LC79H (AL)
EVB User Guide

GNSS Module Series

Version: 1.0

Date: 2022-07-20

Status: Released

At Quectel, our aim is to provide timely and comprehensive services to our customers. If you require any assistance, please contact our headquarters:

Quectel Wireless Solutions Co., Ltd.
Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai 200233, China
Tel: +86 21 5108 6236
Email: info@quectel.com

Or our local offices. For more information, please visit:
http://www.quectel.com/support/sales.htm.

For technical support, or to report documentation errors, please visit:
http://www.quectel.com/support/technical.htm.
Or email us at: support@quectel.com.

Legal Notices

We offer information as a service to you. The provided information is based on your requirements and we make every effort to ensure its quality. You agree that you are responsible for using independent analysis and evaluation in designing intended products, and we provide reference designs for illustrative purposes only. Before using any hardware, software or service guided by this document, please read this notice carefully. Even though we employ commercially reasonable efforts to provide the best possible experience, you hereby acknowledge and agree that this document and related services hereunder are provided to you on an "as available" basis. We may revise or restate this document from time to time at our sole discretion without any prior notice to you.

Use and Disclosure Restrictions

License Agreements

Documents and information provided by us shall be kept confidential, unless specific permission is granted. They shall not be accessed or used for any purpose except as expressly provided herein.

Copyright

Our and third-party products hereunder may contain copyrighted material. Such copyrighted material shall not be copied, reproduced, distributed, merged, published, translated, or modified without prior written consent. We and the third party have exclusive rights over copyrighted material. No license shall be granted or conveyed under any patents, copyrights, trademarks, or service mark rights. To avoid ambiguities, purchasing in any form cannot be deemed as granting a license other than the normal non-exclusive, royalty-free license to use the material. We reserve the right to take legal action for noncompliance with abovementioned requirements, unauthorized use, or other illegal or malicious use of the material.

Trademarks

Except as otherwise set forth herein, nothing in this document shall be construed as conferring any rights to use any trademark, trade name or name, abbreviation, or counterfeit product thereof owned by Quectel or any third party in advertising, publicity, or other aspects.

Third-Party Rights

This document may refer to hardware, software and/or documentation owned by one or more third parties ("third-party materials"). Use of such third-party materials shall be governed by all restrictions and obligations applicable thereto.

We make no warranty or representation, either express or implied, regarding the third-party materials, including but not limited to any implied or statutory, warranties of merchantability or fitness for a particular purpose, quiet enjoyment, system integration, information accuracy, and non-infringement of any third-party intellectual property rights with regard to the licensed technology or use thereof. Nothing herein constitutes a representation or warranty by us to either develop, enhance, modify, distribute, market, sell, offer for sale, or otherwise maintain production of any our products or any other hardware, software, device, tool, information, or product. We moreover disclaim any and all warranties arising from the course of dealing or usage of trade.

Privacy Policy

To implement module functionality, certain device data are uploaded to Quectel's or third-party's servers, including carriers, chipset suppliers or customer-designated servers. Quectel, strictly abiding by the relevant laws and regulations, shall retain, use, disclose or otherwise process relevant data for the purpose of performing the service only or as permitted by applicable laws. Before data interaction with third parties, please be informed of their privacy and data security policy.

Disclaimer

a) We acknowledge no liability for any injury or damage arising from the reliance upon the information.
b) We shall bear no liability resulting from any inaccuracies or omissions, or from the use of the information contained herein.
c) While we have made every effort to ensure that the functions and features under development are free from errors, it is possible that they could contain errors, inaccuracies, and omissions. Unless otherwise provided by valid agreement, we make no warranties of any kind, either implied or express, and exclude all liability for any loss or damage suffered in connection with the use of features and functions under development, to the maximum extent permitted by law, regardless of whether such loss or damage may have been foreseeable.
d) We are not responsible for the accessibility, safety, accuracy, availability, legality, or completeness of information, advertising, commercial offers, products, services, and materials on third-party websites and third-party resources.

