R&S®InstrumentView
Software Manual

1321104002
Version 16.00

ROHDE&SCHWARZ
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The software manual describes the following:

- R&S®InstrumentView

The R&S®InstrumentView supports the following product series:

- R&S®FPH
- R&S®FPC
- R&S®FSC
- R&S®FSH4
- R&S®ZNH
- R&S®ZPH
- R&S®ZVH
- R&S®PR200
- R&S®EM200
- R&S®RTA4000
- R&S®RTB2000
- R&S®RTC1000
- R&S®RTH1000
- R&S®RTM3000

The contents of this manual correspond to software version 2.70 or higher.

The software contained in this product uses several valuable open source software packages. For information, see the "Open Source Acknowledgment" document, which is available for download from the R&S InstrumentView product page at i.e. http://www.rohde-schwarz.com/product/Instrumentview > "Downloads" > "Software".
Rohde & Schwarz would like to thank the open source community for their valuable contribution to embedded computing.

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1321.1040.02 | Version 16.00 | R&S®InstrumentView

Throughout this manual, products from Rohde & Schwarz are indicated without the ® symbol, e.g. R&S®InstrumentView is indicated as R&S InstrumentView.

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1 Installing R&S InstrumentView

Installing the R&S InstrumentView software

The R&S InstrumentView allows you to control the instrument remotely via LAN or USB interface. It is an application software which provides printing service, customize report generation and editorial functions on the different datasets used in the instrument. The R&S InstrumentView also provides post-processing features to edit the markers position on the trace measurements.

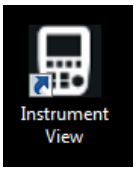
The R&S InstrumentView supports a range of:

- Spectrum analyzer: R&S FPH, R&S FPC, R&S FSC, R&S FSH4, R&S ZPH, R&S ZVH and R&S ZNH.
- Receiver: R&S PR200 and R&S EM200.
- Oscilloscopes: R&S RTA4000, R&S RTB2000, R&S RTC1000, R&S RTH1000, R&S RTM3000

The setup program installs the R&S InstrumentView software on PC's running Windows 7, 8 and 10.

To install the software, download the latest software installer from the individual instrument product homepage, i.e. www.rohde-schwarz.com/product/fph.

Running the R&S InstrumentView software



There are a few ways to start the R&S InstrumentView software:

- Double-click the R&S InstrumentView icon on the PC desktop.
- Navigate to "Start", select "All Programs > Rohde-Schwarz > Instrument View" and click the application icon .

About the software information

To display the software information for R&S InstrumentView, select "Options > About" menu item. See Figure 1-1.

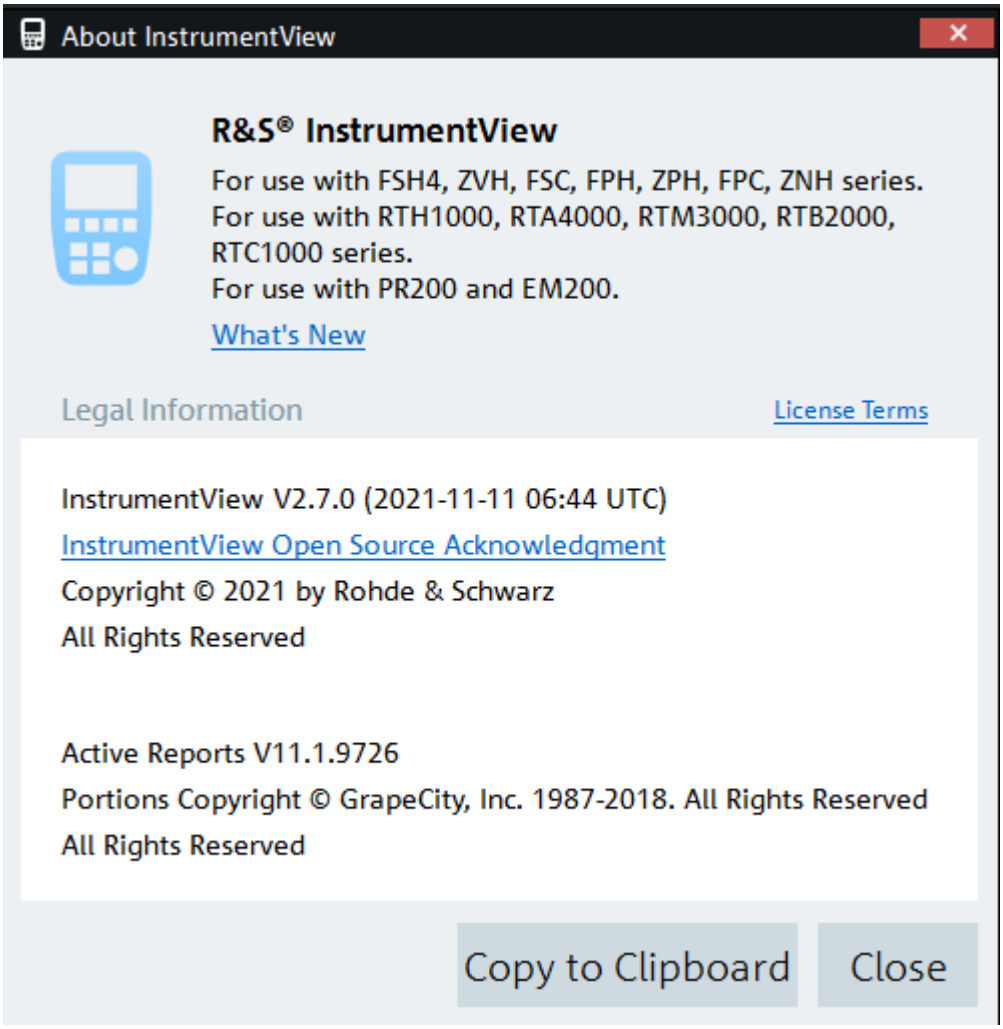


Figure 1-1: About R&S InstrumentView

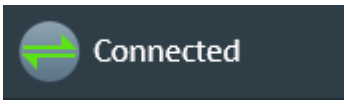
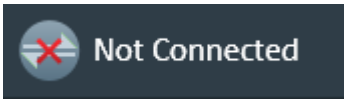
2 Connecting the Instrument

The InstrumentView software communicates your instrument via USB or Ethernet (LAN).

You can select the type of connection using the connection manager menu at the top right-hand corner of the screen layout. See Figure 3-1.

The connection manager menu also displays the instrument connection status.

Table 2-1: Connection status

Connection status	Function
	One or more instruments are connected withe the PC
	No instrument is connected with the PC

2.1 Connection Manager Menu

In the "Connection Manager" menu, you can configure the remote connection between the PC and the instrument.

Depending on the connection status icon , you can connect or disconnect the instrument from the connection manager list.

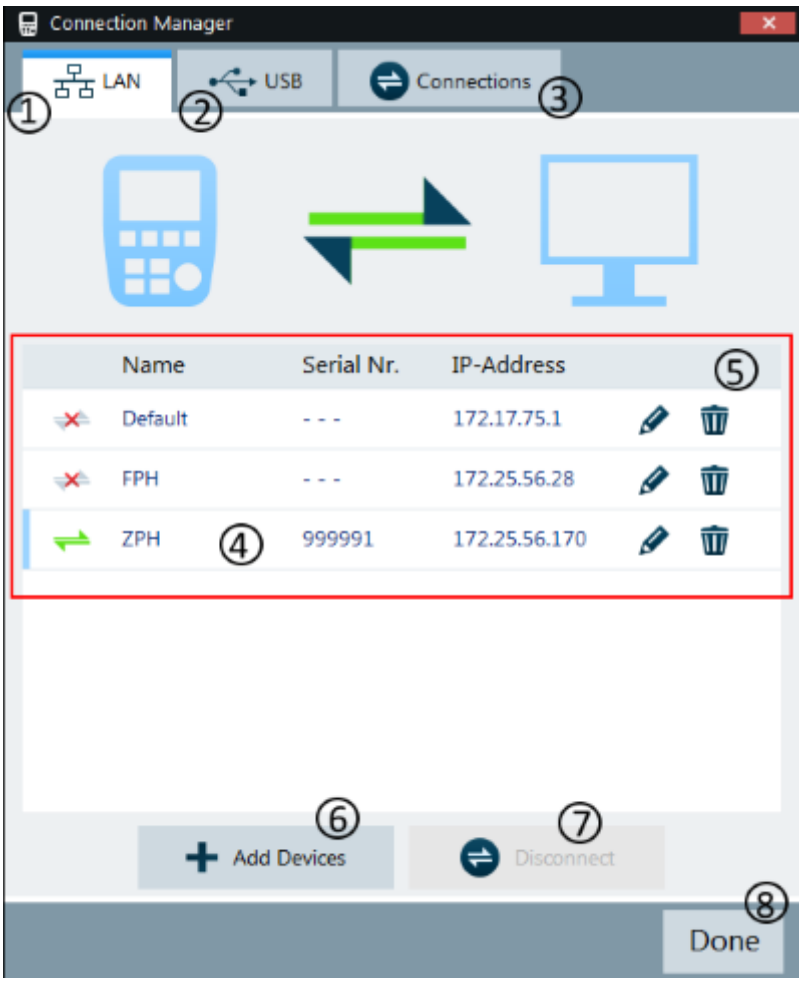


Figure 2-1: Connection manager menu

1 = LAN connection tab
2 = USB connection tab
3 = List of connections tab
4 = Connected instrument
5 = Connection manager list for LAN connection
6 = Select "Add Devices" button to configure a new instrument
7 = Select "Disconnect" / "Connect" button to connect or disconnect instruments from the connection manager list
8 = Select "Done" button to exit the "Connection Manager" dialog box

2.1.1 LAN Connection

During the initial startup, the "IP-Address / Hostname" field is set to default "172.17.75.1". You can edit the IP address or enter the hostname in the field using the icons .

