KG100S TE-B

User Guide

Wireless Module for Amazon Sidewalk

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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 phone or other cellular 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
-	2023-03-25	Wain ZHAO	Creation of the document
1.0.0	2023-03-25	Wain ZHAO	Preliminary

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1 Introduction

To help you to develop applications with Quectel KG100S conveniently, Quectel supplies corresponding development board (KG100S TE-B) to test the module. This document can help you quickly understand KG100S TE-B interface specifications, RF characteristics, electrical and mechanical details and know how to use it.

2 Product Overview

The KG100S TE-B is a stand-alone LoRa, FSK, and BLE protocol development board that supports UART and Jlink interfaces. The KG100S module integrates all of Amazon sidewalk hardware and software resources.

2.1. Top View

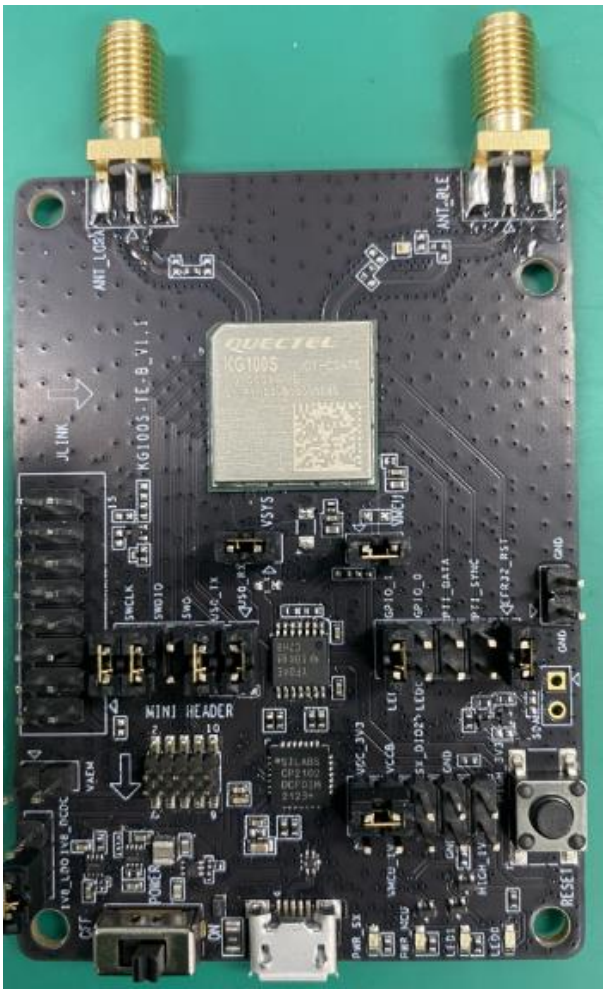

Figure 1: Top View

Figure 2: Bottom View

2.2. Component Placement

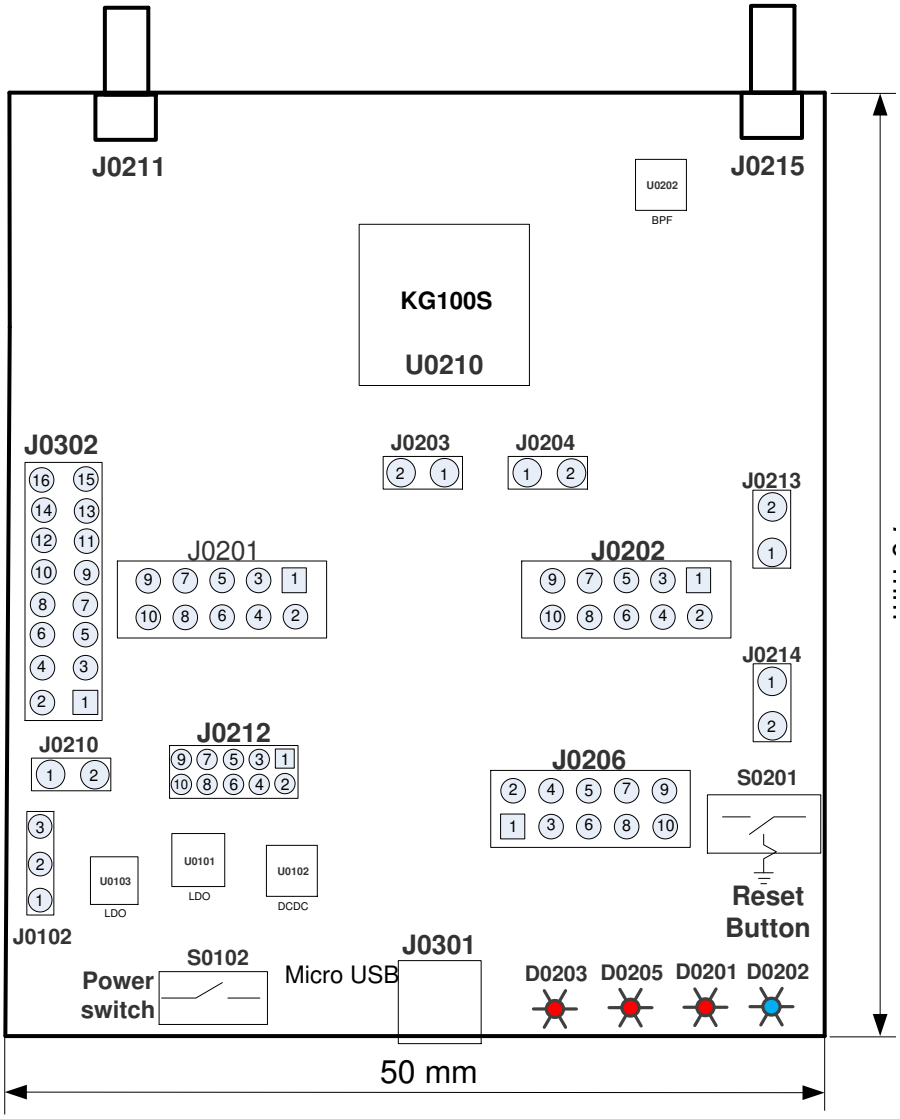

Figure 3: Component Placement of KG100S TE-B

Table 1: Components of KG100S TE-B

Components	RefDes.	Description
KG100S	U0210	The KG100S module
LDO	U0101, U0103	Voltage Conversion
DC-DC	U0102	Voltage Conversion
BPF	U0202	Band Pass Filter

Micro USB	J0301	• USB power supply interface • Typical supply voltage: +5 V