Safety Information

The following safety precautions must be observed during all phases of operation, such as usage, service or repair of any terminal incorporating Quectel LC79H (AL) module. Manufacturers of the terminal should distribute the following safety precautions to users and operating personnel, and incorporate them into all manuals supplied with the product. 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	**LC79H (AL) EVB User Guide**
Subtitle	GNSS Module Series
Document Type	EVB User Guide
Document Status	Released

Revision History

Version	Date	Description
-	2022-03-14	Creation of the document
1.0	2022-07-20	First official release

Contents

Table Index

Figure Index

1 Introduction

This document provides information on the steps needed to evaluate the Quectel LC79H (AL) module using the Evaluation Board (EVB). The EVB is a convenient tool that allows you to become familiar with the LC79H (AL) module.

Specifically, the document is divided into several sections:

● Chapter 2 provides the general overview of EVB Kit.
● Chapter 3 describes the EVB user interfaces.
● Chapter 4 describes how to communicate with the module via QCOM tool.
● Chapter 5 describes how to test the module via QGNSS tool.
● Chapter 6 describes how to upgrade module firmware via QGPSFlashTool.
● Chapter 7 is an appendix, which summarizes the relevant documents and terms and abbreviations appearing herein.

NOTE

For EVB schematic and PCB layout design files, contact Quectel Technical Support (support@quectel.com).

2 General Overview

2.1. EVB Kit

The EVB Kit includes: Evaluation Board (EVB), Quectel Active GNSS Antenna, Type-B USB Cable, USB flash drive, Bolts and Coupling Nuts. Download the software tools (QCOM, QGNSS, QGPSFlashTool) from our website Download Zone or request them from Quectel Technical Support.

The EVB Kit contents are shown in the figure below. Check *Table 1* for details.
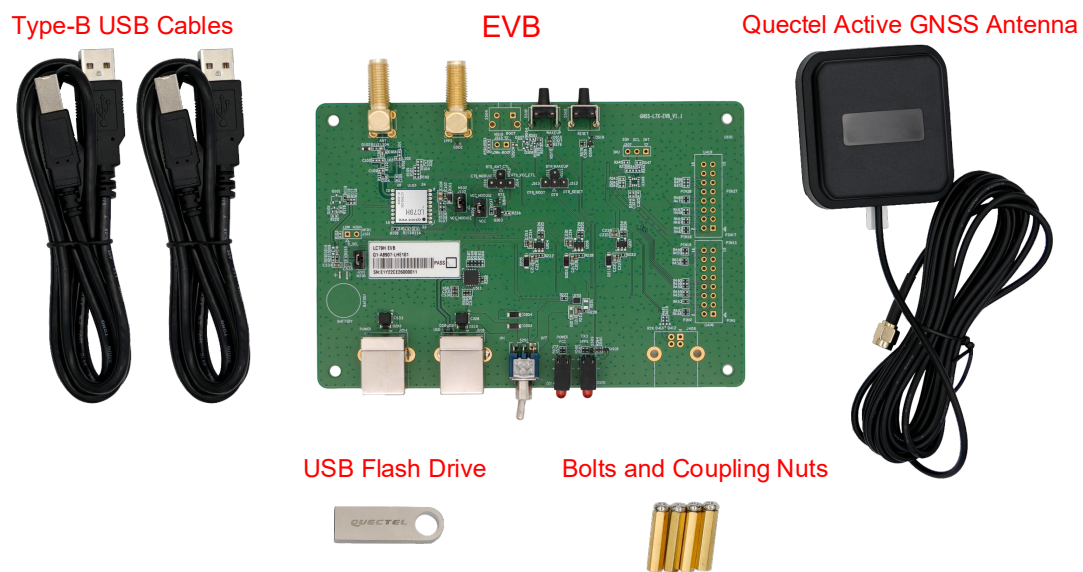
Figure 1: EVB and Components

Table 1: List of Kit Components

Items	Description	Quantity
EVB	LC79H (AL) Evaluation Board Size: 80 mm × 120 mm	1
USB Cable	Type-B USB Cables	2
USB Flash Drive	8 GB USB Flash Drive (including the module-related documents, tools, and drivers)	1
GNSS Antenna	Active GNSS Antenna: **YB0017AA** Request the Antenna Datasheet from Quectel Technical Support.	1
Instruction Sheet	Sheet providing instructions on how to connect the EVB and its components, detailed information on EVB contents, etc.	1
Others	Bolts and Coupling Nuts	4 pairs

2.2. Connect Cable and Antenna to EVB

The connection between the EVB and its components is shown in the figure below. For more information on how to connect the EVB and its components, refer to the instruction sheet inside the EVB Kit.

