NetView&Modem

Software manual

Version 1.2

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Table of Contents

Preface 5
Terms and Conditions 5
About this Manual 6
Symbols and Typographic Conventions 6
Screen Captures 6
Technical Assistance 6
Getting Started 7
Setting up 8
System Requirements 8
Installing NetView & Modem 8
Uninstalling Net View & Modem 9
Updating NetView & Modem 9
Getting Connected 10
Starting NetView & Modem 10
Connection Mode Switcher 11
Connection Board 11
TCP Panel 11
Default LAN Settings 12
Serial Panel 12
Devices Pane 13
Closing NetView & Modem 14
GNSS Receiver 15
Operation 15
Reports 16
Actions 16
Update Options 16
Update Firmware 18
Monitoring 18
Receiver Info 19
Measurements 19
Sky Plots 22
Orientation, Angels and Base Lines 23
Multi-RTK 24
RTPK 24
Configuring the Receiver 27
Graphical user interface for working with the receiver

parameters 27
The Parameter tabs 27
Operations with the files 41
Start/Stop File Recording 41
Delete Files 42
GNSS Spectra 43
Collecting Spectra 44
Operation with Plots 44
Statistics and Additional data 45
Saving and Deleting 46
Spoofing Detection 46
Configuring the Modem 49
External Modem via Bluetooth 49
Daisy Chaining 50
Modem Firmware update 50
Radio Parameters 51
Levels and Compass calibration 53
Calibration check procedure 53
Removing Levels Offsets 53
Levels calibration 54
Compass calibration 56
Radio Spectra 60
Options 62
Output 63
Select Output tile 63
Ports tab 63
Message Sets tab 64
Manual Mode 66
Real-Time Logging 68
Modem 70
Update Firmware 70
Pair Modem and GNSS Receiver via Bluetooth 71
Terminal 72
Appendices 73
Appendix 1. Predefined sets of messages 73
Appendix 2. TCL-script example 73
Web Resources 74

Preface

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About this Manual

This Manual is designed to help you get familiar with the JAVAD Mobile Tools User Interface and introduce you to the JAVAD Mobile Tools main features.

Symbols and Typographic Conventions

This Manual uses the following text conventions:

Example	Description.
Main	Titles of dialog windows/boxes, names of menu options.

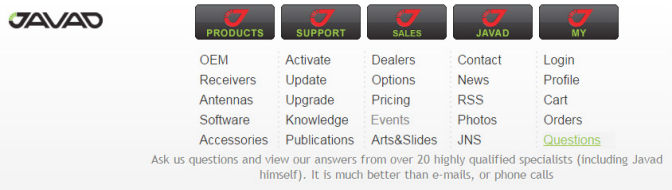
Screen Captures

This Manual includes sample screen captures. Your actual screen can look slightly different from the sample screen due to the receiver you have connected, operating system used and settings you have specified. This is normal and not a cause for concern.

Technical Assistance

If you have a problem and cannot find the information you need in the product documentation, contact your local dealer. Alternatively, request technical support using the JAVAD GNSS World Wide Web site at: www.javad.com.

To contact JAVAD GNSS Customer Support use the QUESTIONS button available on the www.javad.com.



Getting Started

Net View & Modem software is a Windows application for controlling navigation equipment developed and manufactured by JAVAD GNSS. Before you start using Net View & Modem, you should become familiar with its functions and learn how to install, launch, exit, and uninstall the program.

Net View & Modem software provides the following functionality:

GNSS Receivers

- Directly connect to the receiver(s), using one of the following interfaces: serial, USB, TCP/IP (through the Ethernet ports or Wi-Fi adapter), Secure TCP/IP (SSL/TSL), Bluetooth.
- User-friendly connection board.
- Displaying of the total number and the status of all visible and tracked satellites.
- Displaying the receiver current position, time and other measurements in real time.
- Satellite sky plots and orientation plots.
- Clear NVRAM, receiver reset, return to the initial parameter values, initiation file system, reset RTK.
- Create general, parameters and options reports.
- Update Firmware online from Javad website or a file.
- Loading Options online from Javad website or Option Authorization File.
- Setup of various parameters of the receiver using the graphical interface or command line.
- Start and stop file recording, deleting files, downloading files using file manager.
- Configure internal modems using the graphical interface or command line.
- Update internal modem Firmware online from Javad website or a file.
- Pairing with the external modems.
- Manual mode terminal allows sending commands with quick tip and view receiver response. Limited terminal supports a TCL script language to automate the “common” receiver control tasks.
- Collecting and display GNSS and Radio Spectra.
- Connecting to multiple receivers.
- Support for multiple connections to the receiver for optimized simultaneous work.

Modems

- Directly connect to the modem(s), using one of the following interfaces: serial, USB.
- Update Firmware online from Javad website or a file.
- Pairing with GNSS receiver.

Terminals

- Directly connect to the devices(s), using one of the following interfaces: serial, USB, TCP/IP (through the Ethernet ports or Wi-Fi adapter), Secure TCP/IP (SSL/TSL), Bluetooth.

Setting up

System Requirements

Check that you have the following required (or recommended) items before installing and using NetView & Modem.

Operation System Requirements

Windows 10, Windows 8.1, Windows 8, Windows 7 SP1, Windows Vista SP2, Windows Server 2016, Windows Server 2012 (64-bit edition), Windows Server 2008 R2 SP1, Windows Server 2008 R2 SP1, Windows Server 2008 SP2.

Hardware Requirements

- 1 GHz or faster processor
- 512 MB of RAM
- 850 MB of available hard disk space (x86)
- 2 GB hard drive (x64)

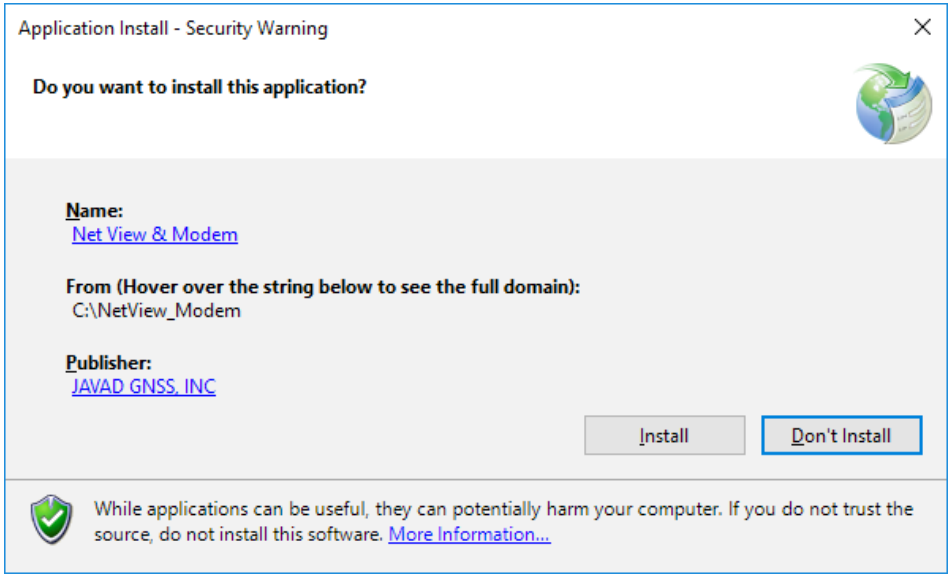
Installing NetView & Modem

NetView & Modem is available from the JAVAD GNSS website.

If downloading the program from the website, extract the program files into a folder on your hard drive.

Navigate to the location of the Net View & Modem program and double-click the *Setup.exe*

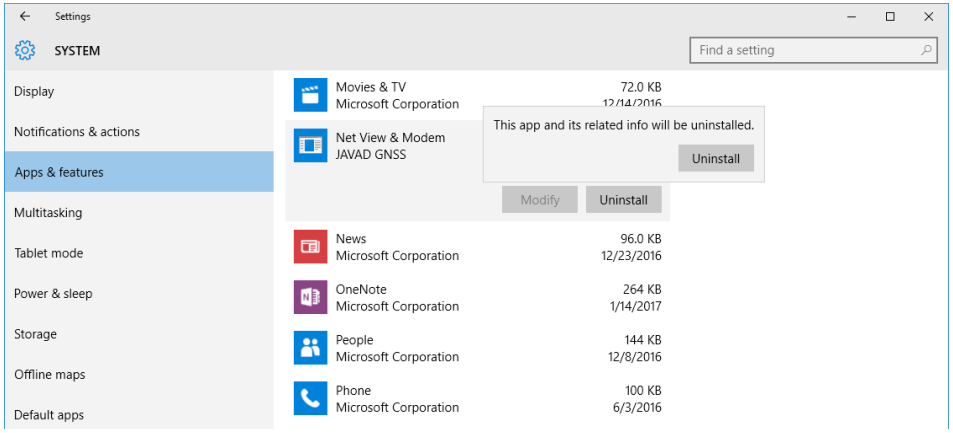
The installation process will be started. Click *Install* to install software. Click *Don't Install* to quit.



Installation

Uninstalling Net View & Modem

To uninstall NetView & Modem software use *Start Menu* or *Settings* ▸ *App & Features.* Find NetView & Modem, and click *Uninstall*.

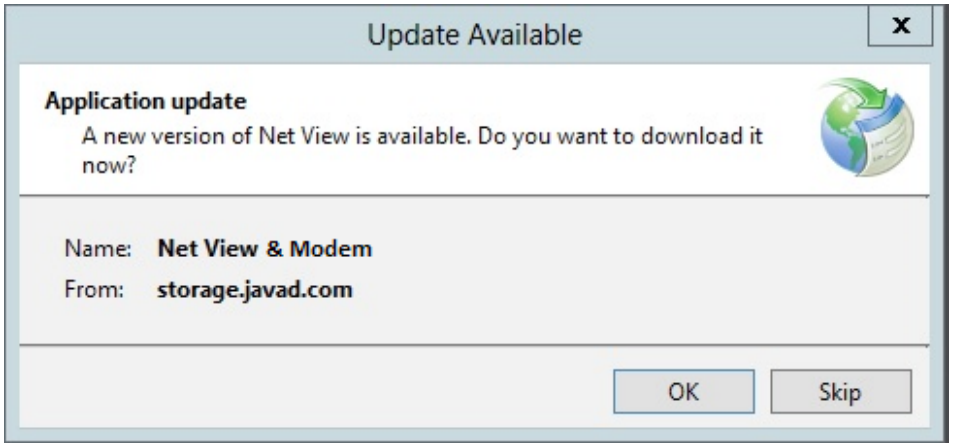


Uninstall

The NetView & Modem software will be uninstalled.

Updating NetView & Modem

The NetView & Modem checks the updates automatically after closing. If a new version is available, the user will be informed of updating next start meanwhile.



Update

Getting Connected

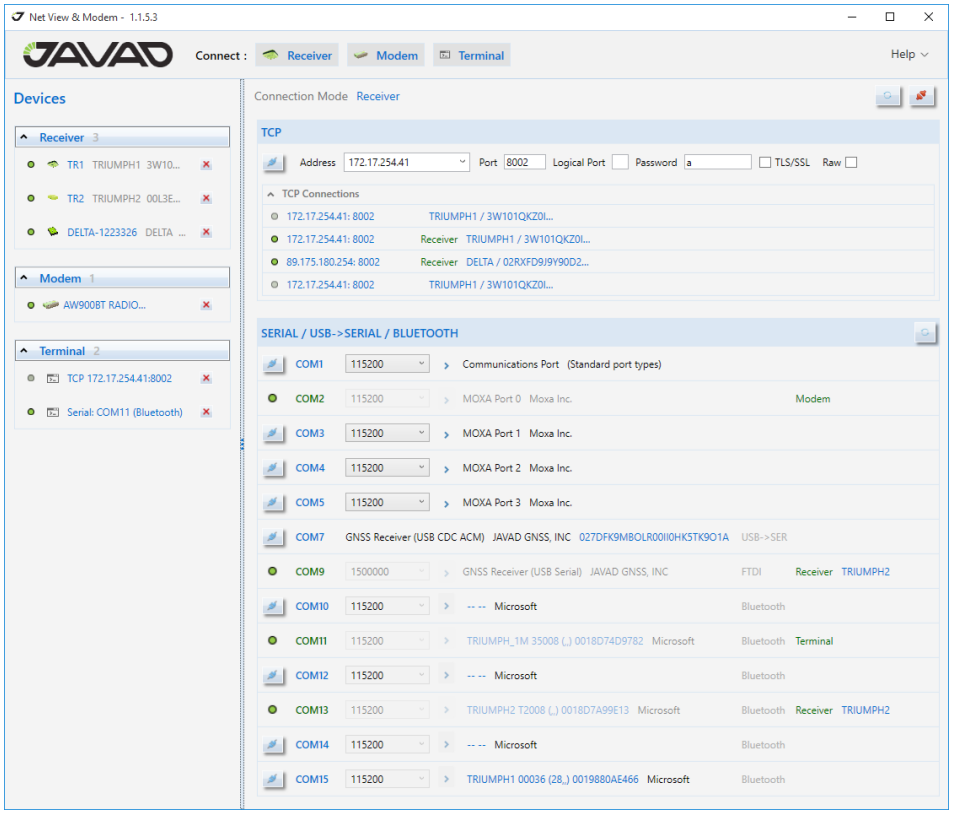
Starting NetView & Modem

NetView & Modem can be launched, like any other Windows program, for example, with the *Start* ▸ *All Programs* ▸ *JAVAD GNSS* ▸ *Net View & Modem*

Once NetView & Modem is launched, the *Main* window appears.

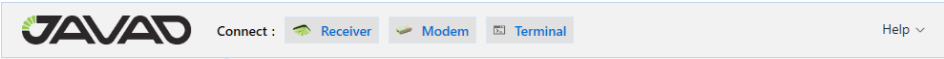
It contains *Connection Switcher, Connection Board, Devices* pane and *Help* Menu.

- *Connection Mode Switcher* – Receiver, Modem, Terminal buttons accordingly switch connection mode.
- *Connection Board* – displays the available communication interfaces and provides the ability to open a connection.
- *Devices pane* – contains a list of the connected devices grouped by *Receiver, Modem, Terminal*.
- *Help Menu* – contains the links to the *Drivers* page, *Software Manual, Application* page.



Main Window

Connection Mode Switcher



Connection Mode Switcher.

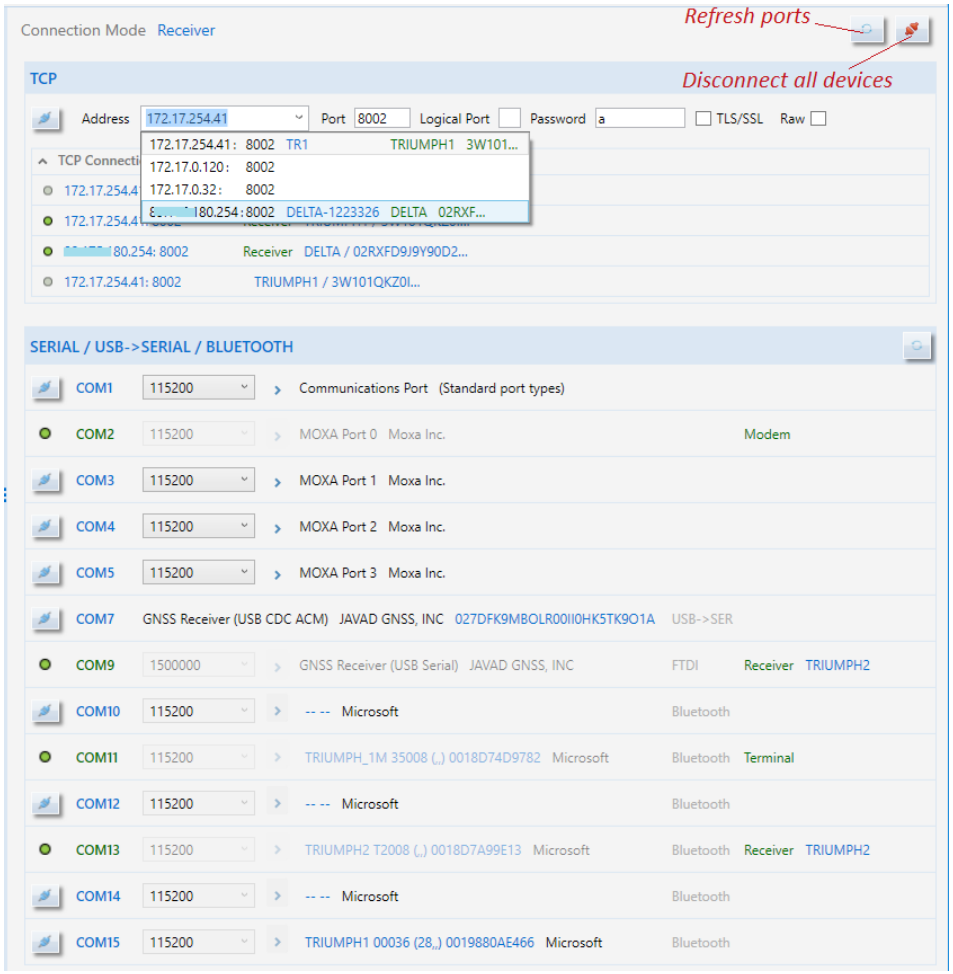
- *Receiver button* – enables the GNSS Mode. It means that connection is established using GREIS protocol and the graphical interface to control JAVAD GNSS Receiver is provided.
- *Modem Button* – enables the Radio Mode. The connection is established using the specific protocols and the graphical interface to control JAVAD GNSS Radio is provided. Radio mode allows only the serial communication interface.
- *Terminal Button* – enables the Terminal Mode. The connection is established as is and the panel for the communication is provided.

Connection Board

The *Connection Board* provides access to the available communication interfaces. The interfaces are enabled depending on the connection mode.

- *TCP* – used to connect your computer and remote device. Disabled for Modem mode;
- S*ERIAL / USB->SERIAL / BLUETOOTH* - used to connect via serial or virtual serial ports;
- *Refresh* button refreshes the list of the available interfaces;
- *Disconnect* button closes all opened connections and clears *Devices* pane.

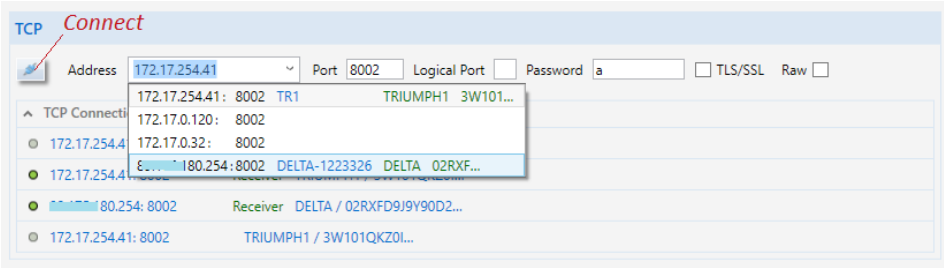
Please see below the detailed description of each communication interface settings.



Connection Board

TCP Panel

TCP panel allows establishing a bidirectional connection to the receiver which is configured as TCP server (see C [2, 4.4.6 TCP Server Configuration]) via LAN (local area network), WLAN (wireless LAN) or the Internet.



TCP Connection panel

The following fields should be filled:

- *Address* - Host name or IP address of the receiver;
- *Port* - TCP port of the receiver. It is the port on which the receiver listens for telnet-like connections. The receiver allows up to five simultaneous telnet-like connections.
- *Logical port* - one of the five logical port mapping (a, b, c, d, e). If the value is empty, then the connection is established with the first free logical port;
- *Password* - an arbitrary sequence of characters (if the receiver is configured to bypass the login/password authentication you may just leave this field blank);
- *TLS/SSL* - Enables/disables the encrypting with cryptographic protocols that provide communications security over the Internet. This parameter should correspond to the receiver settings.
- *Raw* - The connection without an authorization. It is used to connect via serial adapters.

By clicking *Connect,* the connection establishes.

The successfully established connections are stored and can be selected from the drop-down next time.

The drop-down list displays all connections with application startup time. The green circle marks existing connection, gray closed ones.

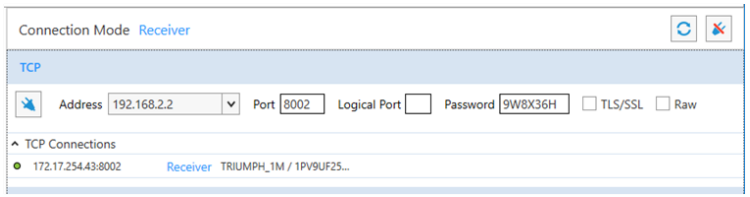
Default LAN Settings

The JAVAD GNSS receivers have the next factory LAN- settings:

- *IP* 192.168.2.2
- *Mask* 255.255.255.192
- *GW* 192.168.2.1

The Receiver TCP Server default Configuration:

- *Port* 8002
- The password is seven symbols of the receiver ID ending with the penultimate (ex. `03B0RGGQNDYWZ1UDNV9W8X36HZ -> 9W8X36H`)



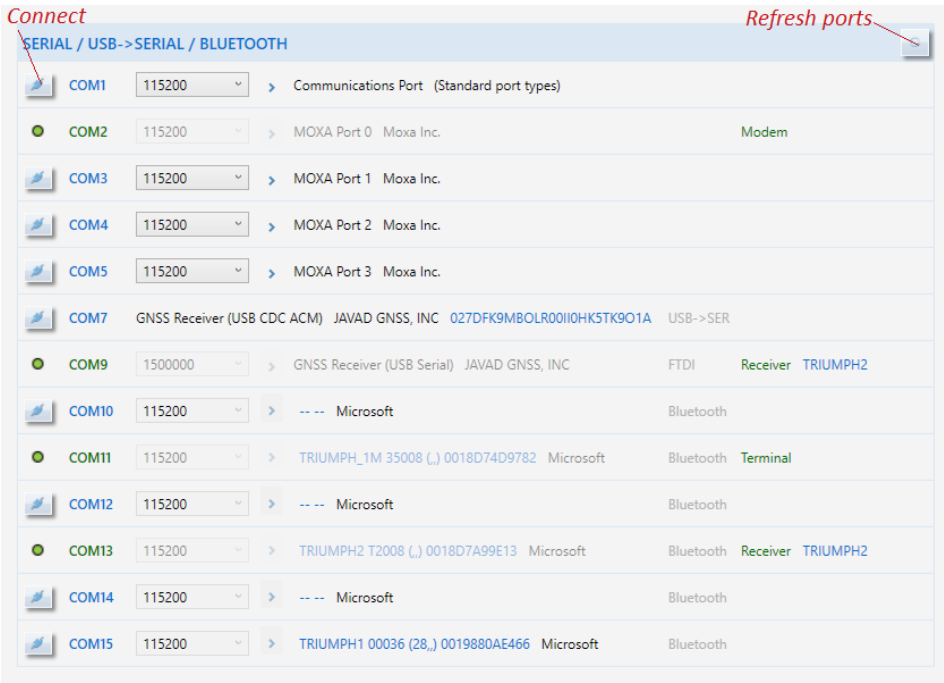
First TCP Connection

To connect the receiver with PC for the first time, the PC Ethernet Adapter must be configured as:

- Receiver IP Address: 192.168.2.3 (“3” - can be any in range of 3-63)
- Network mask: 255.255.255.192
- Default Gateway: 192.168.2.1

Serial Panel

The bidirectional communication with the device connected to the computer via the RS-232(422), USB cable or Bluetooth is established using Serial or Virtual Serial port.



Serial Connection panel

The *Serial* panel provides the list of the existing Serial and Virtual Serial ports.

The information about the connected device and driver is available for the virtual ports.

Set the following parameters for the physical, Bluetooth and FTDI ports:

- *Baud Rate* – specifies how fast data is sent over a serial line. Net View & Modem may not work well on the lowest rates. The rates higher than 115200 speeds must be enabled in OAF.
- *Advanced –>Rts/Cts* – transfer flow control parameter (request to send/ clear to send).
- *Connect* - establishes the selected connection.

The successfully established connections are marked by the green circle and are completed by the information about the device.

Virtual Serial Ports for the Bluetooth are created by the operating system automatically.

Before connecting a USB equipped JAVAD GNSS device with PC USB port, make sure that the USB Port option is enabled in the receiver and the JAVAD GNSS USB driver is installed on the computer.

Note: The drivers are available on the JAVAD GNSS website update page.

Installing Driver

The driver installation procedure varies slightly depending on the operating system used. In general, the installation procedure is as follows:

- Visit the JAVAD GNSS website. Download the USB driver.
- Unpack the archive into a separate, empty folder.
- Run `jgnssusb_x64L.exe or jgnssusb_x86L.exe` depends on PC Operating System Type.
- Connect the receiver to the computer through the supplied USB cable. Turn the receiver on.
- Windows will automatically detect the new hardware device. Follow the on-screen instructions to finish the installation process.

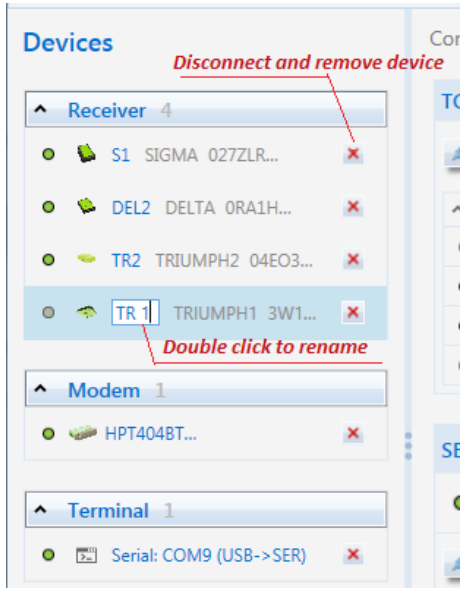
After Windows finishes installing the driver, you will be able to communicate the receiver connected to the computer via USB using the virtual serial port.

Devices Pane

After connecting successfully, the device is added to the corresponding group of *Devices* pane

The Device item displays:

- *Connection State* – green circle – connected, gray - disconnected;
- *Name* – is assigned by default first time. Double click to change. The name is stored and will be used next time.
- *Model, Identifier* – the model and ID of the receiver or modem.
- *Close* – to disconnect from the device, close device page and remove the device from the list.



Devices pane

Clicking on an item opens a device page in the right pane.

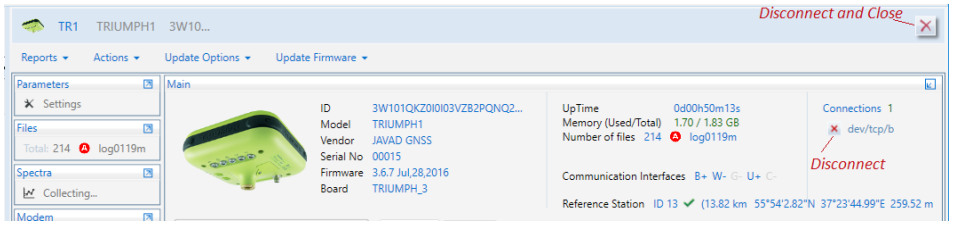
To disconnect from all devices and clear *Devices* pane, click the *Disconnect* button on the *Connection Board*.

Closing NetView & Modem

To close the device page click the *Close* button on the device page or in the *Devices* pane. Closing the page disconnects the device.

To disconnect from all devices, click the *Disconnect* button on the *Connection Board*.

To disconnect from the receiver, click the *Disconnect* button on the receiver page.



Disconnect and Close using the receiver page

If the device has not been disconnected by the time the program is terminated, the connection will be automatically broken before NetView & Modem is closed.

Note: It is strongly recommended to close the connection with the device before to switching the receiver off and disconnecting the cable.

GNSS Receiver

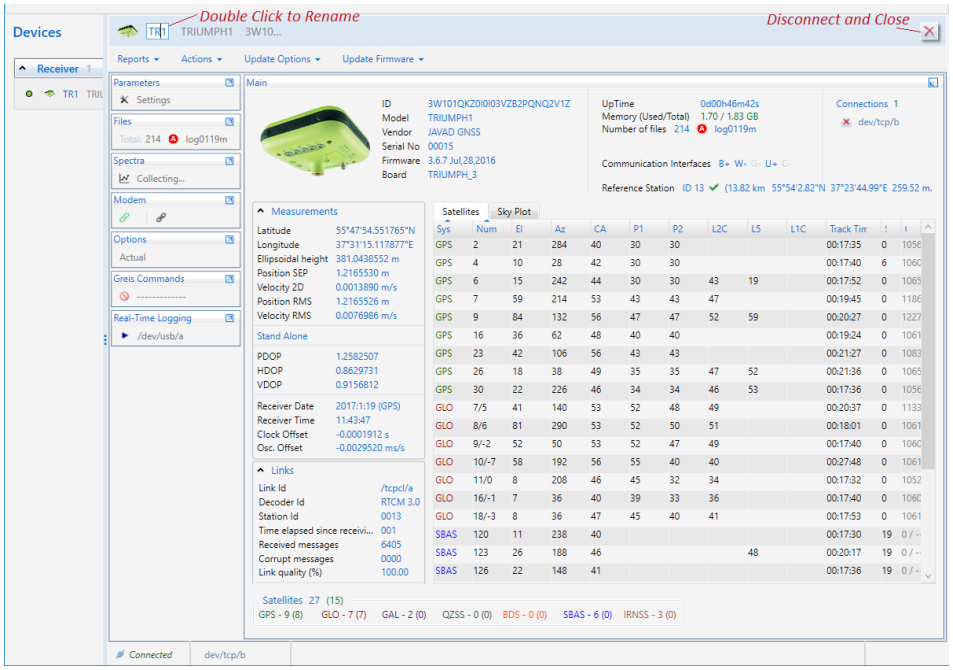
Operation

Connect to the receiver as described in *Getting Started* chapter.

Click on the item in *Receivers* list on *Devices* pane. The *Receiver* page will appear.

Receiver page allows controlling the different aspects of receiver's functionality and will be detail described in the next chapters.

Receiver page consists of the *Header, Menu Bar, Tile View* and *Status Bar*.



Receiver Page

Header:

- *Name* – is assigned by default first time. Double click to change. The name is stored and will be used next time.
- *Model, Identifier* - model and ID of the receiver or modem.
- *Close* – disconnect from the device, close device page and remove the device from the list on *Devices* pane.

Menu Bar:

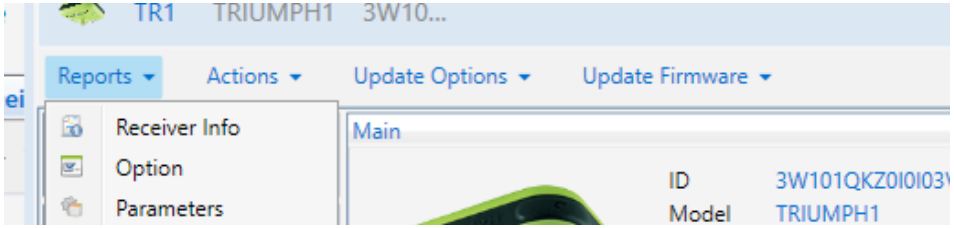
- *Reports menu* - Main info, options, and parameters reports;
- *Actions Menu* performs reset, init parameter, clear NVRAM, init file system, reset RTK actions to the receiver;
- *Update Options* allows updating receiver options online from Javad website or Option Authorization File (OAF).
- *Update Firmware* allows update GNSS firmware online from Javad website or a file;

Tiles:

- *Main* – receiver info, state parameters, connection state, measurements, satellites table, sky plots, orientation;
- *Parameters* – graphical interface for configuring the receiver;
- *Files* – operations with the files in receiver's memory;
- *Spectra* - graphical interface for the GNSS spectra;
- *Greis Commands* – manual mode terminal for the GREIS commands (see [2]);
- *Real-Time Logging* – logging jps or rtcm data to the PC memory;
- To expand (collapse) a tile click on the arrow at the top right corner.

Status Bar is located at the bottom of the page and displays connection state, current operation, and progress of the operation.

Reports



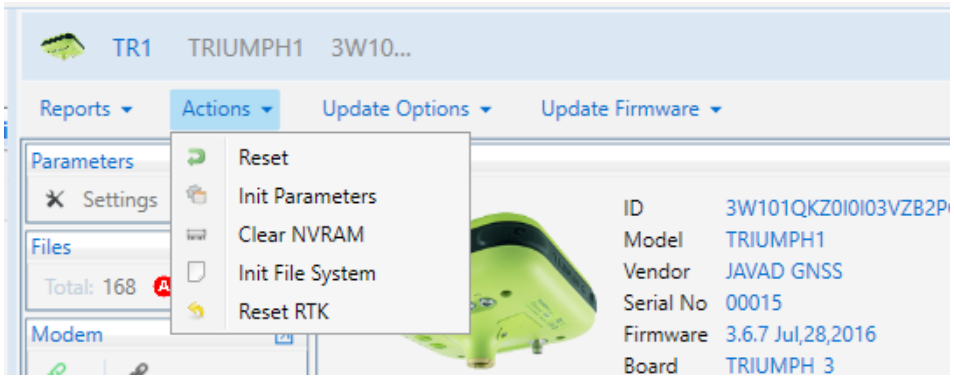
Reports

The following reports on the receiver can be generated:

- *Receiver Info* – receiver's characteristics, position and satellites table (Receiver Info described below and content of Measurements pane)
- *Options* – receiver's characteristics and list of options with current statuses (Receiver Info and content of Options tile)
- *Parameters* – receiver's characteristics and list of all parameters with values.

Select the desired report from the *Reports Menu* and the location for report saving in the *Save File* dialog which will be opened. The report will be created and saved in a text file.

Actions



Actions

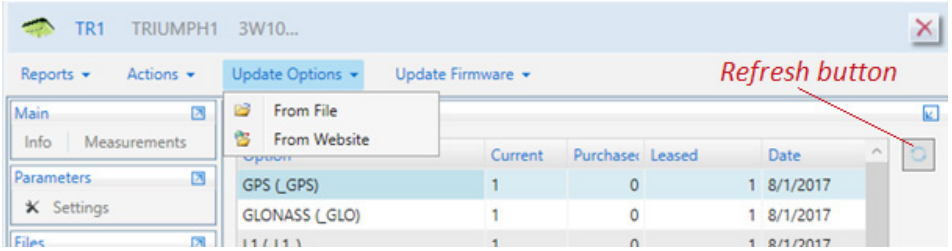
Initialization of the receiver can be performed using the following actions from the menu *Actions*:

- *Reset* – reset (reboot) the receiver. From a functional point of view, the reset is equivalent to turning the power off and then back on.
- *Init Parameters* – to set all receiver parameters to their default values.
- *Clear NVRAM* – to clear NVRAM and reboot receiver. All data stored in the NVRAM (almanacs, ephemeris, etc.) will be lost; all parameters will be set to their default values after reboot.
- *Init File System* - initializes the file system (i.e., reformat the underlying medium). All files stored in the receiver will be lost. The operation can take some time depends on the memory size. Its progress is shown in the bottom status bar.
- *Reset RTK*- to reset the RTK engine.

Update Options

The receiver options can be updated via the Internet or from the OAF.

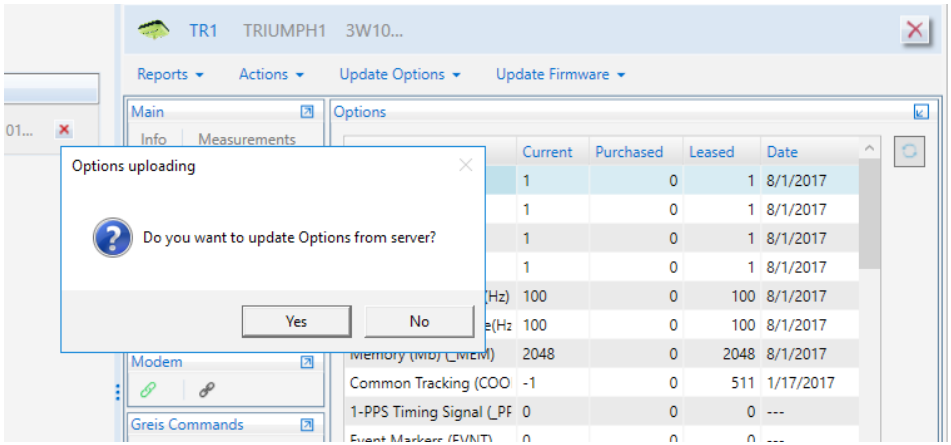
To see the actual options expand the *Options* tile. Clicking *Refresh* button requests options at the receiver and fills the list.



Options Updating

Uploading OAF via Internet

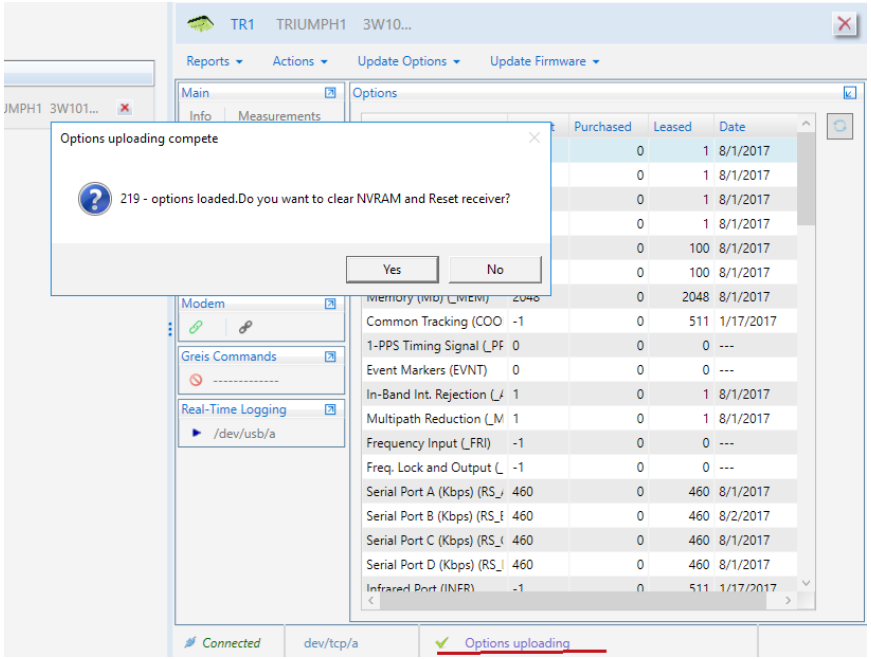
Click *From Website* to upload the options from the Internet and confirm the intention.



