

# L76 Series EVB User Guide

**GNSS 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 terminal incorporating Quectel L76-LB module. Manufacturers of the terminal should send the following safety information to users and operating personnel, and incorporate these guidelines 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 that incorporate the module to avoid ESD damages.

## **About the Document**

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1.0	2013-02-25	Initial	
1.1	2013-03-26	Optimized the contents of Chapter 3.	
2.0	2016-05-03	<ol> <li>Changed the document name from Quectel_L76_EVB_User_Guide to Quectel_L76_Series_EVB_User_Guide.</li> <li>Incorporated the related information of L76-L.</li> </ol>	
2.1	2021-08-05	<ol> <li>Added the applicable module L76-LB.</li> <li>Updated the overall structure of the document, including but not limited to the adding of Chapters 4, 5 and 6.</li> </ol>	

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## **1** Introduction

This document provides info on the steps needed to evaluate the Quectel L76 series modules using the Evaluation Board (EVB). The EVB is a reference tool that allows you to become familiar with the L76 series modules.

Specifically, the document is divided into several sections:

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

In this document, Quectel L76 series includes L76, L76-L and L76-LB modules. For the EVB user guide of L76-L (L) and L76-LB (L) modules, see *document [4]*.

#### NOTE

If you need EVB schematic and PCB layout design files for reference, request them from Quectel Technical Supports (<u>support@quectel.com</u>).

## **2** General Overview

### 2.1. EVB Kit Accessories

The EVB Kit includes Evaluation Board (EVB), Active GNSS Antenna, Micro-USB Cable, Bolts and Coupling Nuts. You can download the software tools (QCOM, QGNSS, QGPSFlashTool) from our website <u>Download Zone</u> or request them from Quectel Technical Supports.

The EVB Kit accessories are shown in the figure below, and check *Table 1* for details.



Figure 1: EVB Kit Accessories

#### Table 1: List of Accessories

Items	Description	Quantity
EVB	Evaluation Board Size: 60 mm × 70 mm	1
USB Cable	Micro-USB Cable	1
GNSS Antenna	Active GNSS Antenna Request the Antenna Datasheet from Quectel Technical Supports.	1
Instruction Sheet	A sheet that lists instructions: how to connect the EVB, details on EVB accessories, and much more.	1
Other	Bolts and Coupling Nuts	4 pairs

### 2.2. Connecting Cables and Antenna to EVB

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



Figure 2: EVB and Accessories Assembly

#### NOTE

Place the active GNSS antenna where it can detect the satellites with a clear view of the sky.

## **3** Board User Interfaces

## 3.1. EVB Top View

EVB top view is shown in the figure below.



Figure 3: EVB Top View

### 3.2. Board User Interfaces

The EVB interfaces are detailed in the table below.



#### Table 2: Detailed EVB Interfaces

Function	Interfaces		Description	
Power Supply	J201 Micro-USB		<ul> <li>Power supply input:</li> <li>DC power supply: 4.5–5.5 V, typ. 5.0 V</li> <li>Current capability should be &gt; 100 mA</li> </ul>	
Lisor Interface	J201 Micro-USB		NMEA sentence output and command input	
User interface	J301 UART		NMEA sentence output and command input	
RF Input	J101 Antenna Connecto	Dr	<ul> <li>The antenna in the kit supports:</li> <li>GPS L1 C/A</li> <li>GLONASS L1</li> <li>BeiDou B1I</li> <li>QZSS L1 C/A</li> <li>SBAS L1</li> </ul>	
Signal Indication	D101 Indication LEDS	TXD (Blue LED)	Flash: Data output from UART TXD. Extinct or Bright: No data output from UART TXD.	
		1PPS (Red LED)	Flash: Successful position fix. The frequency is 1 Hz. Extinct: No position fix.	
	S201 Power Switch		Power the EVB on/off	
Switches and Buttons	S101 STANDBY Switch (ENTER↔EXIT)		Switch to " <b>ENTER</b> ", the module enters the standby mode. Switch to " <b>EXIT</b> ", the module exits the standby mode.	
	S301 UART⇔USB Switch		Switch between USB data transfer and UART data transfer features.	
	Z101 RESET Button		Short press the button to reset the module.	
	Z102 FORCE_ON Button		Short press the button to wake up the module from the backup mode.	
Test Points	J106 Test Points		Pins are detailed in <i>Table 3</i> below.	

Test point distribution is shown below:

#### J106 Pin Assignment:

32K/DRIN	AADET_N	1PPS	STANDBY	GND
TIMER	RESET	TXD1	RXD1	GND

#### Table 3: J106 Pin Detailed Description

Pin Name	I/O	Description
32K/DRIN	-	NC
AADET_N	-	NC
1PPS	DO	1 pulse per second
STANDBY	DI	Enters or exits the standby mode
GND	-	Ground
TIMER	DO	An open drain output signal which controls the ON/OFF status of GNSS modules
RESET	DI	Resets the module
TXD	DO	Transmits data
RXD	DI	Receives the data
GND	-	Ground

## **4** Using QCOM Tool to Communicate

This chapter illustrates how to use the QCOM tool to communicate with the module via the Micro-USB interface.