Figure 2: EVB and Components Assembly

> **NOTE**
>
> Make sure that the Active GNSS Antenna is placed with a clear line of sight to the sky.

3 EVB User Interfaces

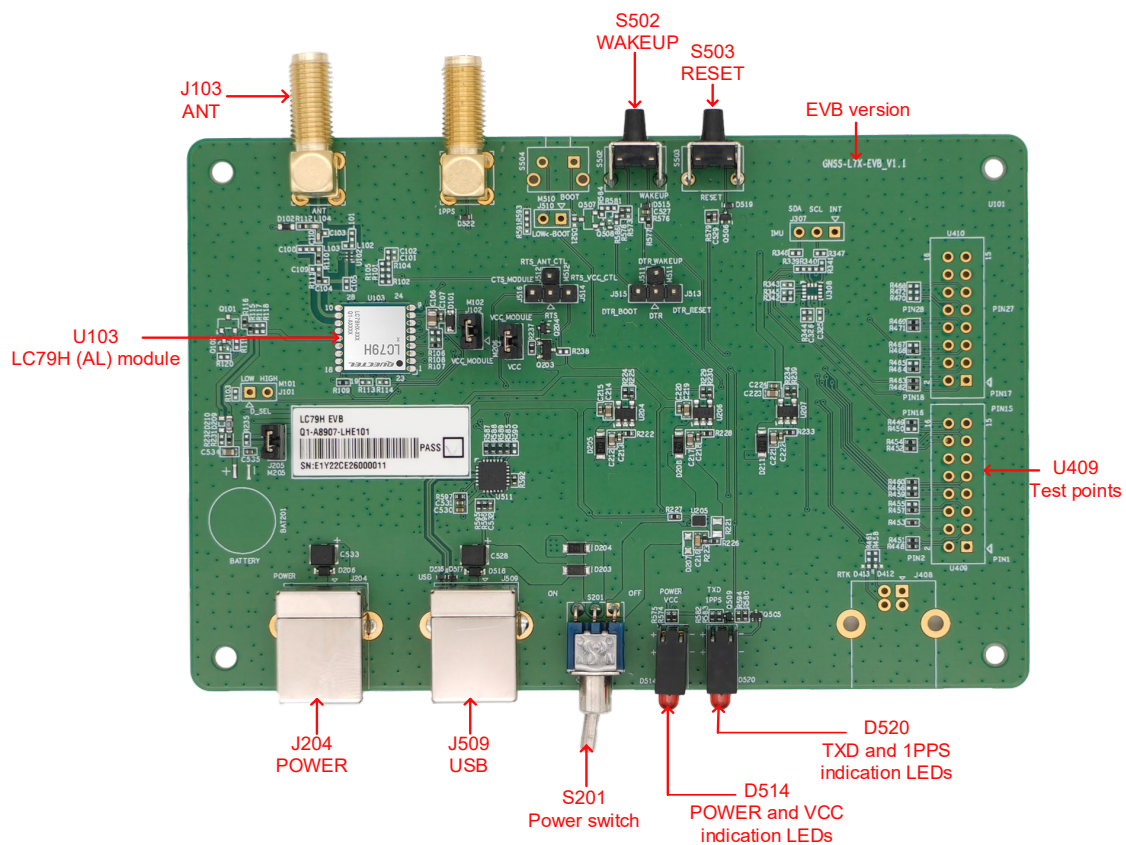## 3.1. EVB Top View

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		Interfaces	Description
Power Supply		J204 POWER	Power supply input: ● DC power supply: 4.5–5.5 V, typ. 5.0 V ● Current capability should be > 100 mA
Communication Interface		J509 USB	Standard NMEA messages output, PAIR/PQTM commands input and output, and firmware upgrade.
RF Input		J103 ANT	The antenna in the Kit supports: ● GPS L1 C/A and L5 ● GLONASS L1 ● Galileo E1 and E5a ● BDS B1I and B2a ● QZSS L1 C/A and L5 ● SBAS L1
Signal Indication	D514 Indication LEDs	POWER (Green)	Bright: The EVB board is powered well. Extinct: The EVB board is not powered.
		VCC (Red)	Bright: The EVB board is powered well. Extinct: The EVB board is not powered.
	D520 Indication LEDs	TXD (Red)	Flashing: Data outputs from UART TXD pin. Extinct or Bright: Data does not output from UART TXD pin.
		1PPS (Green)	Flashing: Successful position fix. Frequency: 1 Hz. Extinct: No position fix.
Switch and Buttons		S201 Power switch	Powers the EVB on/off.
		S503 RESET	Short press on the button to reset the module.
		S502 WAKEUP	Short press on the button to wake up the module from Backup mode.
Test Points		U409 Test points	Pins are detailed in *Table 3* and *Table 4* below.

Test point distribution is shown below:

Table 3: U409 Pin Assignment

SDA	RESERVED
VCC_RF	LNA_EN
GND	NC
GND	RESET
VCC	RESERVED
V_BCKP	RESERVED
1PPS	RXD
TXD	GND