Updating Options via Internet

The status of the uploading is displayed in the status bar.

After the file is uploaded receiver NVRAM is cleared and then it is reset.



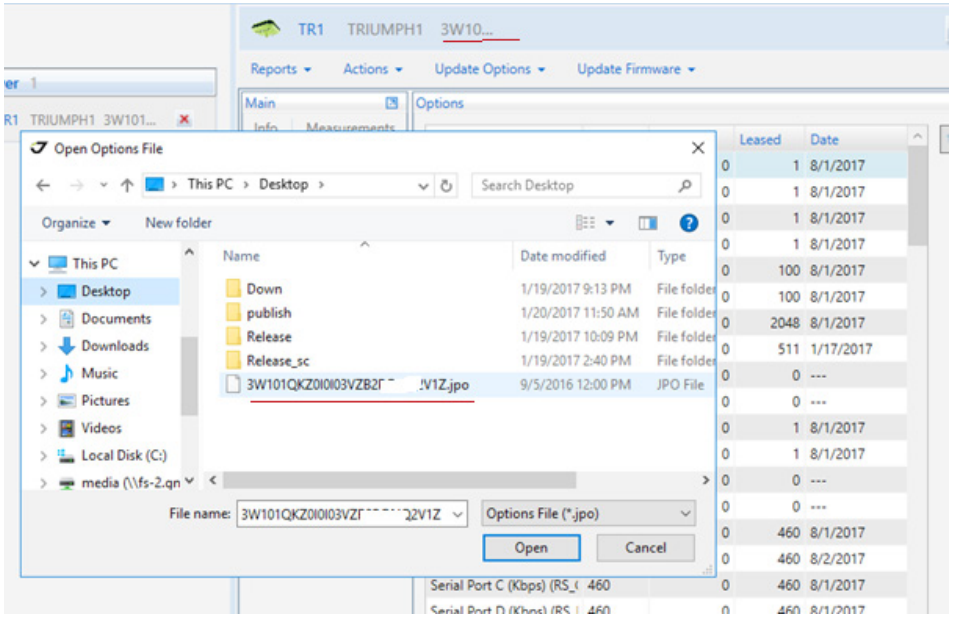
Options are uploaded

To see updated options, click *Refresh* after receiver reconnects.

Uploading OAF from File

Click the *From File* button and select `*.jpo` or `*.opt` file in *Open Options File* window. File name must correspond to the receiver identifier. Otherwise, the warning will be shown.

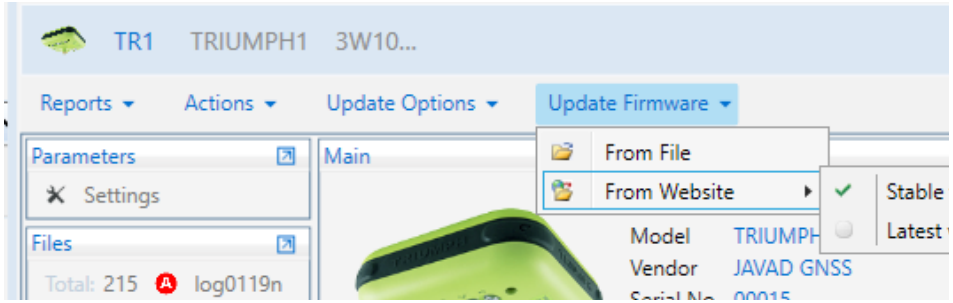
Uploading the options from the file is performing the same way as via the Internet.



Updating Options from jpo-file

Update Firmware

The receiver's firmware can be updated from the file or via the Internet.



Update Firmware

Updating from the file

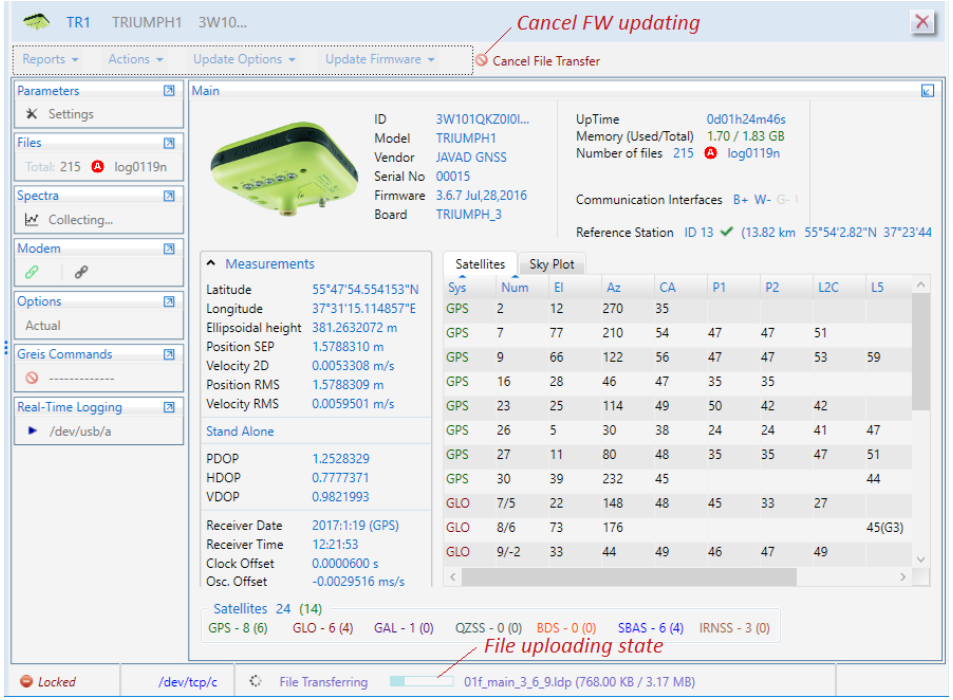
Select the *From File* item and then the firmware file using *Open File* dialog window. If the firmware is suitable to the receiver model and has the newer version, the file uploading will be started. Otherwise, the warning appears.

Updating from Internet

Select *From Website* ▸ *Stable version* to load last stable firmware or ▸ *Last version* to load last available firmware. Both versions are available on JAVAD website [3].

After firmware file is downloaded from the site, the file uploading will be started.

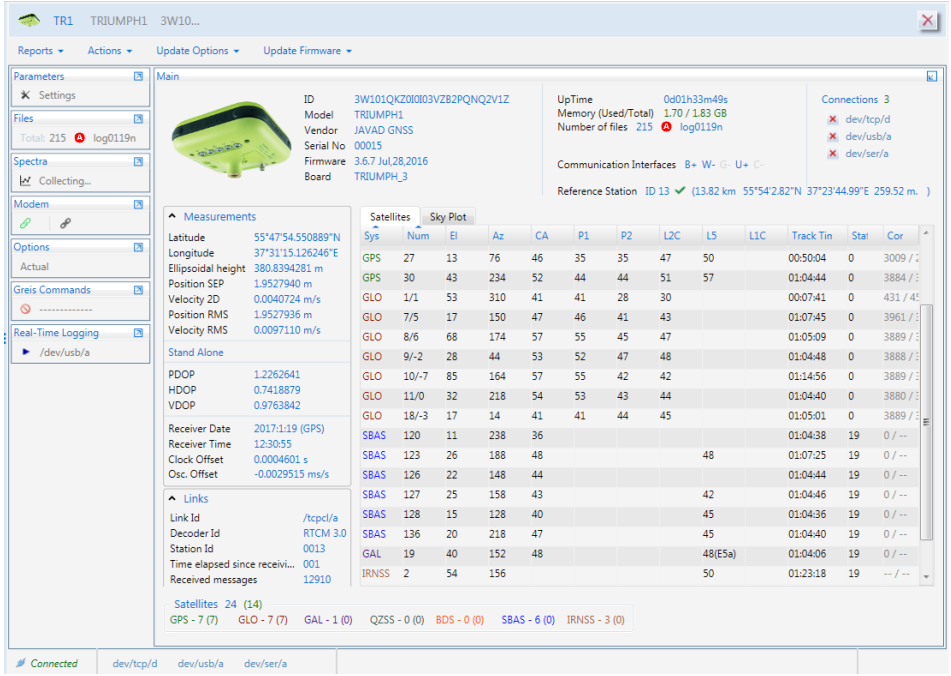
Status bar at the bottom of the window shows the progress. When every part of the firmware is uploaded the receiver reboots and reconnects. To cancel the firmware updating click *Cancel File Transfer*.



Firmware Updating

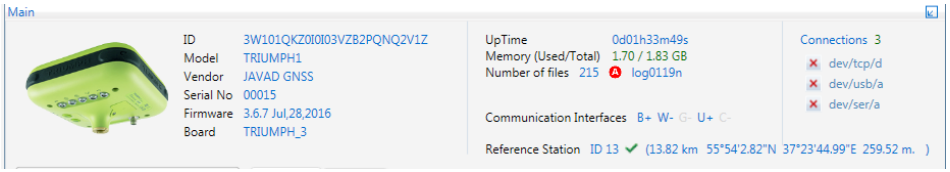
Monitoring

The *Main* Tile shows the appearance of the receiver, its characteristics, available connections, and the set of the panes and tabs for monitoring the measurements such as *Measurements, Links, Satellites, Sky plots, Orientation, Angle* and *Base Lines*.



Receiver Main Tile

Receiver Info



Receiver info

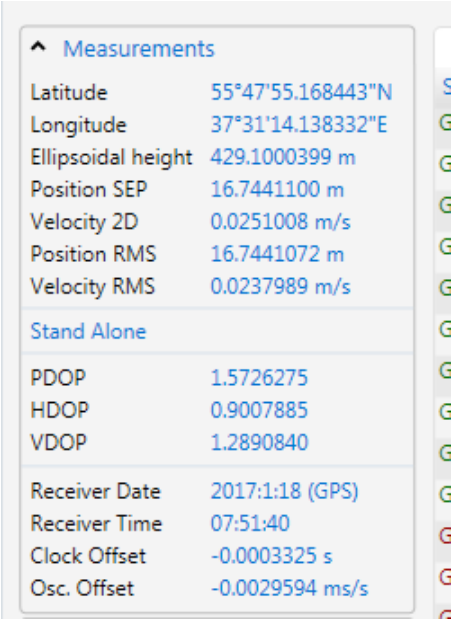
Receiver *Main tile* provides the following information:

- *Image* of the receiver.
- *Receiver Id* - Receiver's identifier.
- *Model* - The model of the receiver, e.g., `TRIUMPH1`
- *Vendor* – JAVAD GNSS.
- *Serial Number* - a number assigned to the receiver on the factory.
- *Firmware Version*
- *Board Version*
- *UpTime* - Time elapsed since last receiver reboot.
- *Memory* (Used/Total) – Used /Available Memory.
- *Number of files* – number of files in the receiver memory and recording status.
- *Communication interfaces* – indicates whether the following communication interfaces are available and enabled:
  - B - Bluetooth
  - W - Wi-Fi
  - G - GSM
  - U - UHF / FH
  - C - Communication Board (for TVS)
- *Reference station* – reference station ID, distance, position and GPS validity are displayed if corrections are received.
- *Connections* – amount and type of not locked connections. Connections are locked for the file transferring, manual mode, daisy chain, real time logging. Locked connections cannot be closed and displayed in the status bar (dark blue for the file transferring, red for others).

Note: The static parameters can be copied to clipboard by double clicking.

Measurements

The *Measurements* pane displays the basic tracking information for the locked satellites. It shows the receiver target point current position, coordinates and the time-frequency parameters describing the behavior of the receiver's local oscillator.



Measurements

Navigation information

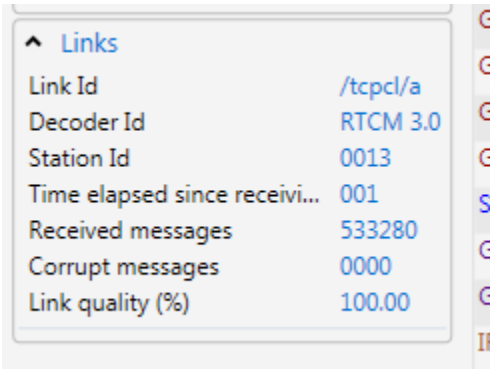
- *Latitude, Longitude, Ellipsoidal height* - geodetic coordinates1
- *Position SEP* - Spherical Error Probable
- *Velocity 2D* - Geodetic Velocity (m/s).
- *Position RMS* - position RMS error2 (m).
- *Velocity RMS* - velocity RMS error (m/s).
- *Solution type* - Standalone / DGPS /RTK float / RTK fixed
- *PDOP* - Position dilution of precision.
- *HDOP* - Horizontal dilution of precision.
  - *VDOP* - Vertical dilution of precision.
- *Receiver date* - the “date” part of the full receiver time representation ([RD] message).
- Receiver time shows the receiver’s current time within day. This value is taken from the message [~~]. For more information about [~~].

Note: Currently the message [~~] reports the time within day in the GPS time scale only.

- *Clock offset* - describes the time derivative of (Trr - Tr), where Tr designates the receiver time, Trr designates the receiver reference time. This parameter is obtained from the [TO] message and is expressed in seconds.
- Osc. Offset is derived from the message [DO] and it is expressed in ppt. The parameter describes the difference between the VCO nominal and quiescent frequencies.

Note: For detailed description of the messages used for navigation information see [2 Chapter 3. Receiver Messages].

Links



Links

The *Links* pane displays the status of the data links associated with the corresponding serial ports/modem.

For each link the following fields are shown:

- *Link Id* - Corresponding stream;
- *Decoder Id* – RTCM / RTCM 3.0 / CMR / JPS / SISNeT;
- *Station Id* – Reference station identifier;
- *Time elapsed since…* - Time [in seconds] elapsed since receiving last message (maximum value = 999). Estimated with an accuracy of ±1 second.
- *Received messages* - The number of the received messages (be-

1 These geodetic coordinates are computed in WGS 84 regardless of the current value of /par/pos/datum/cur.

2 More precisely, this is the square root of the trace of the position error variance-covariance

tween 0001 and 9999). If no message has been received, this data field contains zero.

- *Corrupt messages* - The number of corrupt messages (between 0001 and 9999). If no corrupt messages have been detected, this data field is set to zero.
- *Link quality (%)* - The data link quality in percent (0-100)

Number of Satellites

Satellites 22 (14)
GPS - 10 (9) GLO - 6 (5) GAL - 2 (0) QZSS - 0 (0) BDS - 0 (0) SBAS - 1 (0)

Number of Satellites

Number of satellites pane shows:

- The total number of the locked satellites.
- The number of the locked satellites for each satellite system.
- The number of satellites used in the position calculating (in parentheses)

For the multi antenna receiver the *Number of satellites* pane contains the information for each antenna.

Satellites

a 23 (10)	GPS - 13 (5)	GLO - 10 (5)	GAL - 0 (0)	QZSS - 0 (0)	BDS - 0 (0)	SBAS - 0 (0)	IRNSS - 0 (0)
b 20 (0)	GPS - 11 (0)	GLO - 9 (0)	GAL - 0 (0)	QZSS - 0 (0)	BDS - 0 (0)	SBAS - 0 (0)	IRNSS - 0 (0)
c 23 (0)	GPS - 13 (0)	GLO - 10 (0)	GAL - 0 (0)	QZSS - 0 (0)	BDS - 0 (0)	SBAS - 0 (0)	IRNSS - 0 (0)
d 18 (0)	GPS - 10 (0)	GLO - 8 (0)	GAL - 0 (0)	QZSS - 0 (0)	BDS - 0 (0)	SBAS - 0 (0)	IRNSS - 0 (0)

Multi Antenna Number of satellites

Satellite Table

Satellites | Sky Plot

Select All
GPS
GLO
SBAS
GAL
IRNSS
Apply Clear Cancel

Sys	Num	El	Az	CA	P1	P2	L2C	L5	L1C	Track Tin	Status	Cont.T
							33	43		00:00:16	0	16 / --
					12	12	40	47		00:00:43	0	43 / 16
							19	38		00:00:24	23	0 / --
										00:00:05	0	4 / --
								39		00:04:54	19	-- / --
										00:06:02	0	43 / --
										00:00:24	0	24 / --
GPS	23	46	234	33						00:00:03	23	2 / --
GPS	25	14	36	20						00:00:00	23	0 / --
GPS	31	46	78	43	16	16	35			00:00:35	0	35 / 28
GPS	32	6	64	34			29	38		00:00:13	0	12 / --
GLO	4/6	31	84	33			30			00:00:02	0	2 / 2
GLO	5/1	78	16	30	33		30			00:00:28	23	2 / 21
GLO	6/-4	31	282	24			22			00:00:00	23	0 / --
GLO	15/0	34	124	29	29		26			00:00:04	23	4 / 3
GLO	21/4	41	286	36	35		29			00:01:04	0	60 / 40
GLO	22/-3	18	342	36	35		26			00:00:11	0	11 / 11
GLO	26/-5	26	232	40				45(G3)		00:00:18	19	0 / --
SBAS	123	26	188	34				36		00:00:43	19	0 / --
GAL	9	62	264					40(E5a)		01:53:43	19	-- / --
GAL	22	23	320	44				46(E5a)		00:00:56	19	0 / --

Satellite Table

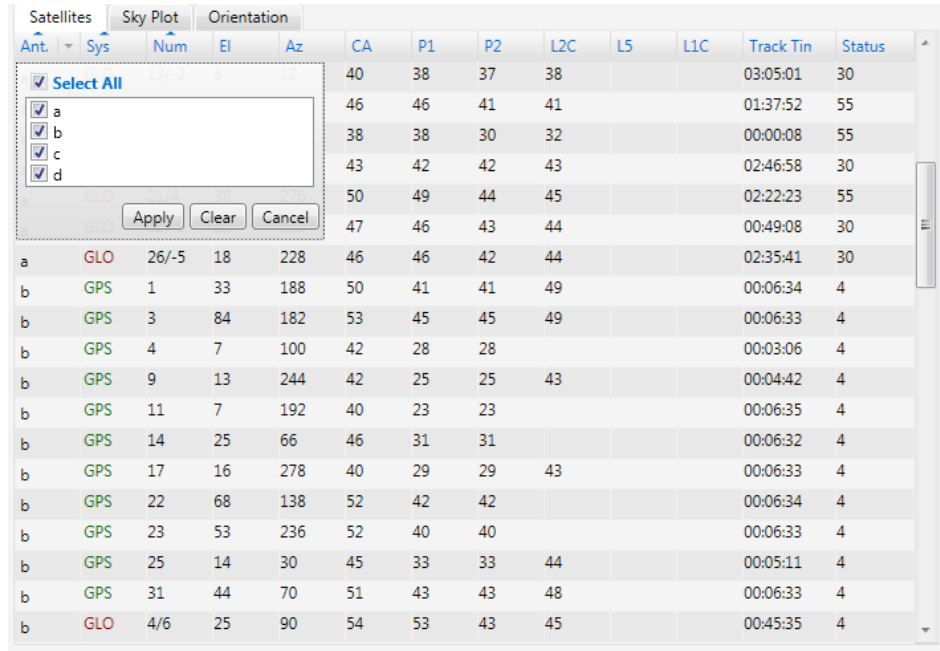
Parameter	Description
Sys	Satellite System: GPS GLO - GLONASS GAL - GALILEO SBAS QZSS BDS - BeiDou (COMPASS) IRNSS Satellite systems are marked by different colors
Num	SV PRN SV PRN / SV Frequency Number for GLONASS. If the character "*" is shown next to PRN in the column, this means that almanac data are unavailable for the corresponding satellite
EL	Elevation angle in degrees.
AZ	Azimuth in degrees

CA	Signal-to-noise ratio [dB*Hz] C/A – GPS, QZSS L1 - SBAS E1 (B + C) – GALILEO CA/L1- GLONASS B1-1 - BeiDou (COMPASS)
P1	Signal-to-noise ratio [dB*Hz] P1 – GPS, GLONASS SAIF - QZSS E5 – GALILEO
P2	Signal-to-noise ratio [dB*Hz] P2 – GPS, GLONASS LEX (P + D) - QZSS E5B (I + Q) – GALILEO
L2C	Signal-to-noise ratio [dB*Hz] L2C – GPS, QZSS E6 (B + C) – GALILEO CA/L2- GLONASS B3 - BeiDou (COMPASS)
L5	Signal-to-noise ratio [dB*Hz] L5(I + Q) – GPS, QZSS L5 - SBAS E5A (I + Q) – GALILEO L3 (I + Q) – GLONASS B2 - BeiDou (COMPASS)
L1C	Signal-to-noise ratio [dB*Hz] L1C (I + Q) – GPS, QZSS
Track Time	Time elapsed since the last loss-of-lock in the C/A channel for the corresponding satellite. This time is given in minutes or, if the symbol ":" is specified in the column, in seconds.
Status	Satellite navigation status. For a complete description of the satellite navigation status structure, see [2, Table 3-4. Satellite Navigation Status].

Table 1. Tracking Parameters

Each column of the table can be sorted. *Sys* and *Num* columns can also be filtered by value.

The *Satellite* table for multi antenna receiver has also antenna column supporting sorting and filtering.



Ant.	Sys	Num	El	Az	CA	P1	P2	L2C	L5	L1C	Track Tin	Status
					40	38	37	38			03:05:01	30
					46	46	41	41			01:37:52	55
					38	38	30	32			00:00:08	55
					43	42	42	43			02:46:58	30
					50	49	44	45			02:22:23	55
					47	46	43	44			00:49:08	30
a	GLO	26/-5	18	228	46	46	42	44			02:35:41	30
b	GPS	1	33	188	50	41	41	49			00:06:34	4
b	GPS	3	84	182	53	45	45	49			00:06:33	4
b	GPS	4	7	100	42	28	28				00:03:06	4
b	GPS	9	13	244	42	25	25	43			00:04:42	4
b	GPS	11	7	192	40	23	23				00:06:35	4
b	GPS	14	25	66	46	31	31				00:06:32	4
b	GPS	17	16	278	40	29	29	43			00:06:33	4
b	GPS	22	68	138	52	42	42				00:06:34	4
b	GPS	23	53	236	52	40	40				00:06:33	4
b	GPS	25	14	30	45	33	33	44			00:05:11	4
b	GPS	31	44	70	51	43	43	48			00:06:33	4
b	GLO	4/6	25	90	54	53	43	45			00:45:35	4

Multi Antenna Satellite Table.

Sky Plots

The *Sky Plot* tab shows the graphic representation of the satellite positions in the sky.

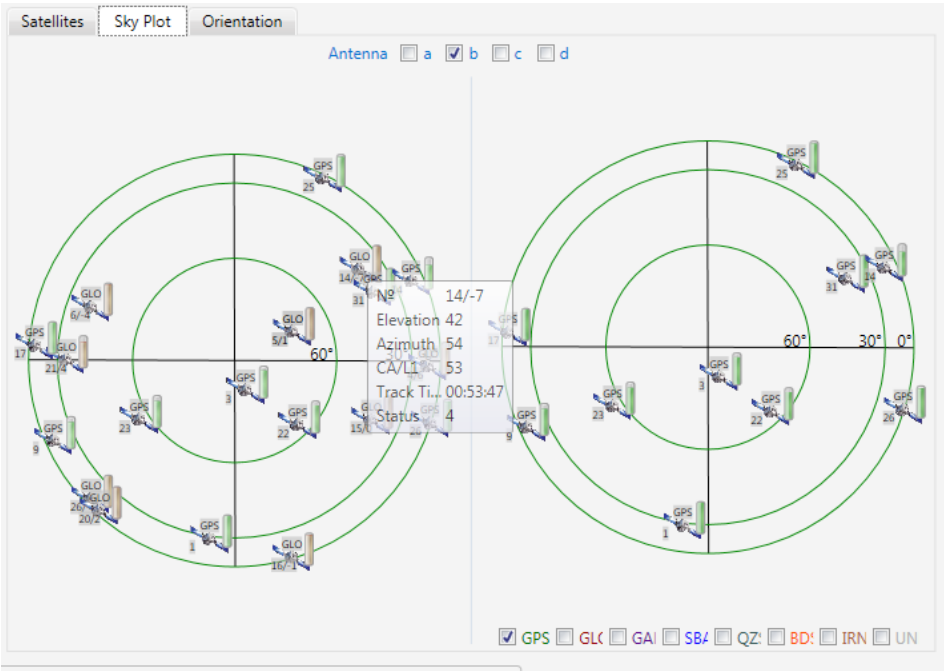
Sky Plots

Each concentric circle represents the elevation angle above the horizon. The external circle corresponds to 0 degrees above the horizon. The center of the sky plot represents 90 degrees above the horizon.

The satellite markers for different systems are shown by the different colors. The degree of filling of marker reflects the value of the signal-to-noise ratio. Satellite info is shown when mouse is over it.

The flags on the right allow the user to select the desired systems to be displayed on the right plot.

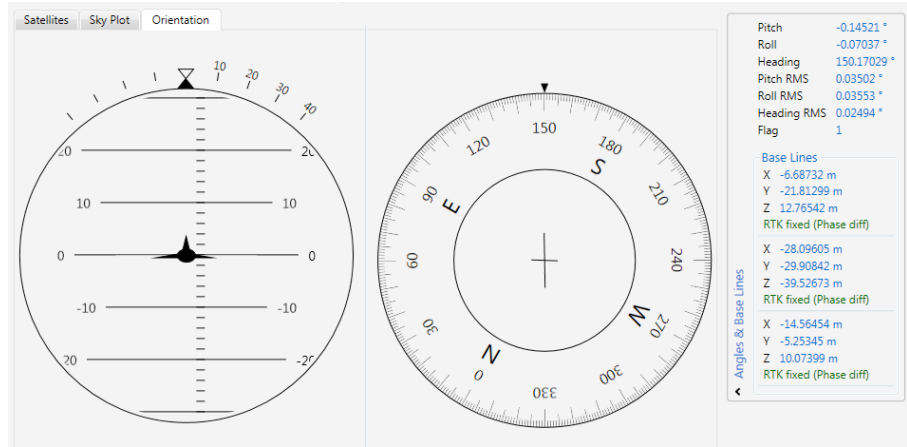
The Multi Antenna sky plots are provided by the antenna filter.



Multi Antenna Sky plots

Orientation, Angels and Base Lines

This information available for multi antenna systems only and displays the orientation of the system.



Orientation tab

The following parameters are shown and obtained from the messages:

[AR]([ha]):

- Time - the receiver time [ms]
- Pitch - the pitch angle [deg] (graphically presented on the left plot)
- Roll - the roll angle [deg]
- Heading - the heading angle [deg] (graphically presented on the right plot)
- Pitch RMS - the pitch angle RMS [deg]
- Roll RMS - the roll angle RMS [deg]
- Heading RMS - the heading angle RMS [deg]
- Flag- 0 - no data available / 1 - data are valid

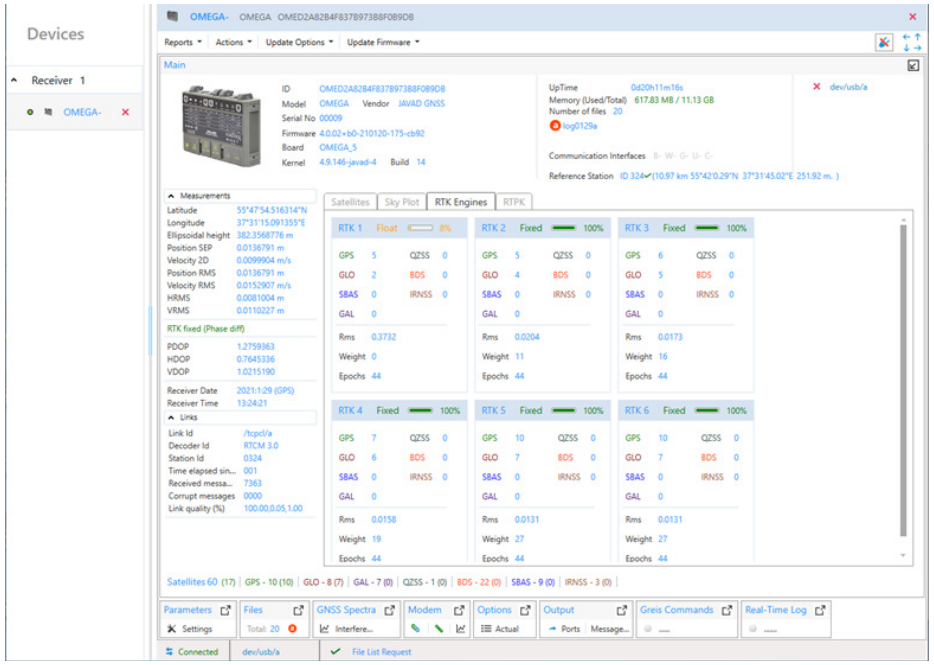
[mr] ([BL])- Baseline vectors:

- AB code diff - baseline vector M-S0 in the current epoch[m]
- AC code diff - baseline vector M-S1 in the current epoch[m]
- AD code diff - baseline vector M-S2 in the current epoch[m]

The *Pitch* value is also represented on the left plot and *Heading* on the right.

Multi-RTK

RTK Engines tab is available if Multi Rtk Mode is on and RTCM3 corrections are receiving.



RTK Engines tab

Each engine is shown in separate box and the following data are provided:

- Engine number.
- Solution.
- Progress (%).
- Satellite count for each satellite system used by engine.
- RMS value.
- Weight of the engine in the resulting solution.
- Epoch count.

RTPK

RTPK - Real Time Postprocessed Kinematics (RTPK) solution - is available for firmware beginning with 4.0.2.0 and requires the RTPK option.

User interface is provided in NetView & Modem 2.2.5.4 or higher.

Short description of RTPK

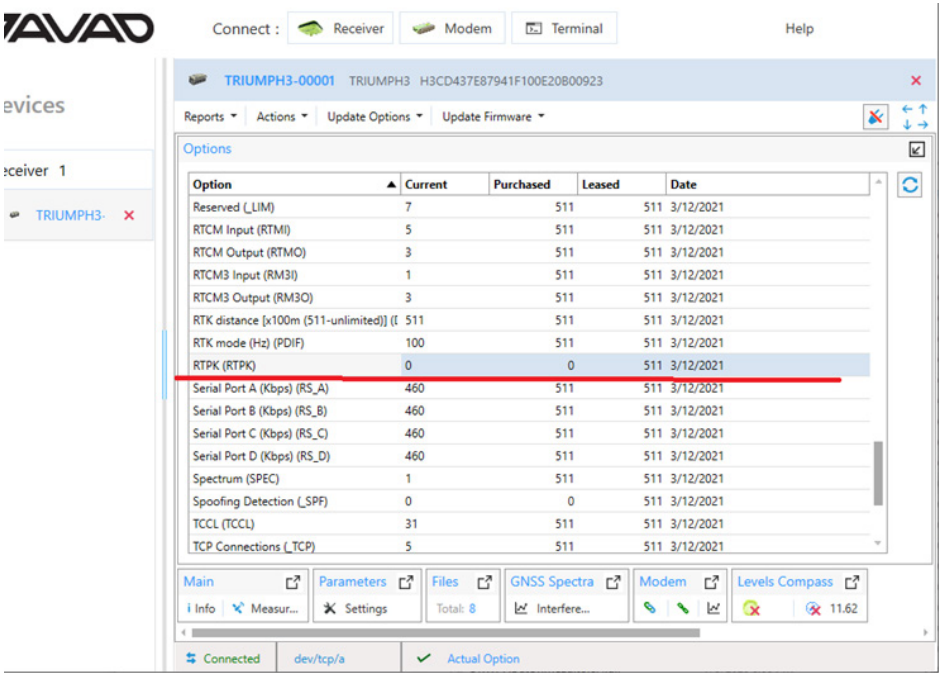
Receiver supports running phase-differential post-processing engine and gathering its results. Only static occupations could be meaningfully processed this way.

Current requirement is availability of suitable RTCM3 corrections.

This is performed by storing all the needed data into a file on receiver, processing of the file by RTPK engine tool, monitoring the process and result, and finally downloading RTPK report file from receiver.

RTPK Option

RTPK is available if RTPK option is loaded. Option can be checked on the tile “Options”.

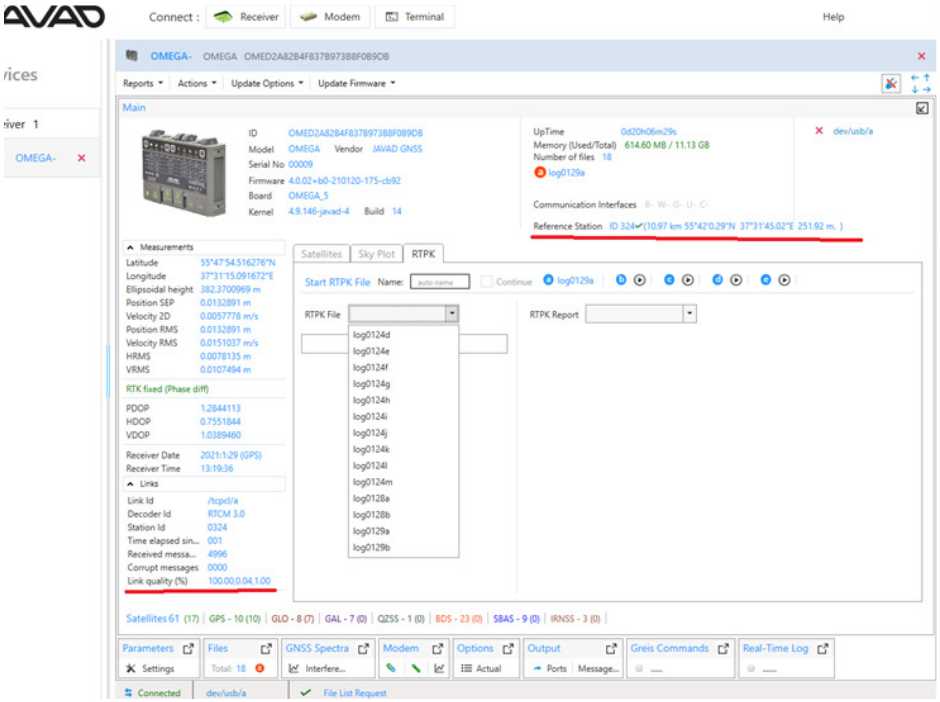


RTPK Option

User interface for RTPK is on Main tile -> tab RTPK.

RTPK Tab

Select Main tile. Make sure that rover receives RTCM3 corrections from a reference station and the quality of the link is high. Select RTPK tab.



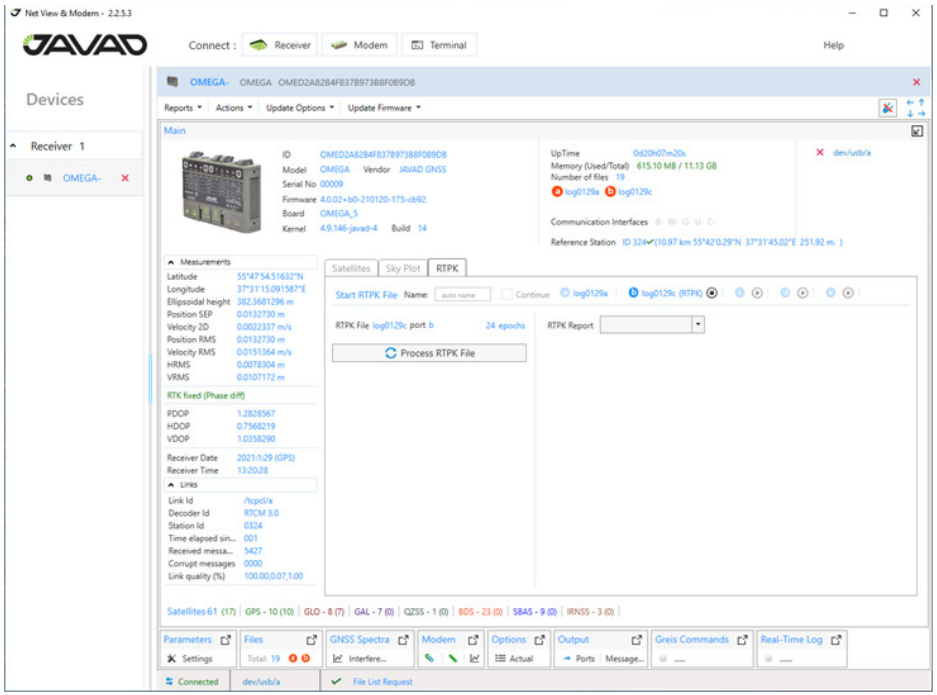
RTPK Tab

The following functionality is provided:

- Start new RTPK-file on any free port.
- Continue existing RTPK-file.
- Process RTPK-file.
- Get RTPK-report.
- Download RTPK-report.