To add a new instrument (LAN connection manually)

1. In the "Connection Manager" dialog, select "Add Devices".

The "Add Single Device" dialog opens.

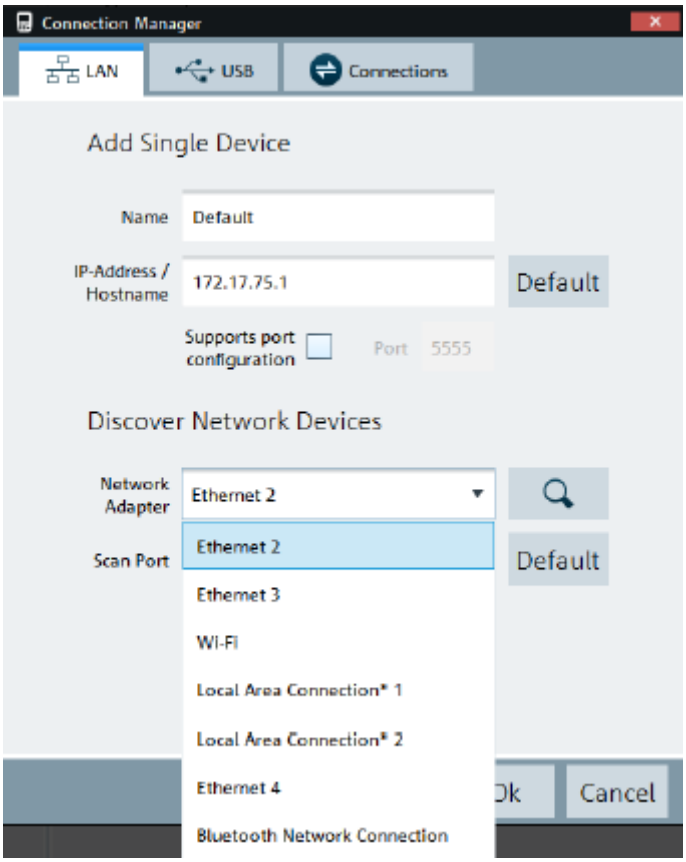


Figure 2-2: Add Single Device dialog

2. In the "LAN" tab, set the "Name" and "IP address / Hostname".
3. Select "OK" to add the new instrument to the connection manager list.

To add a new instrument (LAN connection automatically)

1. In the "Connection Manager" dialog, select "Add Devices".

   The "Add Single Device" dialog opens. See Figure 2-2.
2. In the "LAN" tab, perform a scan for devices in the network connected on the PC using the icon.

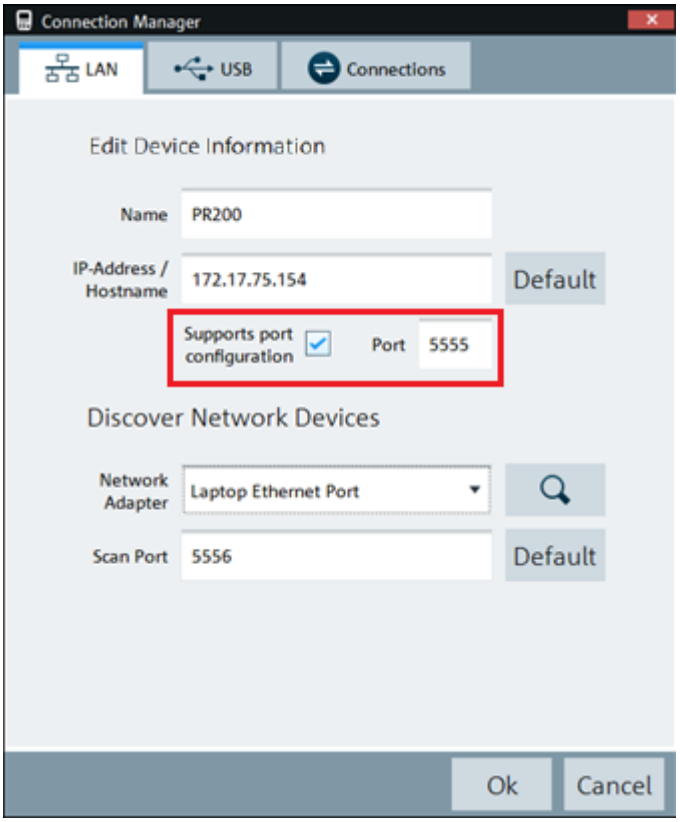
   The found devices appear in the LAN device list.
3. Select "OK" to add the new instrument to the connection manager list.

Port configuration

Port configuration is only applicable for R&S PR200 and R&S EM200.

1. In the "Connection Manager" dialog, select the for the device that requires port configuration.

   The "Edit Device Information" dialog opens.



2. Select "Supports port configuration" checkbox.
3. Set the "Port" configuration.
4. Select "OK" to edit the port configuration for the device.
   Note: The default port for R&S PR200 and R&S EM200 is 5555. To establish a connection, the port configured in R&S InstrumentView must match the port configured in the physical device.

2.1.2 USB Connection

The USB connection is not supported for receivers PR200 and EM200.

When the instrument is connected to the PC for the first time, Windows tries to install the new hardware automatically. The required drivers are installed along with the R&S InstrumentView software package.

When the drivers are found on your system and the hardware has been successfully installed, Windows shows a corresponding message.

There is only one USB instance in the connection manager list. See Figure 2-3.

Depending on the connection status icon , you can connect or disconnect an instrument from the connection manager list.

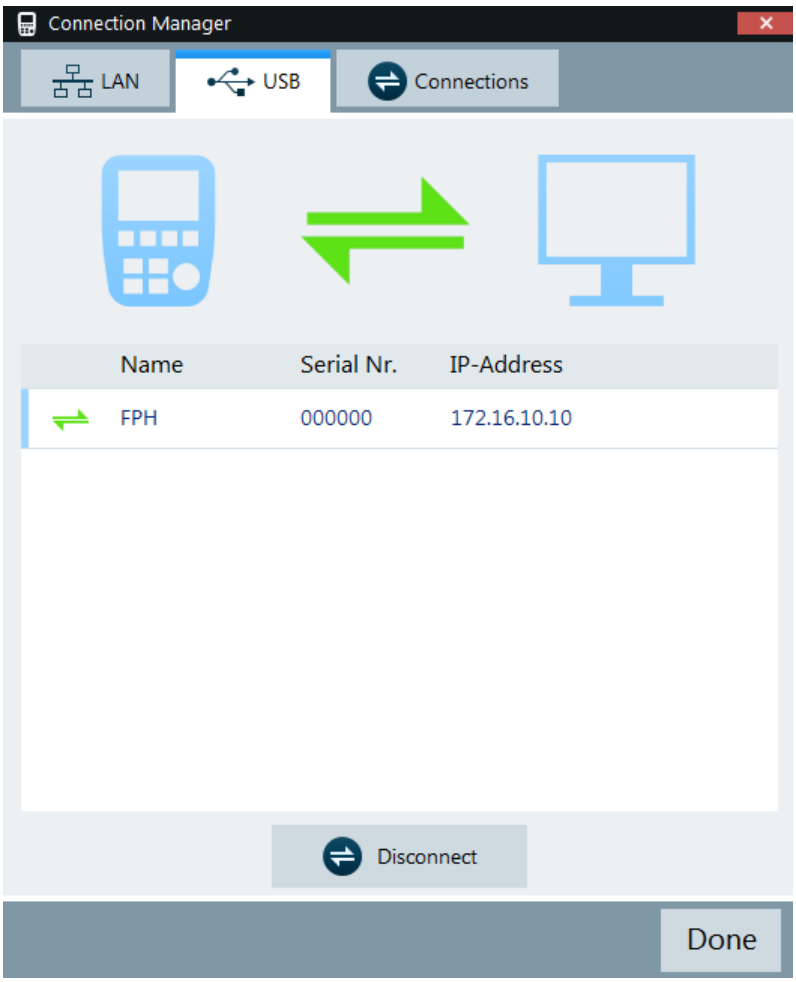


Figure 2-3: USB connection

2.1.3 List of Connections

Only one USB connection instance is supported at any time.