Download the QCOM tool from our website Download Zone.

### 4.1. Communication via the Micro-USB Interface

- **Step 1:** Connect the EVB and the PC with a Micro-USB cable via the Micro-USB interface.
- Step 2: Set the power switch (S201) to ON position to power on the EVB and switch S301 to USB position.
- Step 3: Run the provided driver installer to install the USB driver.
- **Step 4:** View the USB port numbers in the Device Manager, as shown in the figure below.





**Step 5:** Install the QCOM tool provided by Quectel. The COM Port Setting interface of QCOM is shown in the figure below.

ſ		COM Port Setting	
	COM Port: 3	Baudrate: 9600 💌 StopBits: 1 💌	Parity: None 💌
	ByteSize: 8 💌	Flow Control: No Ctrl Flow	Open Port

Figure 5: COM Port Setting Interface of QCOM

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

Step 7: Set the correct "Baudrate" (default value: 9600 bps).



Step 8: Click "Open Port" as shown in *Figure 5* above, then the communication with EVB is established successfully. In this case, the NMEA sentences output by the module will be displayed through the QCOM tool, as shown in *Figure 6* below. For more information about QCOM usage, see *document [1]*.

	COM Port Setting	
COM Port: 3 🚽	Baudrate: 9600 💌 StopBits: 1	- Parity: None -
ByteSize: 8 💌	Flow Control: No Ctrl Flow	Close Port
GPGSV, 4, 2, 15, 02, 44, 3	06, 26, 17, 44, 120, 27, 50, 42, 134, , 20, 39, 2	32, 26, 1*6 <b>F</b>
GPGSV, 4, 3, 15, 09, 33, 0	91, 15, 12, 29, 303, 24, 04, 17, 056, 24, 194, 1	4,170,,1*54
GPGSV, 4, 4, 15, 05, 08, 2	24, 20, 14, 07, 172, , 25, 04, 324, 17, 1*5D	
GLGSV, 2, 1, 08, 65, 65, 0	92, 37, 88, 50, 004, 39, 87, 40, 067, 39, 72, 30,	, 037, 30, 1*76
GLGSV, 2, 2, 08, 66, 27, 1	81, 35, 78, 18, 253, 44, 81, 16, 313, 34, 79, 15,	, 305, 35, 1*7B
GNGLL, 3149. 332122, N,	11706.916215, E, 050848.000, A, A*43	
GNRMC, 050849. 000, A, 3	149. 332122, N, 11706. 916215, E, O. 00, 230.	19,140721,,,A,V*07
GNVTG, 230. 19, T, , M, O.	DO, N, O. OO, K, A*2A	
GNGGA, 050849.000, 314	9. 332122, N, 11706. 916215, E, 1, 18, 0. 67, 5	1.891, M, -O.337, M, , *51
GNGSA, A, 3, 19, 09, 17, 1	95, 12, 06, 04, 20, 193, 02, , , 1. 01, 0. 67, 0. 7	6, 1*01
GNGSA, A, 3, 87, 78, 72, 8	1,88,65,79,66,,,,,1.01,0.67,0.76,2*03	
GPGSV, 4, 1, 15, 195, 69,	095, 29, 19, 66, 098, 28, 06, 58, 358, 30, 193, 5	54, 121, 26, 1*69
GPGSV, 4, 2, 15, 02, 44, 3	06, 26, 17, 44, 120, 28, 50, 42, 134, , 20, 39, 2	32, 27, 1*61
GPGSV, 4, 3, 15, 09, 33, 0	91, 16, 12, 29, 303, 24, 04, 17, 056, 24, 194, 1	4,170,,1*57
GPGSV, 4, 4, 15, 05, 08, 2	24, 20, 14, 07, 172, , 25, 04, 324, 17, 1*5D	
GLGSV, 2, 1, 08, 65, 65, 0	92, 37, 88, 50, 004, 39, 87, 40, 067, 39, 72, 30	,037,30,1*76
GLGSV, 2, 2, 08, 66, 27, 1	81, 35, 78, 18, 253, 44, 81, 16, 313, 34, 79, 15	, 305, 35, 1*7B
GNGLL, 3149. 332122, N,	11706. 916215, E, 050849. 000, A, A*42	
2021-07-14_13:08:40:	906] Upen CUM Fort Success	
2021-07-14_13:08:45:	480] Upen CUM Fort Success	

Figure 6: NMEA Sentences Output by Module – Displayed on QCOM Tool Interface

## **5** Using QGNSS Tool to Test

This chapter provides a brief explanation on the QGNSS software tool which can be used to verify the status of GNSS modules. For more information about QGNSS usage, see *document* [2].

