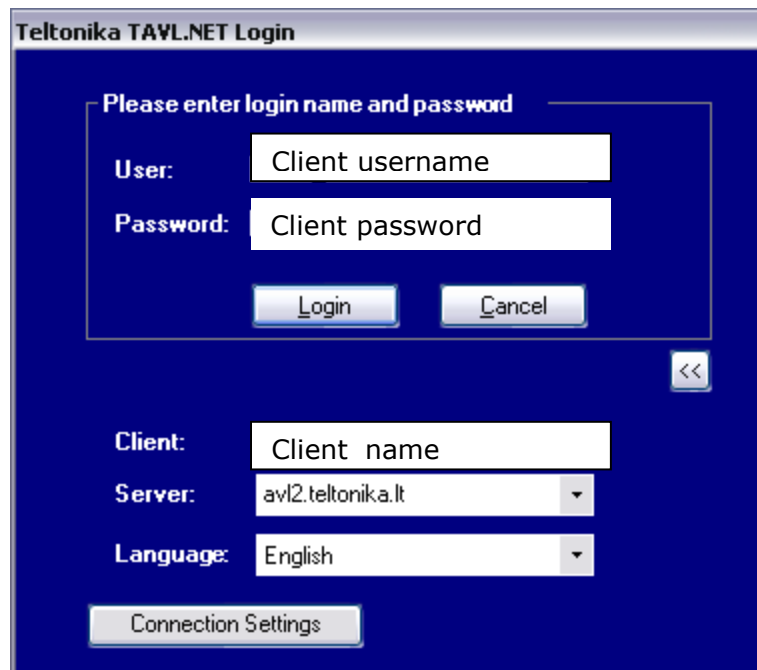# FM1100 Sample User Guide

1 About the document

This document contains information about testing the FM1100 samples and configurations commonly used in such cases.

1.1 Login to TAVL application

TAVL application is used for users to be able to see the AVL data such as GPS location, speed, ignition and other I/O elements' values from FM1100 devices in the user-friendly way. Information required to download and use the TAVL application is provided in the next paragraph. After downloading the TAVL application simply open the *tavl.exe* file and use your login information provided below.

Picture 1. Login to TAVL application

1.2 Downloading the TAVL application

1.2.1 PC requirements

TAVL application runs on a PC with MS Windows XP or MS Windows Vista with latest service packs. MS .NET Framework v3.5 SP1 and Crystal Reports are also necessary components.

TAVL application supports MS MapPoint (copyright © 2008 Microsoft) or any MapX (copyright © 2008 MapInfo Corporation) maps (additional maps have to be installed on users PC).

1.2.2 .NET Framework installation

Download .NET Framework 3.5 SP1 from Microsoft website and install it (url: http://www.microsoft.com/downloads/thankyou.aspx?familyId=ab99342f-5d1a-413d-8319-81da479ab0d7&displayLang=en, mirror: http://avl1.teltonika.lt/downloads/tavl/Framework/dotnetfx35setupSP1.zip). If the download doesn't start automatically, click on the "Start Download" button.

1.2.3 Crystal Reports installation

Download and install Crystal Reports for .NET Framework (url: http://avl1.teltonika.lt/downloads/tavl/Crystal%20Reports/CRRedist2005_x86.zip).

1.2.4 TAVL application installation

Downloads and extract latest available version of TAVL application (url: http://avl1.teltonika.lt/Downloads/tavl).

Note, that if any additional information about the usage of the TAVL application is needed, please see the latest „TAVL3 Application User Manual".
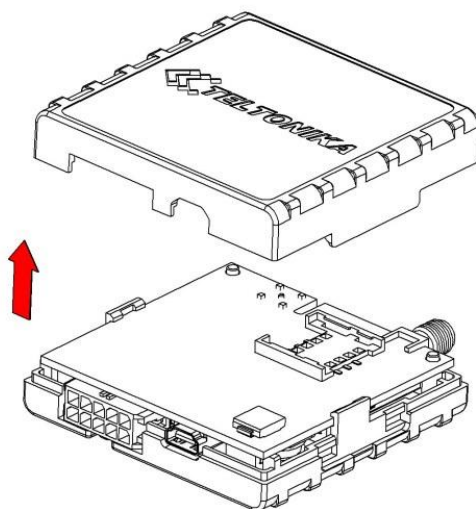
2 Getting started with FM1100 device

This paragraph contains the information needed to successfully launch and use the FM1100 device. The steps below should be followed carefully to completely test the FM100.