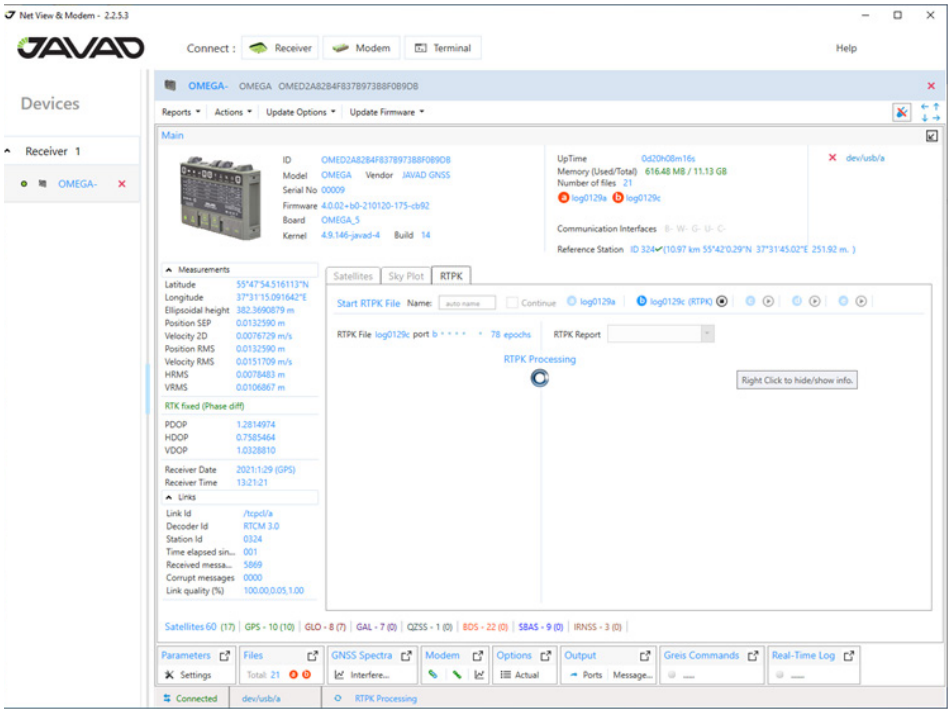
To start new RTPK type name to the Name textbox or leave auto name and click Start button near desirable free file-port (a,b,c,d,e).

To continue RTPK-file type name of the existing RTPK-file, check Continue flag and click Start button near desirable file-port. If Continue flag is not checked file will be overwritten.

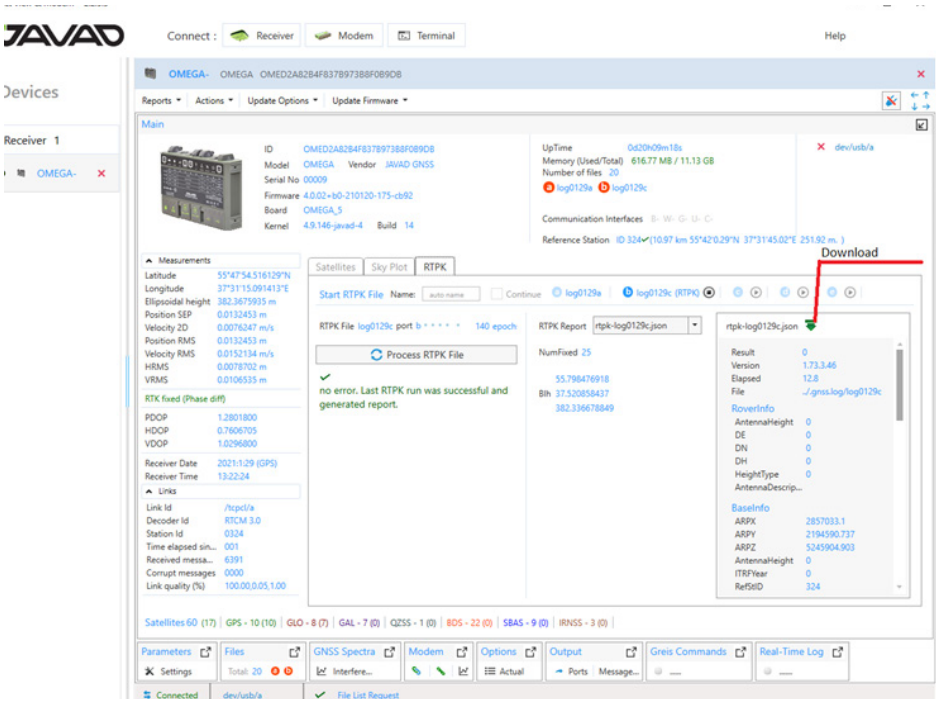


RTPK-File log0129c is recorded on the port b. It is available for the processing

If the RTPK-file is currently being recorded, only it can be processed. Otherwise, first select the file from the dropdown list. Click button “Process RTPK-file”.



RTPK-File processing



RTPK-File processed. No error information, BLH and raw report

After processing is finished RTPK information about result, BLH and raw report is output. NumFixed > 0 means that fixed epochs are in the file.

If processing is unsuccessful the following error code can be output.

31: “RTPK tool does not exist or is not executable”;

32: “input file for RTPK does not exist or is not readable”;

33: “error creating working environment for RTPK (e.g., dedicated working directory or changing there)”;

40-50: “exit code of RTPK tool”;

Download button is in the header of the raw report. Report is saved as json-file.

Configuring the Receiver

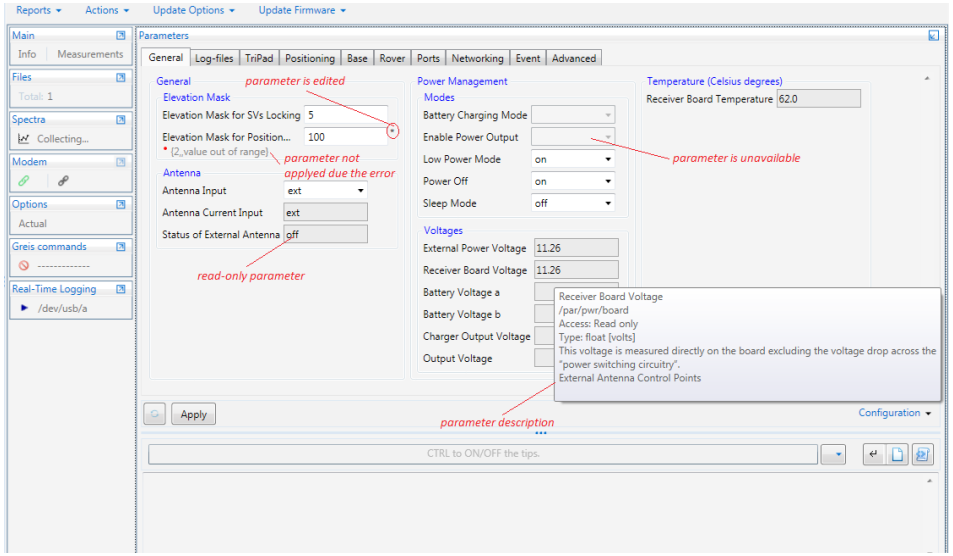
Graphical user interface for working with the receiver parameters

Expand the *Parameters Tile* of the receiver to open the Parameters window.

The *Parameters* window provides the convenient graphical interface to view and change the settings of the receiver.

Note: All parameters are grouped on the tabs according to the aspect of the behavior and fully match to GREIS Manual [2]. The graphical user interface for working with the receiver parameters.

The representation of each parameter is determined by the type, facility of access and availability. The detailed description coincides with Greis Manual [2] and appears when the mouse is over the parameter. Read-only parameters are gray. Parameters which are not available for this model of the receiver are gray and empty.



Parameters Tile

Depending on the type of the parameter, a new value can be typed to text box, selected from the drop-down or checked. Edited parameter is marked by the *-sign and it is not set to the receiver until Apply button clicked. Apply action sets all edited parameters of all tabs to the receiver. If the receiver is not able to set new value error response is displayed under the parameter. Some settings come into effect after restarting. The confirmation dialog appears in this case. If it is confirmed receiver resets and reconnects.

To get the current values for the parameters on the selected tab click Refresh. Read-only parameters are refreshed every 10s even without manual refreshing.

The *Configuration* button saves/loads all parameters to the tcl-script. It is described below.

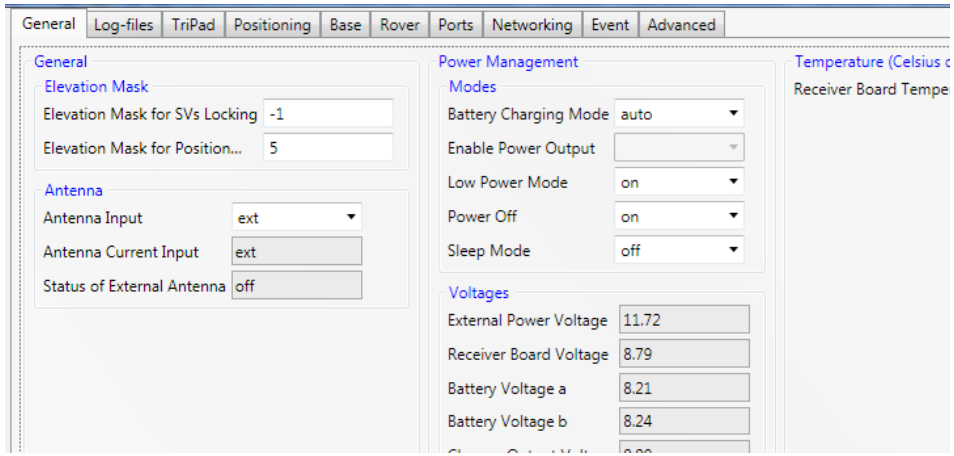
The location of the parameters on the tab varies when resizing the main window.

The Parameter tabs

Each parameter tab is detailed described below. The references to corresponding chapters of the GREIS Manual are given for each group of parameters.

General

The *General* tab shows the most common settings.

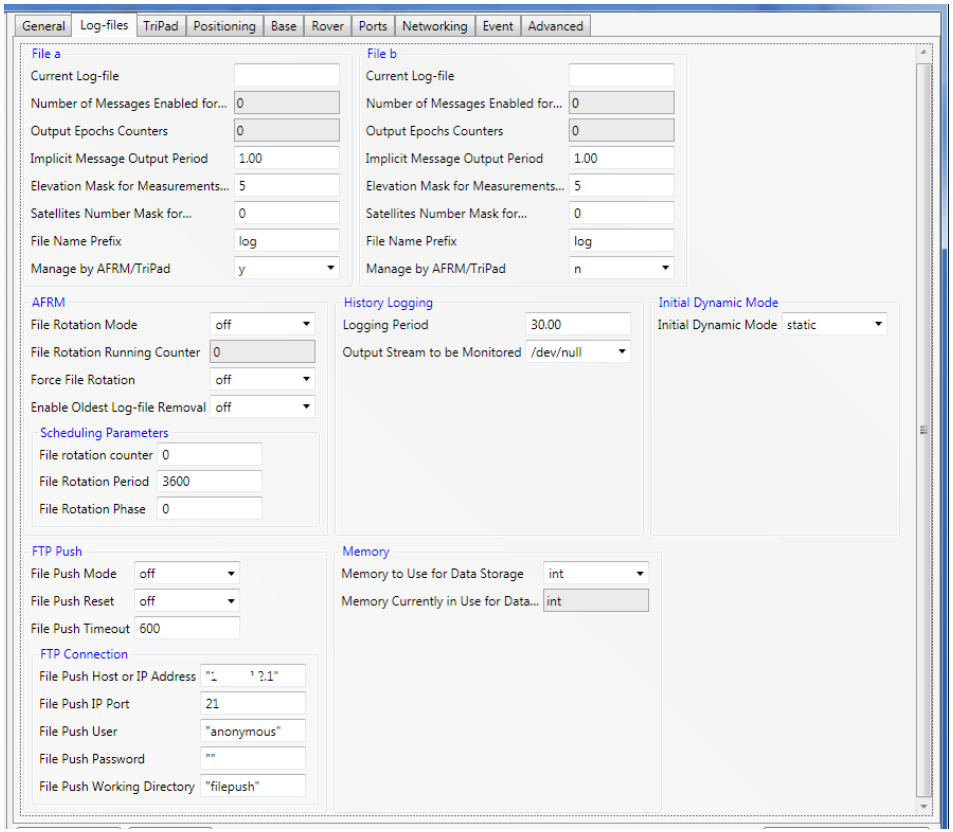


General parameters

- General - [2, 4.4.4. Measurements Parameters]
  - Elevation mask – Elevation masks for SVs locking and for Position Computation - [2, Satellites Tracking Parameters].
  - Antenna - [2, Antenna Input Parameters].
- Power Management - [2, 4.4.28 Advanced Power Management]
  - Modes – power control modes.
  - Voltages – power statuses (all are read-only).
- Temperature - board temperature (C °, read-only) – [2, 4.4.35 Miscellaneous parameters].

Log-Files

The *Log-files* tab contains parameters for file managing [2, 4.4.20 File Management, 4.4.16 Parameters of Generic GREIS Messages].



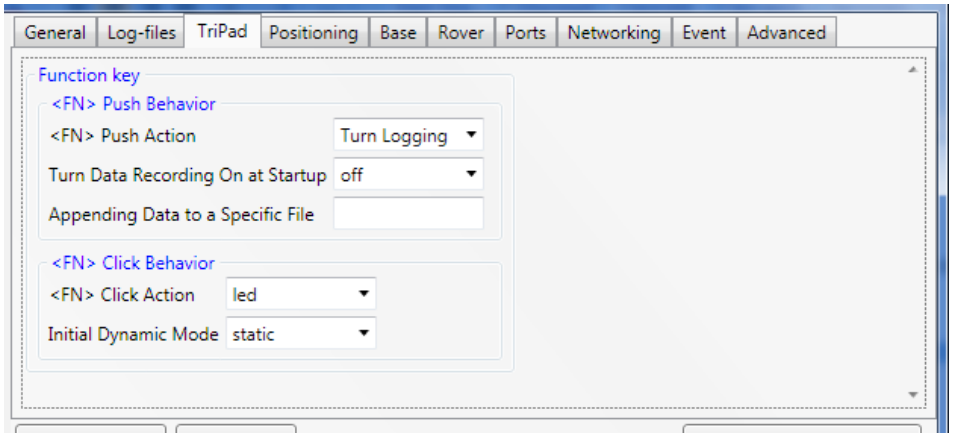
Log-File parameters

The following parameter groups are available:

- *File a, File b* – setting for configuring the output to File A (File B) - [2, Existing Files, Current Log-files, Masks and Counters, Implicit Output Parameters].
- *AFRM* – the settings for the automatically rotating the log-files according to the user-defined schedule. [2, Automatic File Rotation Mode (AFRM)].
- *History Logging* - the settings for thehistory logger which collects and records statistical information. [2, Logging History].
- *Initial Dynamic Mode* - specify the initial mode for all of the new files opened through TriPad. - [2, 4.4.29 TriPad Parameters].
- *FTP Push* – settings for automatically putting log-files to an external server.- [2, File Push Parameters].
- *Memory* – int (internal), ext (SDCARD) Data Storage. Available for the receiver with external memory. - [2, File-system Parameters].

TriPad

The *TriPad* tab provides the parameters for configuring the TriPad user interface of the receiver.

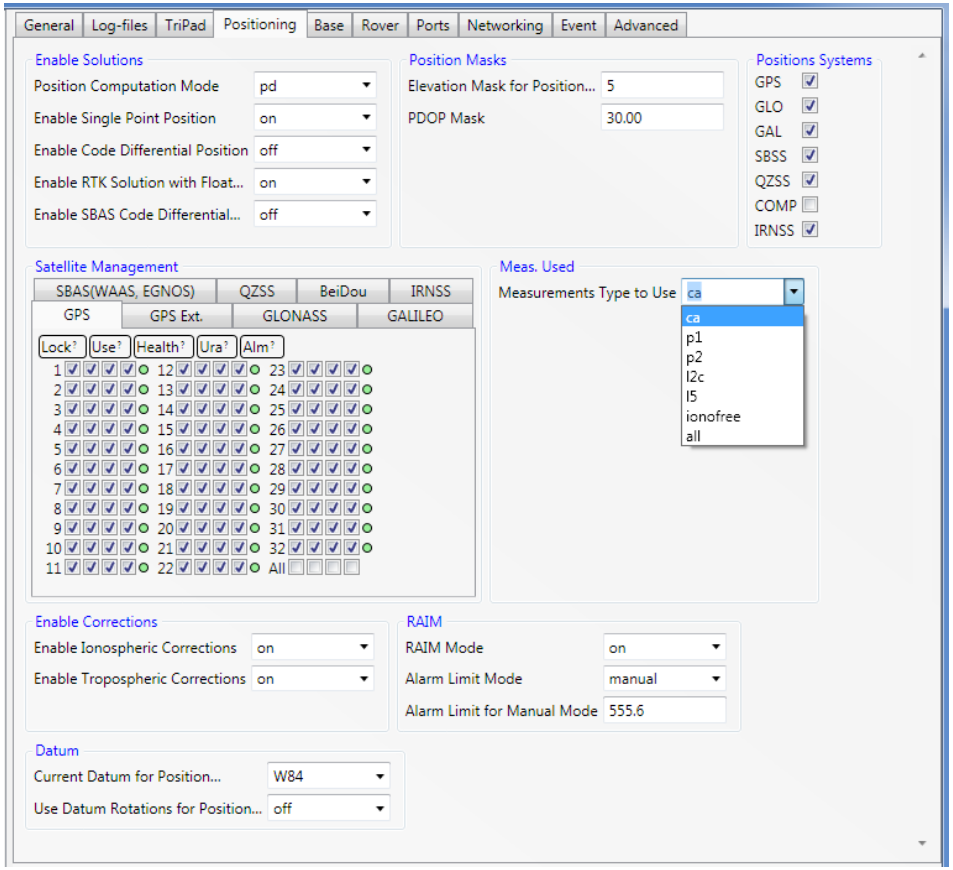


TriPad parameters

- *Function key* - [2, 4.4.29 TriPad Parameters].

Positioning

The *Positioning* tab allows the user to select satellites to track, to specify which measurements to use in position computation and to enable solution mode. Since most of these parameters are described in the chapter [2, 4.4.6 Positioning Parameters] only the subtitles are shown below.



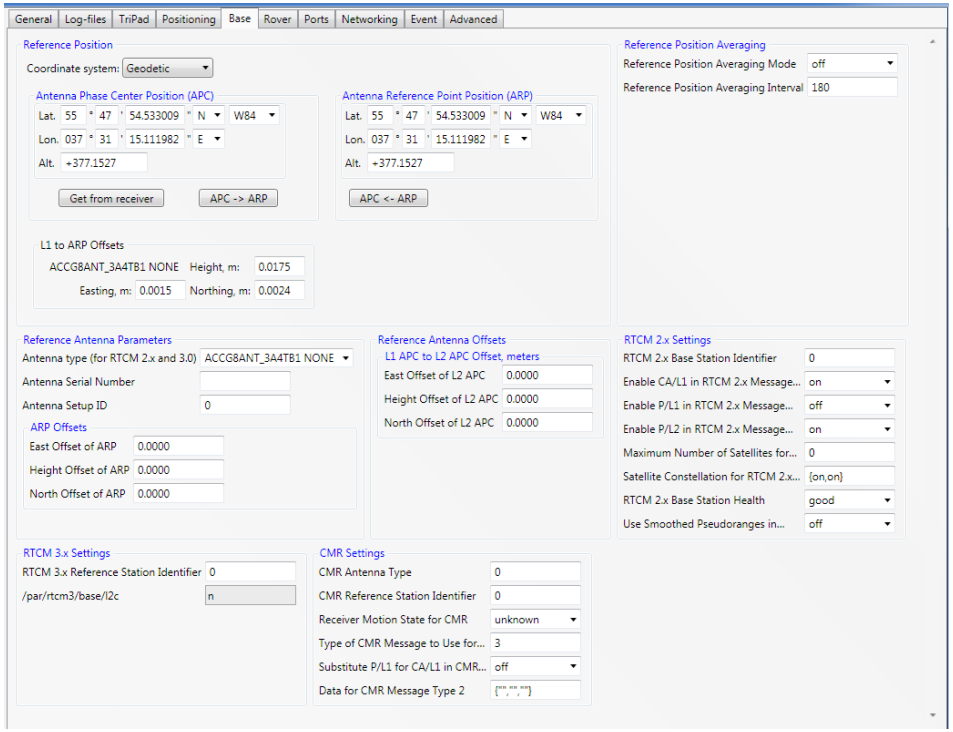
Positioning parameters

The following parameters can be queried and changed:

- *Enable Solution* – to configure the position computation.- [2, Generic Positioning Parameters].
- *Position Masks* – the elevation mask for satellites and PDOP limited the position computation. - [2, Generic Positioning Parameters].
- *Positions Systems* - to select satellite constellation(s) used for position computation. - [2, Enable Satellite System].
- *Satellite Management* – the set of the similar tabs for each GNSS system. The tabs contain check boxes for enabling/disabling
  - *Lock* – locks the receiver to track satellites by their PRN. [2, Satellites Tracking Parameters].
  - *Use* – using of GNSS satellite number N for position computation. - [2, Generic Positioning Parameters].
  - *Health* - to excluding satellite number N from position computation when the satellite is unhealthy. - [2, Generic Positioning Parameters].
  - *Ura* – to exclude satellite number N from position computation when URA value exceeds the limit specified by URA mask parameter. - [2, Generic Positioning Parameters].
  - *Alm* - the green circle to the right of the check boxes indicates that the almanac is available for the satellite. [2, 4.4.5 Almanac Status].
- *Meas. Used* - specifies which measurements receiver will use for single point position computation. [2, Generic Single Point Parameters].
- Enable Corrections- the receiver will correct the measured pseudo-ranges for enabled corrections. [2, Generic Single Point Parameters].
- RAIM – settings for the receiver autonomous integrity monitoring. [2, RAIM Parameters].
- Datum - settings of the datum that will be used for position computation. [2, Datums].

Base

The *Base* tab provides the capabilities to configure the receiver as a Reference Base Station and also allows getting receiver coordinates. Most of these parameters are described in [2, 4.4.9 Reference Parameters, 4.4.13 RTCM 2.x Parameters, 4.4.14 RTCM 3.x Parameters] and these references are passed.



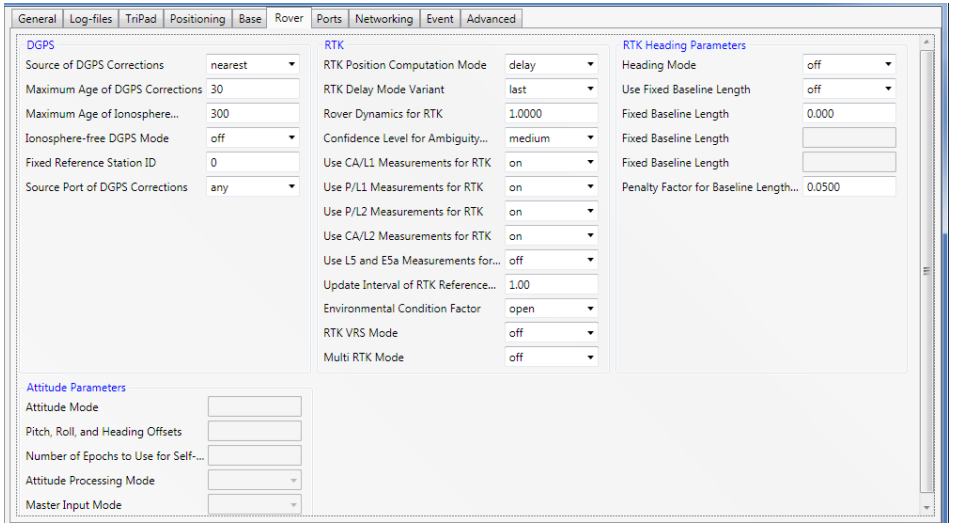
Base parameters

The following parameters can be set using the *Base* tab:

- *Reference position* - the coordinates for L1 Antenna Phase Center (APC) and Antenna Reference Point (ARP). [2, Reference Station Coordinates]. The APC and ARP coordinates in the receiver are entirely independent. To calculate one from another click APC -> ARP or ARP -> APC buttons. Calculating is carried out using L1 to APR Offsets – the vector offset between L1 phase center and ARP, which is determined by the selected Antenna Type but can be changed manually. If the coordinates of APC and ARP are unknown they can be got from the receiver by clicking Get from Receiver button. The APC coordinates will be filled using ([PG] –message but this way should not use for real Reference Station. The RTCM 2.x message 24 as well as RTCM 3.x standard requires that APC and ARP coordinates to be transmitted from reference station to rover receivers.
- *Reference Position Averaging* – settings automatically calculating and setting reference position when precise position is unknown. [2, Reference Position Averaging].
- *Reference Antenna Parameters* – the settings of the antenna and the vector components between a surveyed point (land mark) and the ARP. [2, Reference Antenna Parameters].
- *Reference Antenna Offsets* – parameter specifies the vector components between L1 Antenna Phase Center (APC) and L2 APC. [2, Reference Antenna Parameters].
- *RTCM 2.x Settings* – settings for configuring RTCM (Radio Technical Commission for Maritime Services) 2.x corrections. [2, RTCM 2.x Reference Station Parameters, 3.5.3 RTCM 2.x Messages].
- *RTCM 3.x Settings* – settings for configuring RTCM (Radio Technical Commission For Maritime Services) 3.x corrections. [2, RTCM 3.x Reference Station Parameters, 3.5.4 RTCM 3.2 Messages].
- *CMR Settings* – settings for configuring Compact Measurement Record (CMR) corrections. [2, CMR Reference Station Parameters, 3.5.5 CMR Messages].

Rover

The *Rover* tab allows configuring the receiver as a rover and mostly useful for RTK operation. Parameters are described in the chapters [2, 4.4.7 Code Differential (DGPS) Parameters, 4.4.8 Phase Differential (RTK)].



Rover parameters

Available parameter groups**:**

- *DGPS* – settings for differential corrections using.
- *RTK* – settings for RTK-engine [2, Generic RTK Parameters].
- *RTK* Heading Parameters – settings for configuring RTK - engine to compute heading, pitch and orientation in the multi-antennas receiver [2, RTK Heading Parameters], documentation on Duo and Quattro.
- *Attitude Parameters* – mode and initial values for calculating vectors in the multi-antennas receiver [2, Attitude Parameters], documentation to Duo and Quattro receivers.

Ports

The *Ports* tab contains the nested tabs for configuring all available input /output interfaces of the receiver.

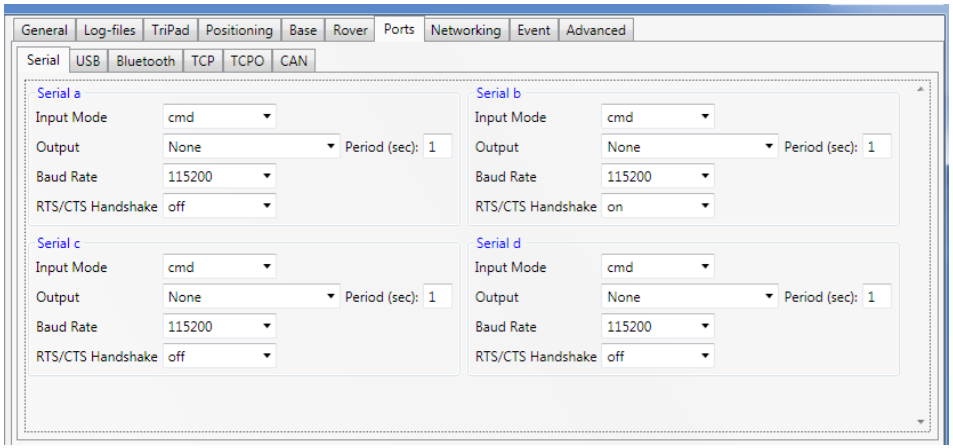
For each interface can be query/set:

- *Input Mode* – specifies what type of incoming data to accept (excluding TCPO) [2, 4.4.23 Generic Communication Parameters (Basic Operation Mode)].
- *Output Mod*e – the periodic output. The messages can be selected from the predefined sets of messages (see Appendix 1. Predefined sets of messages. The list of the messages in the set is displayed when mouse is over the item of drop–down. If ordered output does not match any set it is shown as *User Defined.*

Most of the interfaces require additional settings. The nested tabs are following:

Serial tab

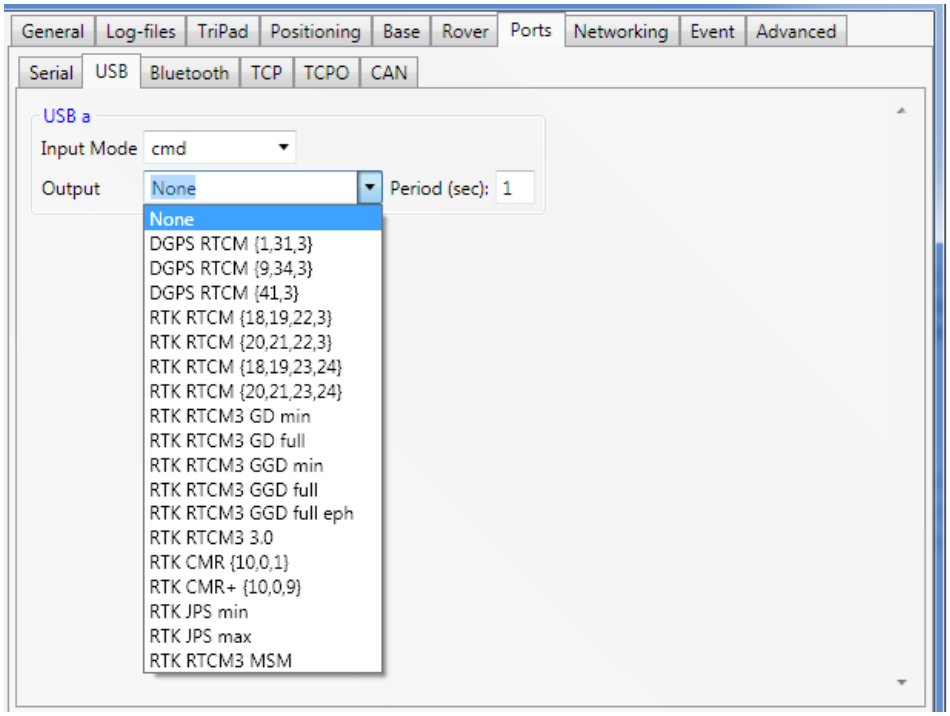
The *Serial* tab contains the parameters for configuring serial a, b, c, d ports such as Baud Rate and RTS/CRS Handshake [2, 4.4.24 Serial Port Parameters. (Hardware Settings)].



Serial ports parameters

USB tab

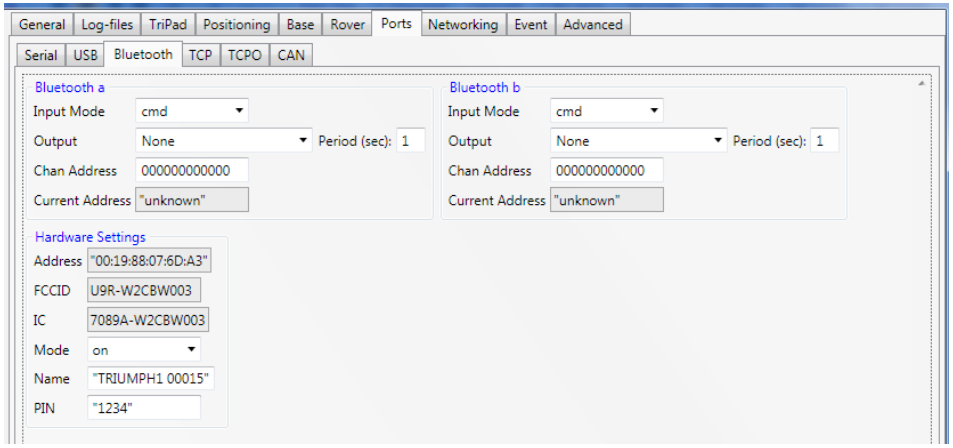
The *USB* tab allows setting input/output for the available *USB* ports.



USB port parameters

Bluetooth tab

The *Bluetooth* tab allows setting input/output for the available *Bluetooth* ports and also provides *Hardware Settings* to configure Bluetooth module [2, 4.4.27 Bluetooth Parameters].

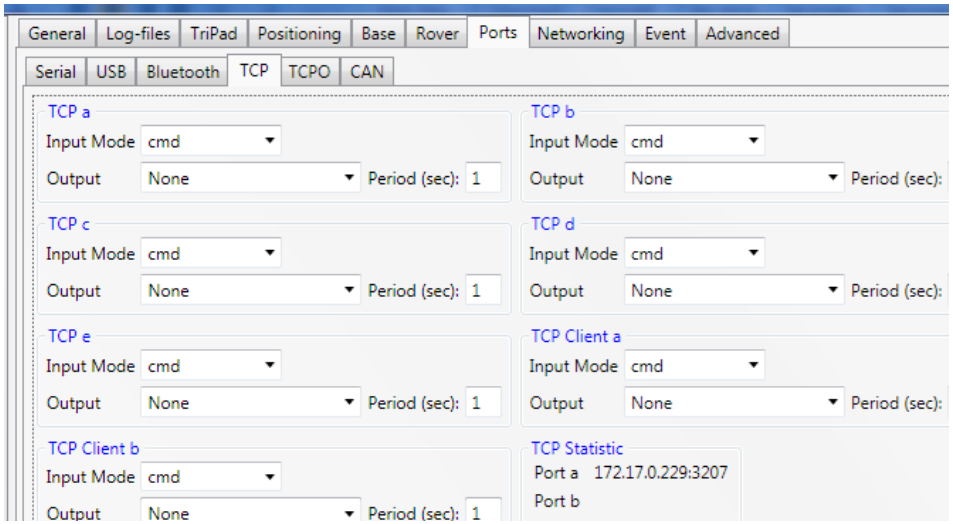


Bluetooth ports parameters

TCP tab

Receiver provides the TCP server functionality which allows establishing bidirectional TCP connections and also it is capable to operate as TCP client for different kinds of TCP servers.

TCP tab - contains input/output settings for all types of the TCP ports and statistics on the use of TCP server ports. [2, 4.2.2 Input and Output Ports Notations].

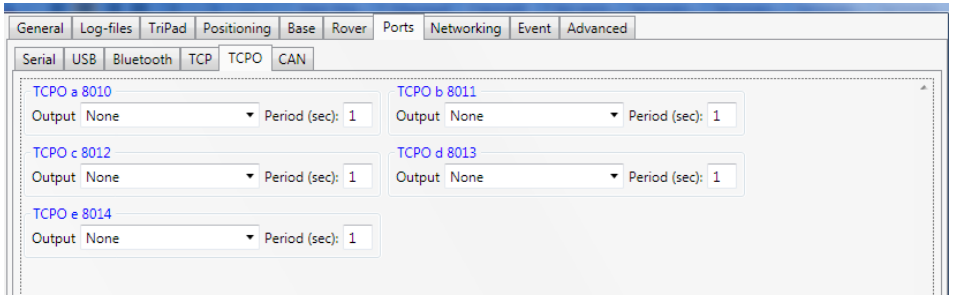


TCP ports parameters

- *TCP a, TCP b, TCP c, TCP d, TCP e* – input/output settings for the TCP streams (dev/tcp/a,…,dev/tcp/e)
- *TCP Client a, TCP Client b* – input/output settings for TCP client connections. Depending on receiver model, up to 2 independent connections could be established at any given time.
- *TCP Statistics* – list of active incoming TCP connections (IP-address and port are displayed). [2, 4.4.25 Network Parameters (Network Statistics)].

TCPO tab

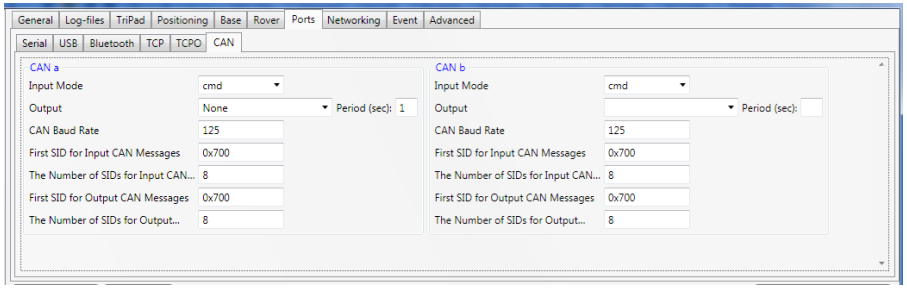
The *TCPO* tab is designed to enable output data for TCP output server ports. [2, 4.4.25 Network Parameter (TCP Output Server Configuration)].



TCPO ports output settings

CAN tab

The *CAN* tab allows setting the parameters for configuring CAN ports of the receiver to establish connections via CAN interface. [2, 4.4.30 CAN Ports Parameters].



CAN ports settings

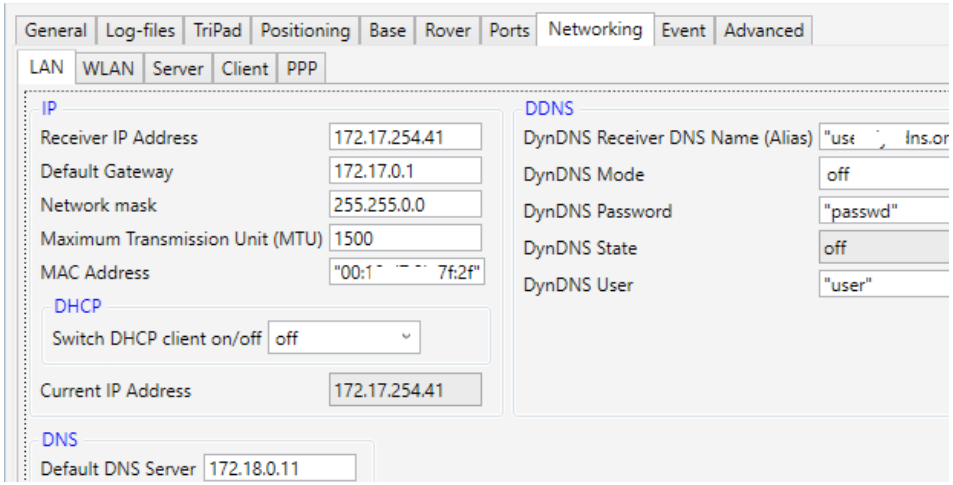
Networking

The *Networking* tab comprises in turn the set of the tabs to configure the receiver to establish connections via different network interfaces as a server, and client. In most cases, it requires a reboot to the network settings to take effect.

