

LUA300C (00)

EVB User Guide

IMU Module Series

Version: 1.0

Date: 2025-07-08

Status: Released



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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 precautions by incorporating them into all product manuals. Otherwise, Quectel assumes no liability for customers' failure to comply with these precautions.



Ensure that the product may be used in the country and the required environment, as well as that it conforms to the local safety and environmental regulations.



Keep away from explosive and flammable materials. The use of electronic products in extreme power supply conditions and locations with potentially explosive atmospheres may cause fire and explosion accidents.



The product must be powered by a stable voltage source, while the wiring must conform to security precautions and fire prevention regulations.



Proper ESD handling procedures must be followed throughout the mounting, handling and operation of any devices and equipment incorporating the module to avoid ESD damages.

About the Document

Document Information

Title	LUA300C (00) EVB User Guide
Subtitle	IMU Module Series
Document Type	EVB User Guide
Document Status	Released

Revision History

Version	Date	Description
-	2025-05-19	Creation of the document
1.0	2025-07-08	First official release

Contents

Safety Information.....	3
About the Document.....	4
Contents	5
Table Index.....	6
Figure Index	7
1 Introduction	8
2 General Overview.....	9
2.1. EVB Kit.....	9
2.2. Connect Cable to EVB	10
3 EVB Interfaces.....	11
3.1. EVB Top View.....	11
3.2. EVB Interfaces	11
4 Test via QGNSS Tool	14
4.1. Test Steps	14
4.2. QGNSS Interface Explanation	15
5 EVB Installation.....	17
6 Power Consumption Measurement	18
7 EVB Framework.....	20
8 Common Issues and Troubleshooting	21
9 Cautions	22
10 Appendix References	23

Table Index

Table 1: List of Kit Components	9
Table 2: Detailed EVB Interfaces	12
Table 3: J204 Test Points	12
Table 4: J205 Test Points	13
Table 5: Related Documents	23
Table 6: Terms and Abbreviations	23

Figure Index

Figure 1: EVB Kit Components	9
Figure 2: EVB and Component Assembly.....	10
Figure 3: EVB Top View	11
Figure 4: COM Port and Baud Rate Setting	14
Figure 5: QGNSS Interface (Connected).....	15
Figure 6: IMU Output – Stable Angular Rate, Acceleration, and Temperature	16
Figure 7: IMU Output – Varying Angular Rate, Acceleration, and Temperature	16
Figure 8: EVB Top and Bottom Views	17
Figure 9: VCC Power Consumption Measured with Ammeter	18
Figure 10: VCC Power Consumption Measured with Power Consumption Meter	19
Figure 11: EVB Framework	20

1 Introduction

This document provides information on the steps needed to evaluate the Quectel LUA300C (00) module using the Evaluation Board (EVB). The EVB is a convenient tool that allows you to become familiar with the LUA300C (00) module.

Specifically, the document is divided into several chapters as follows:

- Chapter 2 provides the general overview of the EVB kit.
- Chapter 3 describes the EVB interfaces.
- Chapter 4 describes how to test the module via QGNSS tool.
- Chapter 5 describes the installation of EVB.
- Chapter 6 describes how to measure power consumption for LUA300C (00) module.
- Chapter 7 provides the EVB framework.
- Chapter 8 describes the common issues and troubleshooting.
- Chapter 9 provides the cautions.
- Chapter 10 is an appendix, which lists the relevant documents, and terms and abbreviations appearing in this user guide.

NOTE

1. For details about documents related to the LUA300C (00) module, see [Table 5: Related Documents](#).
2. Request the latest version of QGNSS software tool from Quectel Technical Support (support@quectel.com).

2 General Overview

2.1. EVB Kit

The EVB kit includes:

- Evaluation Board (EVB),
- LUA300C (00) module,
- USB Type-C cable, and
- Bolts and coupling nuts.

The EVB kit components are shown in the figure below. For details, see [Table 1: List of Kit Components](#).

