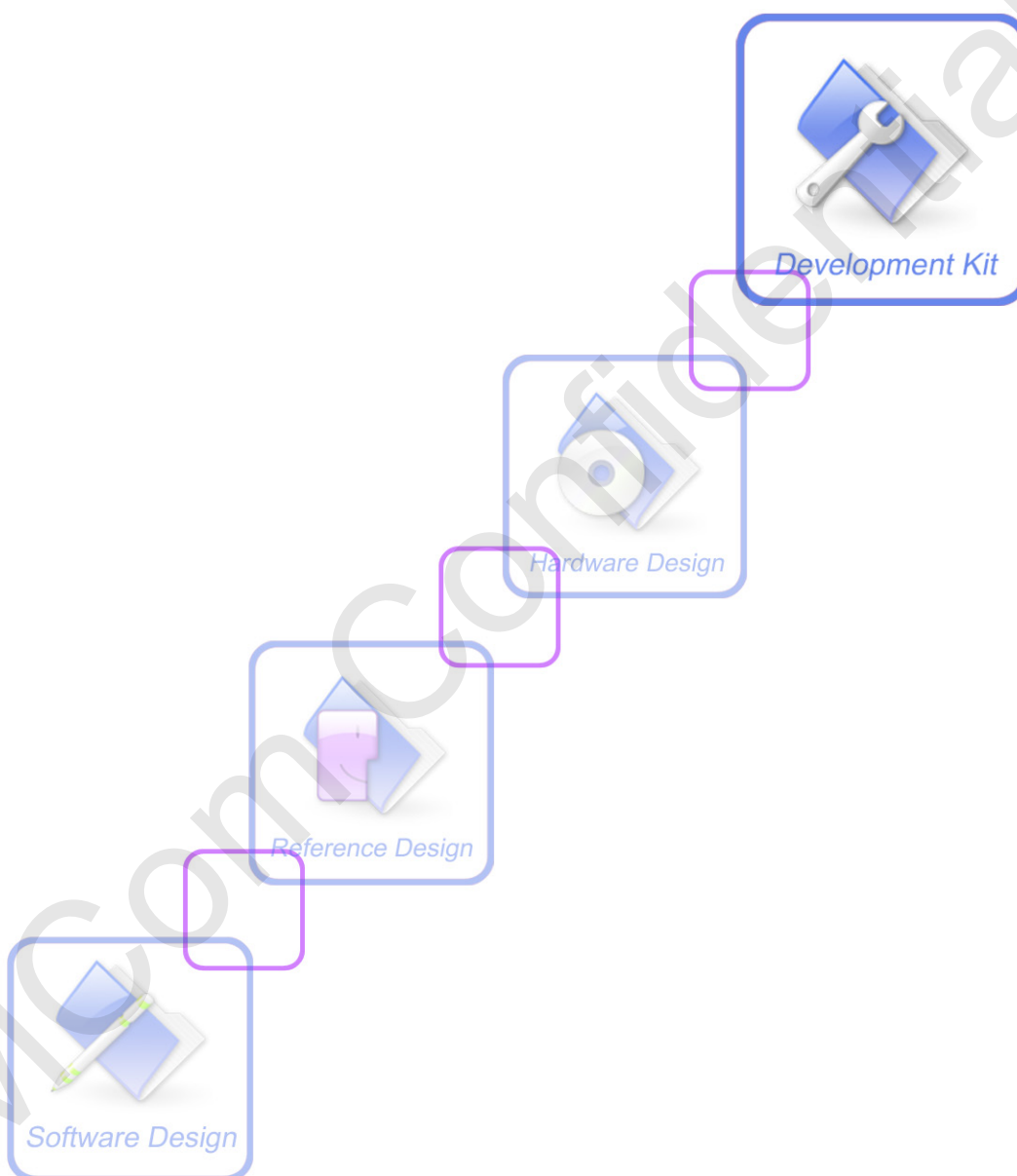


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Version History

Data	Version	Description of change	Author
2019-06-14	1.00	Origin	xiuyu.zhang

SCOPE

This document describes how to use SIM7900-EVB to do test; user can get useful info about the SIM7900-EVB quickly through this document.

This document is subject to change without notice at any time.