Power Switch	S0102	VBUS ON/OFF control
RESET Button	S0201	Reset the module
USB-to-UART Interface	J0301	Support UART interface
RF Connectors	J0211, J0215	RF SMA connectors
Status Indicators	D0203	Indicate the power on/off status
	D0205	
	D0202	Indicate the GPIO1 status
	D0201	Indicate the GPIO0 status
Jlink	J0302	Firmware Download
Optional Power Supply	J0102	• When the jumper is connected to pin1 and pin2, LDO will supply power to the KG100S VMCU; • When the jumper is connected to pin2 and pin3, DC-DC will supply power to the KG100S VMCU.
Test Points	J0203	Test Points
	J0204	
	J0213	

3 Kit Accessories & Assembly

3.1. Accessories Assembly

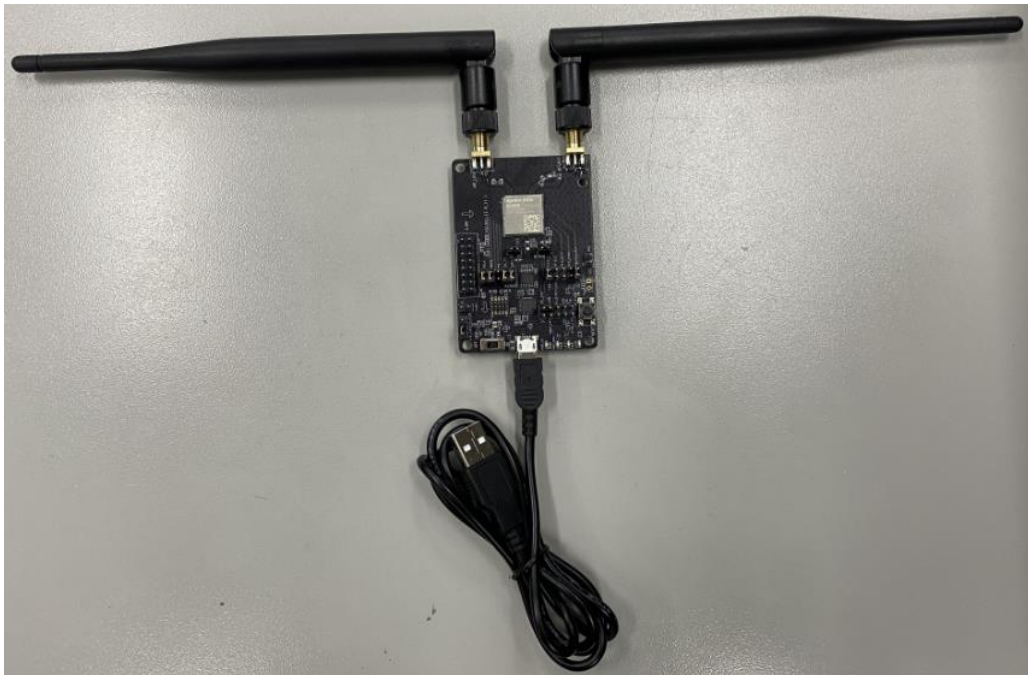

Figure 4: TE-B Kit Accessories Assembly

3.2. Accessories List

Figure 5: TE-B Kit Accessories

Table 2: Accessories List

Items	Description	Quantity (pcs)
Cables	Micro USB cable	1
Antennas	LoRa & BLE antennas	2
Instruction Sheet	A sheet of paper giving instructions for TE-B connection, details of TE-B accessories, etc.	1

4 Application Interfaces

This chapter describes the information and applications of some hardware interfaces of the KG100S TE-B:

- Power Supply Interface
- Power Switch
- RESET Button
- USB-to-UART Interface
- Test Points
- RF Connectors
- Status Indicators

4.1. Power Supply Interface

KG100S TE-B can be powered by USB Micro USB connector(J0301) The simplified power supply schematic of KG100S TE-B is provided in the following figure.