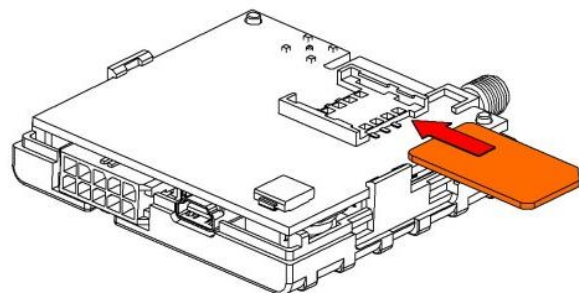## 2.1 SIM card insert scheme
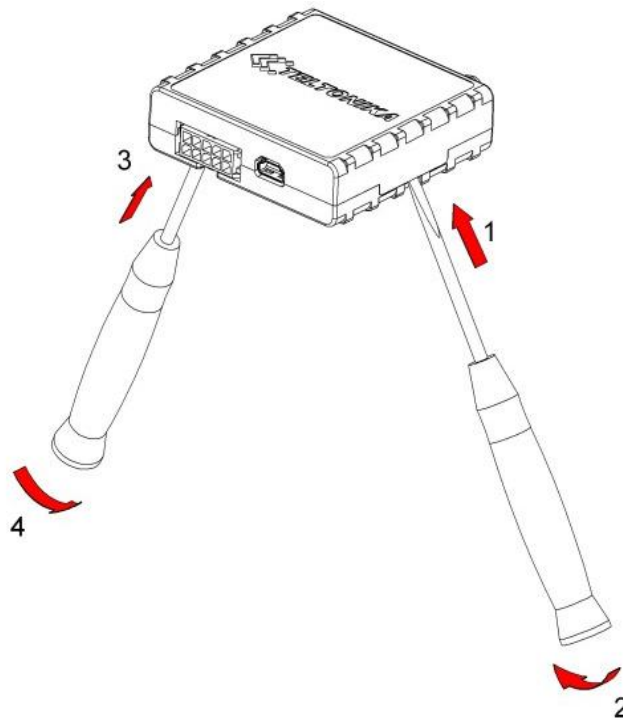
①
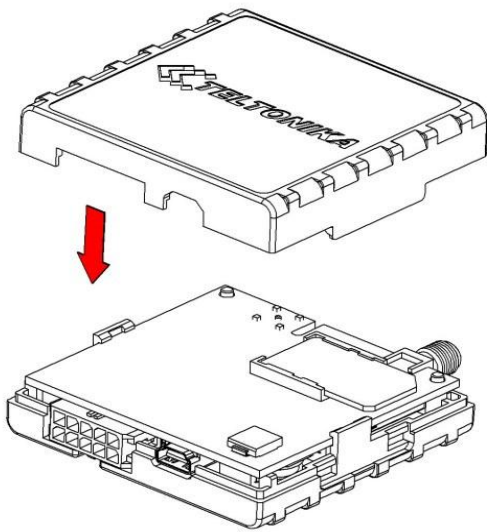
Gently open FM1100 case using screwdrivers
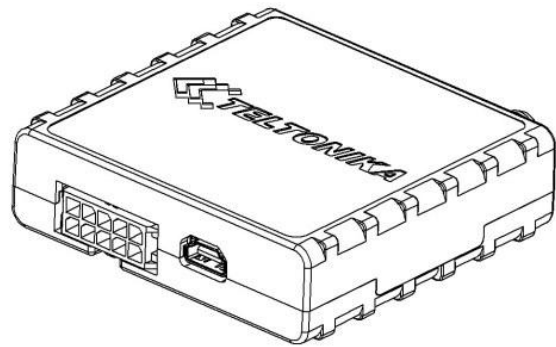
②