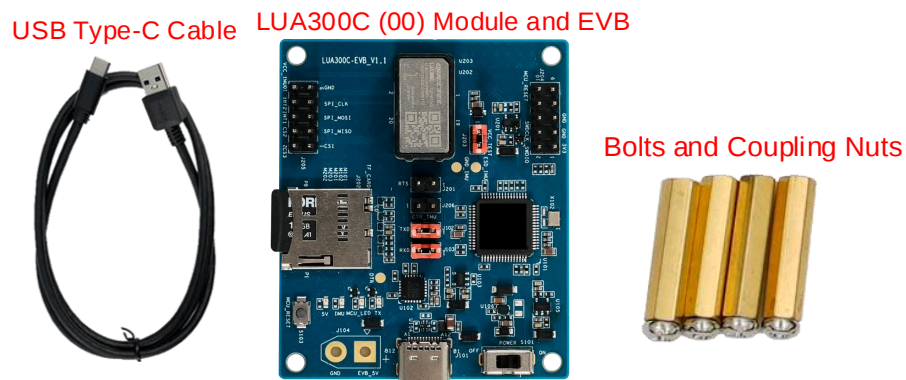


Figure 1: EVB Kit Components

Table 1: List of Kit Components

Item	Description	Quantity
EVB	LUA300C (00) Evaluation Board Size: 60 mm × 50 mm	1
USB Cable	USB Type-C Cable	1
IMU Module	LUA300C (00)	1
Others	Bolts and Coupling Nuts	4 pairs

2.2. Connect Cable to EVB

The connection between the EVB and its components is shown in the figure below.



Figure 2: EVB and Component Assembly

3 EVB Interfaces

3.1. EVB Top View

EVB top view is shown in the figure below.

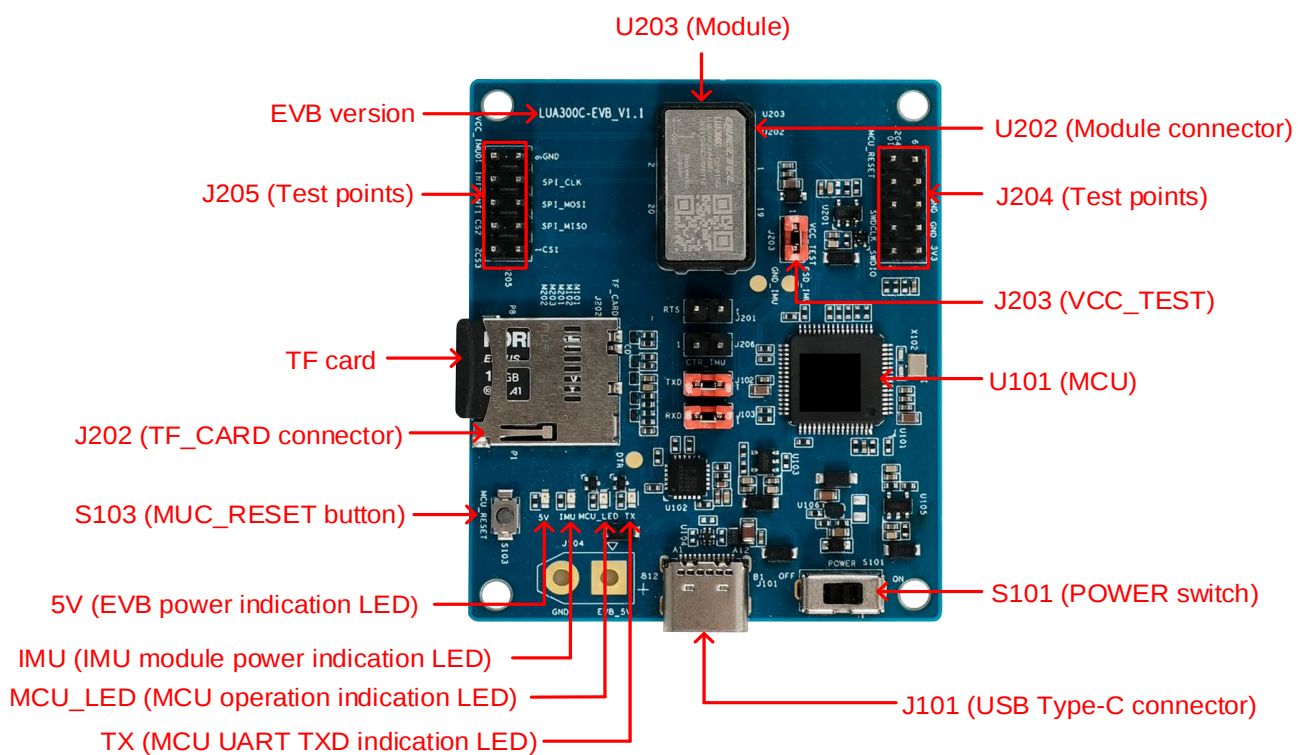


Figure 3: EVB Top View

3.2. EVB Interfaces

The EVB interfaces are detailed in the table below.

