AA-230 ZOOM

Antenna and cable analyzer

Software manual

RigExpert AA-230 ZOOM

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Connecting RigExpert AA-230 ZOOM to your computer

RigExpert AA-230 ZOOM can be connected to a computer running Windows 2000/2003/XP/Vista/7/8/10, as well as Mac OS (version 10.6 or higher) and Linux operating systems.

The latest version of the software may be found at the **Downloads** section of the http://www.rigexpert.com website. Windows, Mac OS and Linux installers are available as separate downloads.

The direct link to the software downloads is
http://www.rigexpert.com/index?s=aa230zoom&f=downloads#soft

Important:
To avoid damage caused by possible electrostatic discharge, always follow this sequence:

1. Connect the coaxial cable to the antenna connector your analyzer.

2. Connect the analyzer to the USB port of your computer

Updating the firmware

A **Firmware update tool**, available at the **Downloads** section of our website, will automatically download new versions of the firmware. Just run the program and follow on-screen instructions.

The direct link to the Firmware update tool is https://rigexpert.com/products/antenna-analyzers/aa-230-zoom/downloads/#firmware

You may also download binary files of the firmware for the off-line updating, if necessary.

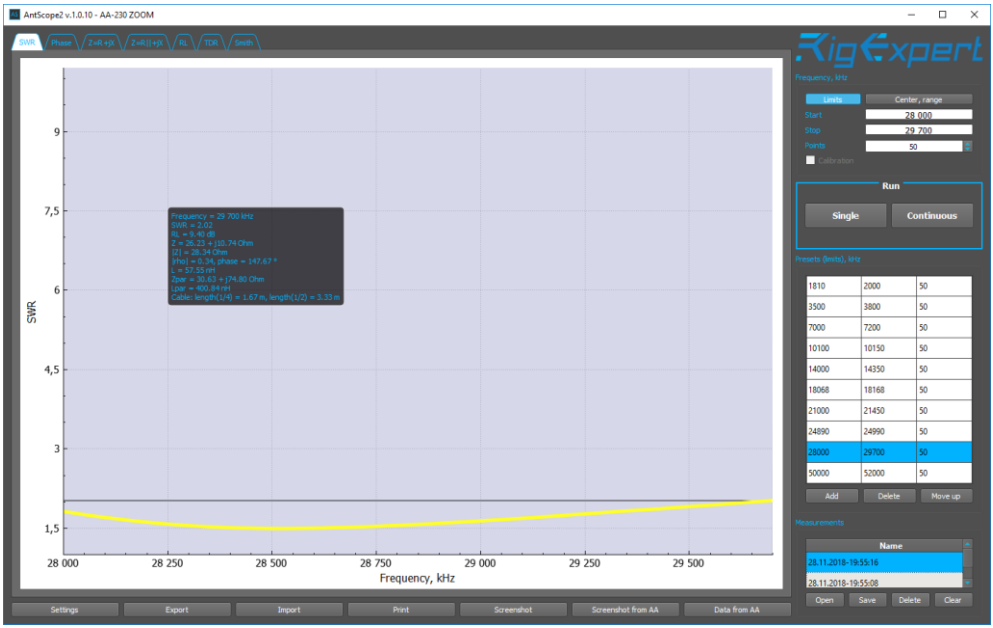
The LCD of the analyzer will flash during the firmware update process.

Notice:

It is safe for the analyzer to cancel the firmware update process at any time, and then start it over

AntScope program

The main function of the AntScope program is to show measurement results on the “big screen”. The AntScope is a great companion to your RigExpert analyzer which adds functions previously available in expensive, professional grade equipment only.