Take off FM1100 case

③

Insert SIM card as shown

④
Assemble devices top part

⑤
Device is ready

2.2 Power source connection

DIN 1 (IGNITION)	5		6		Ucc_DALLAS
DIN 2	4		7		DIN 3
OUT 1	3		8		DATA_DALLAS
OUT 2	2		9		AIN 1
VCC (9□30)V DC(+)	1		10		GND(VCC(9□30)V DC)(-)

Picture 2. 2´5 socket pinout

2.3 Installing FM1100 drivers

Software requirements

- Operating system 32-bit and 64-bit: Windows XP with SP3 or later, Windows Vista, Windows 7.
- MS .NET Framework V3.5 or later (http://www.microsoft.com or http://avl1.teltonika.lt/downloads/tavl/Framework/dotnetfx35setupSP1.zip).

Drivers
   Please download Virtual COM Port drivers from Teltonika website:
      http://avl1.teltonika.lt/downloads/FM1100/vcpdriver_v1.3.1_setup.zip

Installing drivers

Extract and run VCPDriver_V1.3.1_Setup.exe. This driver is used to detect FM1100 device connected to the computer. Click 'Next' in driver installation window (figures below):

Figure 3. Driver installation window

This will launch device driver installation wizard. In the following window click 'Next' button again:

Figure 4. Driver installation window

Setup will continue installing drivers and will display a window about successful process in the end. Click 'Finish' to complete setup:

Figure 5. Driver installation window

You have now installed drivers for FM1100 device successfully.

Power source connection

Note, that FM1100 cannot be powered via USB cable, so the external 10...30 V DC (1,2 W Max) power supply must be used to power up the device.

2.4 Placement of GPS antenna

- GPS antenna must be placed so its state is as horizontal as possible (if antenna is leaning more than 30 degrees, it is considered incorrect mounting).
- GPS antenna cable cannot be bent more than 80 degrees.
- GPS antenna must be placed sticker facing down
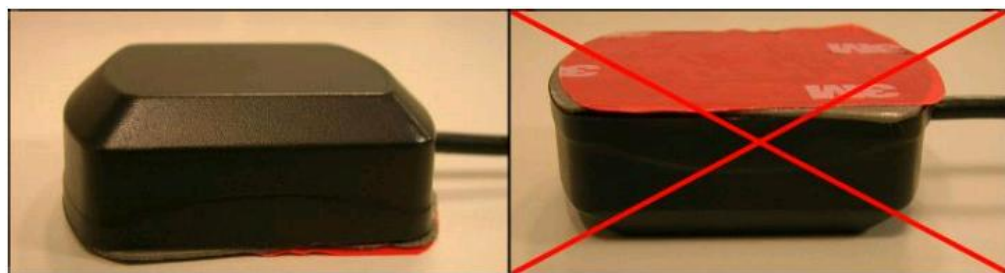
Picture 6. GPS antenna correct mounting

It is recommended to place GPS antenna as close to the window as possible.
NOTE, that most of modern house windows are equipped with filters that could block GPS signal so for best GPS signal quality we recommend to put GPS antenna outside (on windowsill, some plate etc.).

2.5 Loading the Configuration into the FM1100 Device

FM1100 Configurator must be used to configure the FM1100 device. Using the configurator prepared Sample Configurations can be uploaded into the FM1100 or custom device configuration can be made.

Open the FM1100 Configurator software and click on "Connect" button (1) from the main toolbar. If connection is successful, then instead of "Connect" "Disconnect" button appears.

Configuration files for all Sample Scenarios (described in 3 paragraph) are already prepared by Teltonika. To load Sample Scenario to FM1100 device, click on "Load from File..." button (2). Browse for the required configuration file and click OK. Enter the APN parameters into the GPRS part of GSM section of the configuration according to the instructions described in 2.5.1 paragraph. Click on "Save" button (3) to upload the configuration into the FM1100 device.

