

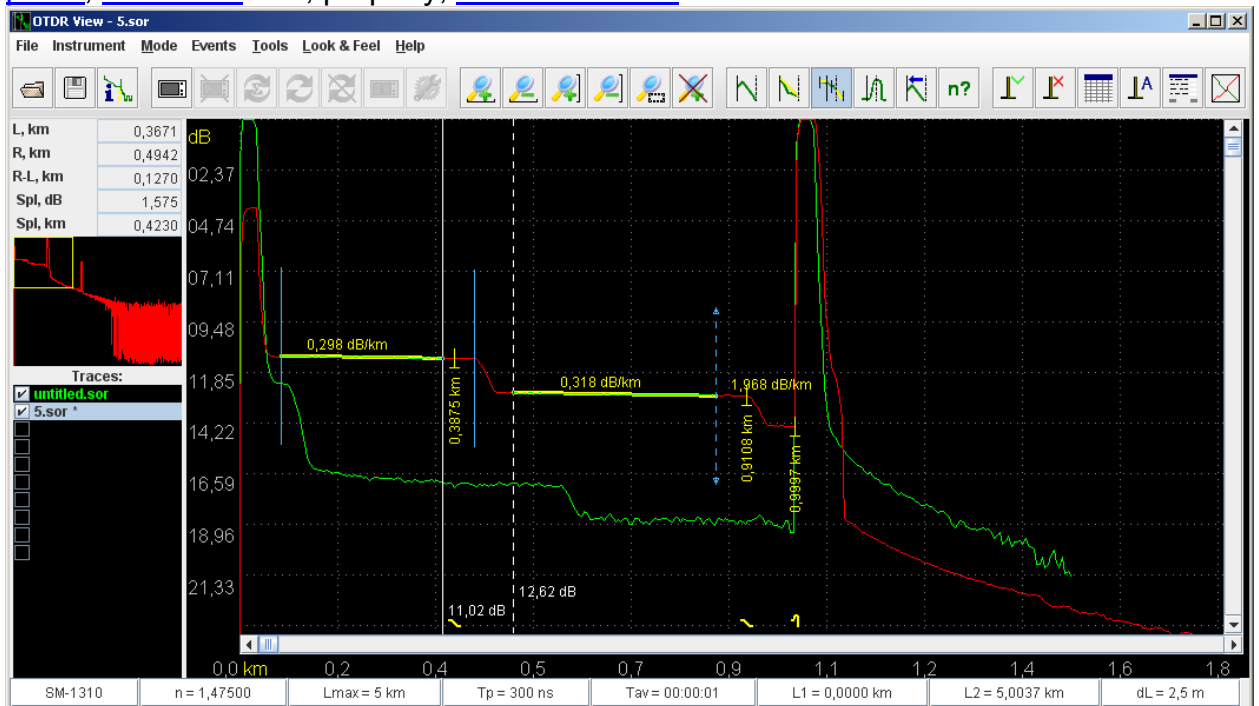
Introduction

OTDR View - is the special software developed by SVYAZPRIBOR Co Ltd. This software is designed specially for measuring (using remote [OTDR](#)), viewing, and editing of SOR files (Bellcore GR-196/SR-4731 version 2.0).

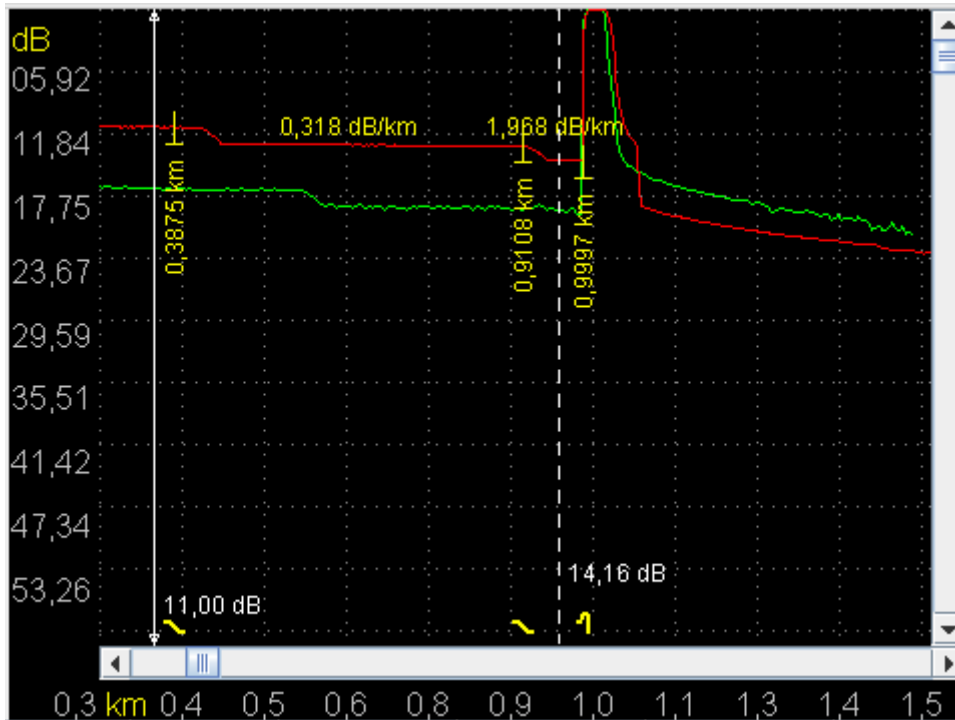
Using OTDR View

Application Window

Application window is separated on several working areas: [main menu](#), [tool bar](#), [control panel](#), [status bar](#) and, properly, [main trace view](#).



Main Trace View



Main trace view contains the area with trace(s) corresponding current displacement of the axes "dB" and "km" according to current zoom. Using [control panel](#), user can determine how many traces (up to ten) will be present in the view at a time, and which trace will be [main \(reference\)](#).

All changes, viewing of events etc. can be performed using [main \(reference\)](#) trace only (see [trace list](#)). Depending on [measure mode](#), main trace view can look some differently.

Using mouse, and working with cursors

In the main, all operations with cursors performed using mouse. To move cursor user should select it by pressing left mouse button and drag to some place on the trace. Moreover, user can move cursors by using keyboard using left and right arrows. To switch cursor user should press Enter key. In this case input focus must be grabbed by main trace view.

