QGNSS User Guide

GNSS Module Series

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1.0	2020-01-03	Initial
2.0	2023-05-23	1. Updated the tool version to V1.8. 2. Numerous changes were made to this document. It should be read in its entirety. 3. Adjusted the scope of application from LC79D to all GNSS modules.

Contents

About the Document **3**
Contents **4**
Table Index **6**
Figure Index **7**

1 Introduction **9**

2 User Interface Description **10**
2.1. Main Window 10
2.2. Menu Bar 11
2.2.1. File Tab 11
2.2.2. Device Tab 11
2.2.3. View Tab 12
2.2.3.1. Data Dock Sub-Window 13
2.2.3.2. Unparsed Data Sub-Window 14
2.2.3.3. Text Data Sub-Window 15
2.2.3.4. Binary Data Sub-Window 16
2.2.3.5. Deviation Map Sub-Window 17
2.2.3.6. GNSS Signal View (Signal Level) Sub-Window 18
2.2.3.7. Sky View Sub-Window 19
2.2.3.8. Messages View Sub-Window 20
2.2.3.9. Configuration View Sub-window 21
2.2.4. Setting Tab 22
2.2.5. Tools Tab 23
2.2.5.1. Command Console 24
2.2.5.2. NMEA Convert KML 25
2.2.5.3. Coordinate Converter 25
2.2.6. DR Tab 27
2.2.7. AGNSS Tab 28
2.2.8. Windows Tab 28
2.2.9. Help Tab 30
2.3. Tool Bar 31

3 Common Operations **33**
3.1. Connect to Receiver 33
3.2. Log Play 34
3.3. Restart Receiver 35
3.4. TTFF 36
3.5. Configure Receiver 38
3.6. Send Command 40
3.7. Send AGNSS Data 41
3.8. Connect to NTRIP Server 43
3.9. Firmware Download 45

4 Appendix References 47

Table Index

Table 1: Deviation Map Function Description 18
Table 2: Signal View Function Description 19
Table 3: Command Console Function Description 24
Table 4: Description of Tool Bar Functions 31
Table 5: Controller Function Description 35
Table 6: Terms and Abbreviations 47

Figure Index

Figure 1: Main Window 10
Figure 2: File Tab 11
Figure 3: Device Tab 11
Figure 4: View Tab 12
Figure 5: Data Dock Sub-Window 13
Figure 6: Unparsed Data Sub-Window 14
Figure 7: Text Data Sub-Window 15
Figure 8: Binary Data Sub-Window 16
Figure 9: Deviation Map Sub-Window 17
Figure 10: Signal View (Signal Level) Sub-Window 18
Figure 11: Sky View Sub-Window 19
Figure 12: Messages View Sub-Window 20
Figure 13: Configuration View Sub-Window 21
Figure 14: Setting Tab Menu 22
Figure 15: Settings Dialog 22
Figure 16: Tools Tab Menu 23
Figure 17: Command Console Tool 24
Figure 18: NMEA Convert KML Tool 25
Figure 19: Coordinate Converter Tool – Enter Values 26
Figure 20: Coordinate Converter Tool – Convert Values 27
Figure 21: DR Status Window 27
Figure 22: AGNSS Window 28
Figure 23: Window Tab Menu 28
Figure 24: Tile Pattern Window 29
Figure 25: Cascade Window 30
Figure 26: Help Tab Menu 30
Figure 27: Tool Bar 31
Figure 28: Open Serial Port Configuration 33
Figure 29: Serial Port Configuration Dialog 33
Figure 30: Log Play 34
Figure 31: Select the File 34
Figure 32: Play Controller 35
Figure 33: Restart Receiver 35
Figure 34: Open TTFF Window 36
Figure 35: TTFF View 37
Figure 36: Open Configuration View 38
Figure 37: Configuration View 39
Figure 38: Open Command Console 40
Figure 39: Open AGNSS Window 41
Figure 40: Connect to FTP Server 41
Figure 41: Download AGNSS File 42

Figure 42: Send AGNSS Data 42
Figure 43: Open NTRIP Client 43
Figure 44: NTRIP Client 44
Figure 45: Open Firmware Download 45
Figure 46: Firmware Download 46

1 Introduction

QGNSS is a tool that allows you to interact with Quectel GNSS modules quickly and easily. It enables evaluation, performance testing, development and debugging of Quectel GNSS modules. Tool features are listed below:

- Supports receivers utilizing standard NMEA strings.
- Supports the parsing of RTCM3.x protocol messages.
- Supports log replay.
- Presents all the information collected by the GNSS device. All aspects of GNSS data (positioning, velocity, time, satellite tracking, etc.) can be monitored and logged under various test scenarios for receiver evaluation.
- Supports the downloading of AGNSS data.
- Supports NTRIP client.
- Supports the downloading of firmware update packet to GNSS positioning modules.

2 User Interface Description

2.1. Main Window

The window illustrated below is the main display window of QGNSS. It shows the menu bar, tool bar and positioning information. You can open the sub-window in the central area.

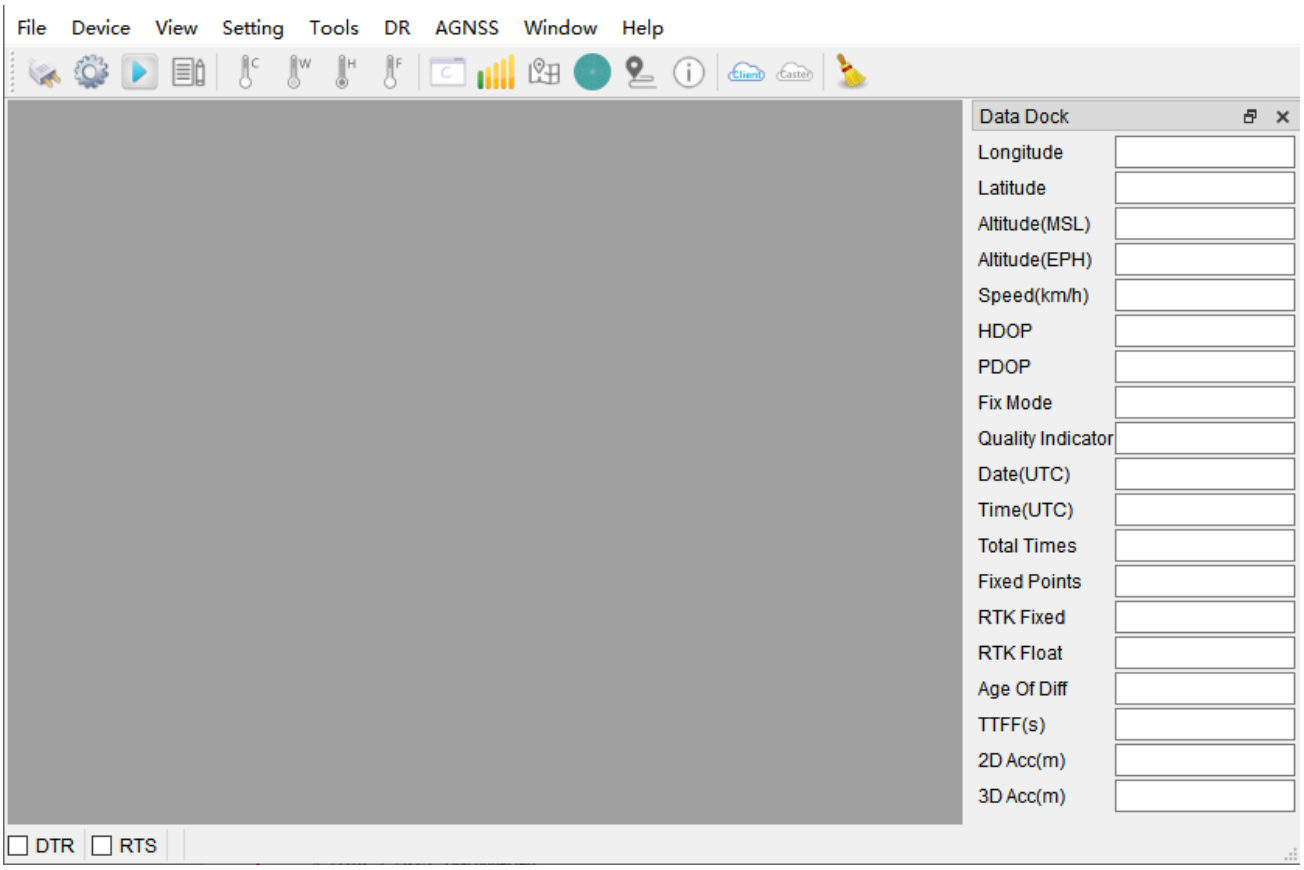


Figure 1: Main Window

2.2. Menu Bar

2.2.1. File Tab

In the "**File**" tab menu:

- Click "**Open**" to open the play dialog box. See *Chapter 3.2 Log Play* for details.
- Click "**Show Logfile in Explorer**" to open the folder of the saved log file.
- Click "**Quit**" to close QGNSS.

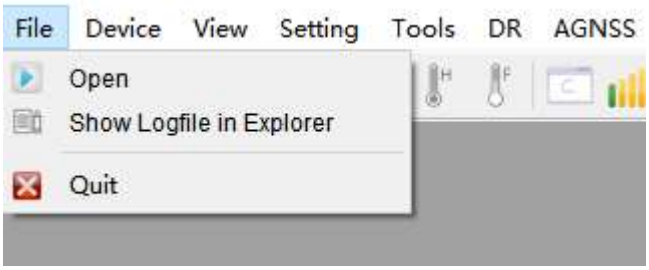


Figure 2: File Tab

2.2.2. Device Tab

In the "**Device**" tab menu:

- Click "**Connect**" to connect to the receiver.
- Click "**Set Device Information**" to configure serial port information. See *Chapter 3.1 Connect to Receiver* for details.

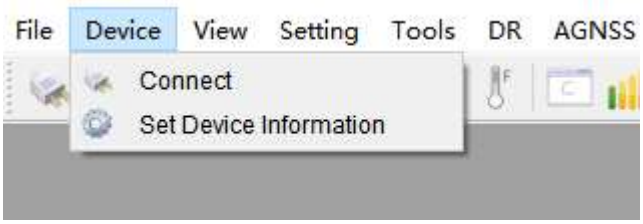


Figure 3: Device Tab

NOTE

Make sure to configure the serial port information before connecting to the receiver.

2.2.3. View Tab

In the "**View**" tab menu:

- Click "**Clear**" to clear the data displayed in the Unparsed Data, Text Data and Binary Data.
- Click "**Online Map**" to view the module real time reported location over a map.

About other tabs, see the following sections for more details.

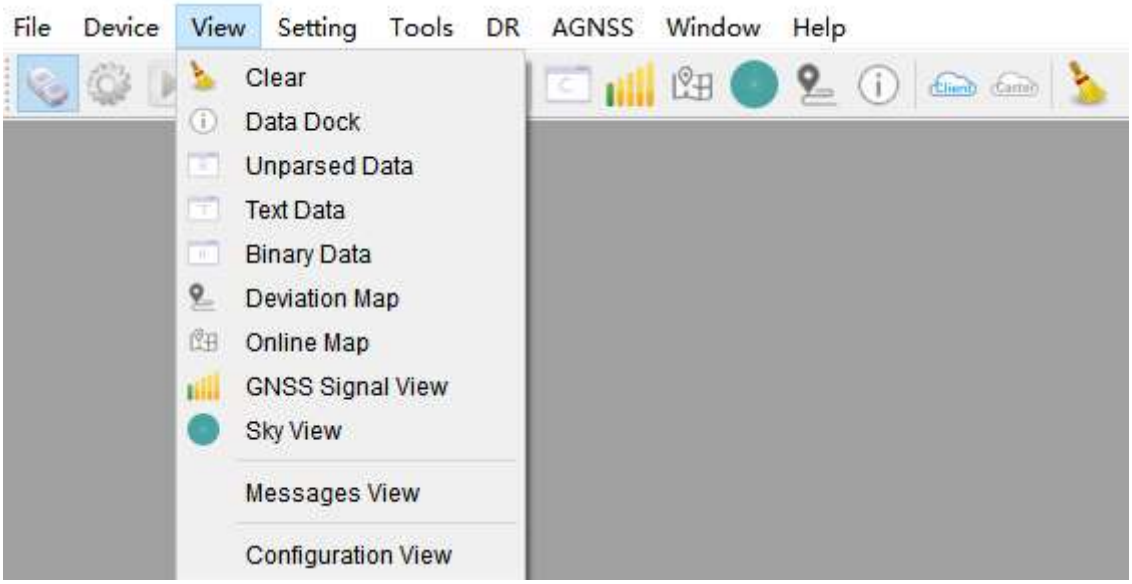


Figure 4: View Tab

2.2.3.1. Data Dock Sub-Window

The “**Data Dock**” sub-window displays detailed information such as longitude and latitude, altitude, and fix mode.

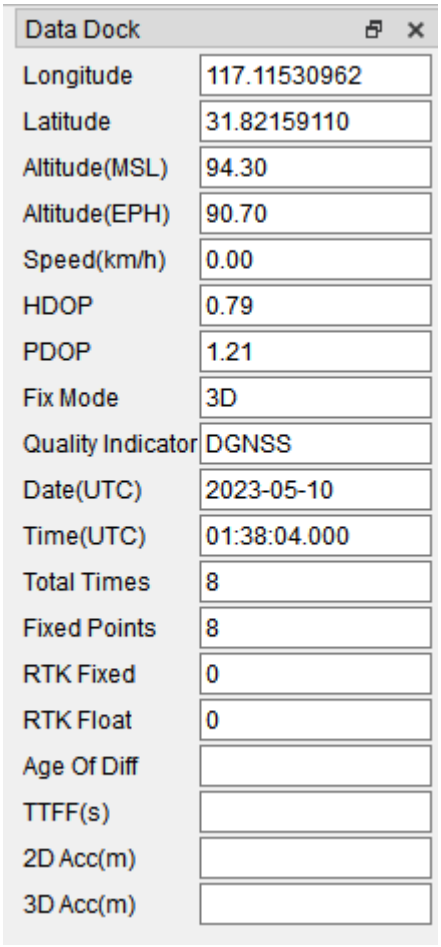


Figure 5: Data Dock Sub-Window

2.2.3.2. Unparsed Data Sub-Window

The "**Unparsed Data**" sub-window displays all data sent by the receiver. There are "**Clear**", "**Timestamp**", "**Pause**" buttons and "**Filter**" at the bottom of the window.