Table 3: Description of Power Supply Interface

RefDes.	Description
J0301	• USB power supply interface • Typical supply voltage: +5 V

The following figure shows the simplified power supply schematic of KG100S TE-B.

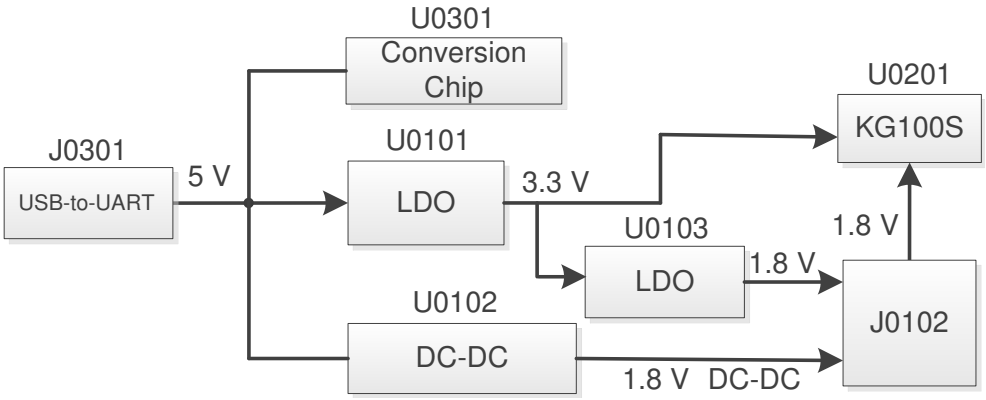

Figure 6: Power Supply for KG100S TE-B

4.2. Switch & Button

Table 4: Description of Power Switch

RefDes.	Description
S0102	VBUS ON/OFF control
S0201	Reset the module

The following figures show the switch and button:

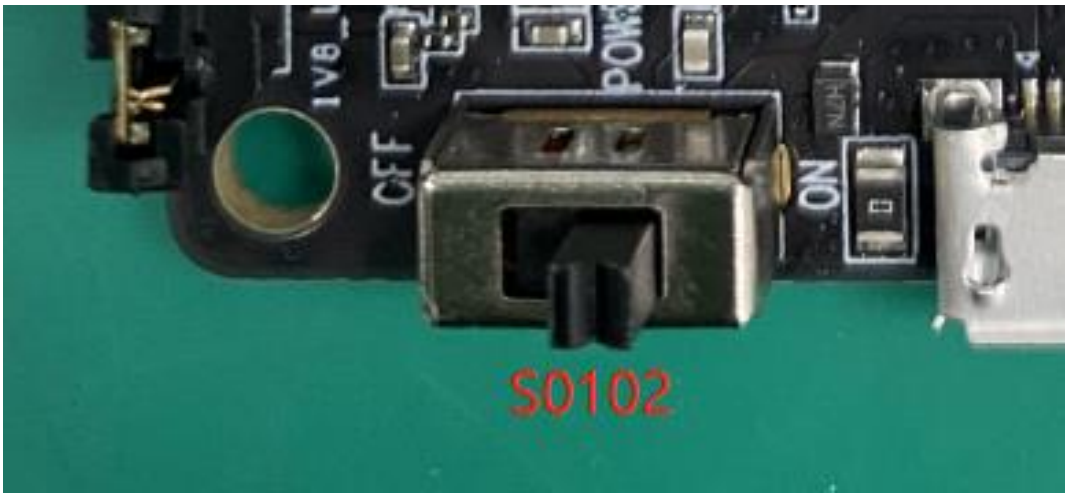

Figure 7: Power Switch

Figure 8: RESET Button

4.3. USB-to-UART Interface

Table 5: Description of USB-to-UART Interface

RefDes.	Description
J0301	Support UART interface

J0301 is intended for communication between the module and the host application. It can be used for AT command communication, J0301 supports 115200 bps baud rate by default.

The following figures show the block diagram of UART on KG100S TE-B.