1. SIM7900-EVB overview

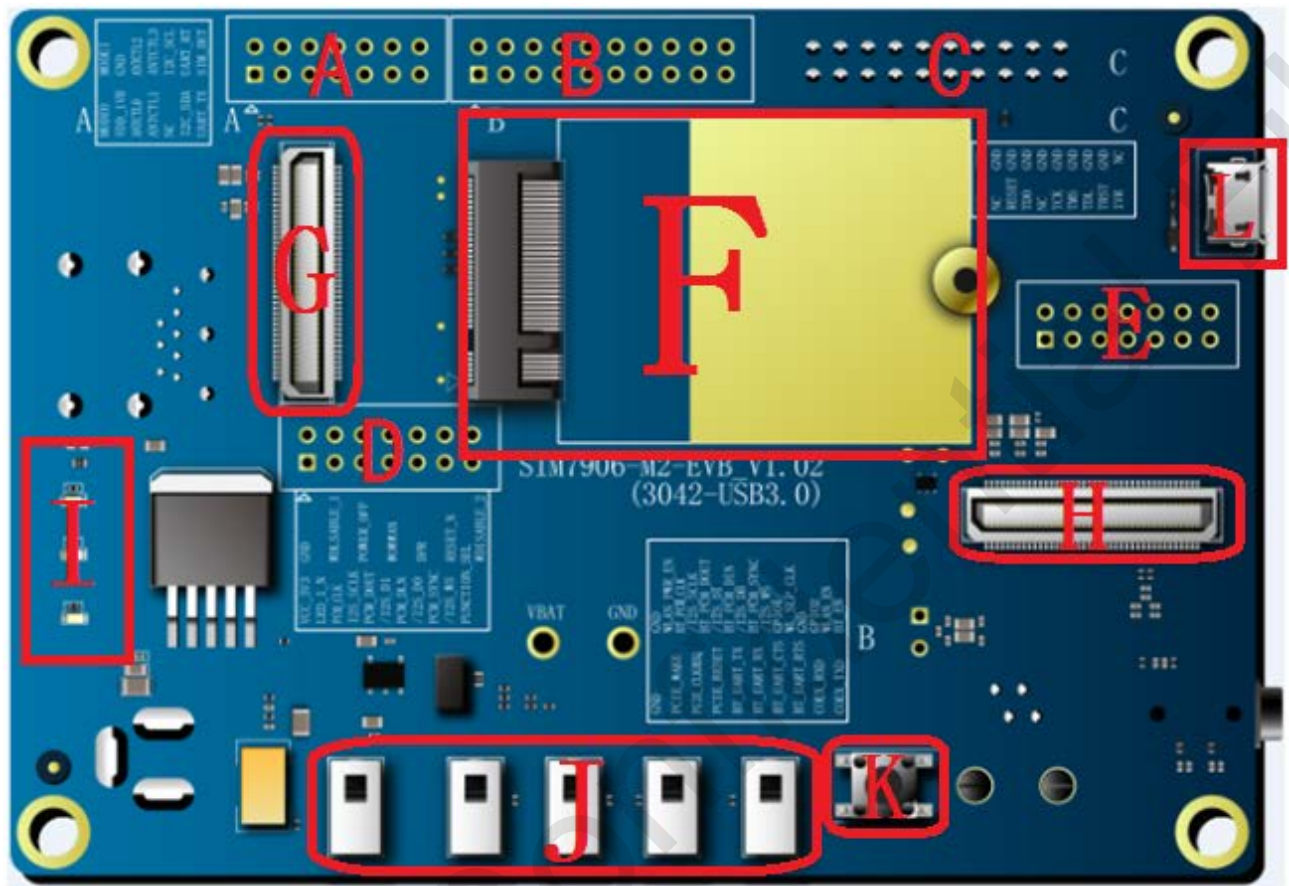


Figure 1: SIM7900-EVB top view

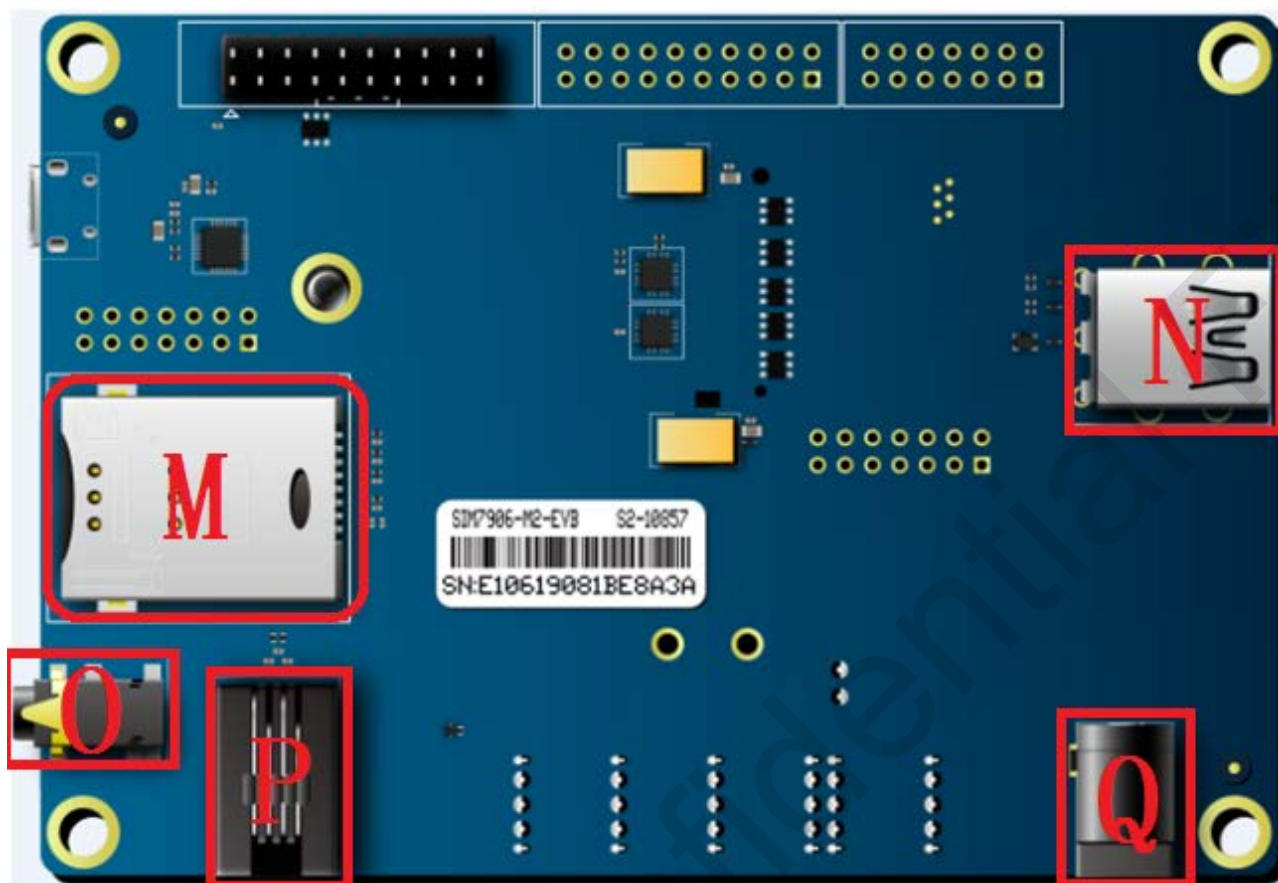


Figure 2: SIM7900-EVBbottom view

- A: Test point A (M.2 signals)
- B: Test point B (WIFI signals)
- C: Test point C (JTAG signals)
- D: Test point D (M.2 signals)
- E: Test point E (UART & AUDIO signals)
- F: M.2 card connector
- G: WIFI board connector
- H: Audio board connector
- I: Indicated LEDs
- J: System control switches
- K: System reset key
- L: USB connector (UART signals)
- M: UIM card connector with SIM_DET signal
- N: USB2.0/3.0 interface
- O: Headphones jack
- P: Handset Jack
- Q: Power jack

2. EVB Accessory



Figure 3: EVB Accessory

- A: SIM7906E-M2
- B: 5V DC adapter
- C: USB Cable
- D: RF cable line
- E: GSM/WCDMA/LTE antenna
- F: GNSS antenna

3. Accessory Interface

3.1 Power Interface

Pin	Signal	I/O	Description
1	Adapter input	I	5V/2.0A DC source input



Figure 4: Power interface

3.2 Audio Interface

There are 3 audio components on the EVB board:

- Handset jack(J402)
- Earphone jack (X400)
- Speaker test point

The signals definition of these connectors have been listed on the board near the related component, which shows below:

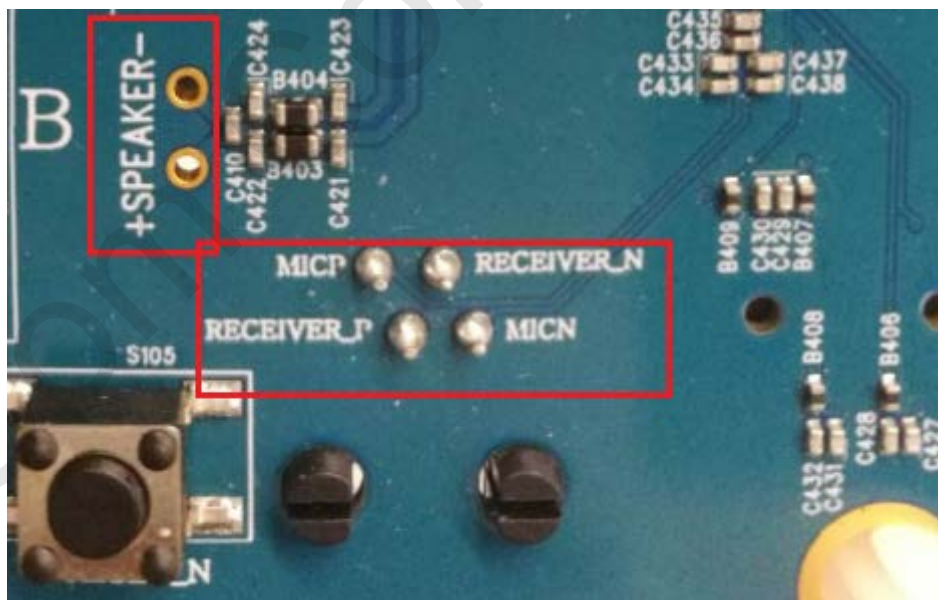


Figure 5: Handset and speaker signals

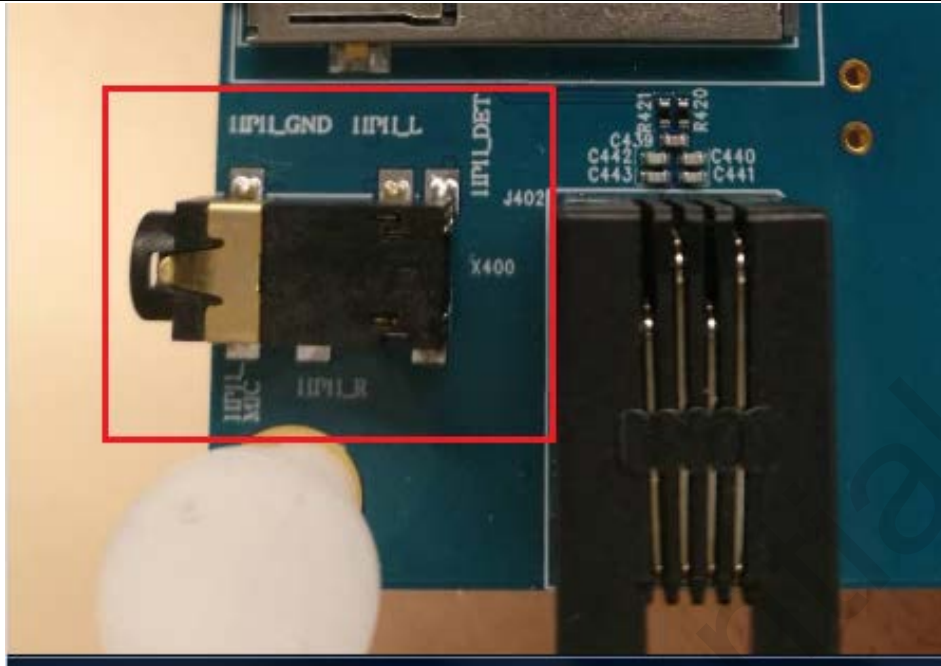


Figure 6: Headphone signals

The J403 is the connector of audio codec components, customers could use the audio board to translate the digital audio signal, like PCM and I2S, into analog audio signals, such as microphone, receiver, headphone, and speaker. The connector shows below:

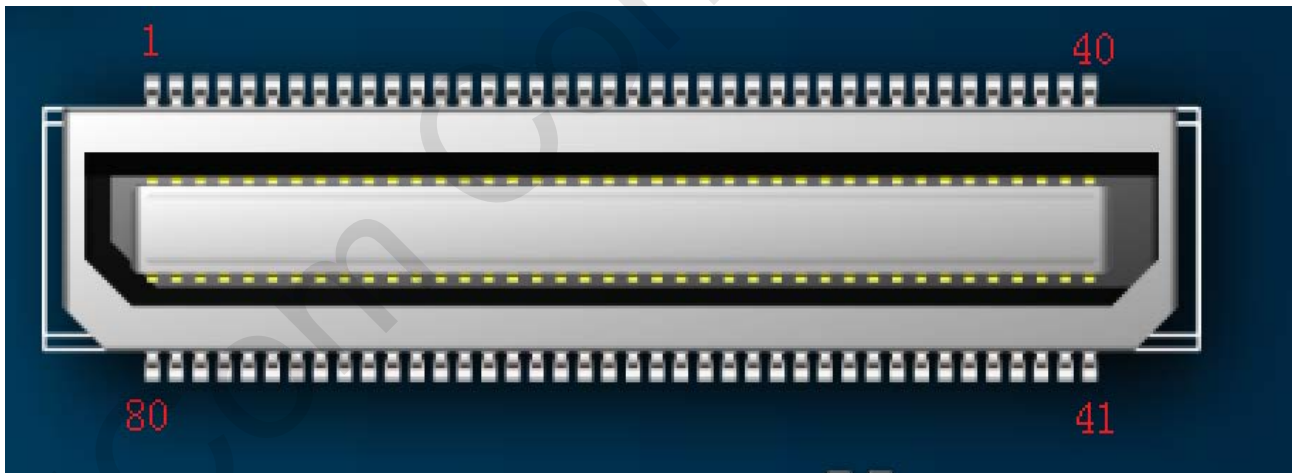


Figure 7: Audio connector J403

Connector J403 has 80 pins, the related signals definition list below.

Table 1: audio connector interface

Type	Signal	Pins	I/O	Description
POWER	GND	1,2,5,8,10,30,36,39,40,41,42,48,49,52,55,56,73,74,79,80	G	Ground

	5V	3,4	PI	5V power input
	VCC_3V3	6,7	PI	3.3V power input
	VDD_1V8	9	PI	1.8V power input
Digital audio	I2S_MCLK	31	DO	I2S main clock input
	PCM_CLK /I2S_SCLK	32	DO	PCM data clock input /I2S data clock input
	PCM_DOUT /I2S_D1	33	DO	PCM data output /I2S data output
	PCM_DIN /I2S_D0	34	DI	PCM data input /I2S data input
	PCM_SYNC /I2S_WS	35	DO	PCM synchronous signal /I2S word select
Analog audio	MIC1_N	50	AI	Negative microphone input
	MIC1_P	51	AI	Positive microphone input
	RECEIVER_N	53	AO	Negative receiver output
	RECEIVER_P	54	AO	Positive receiver output
	SPK_P	75,76	AO	Positive speaker output
	SPK_N	77,78	AO	Negative speaker output
	HPH_L	43	AO	Headphone left channel output
	HPH_R	44	AO	Headphone right channel output
	HPH_GND	45	AG	Headphone ground
	HPH_MIC	46	AI	Headphone microphone
	HPH_DET	47	DI	Headphone insert detection
Control signals	I2C_SDA	37	DIO	I2C bus data signal
	I2C_SCL	38	DO	I2C bus clock signal
RFU	NC	11 ~ 29,57 ~72		Reserved for feature use

Before using the I2C function, users should turn the function_sel switch SW100 down as the I2C interface are multiplexed with BT_CTS/RTS, and the digital audio interface PCM/I2S are multiplexed with the BT_PCM.

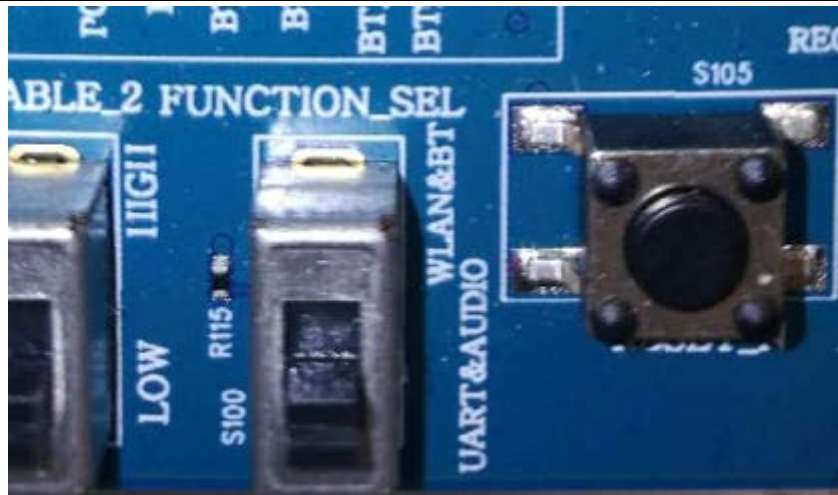


Figure 8: Function_sel switch

3.3 SIM Card Interface

SIM7900-EVB includes one SIM card connector, which locates on the bottom side. The connector J300 is a push-push sim card connector, it contains the SIM_DET signal, and the hot plug function is supported.