Table 2: Detailed EVB Interfaces

Function	Interface	Description
Power Supply	J101 USB Type-C Connector	Power supply input: - DC power supply: 4.5–5.5 V, typ. 5.0 V - Current capability should be > 150 mA
Communication Interface	J101 USB Type-C Connector	Supports QGC messages and firmware upgrade.
Connector	U203 Module	LUA300C (00) module.
	U202 Module Connector	Used to connect the LUA300C (00) module.
	J202 TF_CARD Connector	Used to insert the TF card.
	J203 VCC_TEST	Used to test VCC.
Signal Indication	TX MCU UART TXD Indication LED	High frequency flashing: Data output from UART TXD pin. Extinct: No data output from UART TXD pin.
	MCU_LED MCU Operation Indication LED	Extinct: MCU abnormal operation. Flashing: MCU normal operation.
	IMU IMU Module Power Indication LED	Extinct: Abnormal IMU module power. Bright: Normal IMU module power.
	5V EVB Power Indication LED	Extinct: Abnormal EVB power. Bright: Normal EVB power.
	S101 POWER Switch	Powers the EVB on/off.
Switch and Button	S103 MCU_RESET Button	Short press the button to reset the MCU.

The J204 and J205 test points of LUA300C (00) EVB are described in the tables below:

Table 3: J204 Test Points

Test Point No.	Test Point Label	Test Point Function	I/O	Description
1	3V3	U101: Main power	PI	It is used for 3.3 V power supply for MCU.
2	SWDIO	U101: SWD input/output signal	DIO	It is used for upgrading MCU firmware.
3	GND	GND	-	Ground

Test Point No.	Test Point Label	Test Point Function	I/O	Description
4	SWDCLK	U101: SWD clock signal	-	It is used for upgrading MCU firmware.
5	GND	GND	-	Ground
6	No label	-	-	N/C (not connected)
7	No label	-	-	N/C
8	No label	-	-	N/C
9	No label	-	-	N/C
10	MCU_RESET	U101: Reset pin	DI	Pull it down to reset the MCU.

Table 4: J205 Test Points

Test Point No.	Test Point Label	Test Point Function	I/O	Description
1	CS1	U203: Pin 7	DI	SPI chip-select 1 for IMU unit 1.
2	CS3	U203: Pin 15	DI	SPI chip-select 3 for the memory chip.
3	SPI_MISO	U203: Pin 9	DO	SPI master in slave out
4	CS2	U203: Pin 13	DI	SPI chip-select 2 for IMU unit 2.
5	SPI_MOSI	U203: Pin 11	DI	SPI master out slave in
6	INT1	U203: Pin 6	DO	Interrupt signal 1 for sentinel mode.
7	SPI_CLK	U203: Pin 14	DI	SPI clock signal.
8	INT2	U203: Pin 8	DO	Interrupt signal 2 for sentinel mode.
9	GND	GND	-	Ground
10	VCC_IMU	U203: Pin 1 and Pin 3	PI	IMU module main power supply.

NOTE

Each test point of J205 corresponds to the module's respective pin function. For detailed descriptions, see [document \[1\] hardware design](#). For more information on the reference circuits of module pins, see [document \[2\] reference design](#).

4 Test via QGNSS Tool

This chapter explains how to use the QGNSS software tool for verifying the status of LUA300C (00) module. For more information about QGNSS use, see [document \[3\] QGNSS user guide](#).

4.1. Test Steps

Step 1: Mount the LUA300C (00) module on the EVB and assemble the EVB components.

Step 2: Connect the EVB and the PC with a USB Type-C cable. Then flip the power switch (S101) to **ON** position to power on the EVB.

