HCM511S TE-B

User Guide

Short-Range 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 cellular terminal or mobile incorporating the module. Manufacturers of the cellular 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 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 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.
	Cellular 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 cellular 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 cellular 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 phones or other cellular terminals. Areas with explosive or potentially explosive atmospheres include fueling 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
-	2023-11-15	Luke FU	Creation of the document
1.0	2024-02-02	Luke FU	First official release

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1 Introduction

For convenient development of applications with Quectel HCM511S, Quectel supplies the corresponding development board (HCM511S-TE-B) for module testing. This document can help you quickly understand HCM511S-TE-B interface specifications, RF characteristics, electrical and mechanical details and how to effectively use it.

2 Product Overview

HCM511S-TE-B is a Bluetooth development board that supports a series of interfaces. It can be used for testing basic functionalities and developing HCM511S.

2.1. Top and Bottom Views

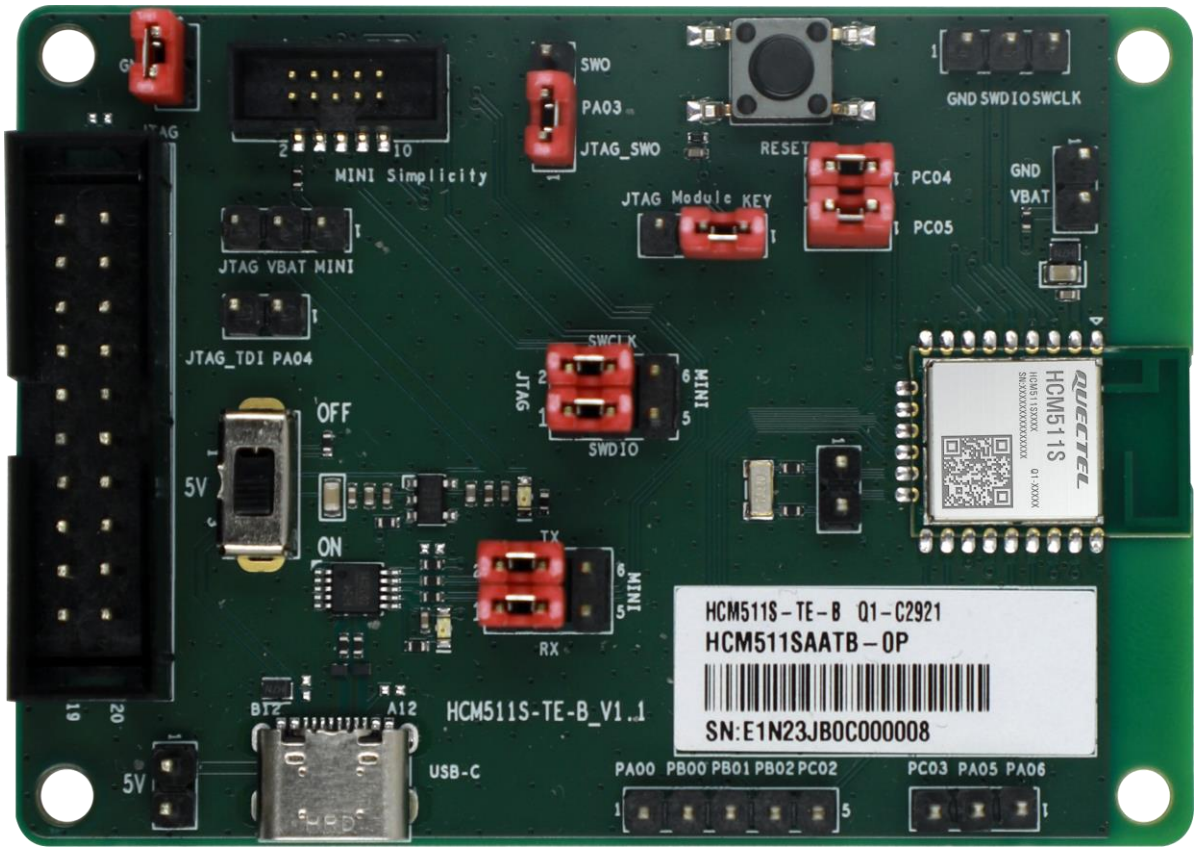

Figure 1: Top View

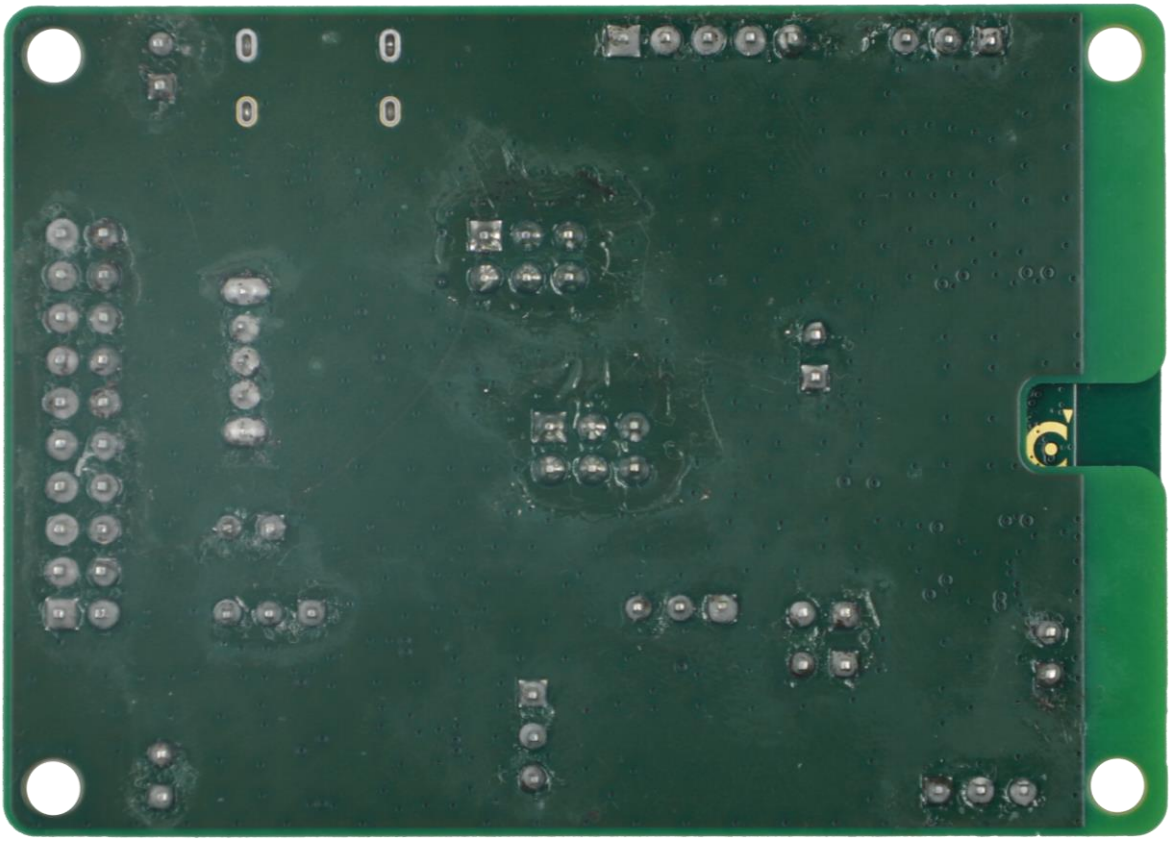

Figure 2: Bottom View

2.2. Component Placement

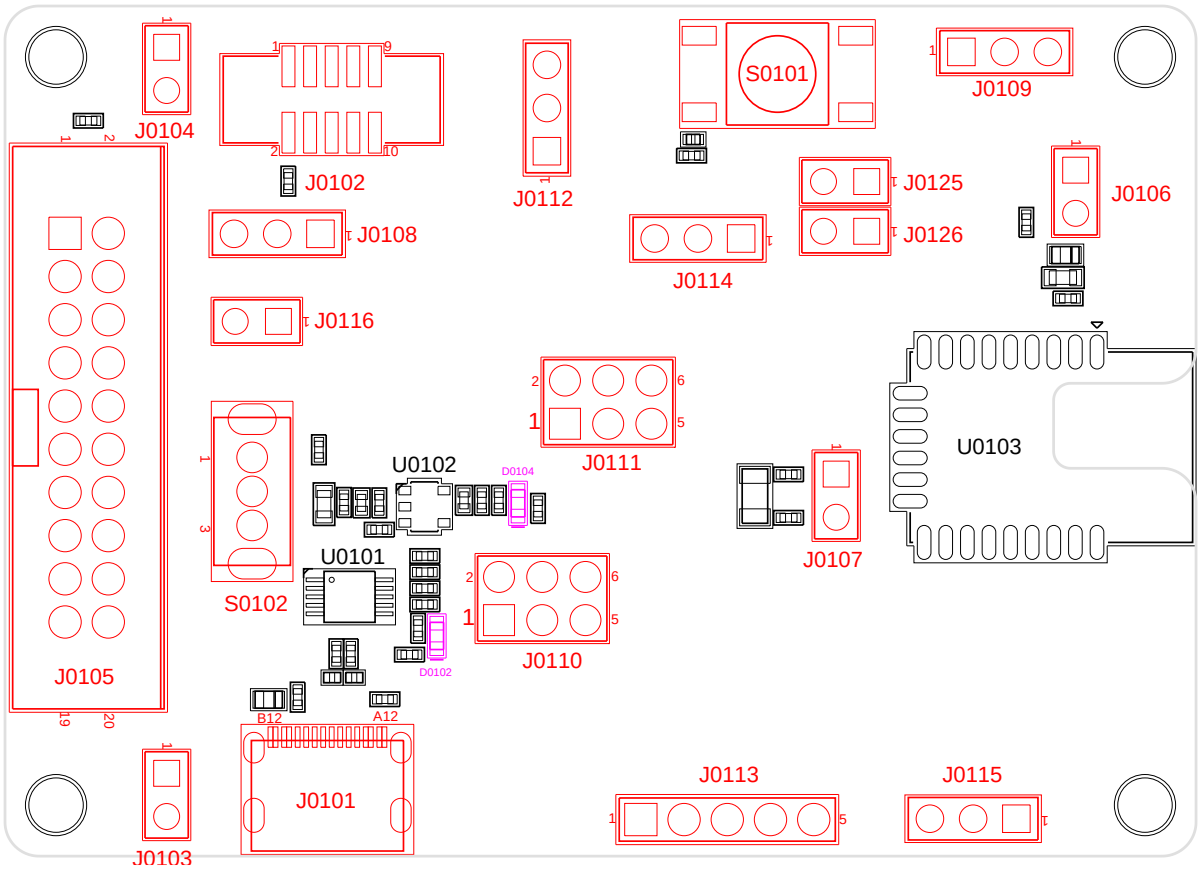