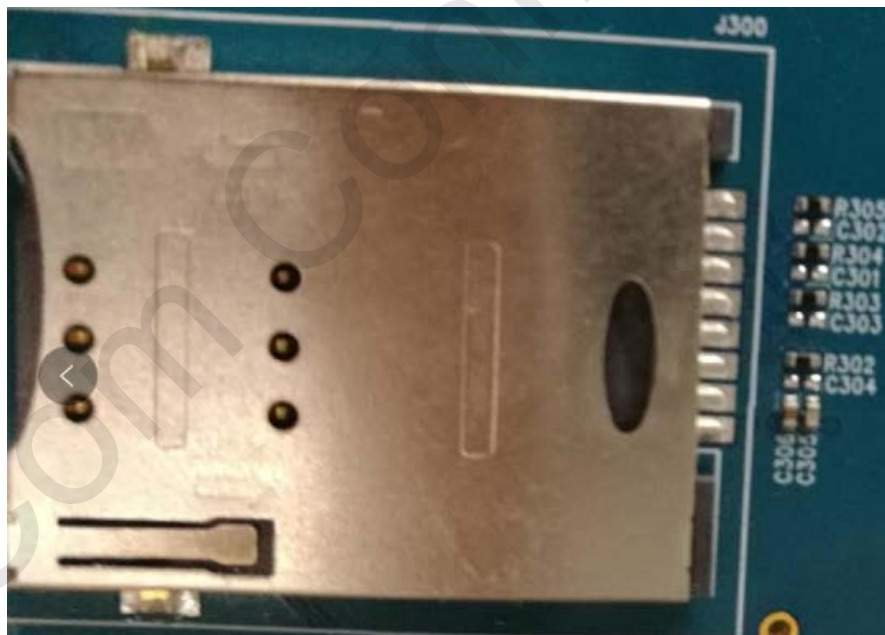


Figure 9: SIM card connector J300

The test points of sim card are listed on the top side, which shows below:

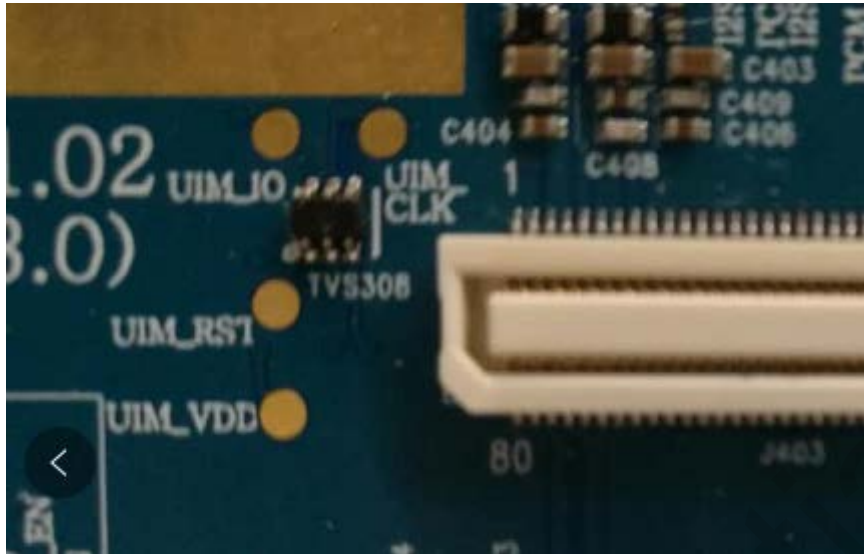


Figure 10: Test point of SIM card

3.4 USB Interface

There is a USB2.0/3.0 type-A interface J501 on the EVB.

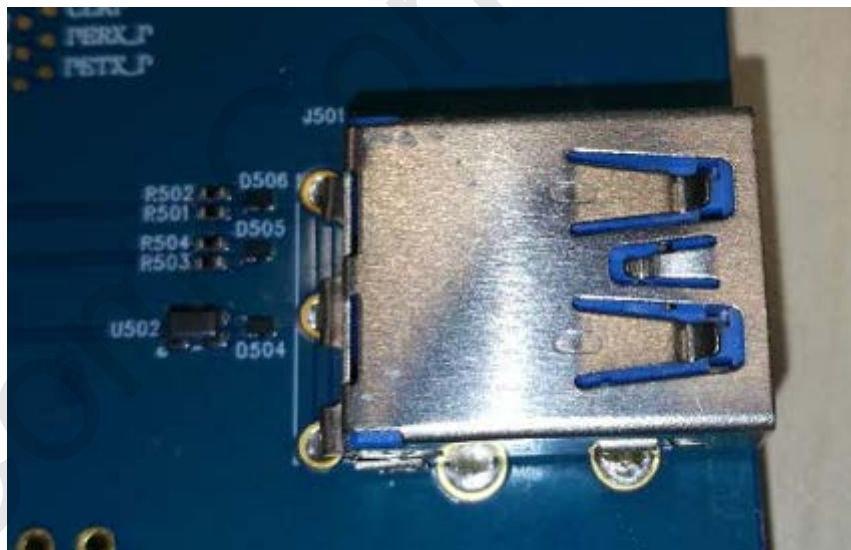


Figure 11: USB2.0/3.0 Type-A interface

The USB2.0/3.0 signals are listed near the related pins, which shows below:

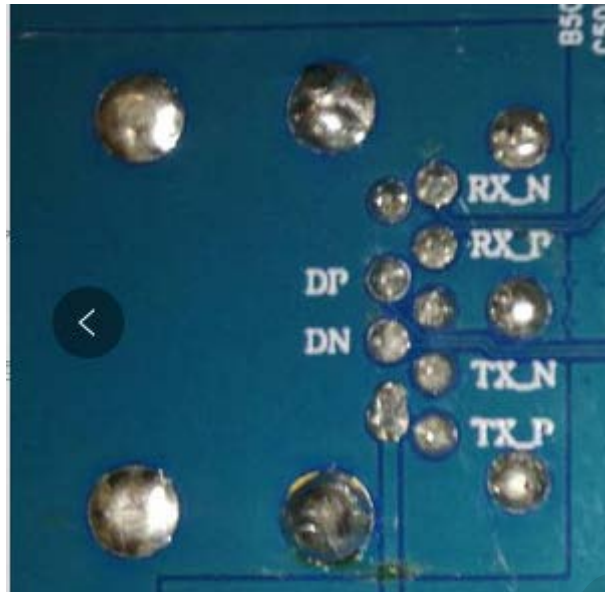


Figure 12: USB2.0/3.0 signal definition

There is a USB to UART ports on EVB

- USB to main UART : J504



Figure 13: USB interface

Before using the UART function through the USB interface, users should turn the function_sel switch SW100 down as the UART_TX and UART_RX are multiplexed with BT_TX and BT_RX.

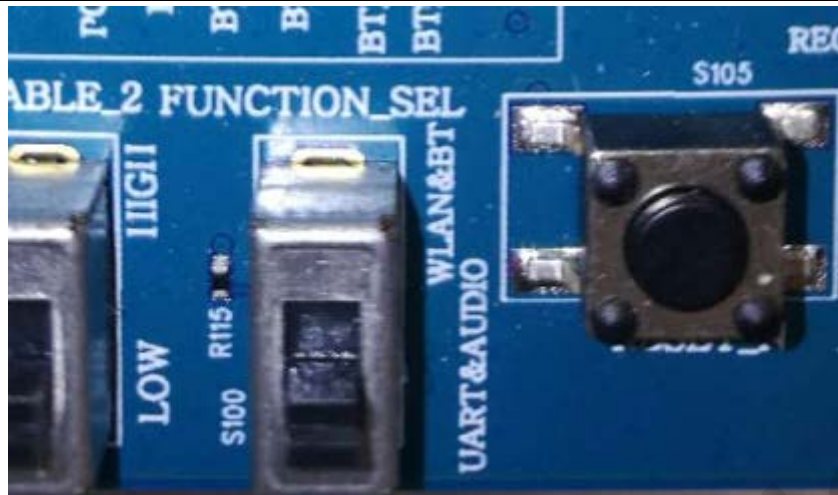


Figure 14: Function_sel switch

EVB USB interface could be imaged to two virtual ports.