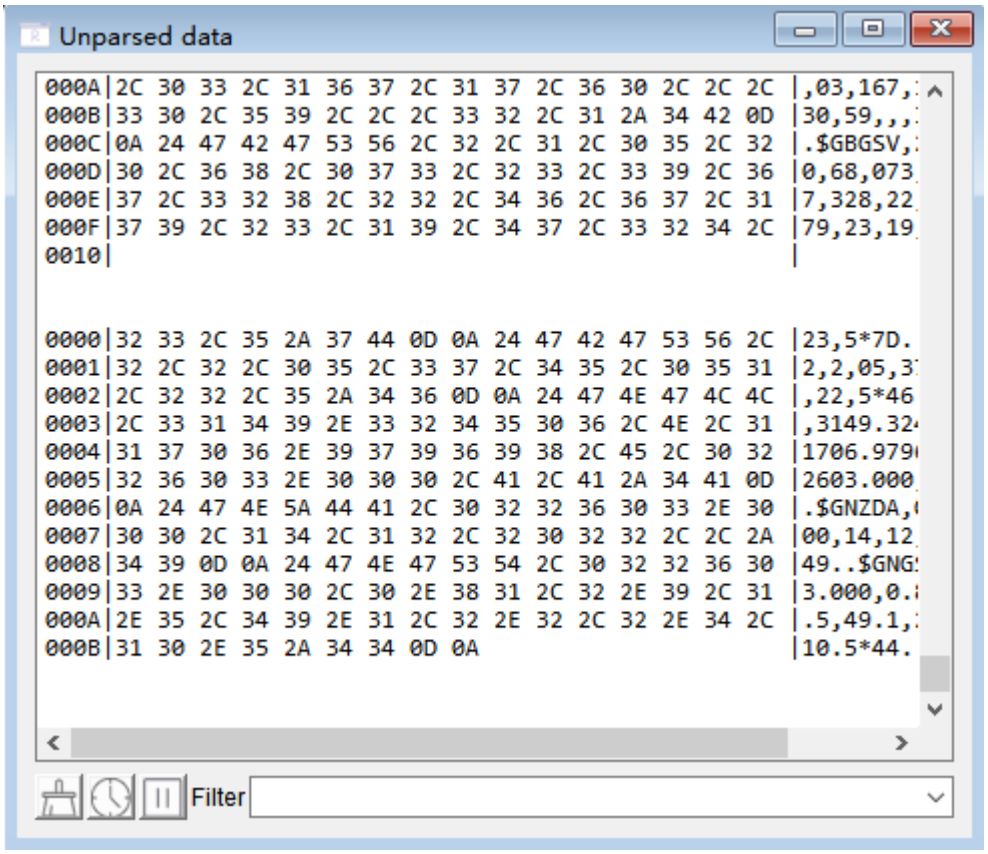


Figure 6: Unparsed Data Sub-Window

2.2.3.3. Text Data Sub-Window

The "**Text Data**" sub-window displays the NMEA messages. There are "**Clear**", "**Timestamp**", "**Pause**" buttons and "**Filter**" at the bottom of the window.

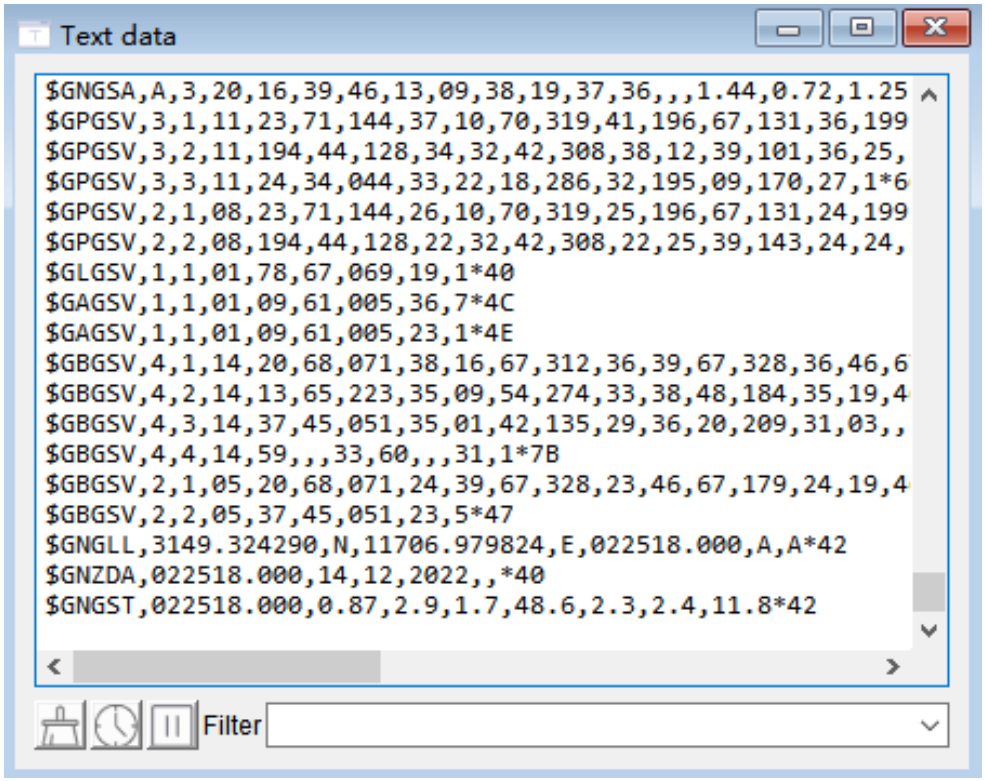


Figure 7: Text Data Sub-Window

2.2.3.4. Binary Data Sub-Window

The "**Binary Data**" sub-window displays the message of the binary protocol. There are "**Clear**", "**Timestamp**", "**Pause**" buttons and "**Filter**" at the bottom of the window.

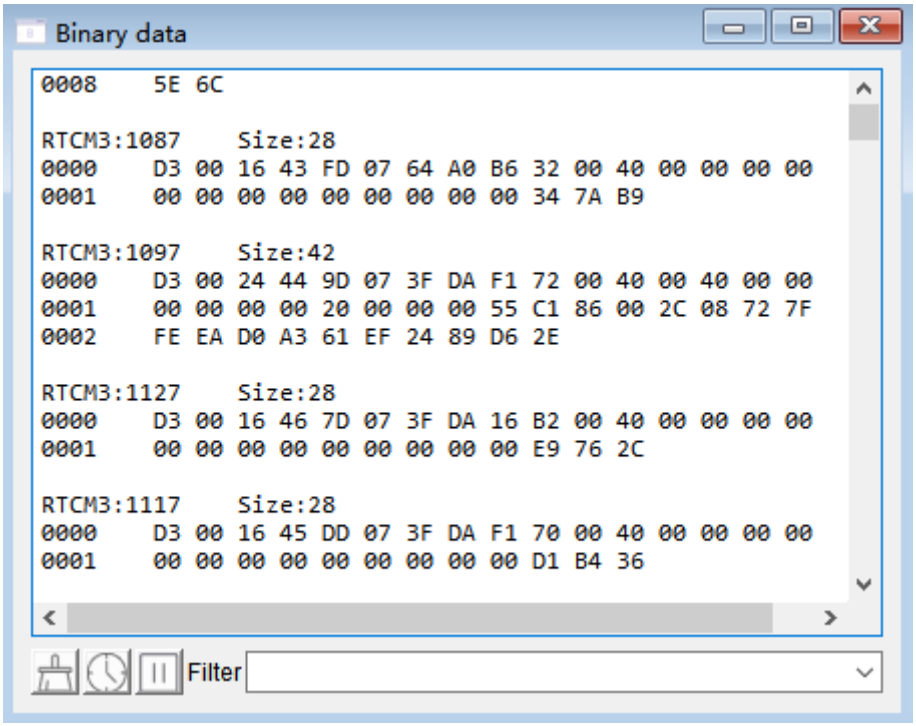


Figure 8: Binary Data Sub-Window

2.2.3.5. Deviation Map Sub-Window

The "**Deviation Map**" sub-window displays positions in longitude and latitude relative to the first positioning point.

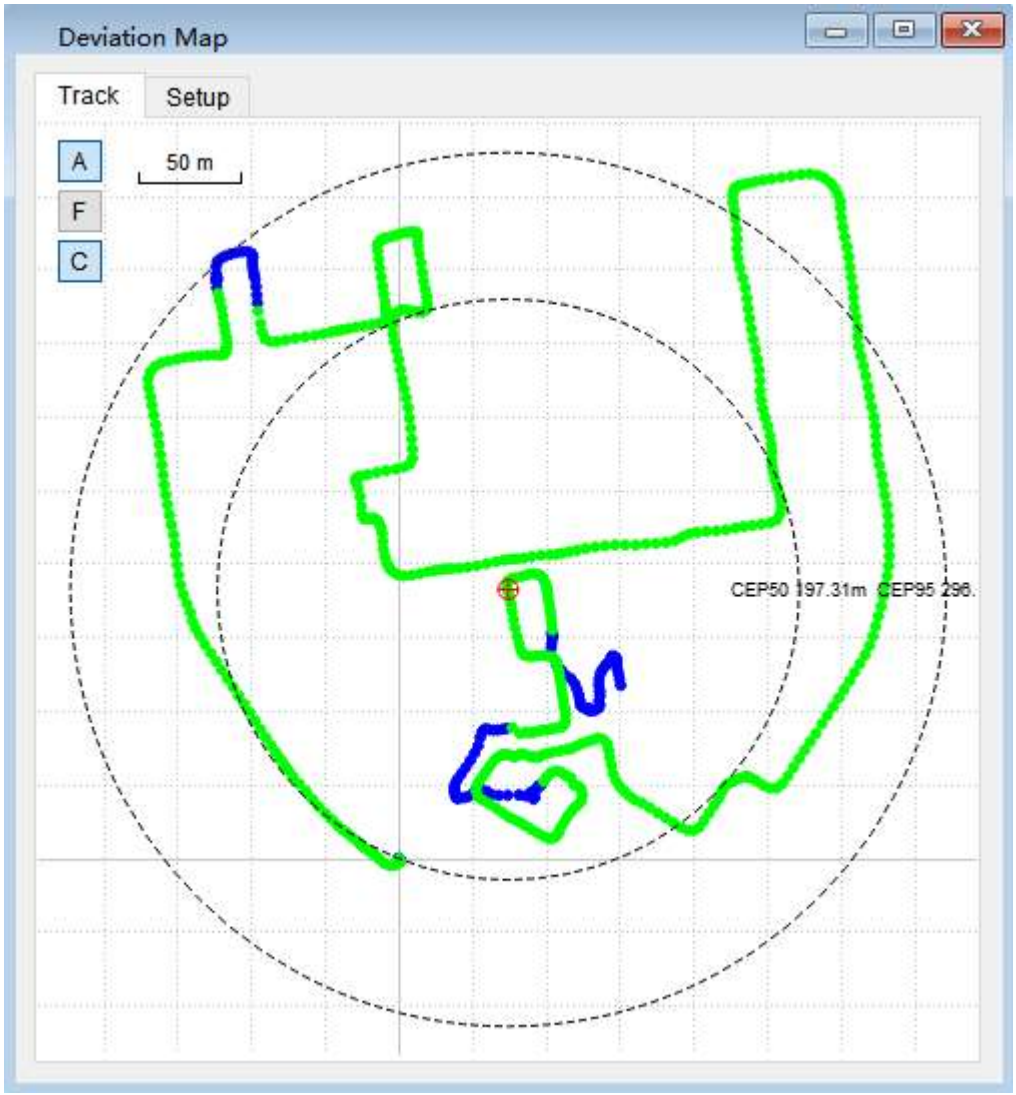


Figure 9: Deviation Map Sub-Window

NOTE

Use the mouse scroll wheel to zoom in/out on the deviation map and hold down the mouse scroll wheel to drag the deviation map.

Table 1: Deviation Map Function Description

Icon	Description
'A'	Display the average point
'F'	Fit track
'C'	Display CEP circle. Use the average point as a reference point by default
Blue Point	Normal positioning point without RTK
Green Point	RTK positioning point
Setup	Click to set the reference point to calculate CEP

2.2.3.6. GNSS Signal View (Signal Level) Sub-Window

The sub-window in the figure below ("**Signal Level**") displays GNSS signal view. The number above the flag represents the C/N_0 value. The checkbox can be used to select which satellite system can be displayed. If the flag is transparent, it means that the receiver is not tracking this satellite constellation and therefore the data is not present at the NMEA GSA messages.

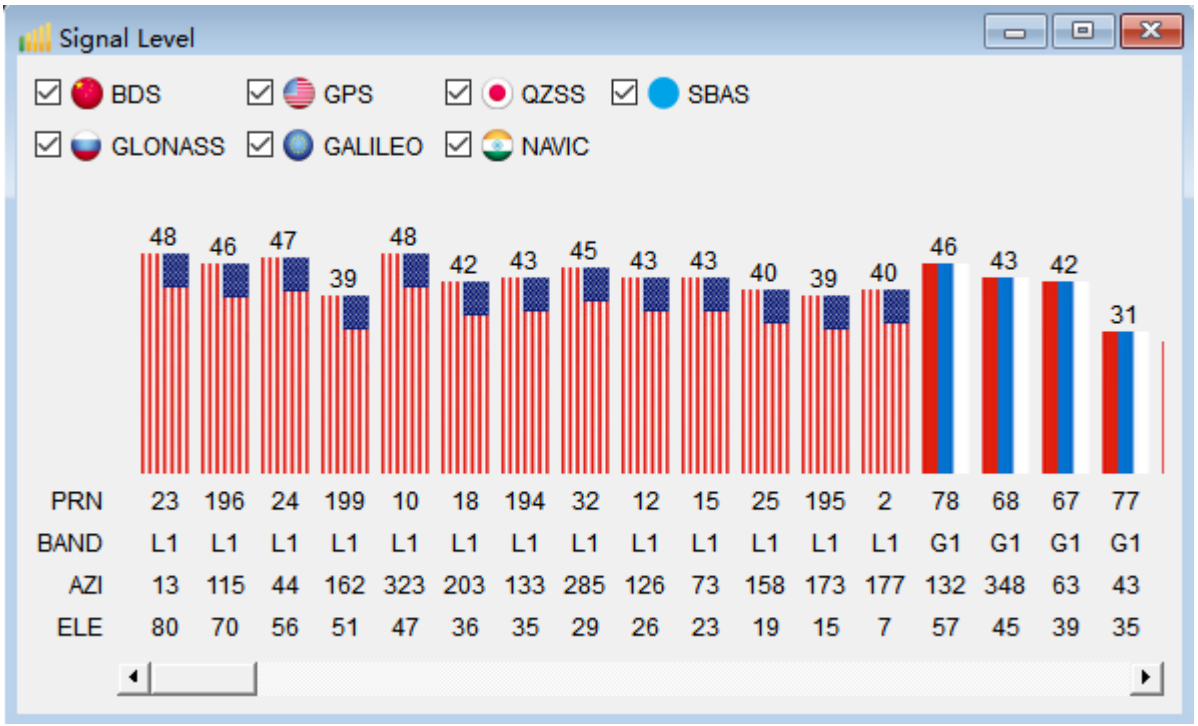


Figure 10: Signal View (Signal Level) Sub-Window

Table 2: Signal View Function Description

Button	Description
PRN	Satellite number of visible satellites.
BAND	Satellite frequency band.
AZI	Azimuth of satellite in degrees.
ELE	Elevation of satellite in degrees.