Figure 3: Component Placement

Table 1: Component Information

Component	RefDes.	Description
Module	U0103	HCM511S module
LDO	U0102	5 V to 3.3 V
USB-to-UART Bridge	U0101	USB-to-UART bridge
Power Supply Interfaces	J0101	USB Type-C power supply interface
	J0103	Positive electrode of external power supply interface (+5 V)
	J0104	Negative electrode of external power supply interface (GND)
	J0108	VBAT jumper interface

Power Switch	S0102	VBAT ON/OFF control
Reset Button	S0101	Resets the module via J0114
USB Interface	J0101	Connects to USART interface of the module via U0101 and J0110
Status LEDs	D0104	Indicates VBAT ON/OFF status
	D0102	Indicates USART status
Debug Interfaces	J0109	3-pin SWD interface
	J0105	20-pin JTAG interface
	J0102	10-pin mini simplicity interface
Test Points	J0106	Tests the module power consumption by connecting an external programmable power supply
	J0107 J0113, J0115	Test basic functions
PA03 Jumper Interface	J0112	Connections between different jumper pins for J0105/J0102
SWD Jumper Interface	J0111	Connections between different jumper pins for J0105/J0102
USART Jumper Interface	J0110	Connections between different jumper pins for U0101/J0102
Reset Jumper Interface	J0114	Connections between different jumper pins for S0101/J0105/J0102
PA04 Jumper Interface	J0116	Connections between jumper pins for J0105
PC04 Jumper Interface	J0125	Connections between jumper pins for J0102
PC05 Jumper Interface	J0126	Connections between jumper pins for J0102

NOTE

See ***Chapter 4*** for details of pins connection of each jumper interface in the table above.