Scaling trace

Using special tool bar buttons user can scale the trace:



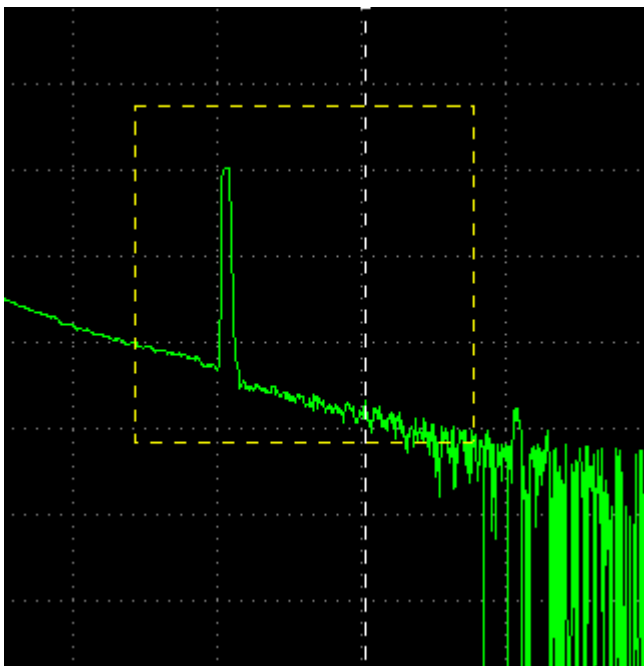
These buttons allows perform scaling of the trace horizontally and vertically relative to current cursor.

More easy way to scale the trace - is zooming mode. Zooming mode is activated by pressing special switch button:



When this button is on, then mouse is used in zooming mode otherwise the default cursor management mode is turned.

Using the zoom mode, you can select and magnify arbitrary places of trace, directly with the mouse.



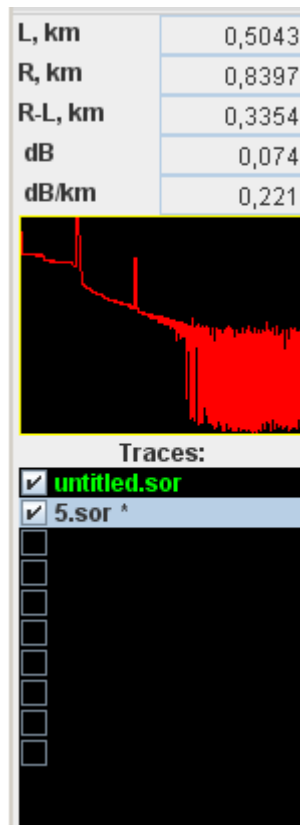
To return to initial scale (1:1) following button of [tool bar](#) should be used:



Control Panel

The Control Panel is consists of three main blocks (up to down):

- [information panel](#)
- [trace map](#)
- [trace list](#)



Information panel

First three information fields (up to down):

- L, km – distance to the left main cursor in km;
- R, km – distance to the right main cursor in km;
- R-L, km – distance between main cursors in km.

The next two fields contain values depending on selected measuring mode:

Mode	1	2	Note
Two points loss measure	dB	dB/km	1 – loss between two points, measured between two points (main cursors); 2 – attenuation coefficient between two main cursors, measured by two points method.
LSA line approximation loss measure	dB	dB/km	1 – loss between two points, measured using least square approximation method (LSA); 2 – attenuation coefficient between two main cursors, measured by LSA method.
Weld attenuation measure	Spl, dB	Spl, km	1 – loss in the optical fiber coupling, measured using five markers; 2 – distance to central marker (coupling) in km.

Reflectance	Refl, dB	Refl, km	1 – reflectance coefficient; 2 – distance to the reflective event.
ORL	dB	ORL, dB	1 – loss between two points, measured between two points (main cursors); 2 – optical return loss, calculated for section between two main cursors.

Trace map

Trace map provides user easy way to navigate through entire trace, when trace is zoomed. Map shows entire [main \(reference\)](#) trace without zoom. Relative reference trace all other traces in selected trace list are shown in [main trace view](#).

Color of the trace is the same for each trace views. With an increase in trace a rectangle on the map indicating the boundaries of the main screen.

When trace is zoomed, corresponding to [main view](#) rectangle will be drawn on the map. This rectangle shows the actual main screen bounds. Drag this rectangle using mouse to perform fast scrolling on the trace.

Trace list



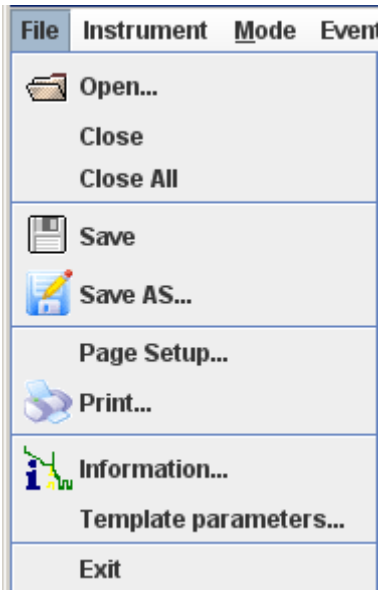
Trace list - is the main view and report generation control tool. Using the trace list user can load up to ten traces, for example, for their comparison. All traces are scaled in agreement with the main (reference) trace zoom. **Main (reference trace)** – is the current (selected) and checked trace in the trace list. If no selected trace in the trace list first checked trace will be main trace automatically.

Main Menu

According with function of submenu

Main menu is divided according with functionality.