Table 4: U409 Pin Detailed Description

Pin Name	I/O	Description
SDA	DI	I2C serial data
VCC_RF	PO	Power supply for external RF components
GND	-	Ground
GND	-	Ground
VCC	PI	Main power supply
V_BCKP	PI	Backup power supply for backup domain of module
1PPS	DO	1 pulse per second
TXD	DO	Transmits data
RESERVED	-	Reserved
LNA_EN	DO	Power control for active antenna
NC	-	Not connected
RESET	DI	Reset the module
RESERVED	-	Reserved
RESERVED	-	Reserved
RXD	DI	Receives data
GND	-	Ground

4 Communication via QCOM Tool

This chapter explains how to use the QCOM tool to communicate with the module via the Micro-USB interface. For more information, see *document [1]*.

Download the QCOM tool from our website Download Zone or request it from Quectel Technical Support.

4.1. Communication via the Type-B USB Interface

Step 1: Connect the EVB and the PC with a Type-B USB cable via the Type-B USB interface.

Step 2: Flip the Power switch (S201) to **ON** position to power on the EVB.

Step 3: Run the provided driver installer to install the USB driver.

Step 4: View the USB port number in the Device Manager, as shown in the figure below.

Figure 4: USB Port

Step 5: Install the QCOM tool provided by Quectel. The COM Port Setting interface of QCOM is shown in the figure below (default baud rate: 115200 bps [1]).
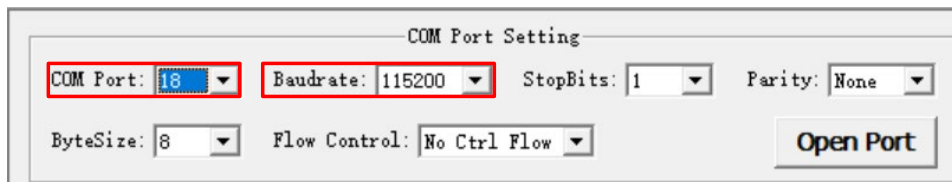

Figure 5: COM Port Setting Interface of QCOM

Step 6: Select the correct "**COM Port**" (USB Port shown in *Figure 4* above).

---

[1] UART interface default settings vary depending on software versions.

Step 7: Set the correct "**Baudrate**".