The following nested tabs are available:

LAN tab

The *LAN* tab – contains LAN DynDNS and DNS parameters described in [2, 4.4.25 Network Parameter].



LAN parameters

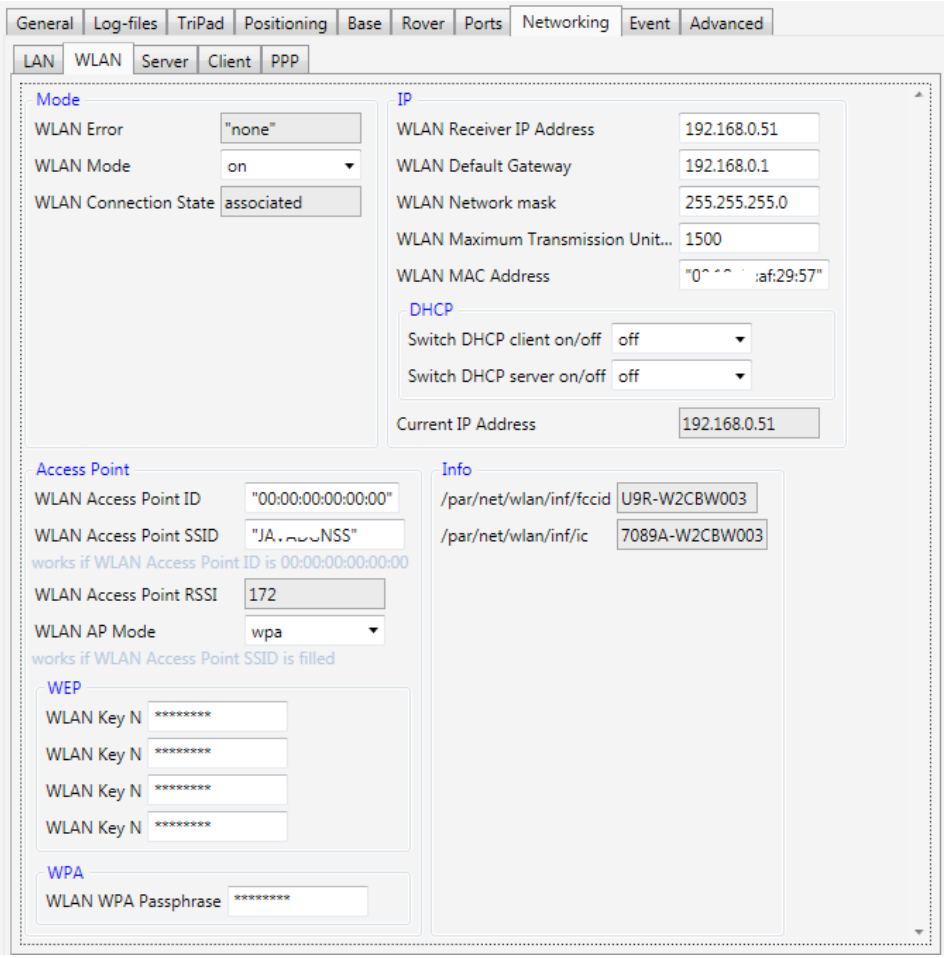
The LAN parameters are the following:

- *IP* – parameters which configure the receiver to be part of a TCP/IP local area network (LAN). [2, LAN Configuration].
- *DHCP* – enable the capability to automatically assign LAN/WLAN parameters to the receiver. [2, DHCP Client Configuration].
- *Current IP Address* – IP address on the local network assigned to the receiver at the moment.
- *DDNS* – settings for accessing and using dynamic DNS server. [2, Dynamic DNS (DynDNS) Client Parameters].
- *DNS* – addresses of the DNS server to use by default and the DNS

server used at the moment. [2, DNS Parameters].

WLAN tab

The *WLAN* tab provides parameters to configure the receiver to be a part of a TCP/IP wireless local area network (WLAN). See detail description in [2, 4.4.25 Network Parameters (WLAN (WiFi) Configuration)].



WLAN parameters

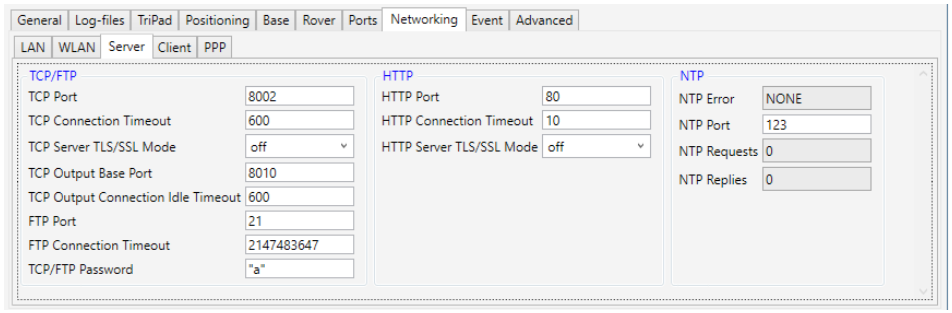
The following parameters configure the WLAN:

- *Mode* – mode (on, off, adhoc) and statuses.
- *Access Point ID* – access point identifiers, received radio signal power and the type of the encryptions (WEP, WPA-PSK/WPA2-PSK).
  - *WEP* – key strings for the access point (write-only).
  - WPA – passphrase for the access point (write-only).
- *IP* – parameters of the TCP/IP network and receiver identifier in it.
  - *DHCP* –
    Client - enables the capability to automatically assign LAN/WLAN parameters to the receiver. [2, DHCP Client Configuration].
    Server – enables DHCP-server in the receiver.
  - *Current IP Address* – IP address on the wireless local area network assigned to the receiver at the moment.
- *Info* - certification parameters of the WLAN- module.

Note: The light gray tips appear under the parameters, if necessary.

Server tab

The Server tab contains parameters to enable and configure TCP, FTP, HTTP and NTP servers implemented in the receiver. See [2, 4.4.25 Network Parameters].



Server parameters

The following servers can be configured:

- TCP/FTP – parameters allows
  - *TCP clients* – to establish bidirectional connections to receiver. [2, TCP Server Configuration].
  - *FTP-standard clients* – to download files (for example). [2, FTP Server Configuration].
- *HTTP* - parameters allows external program running in a WWW browser (see [4]) to establish bidirectional connections to receiver

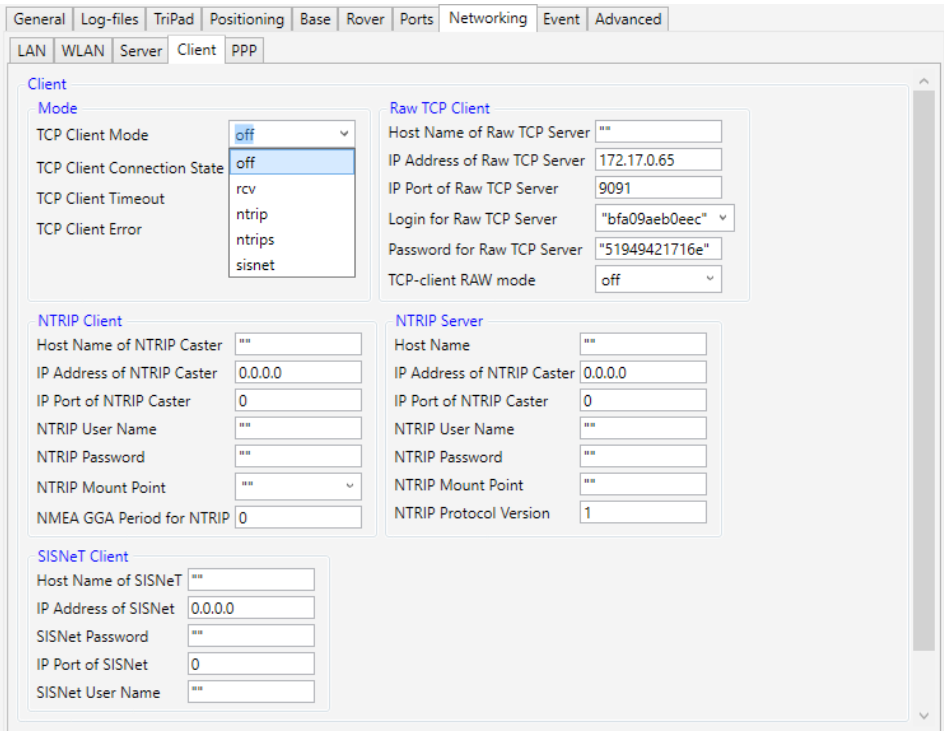
on top of HTTP protocol. [2, TCP Server Configuration].

- *NTP* – parameters of the Network Time Protocol (NTP) for receivers that support it. [2, NTP Server Configuration].

Client tab

The *Client* tab allows configuring the receiver to operate as TCP client for different kinds of TCP servers [2, 4.4.25 Network Parameters (TCP Client Parameters)].

The parameters for *Client* and *Client b* are identically. *Client b* is available depending on receiver model. To access *Client b* parameters it need be expanded.



Client parameters

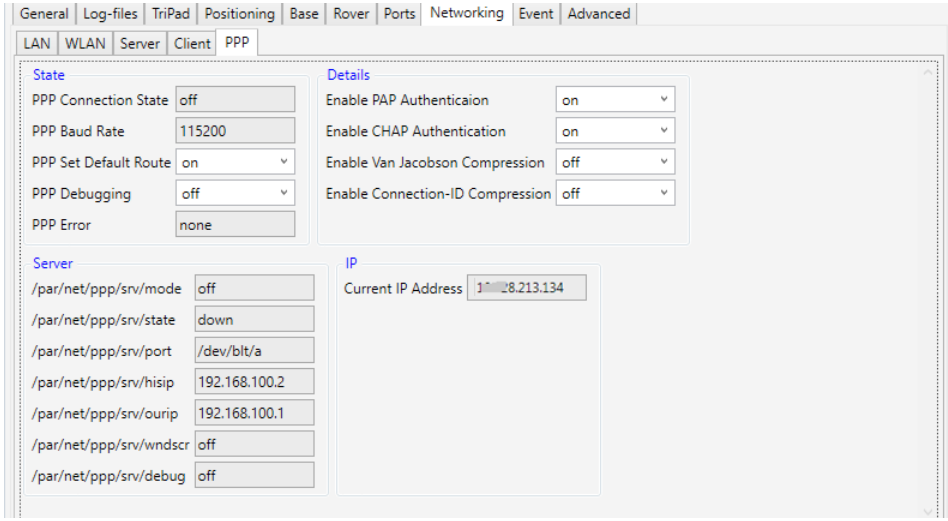
The following parameters for both *Client* and *Client b* can be set:

- Mode – causes the receiver to operate as a client of a certain type and displays statuses.
- *Raw TCP Client* – parameters to establish TCP connection to another (remote) JAVAD GNSS receiver. - [2, RCV Mode Parameters].
- *NTRIP Client* – parameters to establish connection to an NTRIP caster as a client and request data from particular mount point. - [2, NTRIP Client Parameters].
- *NTRIP Client* – parameters to establish connection to an NTRIP caster as a server and add itself as mount point. [2, NTRIP Server Parameters].
- *SisNeT Client* – parameters to establish connection to a SISNeT server.

PPP tab

The *PPP* tab displays the PPP server settings and statuses. PPP server starts when receiver connects to Internet via GPRS and does not require configuring. Only authentication and compression parameters could be set in peculiar cases.

The parameters are described in [2, 4.4.25 Network Parameters (GPRS/DIALUP (PPP) Configuration)].



PPP parameters

PPP parameters:

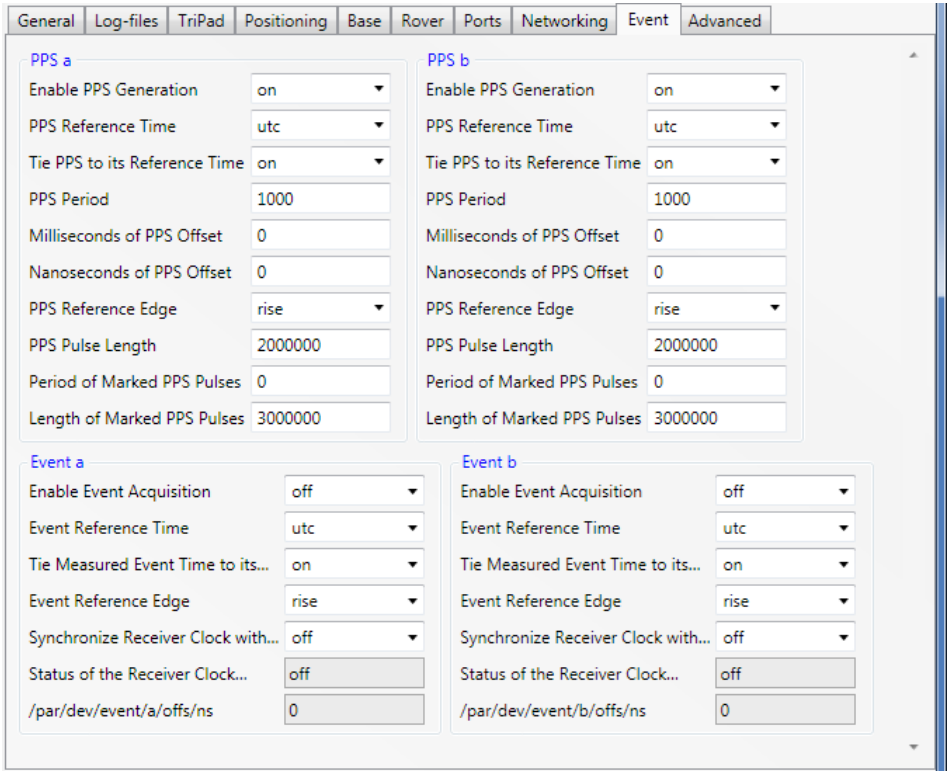
- *State* – the connection statuses of PPP server [2, PPP Configuration Parameters].
- *Details* – additional authentication and compression settings [2, PPP Configuration Parameters].
- *Server* – internal PPP-server settings.
- *IP* – current IP address assigned by the cell operator.

Event

The *Event* tab is designed to configure Pulse per Second (PPS) signals and External Events.

Pulse per Second (PPS) signals [2, 4.4.6 Positioning Parameters Pulse per Second (PPS) Parameters] have programmable reference time system, period and offset. There could be up to two PPS outputs in JAVAD GNSS receivers, “a” (PPSA) and “b” (PPSB). It is possible to use both PPS outputs concurrently. PPSA or both PPSA and PPSB can be available depends on PPS option value.

External Event functionality [2, 4.4.6 Positioning Parameters External Event Parameters] allows the user to measure/record input event times. Up to two external event pins, EventA and EventB may be accommodated depending on receiver model. EVNT option value determines availability of EventA or both EventA and EventB.



Event parameters

The following parameters are available:

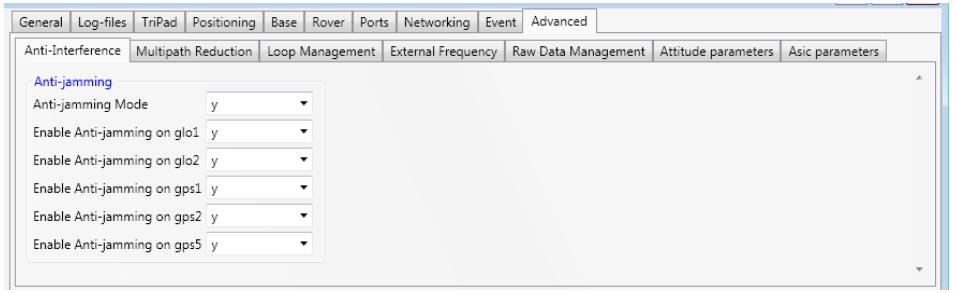
- *PPS a (PPS b)* – settings for the Pulse per Second signals either PPSA or PPSB.
- *Event a (Event b)* – settings for external events input either EventA or EventB.

Advanced

Tab Advanced contains the set of tabs for the fine settings that are rarely used.

Anti-Interference tab

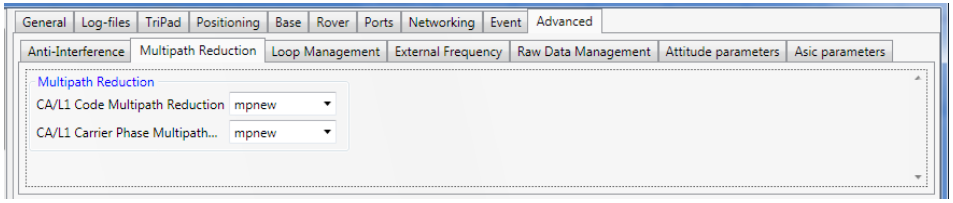
The *Anti-Interference* tab allows enabling anti-jamming mode for the GLONASS and GPS bands [2, 4.4.4 Measurements Parameters Anti-jamming Parameters].



Anti-Interference parameters

Multipath Reduction tab

The *Multipath Reduction* tab contains parameters for enabling code and carrier multipath reduction for CA/Ll. [2, 4.4.4 Measurements Parameters Multipath Reduction Parameters].

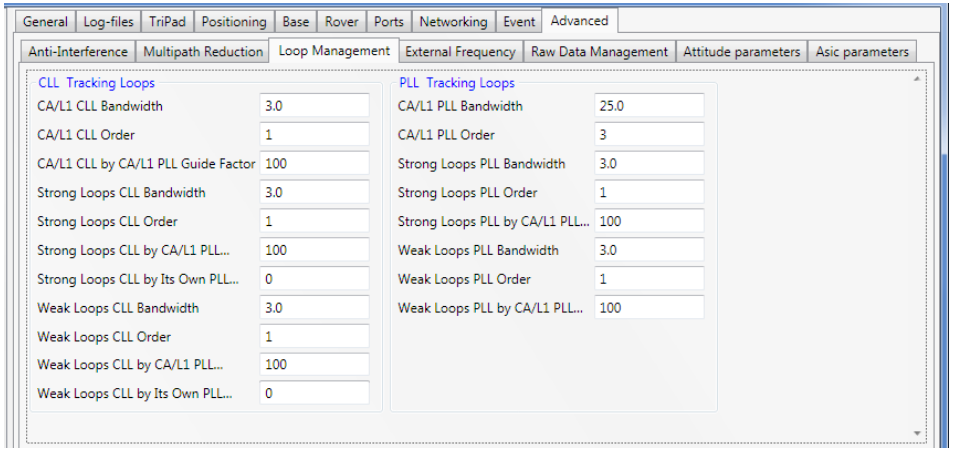


Multipath Reduction parameters

Loop Management tab

The *Loop Management* tab contains tracking loop parameters.

Note: We do not recommended to change them from their default values [2, 4.4.4 Measurements Parameters Tracking Loop Parameters].



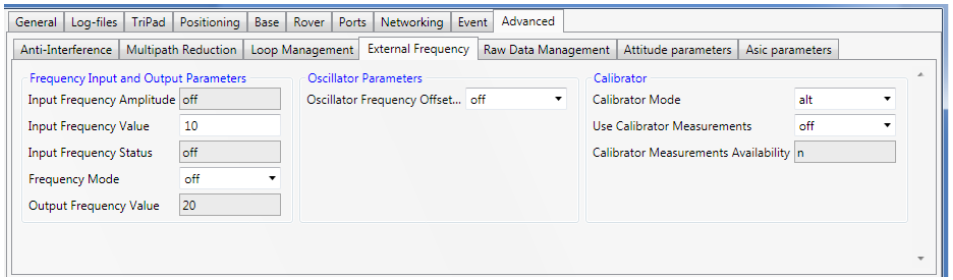
Loop Management parameters

The following parameters are available:

- *CLL Tracking Loops* – parameters for Code Lock Loop.
- *PLL Tracking Loops* – parameters for Phase Lock Loop.

External Frequency tab

External Frequency tab is designed to select and configure oscillator and hardware calibrator [2, 4.4.4 Measurements Parameters].



External Frequency parameters

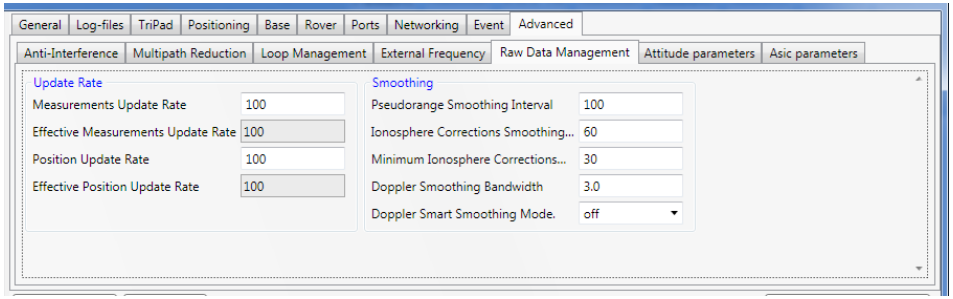
The available parameters are the following:

- *Frequency Input and Output Parameters* – frequency parameters. - [2, Frequency Input and Output Parameters].
- *Oscillator Parameters* – oscillator mode - [2, Frequency Input and Output Parameters].

- *Calibrator* –parameters govern the behavior of the hardware calibrator.- [2, Hardware Calibrator].

Raw Data Management tab

The *Raw Data Management* tab contains the settings of the internal receiver time grid and smoothing for different the indicators.



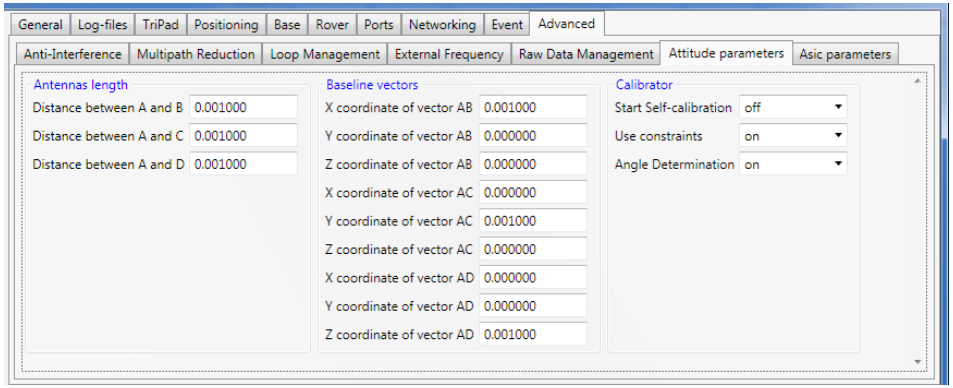
Raw Data Management parameters

The following parameters are presented:

- *Update rate* –parameters specifies the required period of the internal receiver time grid and position updates. [2, 4.4.2. Measurements Parameters Generic Measurements Parameters, 4.4.6. Positioning Parameters Generic Positioning Parameters].
- Effective read-only values are depends of the available options.
- *Smoothing* – smoothing settings for the different indicators. [2, 4.4.2. Measurements Parameters Generic Measurements Parameters].

Attitude parameters tab

The *Attitude parameters* tab allows configure and calibrate multi antenna receiver (see documentation on Duo and Quattro and [2, 4.4.8 Phase Differential (RTK) Parameters Attitude Parameter].



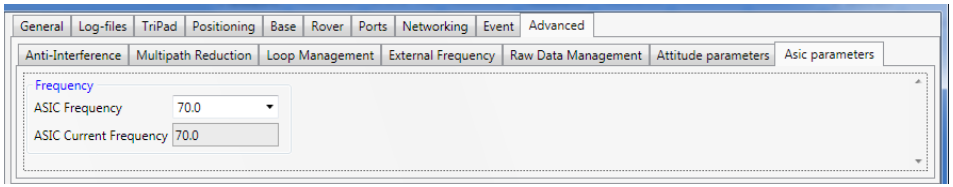
Attitude parameters

The following parameters are available for the multi antenna receiver:

- *Antennas length* – distance between antennas.
- *Baseline vectors* – coordinates of the baseline vectors
- *Calibrator* – staring self-calibration [2, Attitude Parameters], calibrator settings.

Asic parameters tab

The *Asic parameters* tab allows setting the processor clock frequency and displays current DSP (digital signal processor) sampling frequency (4.4.35 Miscellaneous parameters).



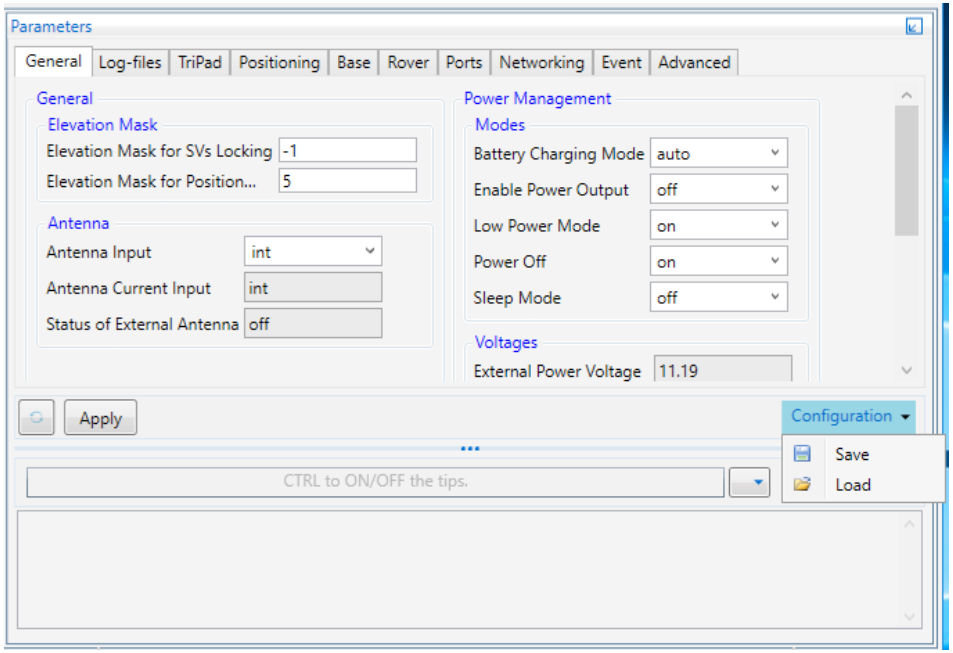
Asic parameters

Save / Load Configuration

All parameters from all tabs can be saved to the *tcl*-script (see Appendix 2. TCL-script example). And then the saved parameters can be loaded to this or another receiver,

To save configuration click button *Configuration* ▸ *Save* and select file

for saving.

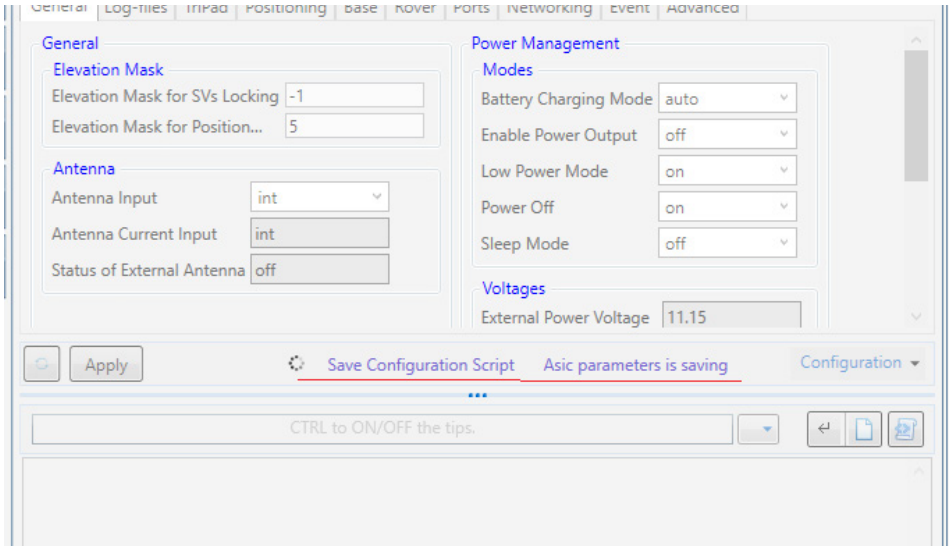


Save / Load Configuration menu

If any of edited parameter was not applied the appropriate warning will be shown.

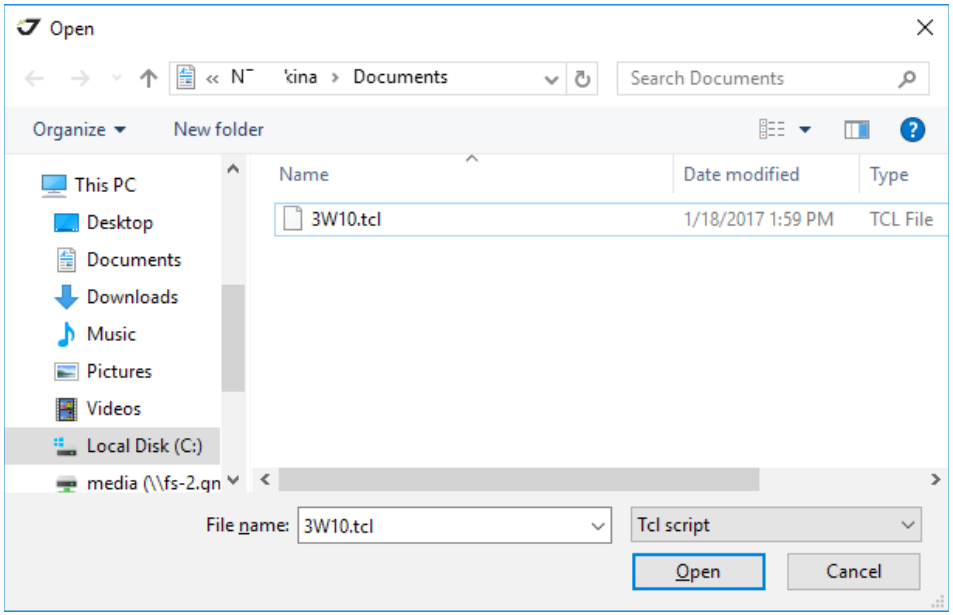
All parameters from all tabs except LAN and WLAN will be saved to the file of the tcl format (Tool Command Language). The tcl-script cannot be loaded to the receiver using ordinary terminals ONLY using the Parameters tab of NetView & Modem.

While saving user interface is disabled and the corresponding information is displayed near the button.



Saving the configuration

To load configuration click button *Configuration* ▸ *Load* and select *tcl*-file.

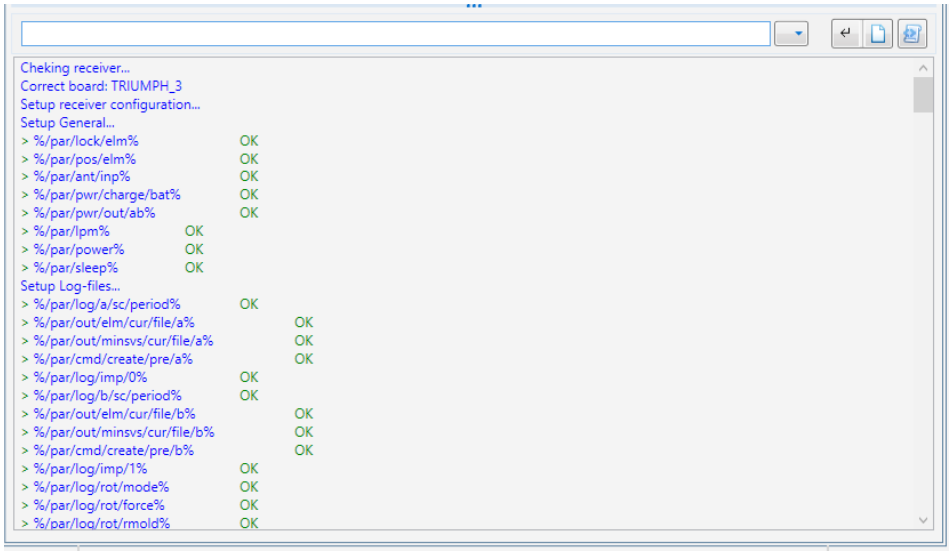


Load configuration from script

After the board compatibility is checked the script will be loaded to the

receiver.

The result will be displayed in the *Manual Mode* pane.



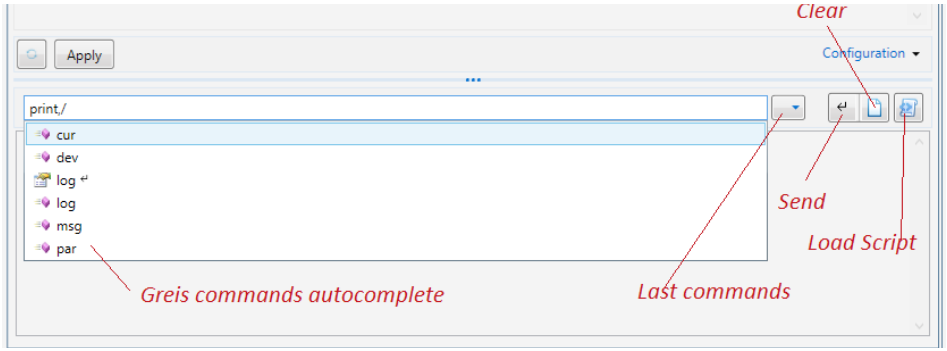
Configuration tcl-script loaded

Limited Manual Mode Pane

The *Manual* pane is located under the parameter tabs and allows directly controlling the receiver by using of GREIS commands. The *Manual* pane works like a limited terminal communicating with the receiver, (i.e., it allows the user to send various receiver commands and get responses to these commands). For a complete list of commands supported by JAVAD GNSS receivers, refer to the Greis Manual [2].

The *Limited Manual* pane does not support outputting of the messages. Only the responses to the commands are displayed and can be logged.

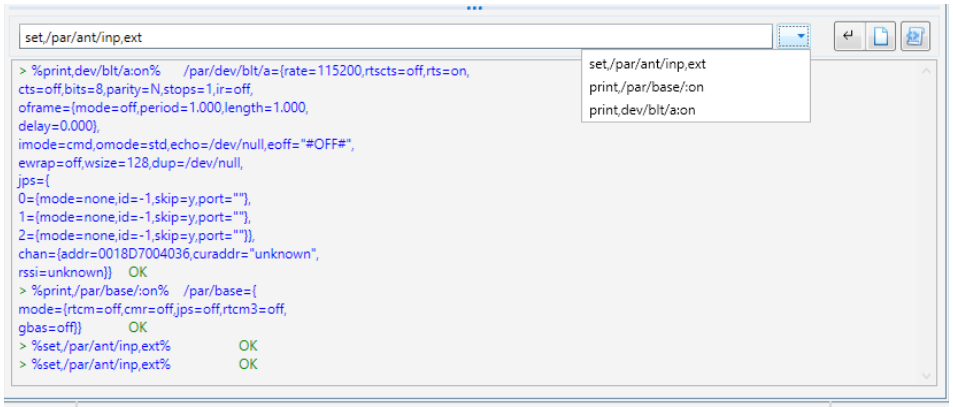
The full-function terminal is provided on the *GREIS Commands* tile (see Manual Mode chapter).



Manual Mode pane. Command input

The Manual pane consists of the following elements:

- The *Input* line for the Greis commands. As you type a hint is shown with a list of available commands.
- The *Output* window displays receiver responses. “>” means that the receiver responded and is followed by the text of the response.
- The *Last Commands* button allows select one of the previously used commands. Up to 50 commands are stored.
- The *Send* button sends command to the receiver (equivalent to Enter in Input Line)
- The *Clear* button clears the Output Window.
- *Load Script* button sends a set of the commands from the selected script to the receiver.



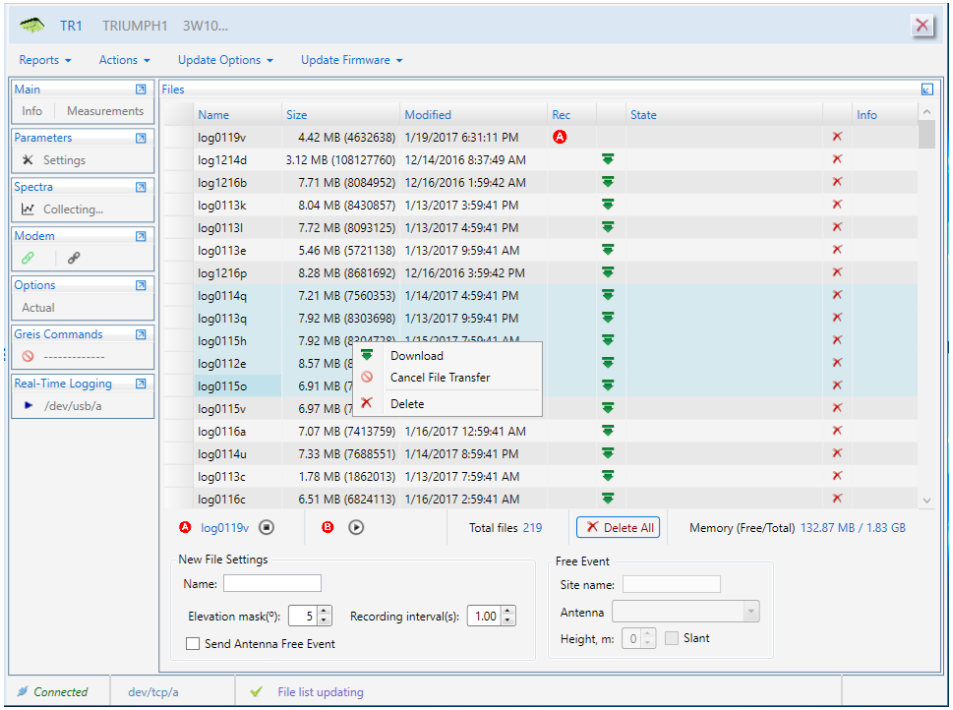
Manual mode pane. The reply of the receiver

The size of the pane can be changed by stretching out the slider, which separates the parameters and the field for manual input. The slider has a typical three points in the middle.