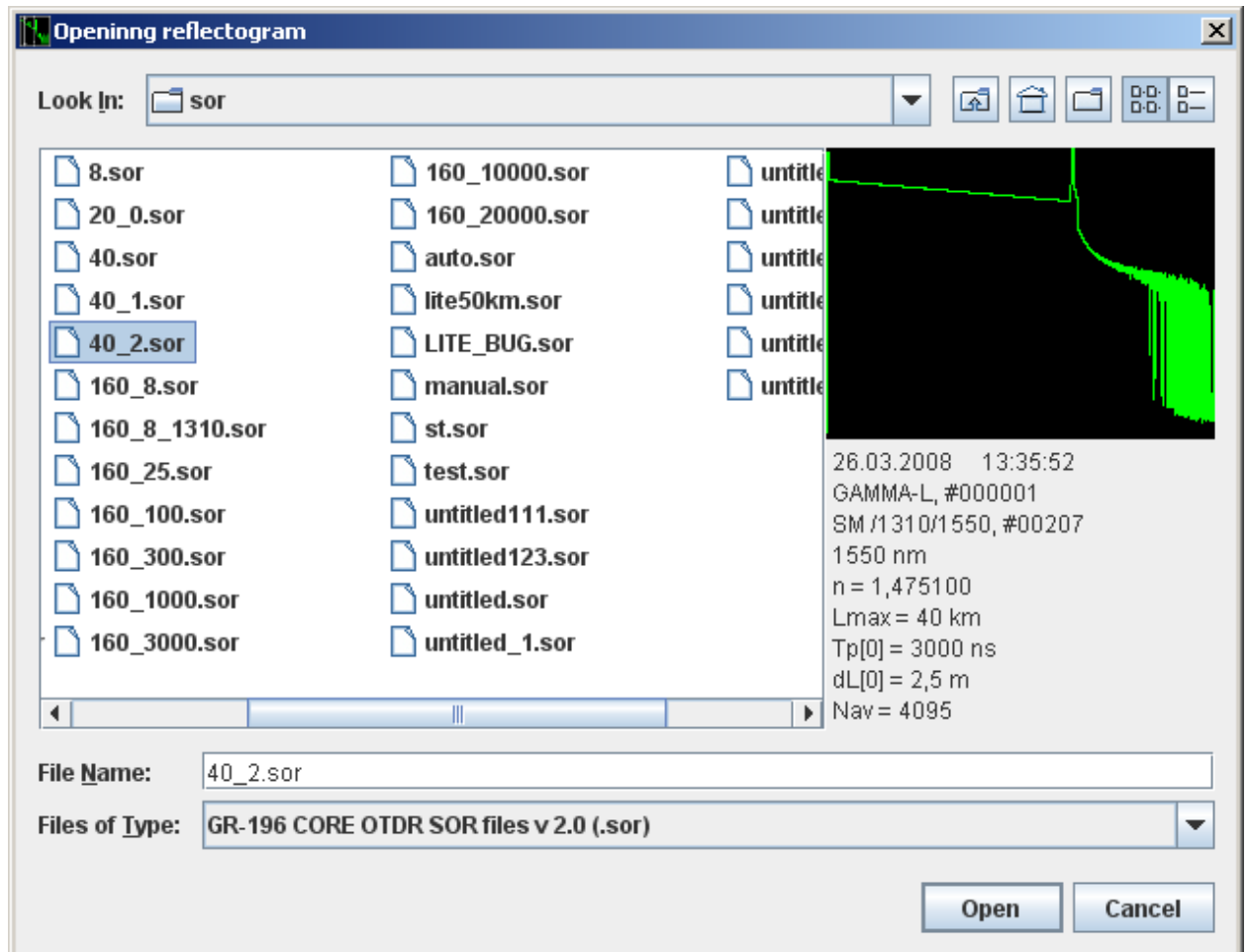
File



Menu file consist of following items:

Open...

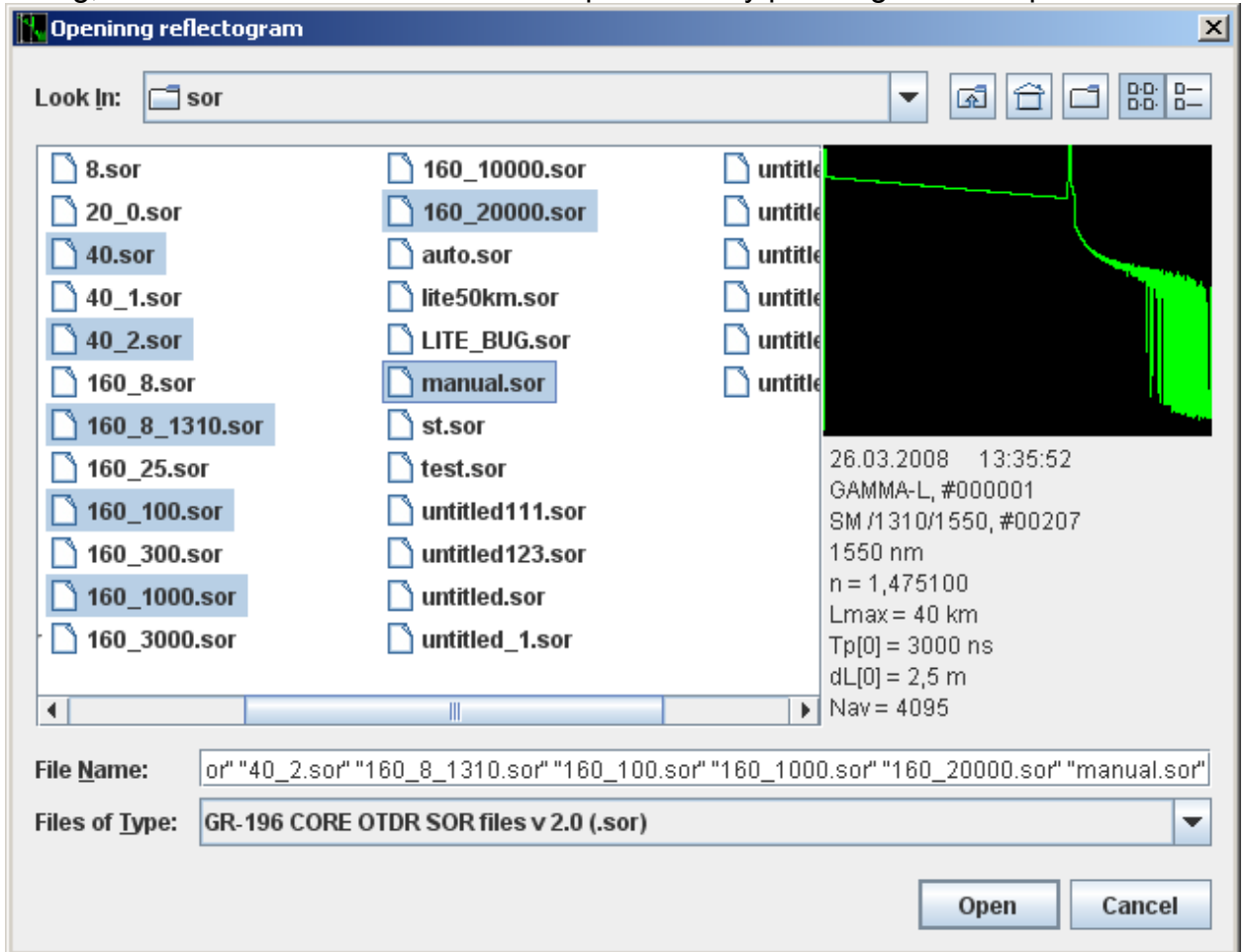
Open the trace. After selecting this item or clicking corresponding item from [tool bar](#), this window will be shown:



Using this window user can open its traces. Preview helps him to select and open proper trace from entire list. Note that the current trace slot of the [trace list](#) will be used to open the trace. Opened trace will marked as [main \(reference\) trace](#) automatically.

How to open several traces together

From the version 2.012 of Software, finally, new convenient feature is available. User can open several traces at a time. Habitually, holding “Shift” or “Ctrl”, in the file open dialog, user can select several files and open them by pressing button “Open” once:



After pressing the “Open” button, selected traces consequentially will be loaded into the [trace list](#) (up to 10 traces at a time).

Close

Close current trace.

Close All

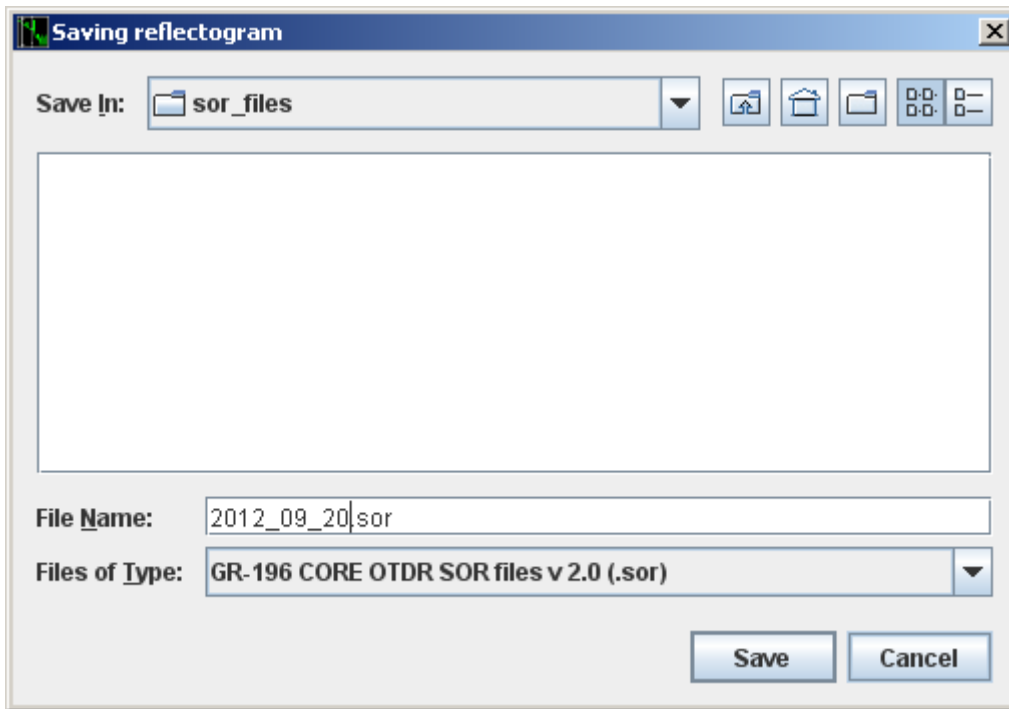
Often need to close all opened traces, exactly this menu item used for closing entire [trace list](#).

Save

Save current trace in its file.

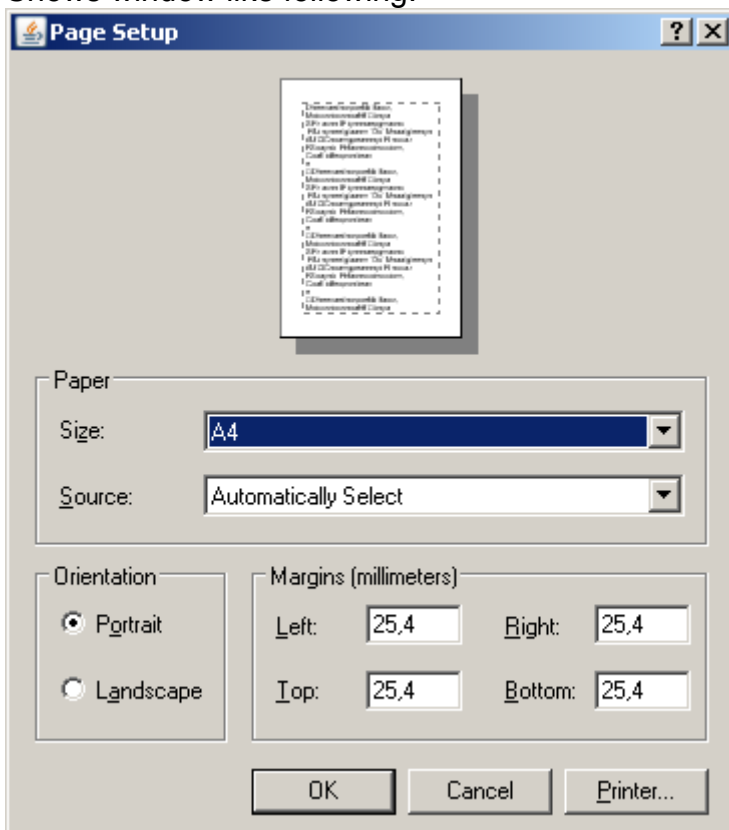
Save As...

Save current trace into the new file with other name.



Page Setup ...

Shows window like following:



Setting the page properties (like margins, orientation etc.) and printer selection.

Print...

Generates report (prints it), corresponding to the current trace view. Report consists of main trace view and some additional information about trace and events table.