Step 8: Click "**Open Port**" to establish communication with the EVB. The NMEA sentences output by the module will be displayed in the receiving bar of the QCOM tool, as shown in the figure below.
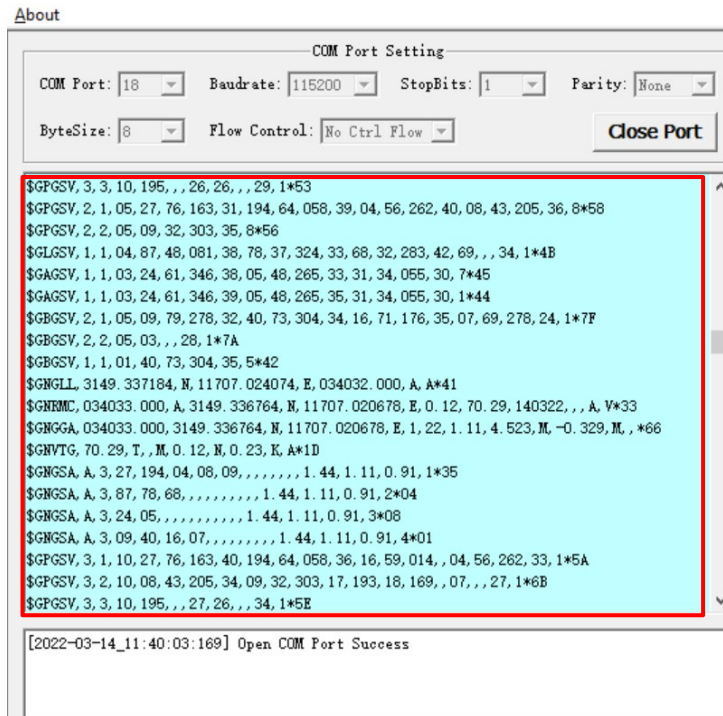
Figure 6: NMEA Sentences Output – Displayed on QCOM Tool Interface

5 Test via QGNSS Tool

This chapter explains how to use the QGNSS software tool for verifying the status of GNSS module. For more information about QGNSS use, see *document [2]*.

Request the QGNSS from Quectel Technical Support.

5.1. QGNSS Setting

Step 1: Assemble the EVB components.

Step 2: Flip the Power switch (S201) to **ON** position to power on the EVB.

Step 3: Start the QGNSS and click "**Setting**" and "**Serial Port Configuration**" (default baud rate: 115200 bps [2]).
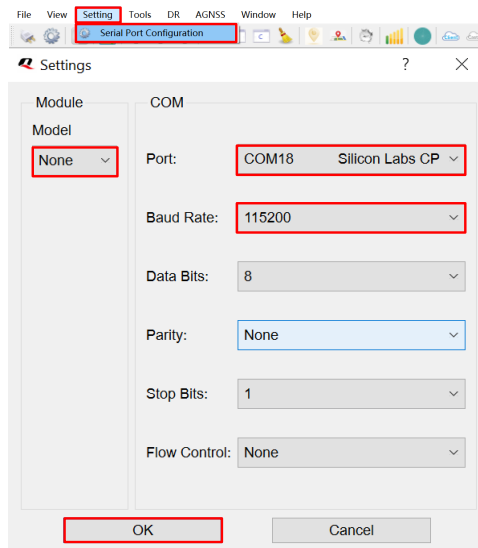
Figure 7: COM Port and Rate Setting

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

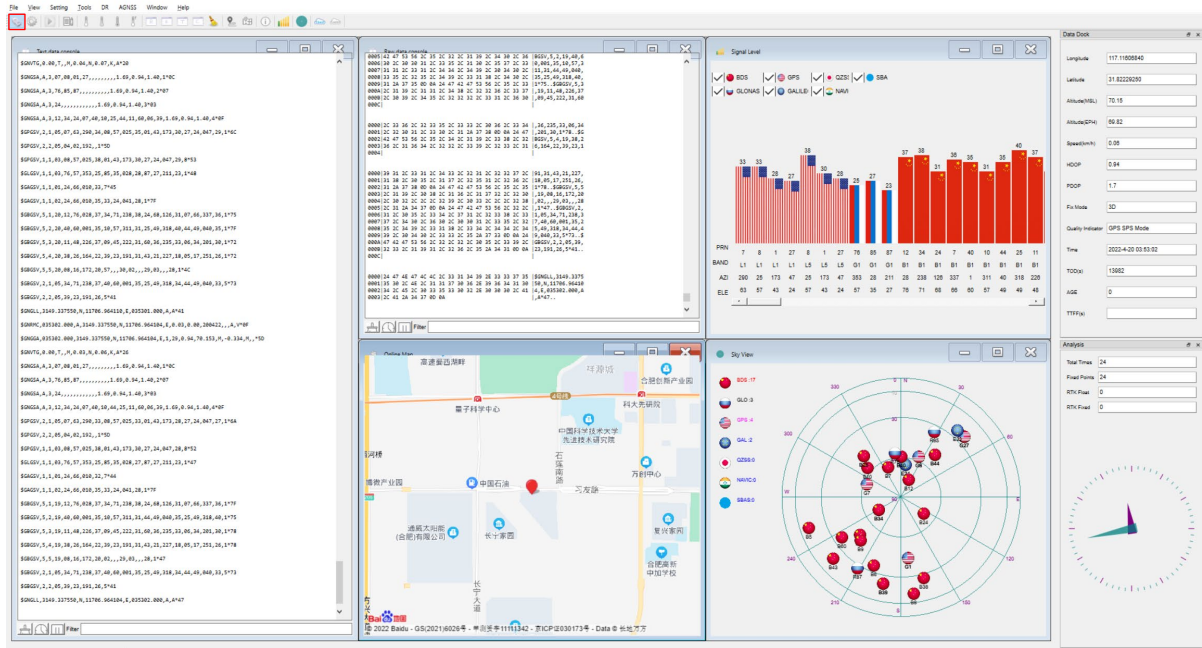[2] UART interface default settings vary depending on software versions.