To check the current FM1100 configuration click on "Load" (4) button. To save the modified configuration click on "Save to File…" button (5) and the configuration will be saved into the file with ".xml" extension. The saved configuration will be able to upload into any FM1100 device in the same way as described above.
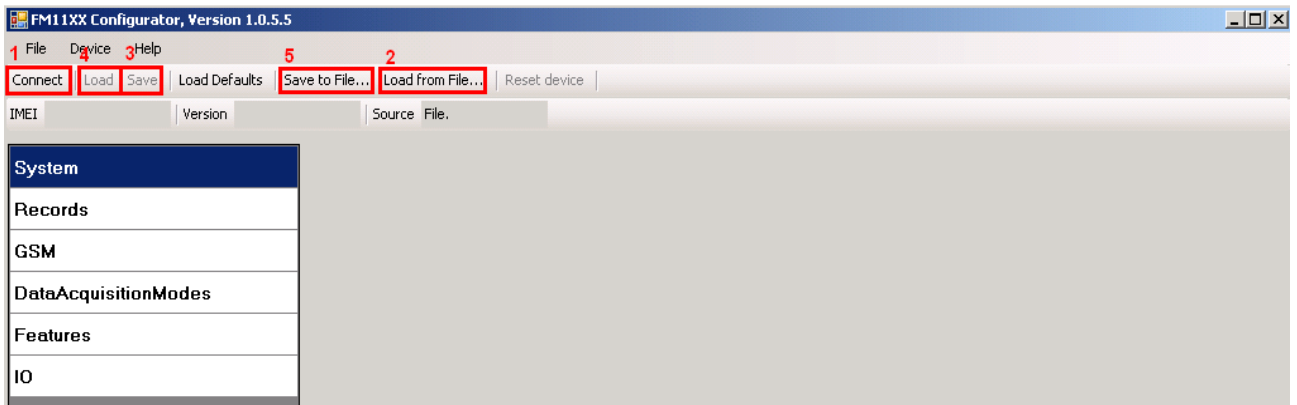
Picture 7. Configuration toolbar view
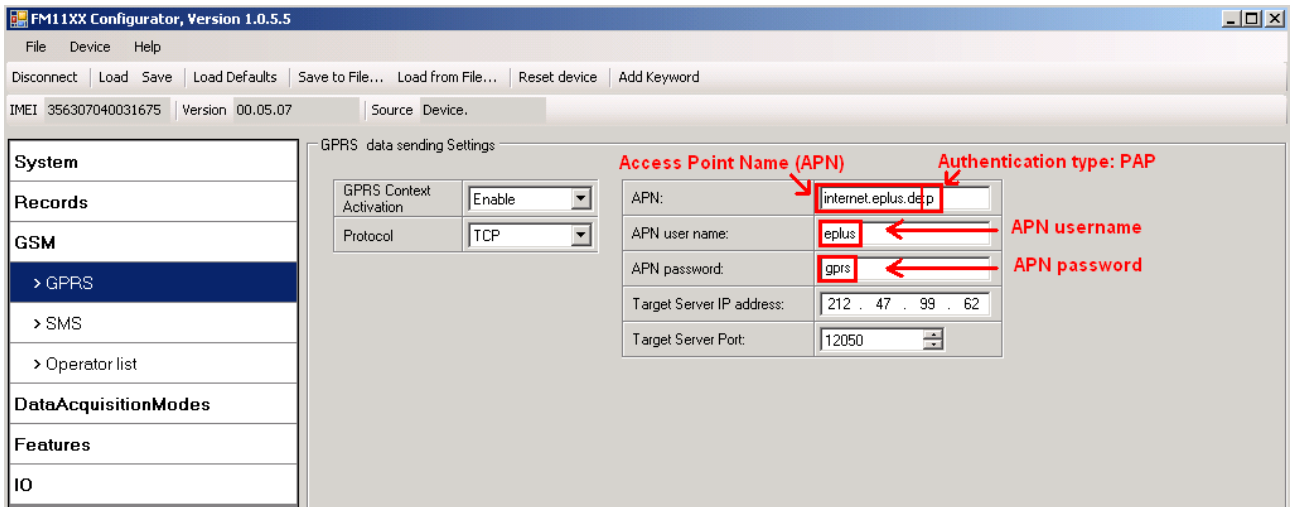
2.5.1 APN configuration

In order to FM1100 device to be able to connect to local GPRS network (and send AVL data) the following APN data (provided by local GSM services provider) must be entered into FM1100 configuration:
Access Point Name (APN) with authentication type CHAP or PAP (if required);
APN login;
APN password;

Sample of GPRS configuration of German "EPLUS" GSM service provider:

**Picture 8. GPRS configuration**

2.5.2 Data Acquisition Modes

Data Acquisition Modes are essential part of FM1100 device, it is also highly configurable.