2.2.3.7. Sky View Sub-Window

The "**Sky View**" sub-window displays the azimuth and elevation angle (above the Horizon) of each visible navigation satellite per constellation and counts the number of all visible satellites of each positioning system.

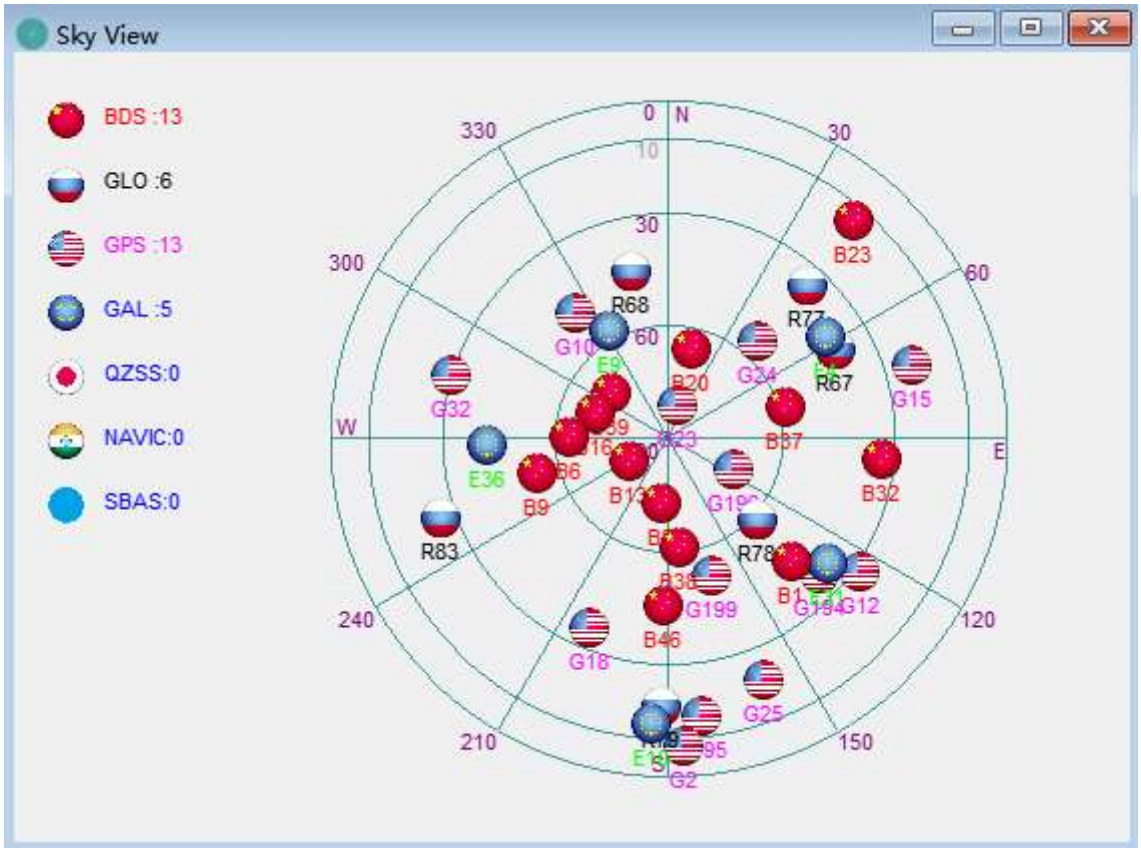


Figure 11: Sky View Sub-Window

2.2.3.8. Messages View Sub-Window

The "**Messages View**" sub-window displays the message output by the receiver in the form of a parameter table.

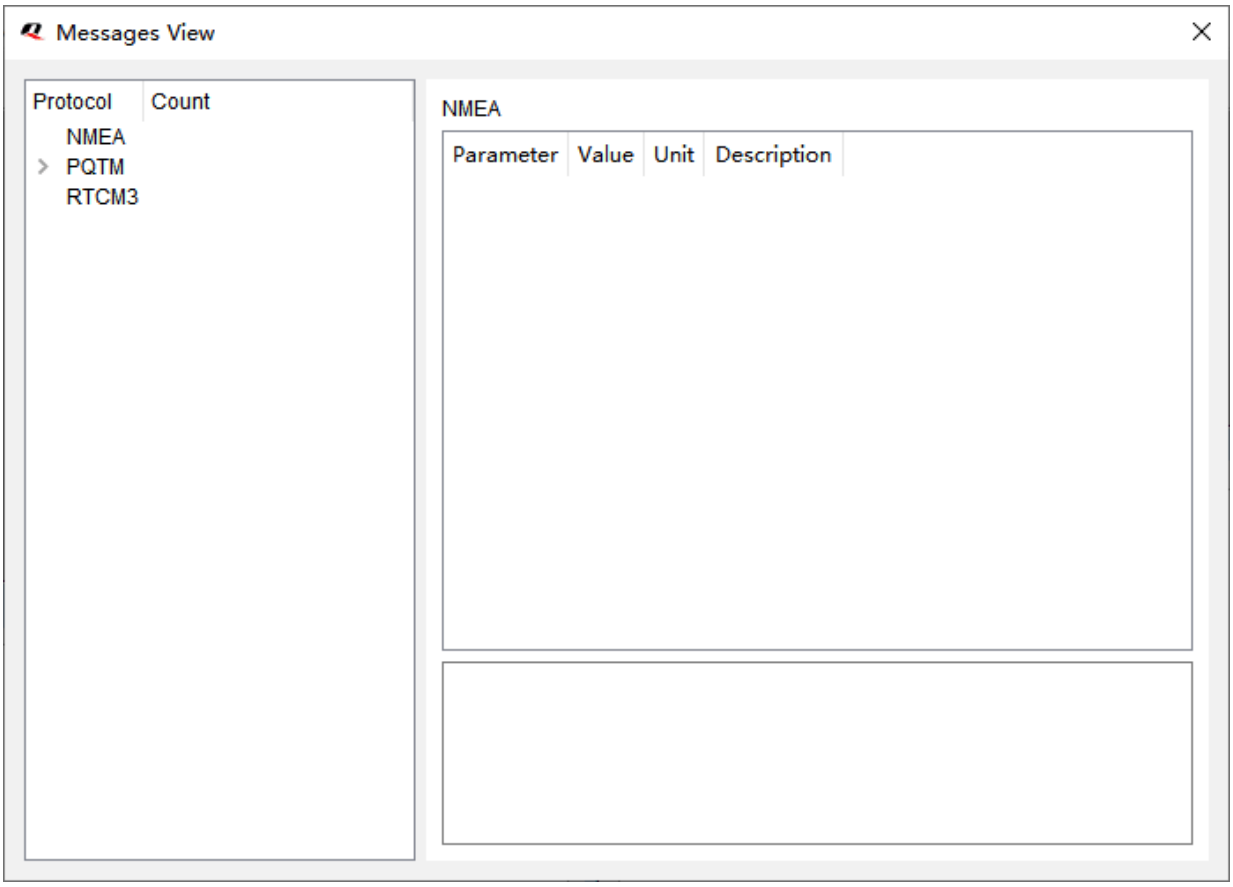


Figure 12: Messages View Sub-Window

2.2.3.9. Configuration View Sub-window

This "**Configuration View**" sub-window is using to modify the receiver configuration. The configuration parameters may change upon the module type.

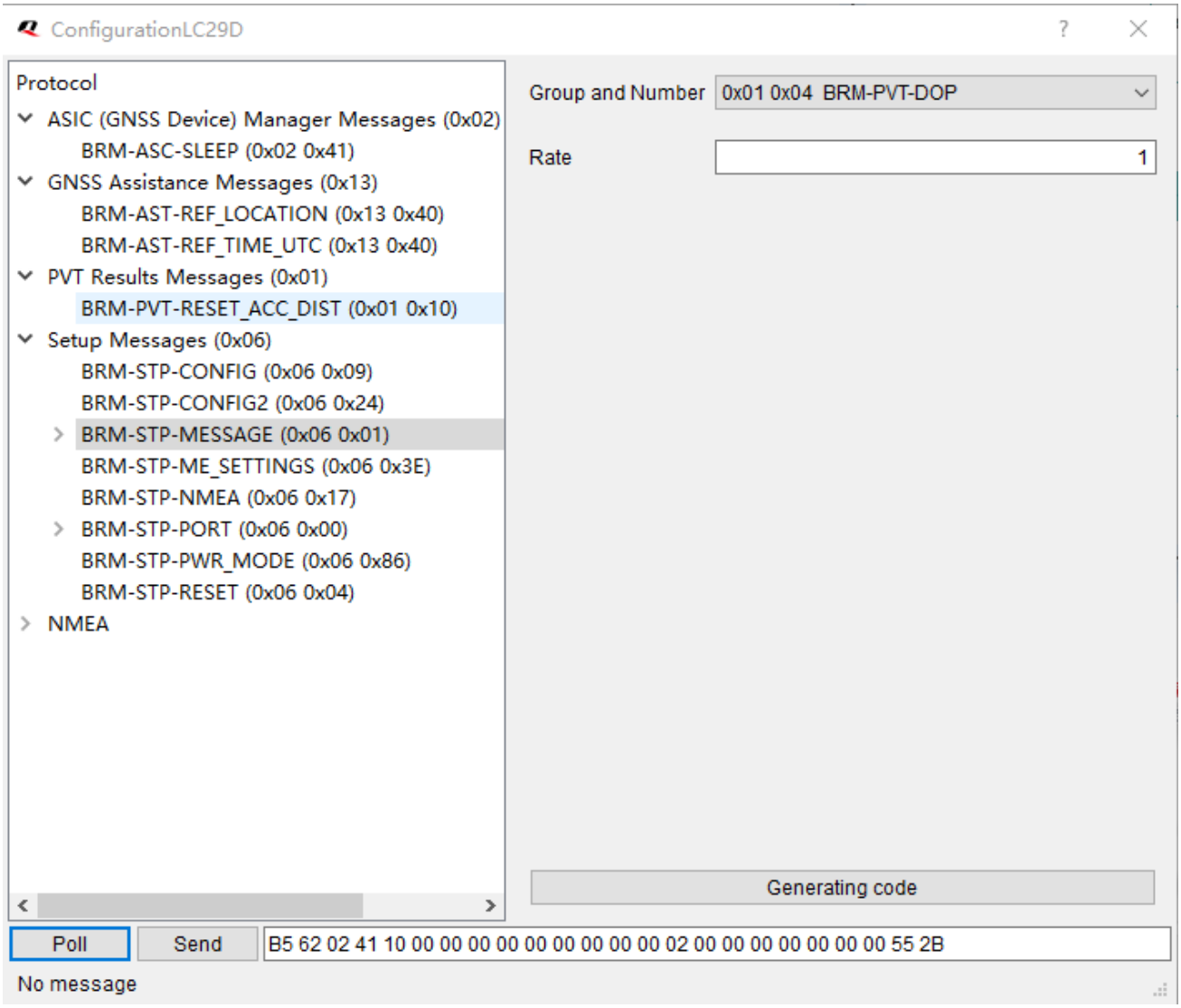


Figure 13: Configuration View Sub-Window

2.2.4. Setting Tab

Click the “**Preferences**” to enter the Preferences Dialog, and set the supported protocol to parse in the Preferences Dialog.

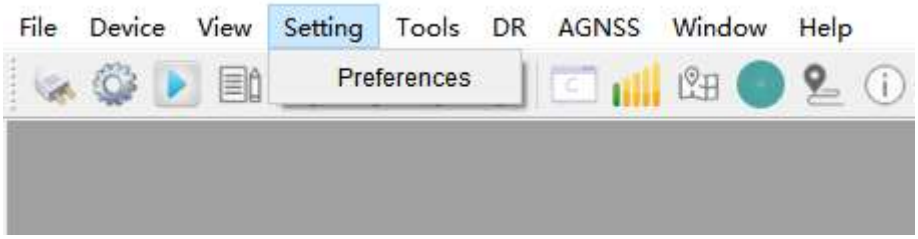


Figure 14: Setting Tab Menu

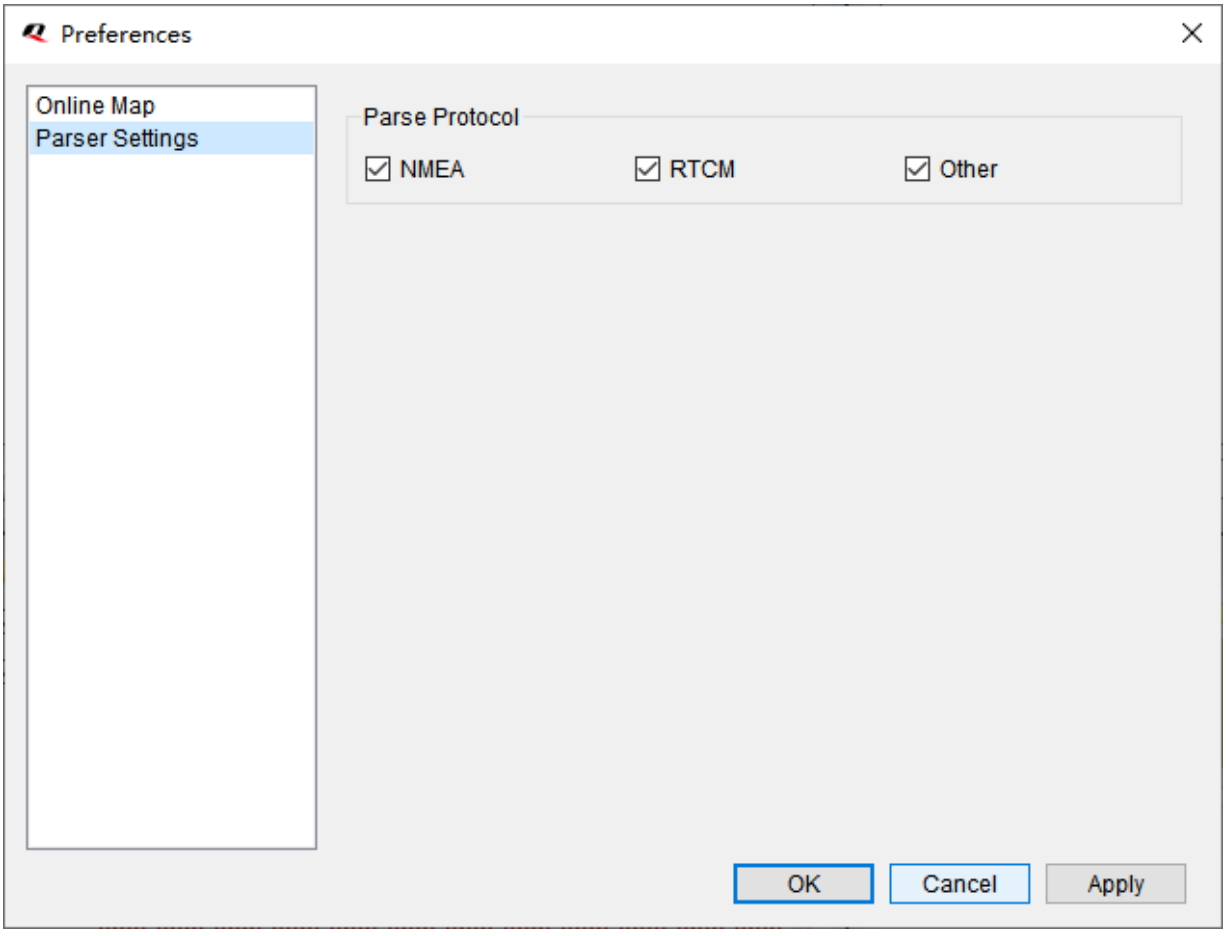


Figure 15: Settings Dialog

2.2.5. Tools Tab

In the "**Tools**" tab menu:

- Select "**Command Console**" to send commands. See *Chapter 3.6 Send Command* for details.
- Select "**Static TTFF Testing**" to open the TTFF cycle testing tool. See *Chapter 3.4 TTFF* for details.
- Select "**Firmware Download**" to open the receiver firmware upgrade tool. see *Chapter 3.9 Firmware Download* for details.
- Select "**QGNSS log**" to open the log analysis tool and follow the instructions step by step.
- Select "**NTRIP**" to connect to NTRIP server, see *Chapter 3.8 Connect to NTRIP Server* for details.
- "**Switch Online Map**" can switch between the online maps used by QGNSS.
- Select "**NMAE Convert KML**" to open the tool for converting NMEA logs to a KML file, see *Chapter 2.2.5.2 NMEA Convert KML* for details.
- Select "**Coordinate Converter**" to open the coordinate conversion tool, see *Chapter 2.2.5.3 Coordinate Converter* for details.