To view a list of instruments connected to the PC, select the "Connections" tab in the "Connection Manager" dialog box.

The connection status is displayed according to the type of connection established between the PC and instrument, e.g. USB , LAN .

Depending on the connection status icon , you can connect or disconnect an instrument from the connection manager list.

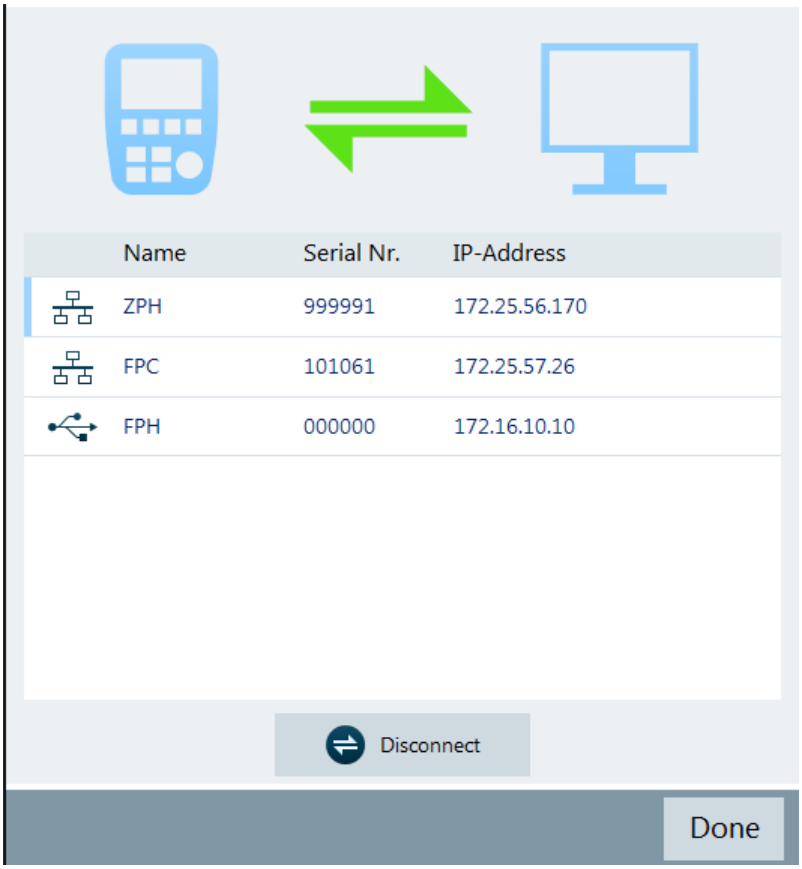
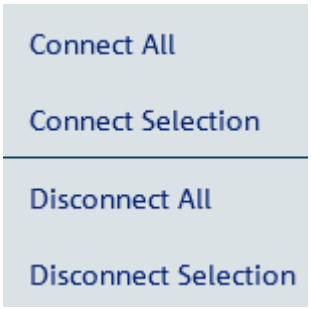


Figure 2-4: List of connected devices

2.1.4 Context Menu

Right-click in the connection manager list to access the following menus:



"Connect All": Connects all the listed instruments in the connection manager list.

"Connect Selection": Connects only the selected instrument in the connection manager list.

"Disconnect All": Disconnects all the listed instruments in the connection manager list.

"Disconnect Selection": Disconnects only the selected instrument in the connection manager list.

3 R&S InstrumentView Screen Layout

The following illustrates the display of the R&S InstrumentView screen layout.

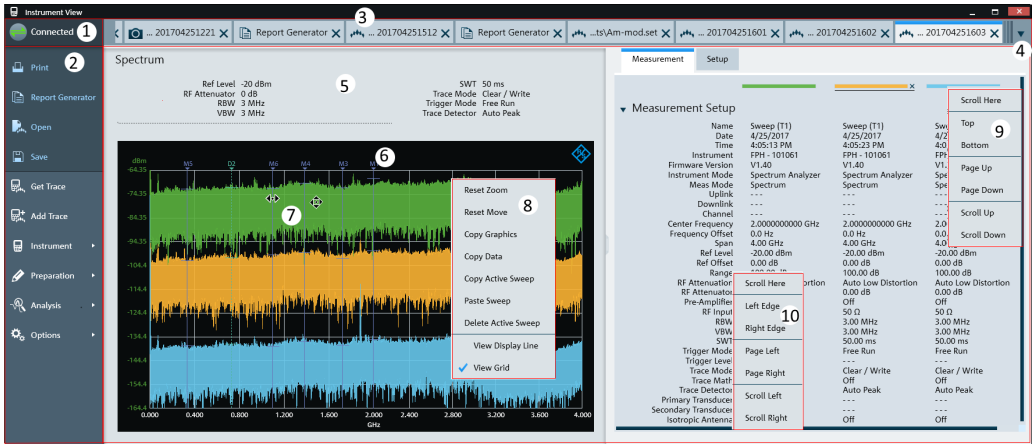
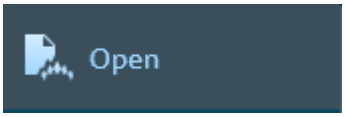


Figure 3-1: R&S InstrumentView screen layout

1 = Connection manager menu
2 = R&S InstrumentView menu
3 = Tab header bar
4 = Drop-down box to show hidden tabs in the Tab header bar
5 = Displays dialog box associated with the selected tab in the Tab header bar
6 = Trace measurement of the selected tab
7 = Mouse menu option. See details in Table 5-7.
8 = Context menu for trace measurement window
9 = Context menu for vertical scrollbar
10 = Context menu for horizontal scrollbar

Table 3-1: R&S InstrumentView menu

R&S InstrumentView menu	Function
	Prints and displays the print preview of the trace measurements. See Chapter 4.1, "Printing Trace Windows", on page 19.
	Customizes the report generation for the trace measurement results. See Chapter 4.2, "Report Generator", on page 21.
	Opens an existing trace measurement from the PC. See Chapter 4.4, "Open Instrument", on page 26.
	Saves the trace measurements and dataset. See Chapter 4.3, "Save Instrument", on page 24.
	Retrieves a trace measurement from the connected instrument. See Chapter 5.1.1, "Get Trace", on page 35. See Chapter 6, "Using R&S InstrumentView with an Oscilloscope", on page 113.

R&S InstrumentView menu	Function
	Adds a trace measurement from the connected instrument to the existing trace measurement. See Chapter 5.1.2, "Add Trace", on page 40. See Chapter 6, "Using R&S InstrumentView with an Oscilloscope", on page 113.
	Remote display and control of the instrument from PC. See Chapter 5.2.1, "Remote Display", on page 42. Provides a snapshot of all connected devices. See Chapter 5.2.2, "Lab Display", on page 45. Files transfer between the instrument and PC. See Chapter 5.2.3, "File Transfer", on page 46. Synchronizing files between instrument and PC. See Chapter 5.2.4, "Synchronization", on page 49. Multiple transfers of trace measurements from the instrument to PC. See Chapter 5.2.5, "Multi-Transfer", on page 51. Captures a screenshot from the instrument. See Chapter 5.2.6, "Screenshot", on page 53 Date time synchronization. See Chapter 5.2.7, "Date Time Synchronization", on page 54. Saves current active instrument dataset. See Chapter 5.2.8, "Save Active Dataset", on page 55. Activates dataset from PC to instrument. See Chapter 5.2.9, "Activate Dataset to Instrument", on page 55.
	Edits the different datasets supported by the instrument family. See Chapter 5.3, "Working with Instrument Datasets", on page 58.
	Provides post data analysis for spectrogram and map analysis. Provides GPX conversion to KMZ and CSV file format. See Chapter 5.3.14, "Map Creator", on page 83.
	Provides color settings on the different elements in trace window. Configures the local directory settings for the different types of files used in the application. Provides setting to enable the retrieve of full dataset from instrument. Displays the keyboard shortcuts key. Displays the application software information. See Chapter 4.5, "Options", on page 26.

Tab header bar

After the PC is successfully connected to the instrument, new tabs display in the "Tab header bar" when menu items are selected from the R&S InstrumentView menu.

Tab selected for usage is highlighted with a horizontal blue line in the tab. See an example in Figure 3-2.

Figure 3-2: Selected tab

3.1 Context Menu

Right-click on the trace measurement window, horizontal scrollbar or vertical scrollbar to access the following menus:

Trace measurement window:

"Reset Zoom", "Reset Move": Resets to original zoom level or moved position.

"Copy Graphics": Copies the selected trace from the trace window to the clipboard.

"Copy Graphic with Label": Available with R&S ZPH and ZNH product series, this context menu copies the trace window and the "Measurement Setup" details to the clipboard.

"Copy Data": Copies the instrument setup and trace data from the trace window to the clipboard.