Step 3: Start the QGNSS tool and click "**Device**" and "**Set Device Information**" (default baud rate: 460800 bps ¹), as shown in the figure below.

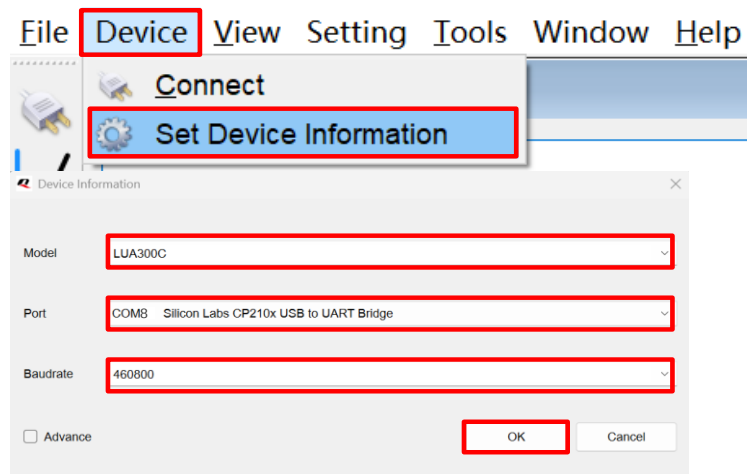


Figure 4: COM Port and Baud Rate Setting

Step 4: Click the  "**Connect or disconnect**" button. The interface shown in the figure below appears once the module is connected.

¹ UART interface default settings may vary depending on software versions.

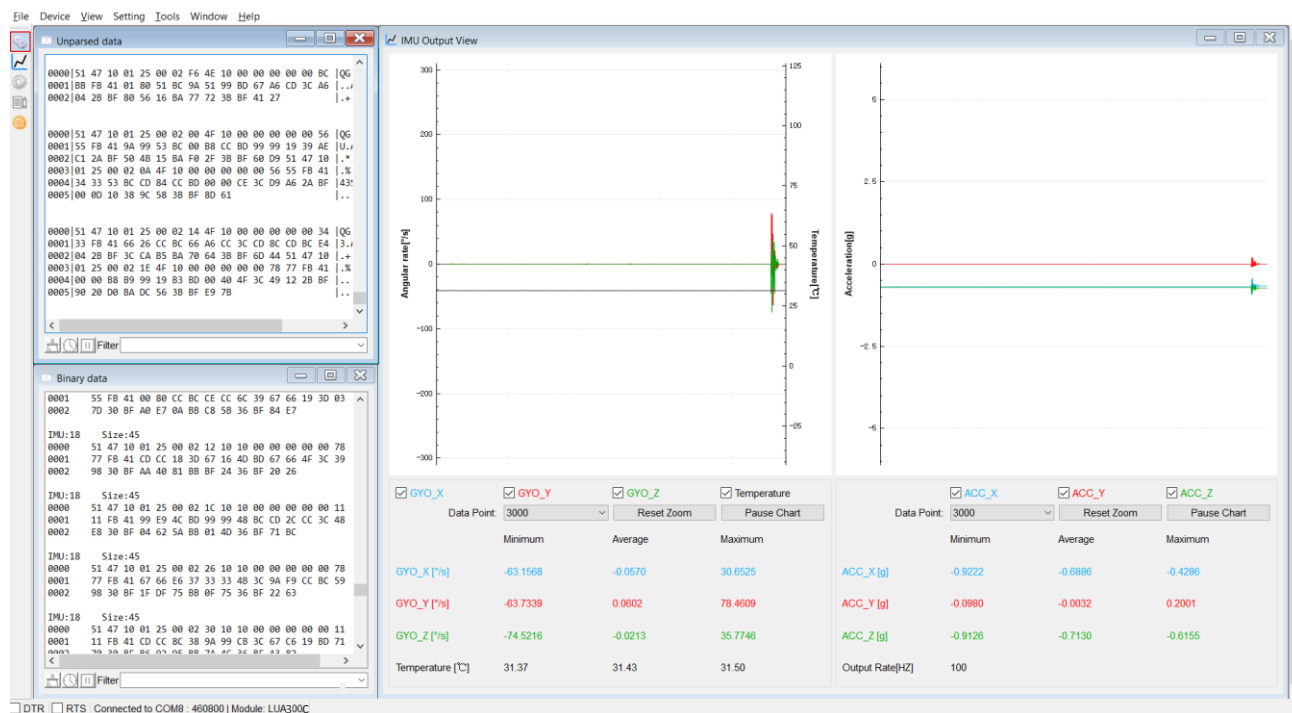


Figure 5: QGNSS Interface (Connected)