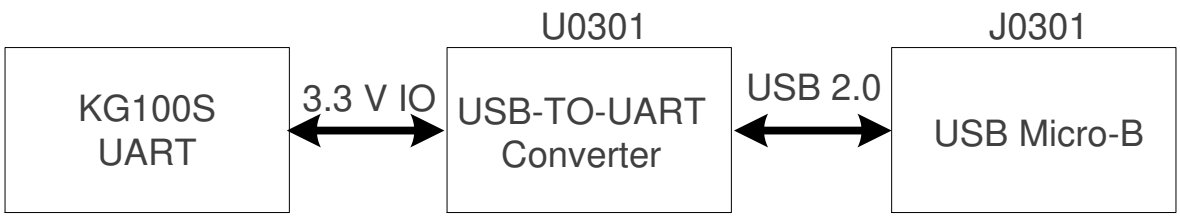

Figure 9: USB-to-UART Block Diagram

Figure 10: USB Connector

4.4. RF Connectors

KG100S TE-B offers two RF antenna connectors.

Table 6: Description of RF Connectors

RefDes.	Description
J0211	Connect ANT_LoRa (from KG100S) through SMA connector
J0215	Connect ANT_BLE (from KG100S) through SMA connector

The following figures show the block diagram of RF antenna connectors:

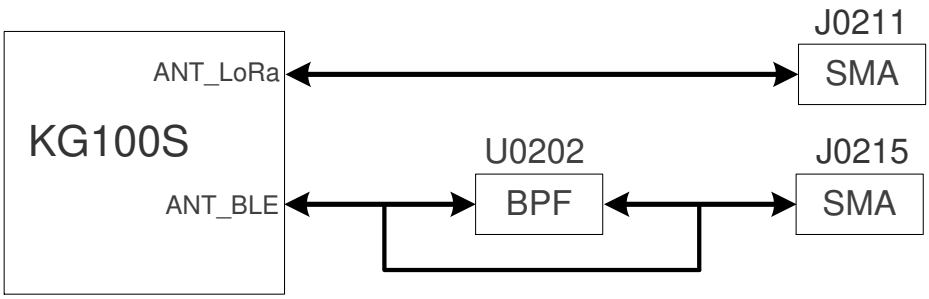

Figure 11: RF Antenna Connectors Block Diagram

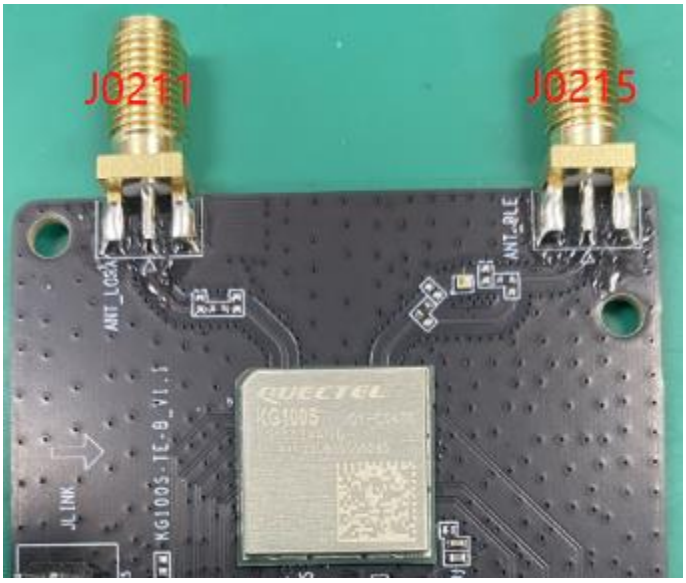

Figure 12: RF Connectors

4.5. Jlink Interface

The KG100S TE-B can be used for firmware download. You can refresh the data by them.

Table 7: Description of Firmware Download

RefDes.	Description
J0302	Firmware Download

The following figure shows the firmware download:

Figure 13: Firmware Download

Table 8: Pin Definition of J0302

J0302		
Pin No.	**Pin Name**	**Description**
1	VCC	3.3 V power supply
2	VCC (optional)	3.3 V power supply
3, 5, 11	NC	No connect
7	SWDIO	Bidirectional data interface
9	SWCLK	Clock
13	SWO	Information output
15	RESET	Reset pin
4, 6, 8, 10, 12, 14, 16	GND	Ground

4.6. Test Points

The KG100S TE-B provides a series of test points. They can help you to obtain the corresponding waveform of some signals. The following figure shows the test points of J0203, J0204, J0213.