Information...

Shows trace information dialog that consists of two tabs: Description and Instrument. This dialog reflects information about [main \(reference\) trace](#). Some fields of this dialog can be changed. To apply changes user should press “ok” button, but changes will stay in the RAM memory only, user should press “Save” or “Save As” menu item to store all changes.

The screenshot shows a dialog box titled "Information - 1.5_f1.sor" with two tabs: "Description" and "Instrument". The "Description" tab is active and contains the following fields:

- Date/Time: 26.03.2008 14:31:02
- Cable ID: Cable
- Fiber ID: Fiber
- Fiber Type: [G.652] Conventional SM Fiber (dropdown menu)
- Originating Location: 0
- Terminating Location: 1.5 (manual)
- Condition: as-build condition (dropdown menu)
- Trace Type: reverse trace (dropdown menu)
- Operator: Rafshan Dzhamshudovich
- Comment: Demo cable

Buttons for "ok" and "cancel" are located at the bottom of the dialog.

Fields of the “Description” tab:

Item	Description
Date/Time	Date and time of the measurement
Cable ID	Information about optical cable
Fiber ID	Information about optical fiber
Fiber Type	Optical fiber type corresponding to measured trace
Originating Location	Information about beginning of the optical cable
Terminating Location	Information about the end of the optical cable
Condition	Description of the trace measurement reason
Trace type	Description of the trace type (standard, reverse, difference, reference)
Operator	Information about operator-measurer that performed trace measurement
Comment	Auxiliary field

Fields of the “Instrument” tab:

Item	Description
Supplier Name	The name of the manufacturer of the instrument used for trace measuring
OTDR Mainframe ID	The name of the main instrument block (platform)
OTDR Mainframe Serial Number:	Unique serial number of the main instrument block (platform)
Optical Module ID	The name of the optical module used for trace measurement
Optical Module Serial Number	Unique serial number of the optical module used for trace measurement
Software Revision	Version of the optical module software
Other	Auxiliary field with additional information

Template parameters...

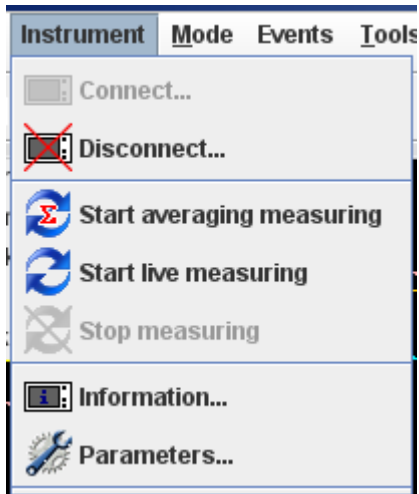
This menu item used to open special dialog box – template (see “[Information->Trace Type](#)”) parameters dialog.

Template parameters are usable for creation of reference (template) traces. These templates can be used in special mode of SVYAZPRIBOR Co Ltd. OTDRs – known as “Test Station” (supported in OTDR GAMMA LUX/LITE). Parameter set to 0 will ignored in the trace analysis.

Exit

Close application **OTDR View**.

Instrument

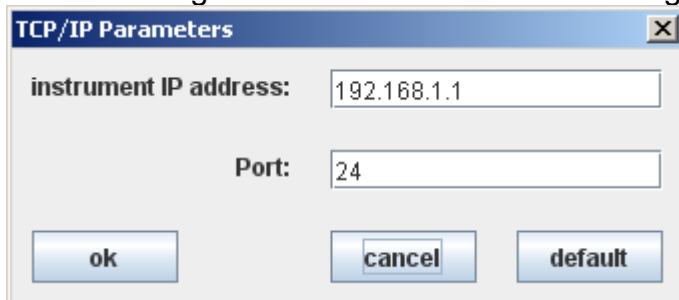


This menu is used for remote control and measuring using OTDR GAMMA series supplied by SVYAZPRIBOR Co Ltd.

Description of Instrument menu items:

Connect...

After selecting “Connect...” menu item following window will be shown:



This is “Connection Parameters Dialog” that allows user to set instrument IP address and port for TCP/IP connection. Leave default values if you unsure. These values must conform instrument settings.

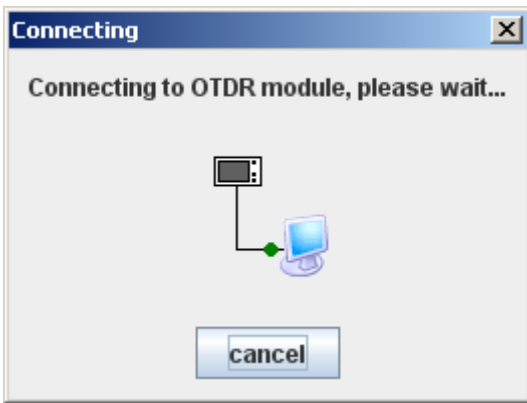
IMPORTANT:

IP address of the instrument and your PC must be aligned using proper netmask otherwise connection problems may occur.

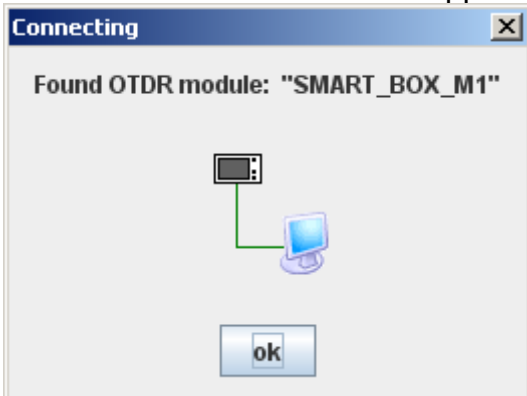
For example, for netmask 255.255.255.0, if PC IP is 192.168.1.4 then instrument IP should be of following format: 192.168.1.XXX, where XXX integer value from 1 to 254 (except values already used in your subnet).

If you have any problems with connection or using our production, you may ask us via our web forum <http://svpribor.ru/conference.html> or just can contact us by phone (see <http://svpribor.ru/address.php>). We always glad to help.