Figure 8: QGNSS Interface (Connected)

5.1.1. QGNSS Interface Explanation

You can view GNSS information, such as C/N_0 message, time, position, speed, and precision in the QGNSS interface. See the following table to find out more about these parameters.
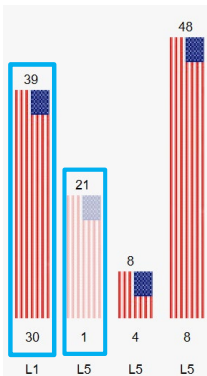
Table 5: QGNSS Interface Explanation

Icon	Explanation
	This sky view interface shows the position of the satellites in use. 1) The left column icons show the satellites in use and their number. • BDS: 4 • GLO (GLONASS): 0 • GPS: 11 • GAL (Galileo): 0 • QZSS: 0 • NAVIC (IRNSS): 0 • SBAS: 0 2) The grid map on the right shows the position of the satellites in use.
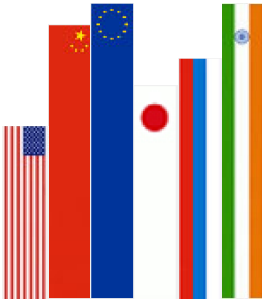
Icon	Explanation
	GPS satellite BDS satellite GLONASS satellite Galileo satellite ● QZSS satellite ◉ NavIC satellite
	• PRN 30 C/N$_0$ is 39 dB-Hz. • Column in bright red means that the navigation data of the satellites are in use. • PRN 1 C/N$_0$ is 21 dB-Hz. • Column in light red means that the navigation data of the satellites are not in use.
	• Longitude (unit: degree) • Latitude (unit: degree) • Altitude (MSL) (unit: m) • Altitude (EPH) (unit: m) • Receiver speed (unit: km/h) • Horizontal dilution of precision • Position dilution of precision • Fix Mode: 2D, 3D • Quality Indicator: DGNSS, DGPS, GPS SPS mode • UTC date and time • Time of day [3] (unit: second) • Age of differential GPS data • Last TTFF (unit: second)
	• Total Times • Fixed Points • RTK Float • RTK Fixed

---

[3] Total number of seconds elapsed since midnight of the current day.

6 Firmware Upgrade via QGPSFlashTool

Quectel LC79H (AL) module upgrades firmware via the UART interface using QGPSFlashTool. For more information, see *document [3]*.