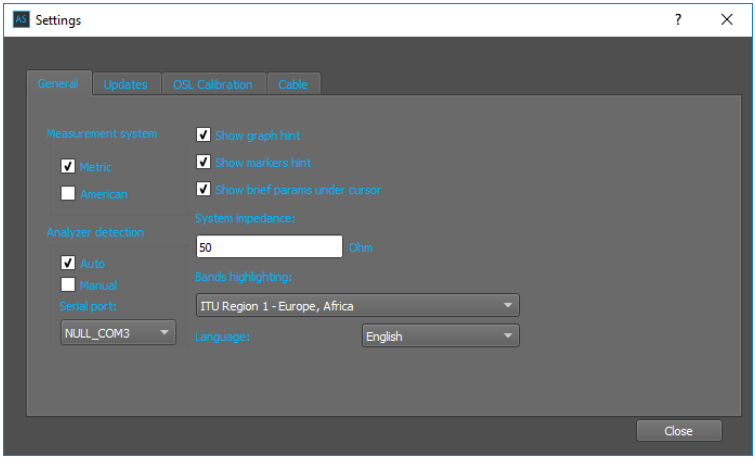
Settings

1. Connect your analyzer to the PC as described in section 1 of this manual. Make sure the analyzer is turned on and is in the “ PC mode ” (the AA-230 ZOOM is already in the “ PC mode ” once turned on).

2. Run AntScope. Under Windows, the program will automatically detect the virtual COM port number as well as the analyzer type. For Mac OS and Linux, select serial device name and analyzer type in the Configure menu.

Menu General

Here you tick everything that applies for your use.
Also select the ITU zone where you are located.



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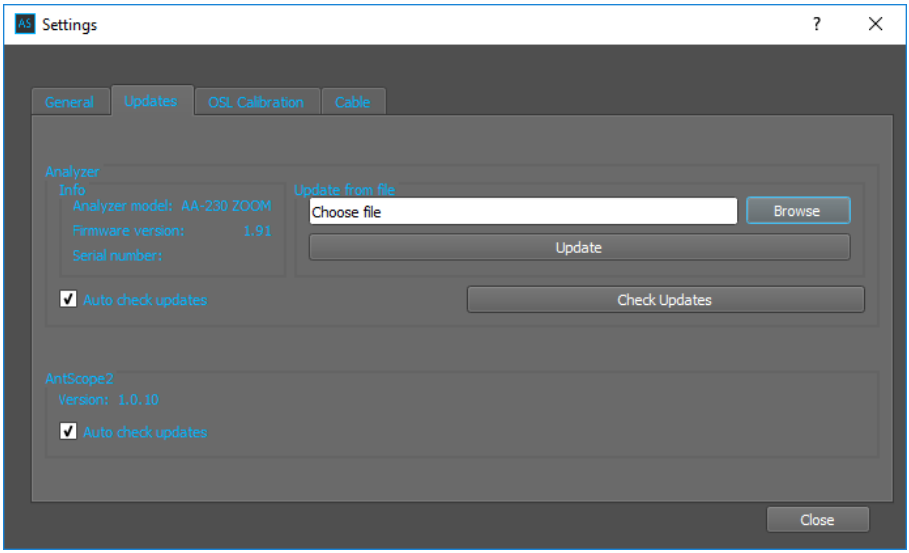
Menu Updates



The Updates menu gives you the option to install a downloaded Firmware file. Either you do this via an **Auto Check Updates** and click **Check Updates**.

The AntScope can also automatically search for updates.

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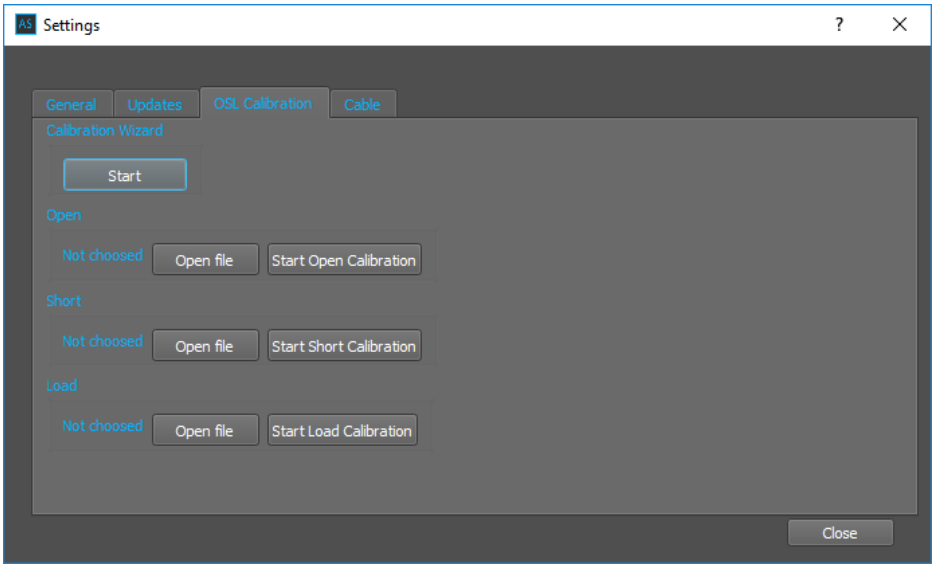
Menu QSL Calibration



The calibration wizard is started here.