Download the QGNSS tool from our website Download Zone.

### 5.1. COM Port and Baud Rate Setting

- **Step 1:** Assemble the EVB Accessories.
- **Step 2:** Set the power switch (S201) to **ON** position in order to power on the EVB and switch S301 to **USB** position.
- **Step 3:** Start the QGNSS and click "**Setting**" and "**Serial Port Configuration**" (the L76 series supports 9600 bps by default), as shown in the figure below.

File View Setting Ion	ols DR AGNSS Configuration	Window Help	.a. 🕲 📊 🔵	
Settings			?	$\times$
Module Model	COM			
None ~	Port:	COM3	Silicon Labs C	:P: ~
	Baud Rate:	9600		$\sim$
	Data Bits:	8		~
	Parity:	None		~
	Stop Bits:	1		~
	Flow Control:	None		~
	Ж		Cancel	

Figure 7: QGNSS Setting

**Step 4:** Click the **onnect or disconnect**" button. After connecting the module, the interface as shown in the figure below.



#### Figure 8: QGNSS Interface (Connected)

#### 5.1.1. Interface Explanation

You can view GNSS information, such as CNR info, time, position, speed, and precision in the QGNSS interface. To find out more about these parameters, see the following table.

#### Table 4: Explanation of QGNSS Interface

Icon	Explanation
<ul> <li>Sky View</li> <li>B05.4</li> <li>G6.3</li> <li>G61.1</li> <li>G25.1</li> <li>G41.0</li> <li>G25.0</li> <li>M0000</li> <li>S83.0</li> </ul>	<ul> <li>This sky view interface shows the satellite position of the satellites in use. The left column icons show the satellites in use and their numbers.</li> <li>BDS (BeiDou): 4</li> <li>GLO (GLONASS): 0</li> <li>GPS: 11</li> <li>GAL (Galileo): 0</li> <li>QZSS: 0</li> <li>NavIC: 0</li> <li>SBAS: 0</li> <li>The grid map on the right shows the position of the satellites in use.</li> </ul>





- RTK Fixed
- CEP 95 (unit: m)
- RMS (unit: m)

Ntrip Status

RTK Fixed

CEP 95(m)

RMS(m)



## 5.2. TTFF Testing

The QGNSS tool allows you to execute TTFF (Time to First Fix) testing under the following testing conditions:

- Full cold start
- Cold start
- Warm start
- Hot start

QGNSS configuration steps for TTFF testing:

Step 1: Click the "Tools" menu, and select the "Static TTFF Testing" as shown in the figure below.



Figure 9: Static TTFF Testing via QGNSS

Step 2: Select "Restart type", set the "Number of tests" and "TTFF Time-out (Sec)", as shown in the figure below.



Figure 10: TTFF Test Settings



**Step 3:** AGNSS is optional when testing TTFF with QGNSS <sup>1</sup>, as shown in the figure below. Click "**Set AGNSS**" button to set up online AGNSS. For more information, see *Chapter 5.3.1*.



#### Figure 11: AGNSS Setting

Step 4: Click on the "Run" button to start the test. OR Click on the "Stop" button to stop the test.



Figure 12: Run or Stop Test

<sup>&</sup>lt;sup>1</sup> You can set AGNSS either in this step, or before the TTFF setting through the ways illustrated in *Chapter 5.3*.



**Step 5:** View the test results displayed visually in charts as shown in the figure below. The test results are stored in the directory where the tool is installed.



Figure 13: Test Results

## 5.3. AGNSS Setting

There are two ways to use AGNSS to improve the TTFF.

#### 5.3.1. Assistant GNSS Online

Step 1: Click the "AGNSS" menu, and select the "Assistant GNSS Online" as shown in the figure below.

<u>F</u> ile	<u>V</u> iew	Setting	Tools	DR	AGNSS	Window	<u>H</u> elp	
	63	D 🗎	l A	1 1	Assi	stant GNSS (	Offline	
	-96-		0		Assi	stant GNSS (	Online	

Figure 14: AGNSS Setting via QGNSS – Assistant GNSS Online

Step 2: In the "Assistant GNSS Online" interface, fill in the FTP server information, and set "Time", "Position" and "Restart type" according to your needs.