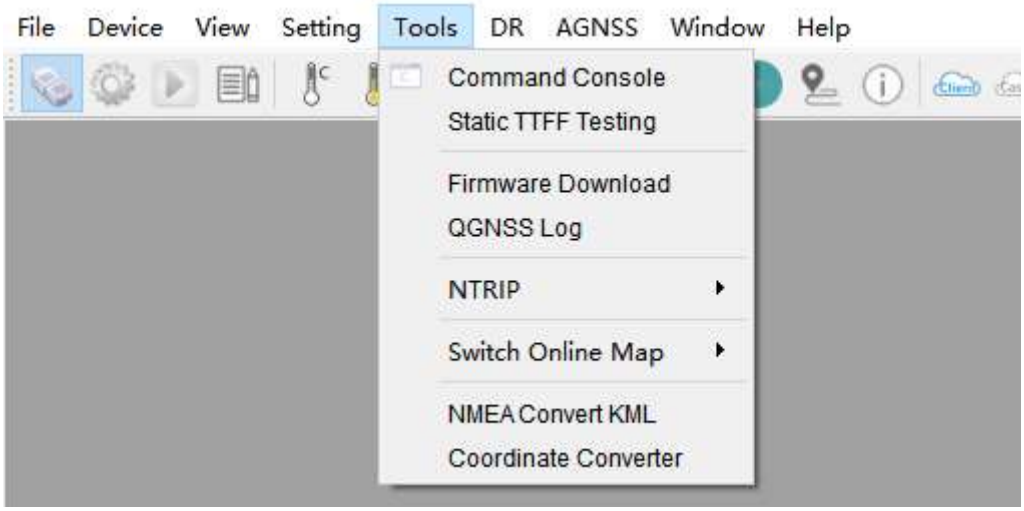


Figure 16: Tools Tab Menu

2.2.5.1. Command Console

The "**Command Console**" tool is used for sending a command.

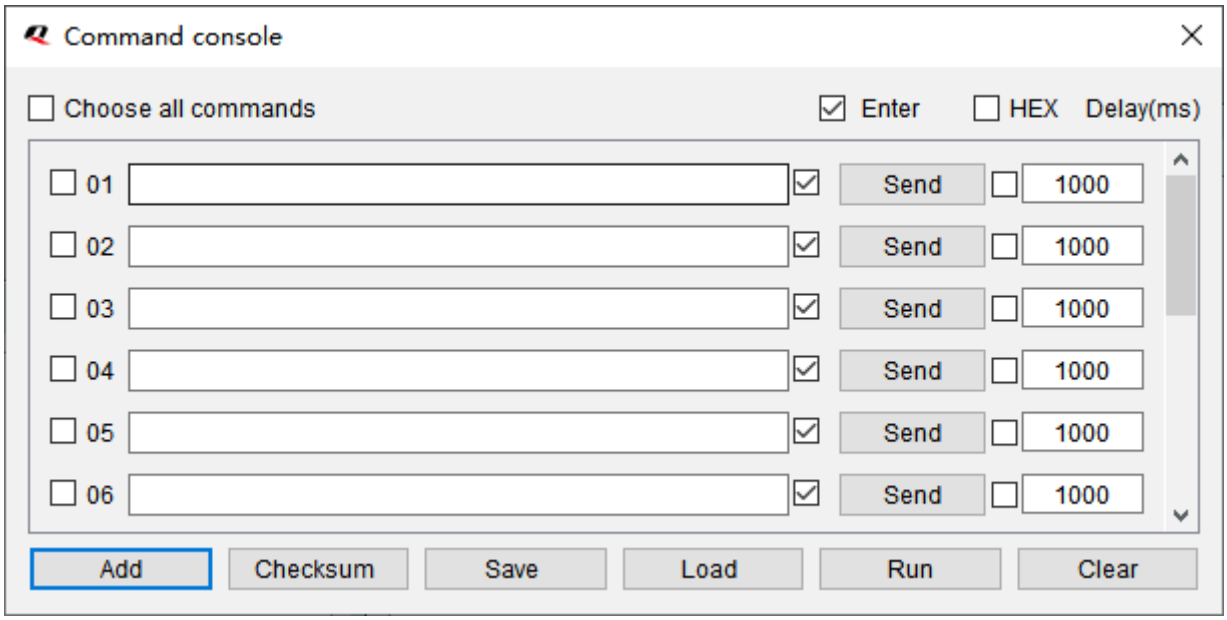


Figure 17: Command Console Tool

Table 3: Command Console Function Description

Button	Description
Enter	Whether "\r\n" is added behind the command.
HEX	If a binary command is sent, HEX checkbox should be selected.
Delay (ms)	After the command is sent, delay N milliseconds to send the next one.
Adds	Add the number of sent commands, and support 99 commands at most.
Checksum	Calculate Checksum for all NMEA commands.
Save	Save the command of the current window to the configuration file.
Load	Load the command from the configuration file to the window.
Run	Send the selected commands in a loop.
Clear	Clear all commands.

2.2.5.2. NMEA Convert KML

The "**NMEA Convert KML**" tool is used for converting NMEA logs to a KML format file.

- Click "**File Name(s)**" to select the NMEA file.
- Click "**File Name**" to select the output file location.
- Click "**OK**" to wait for the conversion to complete.

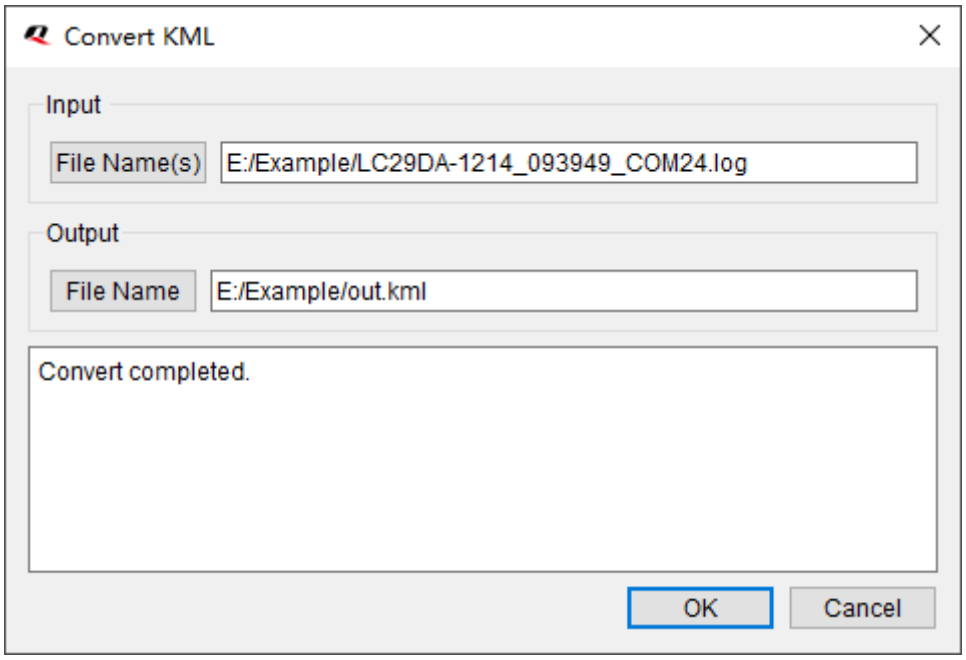


Figure 18: NMEA Convert KML Tool

2.2.5.3. Coordinate Converter

In the "**Coordinate Converter**" tool:

- Select **LLA(Deg)**, **LLA(Deg,Min)**, **LLA(Deg,Min,Sec)** or **ECEF(XYZ)** format and type in the corresponding values, taking "**LLA(Deg)**" as an example:

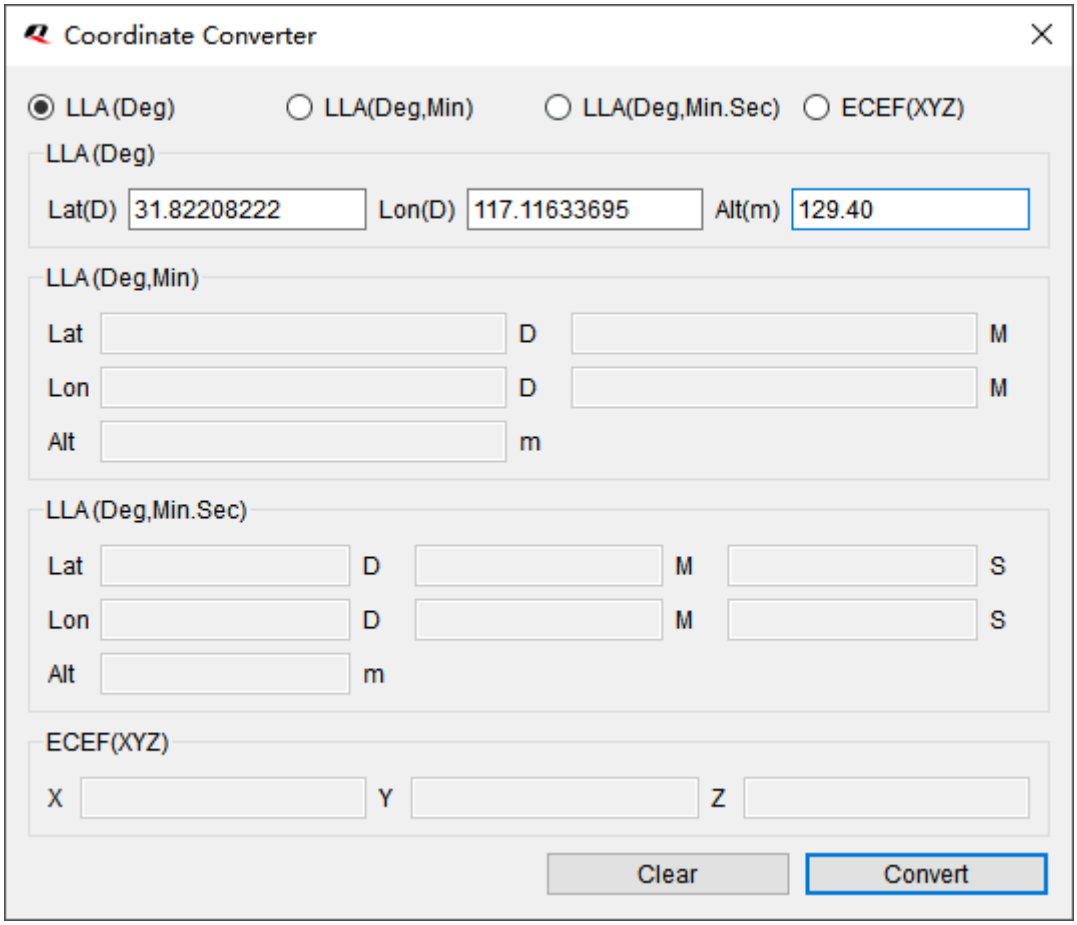


Figure 19: Coordinate Converter Tool – Enter Values

- Click "**Convert**" and the tool will convert the values to other formats.

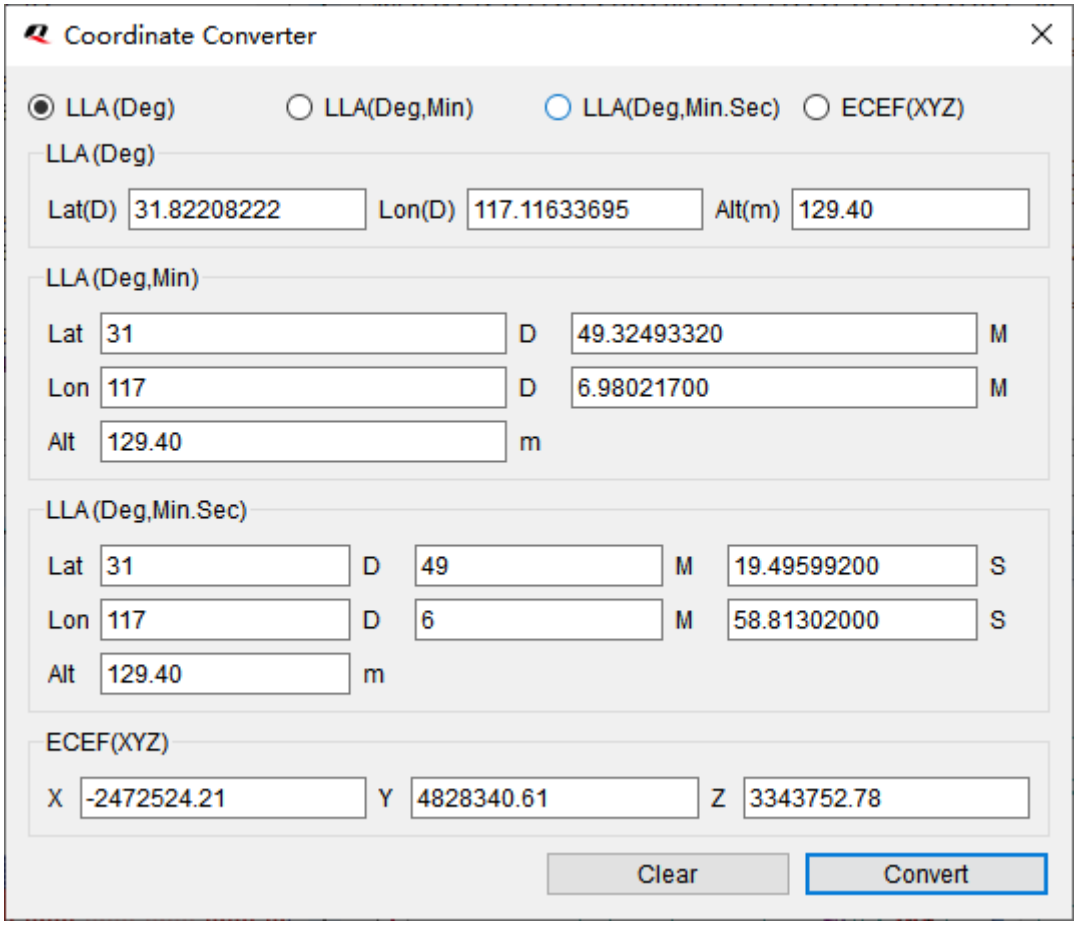


Figure 20: Coordinate Converter Tool – Convert Values

2.2.6. DR Tab

In the "**DR**" tab menu, you can query the DR status of the receiver. Different types of receivers have different status of DR interfaces.