3 Kit Accessory & Assembly

3.1. Kit Accessory

Table 2: Accessory List

Items	Description	Quantity (pcs)
Cable	USB Type-C cable	1

3.2. Kit Assembly

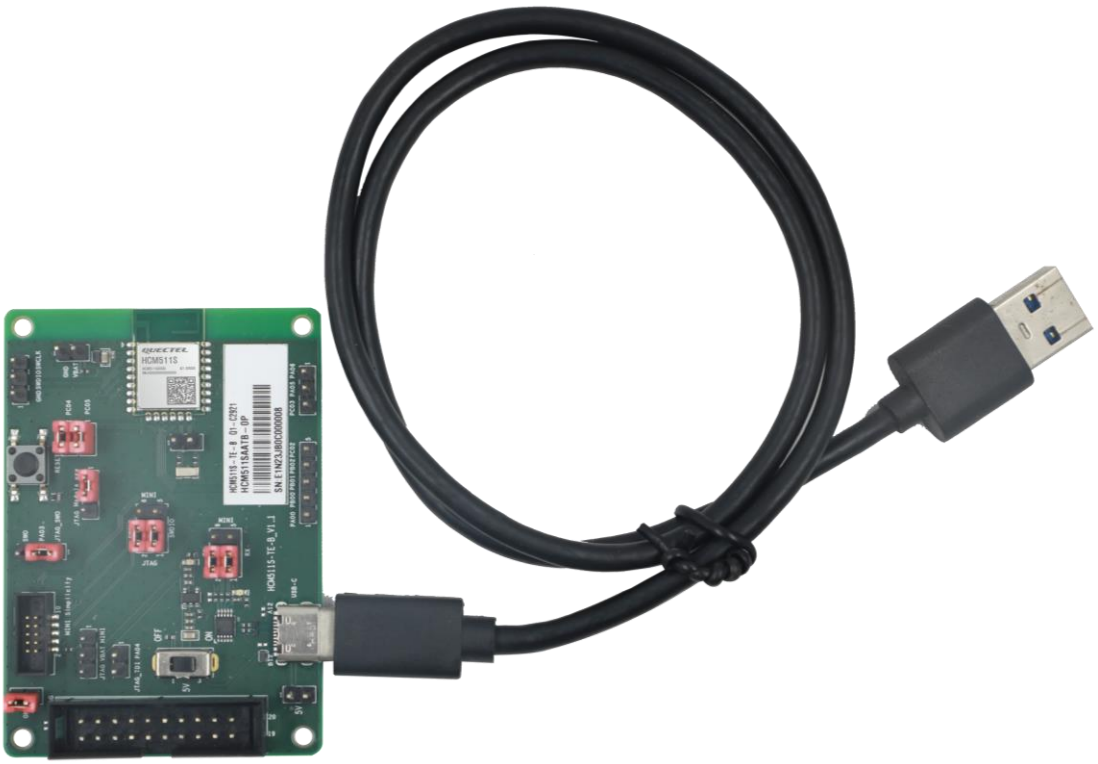

Figure 4: TE-B Kit Assembly

4 Interface Applications

This chapter outlines the information and applications of some hardware interfaces of HCM511S-TE-B.

4.1. Power Supply Interfaces

The simplified schematic of HCM511S-TE-B is shown in the following figure.

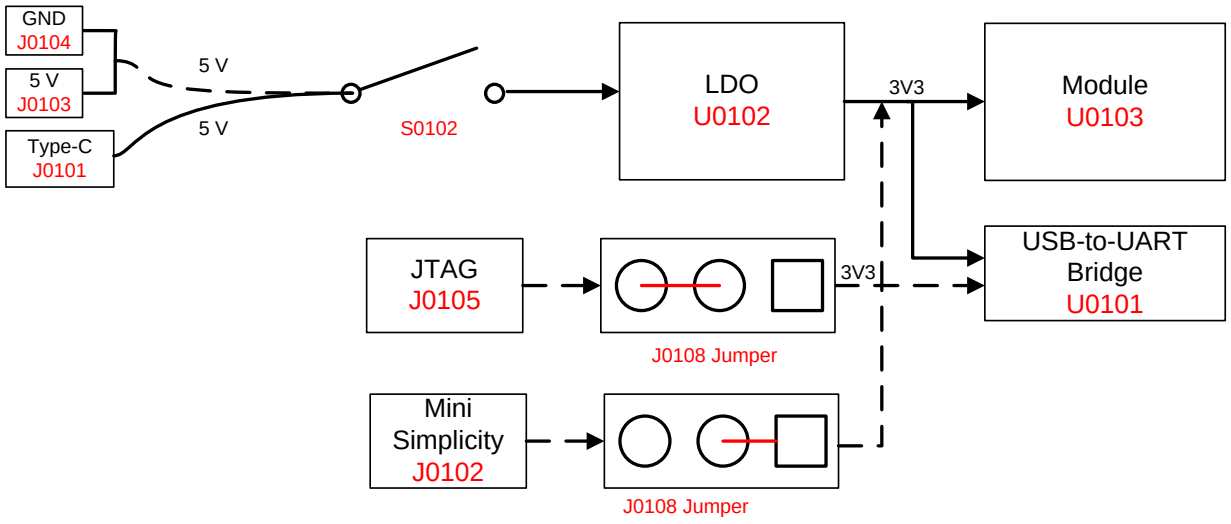

Figure 5: Power Supply for HCM511S-TE-B

4.2. Power Switch and Reset Button

HCM511S-TE-B includes one power switch (S0102) and one reset button (S0101) as shown in the following figure.

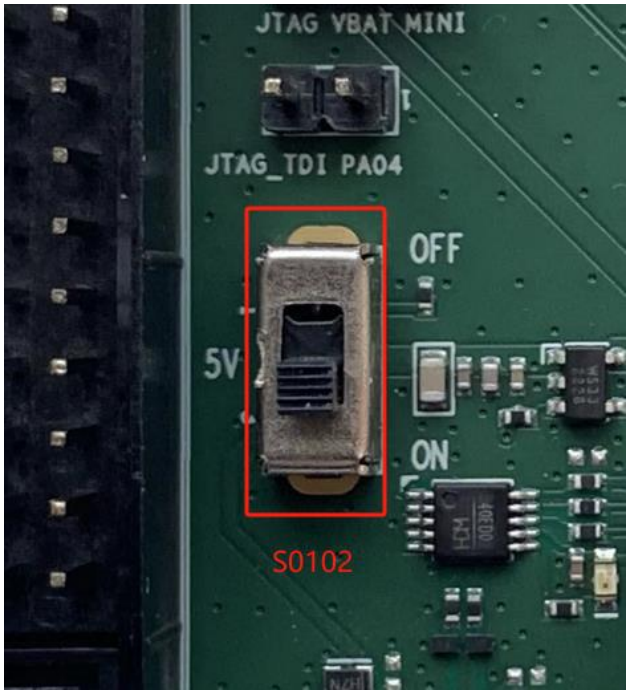

Figure 6: Power Switch

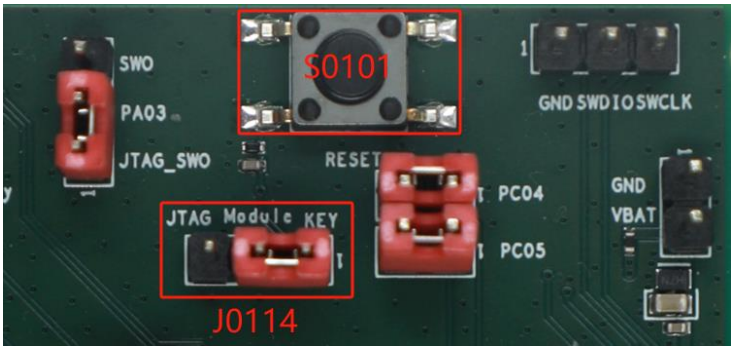

Figure 7: Reset Button

Table 3: Description of Power Switch and Reset Button

RefDes.	Description
S0101	Resets the module via J0114
S0102	VBAT ON/OFF control
J0114	Connects Module to KEY

4.3. USB Interface

HCM511S-TE-B integrates J0101 (USB interface) connecting to the module's USART interface via U0101 (USB-to-UART bridge) for USB-to-UART connection, with the jumpers on J0110 as shown in the following figure.