NOTE

1. Ensure the CP210x driver has been installed when you use the QGNSS tool for the first time. For more information about the driver, please contact the Quectel Technical Support (support@quectel.com).
2. For more information about the reported IMU information, see [document \[4\] IMU application note](#).

4.2. QGNSS Interface Explanation

In the **"IMU Output View"** on QGNSS interface, you can see the information about angular rate (°/s), acceleration (g), and temperature (°C). By selecting specific parameters, you can visualize and analyze data along different axes within the coordinate system:

- To observe angular rate curve along the chosen axis:
Select "**GYO_X**", "**GYO_Y**", "**GYO_Z**" to display the angular rate along the X, Y, and Z axes.
- To view temperature variations:
Select "**Temperature**" to display the temperature curve.
- For acceleration data along the chosen axis:
Select "**ACC X**", "**ACC Y**", and "**ACC Z**" to display the acceleration along the X, Y, and Z axes.

For detailed information on the parameters, see the figures below.



Figure 6: IMU Output – Stable Angular Rate, Acceleration, and Temperature



Figure 7: IMU Output – Varying Angular Rate, Acceleration, and Temperature

5 EVB Installation

If dynamic testing is required, make sure the EVB is firmly fixed to the device under test to avoid any relative movement or vibration between the EVB and the device. Failure to do so may result in severe performance degradation of either the EVB or the IMU module.

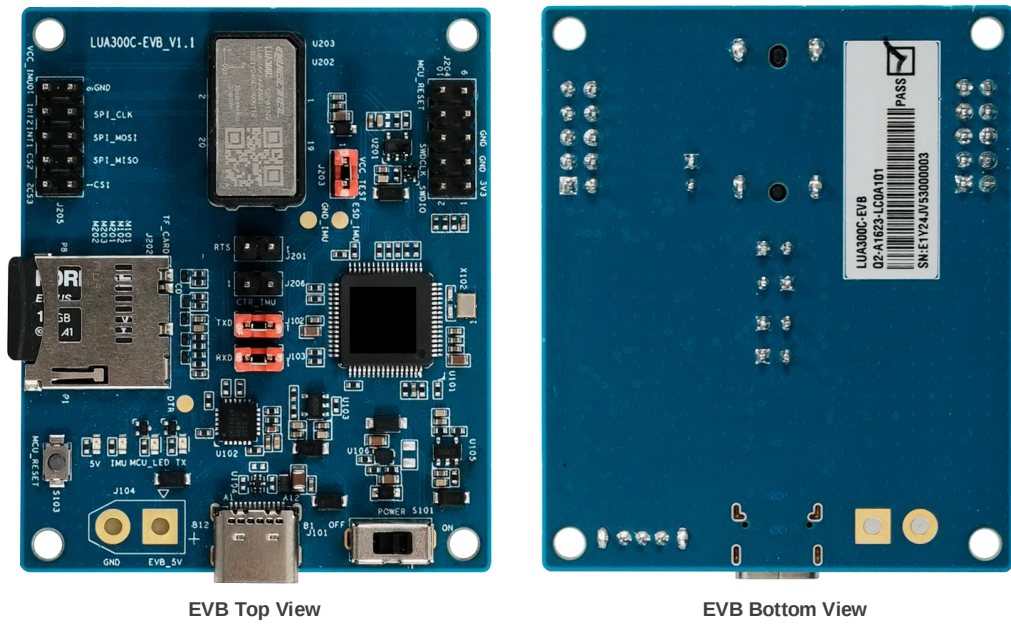


Figure 8: EVB Top and Bottom Views

6 Power Consumption Measurement

Before measuring the VCC power consumption, you must connect the components to the EVB to ensure that the module can communicate normally. See [Chapter 4.1 Test Steps](#) for details.