"Copy Active Sweep": Copies the selected trace from the trace window. When a trace is selected, the corresponding grid color on the Y-axis changed accordingly.

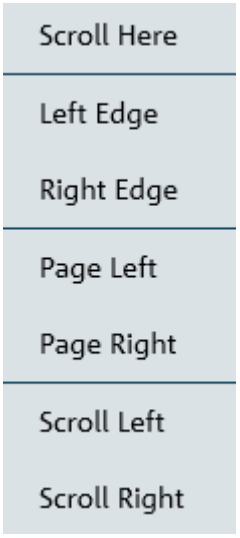
"Paste Sweep": Trace copied to the clipboard is pasted into the trace window.

"Delete Active Sweep": Deletes the selected trace from the trace window. When a trace is selected, the corresponding grid color on the Y-axis changed accordingly.

"View Display Line": A useful feature to visibly show the display line level.

"View Grid": Enables or disables the display of grid line on the trace window.

Horizontal scrollbar:



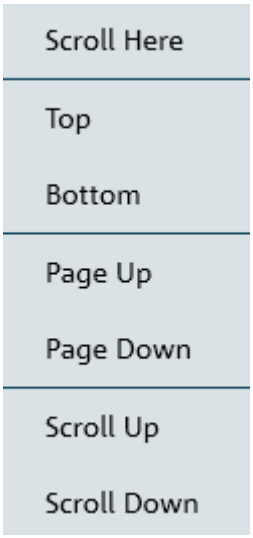
"Scroll Here" : Navigates to the cursor position.

"Left Edge", "Right Edge": Navigates to the extreme left or right of the scrollbar position.

"Page Left", "Page Right": Pages left or right on the scrollbar position.

"Scroll Left", "Scroll Right": Navigates left or right on the scrollbar position.

Vertical scrollbar:



"Scroll Here": Navigates to the cursor position.

"Top", "Bottom": Navigates to the top or bottom of the scrollbar position.

"Page Up", "Page Down": Pages up or down on the scrollbar position.

"Scroll Up", "Scroll Down": Navigates up or down on the scrollbar position.

4 General Settings

The following chapters give information about how to perform general settings like opening and saving files and setting up the report details.

4.1 Printing Trace Windows

The "Print" menu allows you to print the trace measurements currently loaded in the R&S InstrumentView. It also displays the print preview window on the printed output.

Arrangement of the printing sequence is possible by dragging the trace measurement window in the "Selection" section. See Figure 4-1.

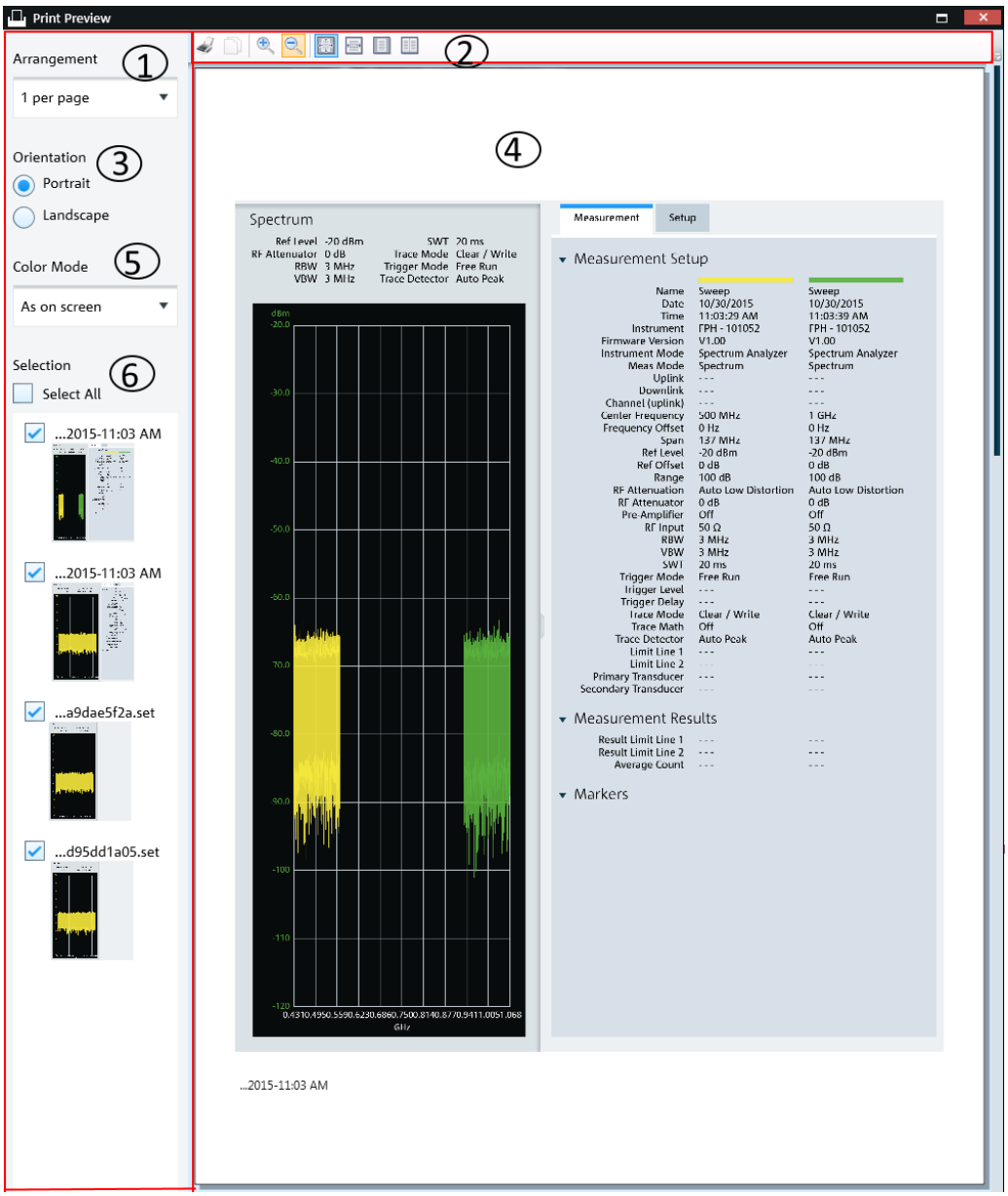


Figure 4-1: Print dialog

1 = Arrangement of the number of trace measurement windows per page (1, 2, 4, 6, 16 per page)
2 = Print preview tool
3 = Orientation on the printed output
4 = Preview window
5 = "Color mode" defines the window background color as black or white
6 = "Selection" displays the printed order of the trace measurement windows

Table 4-1: Print preview tools

Print preview tools	Function
Print or (Ctrl+P)	Prints the preview output.
Copy (Ctrl+C)	This action is not available.
Zoom in (Ctrl+)	Zoom-in the preview details.
Zoom out (Ctrl-)	Zoom-out the preview details.
100% (Ctrl+1)	Previews the actual print size of the trace measurement window.
Page width (Ctrl+2)	Previews the whole width size of the trace measurement window.
Whole page (Ctrl+3)	Previews a single page of the trace measurement result in the preview window.
Two pages (Ctr+4)	Previews two pages of trace measurement results on the same row in the preview window.

Context menu

Right-click in the print preview window to access the following menus:

- "Increase Zoom": zoom-in on the print preview details
- "Decrease Zoom": zoom-out on the print preview details

4.2 Report Generator

The "Report Generator" menu allows you to select logo, report output format and language and selectively display measurements parameters to customize the test report. See Figure 4-2.