Assistant GNSS Online		?
ownload from server		Time
FTP server information	Name Size Owner Group Time	Using UTC time
Address queclocator.com		O Using specified time 2021-08-03 08:18:08
User name Default		Leap second
Password •••••		Time Accuarcy[ms]
Connect Quit		Position
		Latitude[deg]
		Longitude[deg] Accuracy[m]
		Use Current Position
		Restart type
		Cold start      Warm start      Hot start      None
	< >> Download selected file	Time Position AGNSS Data
GNSS data	Download Selected life	Reset and Transfer
Select file Specifies the file	e path to download to the module	

Figure 15: Assistant GNSS Online Setting

**Step 3:** After clicking the "**Connect**" button, select online AGNSS files according to your needs and then click "**Download selected file**" to download the files from the server.

woload fro	om server									Time		
TP server	informatic	n										
			Nai	me	Size	Owner	Group	Time	Â			
ddress	gnss.que	clocator.com		EPO_GPS_3_1.DAT	27648	user	group	2021-08-03 08:10		Using specified time 2021-08-03 08:5	0:12	
lser name	Default		Ξ,	EPO_GPS_3_1.MD5	32	user	group	2021-08-03 08:10		Lean second		
	_ creat		Ξ,	EPO_GPS_3_10.DAT	27648	user	group	2021-08-03 08:10				_
assword	•••••		Ξ,	EPO_GPS_3_10.MD5	32	user	group	2021-08-03 08:10		Time Accuarcy[ms]		
Discon	nect	Quit	=	EPO_GPS_3_2.DAT	27648	user	group	2021-08-03 08:10		Position		
			Ξ,	EPO_GPS_3_2.MD5	32	user	group	2021-08-03 08:10		Position		
ogged on	ito olocotor or		Ξ,	EPO_GPS_3_3.DAT	27648	user	group	2021-08-03 08:10		Latitude[deg] 31.82216667 Altitude[m]	0	
agriss.que	GIUGALUI.GU	лп.	Ξ,	EPO_GPS_3_3.MD5	32	user	group	2021-08-03 08:10				
			=	EPO_GPS_3_4.DAT	27648	user	group	2021-08-03 08:10		Longitude[deg] 117.115225 Accuracy[r	.ı]	_
			Ξ,	EPO_GPS_3_4.MD5	32	user	group	2021-08-03 08:10		Use Ci	urrent Positic	'n
			Ξ,	EPO_GPS_3_5.DAT	27648	user	group	2021-08-03 08:10				
			Ξ,	EPO_GPS_3_5.MD5	32	user	group	2021-08-03 08:10		Restart type		
			Ξ,	EPO_GPS_3_6.DAT	27648	user	group	2021-08-03 08:10				
			=	EPO_GPS_3_6.MD5	32	user	group	2021-08-03 08:10		Cold start      Warm start      Hot sta	at ON	٩c
			Ξ,	EPO_GPS_3_7.DAT	27648	user	group	2021-08-03 08:10			Ŭ	
					~~				<u> </u>		Doto	
				[	Download	d selected	d file				Data	
NSS data										Boost o	nd Transfor	

Figure 16: Connect and Download – AGNSS Online

**Step 4:** Click the "**Select file**" button to select the files to be downloaded to the module, and then click the "**Reset and Transfer**" button to start downloading, as shown in the figure below.



ownload fro	om server								Time	
FTP server	information	Nar	me	Size	Owner	Group	Time	^	O Using UTC time	
Address	gnss.queclocator.com		EPO_GPS_3_1.DAT	27648	user	group	2021-08-03 08:10		Using specified time	2021-08-03 08:50:12
loor nome	Default	=	EPO_GPS_3_1.MD5	32	user	group	2021-08-03 08:10			
ser name	Delault	=	EPO_GPS_3_10.DAT	27648	user	group	2021-08-03 08:10		Leap second	
Password	•••••	Ξ,	EPO_GPS_3_10.MD5	32	user	group	2021-08-03 08:10		Time Accuarcy[ms]	
Discon	nect Ouit	Ξ,	EPO_GPS_3_2.DAT	27648	user	group	2021-08-03 08:10		-	
Discon	iloot Quit	E,	EPO_GPS_3_2.MD5	32	user	group	2021-08-03 08:10		Position	
Logged on	to	=	EPO_GPS_3_3.DAT	27648	user	group	2021-08-03 08:10		Latitude[deg] 31.82216	667 Altitude[m] 0
agnss.que	clocator.com.	=	EPO_GPS_3_3.MD5	32	user	group	2021-08-03 08:10			
		=	EPO_GPS_3_4.DAT	27648	user	group	2021-08-03 08:10		Longitude[deg] 117.11522	25 Accuracy[m]
		=	EPO_GPS_3_4.MD5	32	user	group	2021-08-03 08:10			Use Current Position
		5	EPO_GPS_3_5.DAT	27648	user	group	2021-08-03 08:10			
		5	EPO_GPS_3_5.MD5	32	user	group	2021-08-03 08:10		Restart type	
		5	EPO_GPS_3_6.DAT	27648	user	group	2021-08-03 08:10			
		5	EPO_GPS_3_6.MD5	32	user	group	2021-08-03 08:10		Cold start     Warm s	tart O Hot start O Non
		5	EPO_GPS_3_7.DAT	27648	user	group	2021-08-03 08:10			
				00				~		
			[	ownload	d selected	l file				AGN55 Data
JINSS data										Reset and Transfer