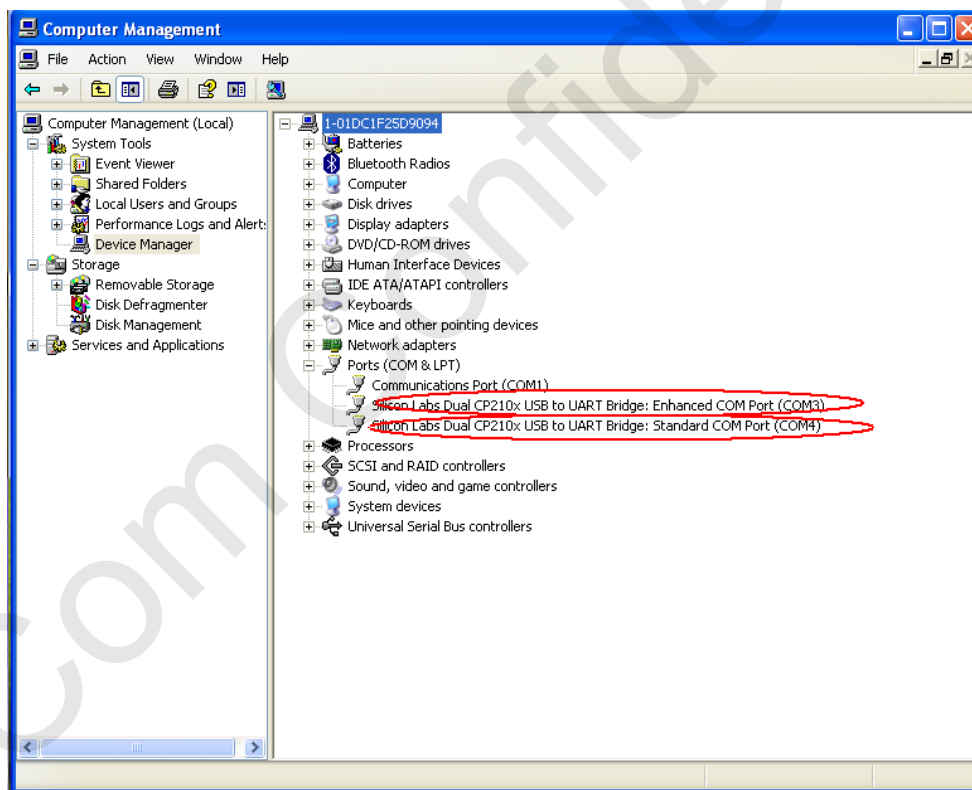


Figure 15: Virtual serial port

For J301:

Enhanced COM port: Main UART

Standard COM port: Debug UART (not support default)

<http://www.silabs.com/products/interface/usb-bridges/Pages/usb-bridges.aspx>

3.6 WIFI&BT interface

The J503 is the connector of WIFI and BT function, customers could use the connector to transmit with WIFI and BT IC through the PCIE and BT_UART interface.

The connector shows below:

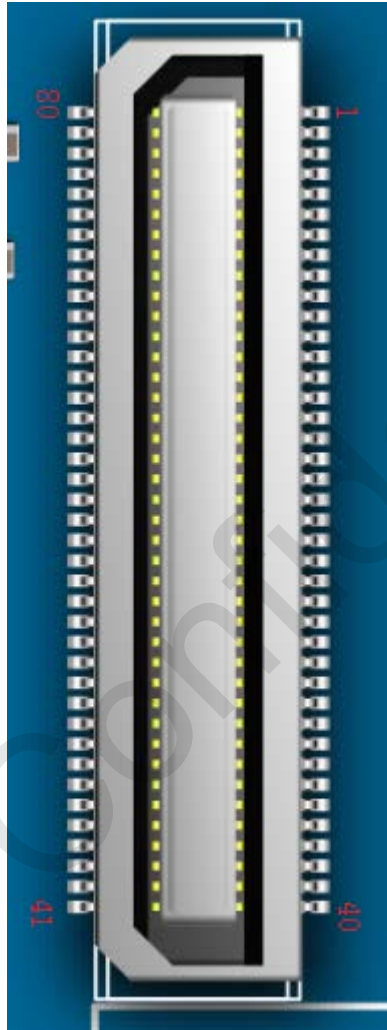


Figure 16: WIFI&BT connector J503

Connector J503 has 80 pins, the related signals definition list below.

Table 2: WIFI&BT connector interface

Type	Signal	Pins	I/O	Description
POWER	GND	1,2,5,8,11,12,19 ,29,34,39,40,41, 42,73,75,79,80	G	Ground
	VCC_3V3	76,77,78	PI	3.3V power input
	VDD_1V8	74	PI	1.8V power input

PCIE interface	PCIE_CLK_P	3	DO	PCIE Reference Clock signal Positive
	PCIE_CLK_N	4	DO	PCIE Reference Clock signal Negative
	PCIE_RX_P	6	AI	PCIE RX Differential signals Positive
	PCIE_RX_N	7	AI	PCIE RX Differential signals Negative
	PCIE_TX_P	9	AO	PCIE TX Differential signals Positive
	PCIE_TX_N	10	AO	PCIE TX Differential signals Negative
Control signals	WLAN_PWR_EN	20	DO	WLAN power enable
	COEX_RXD	21	DI	Wireless coexistence between WWAN and WiFi/BT modules, based on BT-SIG coexistence protocol.
	COEX_TXD	22	DO	Wireless coexistence between WWAN and WiFi/BT modules, based on BT-SIG coexistence protocol.
	WL_SLP_CLK	23	DO	WLAN sleep clock output
	WLAN_EN	24	DO	WLAN function enable
	BT_EN	25	DO	Bluetooth function enable
	PCIE_WAKE_N	26	DO	Asserted to wake up system. Open drain output. Active low.
	PCIE_CLKREQ_N	27	DIO	PCIE clock request. Open drain output. Active low.
BT interface	PCIE_RESET_N	28	DI	Asserted to reset module PCIE interface default. Active low.
	BT_PCM_CLK	30	DO	BT PCM clock output
	BT_PCM_DOUT	31	DO	BT PCM data output
	BT_PCM_DIN	32	DI	BT PCM data input
	BT_PCM_SYNC	33	DO	BT PCM synchronous signal
	BT_UART_TX	35	DO	BT UART transmit data
	BT_UART_RX	36	DI	BT UART receive data
	BT_UART_CTS	37	DI	BT UART clear to send
RFU	BT_UART_RTS	38	DO	BT UART request to send
	NC	13 ~ 18,43 ~72		Reserved for feature use

Before using the BT function, users should turn the function_sel switch SW100 up as the BT_UART and BT_PCM are multiplexed with two lines UART, I2C and digital audio signal (connector J403).

3.7 Power Switch

After 5V Adapter inserted, switch S103 on, then power LED (LED101) will be solid on and the Module will be powered.