Operations with the files

The NetView & Modem software provides a friendly interface for monitoring and managing the memory of the receiver. You can start up two jps-files recording, send free-events to file, stop recording, download file from the receiver or delete it.

Expand *Files* tile to select the *File* window.



File window.

In the upper part of the window is a list of files. If the list is large it might take some time to get it. The following information is provided for each file:

- *Name*
- *Size*
- *Modified* – time of the last modifying
- *Rec* – if the file is recording at the moment A or B is displayed depending log-file a or log-file b is recording
- *State* – status of downloading

Each file line in the list has the *Download* button and the *Delete* button to download or delete the appropriate file.

To perform the group operation select the file list items and right-click to open the context menu.

Start/Stop File Recording

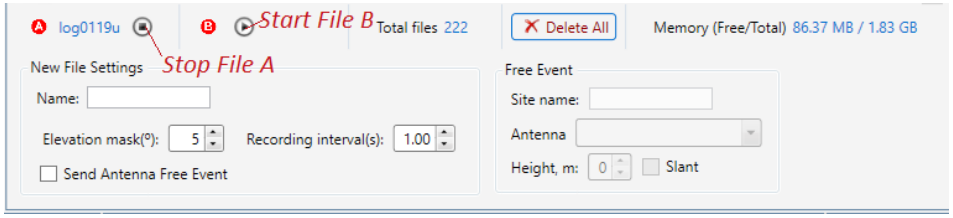
Under file list the pane for file recording is located.

The red circles with the letters A and B inside are displayed if the corresponding file is recording. For the recording file the *Stop* button is available. Otherwise, there is the *Start* button. If no name is set a new file will be started with default name.

To configure a new file:

- Type file *Name* or leave the field empty to get default name.
- Specify the *Elevation Mask*, the parameter for excluding the satellites whose elevation angles are less than the specified value.
- Specify the *Recording interval* of output.
- Check the *Antenna Free Event* if desire to send the following free events when file is starting:
  - "_DYM=STATIC"
  - "_ANT="
  - "_ANH="
- The values for _ANT and _ANH can be specified on the Free Event pane.

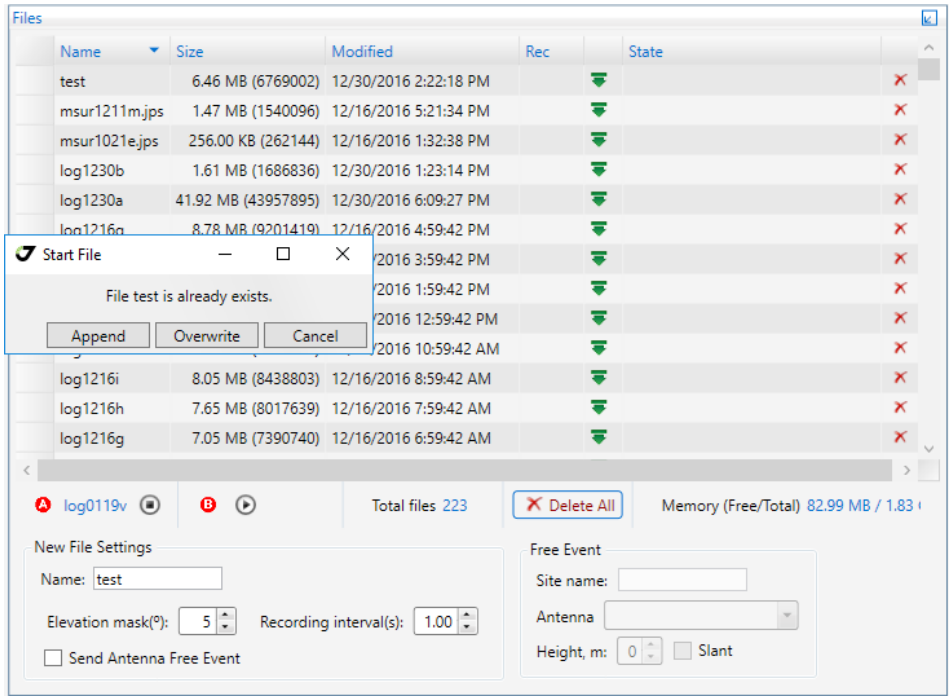
Note: See information about the free events [2, 2.3.9 event].



File recording

Click the *Start* button next to the red circle A or B to start *log-file a* or *log-file b.*

If you try to start the file that is already exists, you will be suggested to append or overwrite it.

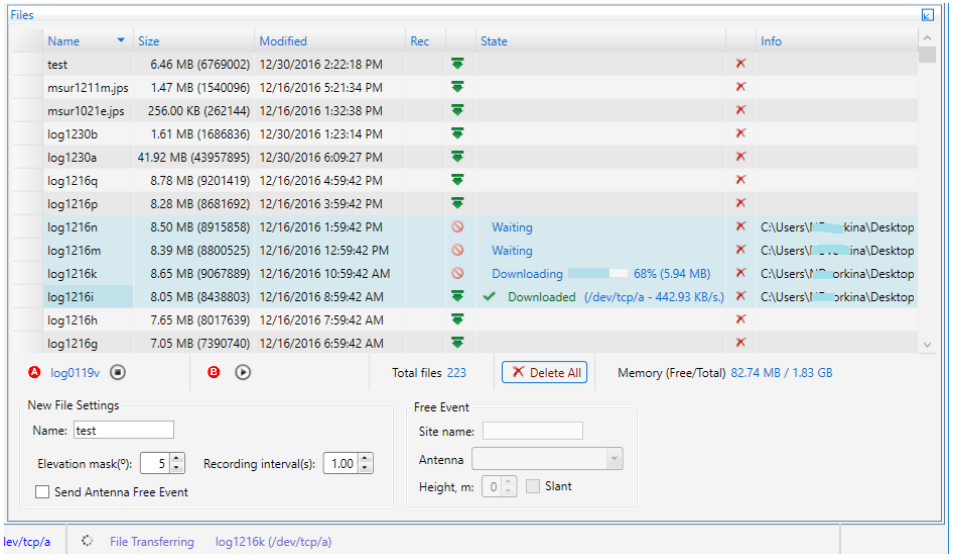


Existing file is started

The information about the *Total Files, Total Memory, Free Memory* is available in the receiver and is displayed under the file list.

Download Files

Select one or several files the file list and click the *Download* button in the line or in the context menu. Specify the file path in case of single file or folder if more than one file is selected.

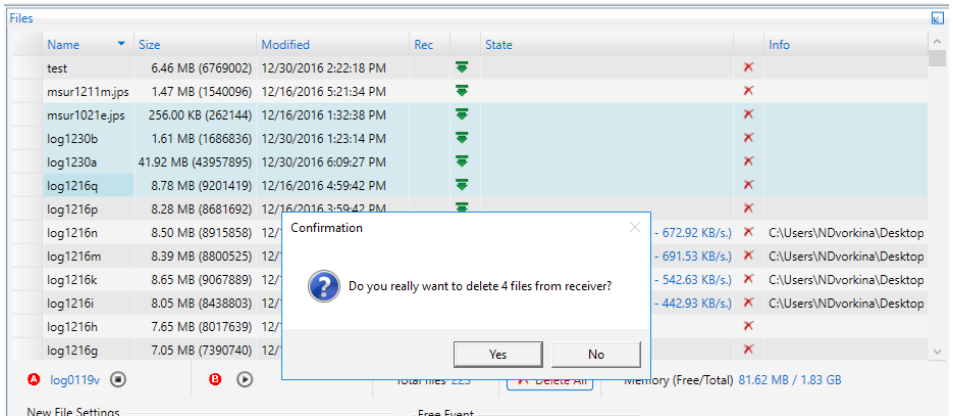


Download files

Downloading states are displayed in the file list. The *Cancel* button for interrupting of the file transfer is available instead of *Download* button.

Delete Files

Select the files you want to delete and click the *Delete* button in the line or in the context menu. The confirmation message will be displayed. Click *Yes*. The selected file will be deleted.

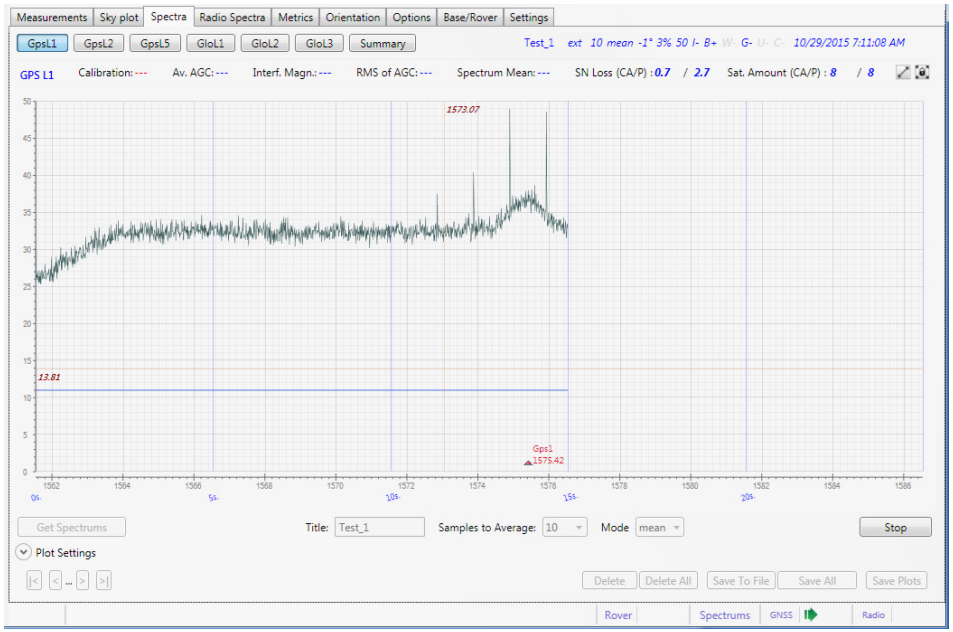


Delete files

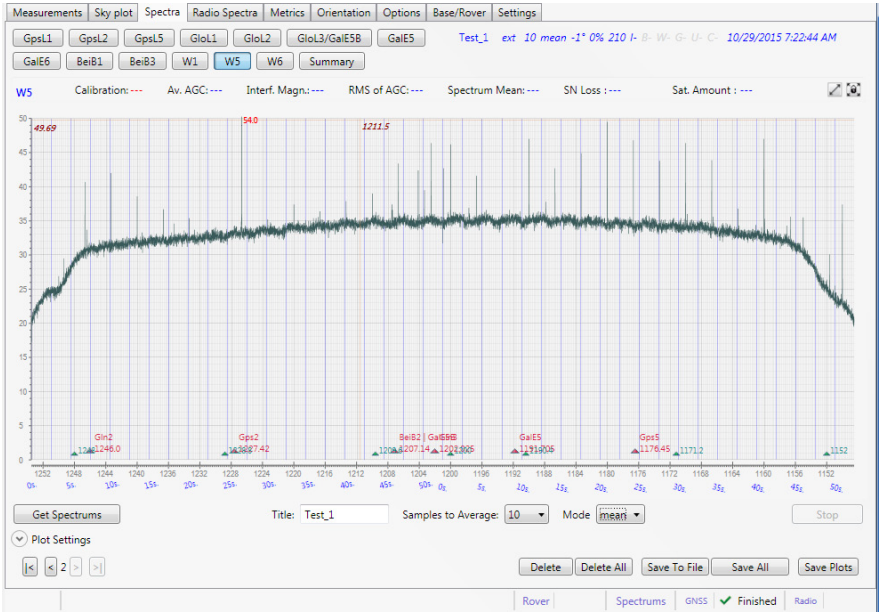
While deleting the files window is disabled. The removal of a large number of files can take some minutes. To remove all files just click the button Delete All without selecting the data.

GNSS Spectra

The *Spectra* tile allows collecting, displaying and storing measurements of the GNSS interference.



GNSS-spectra for SIGMA receiver in process (GpsL1)



GNSS-spectra for TRE-3 finished (W5)

The number of spectra depends on receiver type and is equal to the number of RF bands implemented in the receiver.

The data about interference is collected simultaneously for all GNSS bands (max 13):

- *Gps L1, Gps L2, Gps L5,*
- *Glo L1, Glo L2,*
- *Glo L3/Gal E5B,*
- *Gal E5, Gal E6,*
- *Bei B1, Bei B2, Bei B3,*
- *W1, W5, W6.*

Use the buttons to switch between the bands.

All previously made measurements are available, to see them use the navigation buttons in the left bottom corner.

The following data can be displayed on the graphs:

- Black line - shows the spectrum output.
- Blue line - shows the value of the system voltage (AGC)
- X-axis - the carrier frequency in MHz. For each GNSS band, the values are different.
- X-axis - time in seconds (blue numbers)
- Y-axis - amplitude, dB.
- Red triangle - mid frequency.

Above the graph, the values of calibration and statistical data are shown.

Red numbers at the top of the graph are the signatures to the points of the spectrum, which amplitude exceeds 50 dB.

Note: The option SPEC must be activated for spectra obtaining.

Collecting Spectra

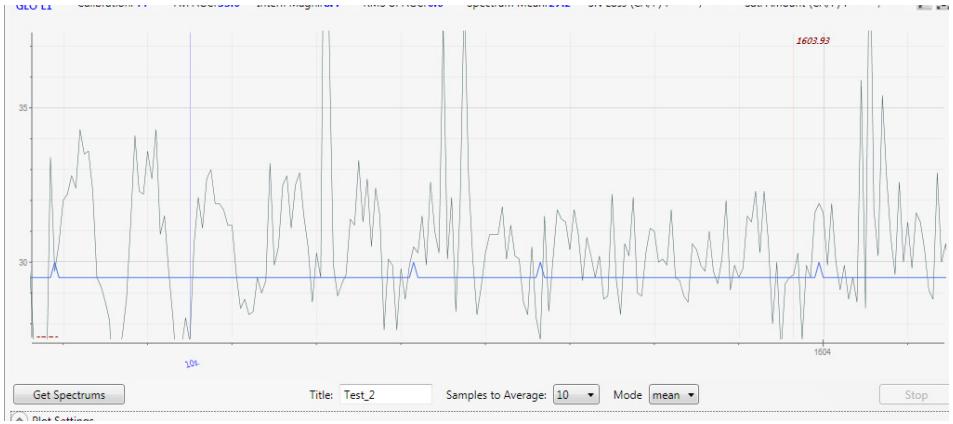
To receive the current measurements of the interference

- Enter the Title;
- Specify the Samples to Average - Time Interval of Incoherent Spectrum Data Accumulation;
- Specify the Mode (mean, min, max) - Spectrum Averaging Mode;
- Click *Get Spectrums*.

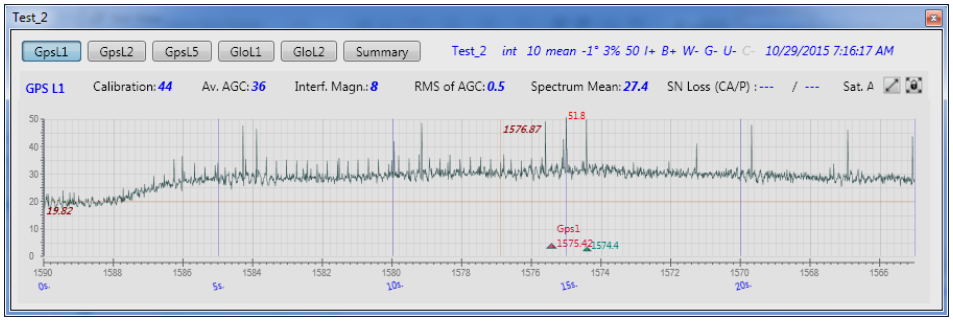
The construction of graph begins. The status of the process will be shown in the status bar filed Spectra | GNSS. Collecting can be interrupted by clicking button Stop.

Operation with Plots

- *Zoom* - select region by mouse right button or turn the mouse wheel to zoom plot.
- *Pan* - left mouse button move the graph.
- *X-axis* – completely, Y-axis 0-50 – top left button
- *X-axis* – completely, Y completely – top right button
- Double click to open plot in the separate window.



GNSS-spectra plot zooming and panning



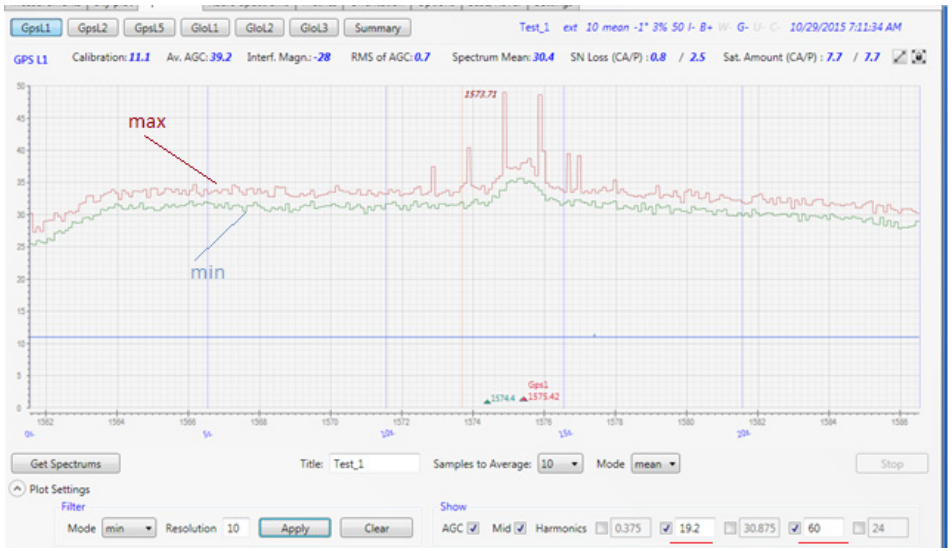
GNSS-spectra plot in separate window

The plots can be processed for analyzing the different aspects of the interference. Expand the Plot Settings group, specify processing settings and click *Apply*.

Plot Settings are the following:

- *Filter* allows roughening plot using different mode,
- *Show* shows/hides AGC line, Middle Frequency and additional harmonics.

Click the *Clear* button to return to the original plot.



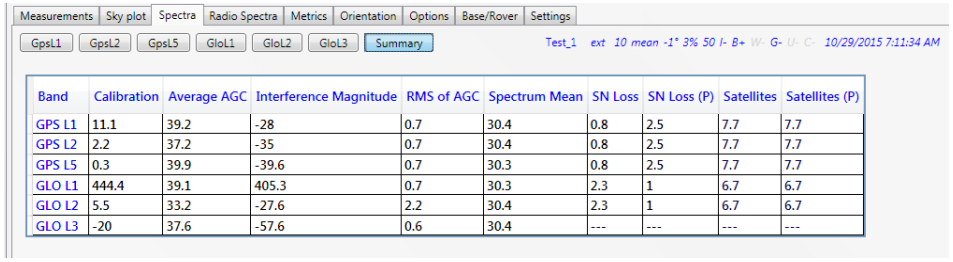
GNSS-spectra plot min and max filters, AGC, Mid and Harmonics 19.2 and 60

Statistics and Additional data

Above the graph the statistics and calibration data are displayed:

- *Calibration* - AGC calibration
- *Av Agc* - mean value of AGC divided by 2 for each of RF bands for the time interval the spectrum has been measured over
- *Inter Magnitude* - interference magnitude, calculated from the average values and calibration of AGC
- *RMS of Magnitude* - RMS value of AGC for each of RF bands for the time interval the spectrum has been measured over.
- *Spectrum mean* - mean spectrum value for each of RF bands for the time interval the spectrum has been measured over.
- *SN Loss* – average loss in signal /noise ratio;
- *Sat Amount* - the average number of satellites for CA and P codes.

Click the *Summary* button, to see the statistics collected for all bands.



Band	Calibration	Average AGC	Interference Magnitude	RMS of AGC	Spectrum Mean	SN Loss	SN Loss (P)	Satellites	Satellites (P)
GPS L1	11.1	39.2	-28	0.7	30.4	0.8	2.5	7.7	7.7
GPS L2	2.2	37.2	-35	0.7	30.4	0.8	2.5	7.7	7.7
GPS L5	0.3	39.9	-39.6	0.7	30.3	0.8	2.5	7.7	7.7
GLO L1	444.4	39.1	405.3	0.7	30.3	2.3	1	6.7	6.7
GLO L2	5.5	33.2	-27.6	2.2	30.4	2.3	1	6.7	6.7
GLO L3	-20	37.6	-57.6	0.6	30.4	---	---	---	---

GNSS Spectra Summary

In the upper right corner the receiver status during the spectrum measuring is shown. It lists the following:

- Name of the test
- Position the antenna
- The number of measurements for averaging
- Elevation mask
- ASIC frequency
- AGC
- I - Anti-Jamming mode (+ enabled; - off)
- Status of communication module (gray if the module is not)
- + enabled; - off:
  - B - Bluetooth
  - W - Wi-Fi
  - G - GSM
  - U - UHF / FH
  - C - Communication Board (for TVS)
- Time

Saving and Deleting

You can save the spectra with additional information or only plots and delete them.

To save or delete the spectra, use the buttons in the right bottom:

- *Delete* - Deletes the current spectrum plots (all bands).
- *Delete all* - Deletes all existing plots for the receiver.
- *Save to file* – Saves the spectra for all bands with the additional information to the particular file.
- *Save all* – Saves all spectra to the selected folder.
- *Save Plots* – Saves the plots (all bands) as png-files to the selected folder.

Spoofing Detection

Spoofing detection is available for firmware beginning with 4.1.0.0 and requires the Spoofing Detection (_SPF) option.

User interface is provided in NetView & Modem 2.2.7.0 or higher.

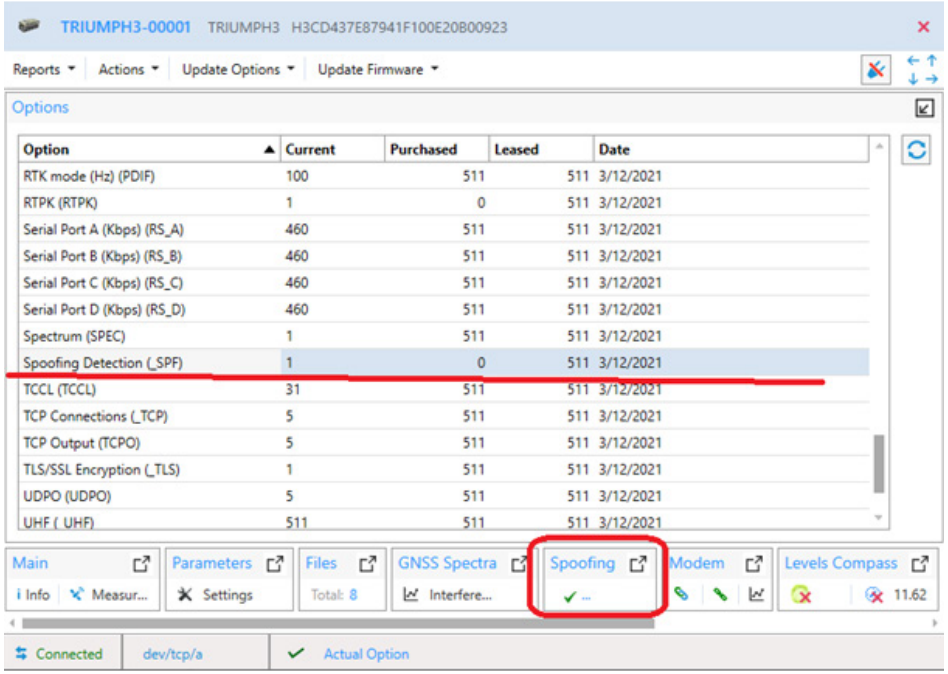
Short description of spoofing/jamming detection algorithm

Receiver detects possible spoofing by analyzing number of correlation peaks. In normal conditions only one peak is present. In case of spoofing, there should be 2 peaks - original and from spoofer. If receiver detects 2 peaks - it marks signal as “spoofed”. If number of spoofed satellites appeared to be more than one, that signal for all satellites is flagged as “spoofed”.

Jamming detection based on analysis of incoming noise characteristics. In case of jamming “noise floor” increases. Also deviation of noise may increase. Receiver measures these parameters and in case at least one is more than threshold that signal for all satellites is flagged as “jammed”.

Spoofing Option

Spoofing detection is available if Spoofing Detection (_SPF) option is loaded.



Spoofing Option

Detail spoofing detection information can be obtained on Spoofing Tile.

Also spoofed and jammed satellites are flagged in the main satellite table if spoofing mode is on.

Information about spoofing mode is presented on the main tile.

Spoofing Tile

Select tile “Spoofing”. Toolbar and satellite system/signal table are on the tile.

The following settings configure spoof detecting:

- Mode – on/off spoofing detection mode.
- Position – on/off using of signal in positioning.
- Dependent Lock - switch tracking to dependent mode.

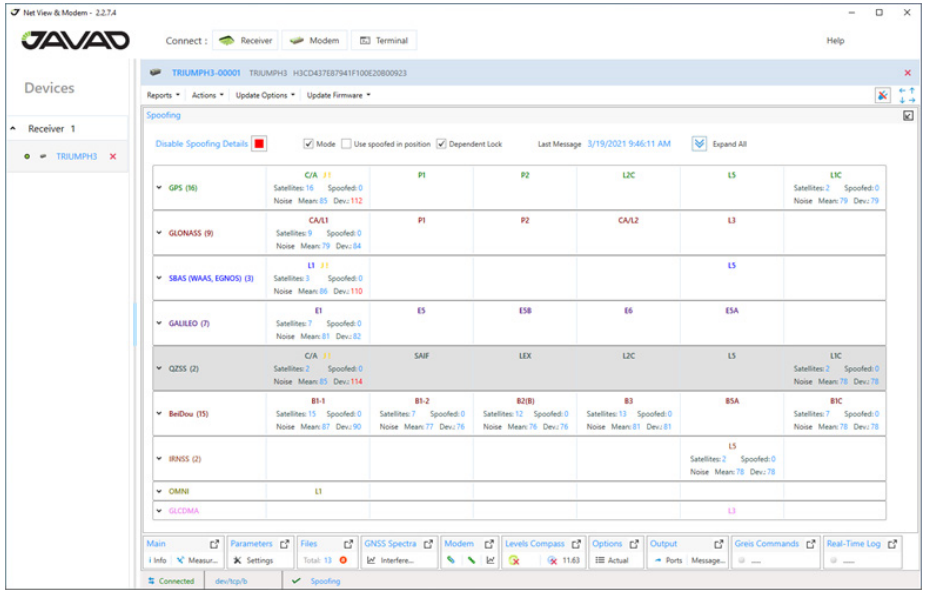
Note: for spoofing/jamming detection, signal should be tracked in independent (not guided) mode, so for checking of all possible signals.

Button “Enable Spoofing Details” starts collecting detail slots information (message [sj]).

Also, toolbar contains time of the last received message and button Expand All, which expand/collapse all systems in the table at once.

The table contains available signals for each satellite system.

Obtained data fill the table.

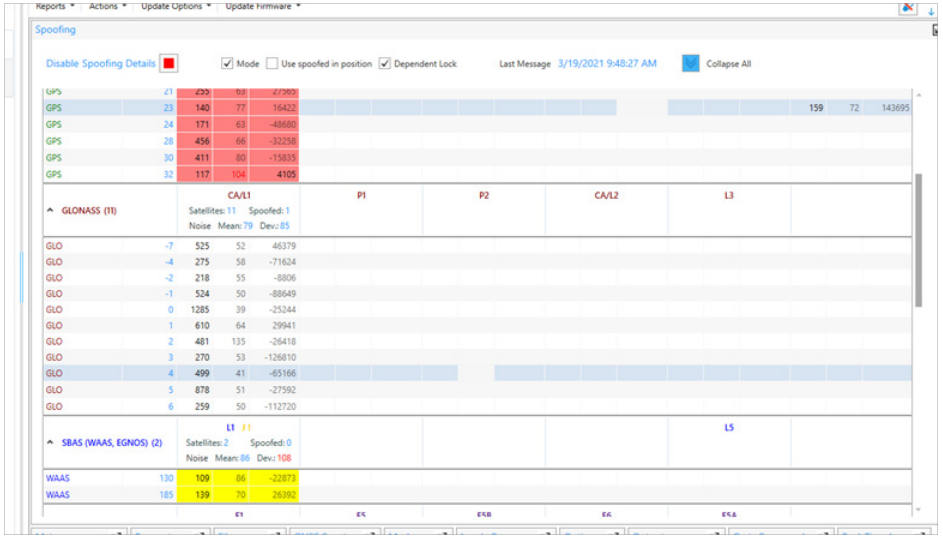


Filled Spoofing Table. GPS/CA, SBAS/L1, QZSS/CA – jammed.

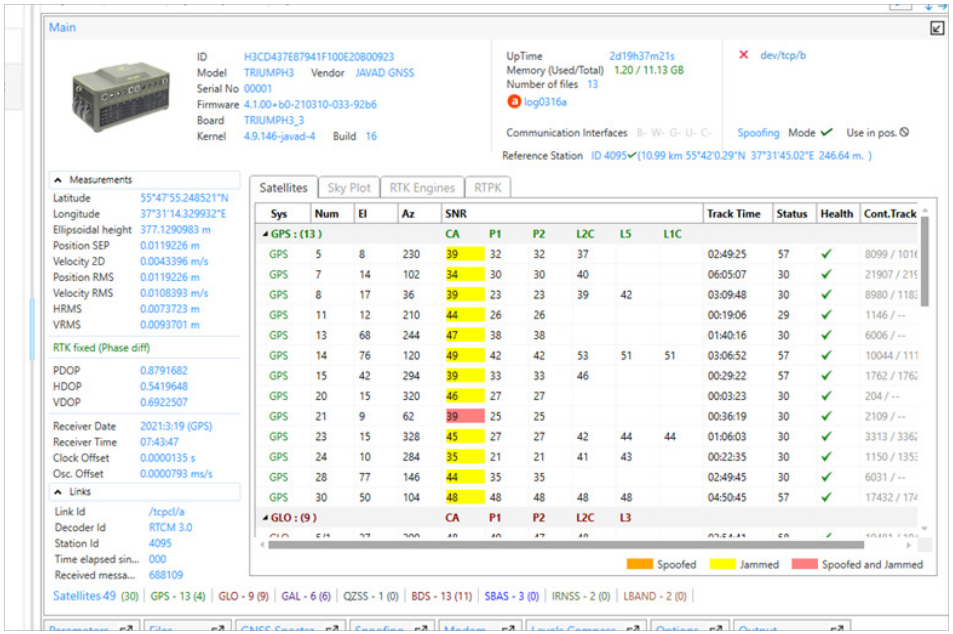
Receiver provides the following information for each available signal in every satellite system:

- Satellites – count of the locked satellites in the signal.
- Spoofed – count of spoofed satellites. If spoofed more than 1 the entire signal is considered to be spoofed. It is red and “S!” appears near the signal header.
- Noise Mean. It is red if greater than 100. It means that signal is jammed and dark yellow “J!” appears near the signal header.
- Noise Deviation. It is red if greater than 100. It means that signal is jammed and dark yellow “J!” appears near the signal header.

Expand system to see satellites information.



Detail satellites info. GPS and SBAS are expanded. GPS/CA – spoofed and jammed, SBAS/L1 – jammed



Spoofed and Jammed flags in the main satellite table.GPS/CA jammed, 21-st satellite also – spoofed.

Spoofing table contains the following columns:

- Satellites system.
- Satellite number.
- Signals. Each signal contains 3 sub columns.
  - Main Peak
  - Second Peak - gray if less than 100
  - Delta Range - gray if Second Peak less than 100.

The entire signal is orange if spoofed, dark yellow if jammed and red if both.

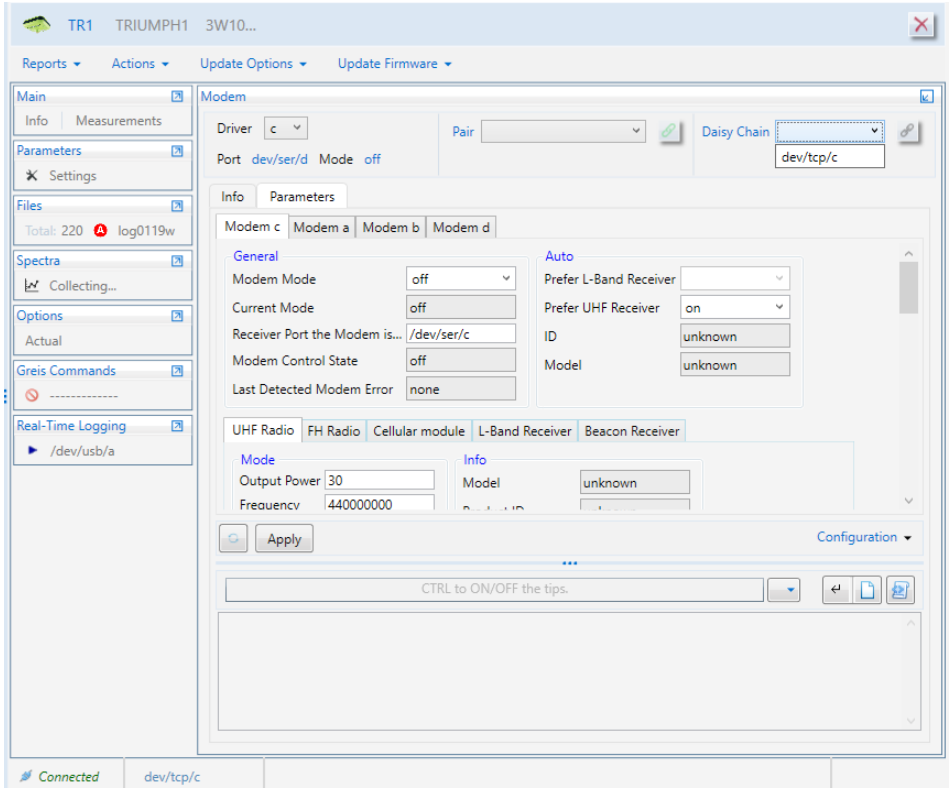
Main Tile

Spoofing detection mode adds dark yellow, orange or red flag to the SNR - value of satellite in the main table if it is jammed, spoofed or both accordingly.

Configuring the Modem

Expand the *Modem* tile to configure an internal modem or pair an external one.

The *Modem* tile has the toolbar for selecting driver, pairing and daisy chaining and also spectra and parameters tabs.



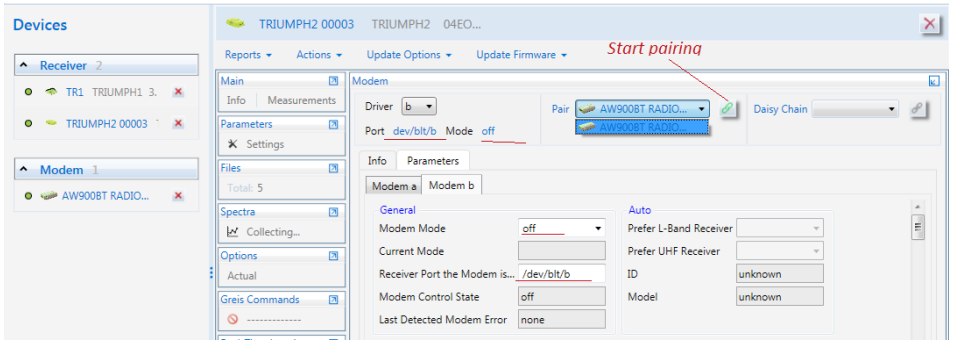
Modem Tile

The toolbar contains:

- The *Driver* drop-down list allows selecting the modem driver.
- *Port* displays the port which is assigned to the selected driver.
- *Mode* displays the selected driver mode.
- The *Pair* drop-down list and the button allow selecting the modem from the list of the available ones and start to pair via Bluetooth.
- The *Daisy Chain* drop-down list and button allow selecting the channel and start daisy chaining.

External Modem via Bluetooth

NetView & Modem provides the possibility of interfacing between modems and receivers. So external modem and receiver can be paired via Bluetooth. Connected modem is available in the Pair drop-down if it is not paired yet.



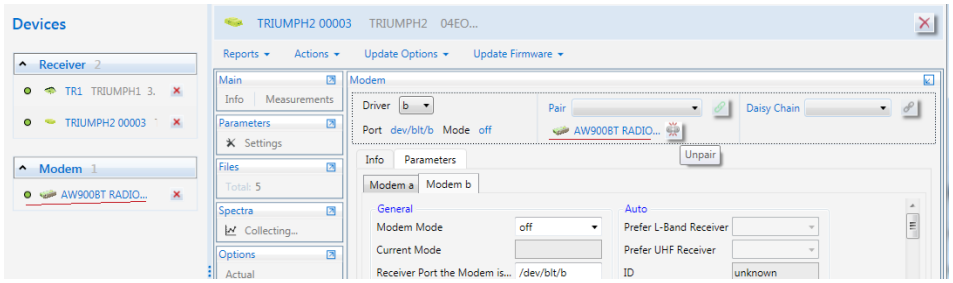
Select modem for pairing

Follow the next steps to pair modem to the receiver:

- Select the *Driver*;
- Set *Port* to `dev/ser/blt/a (b)`;
- Set *Mode* to `off`;

Note: Otherwise, error window will displayed and pairing process will not start.

- Select the modem from *Pair* drop-down list;
- Click *Pair* to start.