Request the QGPSFlashTool from Quectel Technical Support.
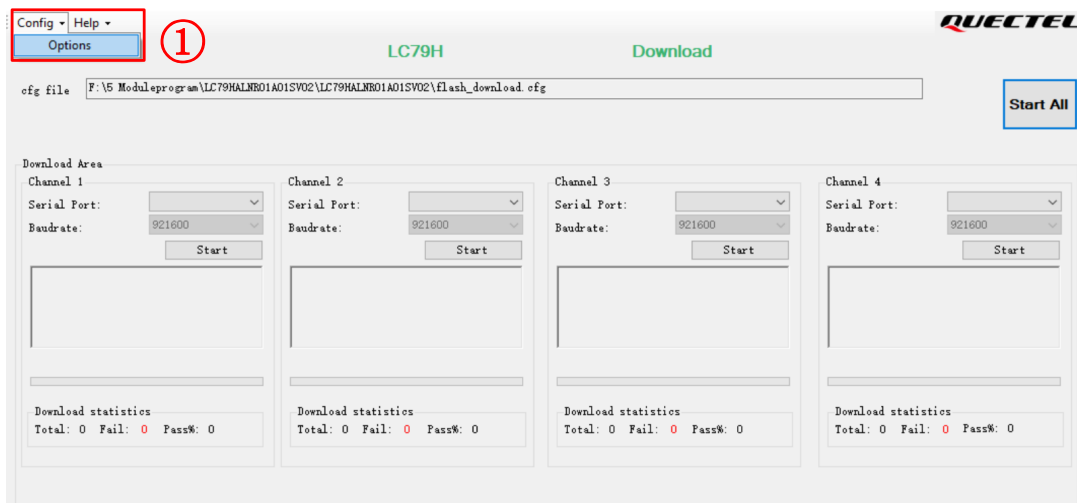
6.1. Firmware Upgrade

Before you start the firmware upgrade process:

First: Connect the EVB to a PC with a Type-B USB cable.

Second: Flip the Power switch (S201) to **ON** position before powering on the EVB.

Firmware upgrade steps:

Step 1: Open QGPSFlashTool. Click the "**Config**" and select "**Options**" as shown in the figure below.
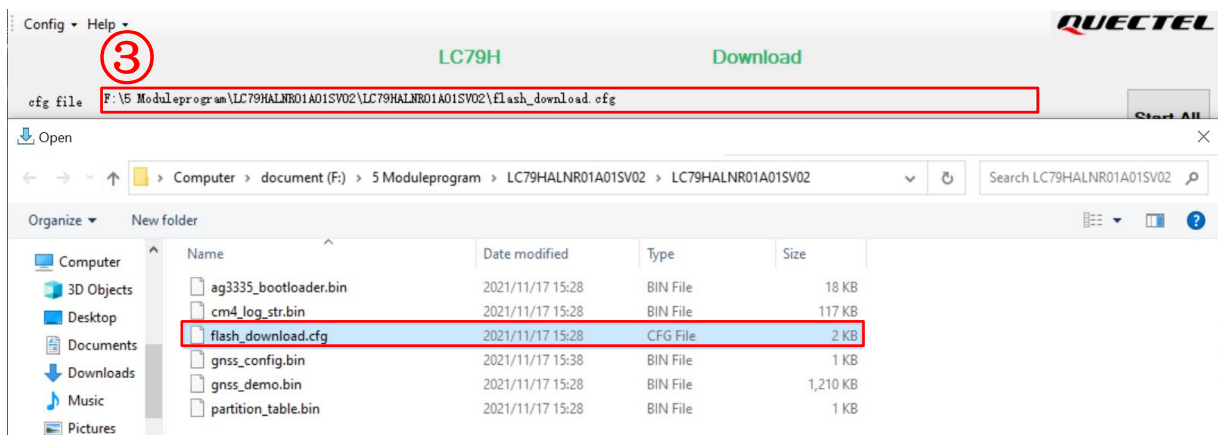

Figure 9: Firmware Upgrade – Step 1

Step 2: In the Options popup, set the number of channels to be used. In the "**Tool Options**" drop-down box, select "**LC79H**" as shown in the figure below.

Figure 10: Firmware Upgrade – Step 2

Step 3: Double click "**cfg file**" to select cfg file, e.g., "**flash_download.cfg**" as shown in the figure below.