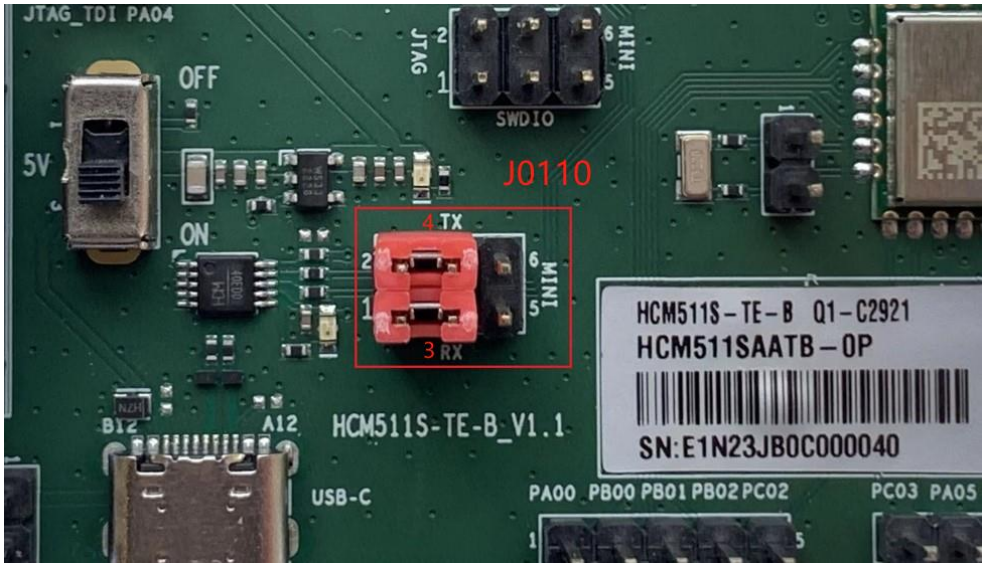

Figure 8: Jumper

J0101 supports 115200 bps baud rate by default. It is intended for data transmission between the module and the host. It can also be used for AT command communication and debugging.

Figure 9: USB-to-UART Bridge

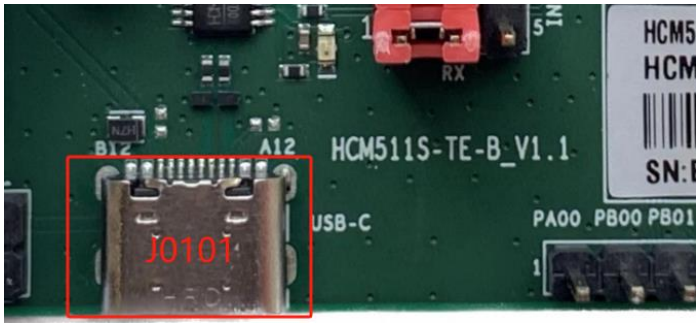

Figure 10: USB Connector

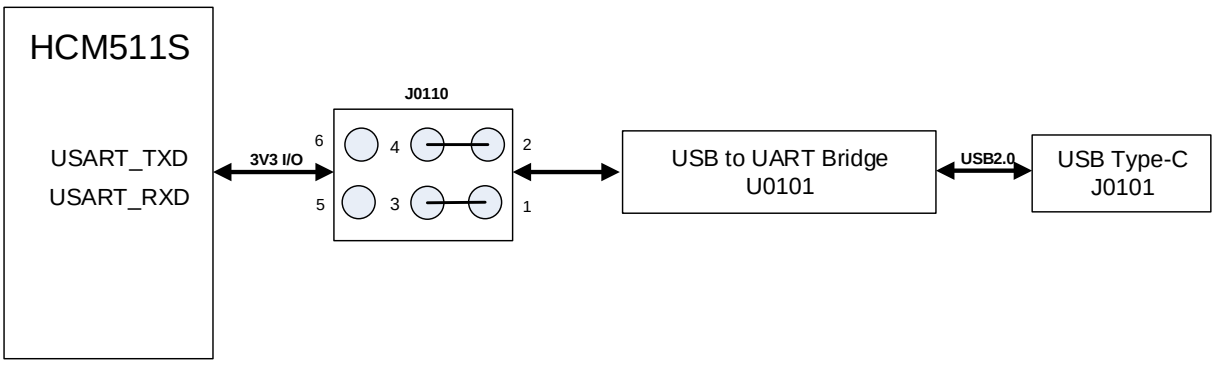

Figure 11: USB-to-UART Connection

Table 4: Description of USB-to-UART Connection

RefDes.	Description
U0101	USB-to-UART bridge
J0101	USB interface
J0110	Connects pin 1 to pin 3
	Connects pin 2 to pin 4

4.4. Debug Interfaces

The module supports J0109 (SWD interface), J0105 (JTAG interface) and J0102 (mini simplicity connector) for flash programming and normal debugging.

