GSM and Offline Tracking (Send Data without GPS Fix)

1 Introduction

1.1 About the Functionality

The Offline Tracking (Send data without GPS fix) enables sending the data in a cold start of the tracking device and prevents the data loss. Also, the GSM tracking feature can now be used to obtain an approximate location in densely urbanized areas, where the GNSS signal is not available.

1.2 Legal Information

1.3 Compatibility

This functionality is compatible with the following devices with the newest firmware version:

- HCV5 (Offline Tracking only)
- LCV5 (Offline Tracking only)
- PRO5 (Offline Tracking only)
- Trace5 (Offline Tracking only)
- Tco4 HCV
- Tco4 LCV
- Pro4
- Eco4
- Eco4 RS T
- Eco4 S/T
- Plug4

1.4   Contact Information

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1.5   Document Changelog

Version	Date	Modification
2.0	2020-07-16	Updated: List of compatible devices. Updated: Manual structure and design.
2.1	2020-10-23	Updated: List of compatible devices.

1.6   Notations

The following notations are used in this document to highlight important information:

Bold text

Used to indicate user interface elements or for emphasis.

Italic text

Used to indicate items that belong to a list and can be selected, also for identification of examples.

Note

Used to highlight important information or special conditions.

2 Offline Tracking (Send Data without GPS Fix)

> ℹ️ For the 5th generation devices, the functionality is called **Offline Tracking**, while for the 4th generation devices it is called **Send data without GPS fix**.

2.1 Description

By default, the tracking devices do not collect records, if they fail to acquire a GPS fix, as an exact time from the GPS is required. When the time is not available, data is not collected and sent, this, in turn, causes data loss. The offline tracking prevents the data from being lost and sends it after synchronizing the device's internal clock.

The tracking devices keep track of the exact time in several ways:

a) By counting a timestamp, starting from 946684800 in the Unix timestamp. Unix timestamp – it is a time variable, calculated from 2000.01.01 00:00:00.

b) By adding time from GPS, as soon as it is obtained. GPS time – this is when the global positioning system time is being used for the timestamp records before the GPS fix is acquired.

c) By synchronizing time with a Network Time Protocol (NTP) server. NTP time – it is a time acquired from the NTP server.

d) By synchronizing time with an operator. GSM operator time – it is a time acquired from a local GSM operator.

> ℹ️ To prevent data confusion and other problems with report mechanisms, this feature must be supported in the server software.

> ℹ️ This feature will not work in Tco4/Pro4 devices with an SD card logging mechanism.

> ℹ️ You have to reboot the tracking device after the configuration in order to activate the Offline Tracking feature.

2.2   Configuration

> ℹ️   This functionality requires the use of the advanced configurator.

Follow these steps to configure the offline tracking:

1. Open the advanced configurator. Select the COM port to which your device is connected.

2. Click **Connect**.

3. Click the **Options** in the **Offline Tracking** section to open the **Offline Tracking** window.

4. Tick the **Send data without GPS fix** checkbox.

5. If you require the usage of the Unix timestamp for the records, tick the **Collect data without time** checkbox.

6. Select the time synchronization method from the **Use time synchronization** drop-down list:

None	No time synchronization method is used. If the **Collect data without time** checkbox was ticked, data recording is continued from the last saved timestamp value. This method is selected by default.
NTP	The device checks for the NTP server twice to sync the data. First – to check if the server is configured in the device, second – if the server is reachable. When this time is acquired, the RTC (Real Time Clock) uses it to count further timestamps.
GSM	The device checks for the GSM operator time. When this time is acquired, the RTC uses it to count further timestamps.

The following steps are applicable only if the *NTP* synchronization is selected:

7. Enter an appropriate NTP server address in the **NTP server** section. An IP address or domain name can be used (max length is 40 symbols).

8. Enter a refresh interval value (in hours) for the NTP server in the **Refresh interval** section. The time interval range is from *0* to *255* hours. If it is set to *0* hours, the refresh is not performed until the next device start-up.