Figure 17: Download Selected File – AGNSS Online

**Step 5:** When the download is successful, the progress bar will indicate 100 % and there will be a green rectangle on the screen, as shown in the figure below.

ownload from	n server									Time	
FTP server i	information		Nam	B	Size	Owner	Group	Time	^	Using UTC time	
Address	agnss.quecl	locator.com		EPO_GPS_3_1.DAT	27648	user	group	2021-08-03 08:10		O Using specified time	2021-08-03 12:26:52
User name	Default		<b>E</b>	EPO_GPS_3_1.MD5	32	user	group	2021-08-03 08:10		Lean second	
				EPO_GPS_3_10.DAT	27648	user	group	2021-08-03 08:10		Loup scools	
Password	•••••			EPO_GPS_3_10.MD5	32	user	group	2021-08-03 08:10		Time Accuarcy[ms]	
Disc	onnect	Quit		EPO_GPS_3_2.DAT	27648	user	group	2021-08-03 08:10		Depition	
			<b>E</b>	EPO_GPS_3_2.MD5	32	user	group	2021-08-03 08:10		Posicion	
Logged onte	o agnss.queck	ocator.com.	<b></b>	EPO_GPS_3_3.DAT	27648	user	group	2021-08-03 08:10		Latitude[deg]	Altitude[m]
			E, 8	EPO_GPS_3_3.MD5	32	user	group	2021-08-03 08:10		Longitude[deg]	Accuracy[m]
			<b>F</b>	EPO_GPS_3_4.DAT	27648	user	group	2021-08-03 08:10		Longhado[dog]	
			<b>E</b> 8	PO_GPS_3_4.MD5	32	user	group	2021-08-03 08:10			Use Current Position
			<b></b>	EPO_GPS_3_5.DAT	27648	user	group	2021-08-03 08:10		Destart type	
			<b>E</b> 8	EPO_GPS_3_5.MD5	32	user	group	2021-08-03 08:10		residir type	
				EPO_GPS_3_6.DAT	27648	user	group	2021-08-03 08:10			
			<b>a</b>	EPO_GPS_3_6.MD5	32	user	group	2021-08-03 08:10	~	Cold start      Warm	start O Hot start O Non
					Do	wnload s	selected	file			
GNSS data										Time Positio	on 🖂 AGNSS Data
Solort file	E-/software/(	CNSS/OGNS	S V152	Build0608/OGNSS V	152 B	N80a0bli	PO CP	S 3 1 DAT			
Select file	E:/software/C	QGNSS/QGNS	S_V1.5.2	_Build0608/QGNSS_V	1.5.2_Bu	ild0608/6	PO_GP	S_3_1.DAT			Reset and Transfer

Figure 18: Successfully Downloaded to the Module – AGNSS Online

#### 5.3.2. Assistant GNSS Offline

Step 1: Click the "AGNSS" menu, and select the "Assistant GNSS Offline" as shown in the figure below.



File	<u>V</u> iew	Setting	Tools	DR	AGNSS	Window	<u>H</u> elp
1 Ca.	162	D 🗎	8	1 1	Assi	stant GNSS (	Offline
	-186		0	• •	Assi	stant GNSS (	Online

Figure 19: AGNSS Setting via QGNSS - Assistant GNSS Offline

Step 2: In the "Assistant GNSS Offline" interface, fill in the FTP server information, and set "Time", "Position" and "Restart type" according to your needs.

FTP server	information			-			time			
Address User name Password Connect	ueclocator.com       Default       Quit	Name	Size Owner	Group	Time	<ul> <li>Using UTC</li> <li>Using spec</li> <li>Leap second</li> <li>Time Accuarcy</li> <li>Position</li> <li>Latitude[deg]</li> </ul>	; time sified time [ /[ms] [	2021-08-03 11:22:57		
						Restart type		Use Current	Position	
						<ul> <li>Cold start</li> </ul>	⊖ Warm s	start 🔘 Hot start		one
		< [	Download sel	ected file	>	✓ Time	Position	n 🗌 AGNSS Data		

Figure 20: Assistant GNSS Offline Setting

**Step 3:** After clicking the "**Connect**" button, select the offline AGNSS files according to your needs and then click "**Download selected file**" to download the files from the server.