Open: Open file or Start the Open Calibration

Short: Open file or Start the Short Calibration

Load: Open file or Start the Load Calibration

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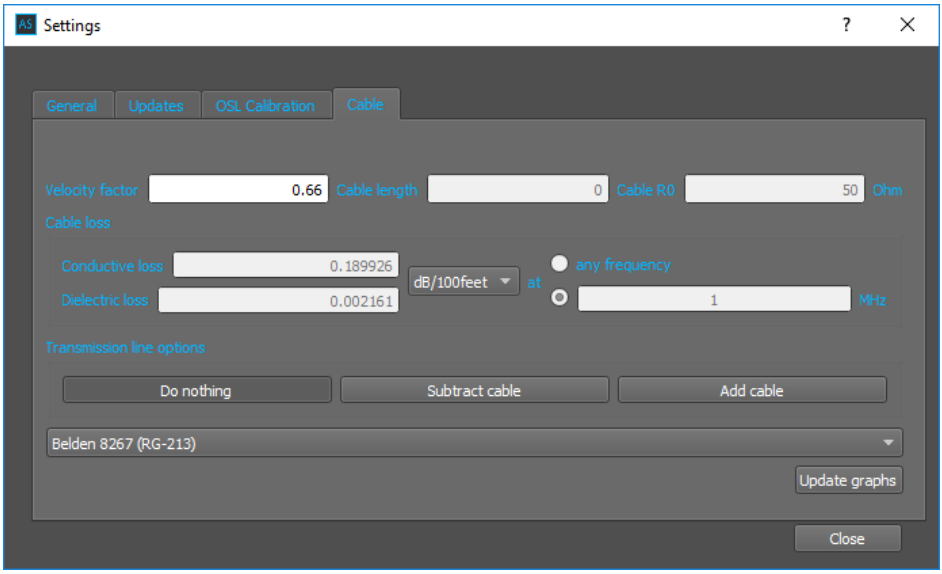
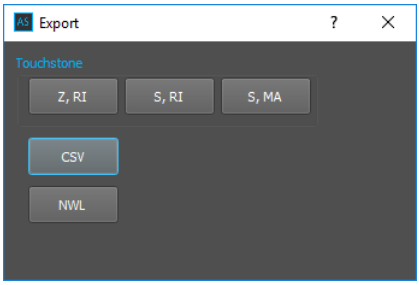
Menu Cable



Velocity factor:
Cable lenght:
Cable R0:
Conductive loss :
Dielectric loss:
Transmissission line option:
  Do nothing:
  Substract cable:
  Add cable:

Update graphs:

Menu Export en Import



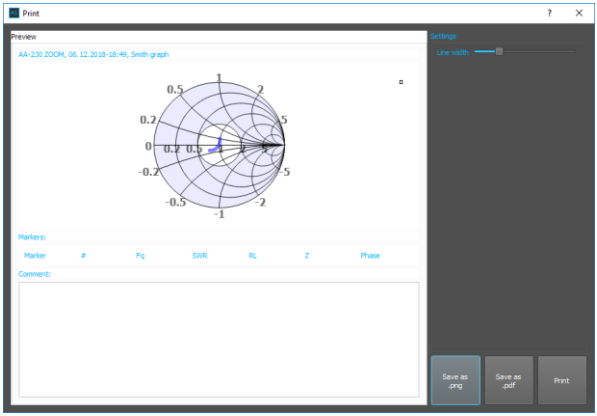
Go to **Export** to save the current measurement to a file, then select **Import** to retrieve the saved data.

Look out:

If you save a file as NWL with extension .nwl then you have to load this as a .nwl file.
For instance, CSV data can be easily imported into a
Microsoft Excel sheet. R and X (active and reactive parts of impedance) values are saved into the CSV file for each point on the graph. To calculate SWR or other parameters, use corresponding formulas.