To start connection press “OK”. Following window will appear:



Connection handshake may take about ten seconds or little more. Information about connected OTDR module will appear after successful connection:



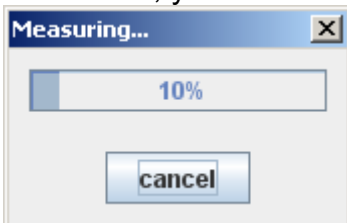
From now can work with remote instrument.

Disconnect...

Disconnects already connected instrument.

Start averaging measuring

Start measuring with averaging using current [measurement parameters](#). Selecting this menu item, you'll see following averaging progress window:



To terminate averaging with stop measurement process just press "cancel".

Start live measuring

Start measuring without averaging (live) using current measurement parameters, used for fast line estimate. Trace update interval depends on measurement parameters and can reach three seconds. To stop measure select menu item "[Stop measuring](#)".

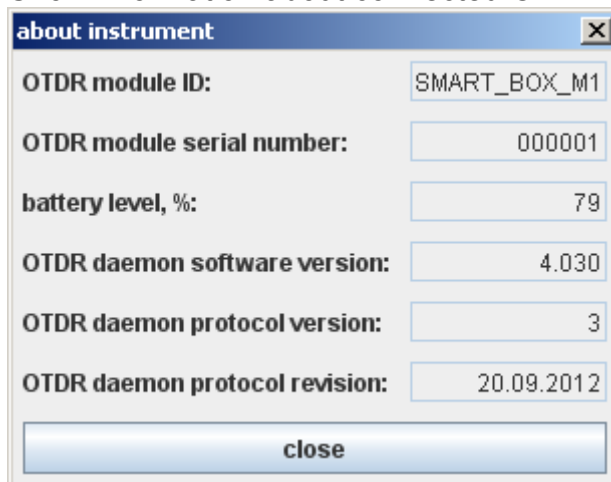
Measured trace will appear and continuously updated on the current trace slot (see trace list). So user can to compare measured and previously loaded traces.

Stop measuring

Stop current measuring process (averaging will be incomplete).

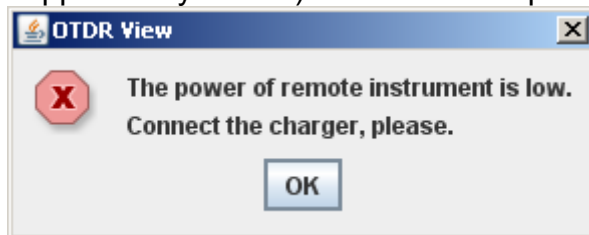
Information...

Show information about connected OTDR:



- OTDR module ID – ID of the OTDR measuring module;
- OTDR module serial number – unique factory serial number of the instrument;
- battery level, % - percentage of the battery level;
- OTDR daemon software version– version of the remote OTDR module software;
- OTDR daemon protocol version – service field;
- OTDR daemon protocol revision – service field;

Application performs monitoring of the power supply of connected instrument (if supported by device). In case of low power, following service message will appear:



Parameters...

Shows measuring parameters dialog:

Measuring parameters [X]

Fiber type (wave length): 1310 [v]

Distance range (Lmax): 0.2 [v] km

Resolution (dL): 0.319 [v] m

Pulse width (Tp): 6 [v] ns

Backscatter coefficient (BC): -80.00 dB

Refractive index (n): 1.46810

Number of averages: 2000000 [v]

Averaging time: 00-05 [v]

Low power

High resolution

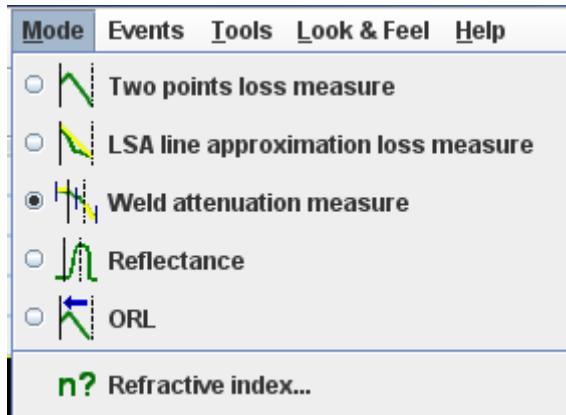
Filter used

ok cancel default

1. wave length, nm –wave length in nm;
2. range, km – measuring range in km. Note that measuring range must be about twice greater real optical fiber (OF) length;
3. resolution, m - the distance between the two readings of OTDR (sampling interval) in meters;
4. pulse width, ns – the duration in nanoseconds of the probe pulse;
5. backscatter coefficient, dB - part of the power of an optical pulse in dB dissipated in the OF and extending to its beginning. In the software supplied to the user usually, the following values are set :
 - minus 81 dB for single-mode fiber and wavelength 1550 nm;
 - minus 80 dB for single-mode fiber and wavelength 1310 nm.
 The backscattering coefficient can be set in increments of 0.1 dB;
7. refractive index (n) – The value of the refractive index of OF; changes in increments of 0.00001;
8. number of averages – if selected the total number of trace averages is specified in the mode with averaging;
9. averaging time – if selected time averaging is enabled. If it is disabled – the averaging according to measurement number;
10. low power - the trace measurement mode with a reduced capacity of the laser radiation is enabled. This mode is reasonable for measuring high reflectivity values from the heterogeneities;
11. high resolution - in this mode, the bandwidth of the optical receiver is increased what allows to reduce the deadzone and better to distinguish between the close lying heterogeneities. However, in this mode the noise of the optical receiver increases;
12. filter user - the digital filtering of acquired trace is enabled/disabled.

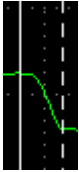
After setting the measurement parameters user can perform measurement using live or averaging methods.