> ℹ️   Even if different time synchronization methods are configured, GPS time will be used whenever it is available.
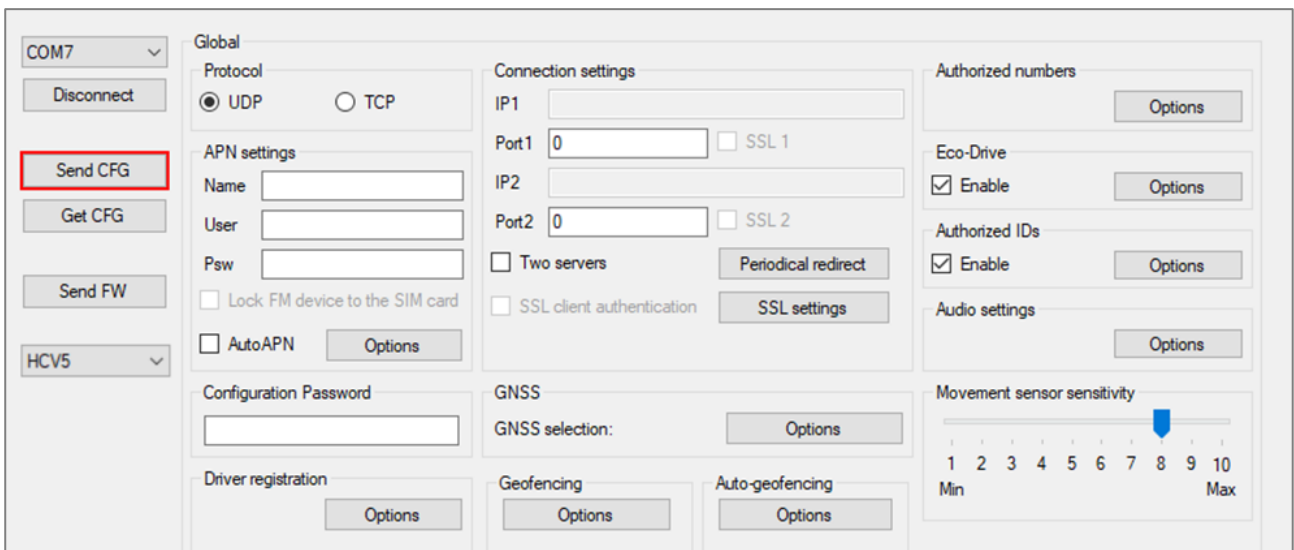
> ℹ️ The GSM time will be acquired only if the GSM operator provides it.
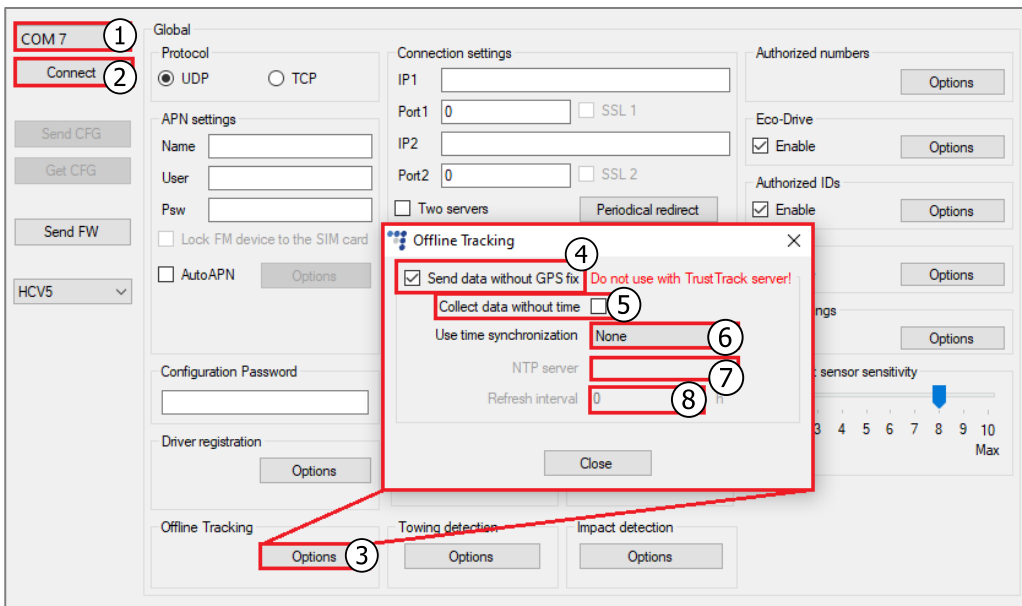
2.3 Finishing the Configuration

To finish the configuration, close the **Offline Tracking** window. Click **Send CFG** to send the configuration to the device.