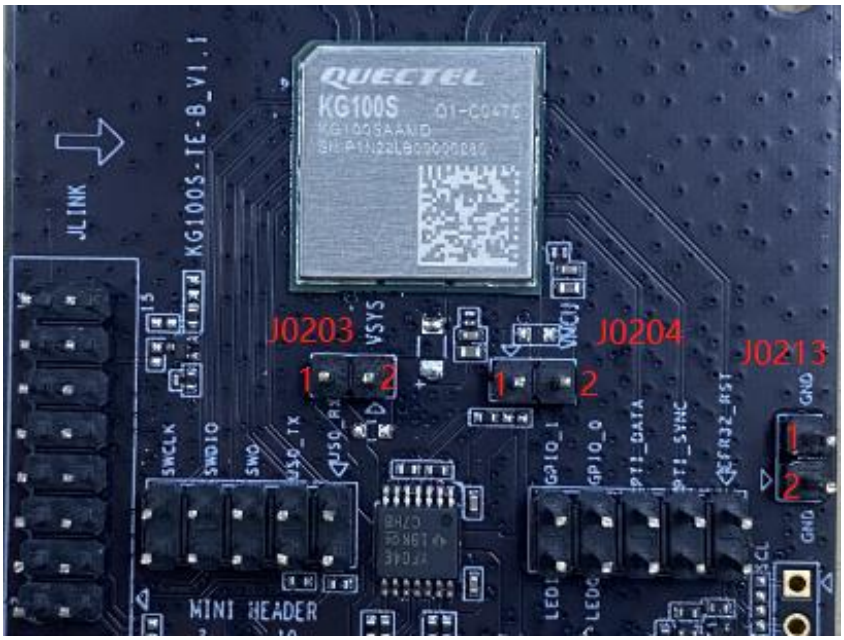

Figure 14: Test PointsTable

Table 9: Pin Definition of J0203, J0204, J0213

J0203		
Pin No.	**Pin Name**	**Description**
1	VCC_3V3	Connected directly to LDO(U0101) of the KG100S TE-B
2	VSYS	Connected directly to VSYS of the module
J0204		
Pin No.	**Pin Name**	**Description**
1	VCC_1V8	Connected directly to LDO(U0103) of the KG100S TE-B
2	VMCU	Connected directly to VMCU of the module
J0213		

Pin No.	Pin Name	Description
1	GND	Ground
2	GND	Ground

4.7. Status LEDs

The KG100S TE-B comprises four status LEDs. The following figure shows the positions of these LED indicators.

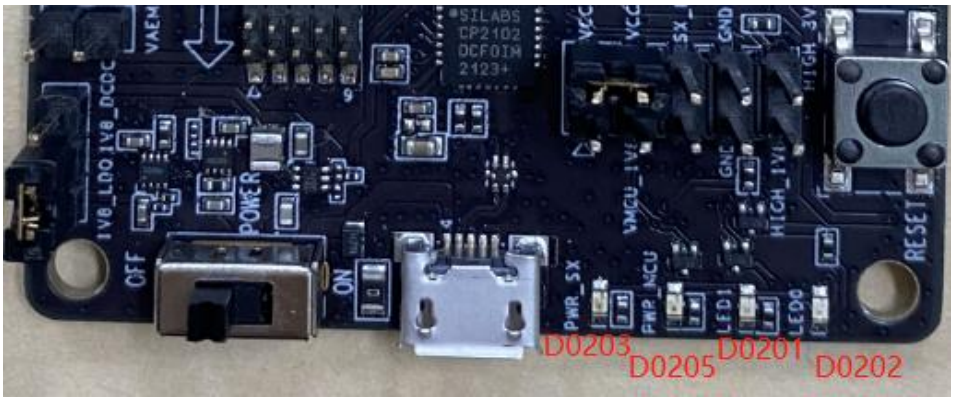

Figure 15: Status LEDs

Table 10: Description of Status LEDs

Reference No.	Description
D0203	Power on/off indicator, it can indicate whether the power supply is ready. Light on: VSYS on Light off: VSYS off
D0205	Power on/off indicator, it can indicate whether the power supply is ready. Light on: VMCU on Light off: VMCU off
D0201	Indicates the status of GPIO0. Light on: high level Light off: low level
D0202	Indicates the status of GPIO1. Light on: high level Light off: low level

5 Operation Procedures

This chapter introduces how to use the KG100S TE-B for testing and evaluating the module.

5.1. Power Up

1. Connect the USB connectors of KG100S TE-B to PC with the USB micro-B cables.
2. Switch S0102 (Power Switch) to "**ON**" state, then D0203 and D0205 (VSYS/VMCU ON/OFF indicator) will light up.

5.2. Communication Via USB Serial Port

1. Power up KG100S according to the procedures mentioned in ***Chapter*** *错误!未找到引用源。*.

2. Connect the USB connectors of KG100S TE-B to PC with the USB cable, and the USB serial port number can be viewed through the PC Device Manager, as shown below.

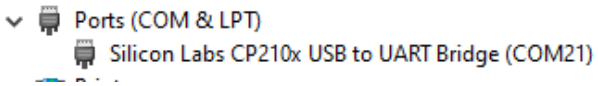

Figure 16: USB Serial Port

3. Install and then use the QCOM tool provided by Quectel to achieve the communication between the module and the PC. The following figure shows the field for setting the COM port on QCOM. Select "**COM Port**" (USB serial port) and set correct "**Baudrate**". For more details about QCOM tool usage and configuration, see ***document [1]***.