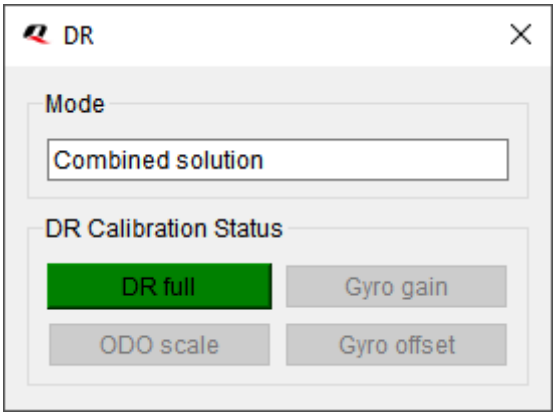


Figure 21: DR Status Window

2.2.7. AGNSS Tab

Via the "**AGNSS**" window, you can download AGNSS files from the FTP server and download AGNSS data to the receiver through the serial port. See *Chapter 3.7 Send AGNSS Data* for details.

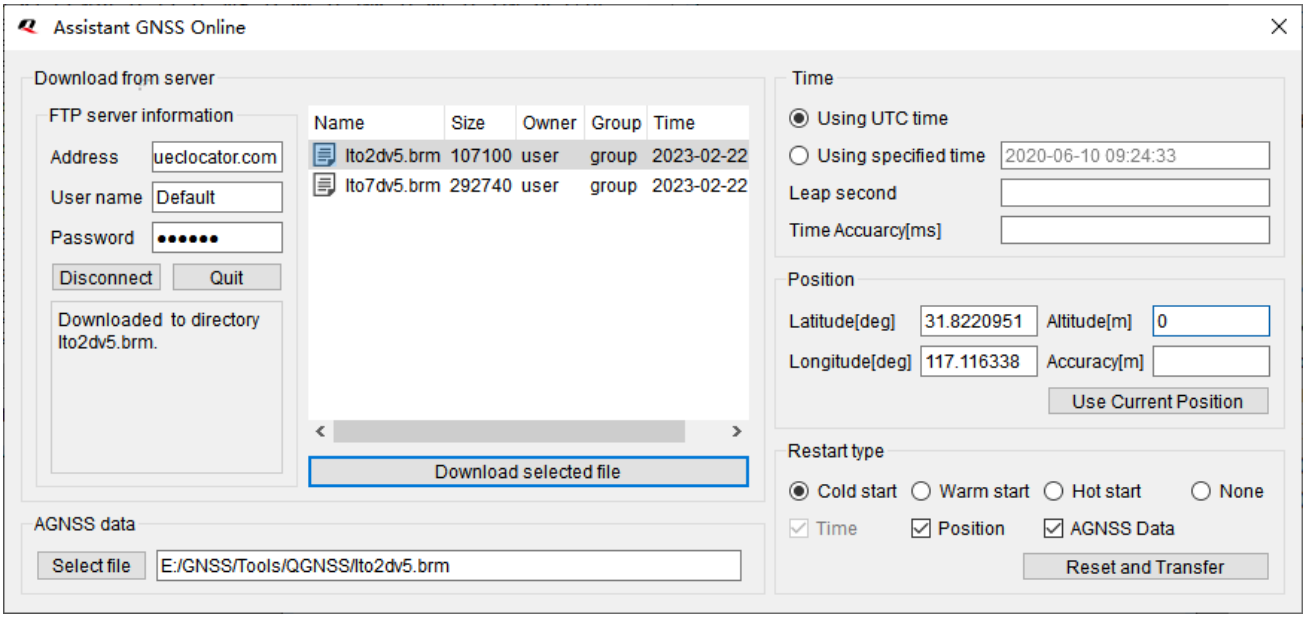


Figure 22: AGNSS Window

2.2.8. Windows Tab

In the "**Windows**" tab menu:

- Click "**Tile pattern**" to display the sub-window(s) to the center.
- Click "**Cascade**" to stack the sub-window(s) to the center.
- Click "**Close All**" to close all sub-windows.

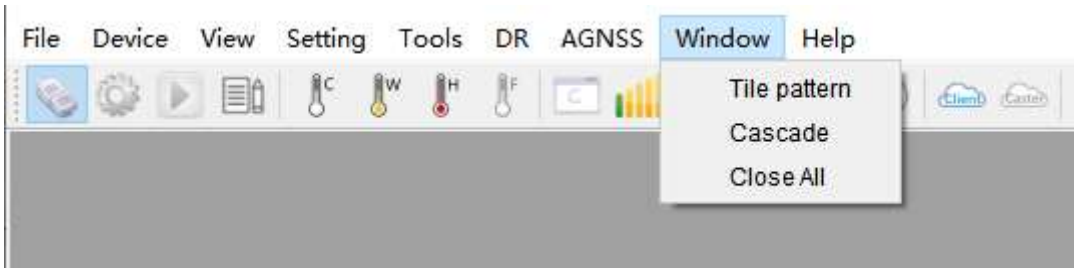


Figure 23: Window Tab Menu

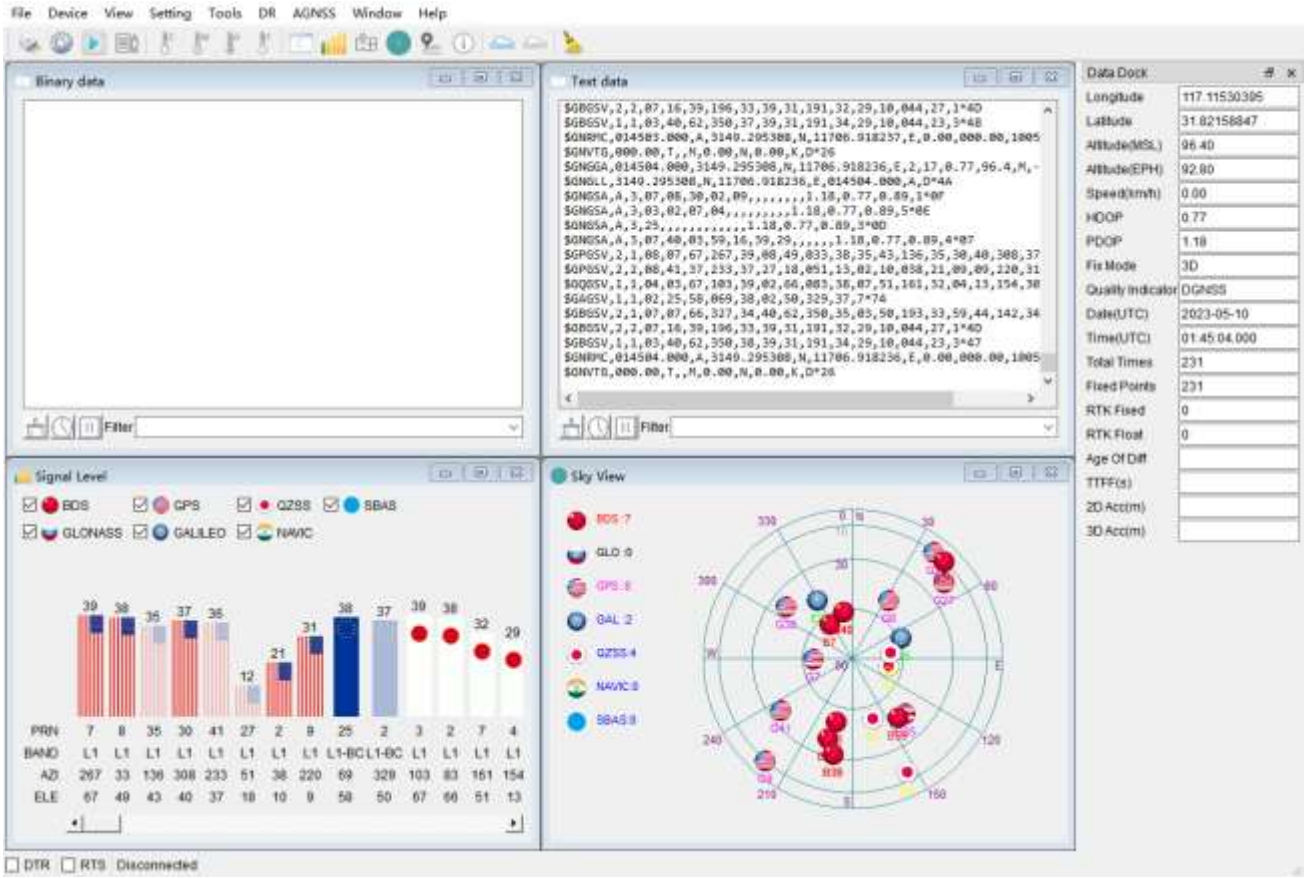


Figure 24: Tile Pattern Window

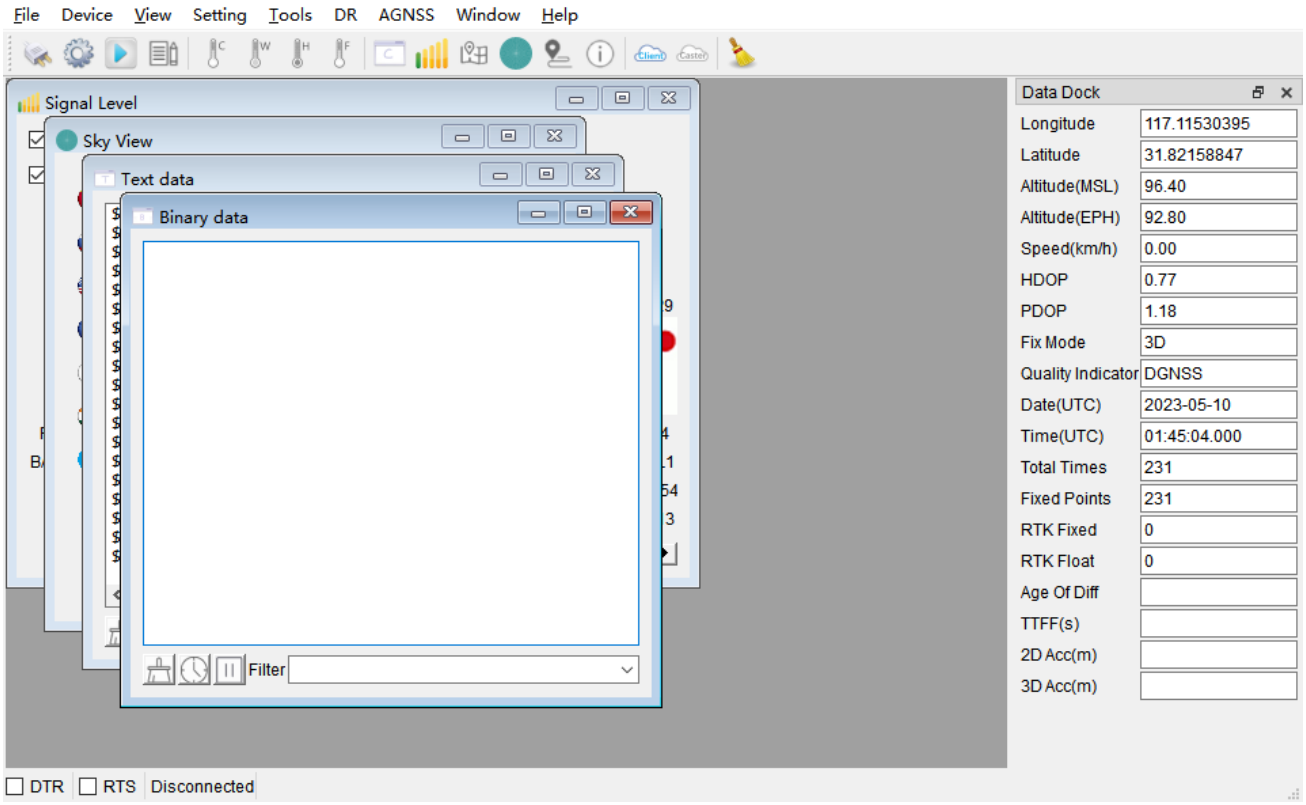


Figure 25: Cascade Window

2.2.9. Help Tab

In the "**Help**" tab menu:

- Click "**Check for Updates**" button to check if the tool is running the latest version of QGNSS.
- Click "**About**" button to see the current software version information.

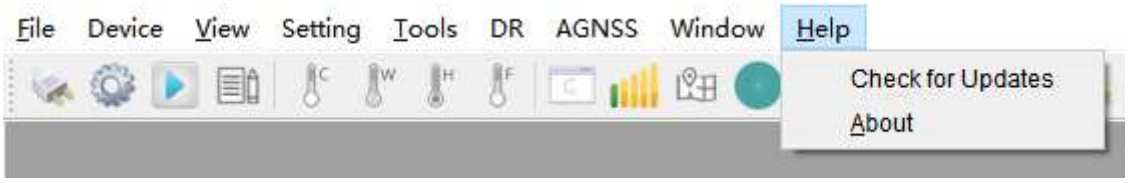


Figure 26: Help Tab Menu

2.3. Tool Bar

Tool bar can be used for quick access to common operations.

Figure 27: Tool Bar

Table 4: Description of Tool Bar Functions

Icon	Function	Description
	Connect	Serial port connection/disconnection
	Set Device Information	Select module and set serial parameter(s)
	Open	Play log file
	Show Logfile in Explorer	Open the folder containing the saved log file(s)
	Cold Start	Send a Cold start command
	Warm Start	Send a Warm start command
	Hot Start	Send a Hot start command
	Full Cold Start	Send a Full cold start command
	Command Console	Open the Command console dialog
	GNSS Signal View	Open the Signal level sub-window
	Online Map	Open the Online Map sub-window
	Sky View	Open the Sky view sub-window
	Deviation Map	Open the Deviation map sub-window

Icon	Function	Description
	Data Dock	Open the Dock window (Data Dock and Analysis)
	NTRIP Client	Open the NTRIP Client dialog
	NTRIP Caster/Server	Disabled (not supported currently)
	Clear	Clear interface data

3 Common Operations

3.1. Connect to Receiver

Follow the below steps to connect the receiver to the QGNSS software utility:

Step 1 Run the QGNSS tool.