ownload fro	om server							Time			
FTP server	information	Name	Size	Owner	Group	Time	^	O Using UTC time			
ddress	gnss.queclocator.com	EPO_GPS_3_9.DAT	27648	user	group	2021-08-03 08:10		Using specified time	202	1-08-03 11:22:	57
eer name	Default	EPO_GPS_3_9.MD5	32	user	group	2021-08-03 08:10					
sername	Delauit	EPO_GR_3_1.DAT	48384	user	group	2021-08-03 08:10		Leap second			
assword	•••••	EPO_GR_3_1.MD5	32	user	group	2021-08-03 08:10		Time Accuarcy[ms]			
Discon	nect Ouit	EPO_GR_3_10.DAT	48384	user	group	2021-08-03 08:10					
DISCON	Quit	EPO_GR_3_10.MD5	32	user	group	2021-08-03 08:10		Position			
Logged on	ito	EPO_GR_3_2.DAT	48384	user	group	2021-08-03 08:10		Latitude[deg] 31.822	19833	Altitude[m]	0
ignss.que	ciocator.com.	EPO_GR_3_2.MD5	32	user	group	2021-08-03 08:10	_		22/22	1	-
		EPO_GR_3_3.DAT	48384	user	group	2021-08-03 08:10		Longitude[deg] 117.11	522	Accuracy[m]	
		EPO_GR_3_3.MD5	32	user	group	2021-08-03 08:10				Use Curr	ent Position
		EPO_GR_3_4.DAT	48384	user	group	2021-08-03 08:10					
		EPO_GR_3_4.MD5	32	user	group	2021-08-03 08:10		Restart type			
		EPO_GR_3_5.DAT	48384	user	group	2021-08-03 08:10					
		EPO_GR_3_5.MD5	32	user	group	2021-08-03 08:10		Cold start      War	n start	O Hot start	O No
		EPO_GR_3_6.DAT	48384	user	group	2021-08-03 08:10		-		-	-
		-	~~				<u> </u>		lion		ata
			Downloa	d selecter	d file					L AGNOS D	biter
NSS data	-									Reset and	Transfer
alact file	Specifies the file path t	o download to the module				Download to mod	ulo				

Figure 21: Connect and Download – AGNSS Offline

**Step 4:** Click the "**Select file**" button to select the files to be downloaded to the module, and then click the "**Download to module**" button to start downloading, as shown in the figure below.

ownload fro	om server								Time		
FTP server	information	Na	me	Size	Owner	Group	Time	^	O Using UTC time		
Address	gnss.queclocator.com		EPO_GPS_3_9.DAT	27648	user	group	2021-08-03 08:10		Using specified time	2021-08-03 11:22:57	
lser name	Default	=	EPO_GPS_3_9.MD5	32	user	group	2021-08-03 08:10		1		
o sor name	Delauit		EPO_GR_3_1.DAT	48384	user	group	2021-08-03 08:10		Leap second		
Password	•••••		EPO_GR_3_1.MD5	32	user	group	2021-08-03 08:10		Time Accuarcy[ms]		
Discon	nect Quit	1	EPO_GR_3_10.DAT	48384	user	group	2021-08-03 08:10		Destiller		
Discon	Gun		EPO_GR_3_10.MD5	32	user	group	2021-08-03 08:10		Position		
Logged or	ito		EPO_GR_3_2.DAT	48384	user	group	2021-08-03 08:10		Latitude[deg] 31.8221	833 Altitude[m] 0	
agnss.que	nss.queclocator.com.	=	EPO_GR_3_2.MD5	32	user	group	2021-08-03 08:10				
		1	EPO_GR_3_3.DAT	48384	user	group	2021-08-03 08:10		Longitude[deg] 117.1152	2 Accuracy[m]	
		=	EPO_GR_3_3.MD5	32	user	group	2021-08-03 08:10			Use Current	Position
		=	EPO_GR_3_4.DAT	48384	user	group	2021-08-03 08:10				
		=	EPO_GR_3_4.MD5	32	user	group	2021-08-03 08:10		Restart type		
		1	EPO_GR_3_5.DAT	48384	user	group	2021-08-03 08:10				
		=	EPO_GR_3_5.MD5	32	user	group	2021-08-03 08:10		Cold start      Warm	start 🔘 Hot start	O Non
		=	EPO_GR_3_6.DAT	48384	user	group	2021-08-03 08:10				
				~~							
				Downloa	d selecte	d file			POSIDO		
GNSS data	í										

Figure 22: Download Selected File – AGNSS Offline

**Step 5:** When the download is successful, the progress bar will indicate 100 % and there will be a green rectangle on the screen, as shown in the figure below.