Menu Print

Here the image you see in the AntScope main screen can be printed in a PDF file or saved as a PNG file



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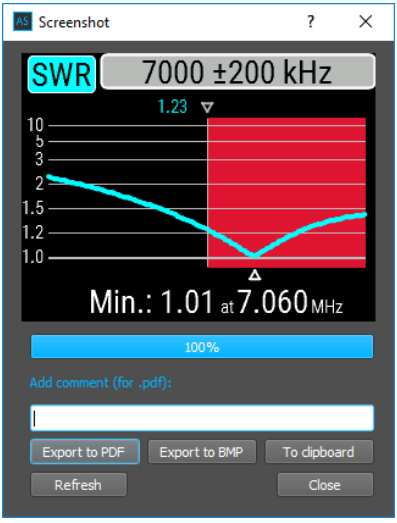
Menu Screenshot

Will save the data as PNG

Menu Screenshot from AA

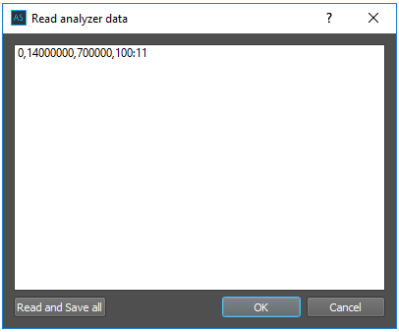


Here you become a screenshot of the AA-230 ZOOM window

And you can Export this file as a PDF or BMP file or you copied this image to your clipboard for use it in one or other document.

Menu Data from AA

This will read the data from your AA-xxx analyzer



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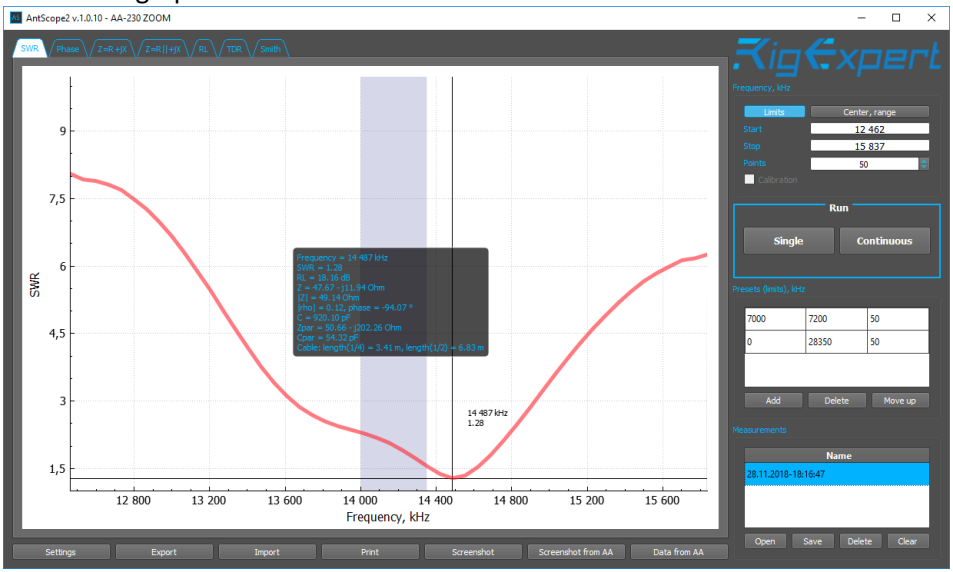
Explanation of the top menu

The screenshot below shows a typical AntScope screen:

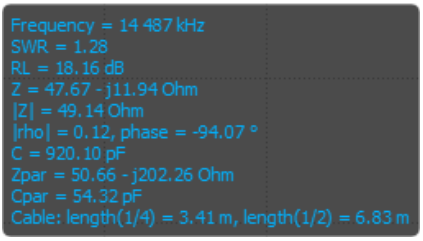
Menu SWR**:**

show SWR graph



Data screen

You will see a pop-up data window when the cursor is moved over the graph, and shows different parameters of a load:



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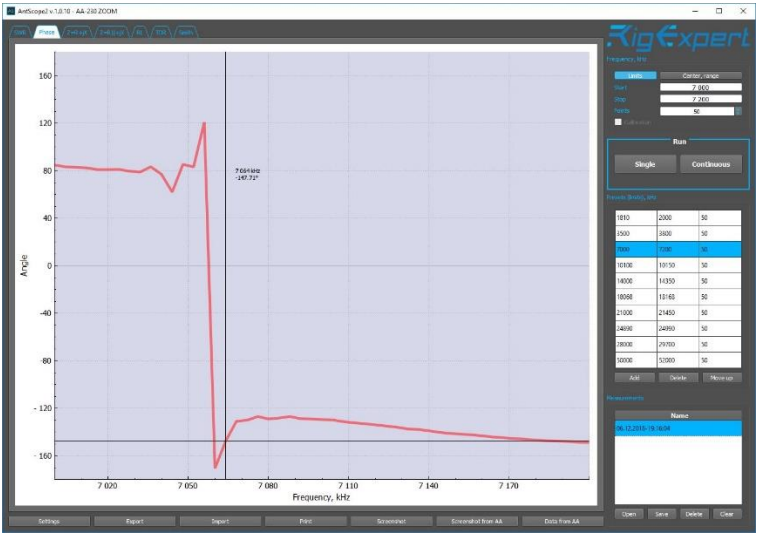
Menu Phase**:**
Phase Info (From Wikipedia, the free encyclopedia)

Phase is the position of a point in time (an instant) on a waveform cycle. A complete cycle is defined as the interval required for the waveform to return to its arbitrary initial value.

Phase can also be an expression of relative displacement between two corresponding features (for example, peaks or zero crossings) of two waveforms having the same frequency.

In sinusoidal functions or in waves, "phase" has two different, but closely related, meanings. One is the initial angle of a sinusoidal function at its origin and is sometimes called **phase offset** or **phase difference**. Another usage is the fraction of the wave cycle that has elapsed relative to the origin

show phase graph



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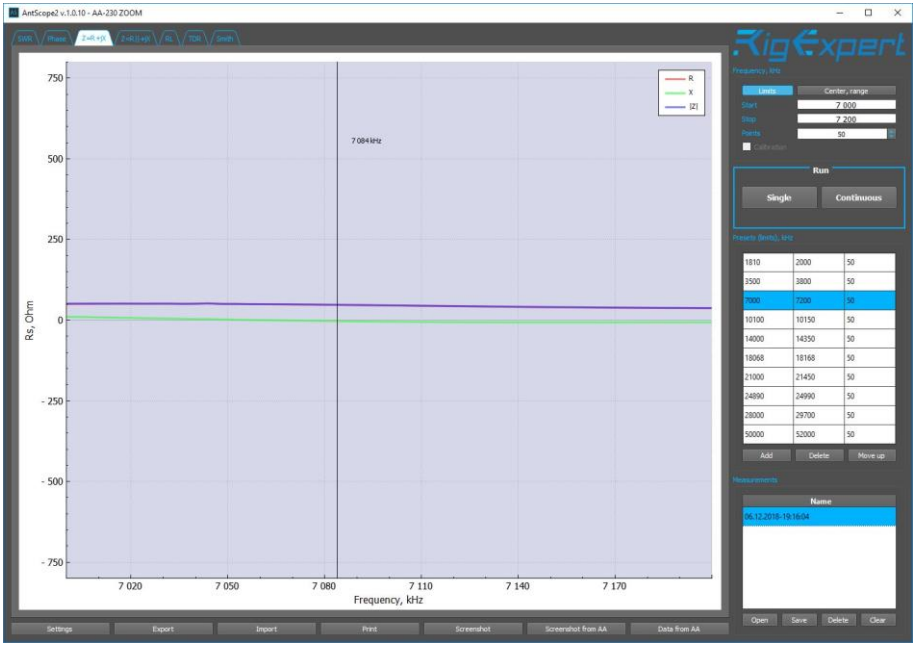
Menu Z=R +jX

show R, X, Z (series model)