Mode



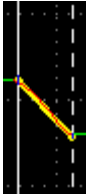
Following modes are available for user:

Two points loss measure



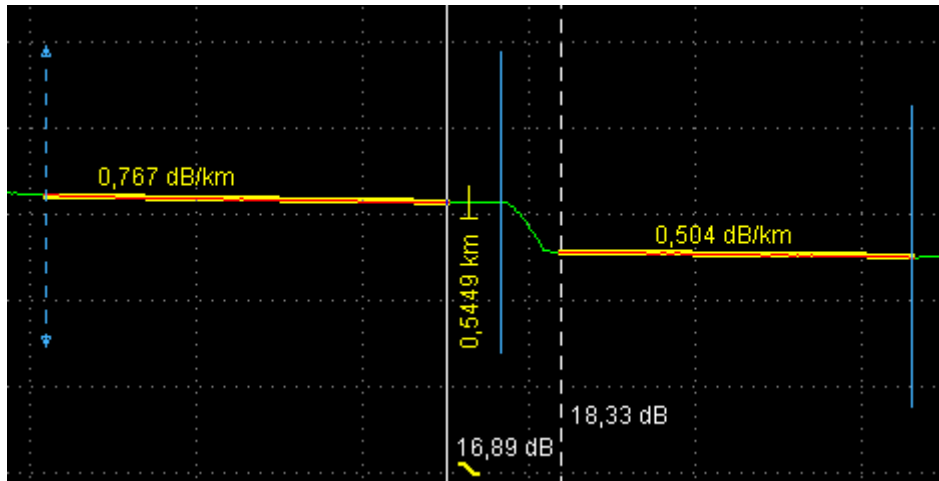
Two point method to measure event loss or attenuation coefficient in the fiber. This method usually used for distance measurement between cursors as well as loss measurement between two cursors. This method is not applicable for loss measurements on noisy areas of the trace.

LSA line approximation loss measure



Measure the long attenuation by two points. In contrast to the mode of "[Two points loss measure](#)" here a straight line approximation of the trace span between the cursors is performed using the least squares method. The so calculated value of the long attenuation is more correct, provided that the cursors are on a homogeneous part of the line.

Weld attenuation measure

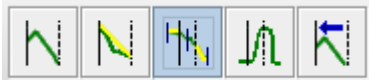


This is the most accurate loss measurement method. Before reading results user have to set five markers (or cursors). Central cursor should be set at the left edge of the connection (at the beginning of the event). Left pair of cursors (relative central cursor) determines the left approximation span as well as right pair of cursors determines the right approximation span. Approximation spans should, wherever possible, have a maximum length and be uniform.

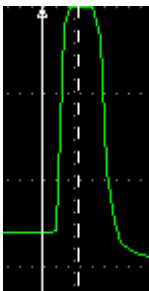
Result is show on [information panel](#)

Spl, дБ – event loss in dB;

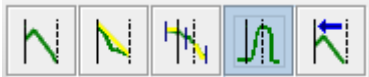
Spl, км - distance to the event (central cursor) in km;



Reflectance

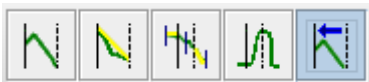


The application can determine the reflectance from the plug connection of the two optical fibers or from the end of the OF. Set the right cursor on the top of the reflected pulse, the left cursor – on the traces span directly in front of it.



ORL

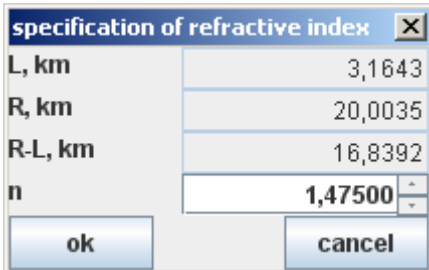
The application allows estimate the value of Optical Return Loss (ORL) of the fiber line span or of the entire fiber line. ORL is the ratio of power supplied into the optic fiber, to the power coming back to the fiber start from the specified fiber line span or of the entire fiber line. Position the cursors at the ends of the measured span.



Refractive index...

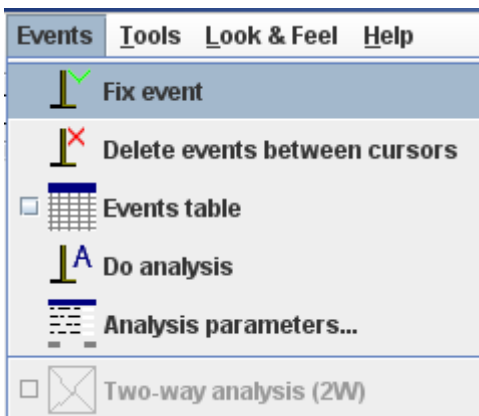


Show “specification of refractive index” dialog. This dialog allows using known distances on the trace solve reverse task - determine refractive index with high accuracy.



Pressing up and down arrows user can change refractive index by ± 0.00001 or simply enter refractive index value into the corresponding text field. So we can tune refractive index according with known distance (L, km; R, km or R-L, km).

События



Fix event

Fix event and add them into [events table](#) using current [measure mode](#) and cursor location.

Delete events between cursors

Delete all events between two main cursors.

Events table

Determines whether or not displayed events table (list all events in the trace). On the screen a window will appear at top of screen with a list of events corresponding to inhomogeneities in the measured lines, ordered by distance from the line beginning:

type	#	location (km)	loss (dB)	reflectance (dB)	attenuation (dB/km)	full (dB)	comment
∩	1	0,0000		-30,818			
∩	2	25,1729	1,616	-33,466	0,187	4,771	
~	3	37,9046	4,425		0,195	8,959	
∩	4	50,5674	2,412	-51,008	0,202	15,870	
~	5	61,7095	0,314		0,205	20,632	
~	6	63,1539	0,253		0,205	21,270	

End to end loss: 24,034 dB

Optical return loss (ORL): 0,000 dB

Show events cancel

Delete

Markers

Move

The row of table contains full event information:

1. event type (reflective, non-reflective (may be gain) or end of fiber);
2. serial number of the event;
3. distance from the origin in km;
4. attenuation in the event if it exceeds the threshold value, dB;
5. reflectance in the event (if it exceeds the threshold value), dB;
6. attenuation coefficient of the span between this event and previous one, dB/km;
7. total attenuation from the start of fiber to the current event, dB.

Do analysis

When this option is selected, the application analyzes the trace, it looks for irregularities, attenuation or reflection coefficient than the defined thresholds, determines the distance to them, attenuation areas between inhomogeneities. These data are entered into the [event table](#) and displayed as icons on the trace.

It should be borne in mind that in a long line when the next segment of the waveform distorted by noise, and their automatic analysis may be inaccurate, for example, welds of optical fiber with low attenuation may not be recognized in noise. These sections should be analyzed "by hand" by moving the mark, erasing wrong and placing new by selecting the [measurement mode](#).