There are three different modes: Home, Roaming and Unknown. All these modes with configured data acquisition and send frequencies depend on current GSM Operator defined in Operator list and are being switched when GSM operator changes (e.g. vehicle passes through country boarder). If current GSM operator is defined as Home Operator, device will work in Home Data Acquisition mode, if current operator is defined as Roaming Operator, device will work in Roaming Data Acquisition mode, and if current operator code is not written in Operator list, device will work in Unknown Acquisition mode.

This functionality allows having different AVL records acquire and send parameters values when object is moving or stands still. Vehicle moving or stop state is defined by Stop Detection Source parameter in System section. As result, FM1100 allows to have 6 different modes.

To ensure that FM1100 sends collected data correctly, enter SIM card operator as your home operator in the "Operator list" part of GSM section of the configuration.
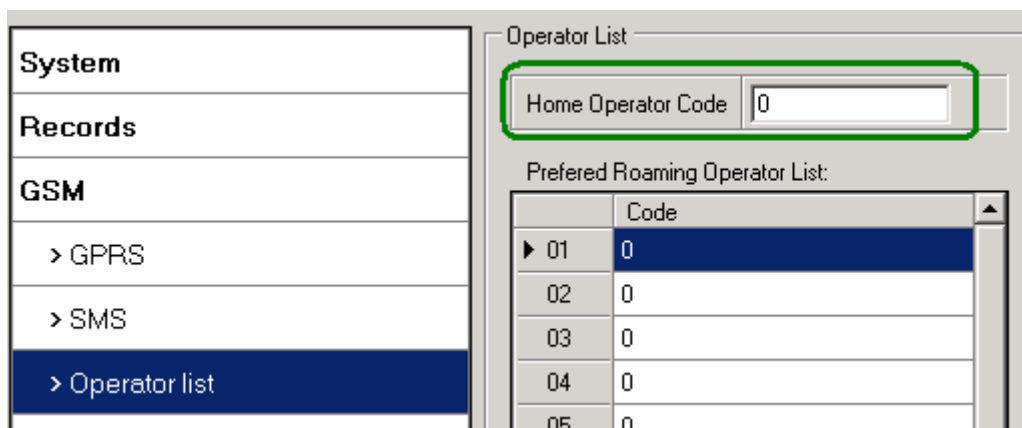
Picture 9. Home Operator

3 Sample scenarios

This section of the document describes the commonly used FM1100 testing scenarios and helps users to perform the detailed testing of the FM1100 device. Below you will find the descriptions of the sample scenarios and the configuration for each case.

3.1 First test

Usually the client's office is the first environment, in which the FM1100 device is tested at the beginning. To make this test faster the sample FM1100 devices are shipped being equipped with prepared configuration. You can also use "1stScenarioConfig.xml" file to upload the device with the prepared configuration.

3.1.1 Configuration

The sample FM1100 devices are shipped already uploaded with "First test" scenario configuration. The only additional configuration must be made is the APN configuration and entering your home operator code. The description of the APN configuration is described in paragraph 2.5.1, for home operator code see Picture 8.

The "First test" scenario configuration is based on fast periodic AVL data acquisition (Min.period = 30 s) and AVL data sending via GPRS to the server as soon as the AVL data record is generated (Min. saved records = 1; Send period = 1 s). According to this configuration one AVL data record, containing information about the GPS position and Input/Output (I/O) parameters is sent to the server every 30 seconds.

Following I/O elements' vales are monitored in every AVL data record:

- DIN1 (as ignition) {values: 0 – Off; 1 – On};
- Movement {values: 0 – object is not moving; 1 – object is moving};
- Power voltage {values: from 10 V to 30 V, according to the power source).

3.1.2 What is the purpose of testing FM1100 in this scenario?

After the testing is successfully done, the user is introduced to the basic FM1100 work - periodic AVL data acquisition and sending to the server with monitoring of the basic I/O parameters. The user is able to see his position according to GPS in the TAVL application software.