ownload fro	om server									Time			
FTP server	information	1	Nan	ne	Size	Owner	Group	Time	^	O Using UTC time			
Address	gnss.quec	locator.com		EPO_GR_3_6.MD5	32	user	group	2021-08-03 08:10		<ul> <li>Using specified time</li> </ul>	202	21-08-03 11:22:57	
lear nama	Dofault		=	EPO_GR_3_7.DAT	48384	user	group	2021-08-03 08:10			-		
Joer marrie	Delault		5	EPO_GR_3_7.MD5	32	user	group	2021-08-03 08:10		Leap second	_		
Password				EPO_GR_3_8.DAT	48384	user	group	2021-08-03 08:10		Time Accuarcy[ms]			
Discon	nect	Quit	=	EPO_GR_3_8.MD5	32	user	group	2021-08-03 08:10		Desilies			
-		-	1	EPO_GR_3_9.DAT	48384	user	group	2021-08-03 08:10		Position			
Download	ed to direct	ory		EPO_GR_3_9.MD5	32	user	group	2021-08-03 08:10		Latitude[deg] 31.822	19833	Altitude[m] 0	
MIK_ID.	PU.		5	MTK_14D.EPO	129024	user	group	2021-08-03 08:10		Longitude[deg] 117 11	522	Accuracy[m]	
				MTK_1D.EPO	9216	user	group	2021-08-03 08:10		Longhootoogi		, record offinit	
				MTK_3D.EPO	27648	user	group	2021-08-03 08:10				Use Current F	osition
				MTK_5D.EPO	46080	user	group	2021-08-03 08:10		Restart type			
			8	MTK_7D.EPO	64512	user	group	2021-08-03 08:10		restart type			
				MTK30.EPO	276480	user	group	2021-08-03 08:10		2			2111
				QG_R_1.DAT	4032	user	group	2021-08-03 08:10	~	Cold start      Warn	n start	Hot start	O None
					Download	I selecter	d file						
GNSS data	R								-	Time Posit	on	AGNSS Data	
Soloct file		OCNES VIS	2 8.1	HOROBIOCNES VI 5	2 BuildOG	NATK		Download to mod	lula				
Select life	CONSON	QGN35_V1.5	Dui	1000001201435_V1.5.	UIUU0	JOINTIN_	ID.EPU	Download to mod	uie			Reset and Trai	nster

Figure 23: Successfully Downloaded to the Module – AGNSS Offline

## **6** Using QGPSFlashTool to Upgrade Firmware

Quectel L76 series module supports firmware upgrade via UART interface by using the QGPSFlashTool.

Download the QGPSFlashTool from our website <u>Download Zone</u>.

Before you start the firmware upgrade process:

First: Connect the EVB to a PC using a Micro-USB cable.

Second: Set the power switch (S201) to ON position to power on the EVB and switch S301 to USB.

Firmware upgrade steps:

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

File: F:\Mod	ule program\LG77LNR01	A02SV02\MTK_AllInOn	e_DA_MT3333. bin				Start
nload Area annel 1 rial Port: andrate:	COM27 ∨ 460800 ∨ Start	Channel 2 Serial Fort: Baudrate:	COM27 460800 Start	Channel 3 × Serial Fort: Bandrate:	COM27 ∨ 460800 ∨ Start	Channel 4 Serial Fort: Baudrate:	COM27 460800 Start
ownload statis otal: 0 Fail	tics : 0 Pass%: 0	-Download stati Total: 0 Fail	sticz	-Download stat Total: 0 Fa	tistics il: 0 Pass%: 0	-Download stati Total: 0 Fai	stics 1: 0 Pass%: 0

Figure 24: Firmware Upgrade – Step 1

**Step 2:** In the Options popup, set the number of channels to be used. In the "**Tool Options**" drop-down list, select "**L76**" <sup>2</sup>, then click "**OK**" as shown in the figure below.

<sup>&</sup>lt;sup>2</sup> Select "L76" for all L76 series modules including L76, L76-L and L76-LB.



Options	×
Options	Model (2)
◉ Only one channel is used	Tool Options L76 🗸 🗸
○ Using two channels	
$\bigcirc$ Using three channels	
○ Using four channels	OK

Figure 25: Firmware Upgrade – Step 2

Step 3: Double click the "ROM file" field to select the ROM file, e.g. "L76LBNR03A01SCV03\_GLN.bin", then double click the "DA File" field to select the DA file, e.g. "MTK\_AllInOne\_DA\_MT3333\_MP.bin", as shown in the figure below.