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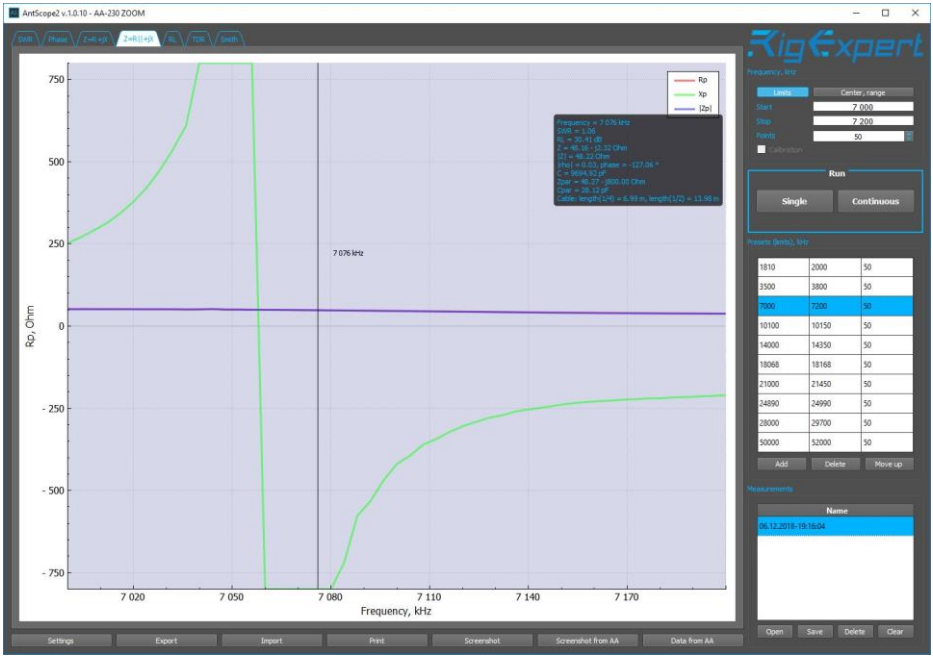
Menu Z=RII +jX

show R, X, Z (parallel model)



Menu RL (Return Loss)

RL (Return Loss) (From Wikipedia, the free encyclopedia)

In telecommunications, **return loss** is the loss of power in the signal returned/reflected by a discontinuity in a transmission line or optical fiber. This discontinuity can be a mismatch with the terminating load or with a device inserted in the line. It is usually expressed as a ratio in decibels (dB);

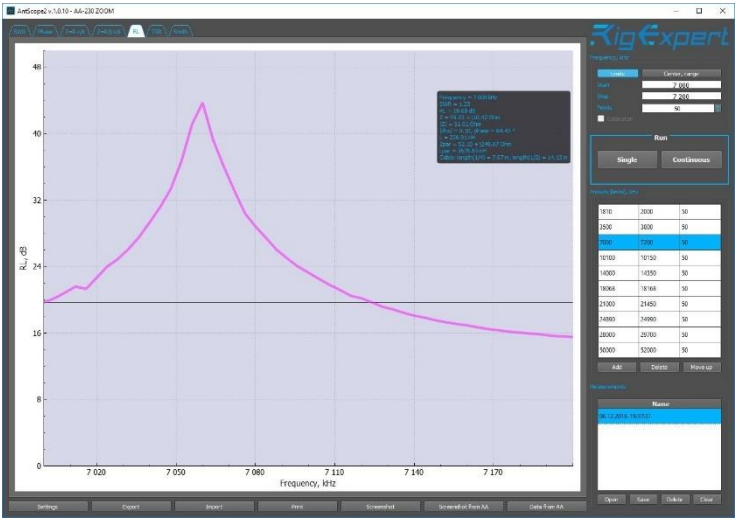
$$RL(\text{dB}) = 10 \log_{10} \frac{P_\text{i}}{P_\text{r}}$$

Where *RL*(dB) is the return loss in dB, P_i is the incident power and P_r is the reflected power.

Return loss is related to both standing wave ratio (SWR) and reflection coefficient (Γ). Increasing return loss corresponds to lower SWR. Return loss is a measure of how well devices or lines are matched. A match is good if the return loss is high. A high return loss is desirable and results in a lower insertion loss.