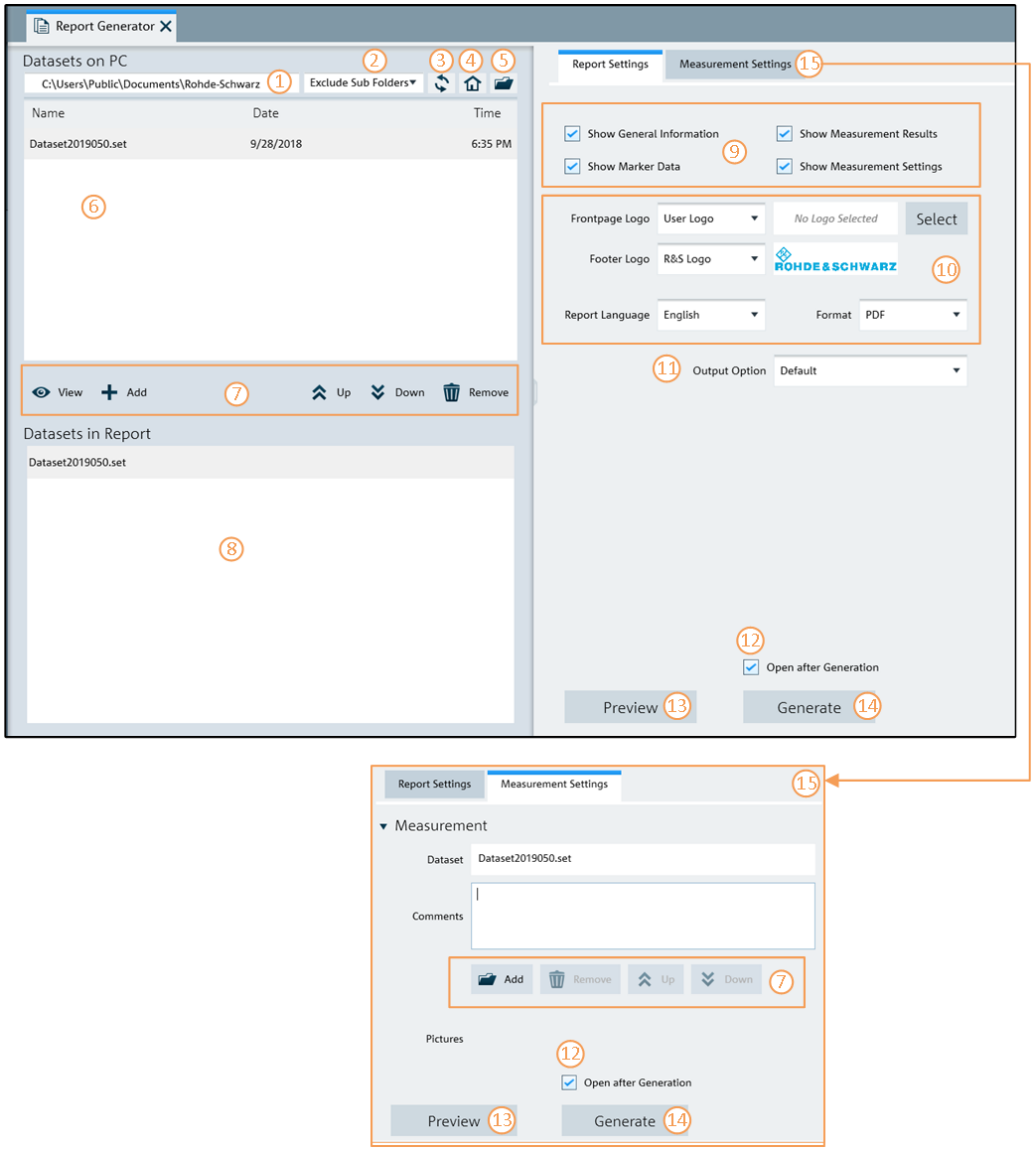


Figure 4-2: Report generation dialog

1 = Displays report library directory path
2 = Selects, if the files in the subfolders are included in the display
3 = Selects "Refresh" button to refresh the files in the selected report library directory
4 = Homepage
5 = Opens the PC window explorer to set report library directory path
6 = List of dataset files extracted from the report library directory. See Chapter 4.3, "Save Instrument", on page 24
7 = Dataset/Screenshot tools
8 = List of dataset sequence to be generated in report
9 = Report parameters
10 = User customization for logo and report language and format (PDF, HTML, RTF)
11 = "Output Option" selects, if a report is generated into one single file or into separate files for each folder
12 = Activates"Open after Generation" checkbox to open the file after report generation
13 = Selects "Preview" button to preview the report format
14 = Activates "Generate" button to generate the report
15 = "Measurement Settings" to insert additional comment and screenshots at the end of the report

Table 4-2: Dataset/Screenshot tools

Report tools	Function
"View"	Views dataset/screenshot.
"Add"	Adds selected dataset/screensot.
"Remove"	Deletes the selected dataset/screenshot.
"Up"	Moves forward the selected dataset/screen-shot.sequence.
"Down"	Moves backward the selected dataset/screen-shot.sequence.

Report parameters

The following shows a snapshot of the report generated. See Figure 4-3.

It shows the details parameters in the "General Information", "Measurement Results" and "Measurement Settings" section. These details parameters are configurable for report generation. See index 8 of Figure 4-2.

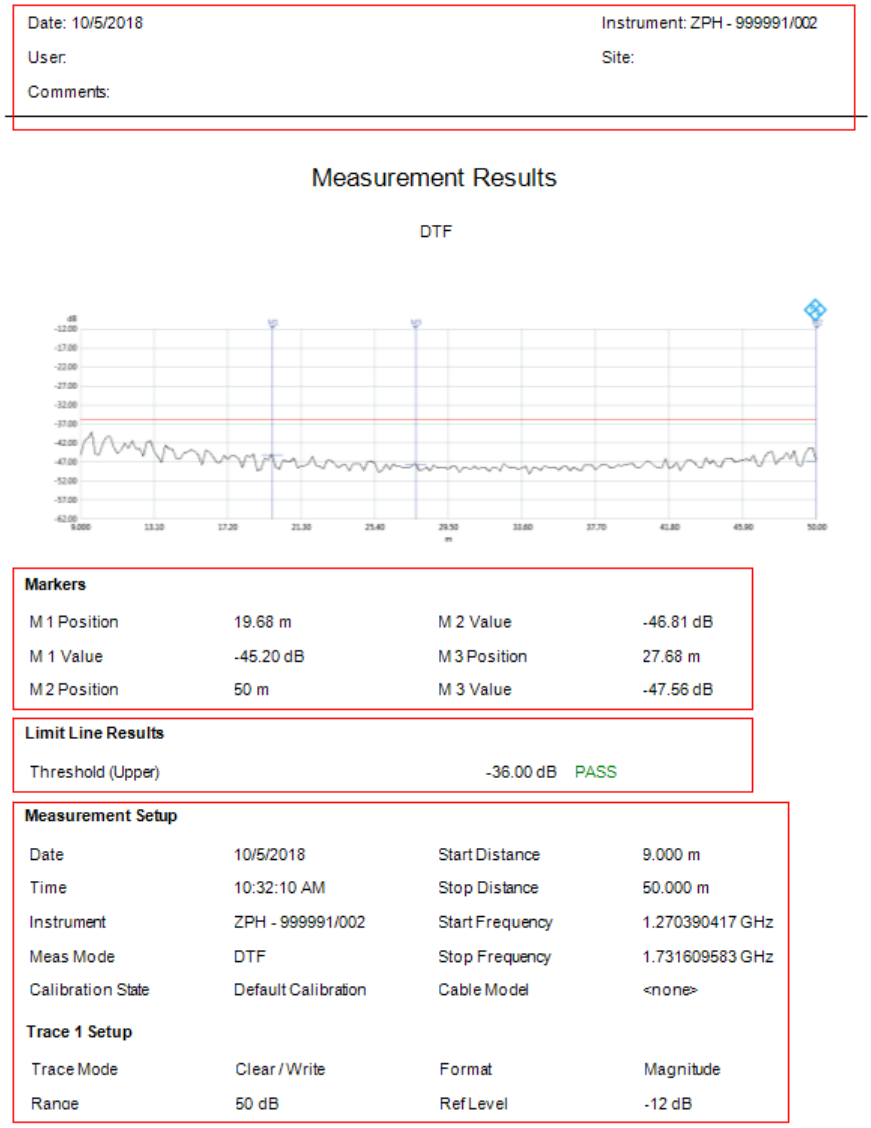


Figure 4-3: Test report generated

1 = General information
2 = Marker data
3 = Measurement results
4 = Measurement settings

4.3 Save Instrument

Save

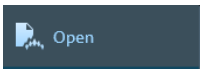
Depending on the types of dataset or trace windows (e.g. screenshot) that the R&S InstrumentView is working with, the "Save" function saves the files in their respective file format. See Table 4-3.

Table 4-3: File format

Description	File format
Primary transducer factor, secondary transducer factor and isotropic transducer factor See Chapter 5.3.1, "Using Transducers", on page 59.	`*.pritrd, *.sectrd, *.isotrd`
Cable models See Chapter 5.3.5, "Using Cable Models", on page 66.	`*.cblmod`
Calibration kit See Chapter 5.3.6, "Using Calibration Kits", on page 67.	`*.ckit`
Relative limit line and absolute limit line See Chapter 5.3.7, "Using Limit Lines", on page 69.	`*.relli, *.absli`
Channel table See Chapter 5.3.8, "Using Channel Table", on page 71.	`*.chnta`
Standards table See Chapter 5.3.9, "Using Standards", on page 72.	`*.semst, *.chpst, *.obwst, *.tdmst`
Quick name table See Chapter 5.3.10, "Using Quick Name Table", on page 76.	`*.qnt`
Ama limits See Chapter 5.3.11, "Using Analog Modulation Analysis AM Limits", on page 77 and Chapter 5.3.12, "Using Analog Modulation Analysis FM Limits", on page 78.	`*.aamlim, *.fmlim`
Datasets See Chapter 5.2.8, "Save Active Dataset", on page 55 and Chapter 5.2.9, "Activate Dataset to Instrument", on page 55.	`*.set, *xset, *cset,`
EMF See Chapter 5.3.15.2, "EMF Measurement Set Editor", on page 89 and Chapter 5.3.15.1, "EMF Measurement Configuration Editor", on page 86. See also Chapter 5.4.5, "EMF Measurement Result", on page 104.	`*.emcf, *.emrf, *.emdf`
Screenshot See Chapter 5.2.6, "Screenshot", on page 53.	`*.png, *.bmp, jpg, *.gif`
Trace measurement with setup configuration details See Chapter 5.1, "Working with Trace Windows", on page 35.	`*.set`
Measurement wizard set See Chapter 5.3.13, "Wizard Set Editor", on page 79	`*.mdf, xmdf`