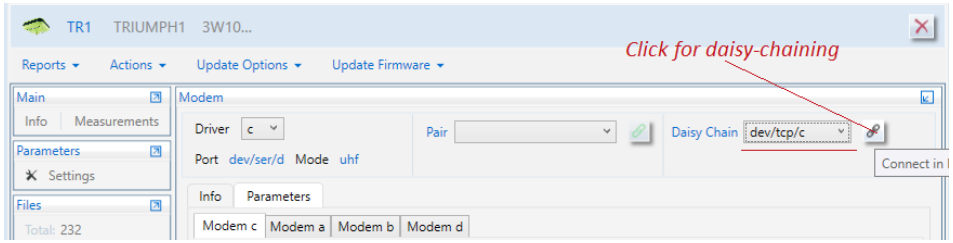
External Modem via Bluetooth paired

Paired modem is displayed under the *Pair* drop-down list and followed

by the *Unpair* button. It can be unpaired by the same procedure.

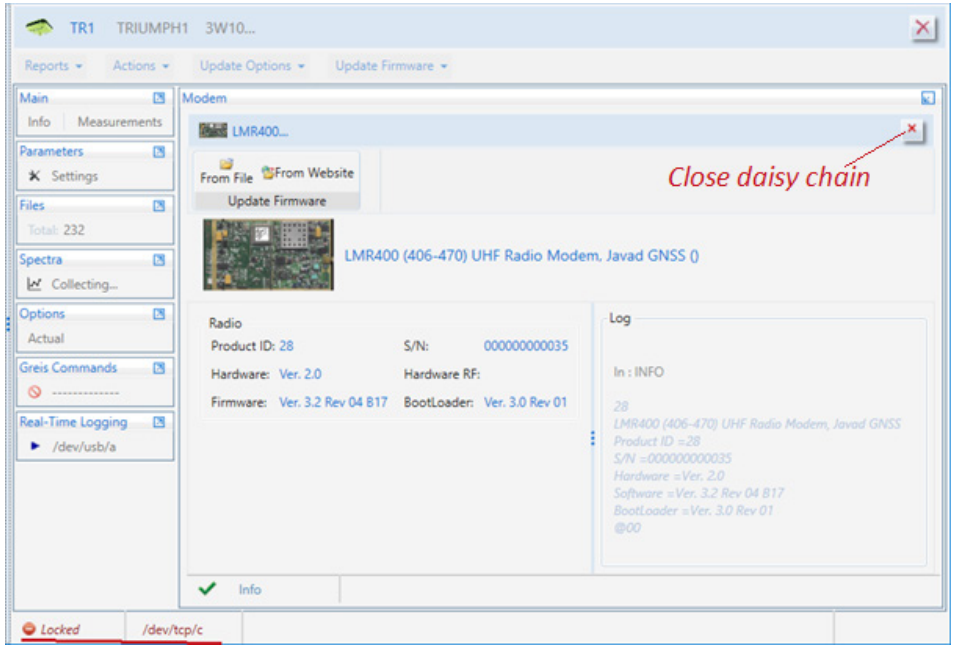
Daisy Chaining

An internal modem can be accessed by daisy chaining. To start daisy chaining select the channel from the *Daisy Chain* drop-down list and click the *Daisy Chain* button.



Daisy chain via tcp/c

After connecting full info about the modem will be displayed and firmware updating will be available.



Internal Modem connected by daisy chain via tcp/c

Internal modem window contains the *Log* pane which displays all commands which were send to the modem and responses. Content of the *Log* pane is also stored to the log file.

To disconnect from the internal modem click the *Close* button. Daisy chaining will stop and the channel will be released.

Modem Firmware update

The modem firmware can be updated from file or via Internet. Depending of the modem model Radio, MCU and Internal MCU firmware can be updating.

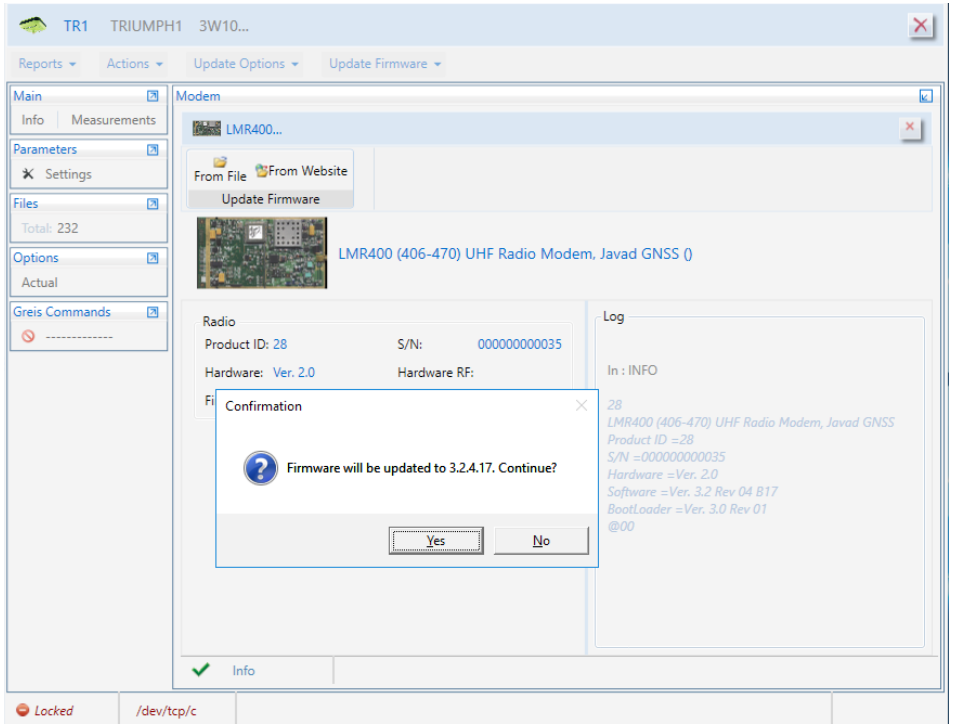
Updating from a file

Click *From File* and choose firmware file using *Open File* dialog window.

Updating from Internet

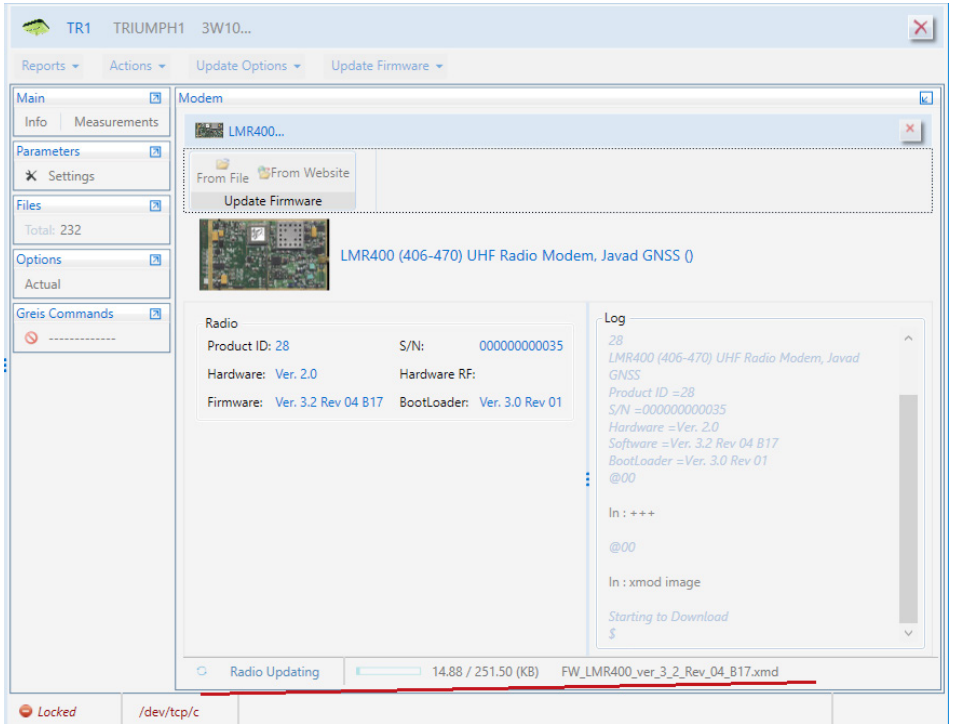
Click *From Website*. The firmware file will be downloaded from the site and checked.

If the firmware is suitable to the modem and has another version, the updating will be started. Otherwise, the warning will be shown.



Internal Modem Firmware updating confirmation

The status bar at the bottom of the window shows the process progress.



Internal Modem Firmware updating

After firmware is updated modem will reconnect and actual information will be displayed.

Radio Parameters

The *Parameters* tab - contains up to four sub-tabs called *Modem c*, *Modem a, Modem b,* and *Modem d*. All section provides the identically set of the settings for each modem. Receivers support GSM, UHF and FH modems which can be as internal so paired.

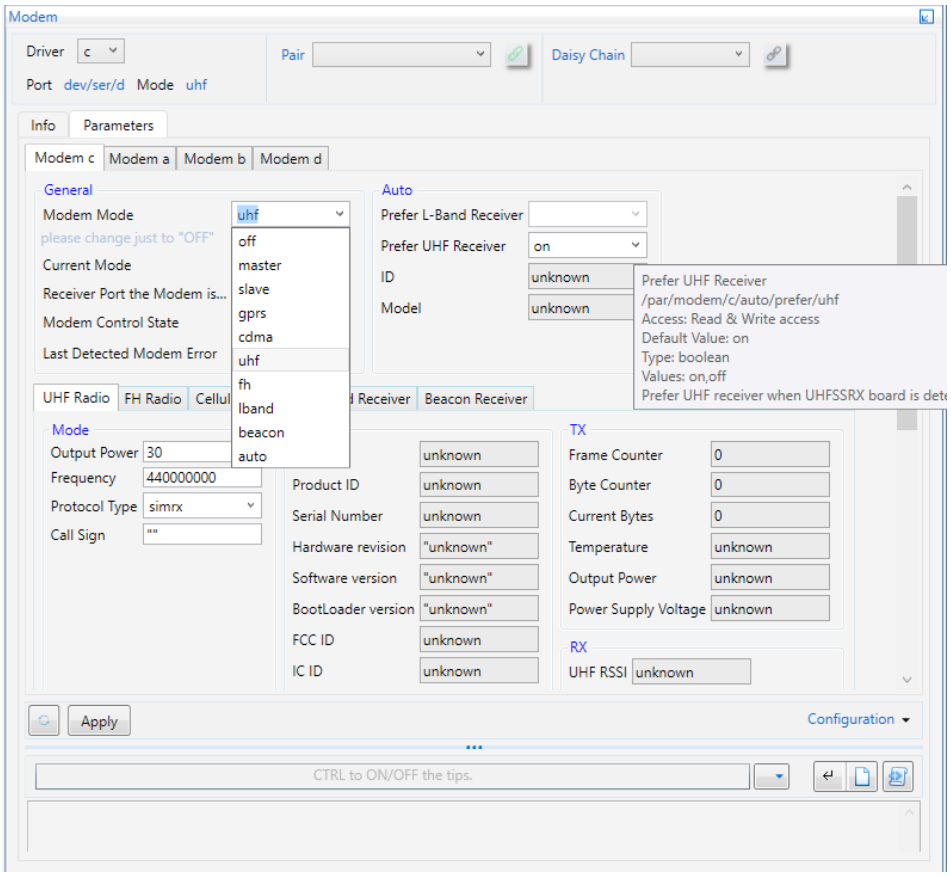
Note: The parameters are described in [2, 4.4.26 GSM, UHF, and FH Modem Parameters].

Depending on the type of modem you may need to configure various settings. They are located at the corresponding tabs.

The *Parameters* tab is arranged like *Parameter* tile (see Configuring the Receiver chapter)

The *Configuration* button saves/loads all radio parameters to the tcl-script.

The *Limited Manual Mode* pane is also provided.



Modem parameters

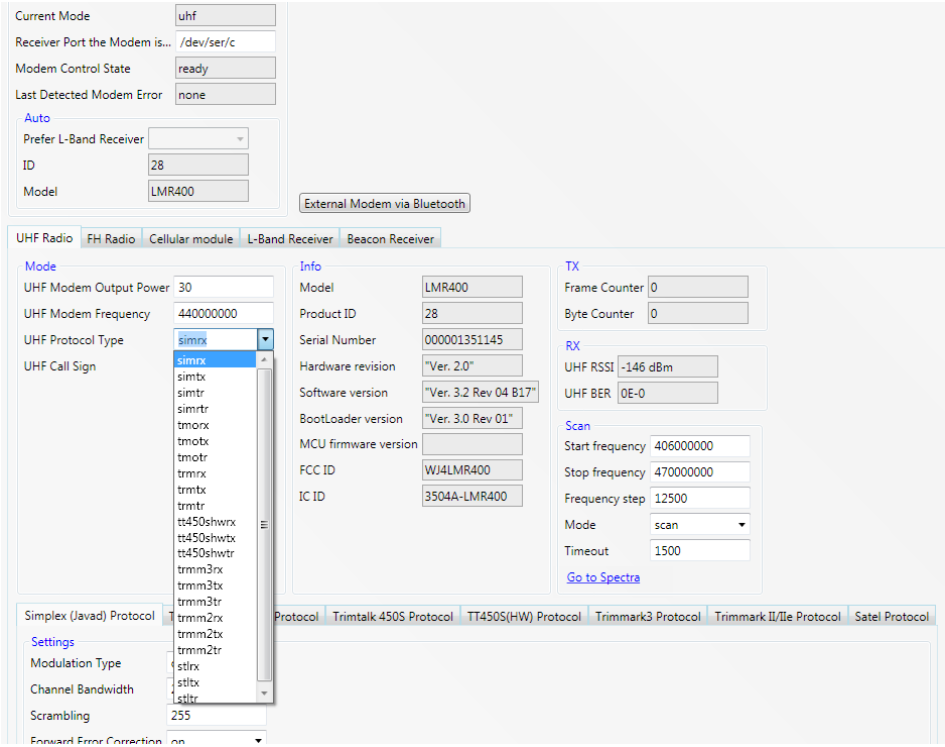
The following parameters can be set for each modem:

- *Common* – allows setting the mode which will use to communicate with the remote modem, corresponding receiver port and to monitor the current mode and statuses.
  - *Auto* – identifiers, filled the modem is detected. [2, Auto modem parameters].
  - *External modem via Bluetooth* – the button for pairing with an external modem

Pairing process is described below.

Tabs for the different types of modems:

- *Uhf Radio* - [2, Uhf Modem Parameters].
- *Mode* – settings configuring the uhf modem
- *Info* – internal settings of the modem (read-only)
- *TX* – counters of the transmitted data (read-only)
- *RX* – characteristics of the received signal (read-only)
- *Scan* – settings for scanning radio interferences.
- Go to spectra – the button for navigating to the receiver main window tab Radio Spectra.

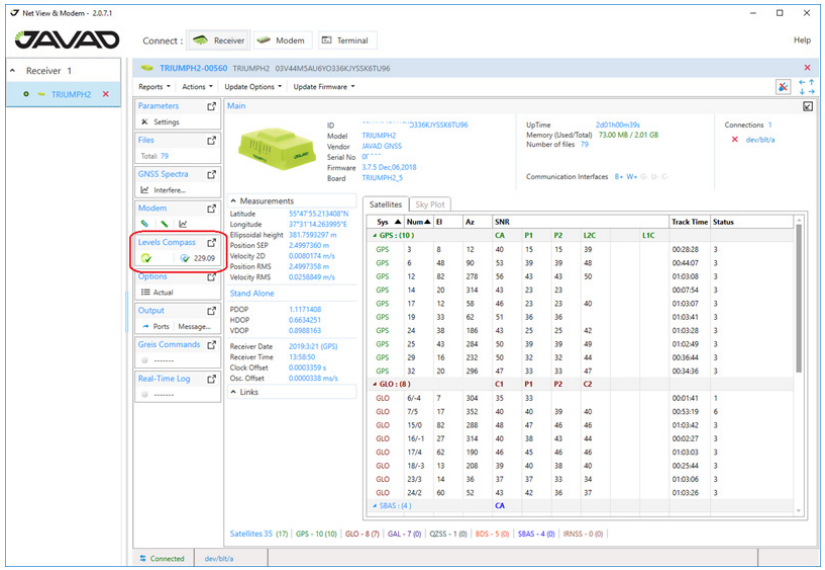


UHF Radio parameters

- *Protocols* – The following protocols can be configured to transmit and receive data via modem depending on selected UHF Protocol Type.
  Simplex (Javad)

Levels and Compass calibration

JAVAD receivers can be equipped with internal compass and levels that allows controlling device orientation parameters. Currently, TRIUMPH-2 and TRIUMPH-1M models are shipped with internal compass and levels. Levels and Compass should be calibrated for proper operation. You can check calibration and calibrate those using NetView & Modem. For this launch NetView & Modem and connect to the receiver via Bluetooth. If the receiver is equipped with internal levels and compass the “Levels Compass” tile will appear.



Levels Compass tile

Green check marks on the bubble and compass icons mean that the device considers it as calibrated. Otherwise, red x-sign will be displayed. The number next to the compass icon is a heading value. To check the calibration or calibrate Levels and/or Compass, maximize the tile.

Calibration check procedure

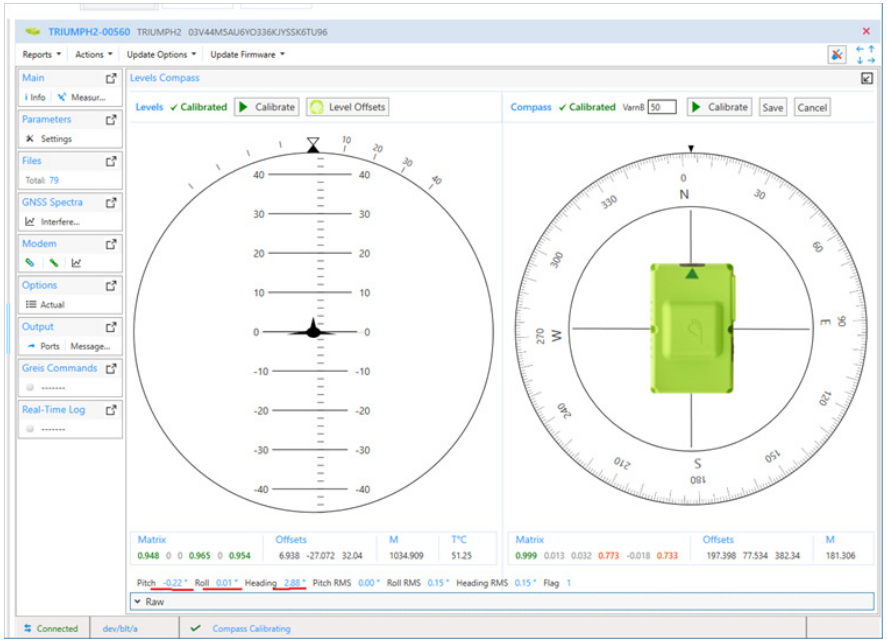
If Levels and Compass are already calibrated, make sure that calibration is still proper.

Levels

Pitch and Roll values are within 0.5° for a receiver is placed on the flat horizontal surface.

Compass

Heading value is the correct direction. You can use another compass to check this. Ideally, the compass should be calibrated before every usage due to a change in the magnetic environment.



Levels Compass are calibrated

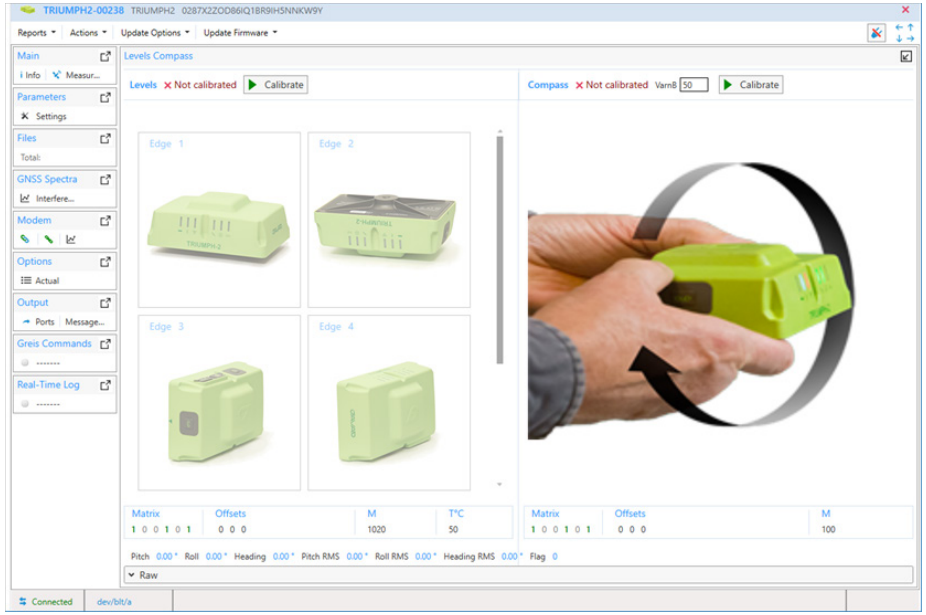
Removing Levels Offsets

If the surface on which the receiver is placed is not ideally flat and horizontal click Level Offsets button to reset level offsets.

Calibration

If Levels and Compass are not calibrated, you will see the pictures with the calibration invitation. The Pitch, Roll, Heading values are not available. Note, the Levels should be calibrated firstly.

Click *Calibrate* to start the calibration if it is not calibrated yet or you are not satisfied with the current results.

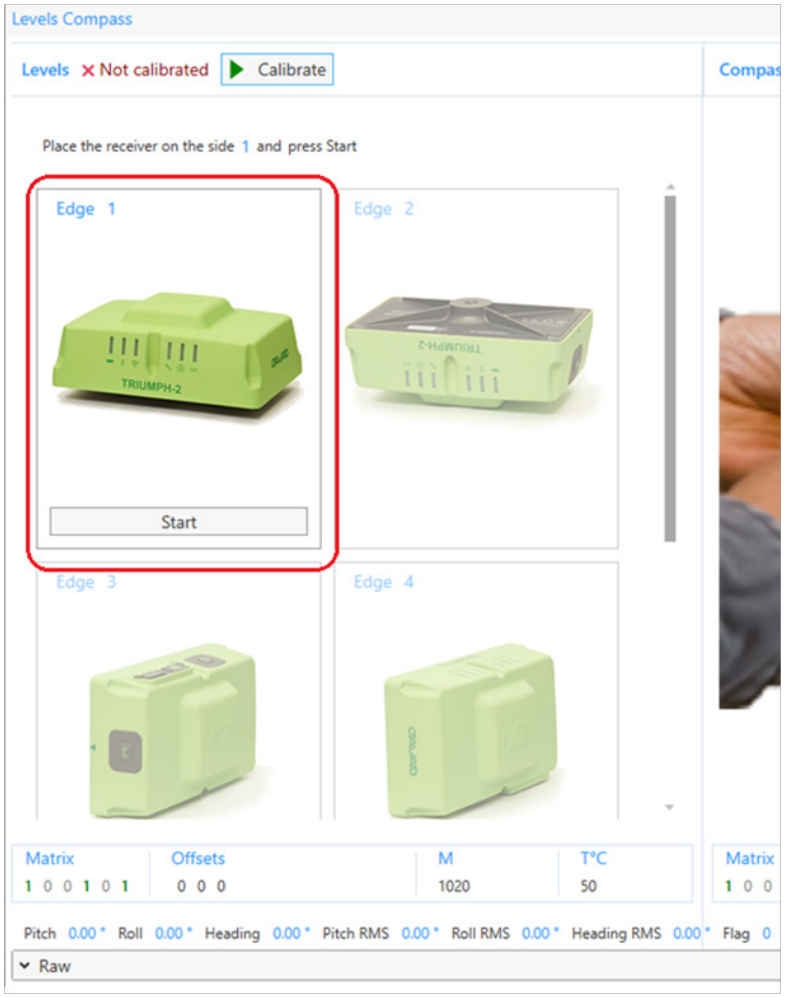


Levels Compass are not calibrated

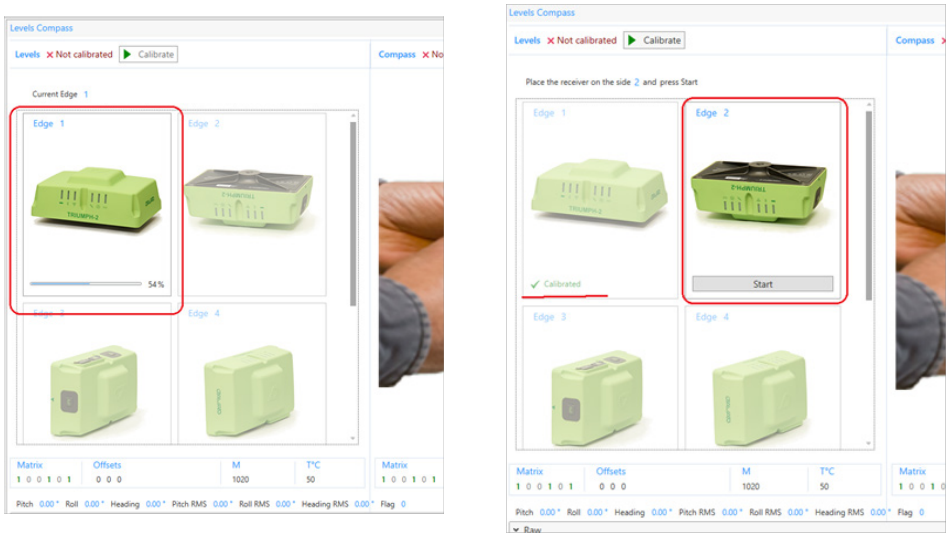
Levels calibration

After *Levels Calibration* is started six edges should be calibrated in the proper order. The controls with the current edges become available one by one.

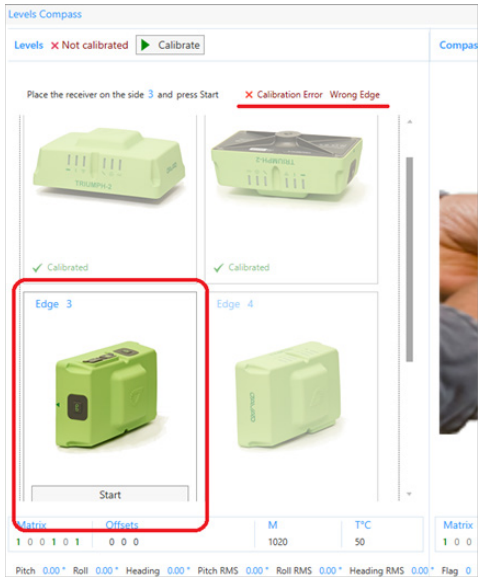
Place the receiver on the flat horizontal surface as shown at the picture and click *Start*. Don't move or shake the receiver during the calibration. After current edge calibration is finished the next edge become available. The same way the next side will be calibrated. Put the receiver on every side following the pictures and calibrate all. Please be careful since pictures for TRIUMPH-2 show the real receiver position, but in other cases, it will be the view from above. If the receiver is placed wrongly, the error message appears.



The first edge is ready for calibration

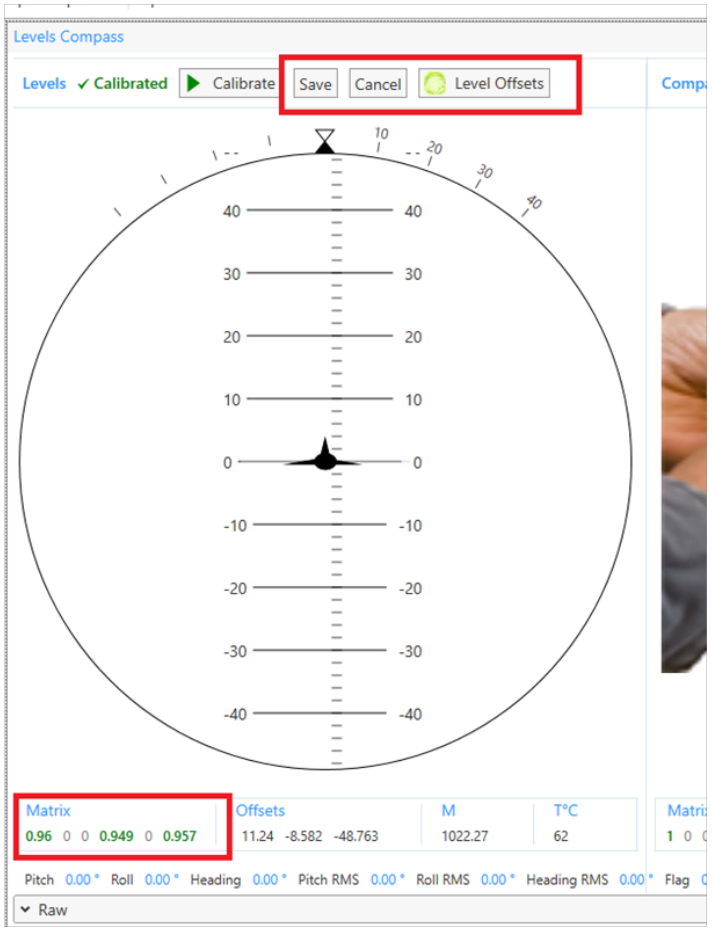


The first edge is calibrated. The second one is ready



Error. The receiver is not placed as shown in the picture

When all sides are calibrated, the levels calibration is complete. Wait for a moment until the calibration matrix is calculated. Afterwards the *Pitch/Roll* plot and the computed values will be displayed.



Levels calibration is finished successfully

The Levels calibration matrix shows the results. If first, fourth and sixth values are more than 0.9, and less then 1, the calibration is proper. You can save the results to the NVRAM by clicking the *Save* button or use those only in the current session by clicking *Cancel*.

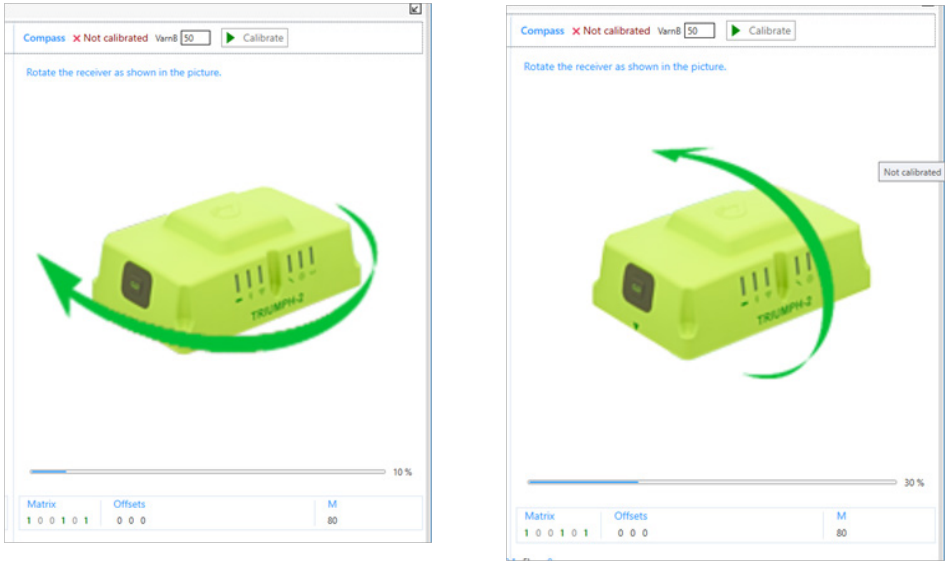
The *Offsets* are the real values offsets, *M* is magnitude. *T* is device temperature.

If it is necessary, click *Level Offsets* to reset the offsets as described above.

Compass calibration

Calibrate the Compass after Levels

To start the compass calibration click *Calibrate*. Rotate the receiver along each axis, following the pictures, until calibration is finished. The rotation directions should be changed six times.



Rotate the receiver along the three axes

After calibration is completed, wait for a moment until the calibration matrix is calculated. Then *Heading* plot and the calculated values will be displayed.

Compass calibration is complete

The compass calibration matrix shows the results of the calibration. If first, fourth and sixth values are more than 0.8 and less than 1, the calibration is proper.

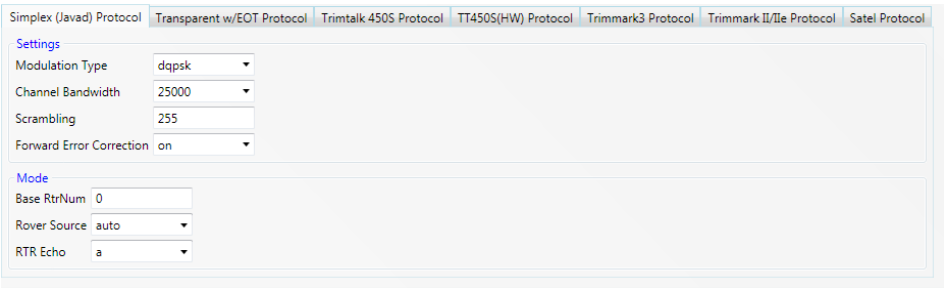
You can save the results to the NVRAM by clicking the *Save* button or use those only in the current session by clicking *Cancel*.

The *Offsets* are the real values offsets, *M* is magnitude. *T* is device temperature.

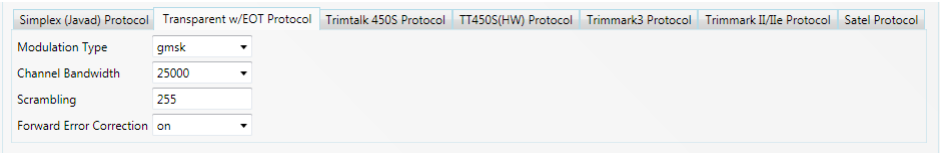
VarnB is the scatter of acceptable values. It takes an amount from 30 to 50. You can play with VarnB to improve the calibration results.

Transparent w/EOT
Trimtalk 450S
TT450S(HW)
Trimtalk3
Trimmark ll/lle
Satel

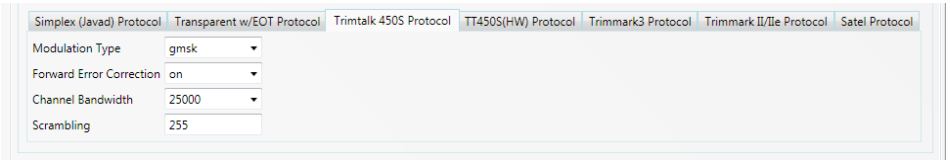
Settings for each protocol are available on the separate tab.



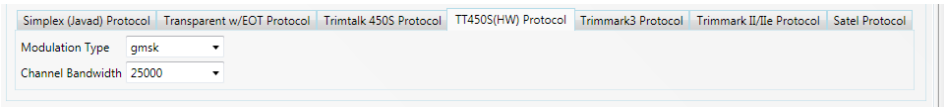
Simplex (Javad) protocol parameters



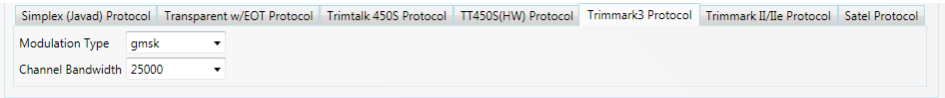
Transparent w/EOT protocol parameters



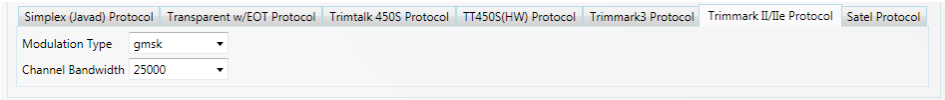
Trimtalk 450S protocol parameters



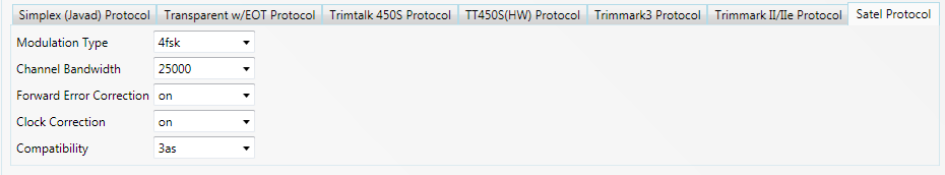
TT450(HW) protocol parameters



Trimtalk3 protocol parameters



Trimtalk II/IIe protocol parameters

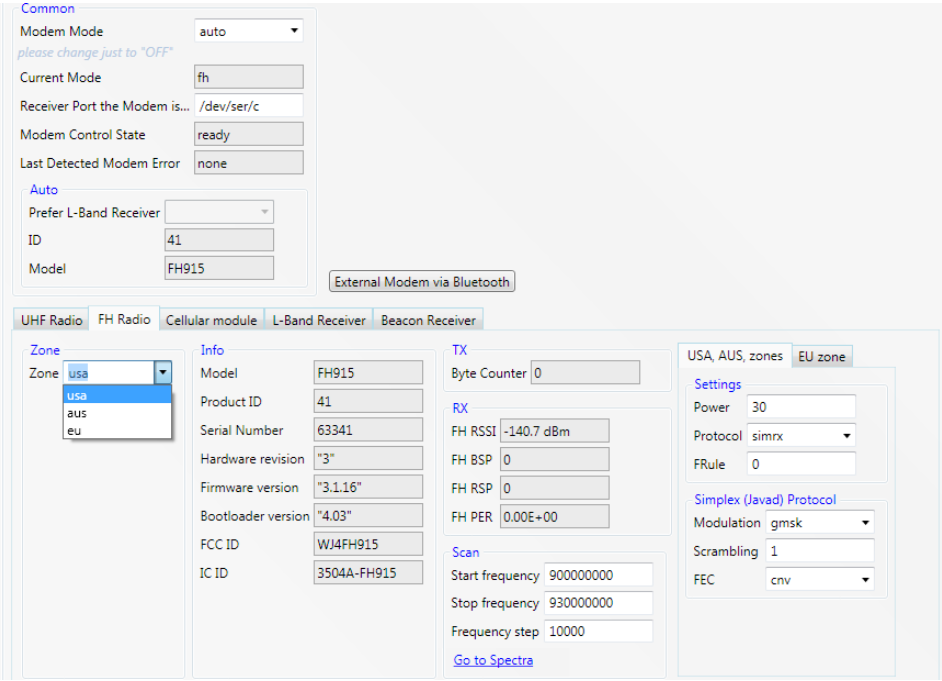


Satel protocol parameters

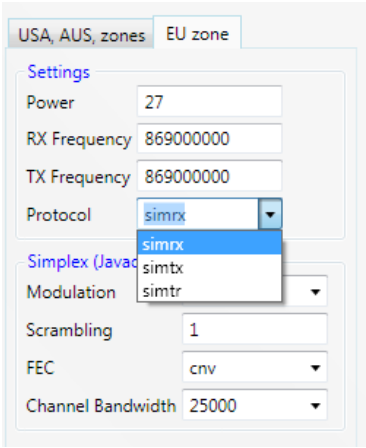
- FH Radio - [2, FH Modem Parameters].
  - Zone – the zone of FH radio operation
  - Info – internal settings of the modem (read-only)
  - TX – counter of the transmitted bytes (read-only)
  - RX – characteristics of the received signal (read-only)
  - Scan – settings for scanning radio interferences.
  - Go To Spectra – button for navigating to the receiver main window tab Radio Spectra.
  - Zones – The following zones can be configured to transmit and receive data via modem depending on selected Zone.