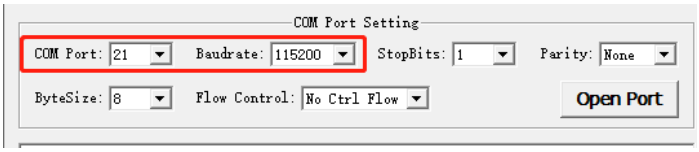

Figure 17: Main UART Setting Field on QCOM

5.3. Firmware Upgrade

You can use the J-Flash V7.58b tool between the module and the PC via UART.The Module upgrades firmware via UART with specific steps as below.

5.3.1. JLink Configuration

1. See ***Chapter 5.3*** to connect the module to JLink.
2. The module is connected to a PC via Micro USB, switch S0102 (Power Switch) to "**ON**" state.
3. Run J-flash v7.58b on Windows.
4. Click "**Create ew project**" and Click select "**Start J-Flash**".
5. Select "**Target device**" to "**EFR32BG21BXXXF1024**".
6. Select "**Target Interface**" to "**SWD**".
7. Select "**Speed**" to "**4000**" and then click '**OK**' to confirm.

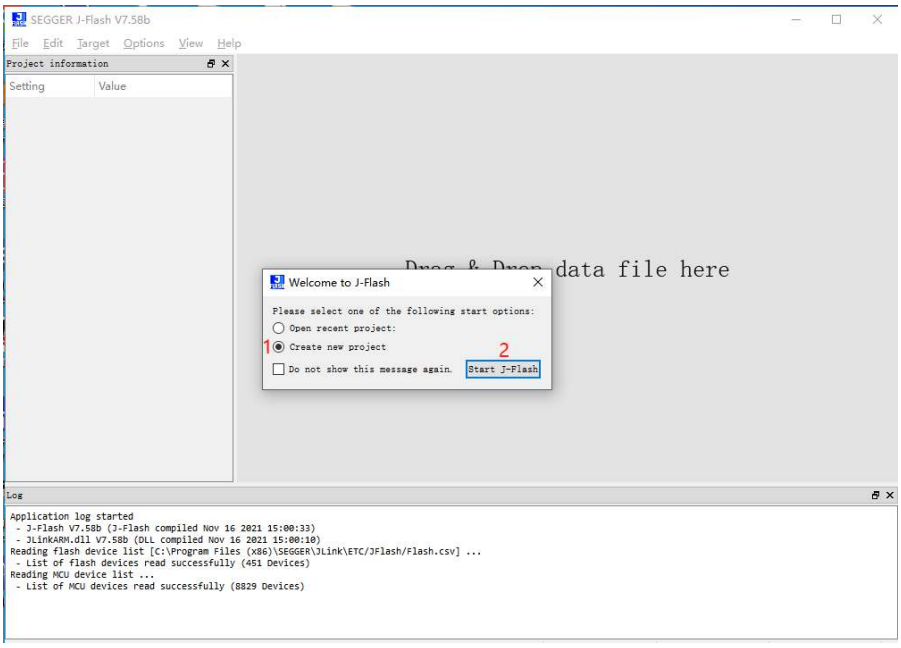

Figure 18: JLink Configuration (1)

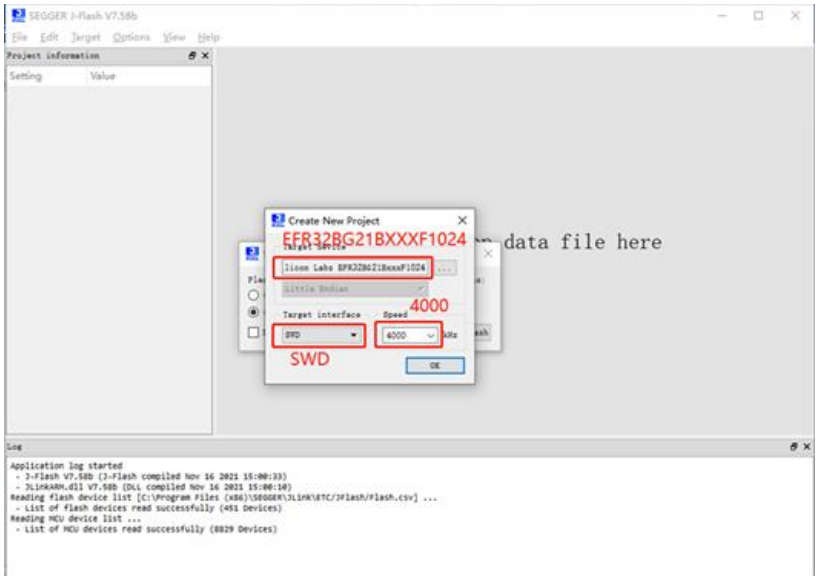

Figure 19: JLink Configuration (2)

5.3.2. Firmware Download

Based on ***Chapter 5.3.1***, click "**Target**" and then click "**Connect**". Connected successfully will be displayed in the log bar.