Steps for measuring VCC power consumption with an ammeter:

Step 1: Switch off the power supply (S101) and remove the jumper cap from VCC_TEST (J203). Connect the ammeter in series to both pins of J203 (VCC_TEST) as shown below.

Step 2: Switch on the power supply (S101) and read the ammeter.

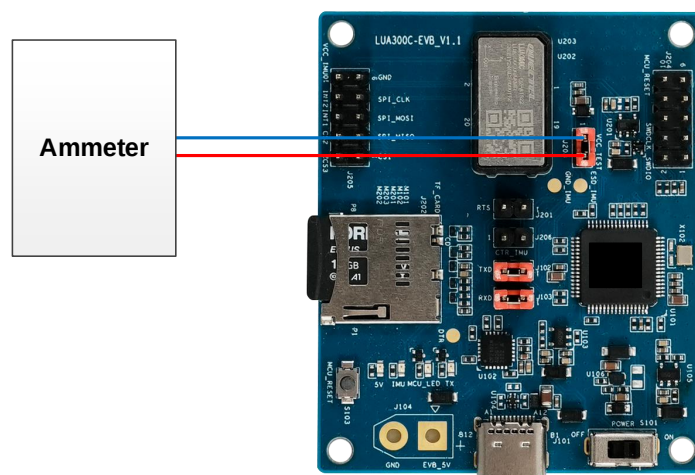


Figure 9: VCC Power Consumption Measured with Ammeter

Steps for measuring VCC power consumption with a power consumption meter:

Step 1: Switch off the power supply (S101) and remove the jumper cap from the VCC_TEST (J203). Connect the positive terminal of the power consumption meter to pin 1 (with arrow silkscreen) of J203, and the negative terminal is connected to GND pin of J205 test points.

Step 2: Switch on the power supply (S101) and read the power consumption meter.

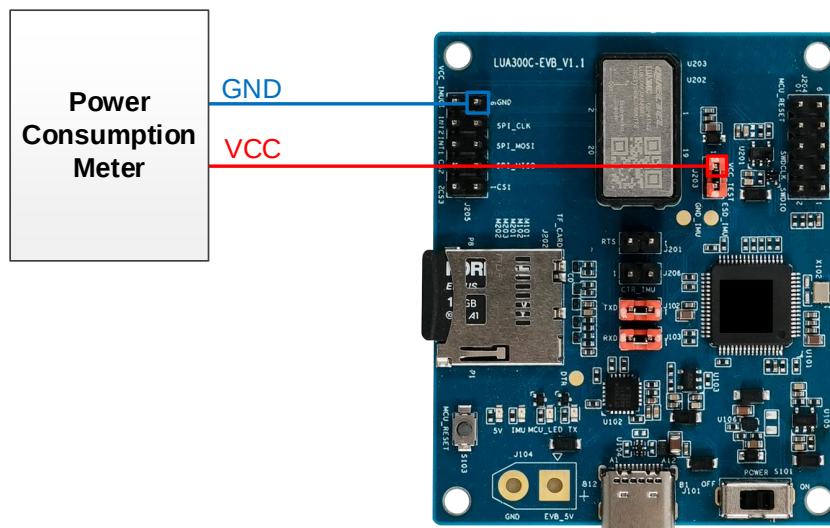


Figure 10: VCC Power Consumption Measured with Power Consumption Meter

NOTE

1. Adjust the current resolution before using the power consumption meter.
2. Formula for calculating the power consumption value: $P = V_{\text{Supply}} \times I_{\text{Test}}$.

7 EVB Framework

The power is supplied to EVB via the USB Type-C connector, and then to the IMU module via a Low-dropout Regulator (LDO). The IMU module is connected to the MCU, and then to the communication interface on the EVB via USB-to-UART Bridge Chip (CP2102).