Step 2 Click the "**Set Device Information**" button on the tool bar to open the "**Device Information**" window.

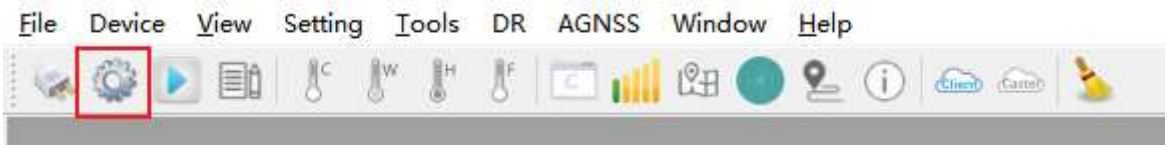


Figure 28: Open Serial Port Configuration

Step 3 Select the module and serial port parameters, and then click the "**OK**" button.

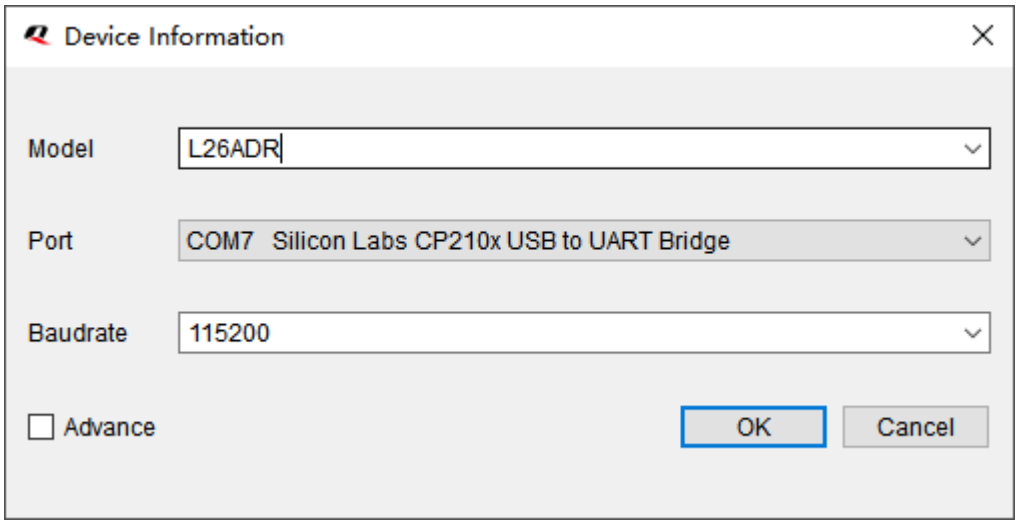


Figure 29: Serial Port Configuration Dialog

3.2. Log Play

Steps to replay a recorded log file:

Step 1 Click the "**Play**" button to open the play dialog box.

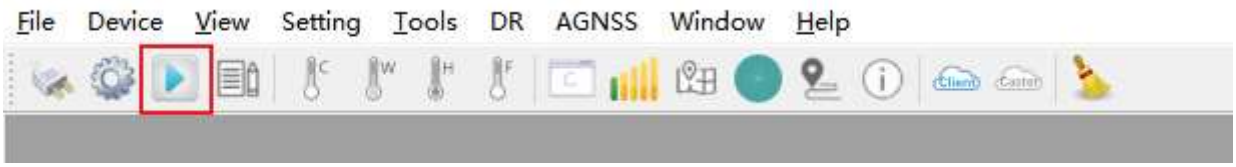


Figure 30: Log Play

Step 2 Select the file, and the play control window will pop up.

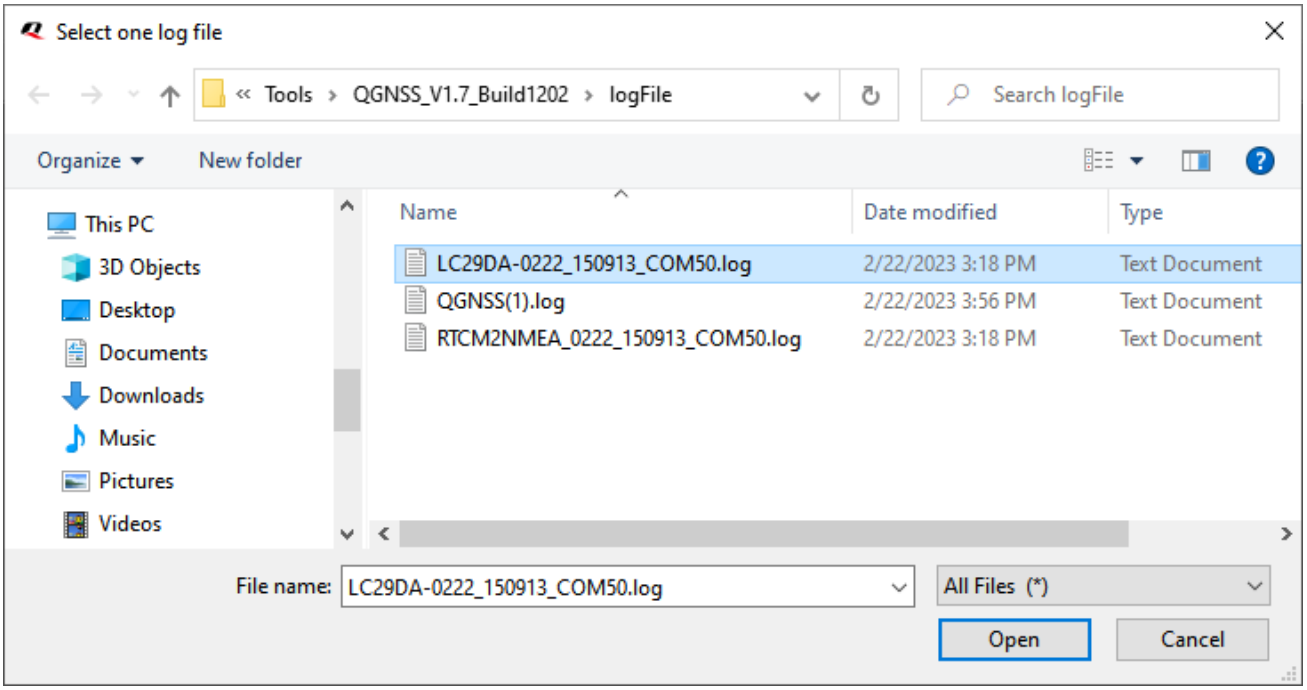


Figure 31: Select the File

Step 3 Select the Read Rate(B/s) value, and then click "**Exit**" button.

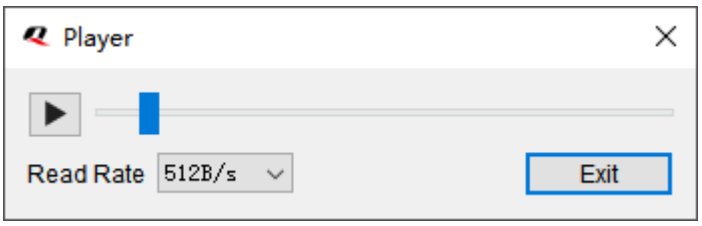
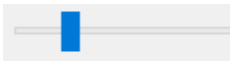
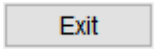


Figure 32: Play Controller

Table 5: Controller Function Description

Button	Description
	Play and pause
	Play progress bar, click to drag the progress bar.
	File reading speed
	Exit

3.3. Restart Receiver

Choose a restart type and click the corresponding button in the tool bar to send the restart command to the receiver. For the description of these buttons, see *Table 4: Description of Tool Bar Functions* .

Figure 33: Restart Receiver

3.4. TTFF

Click “**Static TTFF Testing**” to open the TTFF window.

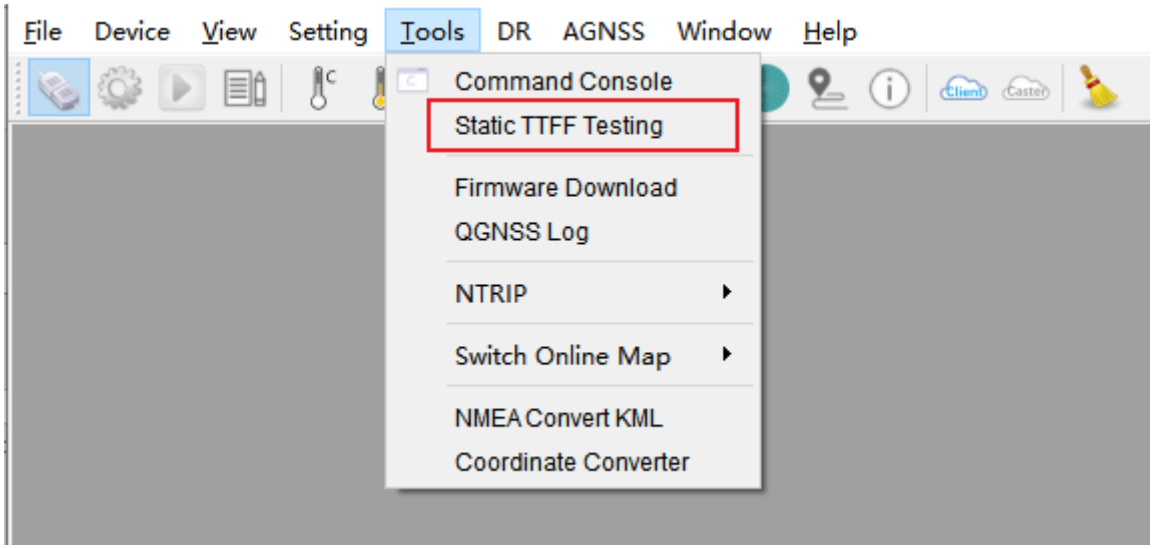


Figure 34: Open TTFF Window

Step 1 Choose a “**Restart type**”.

Step 2 Enter “**Number of tests**” and the “**TTFF Time-out(Sec)**” of each test.

Step 3 Click “**Run**” button.

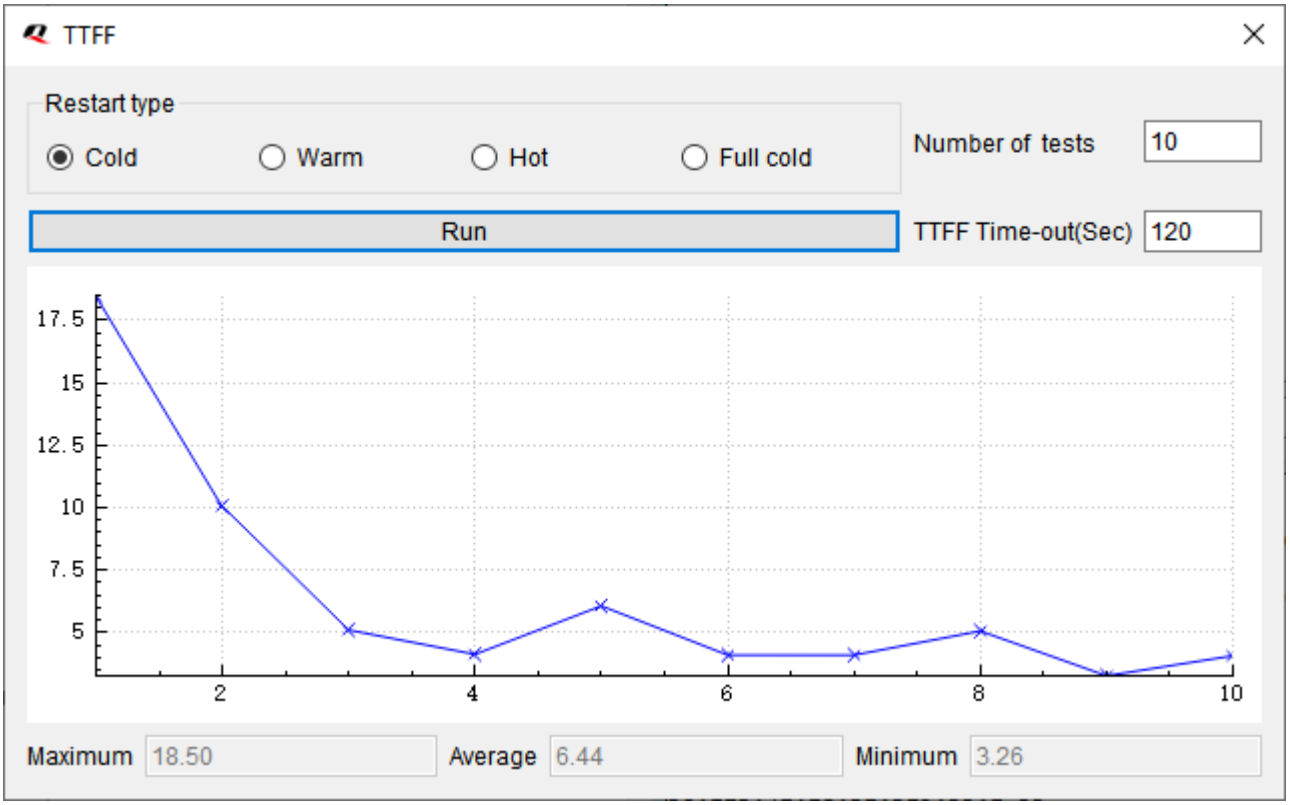


Figure 35: TTFF View

NOTE

Save the TTFF test log file (TTFF_xxx_xxx.log) in the log folder. Open the folder to view the log file.

3.5. Configure Receiver

Click “**Configuration View**” in the “**View**” tab drop-down menu to open “**Configuration View**” window.

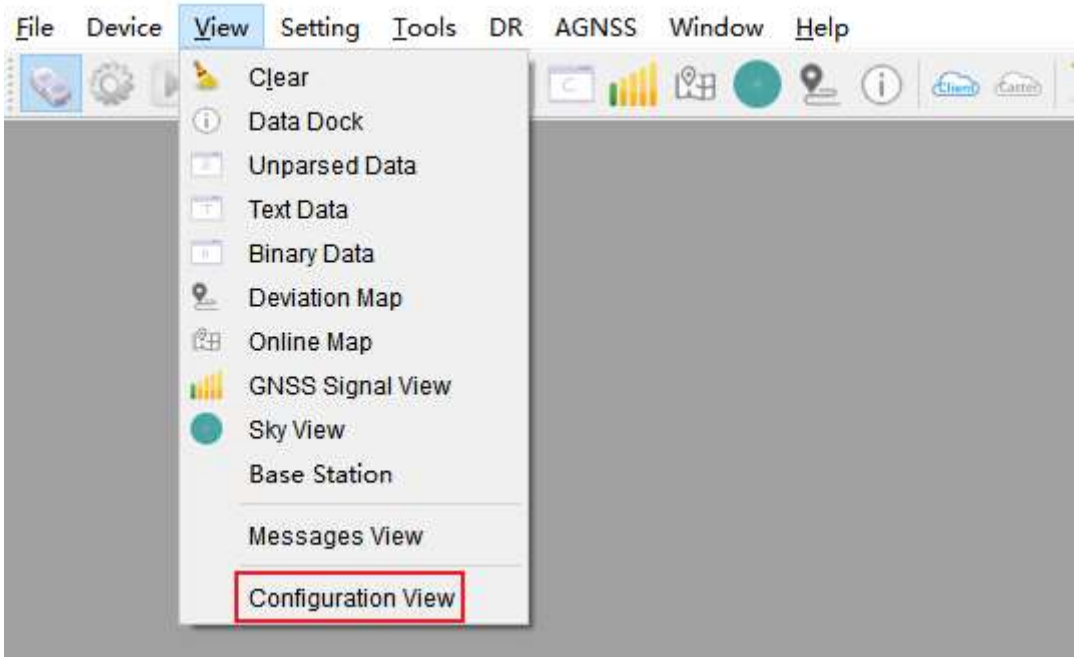


Figure 36: Open Configuration View

Step 1 Select the parameters that need to be configured and click “**Generating code**” button.