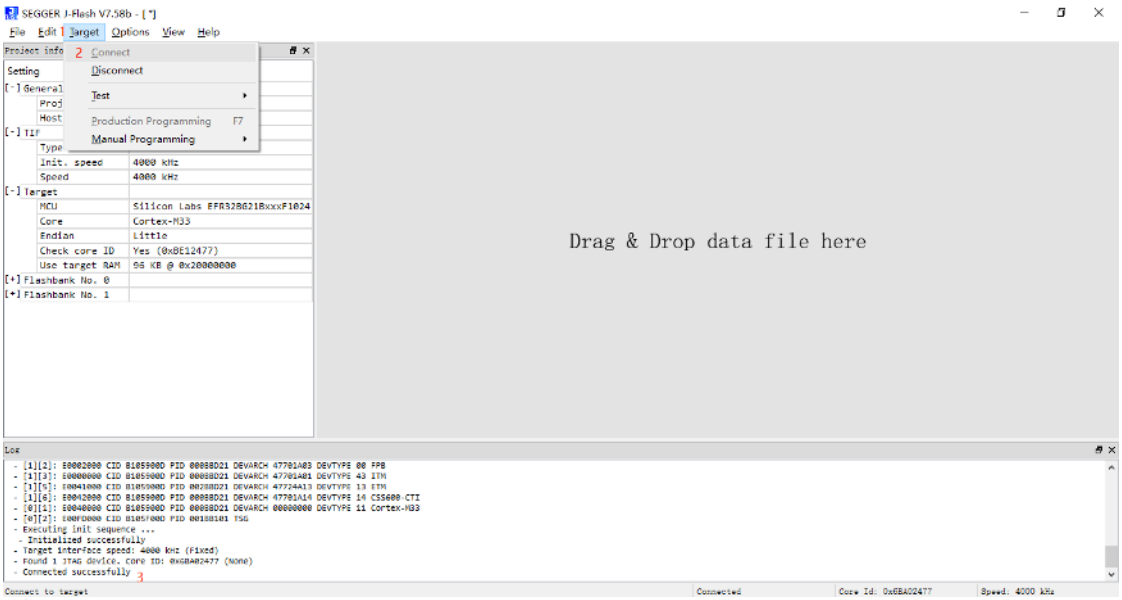

Figure 20: Firmware Upgrade (1)

Click '**File**', and then select "**Open data file**", and finally select the firmware you want to download.

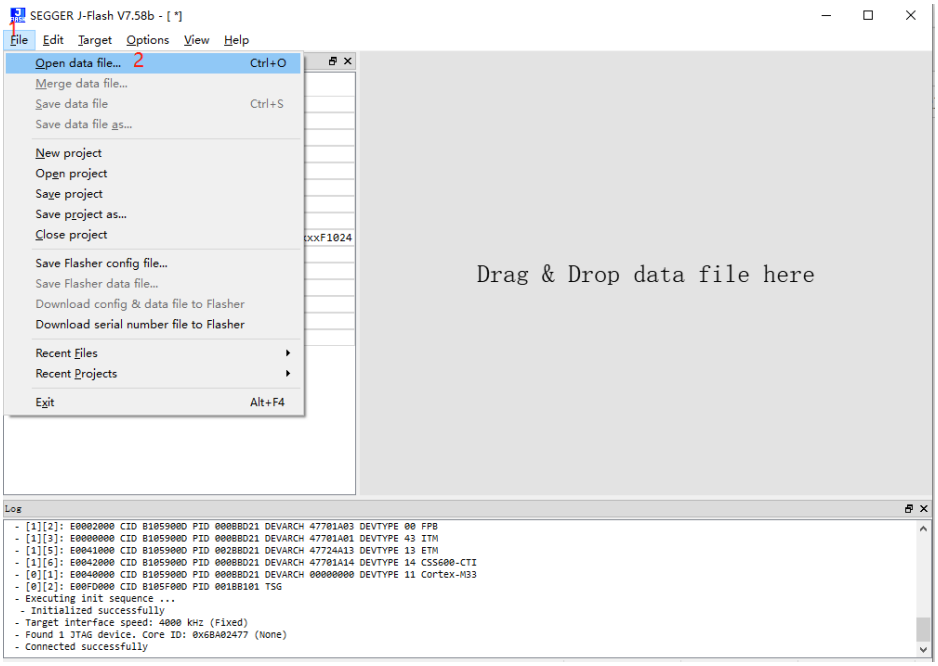

Figure 21: Firmware Upgrade (2)

Click on "**Target**", and select "**Manual Programming**", and then click "**Erase Chip**", and finally click "**Program & Verify**".