Description	File format
Map data See Chapter 5.3.14, "Map Creator", on page 83.	*.idm, *prj, *.gpx
Spectrogram See Chapter 5.4.1, "Spectrogram", on page 94.	*.spm
Scope waveforms with setup configuration details See Chapter 6, "Using R&S InstrumentView with an Oscilloscope", on page 113	*scset
CSV instrument file reconstruction supportsTransducer , Cable Model, Channel Table, Limit Line, AMA AM Limit, AMA FM Limit and Standard	*.csv
Touchstone export file formats. See Chapter 4.5.5, "Command-Line Tool", on page 32	*.s1p, *.s2p
PR200 and EM200 support editors See Using Memory List, Using Suppress List	*.csv, *.xml
Correction Set editor file format See Using Correction Set	*.ini

4.4 Open Instrument



The "Open" menu allows you to open existing trace measurements, datasets or oscilloscope waveform file from the PC and display them. After selecting a file, a new tab is opened in the "Tab header bar".

For trace measurement details, see Figure 5-1.

For supported dataset details, see Chapter 5.3, "Working with Instrument Datasets", on page 58.

For use with the oscilloscope waveforms, see Chapter 6, "Using R&S InstrumentView with an Oscilloscope", on page 113.

Context menu

For details, see Chapter 3.1, "Context Menu", on page 17.

4.5 Options

The "Options" menu allows you to configure the application preference such as the color settings of the trace element, selection of instrument type family, directory path setting , display of keyboard shortcuts and software information.

- Color Settings....27
- Directory Settings....29
- Application Settings....31
- Keyboard Shortcuts....32
- Command-Line Tool....32
- About....33

4.5.1 Color Settings

The "Color Settings" dialog provides settings for the color displayed of the different trace elements in the trace window. See Figure 4-4. You can select if you want to display the analyzers or the oscilloscopes color settings.

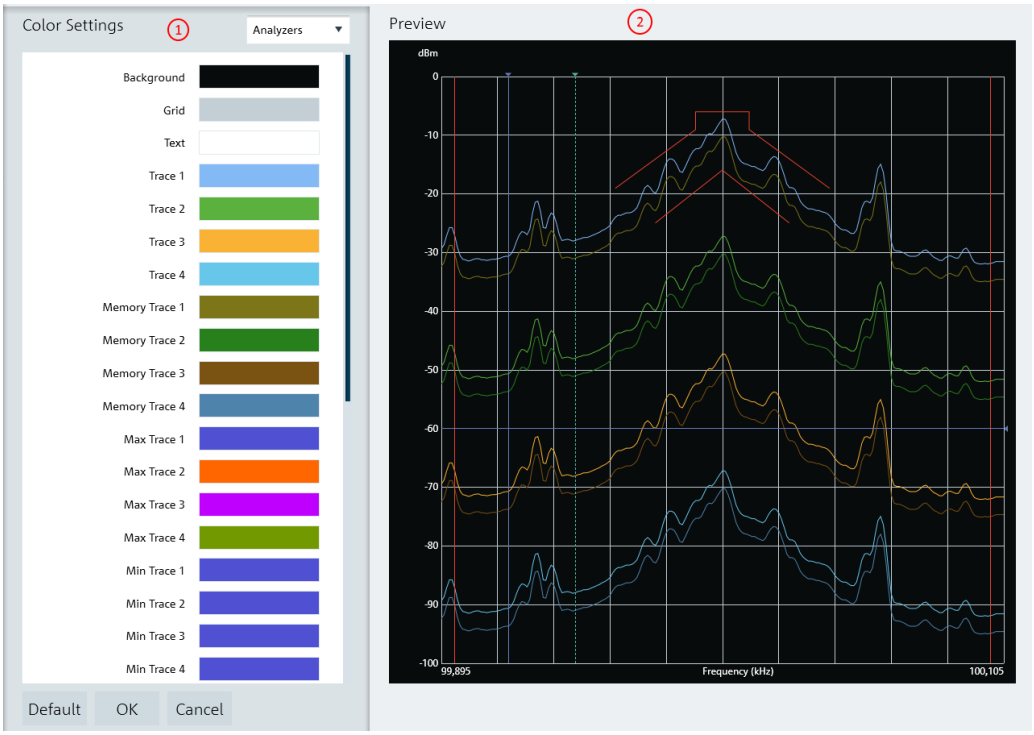


Figure 4-4: Color settings dialog for spectrum and network analyzers

1 = "Color Settings" menu display the color of each trace element in the trace window
2 = "Preview" window displays each trace element color in the trace window

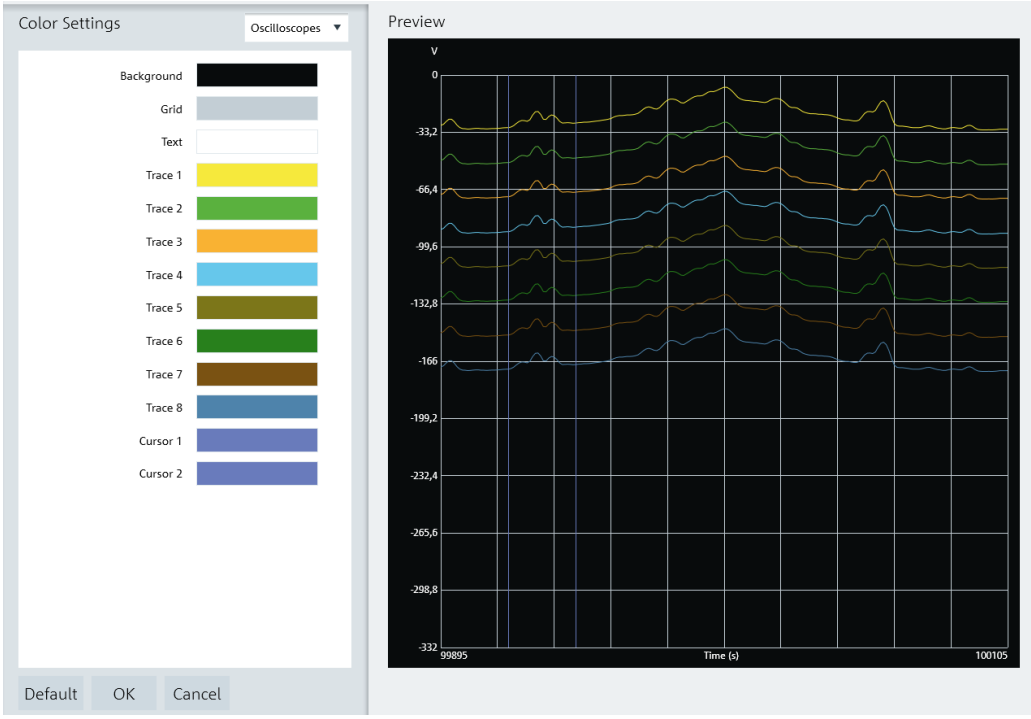


Figure 4-5: Color settings dialog for oscilloscopes

The following settings are provided:

- Background
- Grid line
- Text display on the trace window
- Up to four trace lines
- Up to four memory trace lines
- Up to maximum 4/16 trace lines for spectrum analyzers/ oscilloscopes
- Up to four minimum trace lines
- Up to four average trace lines
- Indicator line
- Display line
- Marker and delta marker line
- Upper and lower limit line
- Tx and adjacent channel indicator
- Channel bandwidth
- Up to two cursor lines

Select the desired trace element in the "Color Settings" menu and the "Color selection" dialog is displayed for configuration. See Figure 4-6.