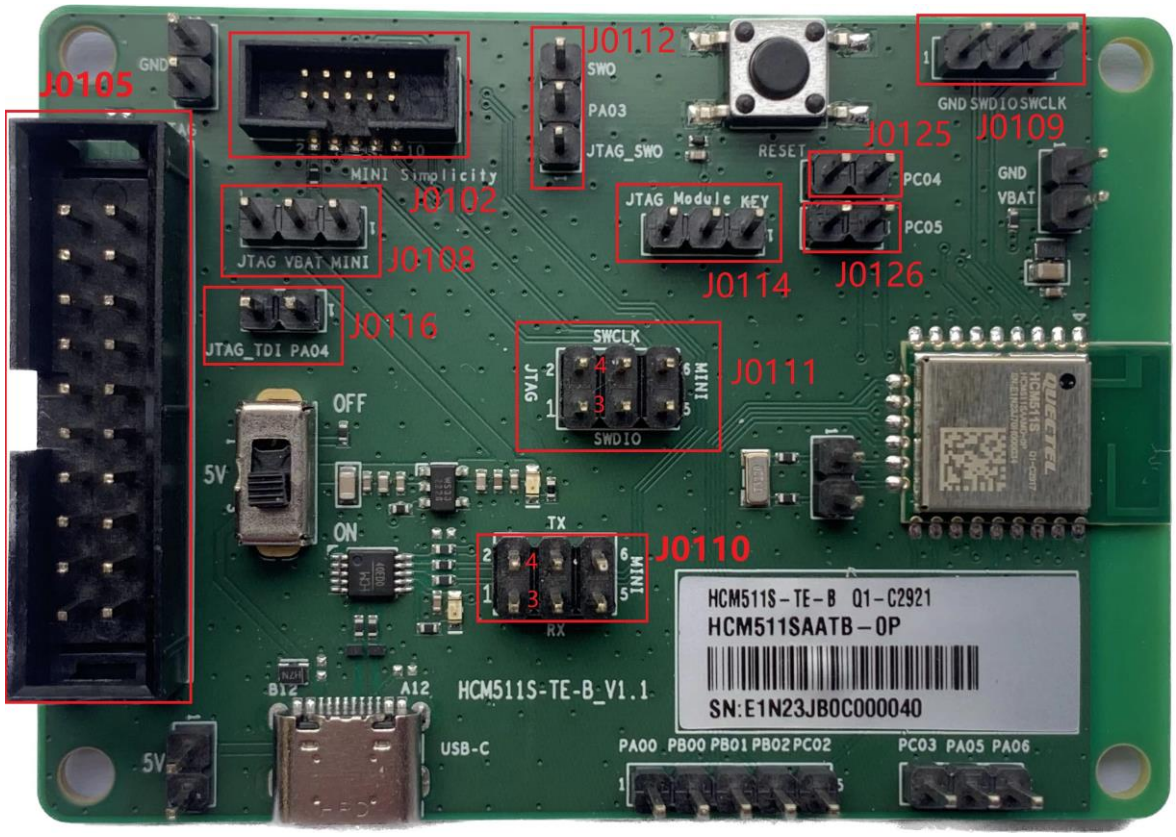

Figure 12: Debug and Jumper Interfaces

Table 5: Description of Debug and Jumper Interfaces

RefDes.	Description
J0109	3-pin SWD interface
J0105	20-pin JTAG interface
J0102	10-pin mini simplicity interface
J0108	Connects VBAT to JTAG for JTAG connection
	Connects VBAT to MINI for mini simplicity connection
J0116	Connects JTAG_TDI to PA04 for JTAG connection

J0112	Connects PA03 to JTAG_SWO for JTAG connection
	Connects PA03 to SWO for mini simplicity connection
J0114	Connects Module to JTAG for JTAG connection
	Connects Module to KEY for mini simplicity connection
J0111	Connects pin1 to pin 3 and pin 2 to pin 4 for JTAG connection
	Connects pin 4 to pin 6 and pin 3 to pin 5 for mini simplicity connection
J0110	Connects pin 4 to pin 6 and pin 3 to pin 5 for mini simplicity connection
J0125	Connects pin 1 to pin 2 for mini simplicity connection
J0126	Connects pin 1 to pin 2 for mini simplicity connection

When you use J0109 (SWD interface), connect pin 1 (GND), pin 2 (SWDIO) and pin 3 (SWCLK) of J0109 to JTAG downloader as below:

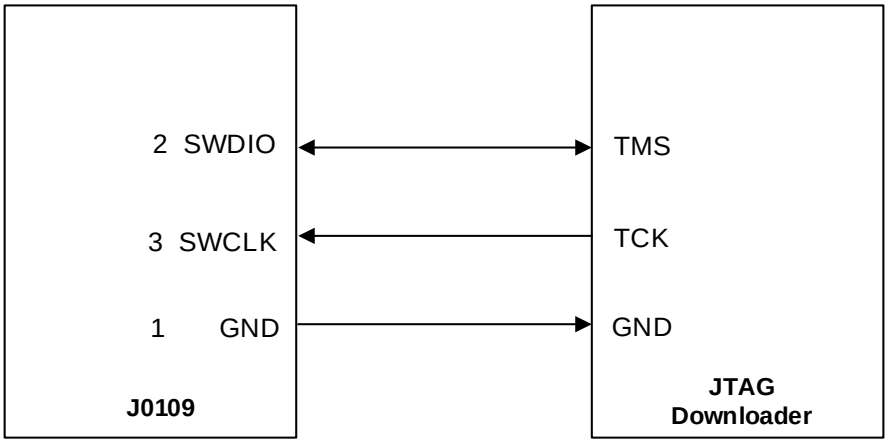

Figure 13: SWD Connection

When you use J0105 (JTAG interface), place the jumper as shown below, and connect the JTAG downloader to PC through a USB type-C cable.