Figure 11: Firmware Upgrade – Step 3

Step 4: Select the "**Serial Port**" of the COM Port that will be used. Click "**Start**" button and then press the RESET button at least 100 ms to start downloading the firmware, as shown in the figure below.
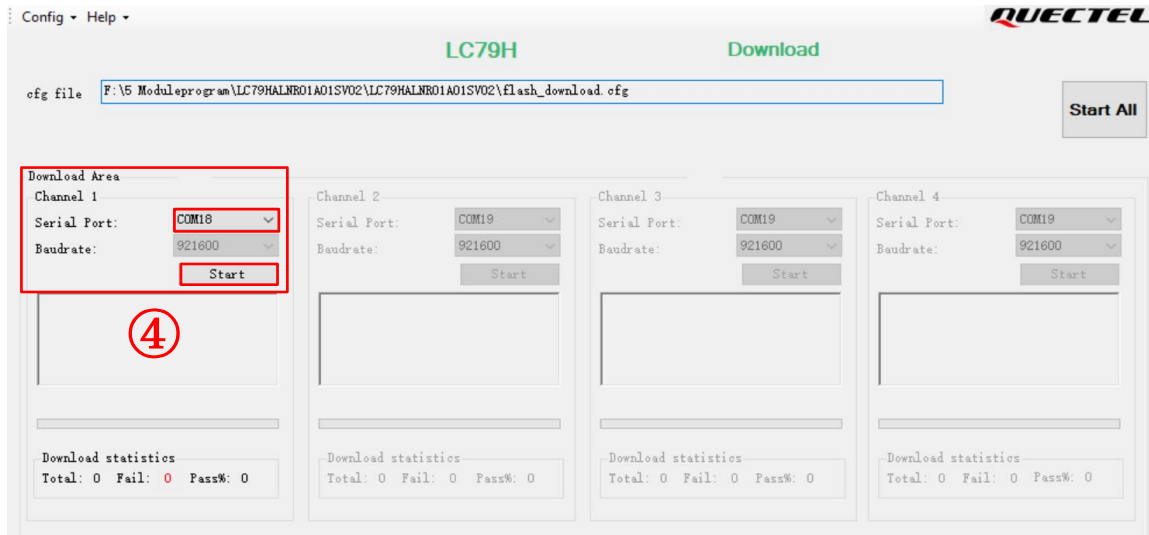
Figure 12: Firmware Upgrade – Step 4

Step 5: Upon successful firmware upgrade, the QGPSFlashTool green progress bar on the screen will indicate "100%", as shown in the figure below.

Figure 13: Successful Firmware Upgrade

NOTE

Make sure that the Active GNSS Antenna is placed with a clear line of sight to the sky.

---

7 Appendix References

Table 6: Related Document

Document Name
[1] [Quectel_QCOM_User_Guide](#)
[2] Quectel_QGNSS_User_Guide
[3] Quectel_QGPSFlashTool_User_Guide

Table 7: Terms and Abbreviations

Abbreviation	Description
2D	2 Dimension
3D	3 Dimension
BDS	BeiDou Navigation Satellite System
C/N_0	Carrier-to-Noise Ratio
CEP	Circular Error Probable
COM Port	Communication Port
DC	Direct Current
DI	Digital Input
DO	Digital Output
EPH	Ellipsoidal Height
ESD	Electrostatic Discharge
EVB	Evaluation Board
Galileo	Galileo Satellite Navigation System (EU)

Abbreviation	Description
GLONASS	Global Navigation Satellite System (Russia)
GND	Ground
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
I2C	Inter-Integrated Circuit
I/O	Input/Output
NAVIC/IRNSS	Indian Regional Navigation Satellite System
LED	Light Emitting Diode
MSL	Mean Sea Level
NMEA	NMEA (National Marine Electronics Association) 0183 Interface Standard
PC	Personal Computer
PCB	Printed Circuit Board
PI	Power Input
PO	Power Output
1PPS	One Pulse Per Second
PRN	Pseudo Random Noise
QZSS	Quasi-Zenith Satellite System
RF	Radio Frequency
RTK	Real Time Kinematic
RXD	Receive Data (Pin)
SBAS	Satellite-Based Augmentation System
SDA	I2C Serial Data
SPS	Standard Positioning Service
TTFF	Time to First Fix

Abbreviation	Description
TXD	Transmit Data (Pin)
UART	Universal Asynchronous Receiver/Transmitter
USB	Universal Serial Bus
UTC	Coordinated Universal Time