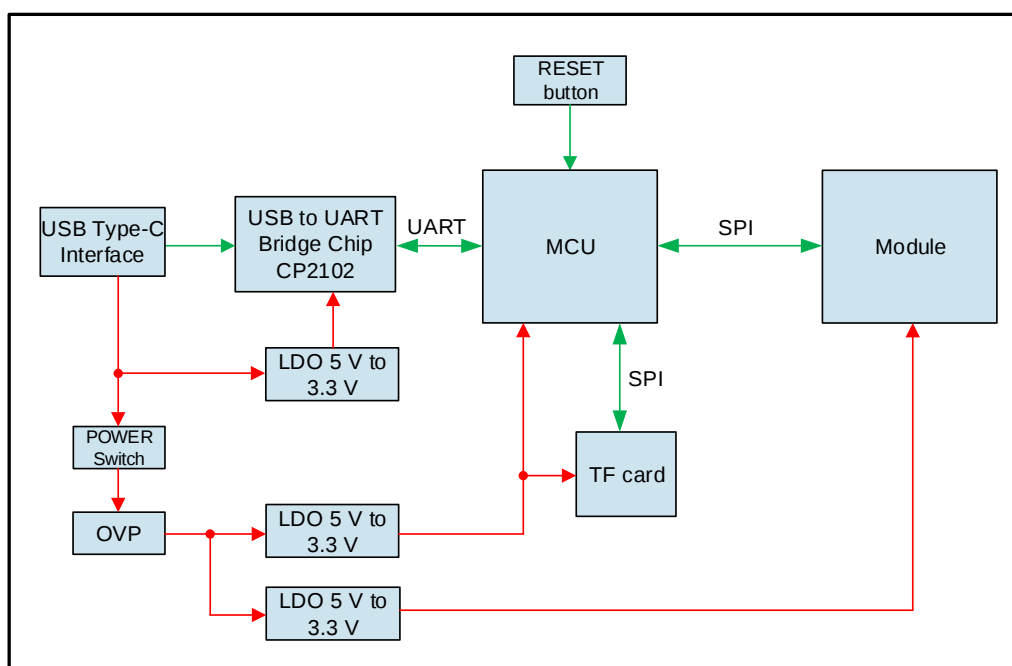


Figure 11: EVB Framework

8 Common Issues and Troubleshooting

1. **COM port is not detected in the Device Manager when EVB is connected to your PC with a USB Type-C cable.**
 - Verify if the EVB communication interface is properly connected to the PC.
 - Verify if CP210x Driver has been installed successfully.
2. **Communication interface is not outputting any messages or commands.**
 - Verify if TXD pin outputs normally (via the **TX** indication LED).
 - Verify if the jumper caps are connected correctly, as shown in [Figure 3: EVB Top View](#).
 - Ensure that the module's power supply is normal.
3. **Module is unable to enter upgrade mode.**
 - Verify if the module is in normal operating mode.
 - Check if the downloaded firmware is correct.
 - Verify if the correct COM port has been selected.

NOTE

For the issues that cannot be solved, please contact Quectel Technical Support (support@quectel.com).

9 Cautions

1. Make sure to conduct tests in the same environment when comparing different parameters of the IMU module.
2. Ensure that the measurement method is correct. If there are significant differences between parameters tested via EVB and those provided by Quectel, contact Quectel Technical Support.
3. QGNSS tool may be updated periodically to fix bugs or improve performance. Make sure that you are using the latest version of the tool. If a newer version is available, the tool will automatically prompt you to upgrade it upon launch.

10 Appendix References

Table 5: Related Documents

Document Name
[1] Quectel_LUA300C(00)_Hardware_Design
[2] Quectel_LUA300C(00)_Reference_Design
[3] Quectel_QGNSS_User_Guide
[4] Quectel_LUA300C(00)_IMU_Application_Note

Table 6: Terms and Abbreviations

Abbreviation	Description
COM Port	Communication Port
DC	Direct Current
DI	Digital Input
DIO	Digital Input and Output
DO	Digital Output
EVB	Evaluation Board
GND	Ground
I/O	Input/Output
IMU	Inertial Measurement Unit
LDO	Low-dropout Regulator
LED	Light Emitting Diode
MCU	Microcontroller Unit

Abbreviation	Description
PC	Personal Computer
SPI	Serial Peripheral Interface
SWD	Serial Wire Debug
TF	TransFlash (MicroSD Card)
TXD	Transmit Data (Pin)
UART	Universal Asynchronous Receiver/Transmitter
USB	Universal Serial Bus
VCC	Voltage at Common Collector