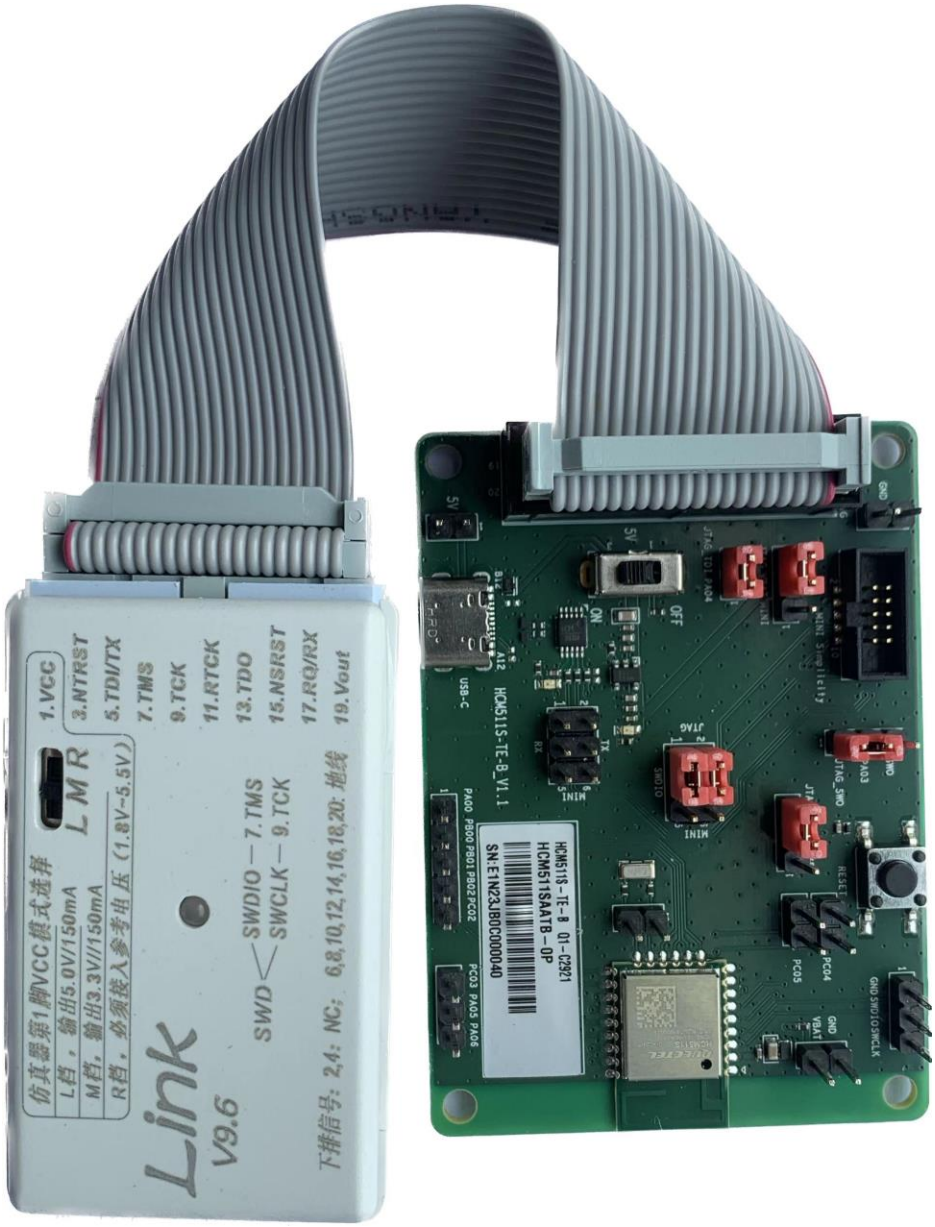

Figure 14: JTAG Connection

When you use J0102 (mini simplicity interface), place the jumper as shown below, and connect the J-link debugger (SI-DBG1015A) to PC through a USB type-C cable.

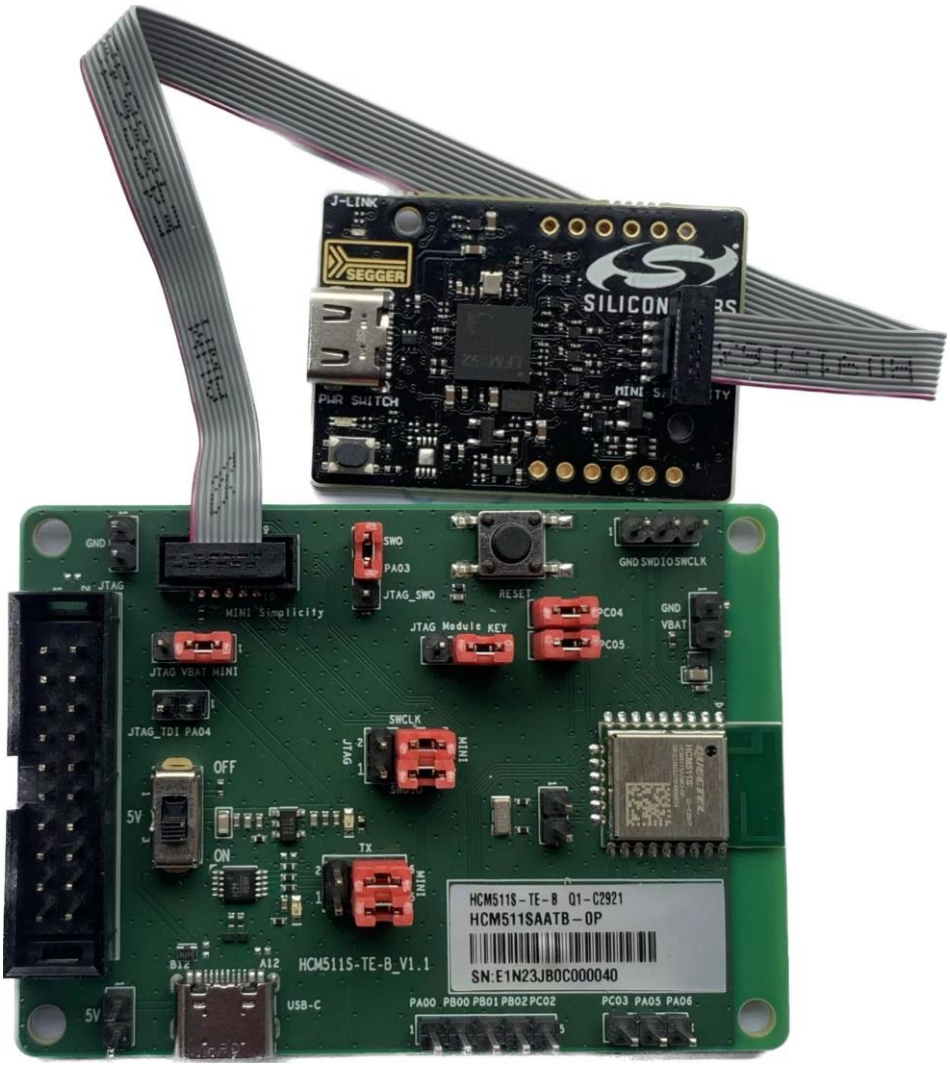

Figure 15: Mini Simplicity Connection

4.5. RF Interfaces

Test the conductivity through the concentric circle on the bottom side. Weld the RF coaxial cable as shown below.

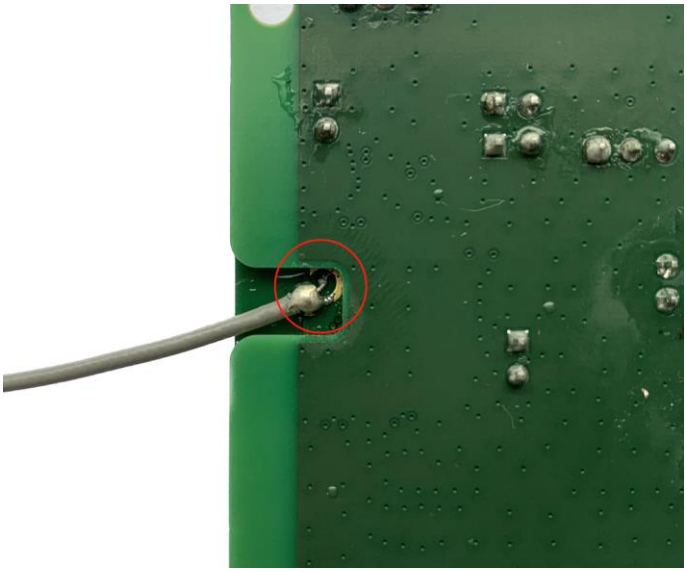

Figure 16: Concentric Circle Welding

Before testing the conductivity, you must remove the shielding cover of the module and matched resistor and capacitor to disconnect the matching circuit of the PCB antenna. The matched resistor and capacitor are shown as below.

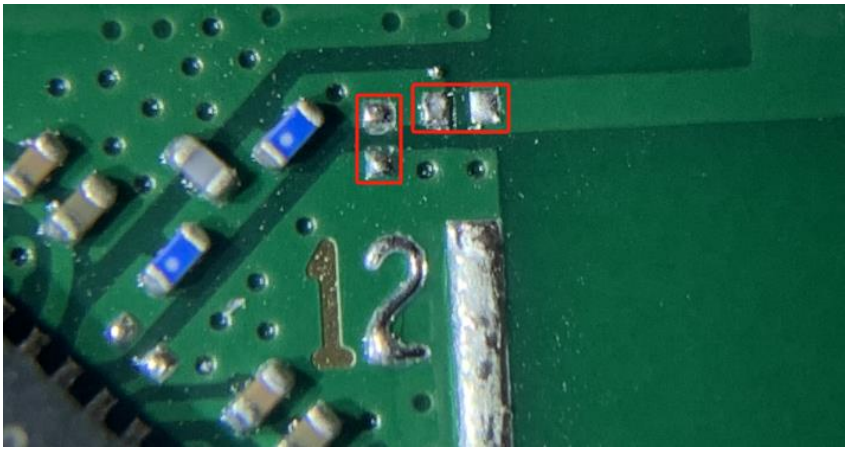

Figure 17: Matched Components

4.6. Test Points

HCM511S-TE-B features a series of test points (J0106, J0107, J0113, J0115), which are illustrated in the following figure, and these test points can help you to obtain the corresponding waveform of some signals.