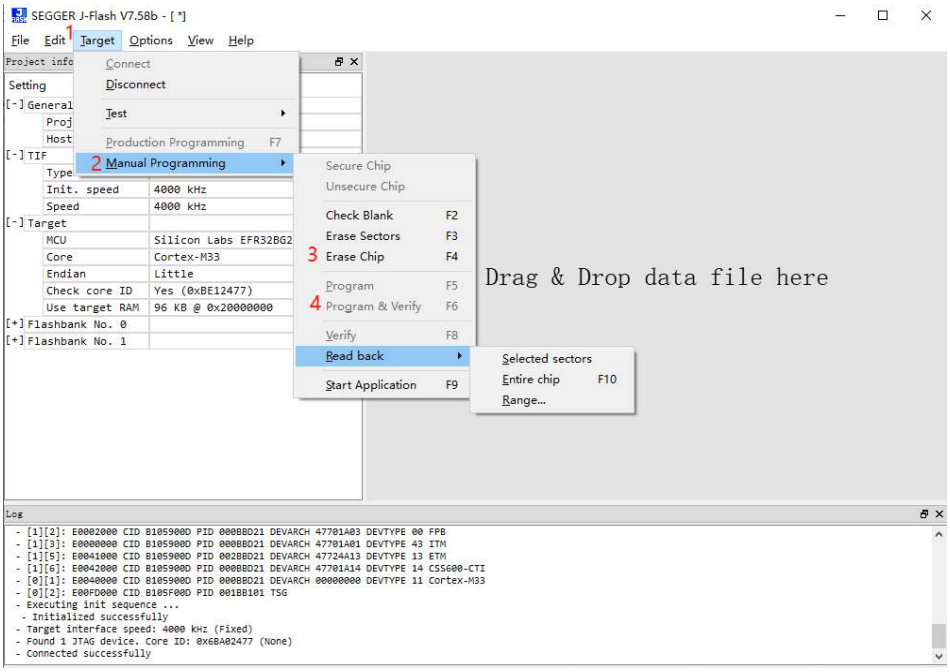

Figure 22: Firmware Upgrade (3)

If the firmware is successfully upgraded, the message successfully will also be displayed.

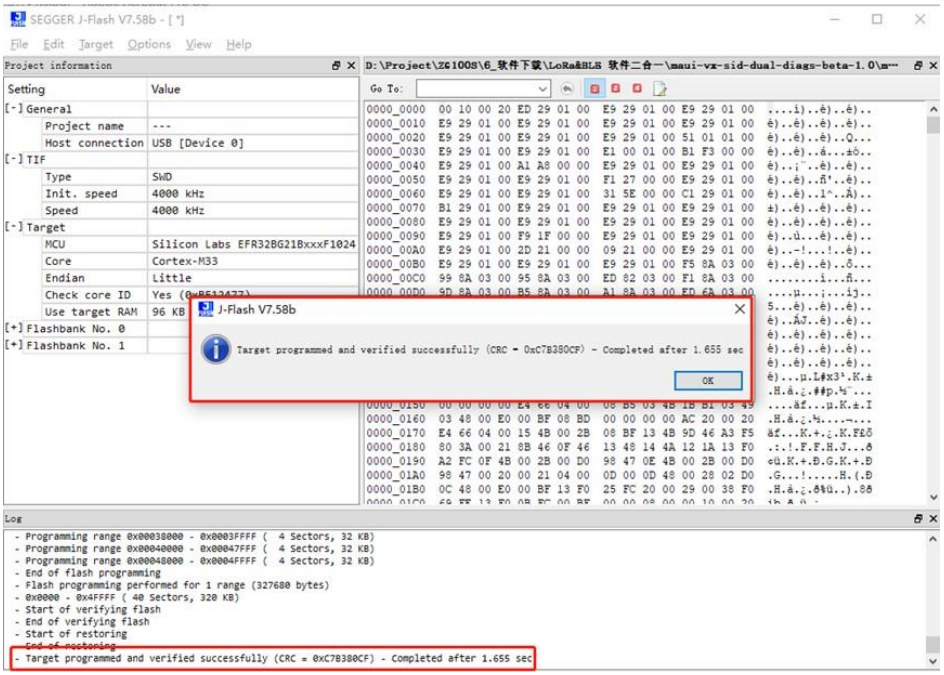

Figure 23: Firmware Upgrade (4)

5.4. Reset the Module

Press the S0201 (RESET button) for more than 100 ms then release it to reset the module.

6 Appendix References

Table 11: Related Document

Document Name
[1] Quectel_KG100S_Hardware_Design

Table 12: Terms and Abbreviations

Abbreviation	Description
BLE	Bluetooth Low Energy
BPF	Band Pass Filter
BT	Bluetooth
COM	Cluster Communication Port
DC	Direct Current
EVB	Evaluation Board
GND	Ground
LDO	Liquid Crystal Display
LED	Light Emitting Diode
NC	Not Connected
PC	Private Computer
QCOM	Quectel Cluster Communication Port
RF	Radio Frequency
SMA	SubMiniature Version A

UART	Universal Asynchronous Receiver & Transmitter
USB	Universal Serial Bus
VCC	Volt Current Condenser