3   GSM Tracking

ℹ️ This functionality is applicable only for the 4th generation devices.

3.1   Description

When the device loses GPS fix, it is impossible to determine location of the vehicle. Instead, you can use the GSM tracking feature, which provides an approximate location in densely urbanized areas, where the GNSS signal is not available.

The tracking device employs a QuecLocator service provided by the Quectel modem. This service collects data from the neighboring GSM stations and sends it to the Quectel server. The received response contains the approximate coordinates of the device. However, this method is inaccurate.

ℹ️ Each position request requires approximately 200 bytes of the GPRS data.

Operation principles

- The device must have its internal timer running before it can start using the GSM tracking functionality:
    - GPS fix must be acquired at least once before losing fix.
    - Alternatively, NTP or GSM time synchronization should be enabled.
- The position from the QuecLocator service is received only after a configurable amount of time without the GNSS fix.
- The time interval between separate position requests is configurable.
- When the tracking device is turned on, the timer for the GSM tracking feature starts after two minutes. During this time the GNSS module has time to acquire the first fix.
- The coordinates that were obtained from the QuecLocator service are sent to the server in the record header – the same packet as GNSS coordinates.
- As soon as the GNSS signal becomes strong enough, the device will switch back to the GNSS tracking mode.

ℹ️ It is possible to configure the GSM tracking feature to be active only when the engine is on.
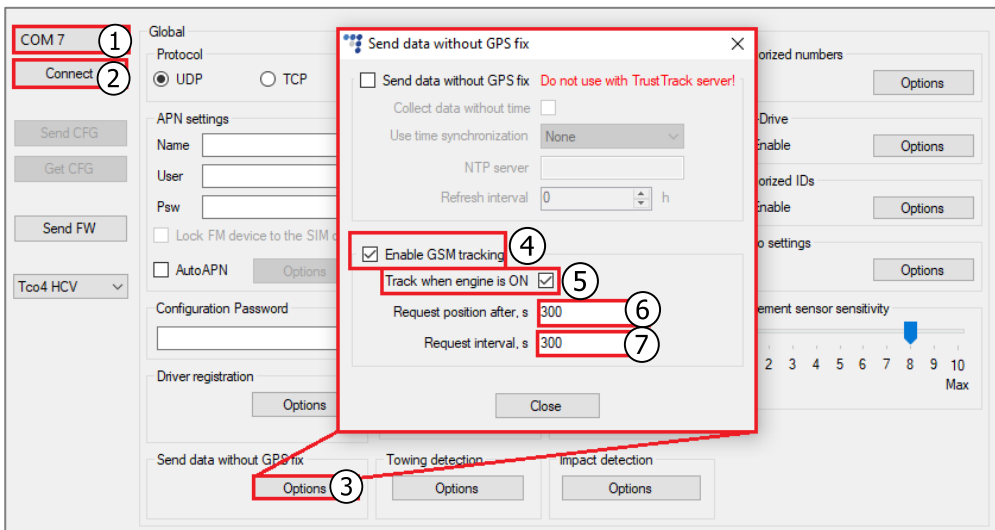
3.2   Configuration

Follow these steps to configure the GSM tracking:

1. Open the advanced configurator. Select the COM port to which your device is connected.

2. Click **Connect**.

3. Click the **Options** in the **Offline Tracking** section to open the **Offline Tracking** window.

4. Tick the **Enable GSM tracking** checkbox.

5. If required, untick the **Track when engine is ON** checkbox.

6. Enter the required GNSS fix waiting time value in the **Request position after** field. The range is from *30* to *43200* seconds. Default value: *300* s.

7. Enter the required **Request interval** value. The range is from *30* to *43200* seconds. Default value: *300* s.

> ℹ When the tracking device is turned on, the timer for the GSM tracking feature starts after 2 minutes.

3.3   Finishing the Configuration

To finish the configuration, close the **Offline Tracking** window. Click **Send CFG** to send the configuration to the device.