Step 2 Click “**Send**” button to send the generated code to the receiver.

If the parameters support the query, click the “**Poll**” button to query the configuration parameters.

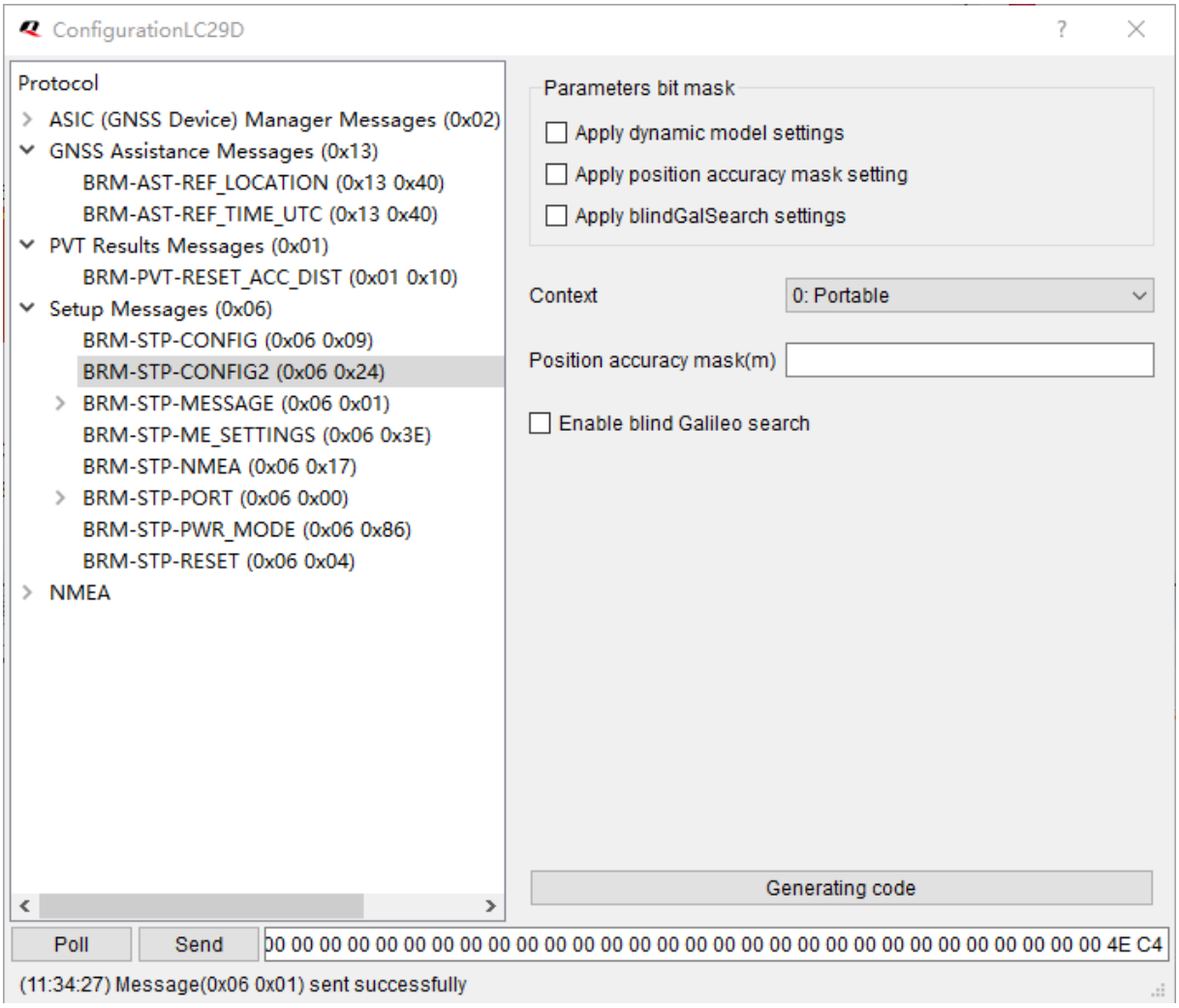


Figure 37: Configuration View

3.6. Send Command

Click the "**Command Console**" in the "**Tools**" tab drop-down menu to open "**Command Console**" window. See *Figure 17 Command Console Tool* for details of "**Command Console**" interface.

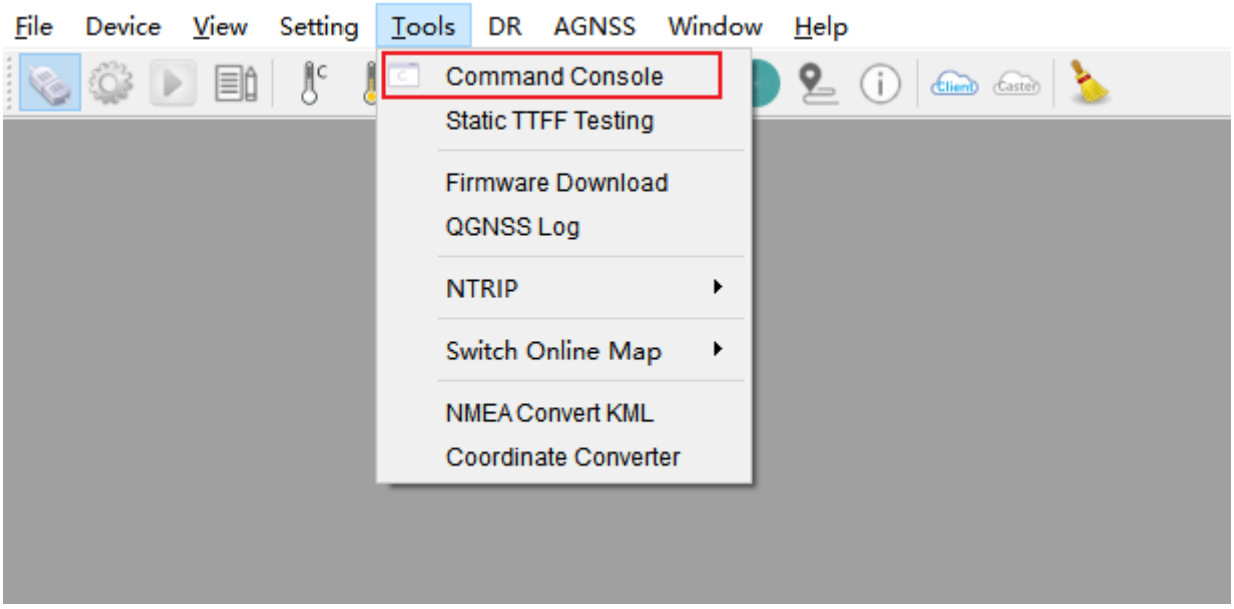


Figure 38: Open Command Console

Send one command at a time:

1. Enter the command to be sent in the command box.
2. Click **"Send"** to send the command.

Send the selected commands in a loop:

1. Enter the commands to be sent in the command boxes one by one.
2. Select the checkboxes of the commands to be sent.
3. Click "**Run**" to send the commands in a loop.

For description of the functions of other buttons, see *Table 3: Command Console Function Description*.

3.7. Send AGNSS Data

Click "**Assistant GNSS Online**" in the "**AGNSS**" tab drop-down menu to open "**AGNSS**" window.

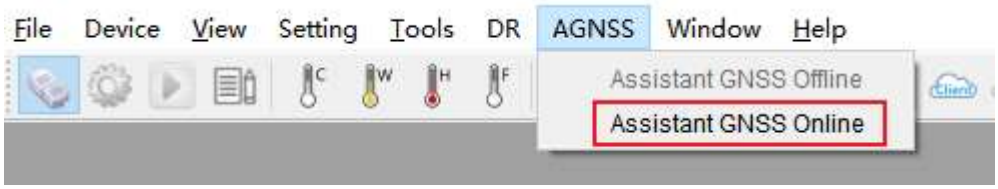


Figure 39: Open AGNSS Window

Step 1 Get AGNSS file:

1. Click "**Connect**" to connect to the FTP server.

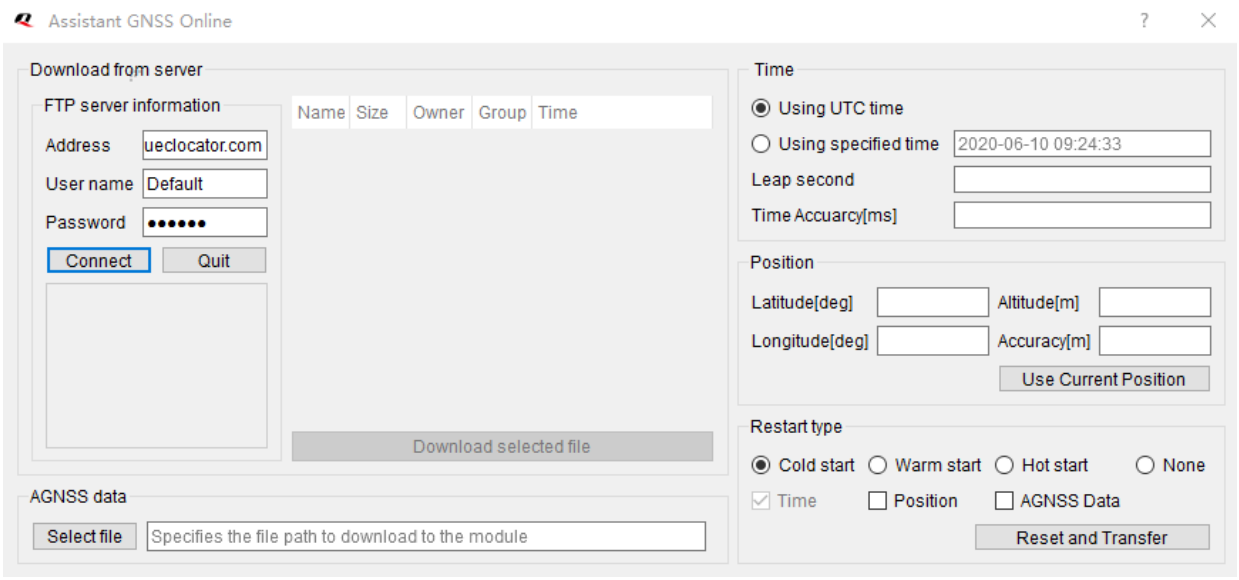


Figure 40: Connect to FTP Server

NOTE

AGNSS file is used to improve the TTFF duration by providing long duration Ephemeris to the receiver.

2. Select the AGNSS file to be downloaded and click "**Download selected file**".

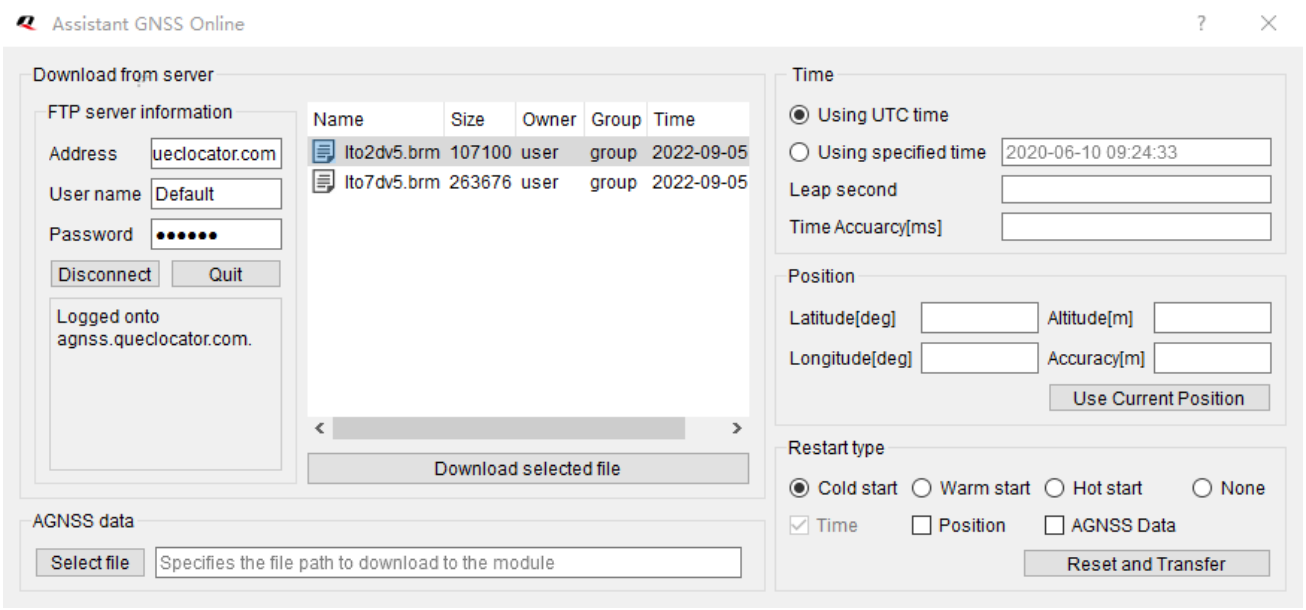


Figure 41: Download AGNSS File

Step 2 Send AGNSS data to the receiver:

1. Click "**Using UTC time**" to use the current time from receiver or click "**Using specified time**" to enter a time information.
2. Enter the position information (Latitude, Altitude, Longitude and Accuracy) or click "**Use Current Position**" to use the current position from receiver.
3. Choose a "**Restart type**".
4. Check "**Position**" and "**AGNSS Data**".
5. Click "**Reset and Transfer**".