The [thresholds](#) at which the automatic analysis was carried traces are saved when you save the file with a trace.

If you already have on the trace events, when you start the automatic trace analysis are erased.

Analysis parameters...

Threshold values are specified for the automatic trace analysis:

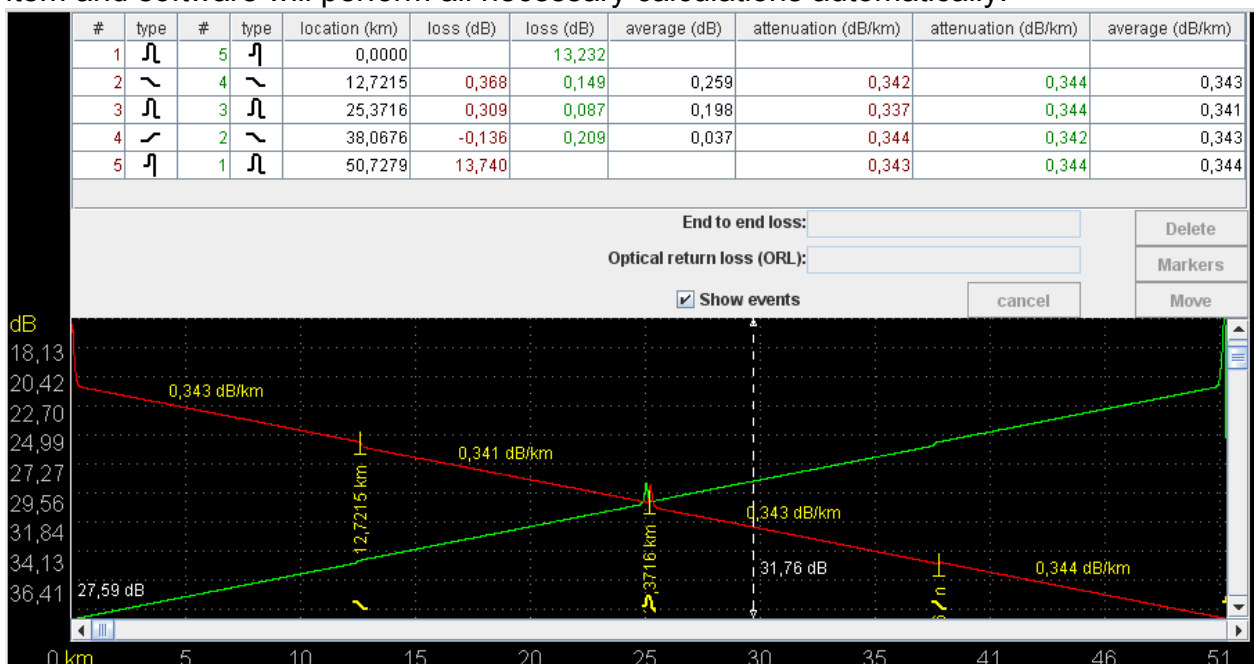
1. Loss threshold (LT) - loss threshold in heterogeneities, dB. Heterogeneities, in which the attenuation exceeds a given threshold, are displayed in the table of landmarks during trace analysis.
2. Reflectance threshold (RT) - reflectance threshold value, dB. Heterogeneities with reflectance above this threshold are displayed in the table of landmarks during analysis.
3. End-of-fiber threshold (ET) - attenuation threshold value, dB, to determine end of fiber. The first heterogeneity with attenuation greater than a threshold

value ET, is determined during trace analysis as the end of OF, all subsequent heterogeneity are ignored.

- Backscatter coefficient (BC) - part of the power of an optical pulse in dB dissipated in the OF and extending to its beginning. The backscattering coefficient can be set in increments of 0.1 dB.

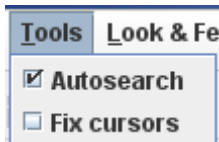
Two-way analysis (2W)

Bidirectional trace analysis. Provide the method of measuring real values of losses in the optical fiber. This method is based on analysis of two OTDR traces (direct and reverse). Each trace must be measured using the same measurement parameters. After measuring user have to analyze each trace and save each trace in its own SOR file. After that user should open two analyzed traces (direct and reverse) on the different trace slots using [trace list](#). Next, user must to choose "two-way analysis (2W)" menu item and software will perform all necessary calculations automatically:



Fields with averaged values contains the real values of attenuations and attenuation coefficients with corresponding units of measure (see ITU-T Telecommunication Recommendations G.650.3).

Instruments



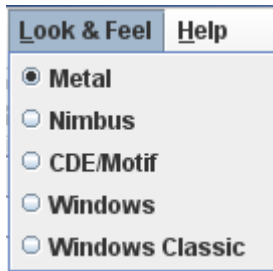
Autosearch

Enable/disable the algorithm of automatic trace vertical scrolling. That allows automatically align OTDR trace vertically on the screen.

Fix cursors

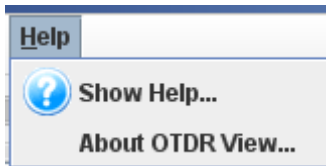
Enable/disable synchronized movement of all available cursors. So user can move all cursors without changing distance between each other.

Look & Feel



This menu provides different styles of GUI (graphical user interface) that user can set for application. The available menu options depends on operating system and its settings.

Help



Show Help...

Show this window.

About OTDR View...

Show about dialog:



Toolbar



Toolbar items repeat significant functions of [main menu](#) with using the same icons.

Status bar



Status bar is located at the bottom of the program window and allows you to display information on the main trace (see [list of traces](#)).

As on picture, table contains description of status bar elements (from left to right):

Item	Description
SM-1310	Fiber type and wave length
n = 1,47500	Refractive index of OF
Lmax = 5 km	Measuring range distance

Тр = 300 ns	Length of probe pulse
Тав = 00:00:01 (или Nav = 4)	Averaging time (or number of averages)
L1 = 0,0000 km	Beginning of the fiber section from where measurement starts
L2 = 5,0038 km	End of the fiber section from where measurement starts
dL = 2,5 m	Resolution (distance between two neighboring samples of data)

Abbreviations

OTDR – optical time domain reflectometer

OF – optical fiber

ORL – optical return loss

SM – single mode