Return loss is used in modern practice in preference to SWR because it has better resolution for small values of reflected wave

Show return loss graph



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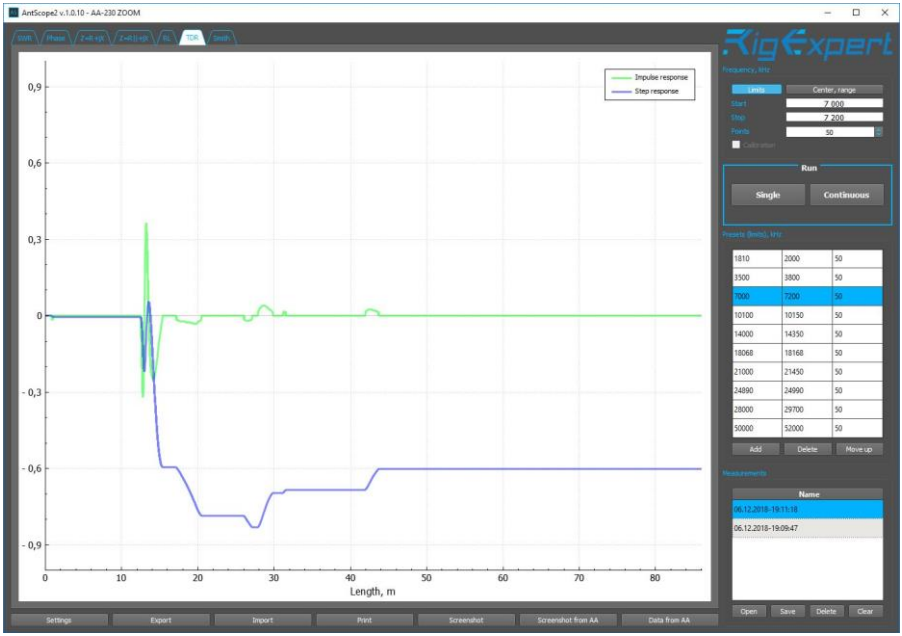
Menu TDR (Time domain reflectometer)

Time domain reflectometer info (From Wikipedia, the free encyclopedia)
A **time-domain reflectometer** (**TDR**) is an electronic instrument that uses time-domain reflectometry to characterize and locate faults in metallic cables (for example, twisted pair wire or coaxial cable). It can also be used to locate discontinuities in a connector, printed circuit board, or any other electrical path. The equivalent device for optical fiber is an optical time-domain reflectometer.

show TDR graph

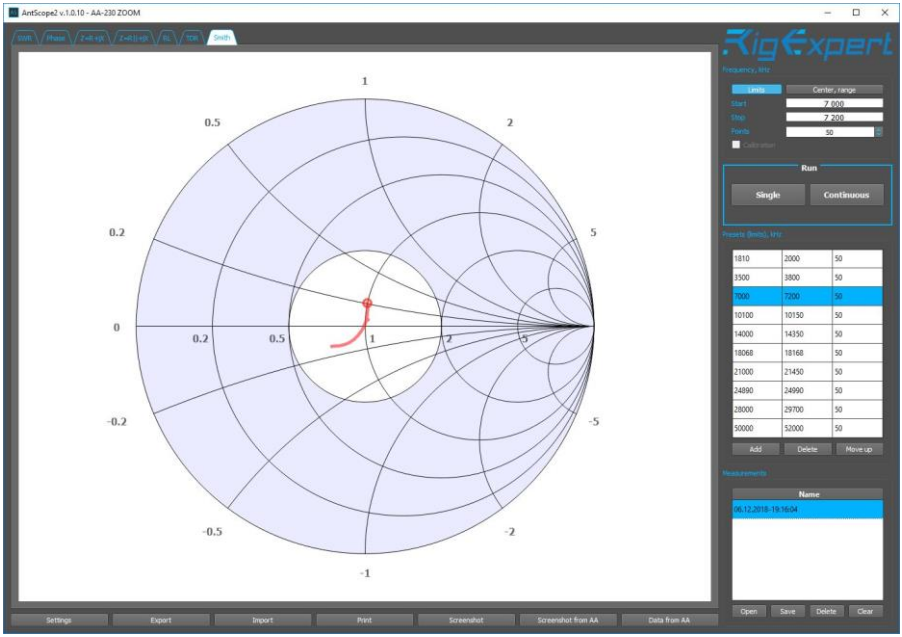


Menu Smith

Info Smith chart (From Wikipedia, the free encyclopedia)