Config ▼ Help ▼	3) 17	6	Dow	nload	QUECTEL
ROM file F:\Modulepro; DA File: F:\Modulepro;	gr am \L76LBNR03A01SCV03_GLN\L76LBNR03A01SC gr am \L76LBNR03A01SCV03_GLN\MTK_AllinOne_I	WO3_GLN. bin NA_MT3333_MP. bin			Start All
. Open	nputer > document (F:) > Moduleprogram	> L76LBNR03A01SCV03_	GLN	ע פֿ Search	× L76LBNR03A01SCV03 ۶
Organize 👻 New folder					III - 🚺 😯
<ul> <li>Pictures</li> <li>Videos</li> <li>system (C:)</li> <li>file (D:)</li> <li>software (E:)</li> <li>document (F:)</li> </ul>	Name           L76LBNR03A01SCV03_GLN.bin           MTK_AllInOne_DA_MT33333_MP.bin	Date modified 2021/5/25 9:10 2017/9/6 17:17	Type BIN File BIN File	Size 657 KB 12 KB	
File <u>n</u> ar	ne:			√ file (*.	bin;*.pkg;*.cyfm;*.cfg) V Dpen Cancel

Figure 26: Firmware Upgrade – Step 3

**Step 4:** Confirm the "**Serial Port**" and "**Baudrate**", and then then click "**Start**" to download, as shown in the figure below.

The setting of the baud rate will affect the download speed. Based on **Step 2**, the baud rate will be automatically selected.



		L76		Download		
file F:\Moduleprogram\L76LBNR0 File: F:\Moduleprogram\L76LBNR0	3A01SCVO3_GLN\L76LBNRO 3A01SCVO3_GLN\MTK_Alli	3A01SCV03_GLN.bin nOne_DA_MT3333_MP.bin	n			Start
anload Area	Channel 2	CON3	Channel 3	CO012	Channel 4	CON3
udrate: 460800 V	Baudrate:	460800 ~	Serial Fort: Baudrate:	460800 ~	Serial Fort: Baudrate:	460800 V
ownload statistics	Download statis	tics	Download statis	stics	Download stati	stics
otal: O Fail: O Pass%: O	Total: O Fail:	: O Pass%: O	Total: O Fail	.: O Pass%: O	Total: O Fai	1: 0 Pass%: 0

Figure 27: Firmware Upgrade – Step 4

**Step 5:** When the firmware upgrade is successful, the progress bar will indicate 100 % and there will be a green rectangle on the screen, as shown in the figure below.

		L76		Download		
file F:\Moduleprogram	L76LBNR03A01SCV03_GLN\L76LBNN L76LBNR03A01SCV03_GLN\MTK_ALI	03A01SCV03_GLN. bin InOne_DA_MT3333_MP. bi	n			Start
rnload Area						
hannel 1	Channel 2		Channel 3		Channel 4	
erial Port: COM3	Serial Port:	COM3 V	Serial Port:	COM3 ~	Serial Port:	COM3 ~
udrate: 460800	Baudrate:	460800 ~	Baudrate:	460800 ~	Baudrate:	460800 ~
Iownloading Iownload success!						
ownload complete!(2	9.8s)					
944/11944 672744/672744 ownload statistics	-Download stati	stics	-Download statis	stics	-Download stati	stics
otal: 1 Fail: 0 Pass9	6: 100% Total: 0 Fai	L: O Pass%: O	Total: O Fail	.: O Pass%: O	Total: O Fai	1: 0 Pass%: 0

Figure 28: Successful Firmware Upgrade



# **7** Appendix References

#### **Table 5: Related Documents**

Do	Document Name		
[1]	Quectel_QCOM_User_Guide		
[2]	Quectel_QGNSS_User_Guide		
[3]	Quectel_QGPSFlashTool_User_Guide		
[4]	Quectel_L76-L(L)&L76-LB(L)_EVB_User_Guide		

#### **Table 6: Terms and Abbreviations**

Abbreviation	Description
2D	2 Dimension
3D	3 Dimension
BeiDou	BeiDou Navigation Satellite System
COM Port	Communication Port
CEP	Circular Error Probable
CNR	Carrier-to-Noise Ratio
DI	Digital Input
DO	Digital Output
EPH	Ellipsoidal Height
ESD	Electrostatic Discharge
EVB	Evaluation Board
GND	Ground

## QUECTEL

GNSS	Global Navigation Satellite System
GPS	Global Positioning System
I/O	Input/Output
LED	Light Emitting Diode
LNA	Low-Noise Amplifier
Micro-USB	Micro Universal Serial Bus
MSL	Mean Sea Level
NMEA	NMEA (National Marine Electronics Association) 0183 Interface Standard
PC	Personal Computer
PI	Power Input
PMTK	MTK Proprietary Protocol
PO	Power Output
PPS	Pulse Per Second
PRN	Pseudorandom Noise
RMS	Root Mean Square
RTK	Real-Time Kinematic
RXD	Receive Data (Pin)
SBAS	Satellite-Based Augmentation System
SPS	Standard Positioning Service
SV	Satellite Vehicle
TTFF	Time to First Fix
TXD	Transmit Data (Pin)
USB	Universal Serial Bus
UTC	Coordinated Universal Time
WGS84	World Geodetic System 1984