    USA, AUS - USA and Australia;

    EU - Europe.



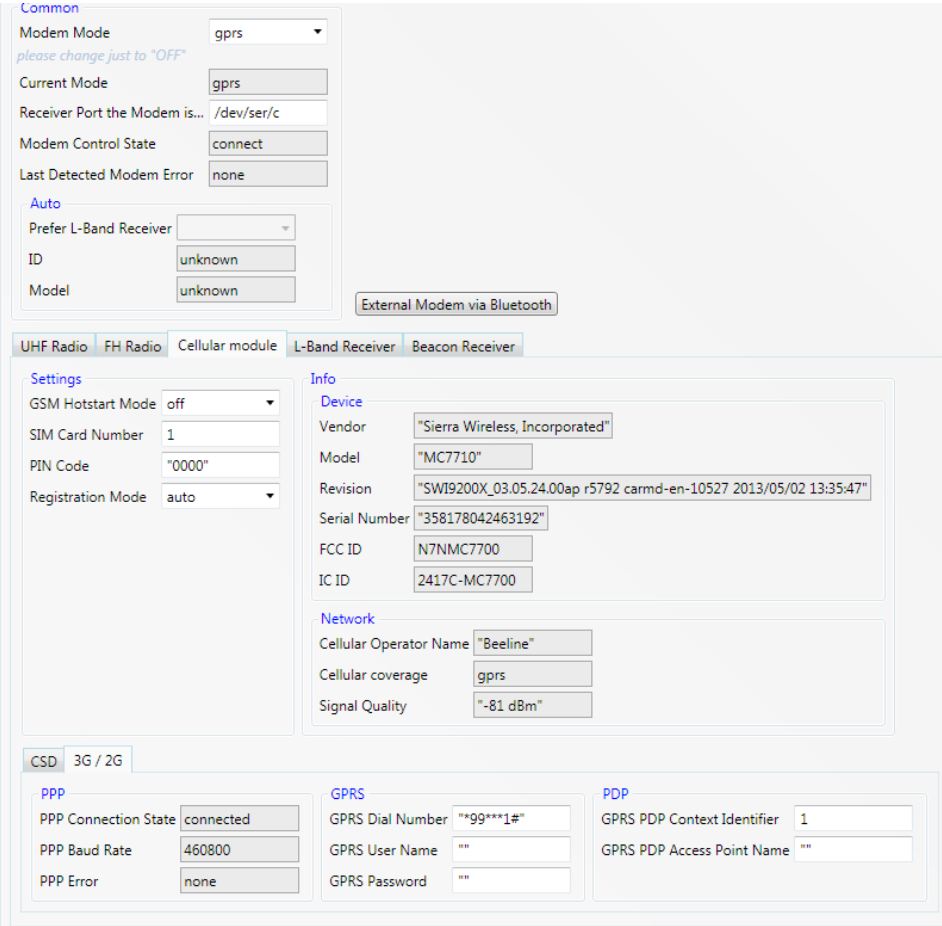
FH Radio parameters, USA, AUS zone



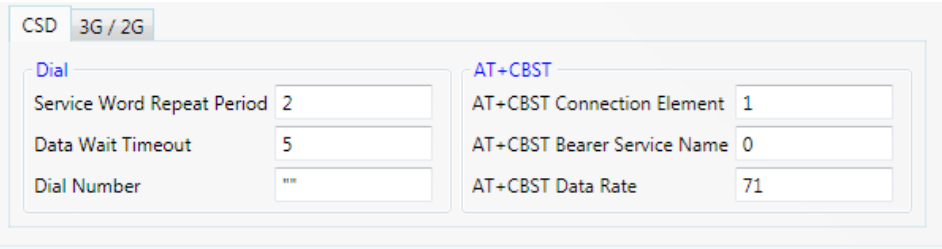
FH Radio parameters, EU zone

- Cellular module - [2, GSM Modem Parameters].
  - Settings – settings which configure the receiver to control the cellular module
  - Info- (read-only):
    - Device – internal settings of the modem
    - Network – the parameters of the cellular network
  - Mode – the settings configuring two different modes of cellular module depending of selected modem mode:
  - CSD – master, slave
    - Dial – dial settings
    - AT+CBST – select bearer service type.
  - 3G/2G – gprs
    - PPP- connection statuses of the PPP server (duplicated on the Networking.PPP tab PPP Configuration Parameters)
    - GPRS – GPRS connection parameters [2, GPRS Configuration].
    - PDP - Packet Data Protocol (PDP) settings. [2, GPRS Configuration].

Settings for each mode are available on the separate tab.

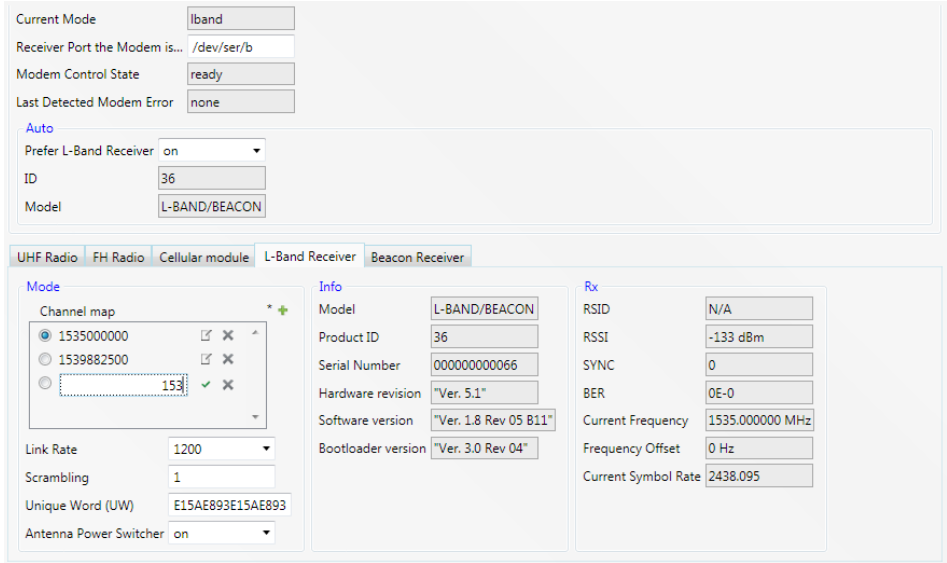


Cellular module parameters, 3G/2G mode.



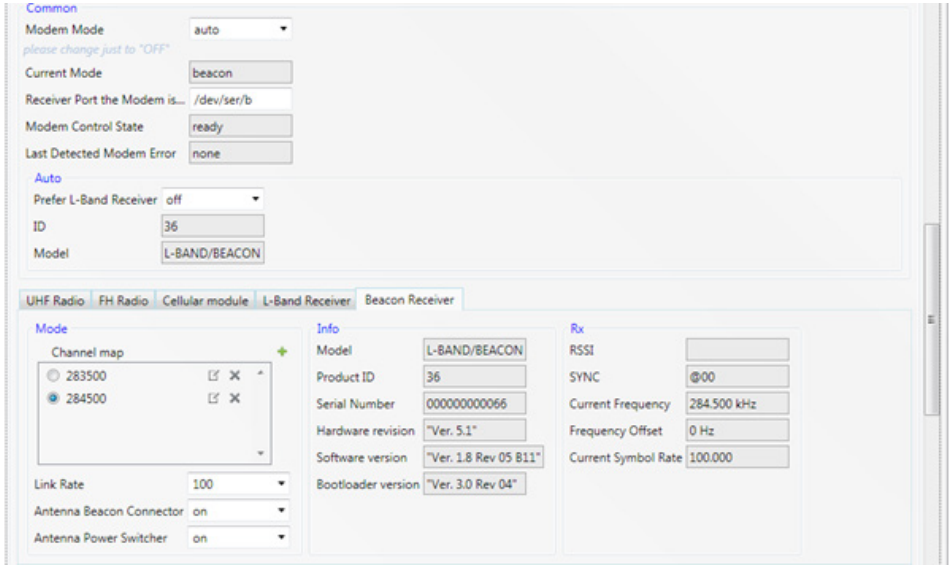
Cellular module parameters, CSD mode.

- L – Band Receiver - [2, LBAND Receiver Parameters]
  - Mode – the settings configuring L-Band receiver mode. Channel frequencies can be added, edited and deleted using Channel map. Selected frequency is set.
  - Info- internal settings of the lband receiver (read-only).
  - Rx – characteristics of the received signal (read-only).



L-Band Receiver parameters

- *Beacon Receiver* – [2, BEACON Receiver Parameters].
  - *Mode* – the settings configuring beacon receiver mode. Channel frequencies can be added, edited and deleted using *Channel* map. Selected frequency is set.
  - *Info* - internal settings of the beacon receiver (read-only).
  - *Rx* – characteristics of the received signal (read-only)

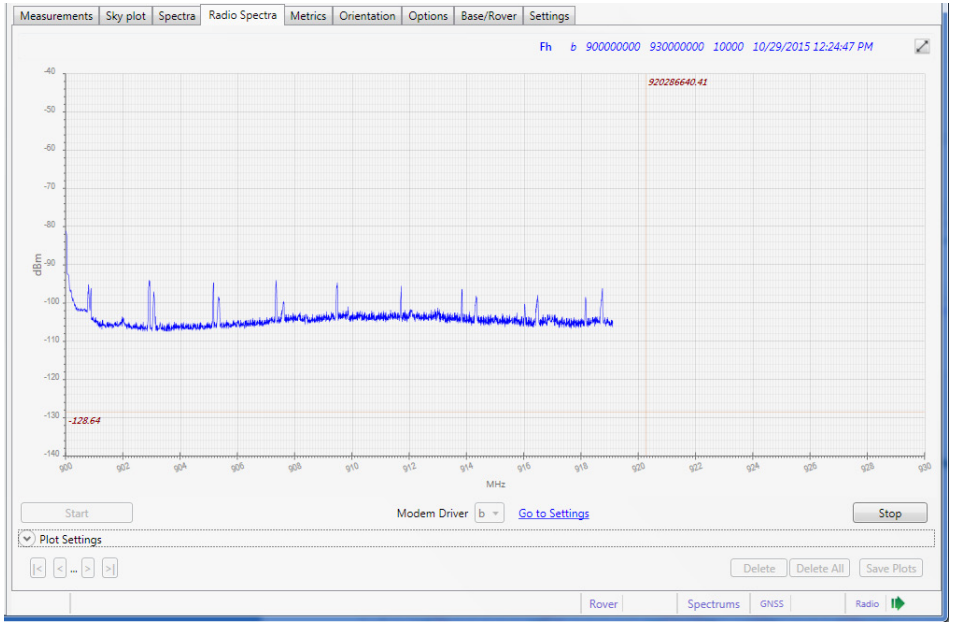


Beacon Receiver parameters

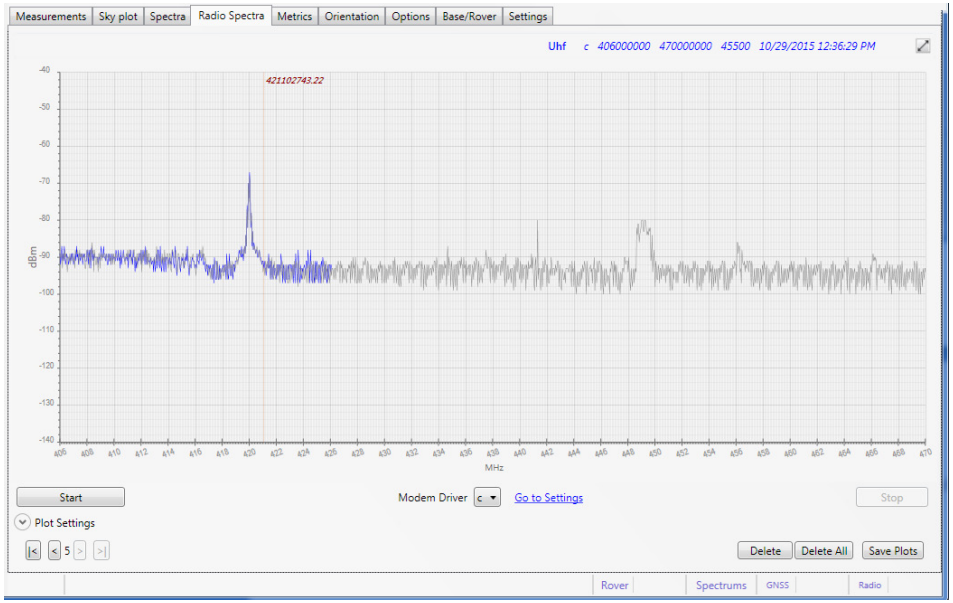
Radio Spectra

The *Spectra* tab allows collecting, displaying and storing the measurements of the radio interference.

To start the spectrum values collecting, select *Modem Driver* and click the *Start* button. Your receiver detects the modem (UHF or FH) automatically and gets spectrum from modem cyclically until the *Stop* button click.



Radio-spectrum (FH) collecting



Radio-spectrum (UHF) stopped

The status of the process is shown in the status bar filed *Spectra* | *Radio*.

All previously made measurements are available. To see them use the navigation buttons in left bottom corner.

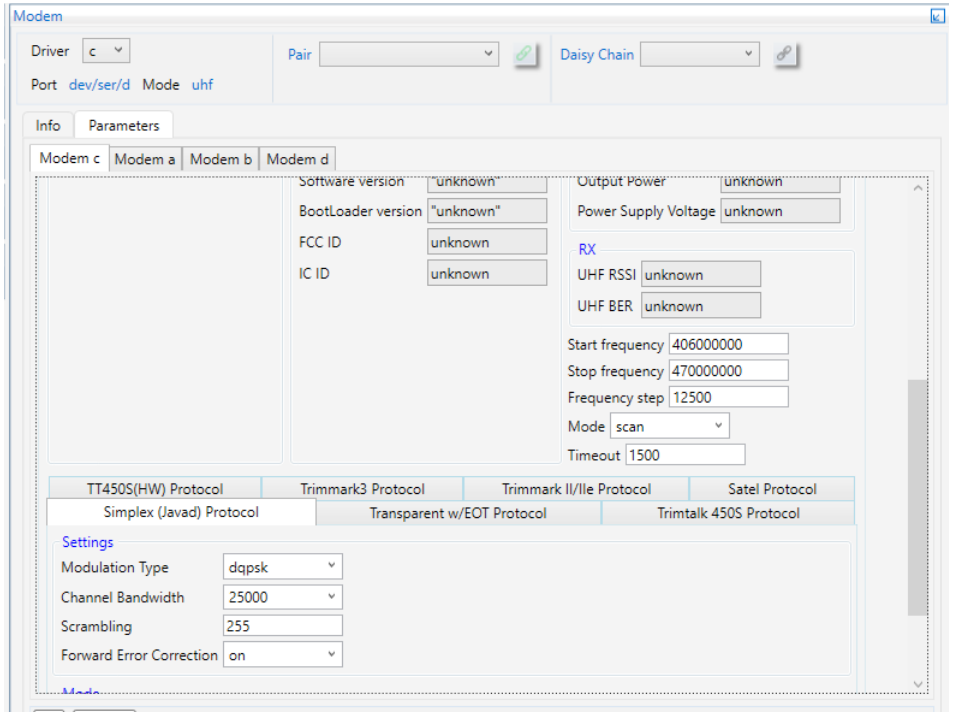
The following data can be displayed on the plots:

- *Blue line* - shows the current spectrum output.
- *Gray line* - shows the value from the previous pass
- *X axis* - the frequency in MHz.
- *Y axis* – RSSI (Received Signal Strength Indication), dBm.

Above the graph the following parameters of the scanning are shown:

- *Modem Type* – Uhf, Fh
- *Modem Driver* – a, b, c, d
- *Start Frequency*
- *Stop Frequency*
- *Frequency Step*

Select the needed driver from the *Driver* drop-down list box. To change the scanning parameters, select the corresponding tab of the *Modem Parameters* and set the desired values to the *Scan* group.

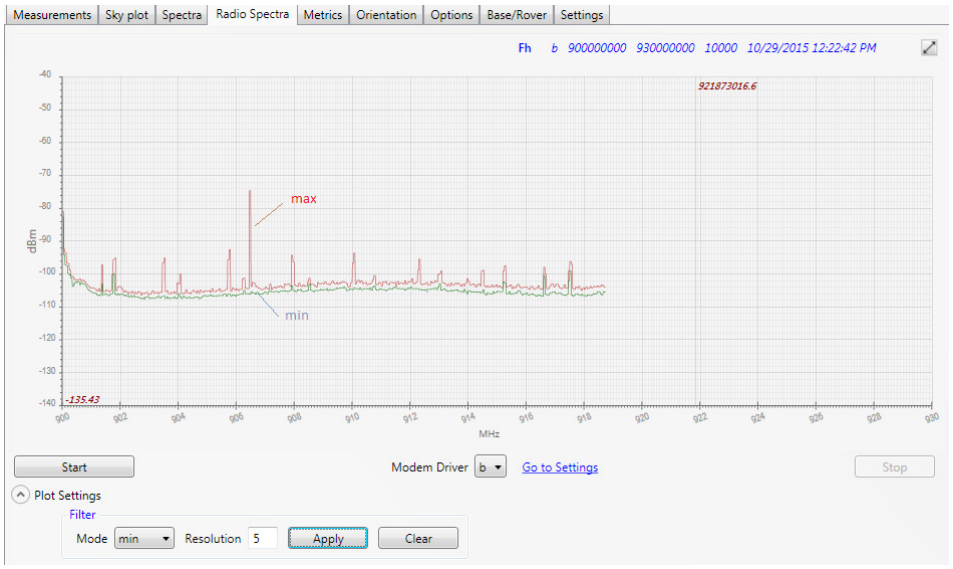


Radio Spectra scanning parameters

Operation with Plots

- *Zoom* - select region by mouse right button or turn the mouse wheel.
- *Pan* - left mouse button move the graph.
- *X-axis* – completely, Y completely – top right button

To analyze the different aspects of the interference the plots can be processed. Expand the *Plot Settings* group, specify the *Filter Mode* and *Resolution* and click *Apply*. To return to the original plot click *Clear*.



Radio-spectrum zoomed, panned and filtered

Saving and Deleting

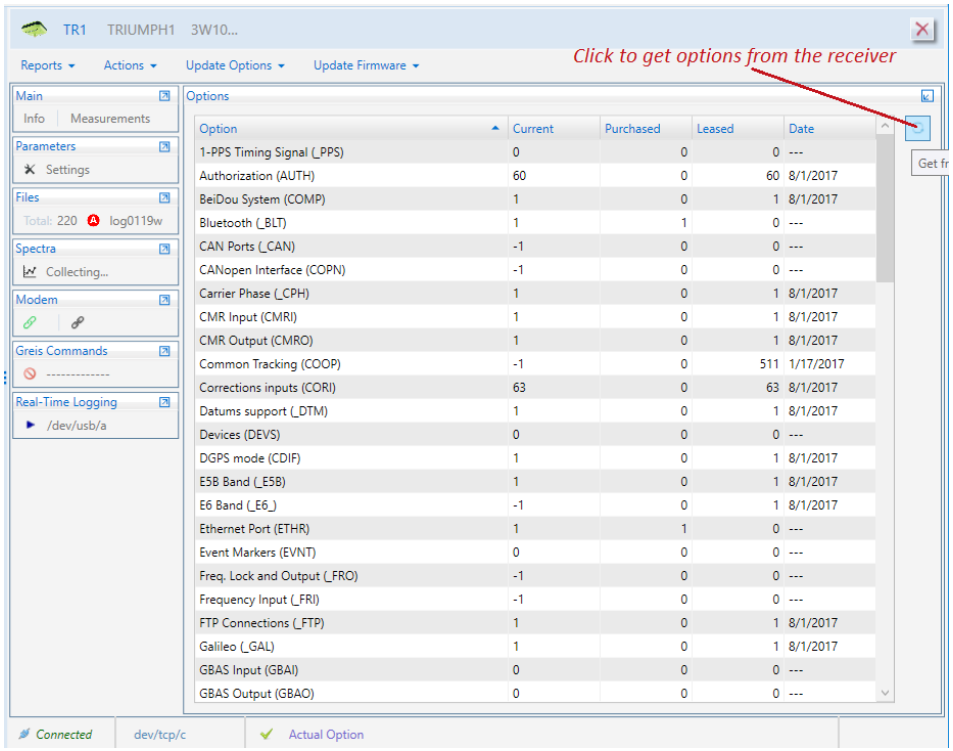
You can save plots and delete them.

To save or delete the spectra, use the buttons in the right bottom:

- *Delete* - Deletes the current spectrum plots.
- *Delete all* - Deletes all plots for the receiver
- *Save Plots* – Saves all plots as png-files to the selected folder.

Options

To see actual options expand the *Options* tile.



Option	Current	Purchased	Leased	Date
1-PPS Timing Signal (_PPS)	0	0	0	---
Authorization (AUTH)	60	0	60	8/1/2017
BeiDou System (COMP)	1	0	1	8/1/2017
Bluetooth (_BLT)	1	1	0	---
CAN Ports (_CAN)	-1	0	0	---
CANopen Interface (COPN)	-1	0	0	---
Carrier Phase (_CPH)	1	0	1	8/1/2017
CMR Input (CMRI)	1	0	1	8/1/2017
CMR Output (CMRO)	1	0	1	8/1/2017
Common Tracking (COOP)	-1	0	511	1/17/2017
Corrections inputs (CORI)	63	0	63	8/1/2017
Datums support (_DTM)	1	0	1	8/1/2017
Devices (DEVS)	0	0	0	---
DGPS mode (CDIF)	1	0	1	8/1/2017
E5B Band (_E5B)	1	0	1	8/1/2017
E6 Band (_E6_)	-1	0	1	8/1/2017
Ethernet Port (ETHR)	1	1	0	---
Event Markers (EVNT)	0	0	0	---
Freq. Lock and Output (_FRO)	-1	0	0	---
Frequency Input (_FRI)	-1	0	0	---
FTP Connections (_FTP)	1	0	1	8/1/2017
Galileo (_GAL)	1	0	1	8/1/2017
GBAS Input (GBAI)	0	0	0	---
GBAS Output (GBAO)	0	0	0	---

Options Tile

Actual options are present in the convenient table supporting the sorting by columns.

Clicking Refresh button requests options at the receiver and fills the table.

Output

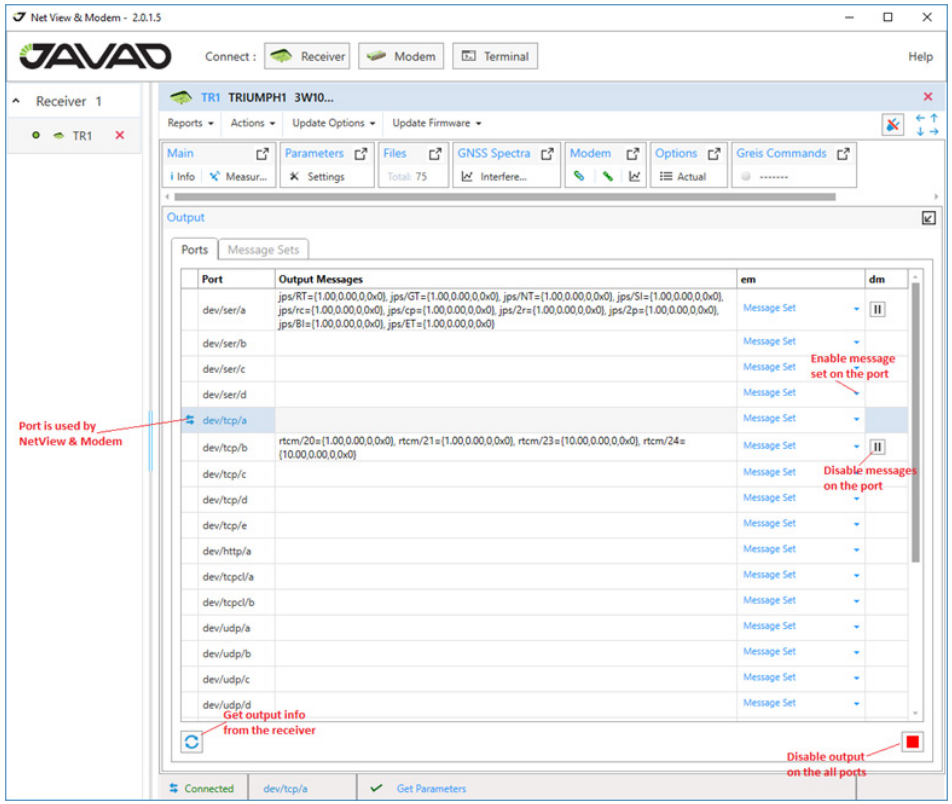
Output window contains Ports and Message Sets tabs. Message stream can be configured and enabled or disabled for the each available receiver port.

Select Output tile

It contains *Ports* and *Message* Sets.

Ports tab

The *Ports* tab provides information about current output on the all available ports. It allows enabling and disabling output on the selected port or all ports.



Output Ports tab

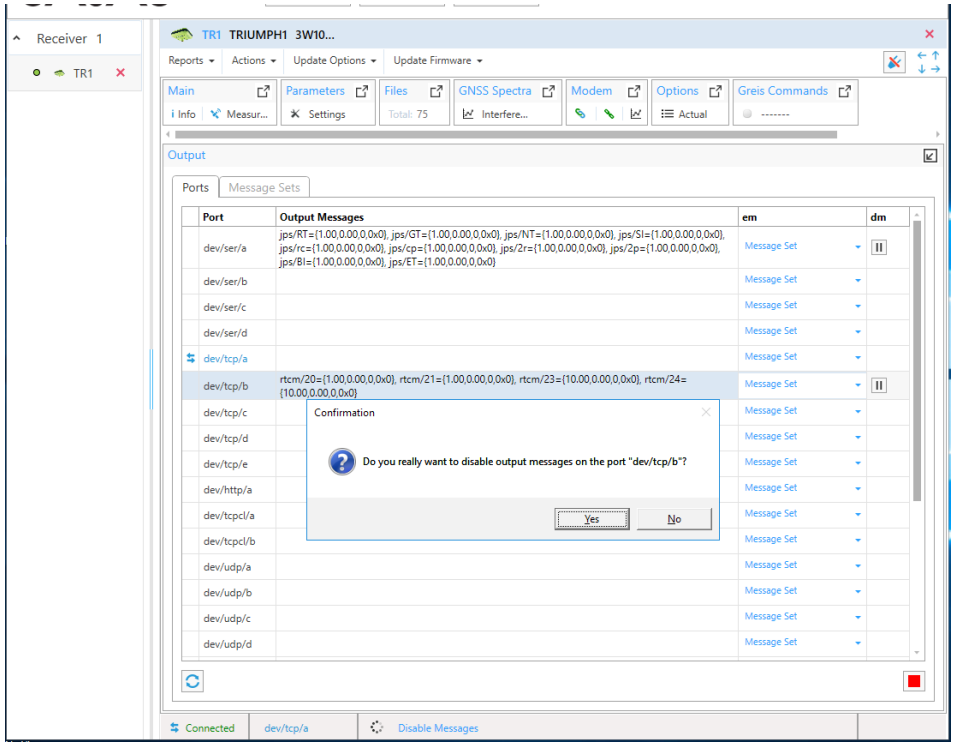
Receiving actual output info

Click *Refresh* to get actual info about output from the receiver.

Disabling output

Click *Disable* to stop output on the selected port and confirm your action.

Click *Disable All* to stop output on all the ports and confirm your action.

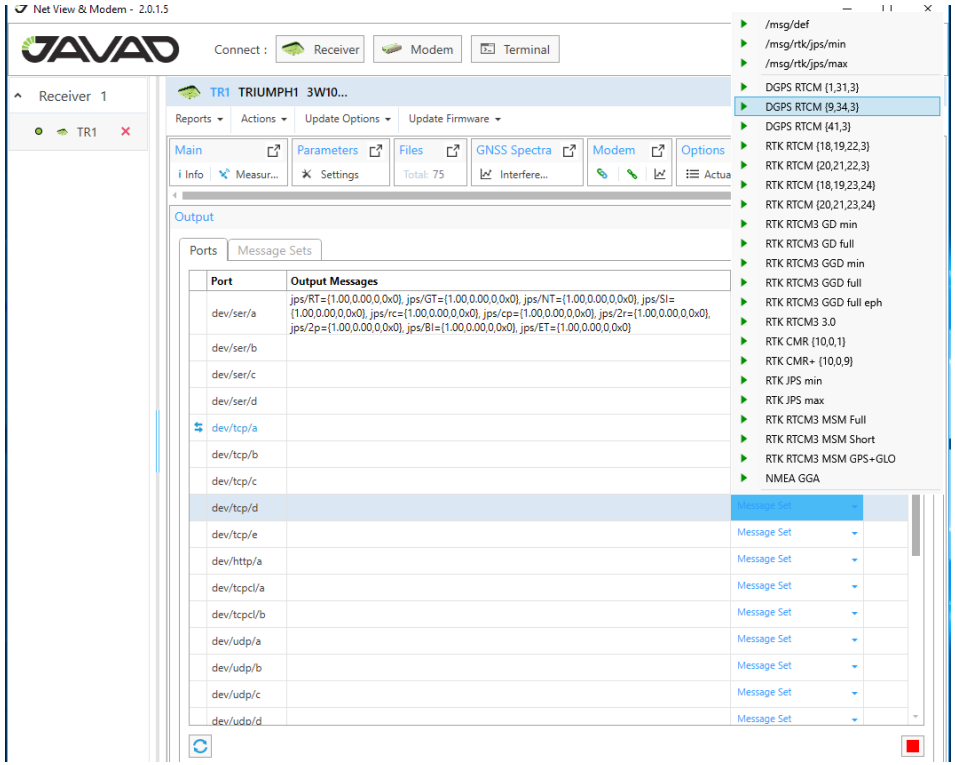


Confirmation of output disabling

Enabling output

Click *Message Set* drop-down and select the desired message set to enable output on the selected port.

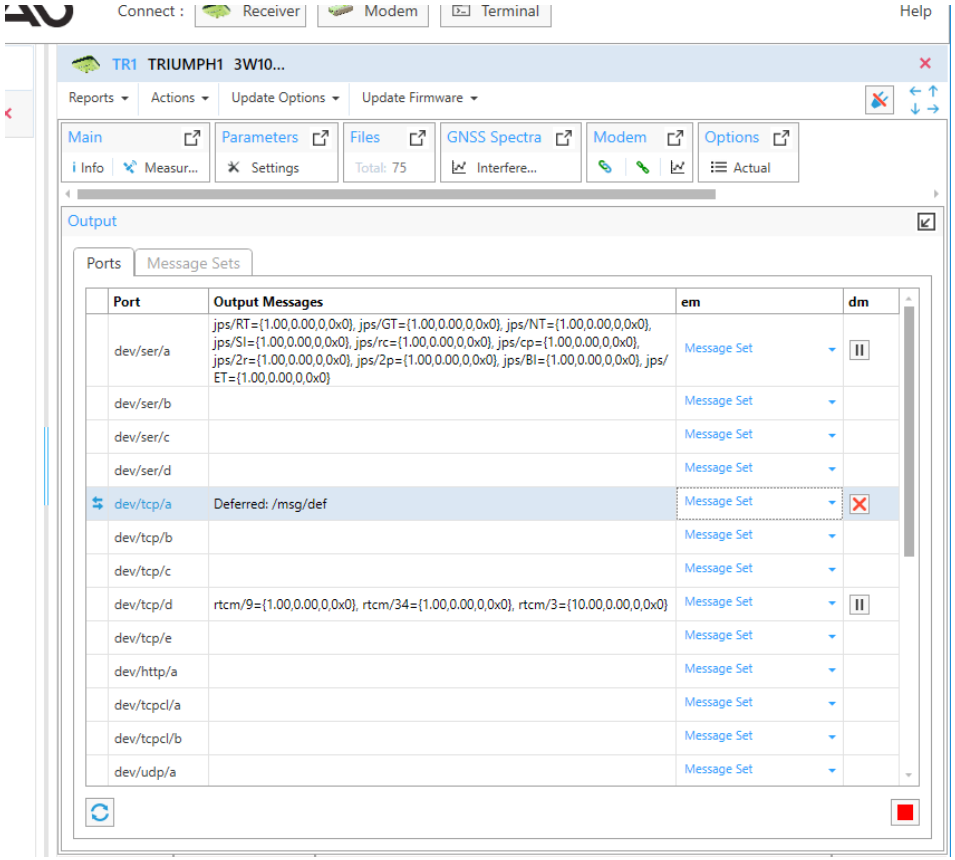
The *Message set* list contains receiver predefined message sets, base correction predefined set and custom sets. They can be edited on the *Message Sets* tab.



Enabling output

Deferred output

If the port is currently used by NetView & Modem, output enabling will be deferred until disconnect. It can be canceled by clicking *Cancel*.



Deferred output on the current port

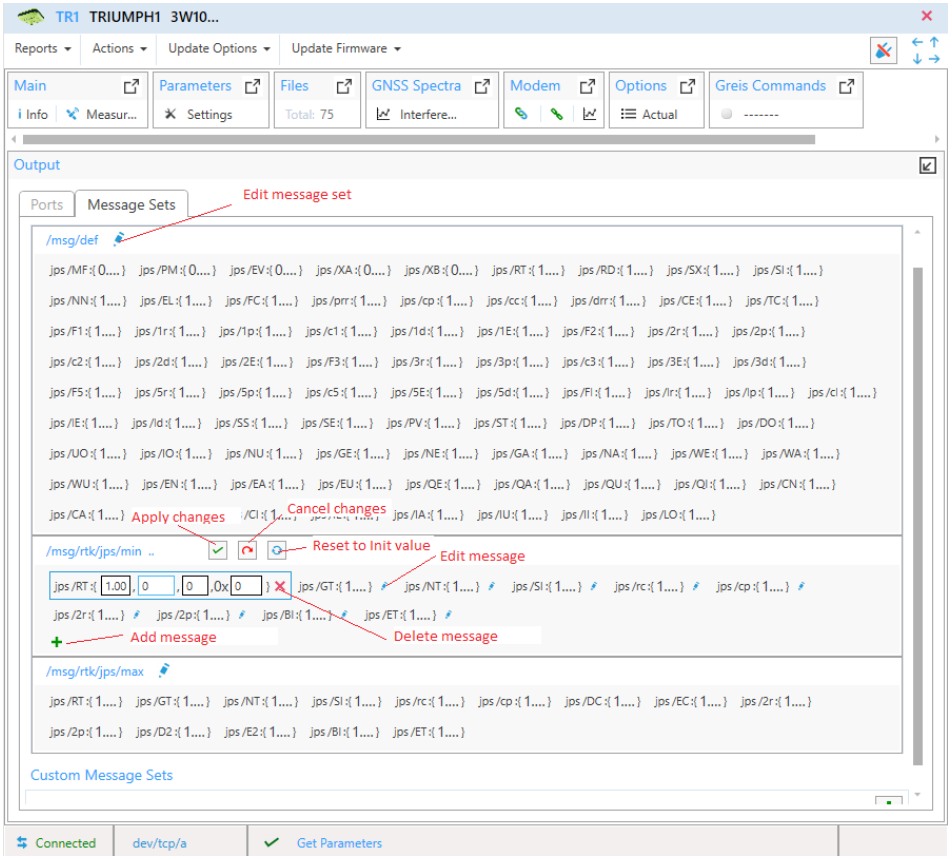
Message Sets tab

The Message Sets tab contains editable message sets.

1. Predefined message sets are

- /msg/def,
- /msg/rtk/jps/min,
- msg/rtk/jps/max,

They can be edited and stored in the receiver.



Predefined messages sets

Editing predefined message set

Click *Edit* (blue pen) in the header. The *Edit* button will be replaced by *Apply, Cancel* and *Reset* buttons.

- *Apply* – saves changes to the receiver.
- *Cancel* – receives actual message set from the receiver. All changes are lost.
- *Reset* – resets predefined message set to the initial value. All changes are lost.