The **Smith chart**, invented by Phillip H. Smith (1905–1987), is a graphical aid or nomogram designed for electrical and electronics engineers specializing in radio frequency (RF) engineering to assist in solving problems with transmission lines and matching circuits. The Smith chart can be used to simultaneously display multiple parameters including impedances, admittances, reflection coefficients, scattering parameters, noise figure circles, constant gain contours and regions for unconditional stability, including mechanical vibrations analysis. The Smith chart is most frequently used at or within the unity radius region.

show Smith chart



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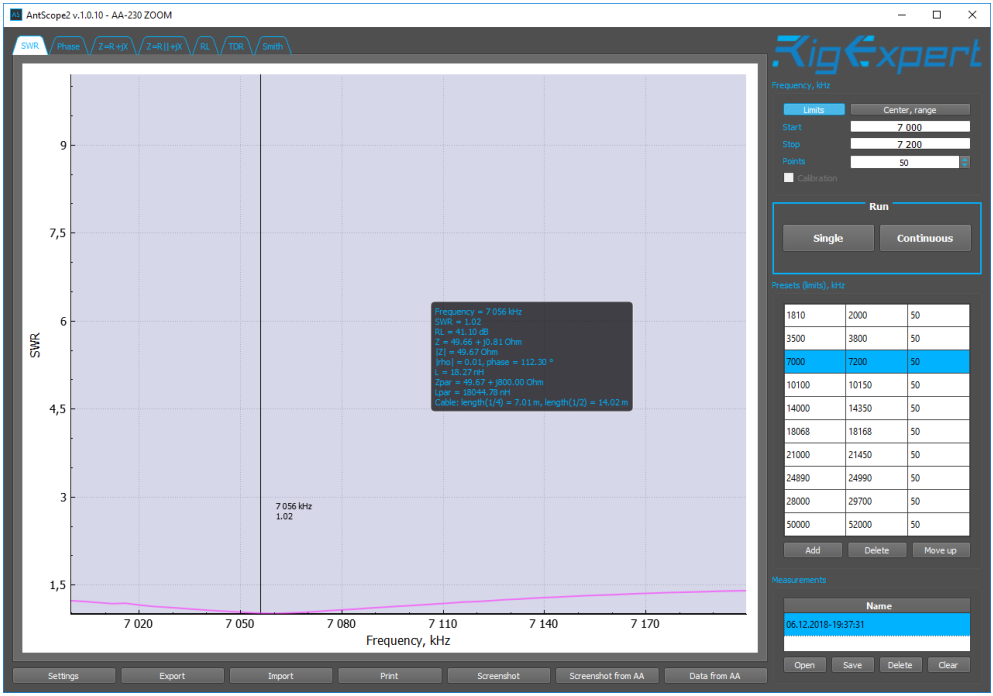
How to use AntScope:



Type your Frequenz in the **Start** field and in the **Stop** field set your end Frequenz klik on **Add** and your setup is saved

See that your AA-230 ZOOM is connected with your computer and antenna

Now klik on Single and the the antenna analyzer is create a full report of your antenna on the selected frequenz, and in the field **Name** there will create a datafile with this report.

Continuous mode – restart measurement when it finishes

Time domain reflectometer (TDR) mode

This mode displays impulse response and step response graphs which show how electromagnetic wave reflects from discontinuities in a cable.
Additionally, a tool tip near the cursor shows estimated value of the impedance of a cable at the corresponding distance.
This will let you know if your cable is in a good or a bad condition.

For best results, perform a scan over the full frequency range with 1000 or more points.
Make sure the characteristic impedance and the velocity factor of the cable are set in the **Settings** – **Cable** parameters menu.
This will let you see the exact distance to the discontinuity.
For TDR measurements, it is not important if the cable ends with antenna, open circuit or short circuit.

Calibration mode

Although RigExpert analyzers are designed to provide suitable precision without any calibration, a simple “open-short-load” calibration method may be used to improve the result.
Moreover, this method may be used to remove the effects of a cable, so accurate measurements at the far end of the cable become possible.

For this method, three calibration standards are required: an “open”, a “short” and a “load” (usually, a 50-Ohm load).
For better results, these standards should be of a good quality.
Additionally, physical length of all loads should be the same.

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