Figure 17: Power switch

3.8 PWR_ON/OFF Switch

After power the EVB, turn the switch S102 up to power up the M.2 card, the module will be turned on, and the indicated LED (LED201) will blink lately.



Figure 18:PWR_ON/OFF switch

3.9 RF Switch

RF switch (S101&S104) could control module RF function to be on or off.

The S101 switch control the WDISABLE_1 signal, when turn down, the M.2 card will turn into flight mode, and will be in normal mode when the switch turns up. The switch is on the up level default.

The S104 switch control the WDISABLE_2 signal, when turn down, the M.2 card will turn off the GPS function, and enable the function when the switch turns up.



Figure 19: RF switch

3.10 LED Indicator

LED light works behaviour as below.

Name	Description	STATUS
LED101	Power ON/OFF indicator	Bright: EVB Power ON; Extinct: EVB Power OFF
LED201	NET status indicator	Blinking at a certain frequency according various net status
LED202	Module status indicator	Indicate the interrupt signal of the M.2 card to the host

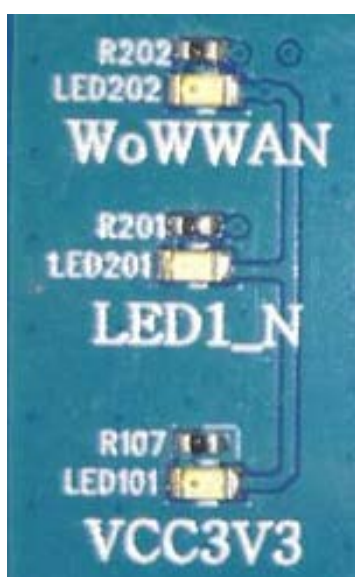


Figure 20: LED Indicator

4. Test Interface

4.1 Test Point Part 1 description



Figure 21: Test interface overview 1

Table 3: Test point A Pin description:

Pin	Signal	I/O	Description
1	MODE0	DI	M.2 card test mode select
2	MODE1	DI	M.2 card test mode select
3	VDD_1V8	PO	1.8V power output
4	GND	-	Ground
5	ANTCTL0	DO	Tunable ANT CTRL
6	ANTCTL2	DO	Tunable ANT CTRL
7	ANTCTL1	DO	Tunable ANT CTRL
8	ANTCTL3	DO	Tunable ANT CTRL
9	GPIO3	DIO	GPIO
10	I2C_SCL	DO	I2C bus clock signal
11	I2C_SDA	DIO	I2C bus data signal
12	UART_RX	DI	UART receive data
13	UART_TX	DO	UART transmit data
14	SIM_DET	DI	UIM card detecting input signal

Table 4: Test point B Pin description:

Pin	Signal	I/O	Description
1	GND	-	Ground
2	GND	-	Ground
3	PCIE_WAKE_N	DO	Asserted to wake up system. Open drain output. Active low.

4	WLAN_PWR_EN	DO	WLAN function enable
5	PCIE_CLKREQ_N	DIO	PCIe clock request. Open drain output. Active low.
6	BT_PCM_CLK	DO	BT PCM clock output
7	PCIE_RESET_N	DI	Asserted to reset module PCIe interface default. Active low.
8	BT_PCM_DOUT	DO	BT PCM data output
9	BT_UART_TX	DO	BT UART transmit data
10	BT_PCM_DIN	DI	BT PCM data input
11	BT_UART_RX	DI	BT UART receive data
12	BT_PCM_SYNC	DO	BT PCM synchronous signal
13	BT_UART_CTS	DI	BT UART clear to send
14	WL_SLP_CLK	DO	WLAN sleep clock output
15	BT_UART_RTS	DO	BT UART request to send
16	GND	-	Ground
17	COEX_RXD	DI	Wireless coexistence between WWAN and WiFi/BT modules, based on BT-SIG coexistence protocol.
18	WLAN_EN	DO	WLAN function enable
19	COEX_TXD	DO	Wireless coexistence between WWAN and WiFi/BT modules, based on BT-SIG coexistence protocol.
20	BT_EN	DO	Bluetooth function enable

Table 5:Test point C Pin description:

Pin	Signal	I/O	Description
1	VDD_1V8	PO	1.8V power output
2	NC	-	Not connected
3	TRST_N	DI	JTAG reset input
4	GND	-	Ground
5	TDI	DI	JTAG data input
6	GND	-	Ground
7	TMS	DI	JTAG mode select
8	GND	-	Ground
9	TCK	DI	JTAG clock input
10	GND	-	Ground
11	NC	-	Not connected
12	GND	-	Ground

13	TDO	DO	JTAG data output
14	GND	-	Ground
15	SRST	DI	System reset input
16	GND	-	Ground
17	NC	-	Not connected
18	GND	-	Ground
19	NC	-	Not connected
20	GND	-	Ground

4.2 Test Point Part 2 description

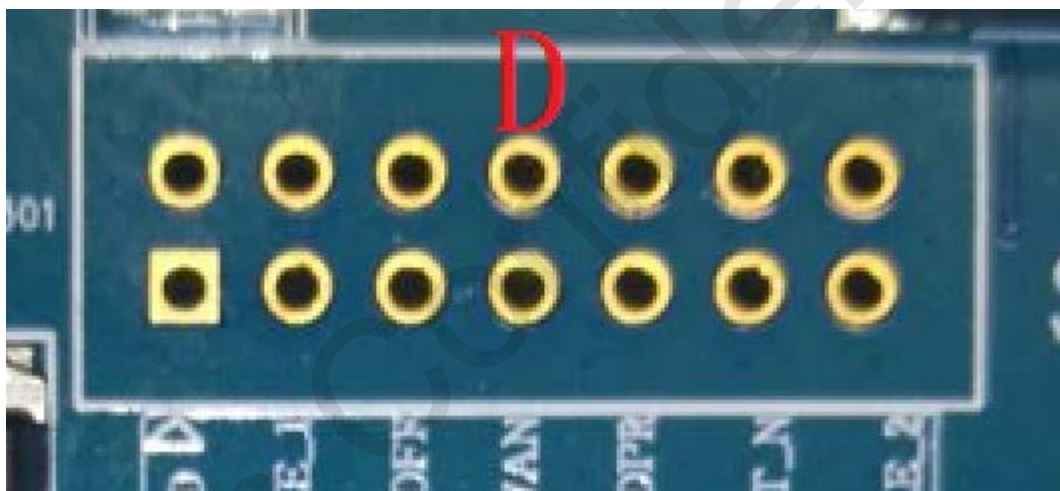


Figure 22: Test interface overview 2

Table 6: Test point D Pin description:

Pin	Signal	I/O	Description
1	VCC_3V3	PO	3.3V power output
2	GND	-	Ground
3	LED_1_N	OC	It is an open collector, active low signal, used to allow the M.2 card to provide status indicators via LED devices that will be provided by the system.
4	W_DISABLE_1_N	DI	WWAN RF Disable, active low
5	PCM_CLK/I2S_SCLK	DO	PCM data clock input /I2S data clock input

6	FULL_CARD_POWER_OFF_N	DI	H: M.2 card powers on. L: M.2 card powers off.
7	PCM_DOUT/I2S_D1	DO	PCM data output /I2S data output
8	WOWWAN	OC	WWAN to wake up the host. It is open collector and active low.
9	PCM_DIN/I2S_D0	DI	PCM data input /I2S data input
10	DPR	DI	Hardware Pin for BodySAR Detection, active low. H: Max transmitting power will not be reduced (default) L: Max transmitting power will be reduced
11	PCM_SYNC/I2S_WS	DO	PCM synchronous signal /I2S word select
12	RESET	DI	System reset control input, active low.
13	FUNCTION_SEL	DI	Turn up to select the WLAN&BT function; Turn down to select the UART, I2C and audio function.
14	W_DISABLE_2_N	DI	GNSS disable active low.