There are a few ways to change the color settings in the "Color Selection" dialog:

- Select the desired color settings in the color display area

- Selects the desired brightness setting in the brightness level indicator
- Modify the RGB color codes
- Modify the hex color codes

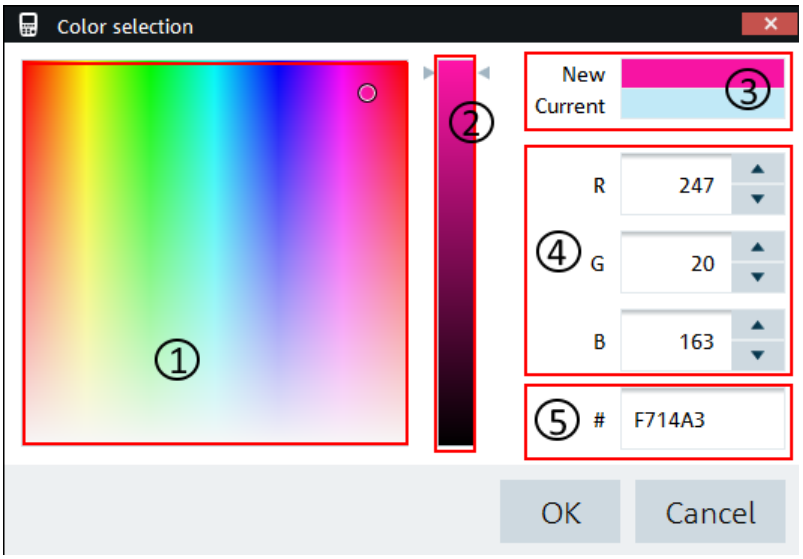


Figure 4-6: Color selection dialog

1 = Color display area
2 = Brightness settings indicator
3 = Color preview area
4 = RGB color codes
5 = HEX color codes

Select the "Default" button to restore the default settings of the trace element color. See Figure 4-4.

4.5.2 Directory Settings

The "Directory Settings" dialog provides the list of default path directories settings for the different type of files used in the application.

To change the path directories setting, double-click the desired file type and select the new directory.

Upon selection, the "Browse For Folder" dialog is displayed to configure the path directory setting. See Figure 4-7.

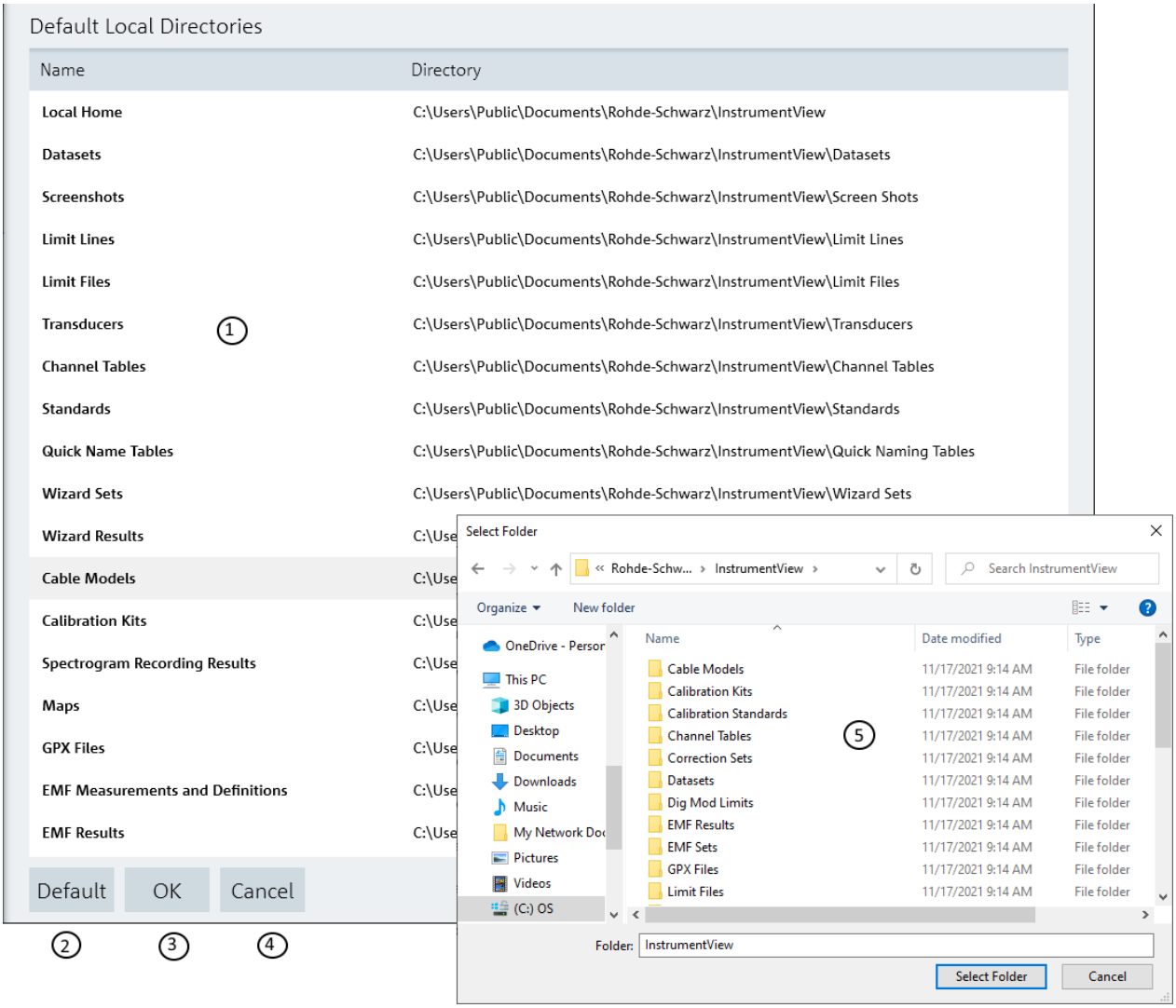
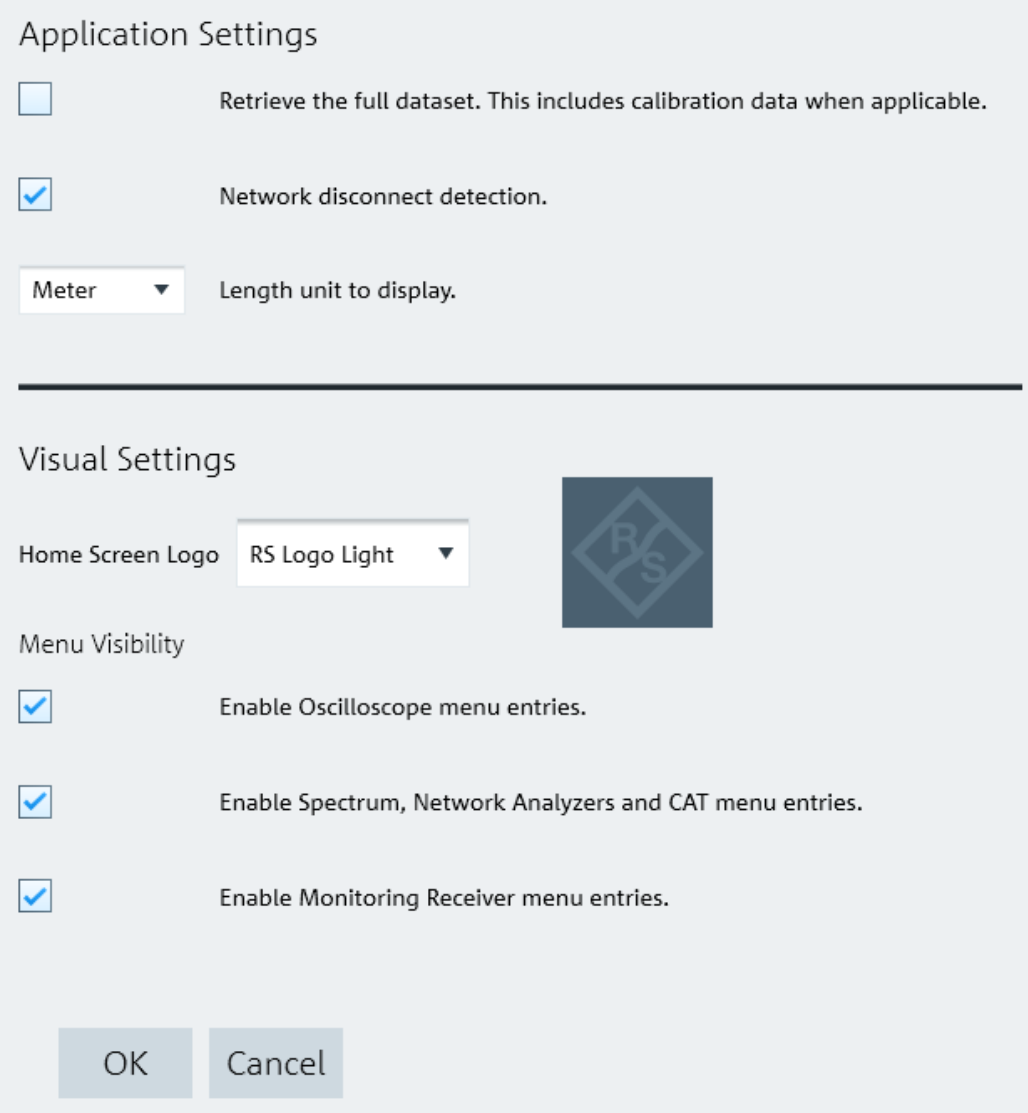


Figure 4-7: Directory settings dialog

1 = List of the different file types directory setting
2 = Press "Default" to reset the path directory to default settings
3 = Press "OK" button to confirm the settings of the path directory
4 = Press "Cancel" button to exit the path directory settings
5 = File browser for path directory selection

4.5.3 Application Settings



By default, the calibration data (if applicable) is not included in the saved dataset.