To test the module's power consumption, disconnect the resistor indicated by the red arrow and connect pin 1 of J0106 to the negative pole and pin 2 of J0106 to the positive pole for the programmable power supply.

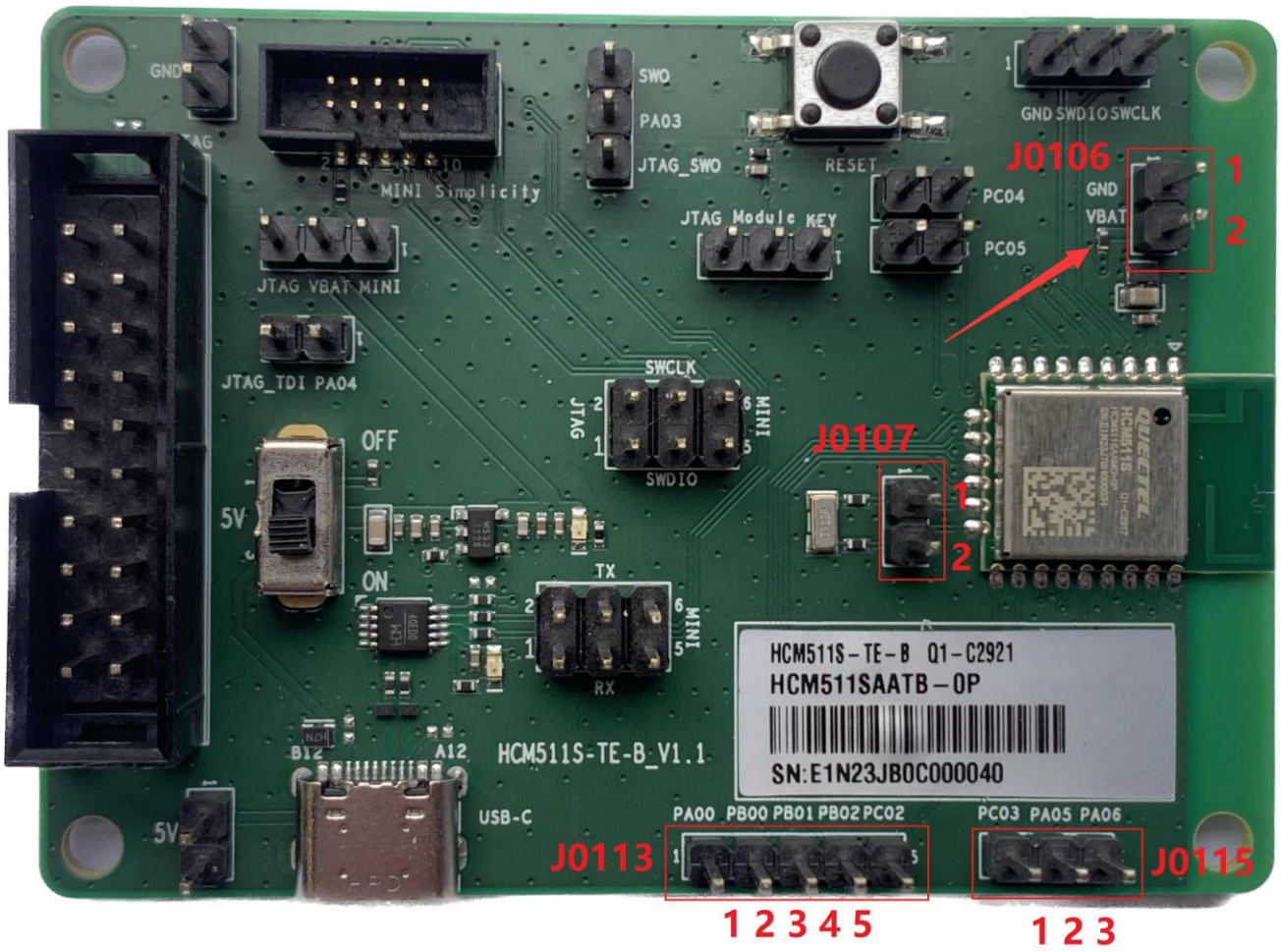

Figure 18: Test Points

Table 6: Pin Description of Test Points

J0106		
Pin No.	**Pin Name**	**Description**
1	GND	Connects these two pins to an external programmable power supply to test the module power consumption
2	VBAT	
J0107		
Pin No.	**Pin Name**	**Description**

1	-	Connected directly to module's GPIO14
2	-	Connected directly to module's GPIO13
J0113		
Pin No.	**Pin Name**	**Description**
1	PA00	Connected directly to module's GPIO1
2	PB00	Connected directly to module's GPIO6
3	PB01	Connected directly to module's GPIO7
4	PB02	Connected directly to module's GPIO8
5	PC02	Connected directly to module's GPIO9
J0115		
Pin No.	**Pin Name**	**Description**
1	PC03	Connected directly to module's GPIO10
2	PA05	Connected directly to module's GPIO4
3	PA06	Connected directly to module's GPIO5

NOTE

See ***document [1]*** for details of module pin names and definitions in the above table.

4.7. Status LEDs

HCM511S-TE-B comprises 2 status LEDs, which are presented in the following figure.