4.3 Test Point Part 3 description

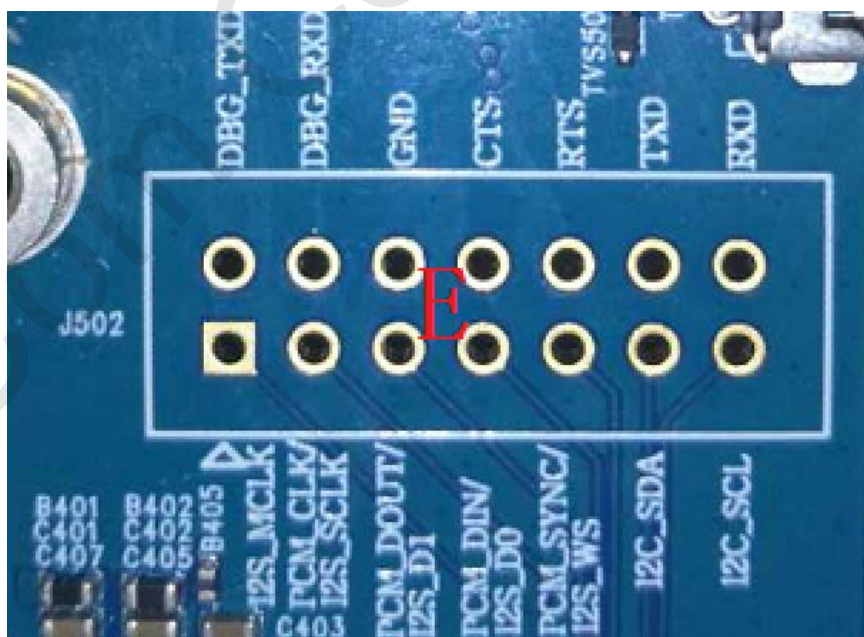


Figure 23: Test interface overview 2

Table 7: Test Point E Pin description:

Pin	Signal	I/O	Description
1	I2S_MCLK	DO	I2S main clock input
2	DBG_TXD	DO	Debug data transmit
3	PCM_CLK/I2S_SCLK	DO	PCM data clock input /I2S data clock input
4	DBG_RXD	DI	Debug data receive
5	PCM_DOUT/I2S_D1	DO	PCM data output /I2S data output
6	GND	-	Ground
7	PCM_DIN/I2S_D0	DI	PCM data input /I2S data input
8	UART_CTS	DI	UART clear to send
9	PCM_SYNC/I2S_WS	DO	PCM synchronous signal /I2S word select
10	UART_RTS	DO	UART request to send
11	I2C_SDA	DIO	I2C bus data signal
12	UART_TX	DO	UART data transmit
13	I2C_SCL	DO	I2C bus clock signal
14	UART_RX	DI	UART data receive

5. Illustration

5.1 SIM7906E-M2 module installation and uninstallation

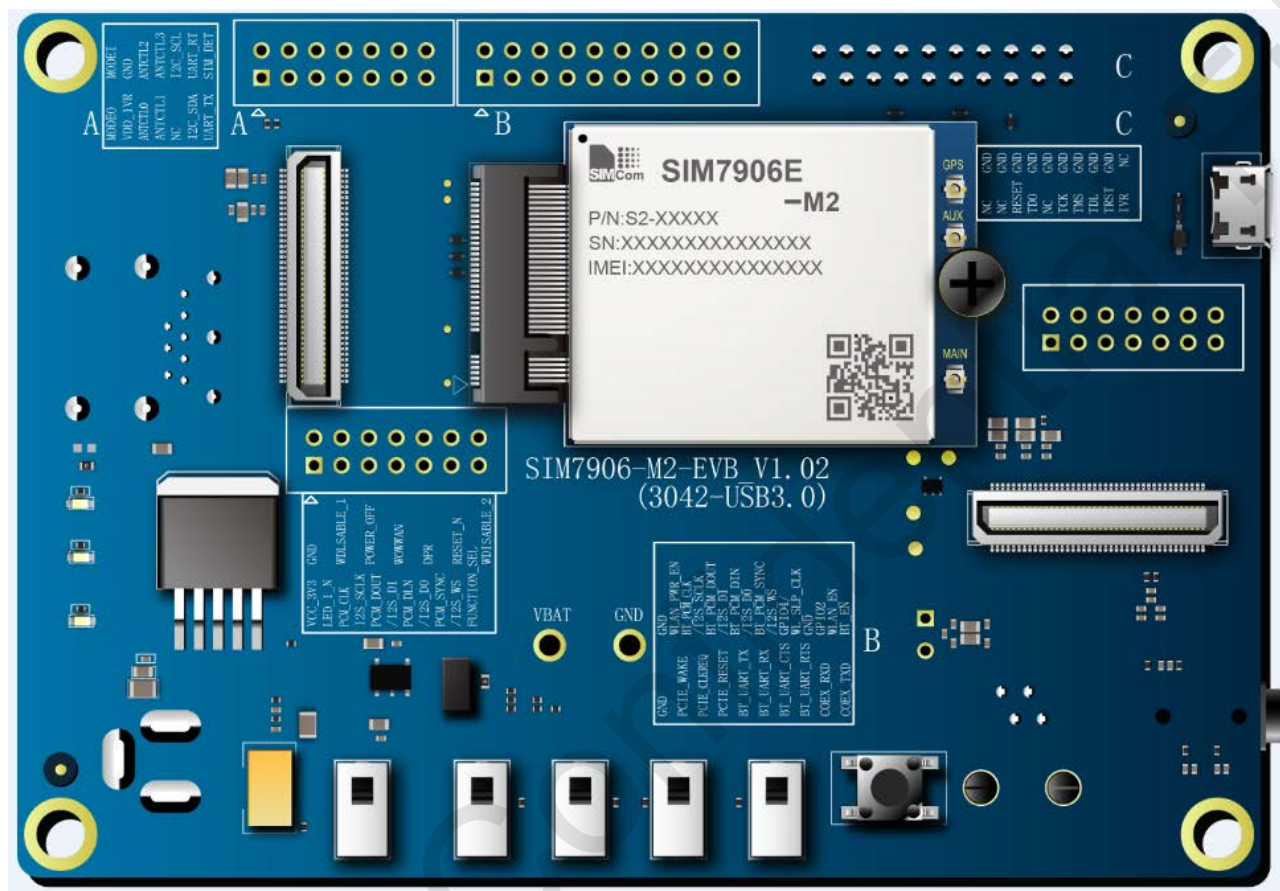


Figure 24: M.2 card assembly

InstallM.2 board:

- 1) It's easy to put M.2 card in correct position without making mistake.
- 2) Turn the screw to the right to tighten it;

Uninstall and replace M.2 board:

- 1) Take out the screw;
- 2) Remove the M.2 card by pulling it to the right side.

5.2 Power on Module:

- 1) Connect the SIMCOM module to the M.2 connector on EVB, turn the screw to the right to tighten it.
- 2) Plug in 5V DC adapter, switch S103 to “ON” state, and the LED light LED101 will be turned on; Keep S101 to “HIGH” position and S104 to the “LOW” position. The S100 could be “UART&AUDIO” position.
- 3) Keep the switch S102 to the “ON” status, SIMCOM module will power on. After the module is on, the LED light LED201 will blink at a certain frequency. Through the state of LED, you can judge registering status of the module. For detailed description, please refer to the related HD document.

