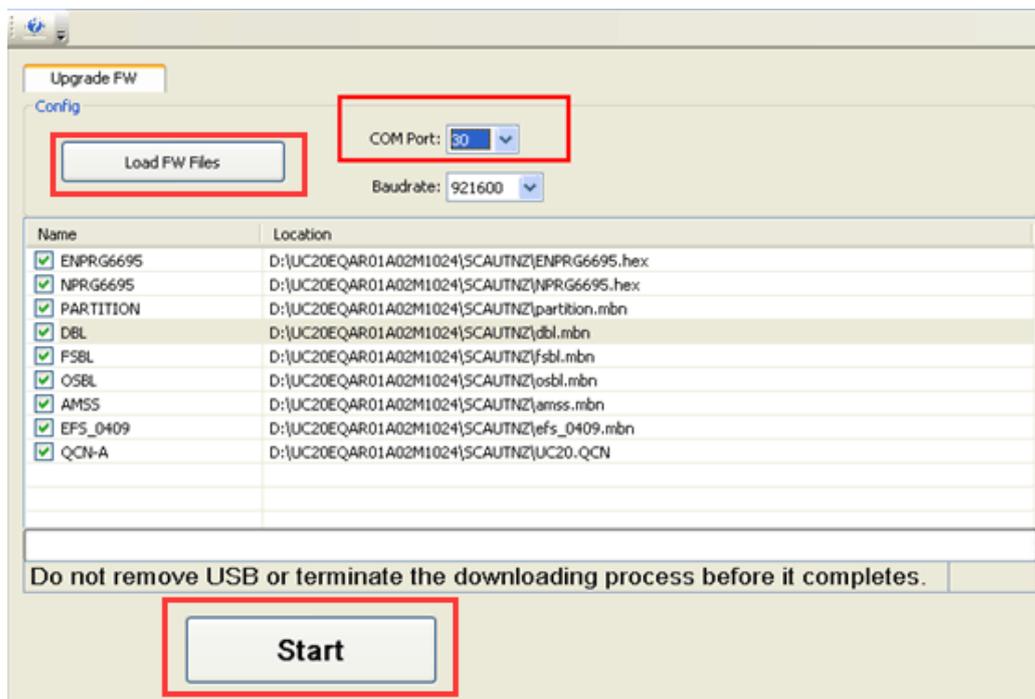
Figure 37: QFlash Tool Configurations for Firmware Upgrade

5.4. Reset the Module

The reset option is only used in case of emergency. For example, the software does not respond for more than 5s due to some serious problems.

Press the RESET button S303 for more than 150ms then release it to reset the module. However, this operation may cause the loss of information stored in the memory as the reset module has been initialized.

5.5. Turn off the Module

There are two ways to turn off the module.

One way is to execute **AT+QPOWD** command. This is the best and the safest way since the module will log off from the network and save data before shutdown. When turning off module with AT command, please keep PWRKEY at high level after the execution of power-off command, otherwise the module will be turned on again after successful turn-off. For more details about the AT command, please refer to *document [4]* and *[5]*.

The other way to turn off the module is to press down S302 (PWRKEY) for at least 0.6s.

5.6. Test Current Consumption of the Module

The UMTS&LTE EVB R2.0 can also be used to test the current consumption of the module after making modifications according to the following steps.