3.2 City Scenario

One of the most widely used scenarios of the FM1100 testing scenario is testing the device in the "City Scenario".

3.2.1 Configuration

To completely test the "City Scenario" please load the prepared configuration file "2ndScenarioConfig.xml" which has been received together with this document. Follow the instructions in paragraph 2.5 to upload the FM1100 with the required configuration.

Again the only additional configuration must be made is the APN configuration and entering home operator code. The description of the APN configuration is described in paragraph 2.5.1, for for home operator code see Picture 8.

The "City" scenario configuration is based on fast periodic AVL data acquisition mainly according to the change of the object's geographic angle (Min.Angle = 20 degrees). According to this configuration the FM1100 device will generate AVL record every time the object's angle is changed more than 20 degrees. Such AVL data acquisition is rational in cases the object mostly moves in the city. Min.Distance = 200 meters, so the additional AVL record will be generated after driving more than 200 meters in the straight line. If the object with FM1100 device is not moving, the AVL data records are generated periodically every 600 seconds (Vehicle on STOP Min.period = 600 s). If the object with FM1100 device is moving, the AVL data records are generated periodically every 30 seconds.

AVL data is sent via GPRS to the server as soon as the AVL data record is generated (Min. saved records = 1; Send period = 1 s). According to this configuration one AVL data record, containing information about the GPS position and Input/Output (I/O) parameters is sent to the server at least every 600 seconds.

Following I/O elements' vales are monitored in every AVL data record:
- DIN1 (as ignition) {values: 0 – Off; 1 – On};
- Movement {values: 0 – object is not moving; 1 – object is moving};
- Power voltage {values: from 10 V to 30 V, according to the power source).
- Speed {values: current vehicle speed in km/h}

Additional AVL data records called "events" are generated on following parameter value changes:
- If power voltage value falls to less than 11 V;
- Speed is less than 5 km/h for more than 1 minute;
- Ignition is turned ON/OFF (DIN1=1 or DIN1=0).

3.2.2 What is the purpose of testing FM1100 in this scenario?

The main purpose of this testing scenario is for the user to see the highly detailed track (as in the sample screenshot below) of his driven track in the city. The user will be able to see his vehicles current position as well as the position in any selected time in the past. The user will be able to see the time and points in the map in which the ignition has been turned ON/OFF, power voltage has become less than 11 V (car battery needs to be recharged). The user will be able to compare "Vehicle on STOP" and "Vehicle MOVING" modes.
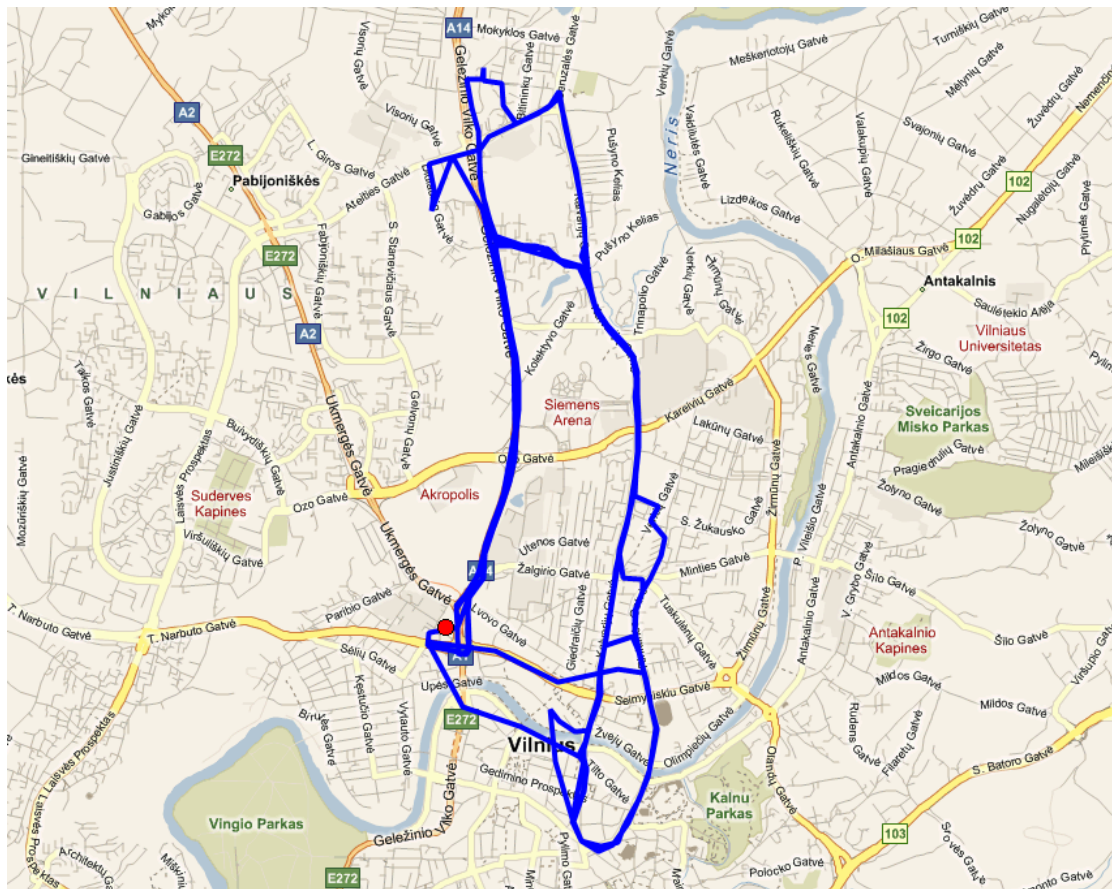
Picture 10. Track of the FM1100 working in "City scenario"