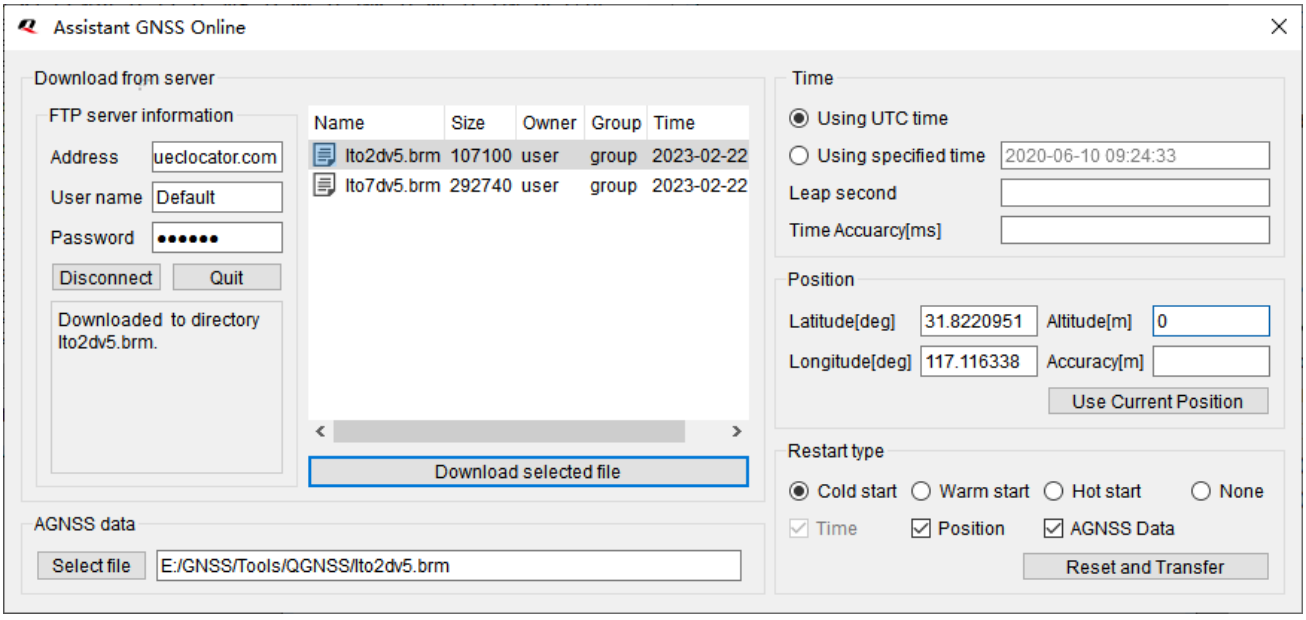


Figure 42: Send AGNSS Data

3.8. Connect to NTRIP Server

The NTRIP is a gateway for the module to receive RTK corrections. Click "**NTRIP Client**" in the "**Tools**" tab drop-down menu to open "**NTRIP Client**" window.

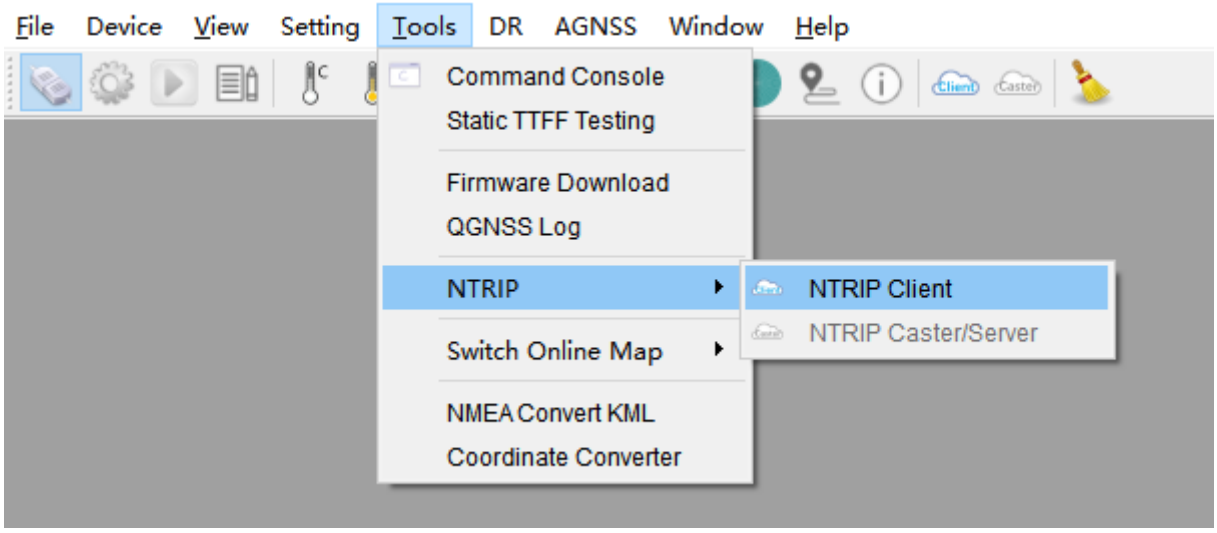


Figure 43: Open NTRIP Client

Step 1 Enter the Address, Port, Username and Password. Contact Quectel Technical Support (support@quectel.com) to get the Username and Password if necessary.

Step 2 Click "**Update NTRIP source table**" to wait for the server to return mount point information.

Step 3 Select "**NTRIP mount point**".

Step 4 Enter "**Request Interval**".

Step 5 Tick the checkboxes in front of "**Use manual position**", you can enter custom data, otherwise the fixed position of the module will be used.

Step 6 Turn on the "**Connect to Host**" switch.

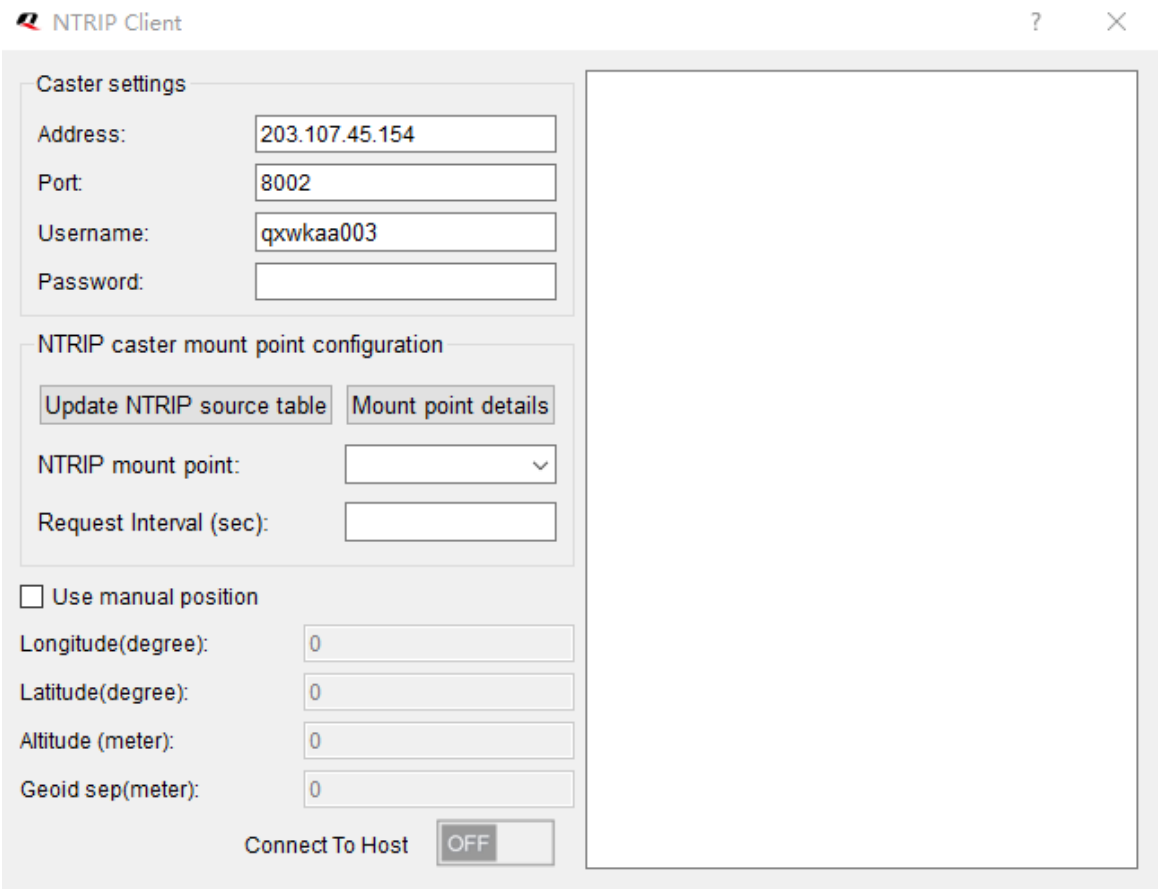


Figure 44: NTRIP Client

3.9. Firmware Download

Connects the receiver according to the *Chapter 3.1 Connect to Receiver*. Click "**Firmware Download**" in the "**Tools**" tab drop-down menu to open "**Firmware Download**" window.

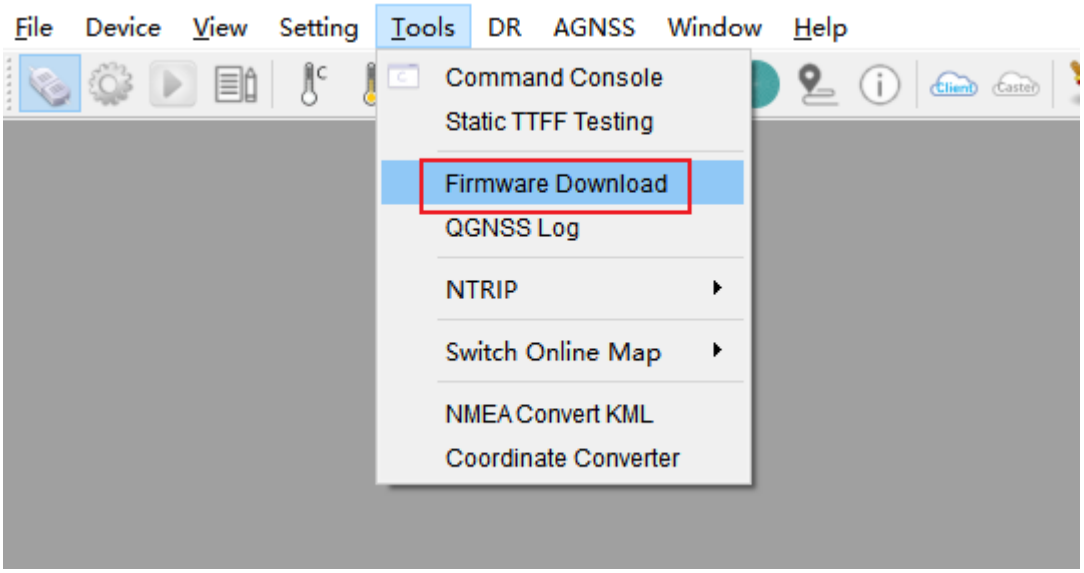


Figure 45: Open Firmware Download

Step 1 Click to select the receiver firmware.

Step 2 Click to wait for the firmware download to complete.

Step 3 Reset module.

NOTE

The steps of using the QGNSS tool to download the firmware may vary from module to module, see firmware upgrade guide document of specific module for details.

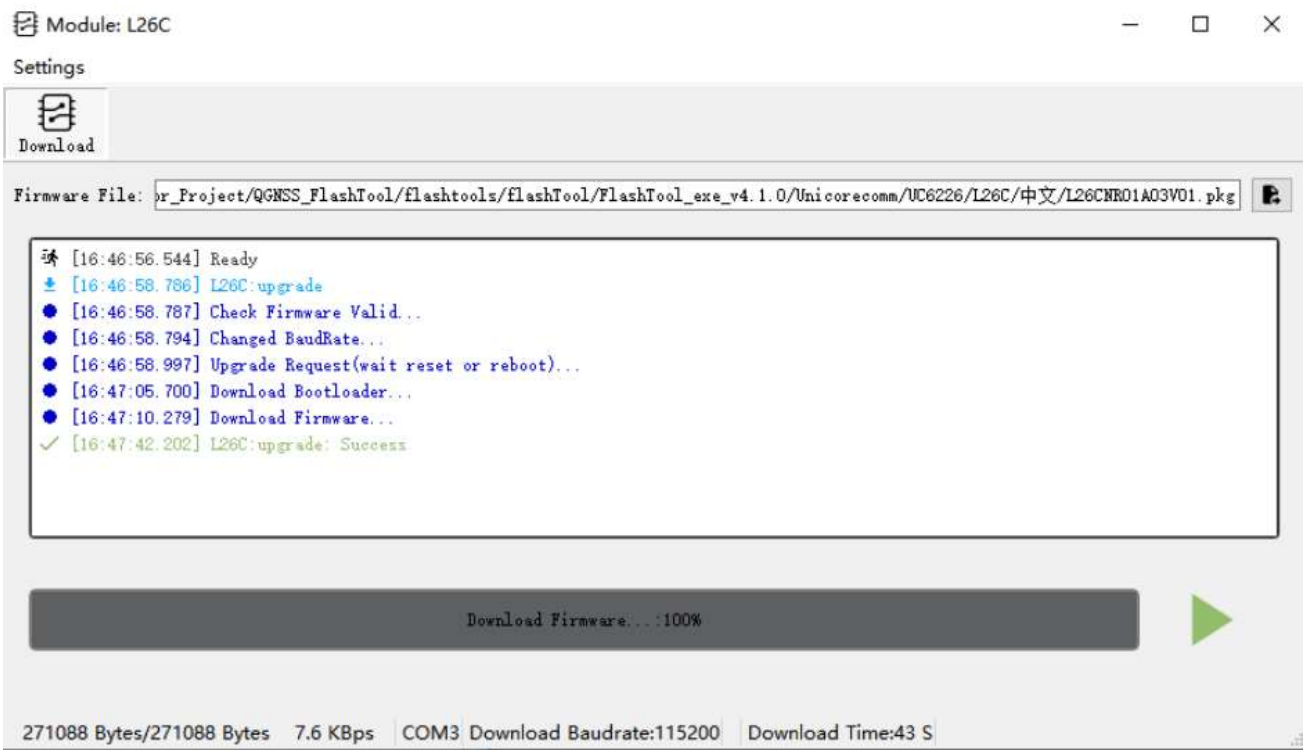


Figure 46: Firmware Download

4 Appendix References

Table 6: Terms and Abbreviations

Abbreviation	Description
AGNSS	Assisted GNSS
BDS	BDS Navigation Satellite System
C/N_0	Carrier-to-Noise-Density Ratio
CEP	Circular Error Probable
DR	Dead Reckoning
EPH	Ellipsoid Height
GLONASS	GLONASS Navigation Satellite System
GPS	Global Positioning System
IRNSS	Indian Regional Navigation Satellite System (NavIC)
KML	Keyhole Markup Language
MSL	Mean Sea Level
NTRIP	Networked Transport of RTCM via Internet Protocol
PRN	Pseudo Random Noise Code
QZSS	Quasi-Zenith Satellite System
RTK	Real-time Kinematic
SBAS	Satellite-Based Augmentation System
TTFF	Time to First Fix