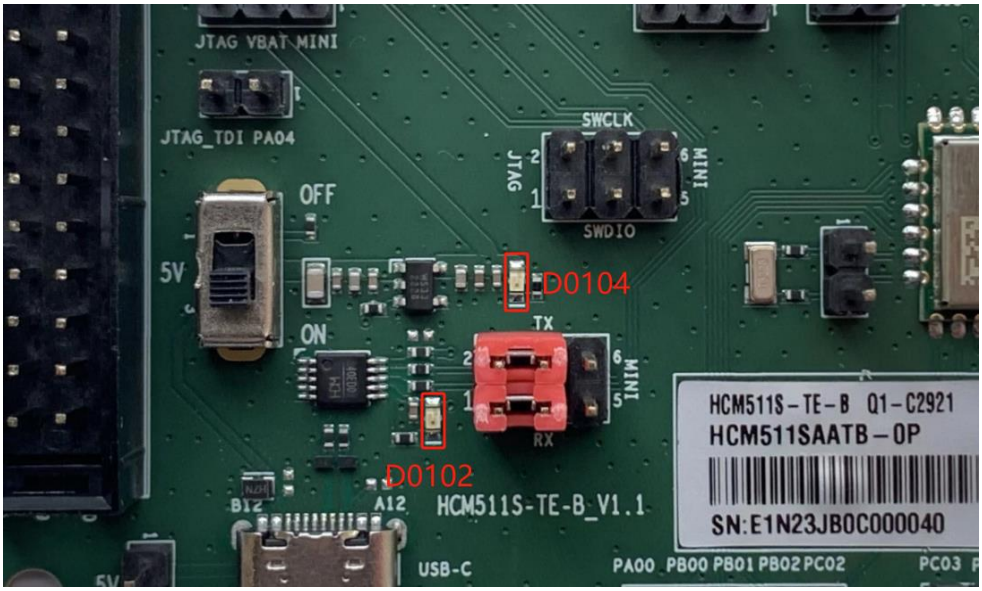

Figure 19: Status LEDs

Table 7: Description of Status LEDs

RefDes.	Description	Comment
D0102	Indicates USART status	Light on: power on Flicker: data transmission
D0104	VBAT ON/OFF indicator	Light on: power on Light off: power off

5 Operating Procedures

This chapter outlines how to use the HCM511S-TE-B for testing and evaluating the module.

5.1. Power Up

1. Connect J0101 (USB interface) of HCM511S-TE-B to the PC with the USB Type-C cable.
2. Switch S0102 (Power Switch) to ON state, then D0104 (VBAT ON/OFF indicator) will light up.

5.2. Communication via USB Connector

1. Turn on the module according to the procedures referred to in ***Chapter 5.1***.
2. The USB serial port number can be viewed through the PC Device Manager, as shown below.

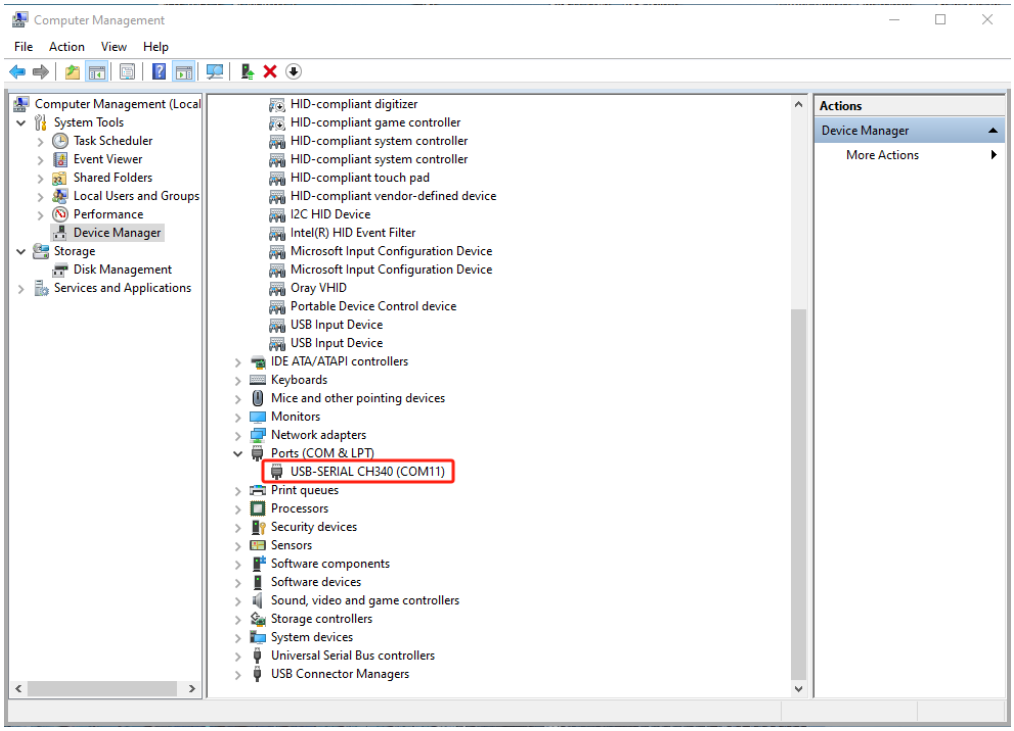

Figure 20: USB Serial Port

3. Use the QCOM tool provided by Quectel to establish communication between the module and the PC via J0101 (USB interface). The following figure shows the field for setting the COM port on QCOM. Select the "**COM port**" (USB serial port) and set the correct "**Baudrate**". For more details about QCOM tool usage and configuration, see ***document [2]***.

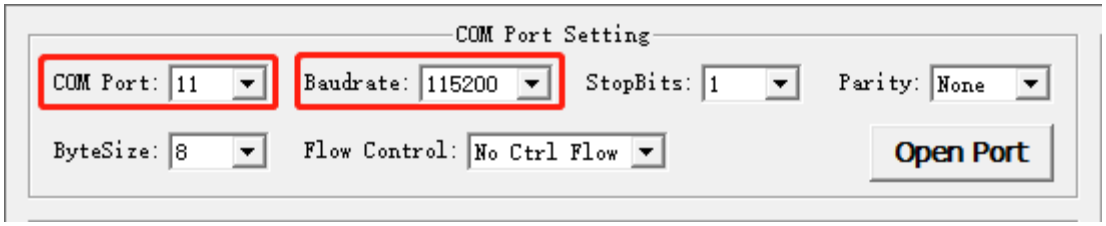

Figure 21: COM Port Setting Field on QCOM

5.3. Firmware Upgrade

You can use the JFlash tool provided by Quectel to establish the communication between the module and the PC via J0109 (SWD interface) or J0105 (JTAG interface).

NOTE

Contact Quectel Technical Support for the JFlash tool. For more details about JFlash tool usage and configuration, see ***document [3]***.

5.4. Reset

To reset the module, first connect Module to KEY of J0114 (reset jumper interface), and then press and hold S0101 (reset button) for more than 100 ms before releasing it.

6 Appendix References

Table 8: Related Documents

Document Name
[1] Quectel_HCM511S_Hardware_Design
[2] Quectel_QCOM_User_Guide
[3] Quectel_HCM511S_Test_Guide

Table 9: Terms and Abbreviations

Abbreviation	Description
COM	Communication
ETM	Embedded Trace Module (Macrocell)
GND	Ground
GPIO	General Purpose Input/Output
IC	Integrated Circuit
JTAG	Joint Test Action Group
LDO	Low-dropout Regulator
LED	Light Emitting Diode
PC	Personal Computer
RF	Radio Frequency
RXD	Receive Data (Pin)
SWD	Serial Wire Debug
SWO	Serial Wire Output

TXD	Transmit Data (Pin)
UART	Universal Asynchronous Receiver & Transmitter
USB	Universal Serial Bus
VBAT	Voltage at Battery (Pin)