5.3 Registering network and making a call

- 1) Install antenna to SIMCOM module board, insert SIM card.
- 2) Power on the module and wait for the registering.
- 3) Connect the USB2.0/3.0 cable to the PC USB port; launch the SSCOM in computer.
- 4) Check the serial port number from Device Manager list.



Figure 25: M.2 card serial port number

- 5) Use the SSCOM to make a call from module as following:
 - a) Launch SSCOM, select the AT port (COM 29 for example), and select the baudrate (115200 for example).

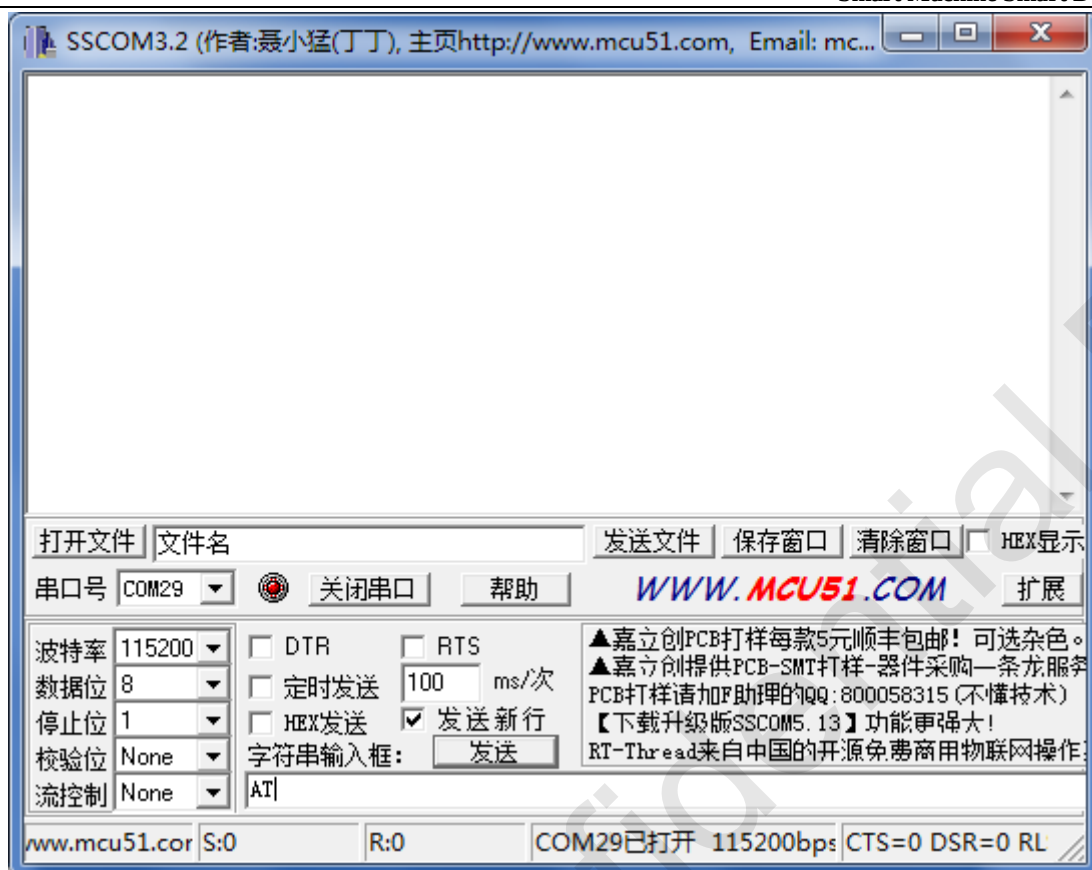


Figure 26: SSCOM interface

- b) Connect the module and make a call.

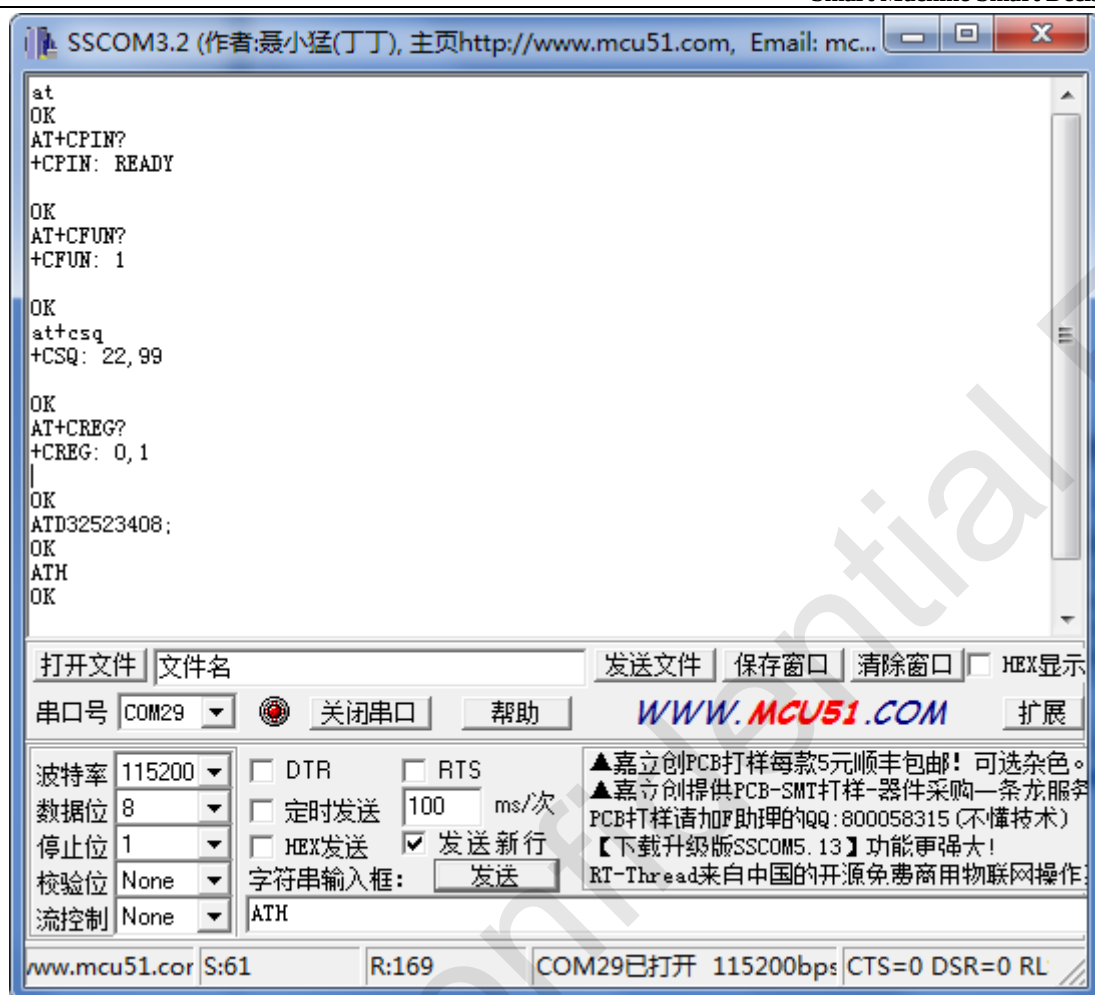


Figure 27: SSCOM commands

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