The track showed in the screenshot above contains the information of 3 days driving of real vehicle in the city of Vilnius, Lithuania. Using the service of local GSM service provider "Bite GSM" 1 MB of data has been transmitted through the GPRS to generate such track.

NOTE, that GPRS traffic differs from the GPRS coverage at the area and the GSM service provider's data averaging policy, so the GPRS traffic can be higher than the described in the example above.

3.3 Event based "Logbook" scenario

Another useful FM1100 testing scenario is testing the device in the "Logbook" scenario. Working in such scenario the position of the object with FM1100 device and I/O elements' values are sent to the server via GPRS on high priority events – when I/O elements' values exceeds the configured thresholds.

3.3.1 Configuration

To completely test the event based "Logbook" scenario please load the prepared configuration file "3rdScenarioEventBased.xml" which was received together with this document.

Again the only additional configuration must be made is the APN configuration and entering home operator code. The description of the APN configuration is described in paragraph 2.5.1, for home operator code see Picture 8.

The "Logbook" scenario configuration is based on rare periodic AVL data acquisition (Min.period = 1 hour). According to this configuration the FM1100 device will generate AVL record every one hour and if any of the below described I/O elements' values are increased or decreased over the configured thresholds.

Periodic AVL data is sent via GPRS to the server once a day (Min. saved records = 24; Send period = 300 s) if no I/O event happen. If any of the events described below happen, the AVL data record with all AVL information is sent to the server as soon as the event appears.

Following I/O elements' vales are monitored in every AVL data record:

- DIN1 (as ignition) {values: 0 – Off; 1 – On};
- DIN2 (as panic button) {values: 0; 1);
- Power voltage {values: from 10 V to 30 V, according to the power source);

Additional AVL data records called "events" are generated on following parameter value changes:

- If power voltage value falls to less than 11 V;
- Speed is less than 5 km/h for more than 1 minute;
- Ignition is turned ON/OFF (DIN1=1 or DIN1=0);
- Panic button is pressed (DIN2 = 1).

3.3.2 What is the purpose of testing FM1100 in this scenario?

After the testing is successfully done, the user is introduced to the FM1100 work based on events. Such device's functionality is needed in cases when no detailed track is needed but the work of any vehicle is needed to be monitored. The user will be able to see the information about the exact time of turning the ignition ON or OFF, Panic Button activation, vehicles battery voltage decrease. Such event based Logbook is usually needed for the companies administrating big amount of the working vehicles. Driver's and vehicle's working hours can be monitored using such case.

Note, that if any additional information about the configuration or working of the FM1100 device is needed, please see the latest „FM1100 User Manual".