Editing message

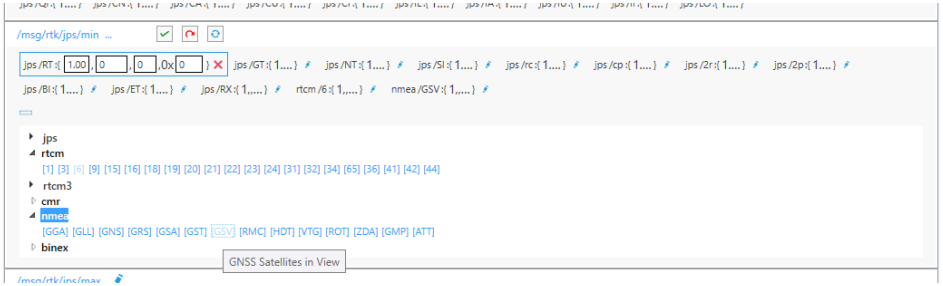
Click *Edit* near desired message. *Output Interval, Phase, Count* became available for the changing.

Delete – deletes message from message set.

The edited message will be signed by blue star.

Adding message to the message set

Click Add Button (green cross). Available messages tree will be opened. Open desired messages group and click on message. It will be added to the set. Messages that are already in the set are shown semitransparent.

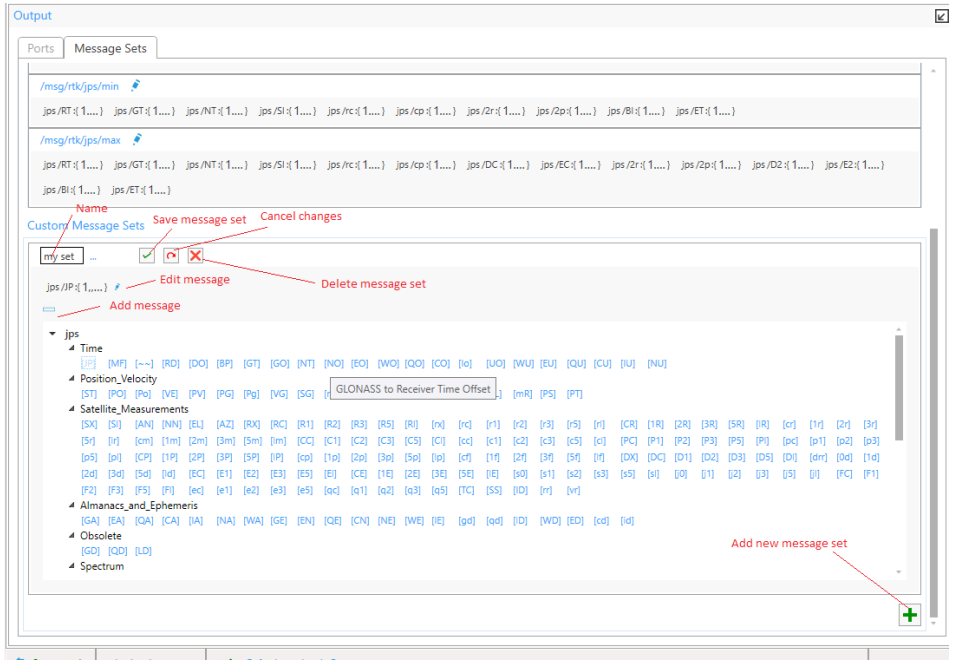


Adding of a message

2. Custom message sets

The custom message sets can be created by the user. They are stored in the NetView & Modem and are available for the enabling in the Ports tab.

To create the new custom messages set click *Add* (Green cross).



Custom Messages Set

Editing custom message set

Click *Edit* (blue pen) in the header. The *Edit* button will be replaced by *Save, Cancel* and *Delete* buttons. New message set is shown in the editing mode.

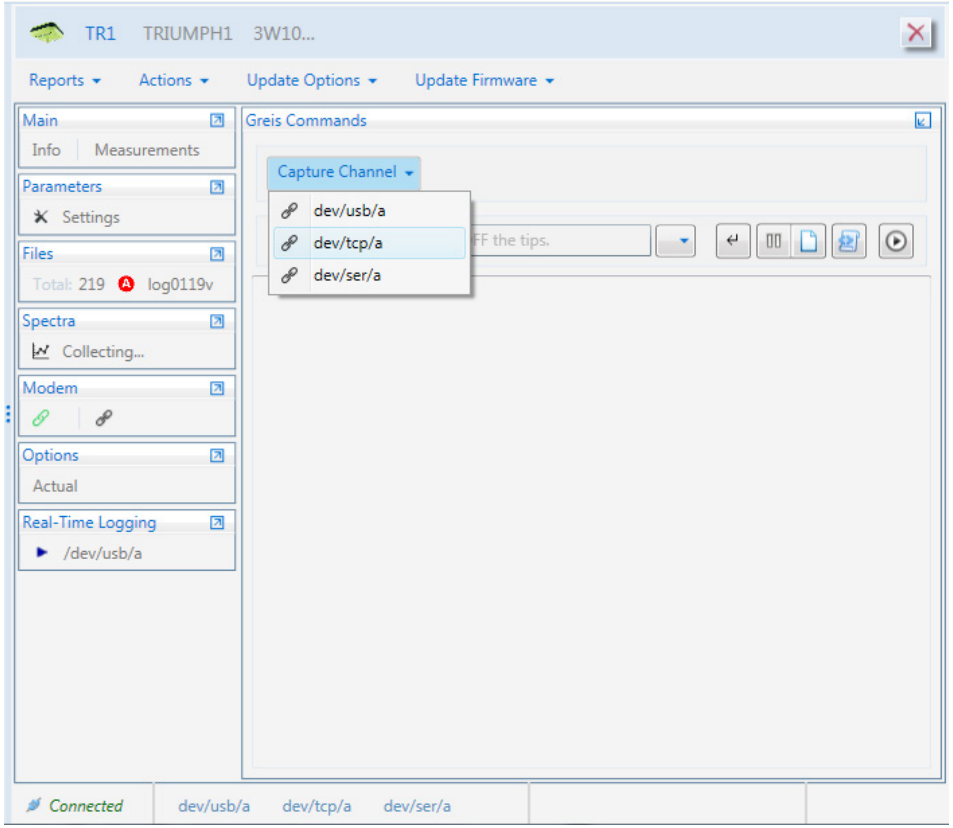
- *Save* - saves changes to the NetView & Modem.
- *Cancel* – receives last saved message set. All changes are lost.
- Delete – deletes custom message set
- Name box allows to change message set name.

Adding and *Editing* messages are carried out in the same way as for the predefined messages set.

Manual Mode

The *Manual Mode* window is designed for direct control of the receiver as a same way as using an ordinary terminal. It allows the user to send various receiver commands, get receiver responses and to log them into the text-file. For a complete list of commands supported by JAVAD GNSS receivers, refer to the [2].

Click on the *Greis Commands* tile of the receiver to go to the *Manual mode* window.



Manual Mode window

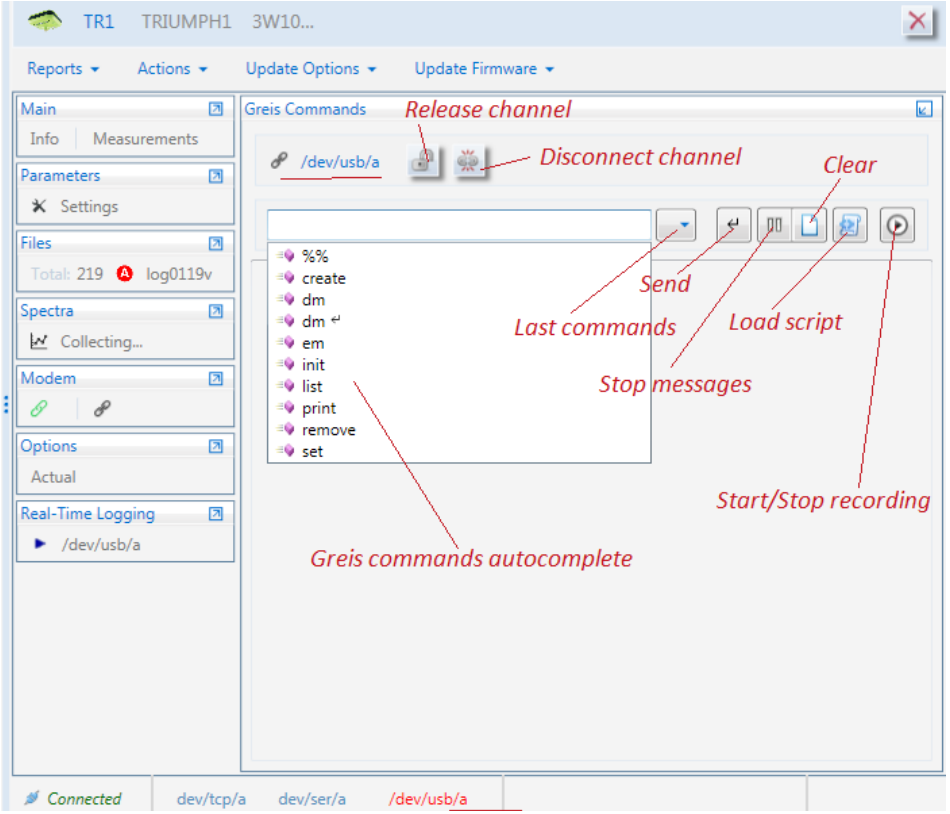
The drop-down list contains the interfaces which NetView & Modem software uses to communicate with the receiver.

Select one to capture for the manual mode and click the *Capture* button.

This connection becomes unavailable for another functionality of the NetView & Modem software. If the connection is the only communication with the receiver is carried out manually only.

After connection is established, all elements of the user interface are enabled.

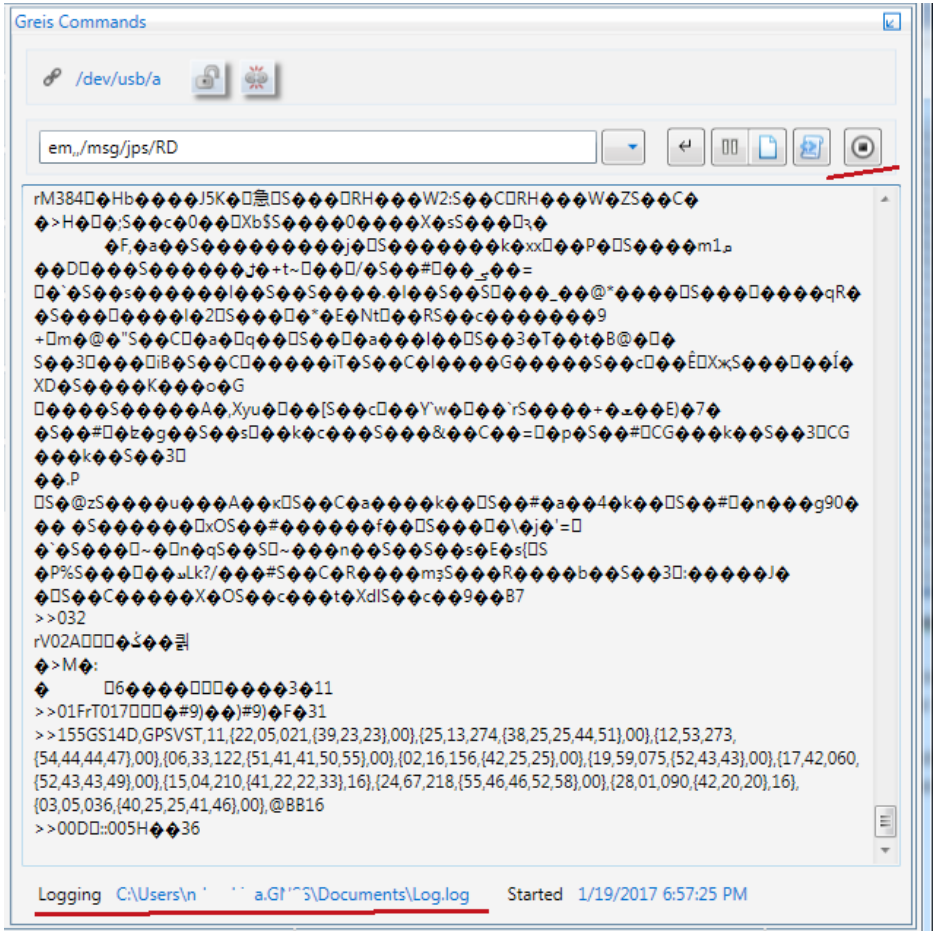
Use the *Input Line* to type a command. The functionality of each button is described below.



Manual Mode window

The following controls are used for the manual operation:

- The *Input line* for the GREIS commands. As you type a hint is shown with a list of available commands.
- The *Output* window displays receiver responses.
- The *Last Commands* list allows select one of the previously sended commands. Up to 50 commands are stored.
- The *Send* button sends command to the receiver (equivalent to Enter in Input Line)
- The *Stop Messages* button disables messages.
- The *Clear* button clears the Output Window
- The *Load Script* button sends a set of the commands from the selected file to the receiver. Only ordinary scripts are supported (tcl-scripts can be loaded using Parameters window).
- The *Start Logging (Stop Logging)* button saves the receiver output to the selected file. After starting the button name changes to *Stop Logging*. The log file path is displayed at the bottom.



Manual Mode window. Output and logging the stream of messages

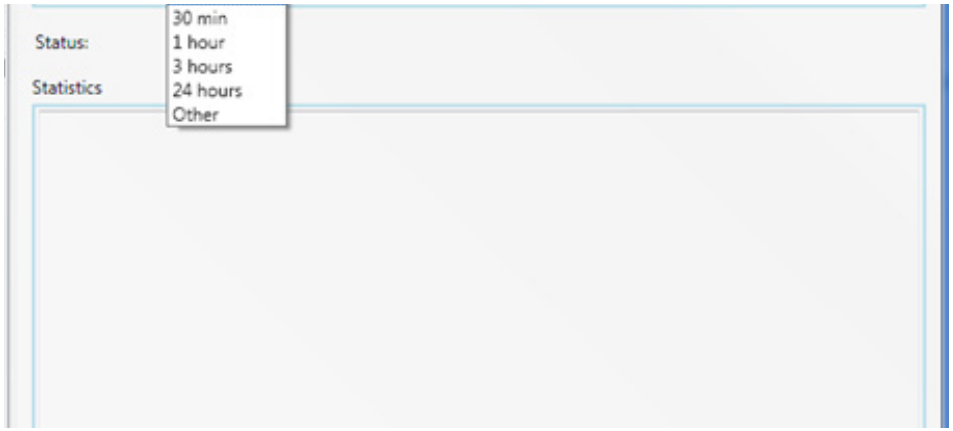
You can finish the manually operation in two ways:

- The *Release* button returns the connection to the NetView & Modem. Output of messages is stopped.
- The *Disconnected* button - close the connection. The ordered messages continue to be output. Net View& Modem doesn't use the connection. This way is useful to configure receiver outputs.

Real-Time Logging

NetView & Modem software allows logging JPS or RTCM messages from the receiver directly to the PC storage in real time. It can be useful, for example, for the receiver for which the internal memory is unavailable. In fact Real-Time Logging in NetView & Modem is just a wrapper on the console application *RealTimeLogger* which is available on JAVAD GNSS site [5].

Click on *Real-Time Logging* tile to open the corresponding window.

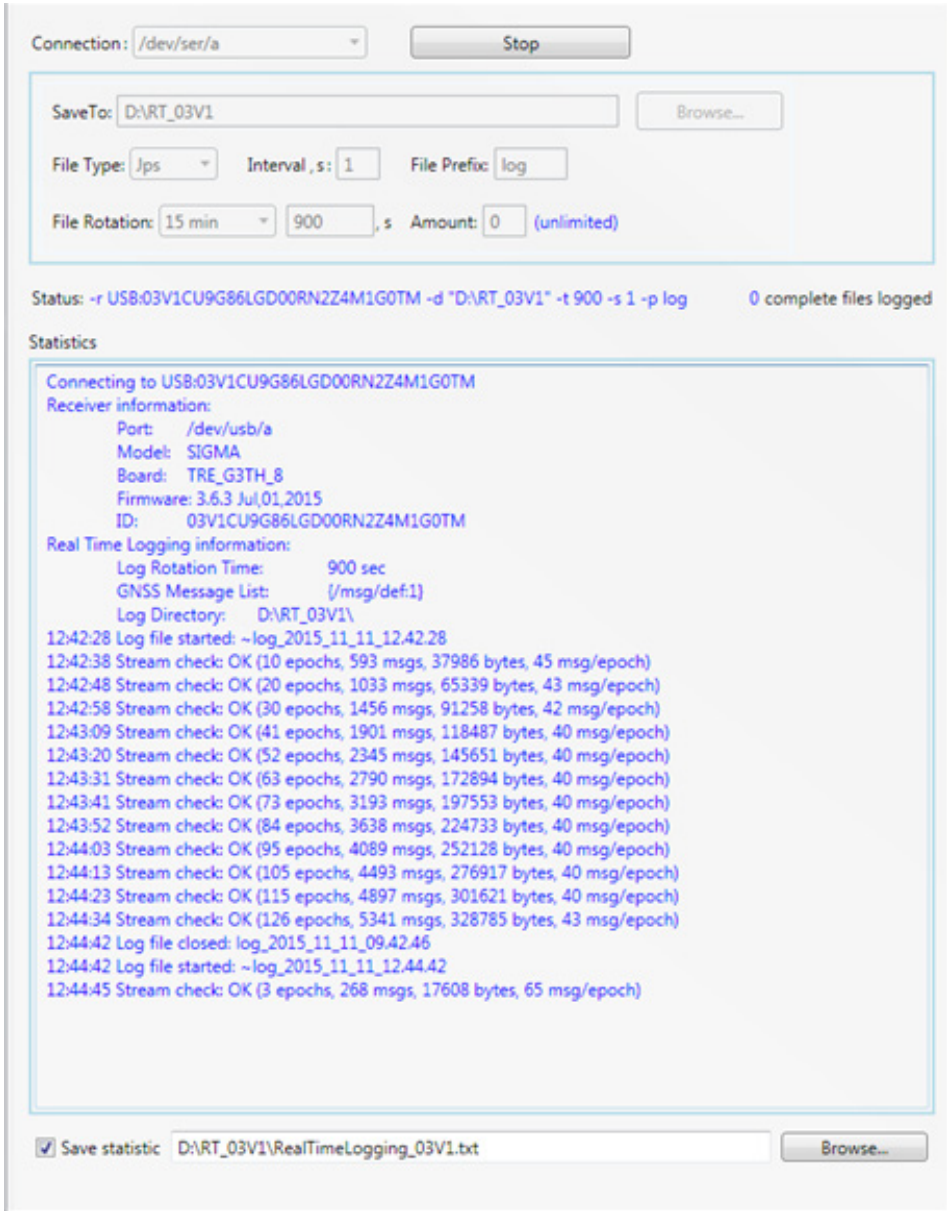


Real-Time Logging window

Follow these steps to start logging:

- Select from the drop-down list one of the connections, which is used by the NetView & Modem for the communication with the receiver. Net View & Modem will use the selected connection for Real-time logging exclusively.
- Specify the folder for logged files saving by typing or using the *Browse* button.
- Set the following parameters:
  - File type - Jps or Rtcm3
  - Interval – interval of messages generation (seconds)
  - File Prefix – prefix which will be added to the file name before the date.
  - File Rotation - recording period (seconds). It can be selected from the drop-down list or typed manually if Other value is selected.
  - Amount - file number. 0 means the files will be logged until Real-time logging is stopped. The value greater than 0 specifies file number to recording.
- Check *Save statistic* and specify file path for saving statistics if desire. File path can be typed manualy or selected using the button Browse.
- Click *Start* button.

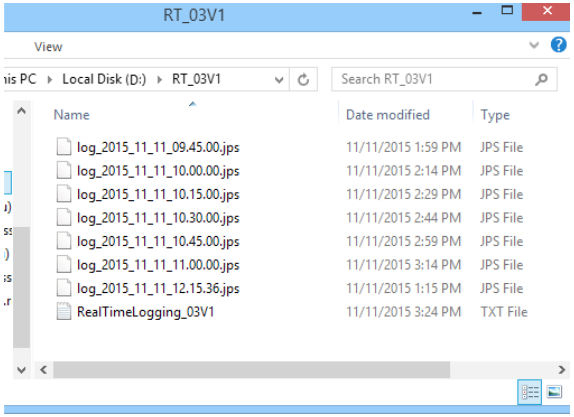
Real-time logging is started (in fact `RealTimeLogger.exe` executed). Status information is displayed below the setting pane and contains the command line which was used for `RealTimeLogger.exe` starting.



Real-Time Logging is going on

Statistics window displays the statistics received from `RealTimeLogger.exe`.

Logged files are located in the selected folder.



Logged files

First file is usually shorter then selected *File Rotation* due to time alignment. The file which is logging at the moment has extension ".tmp".

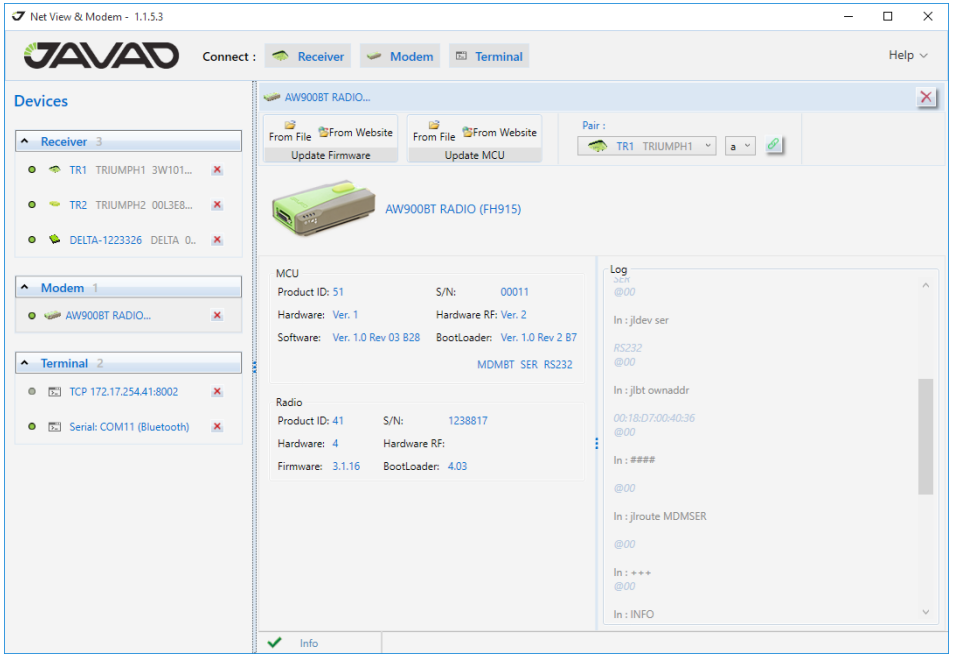
Real-time logging stops if specified file number reached or *Stop* button is clicked. NetView & Modem restores the connection and uses it as usually.

Modem

NetView & Modem provides functionality for interacting with the modems.

Switch the connection mode to *Modem* and connect to the modem as described in Getting Started chapter.

The connected modem will be added to the *Modem* list on the *Devices* pane and the *Modem* page will appear.



Modem Page

The *Modem* page provides the information about a modem, log of the commands and toolbar for updating modem firmware and paring modem with the available GNSS receivers.

The status bar at the bottom of the page displays the current or last operation state.

The *Close* button in the header disconnects the modem and closes the page.

Update Firmware

The modem firmware can be updated from file or via Internet. Depending of the modem model Radio, MCU and Internal MCU firmware can be updating.

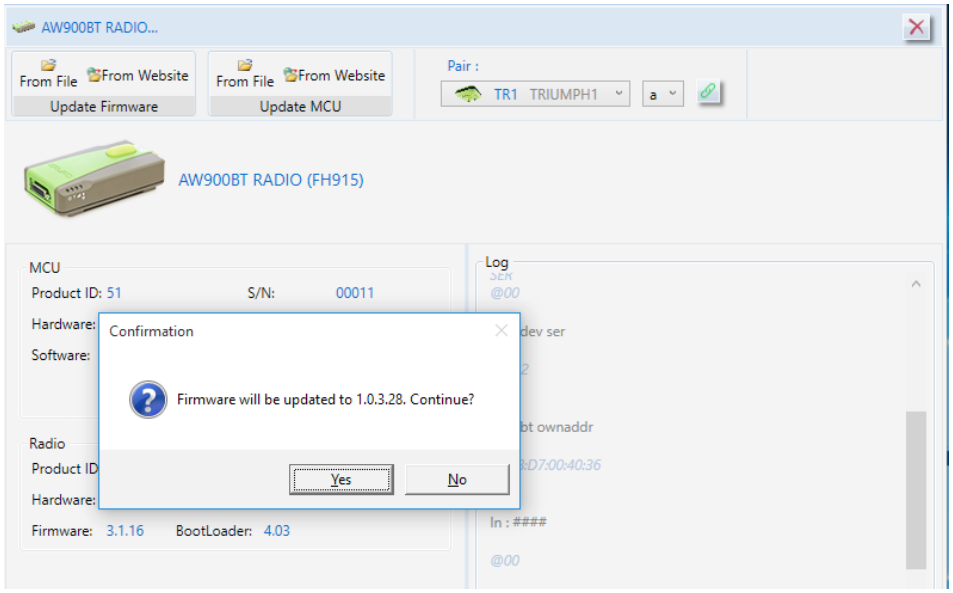
Updating from file

Click *From File* and select the firmware file using *Open File* dialog.

Updating from Internet

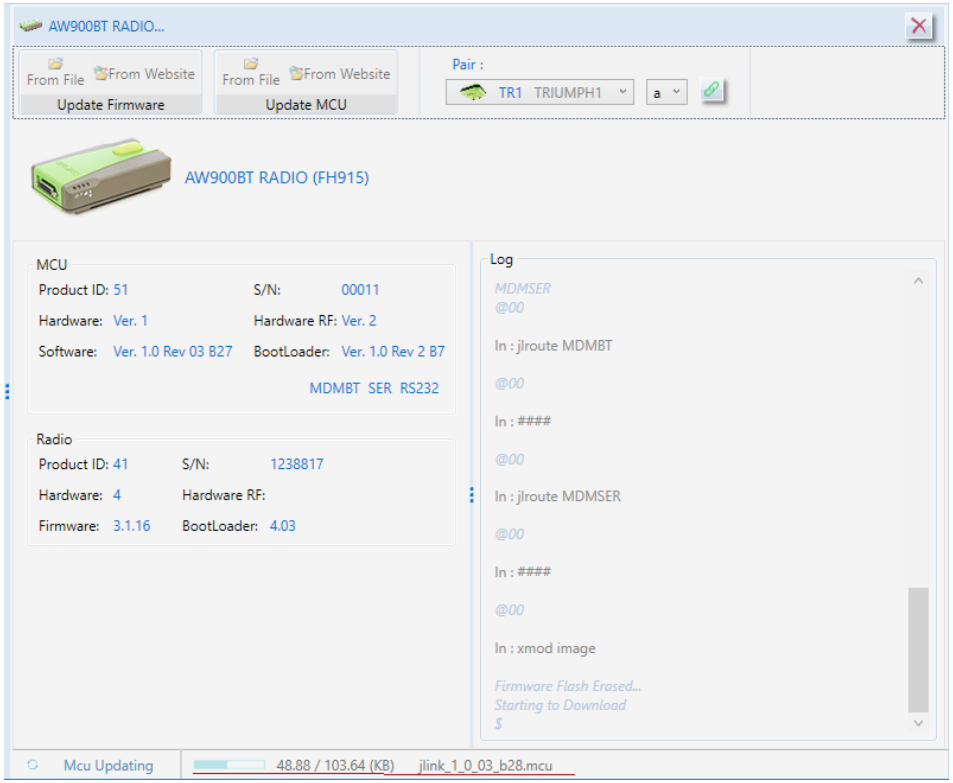
Click *From Website*. The firmware file will be downloaded from the site and checked.

If firmware is suitable to the modem and has newer version, the updating will be started. Otherwise, the warning will be shown.



MCU Firmware updating confirmation

Status bar at the bottom of the window shows process progress.



MCU Firmware updating

After firmware is updated modem will reconnect and actual information will be displayed.

Pair Modem and GNSS Receiver via Bluetooth

NetView & Modem software provides the possibility of interfacing between modems and receivers. So an external modem and a receiver can be paired via Bluetooth. Connected receivers are available in the *Pair* drop-down if it is not paired yet.

Select receiver for pairing

Follow the next steps to pair modem to the receiver:

- Select *Receiver* from the drop-down.
- Select *Receiver Modem Driver.*
- Click *Pair* to start.

The *Receiver Modem driver Port* should be set to `dev/ser/blt/a (b)` and *Mode* to off.

Otherwise, an error window will be displayed and pairing process won't start.

External Modem via Bluetooth paired

The paired receiver info is displayed instead of *Pair* drop-down list box and followed by the *Unpair* button.

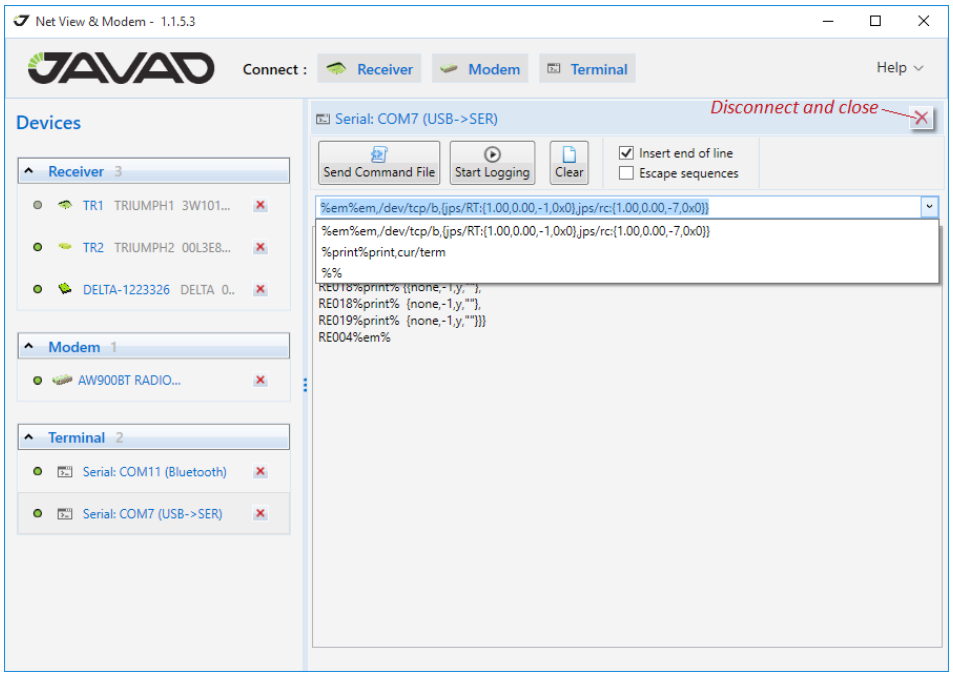
It can be unpaired by the same procedure.

Terminal

NetView & Modem software allows interacting with devices in terminal mode. It means that the application opens the channel, reads data from it and sends user's input as is.

Switch the connection mode to Terminal and connect to the device as described in Getting Started.

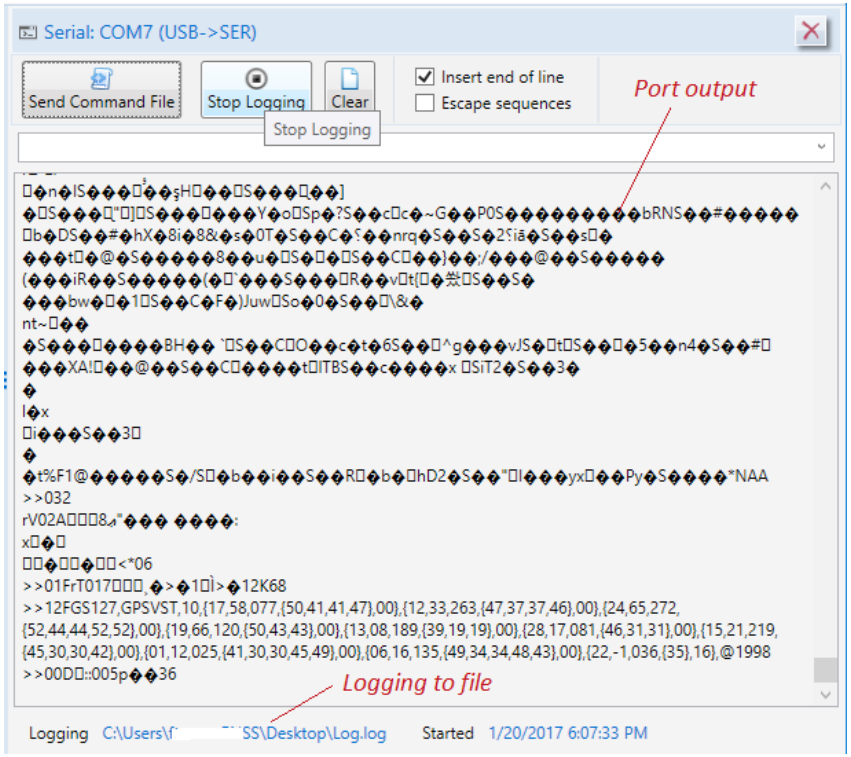
The connection will be added to the *Terminal* list on *Devices* pane and the *Terminal* page will appear.



Terminal window

The following controls serve the terminal operation:

- The *Input* line. As you type press enter key to send command to the device.
- The *Output* window displays receiver responses.
- The *Last Commands* list allows select one of the previously sended commands. Up to 50 commands are stored.
- The *Load Script* button sends a content from the selected file to the device.
- The *Start Logging (Stop Logging)* button saves output to the selected file. After starting the button name changes to *Stop Logging*. The log file path is displayed at the bottom.
- The *Clear* button clears the *Output* window.
- *Insert end of line flag* adds "\r\n" to the end of the typed line.
- *Escape sequence* converts user's input of "\\\\","\\\","","\\0","\\b","\\f","\\n","\\r","\\t","\\v" to the corresponding Unicode characters.



Terminal Output and Logging

Appendices

Appendix 1. Predefined sets of messages

Name	Solution	Messages IDs (interval, s)
DGPS RTCM {1,31,3}	DGPS (Code diff)	1, 31, 3(10)
DGPS RTCM {41,3}	DGPS (Code diff)	9, 34, 3(10)
DGPS RTCM {9,34,3}	DGPS (Code diff)	41, 3(10)
RTK RTCM {18,19,22,3}	RTK float (Phase diff) RTK fixed (Phase diff) Fixed	18, 19, 22(10), 3(10)
RTK RTCM {20,21,22,3}	RTK float (Phase diff) RTK fixed (Phase diff) Fixed	20, 21, 22(10), 3(10)
RTK RTCM {18,19,23,24}	RTK float (Phase diff) RTK fixed (Phase diff) Fixed	18, 19, 23(10), 24(10)
RTK RTCM {20,21,23,24}	RTK float (Phase diff) RTK fixed (Phase diff) Fixed	20, 21, 23(10), 24(10)
RTK RTCM3 GD min	RTK float (Phase diff) RTK fixed (Phase diff) Fixed	1006(10), 1008(10), 1033(10), 1003
RTK RTCM3 GD full	RTK float (Phase diff) RTK fixed (Phase diff) Fixed	1006(10), 1008(10), 1033(10), 1004
RTK RTCM3 GGD min	RTK float (Phase diff) RTK fixed (Phase diff) Fixed	1006(10), 1008(10), 1033(10), 1003, 1011
RTK RTCM3 GGD full	RTK float (Phase diff) RTK fixed (Phase diff) Fixed	1006(10), 1008(10), 1033(10), 1004, 1012
RTK RTCM3 GGD full eph	RTK float (Phase diff) RTK fixed (Phase diff) Fixed	1006(10), 1008(10), 1033(10), 1004, 1012, 1019, 1020
RTK RTCM3 3.0	RTK float (Phase diff) RTK fixed (Phase diff) Fixed	1003 , 1011, 1005 (10), 1007 (10), 1033 (10)
RTK CMR {10,0,1}	RTK float (Phase diff) RTK fixed (Phase diff) Fixed	10, 0, 1(10)
RTK CMR+ {10,0,9}	RTK float (Phase diff) RTK fixed (Phase diff) Fixed	10, 0, 9(10)
RTK JPS min	RTK float (Phase diff) RTK fixed (Phase diff) Fixed	RT, GT, NT, SI, rc, cp, 2r, 2p, BI, ET
RTK JPS max	RTK float (Phase diff) RTK fixed (Phase diff) Fixed	RT, GT, NT, SI, rc, cp, DC, EC, 2r, 2p, D2, E2, BI, ET
RTK RTCM3 MSM	RTK float (Phase diff) RTK fixed (Phase diff) Fixed	1006(10), 1008(10), 1074, 1084, 1094, 1104, 1114, 1124

Appendix 2. TCL-script example

The script should start from string: `#!/usr/bin/tcl`.

Below is the example of the script. It requests the receiver baud rate for serial a and checks that it is 115200.

```
#!/usr/bin/tcl
puts "Checking of baud rate of serial port a. Expected value is 115200"
set result [send "print,/par/dev/ser/a/rate"]
#    variable 'result' contains result of operations 'send'
#    [lindex $result 0] shows error code. If code is "none" it means no errors.
if {[lindex $result 0] == "none"} {
#    Error code is 'none'
#    [lindex $result 1] contains answer on command print,/par/dev/ser/a/rated if {[lindex $result 1] == "115200"} {
puts [concat "Correct baut rate: " [lindex $result 1]]
} else {
puts [concat "Incorrect baut rate: " [lindex $result 1]]
}
} else {
#    # Error code is NOT 'none', [lindex $result 1] contains error text
```

```
puts [concat "Error while read baud rate. Error code
'" [lindex $result 0] "' " [lindex $result 1]]
}
puts "Script stopped"
```

Web Resources

1. JAVAD GNSS web site
2. GNSS Receiver External Interface Specification
3. JAVAD GNSS update page
4. NetBrowser
5. Real-Time Logger
6. Kvaser

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