1. Remove R104.
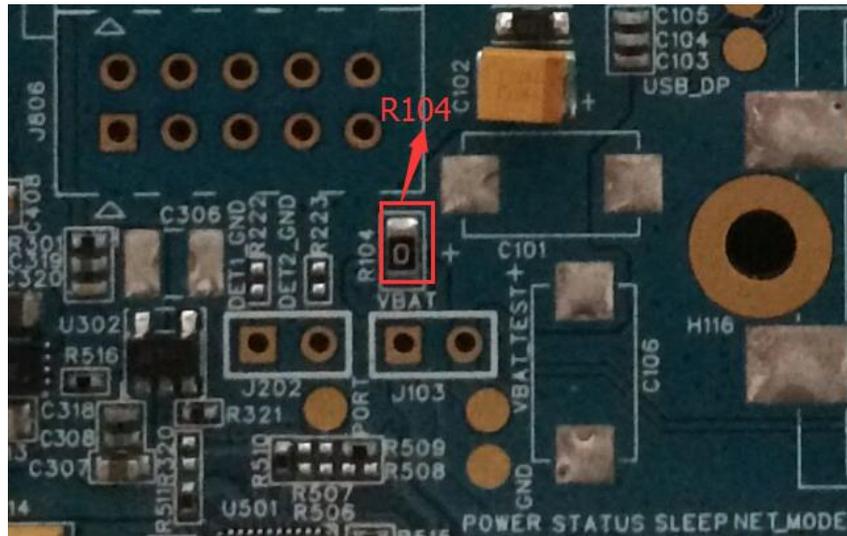
Figure 38: Location of R104

2. Connect an external power supply to J103 to supply power for the module independently.
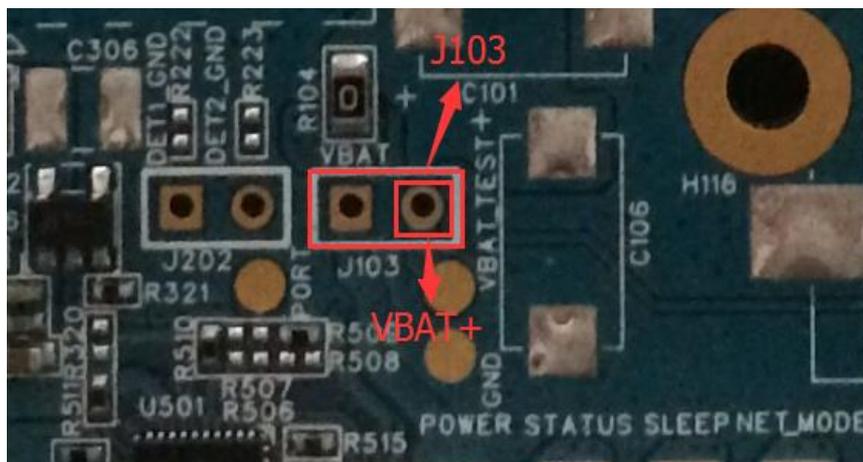
Figure 39: Location of J103

3. Turn on the module according to the procedure mentioned in *Chapter 5.1* and then test the current consumption of the module.

6 Appendix A References

Table 15: Related Documents

SN	Document Name	Remark
[1]	Quectel_EG06_Hardware_Design	Hardware design of EG06 module
[2]	Quectel_EG12_Hardware_Design	Hardware design of EG12 module
[3]	Quectel_EG18_Hardware_Design	Hardware design of EG18 module
[4]	Quectel_EP06&EG06&EM06_AT_Commands_ Manual	AT commands manual for EP06, EG06 and EM06 modules
[5]	Quectel_EM12&EG12&EG18_AT_Commands_Manual	AT commands manual for EM12, EG12 and EG18 modules
[6]	Quectel_QCOM_User_Guide	User guide for QCOM tool
[7]	Quectel_LTE&5G_Windows_USB_Driver_Installation_ Guide	Windows USB driver installation guide for LTE and 5G modules
[8]	Quectel_QFlash_User_Guide	QFlash user guide

Table 16: Terms and Abbreviations

Abbreviation	Description
AGND	Analog Ground
BTB	Board-to-Board
COM	Cluster Communication Port
DC	Direct Current
DI	Digital Input
DO	Digital Output
eMMC	Embedded Multi Media Card

EVB	Evaluation Board
GND	Ground
GNSS	Global Navigation Satellite System
I/O	Input/Output
LED	Light Emitting Diode
LTE	Long Term Evolution
MIC	Microphone
NC	Not Connected
PC	Private Computer
PCB	Printed Circuit Board
PCM	Pulse Code Modulation
PO	Power Output
RF	Radio Frequency
SD	Secure Digital
UART	Universal Asynchronous Receiver & Transmitter
UMTS	Universal Mobile Telecommunications System
USB	Universal Serial Bus
(U)SIM	(Universal) Subscriber Identity Module
VBAT	Voltage of Battery