If necessary, enable the checkbox to retrieve the full dataset including the calibration data.

By default, the "Network disconnect detection" status is checked. When enabled, the R&S InstrumentView reflects the network connection status accordingly. See Table 2-1.

In the "Visual Settings" menu, you can select if you want to use the R&S InstrumentView with an oscilloscope, spectrum and network analyzers and/or monitoring receivers.

The length unit displays the desired unit shown in the calibration data (if applicable).

4.5.4 Keyboard Shortcuts

There are several shortcut keys that you can use to navigate in the application, see Shortcut keyboard.

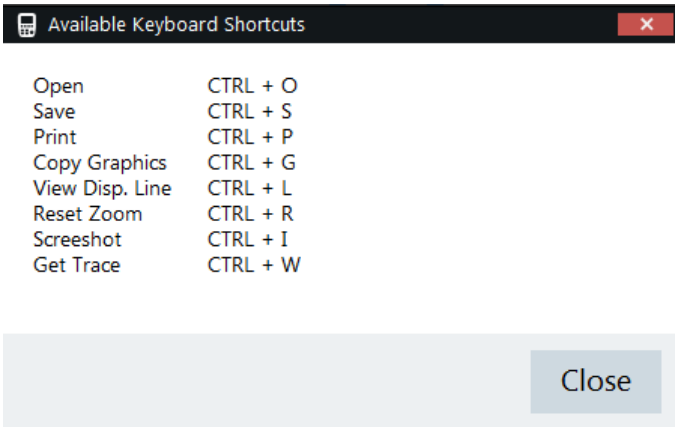


Figure 4-8: Shortcut keyboard

4.5.5 Command-Line Tool

The command-line tool is only applicable for R&S ZNH, R&S ZPH and R&S ZVH product series.

The command-line tool is run via the command prompt supported by PC's running Windows 7, 8 and 10.

The tool supports the following types of commands:

- `ConvertToZPH`
  Converts individual dataset or datasets in a directory to compatible dataset of the desired device type.
  Applicable to R&S ZPH and R&S ZVH only.

Example: Example of syntax for the ZVH -> ZPH converter:

```
InstrumentView.exe -ConvertToZPH ”input.set” ”output.set”
InstrumentView.exe -ConvertToZPH ”inputDirectory” ”outputDirectory”
```

- `ConvertToCSV`
  Converts individual files to CSV compatible format.

Example: Example of syntax for the dataset -> .CSV converter:

```
InstrumentView.exe -ConvertToCSV ”input.set” ”output.csv”
```

- `ConvertToS1P`
  Exports datasets with 1 port S-parameter measurement to S1P touchstone format.

Example: Example of syntax for export to S1P:

```
InstrumentView.exe -ConvertToS1p “input.set” “output.s1p”

InstrumentView.exe –ConvertToS1P ”inputDirectory” ”outputDirectory”
```

- `ConvertToS2P`
  Exports datasets with all 4 S-parameters (S11, S12, S21 and S22) to S2P touchstone format.

Example: Example of syntax for export to S2P:

```
InstrumentView.exe -ConvertToS2p “input.set” “output.s2p”

InstrumentView.exe –ConvertToS2P ”inputDirectory” ”outputDirectory”
```

4.5.6 About

See "About the software information" on page 7.

5 R&S InstrumentView Features

The following chapters illustrate the functionality of the R&S InstrumentView for use with a spectrum analyzer and monitoring receiver in details.

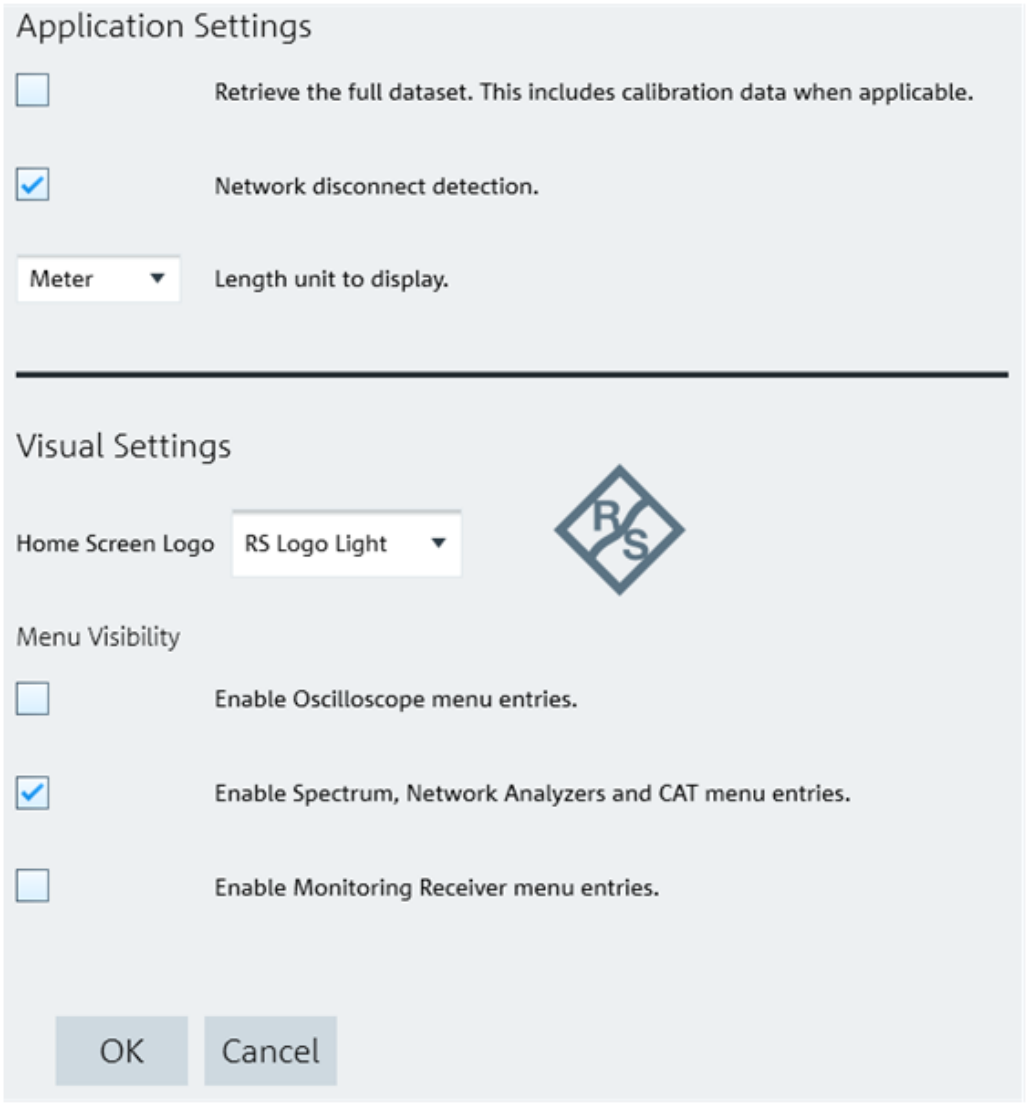
Prerequisites

The R&S InstrumentView supports both spectrum analyzer and monitoring receiver.

To enable the spectrum/network analyzer and CAT functionalities for the R&S InstrumentView, select the "Enable Spectrum, Network analyzer and CAT menu entries" option in the "Option >Settings" dialog.

To enable the monitoring receiver functionalities for the R&S InstrumentView, select the "Enable Monitoring Receiver menu entries" option in the "Option >Settings" dialog.

See also Chapter 4.5.3, "Application Settings", on page 31.



5.1 Working with Trace Windows

The following illustrates the ways how you can work with the trace measurements in R&S InstrumentView.

Context menu

For details, see Chapter 3.1, "Context Menu", on page 17.

- Get Trace 35
- Add Trace 40

5.1.1 Get Trace

The "Get Trace" menu allows you to capture the current trace measurement from the instrument and display it in the trace window. A new tab is formed in the "Tab header bar" for every new trace captured from the instrument. See index 1 in Figure 5-1.

For the R&S ZPH product series and R&S ZNH product series which supported two traces and four traces respectively, each trace contains its own measurement result.

Each trace measurement result consists of two tabs:

- "Measurement"
  - "Measurement Setup"
    Details of the instrument measurement settings. See user manual of the respective instrument for details of measurement settings.
  - "Measurement Results" (if any)
    Pass/Fail result of the limit test.
    See index 6 and 7 in Figure 5-1.
  - "Markers" (if any)
    Setting of the markers position.
  - "DTF List"
    Available for "DTF" mode measurements.
- "Setup"
  Trace measurement details captured from the instrument are displayed in the "Setup" tab. You can edit existing setup information or add additional setup information on the selected trace measurement. See index 3 in Figure 5-1.

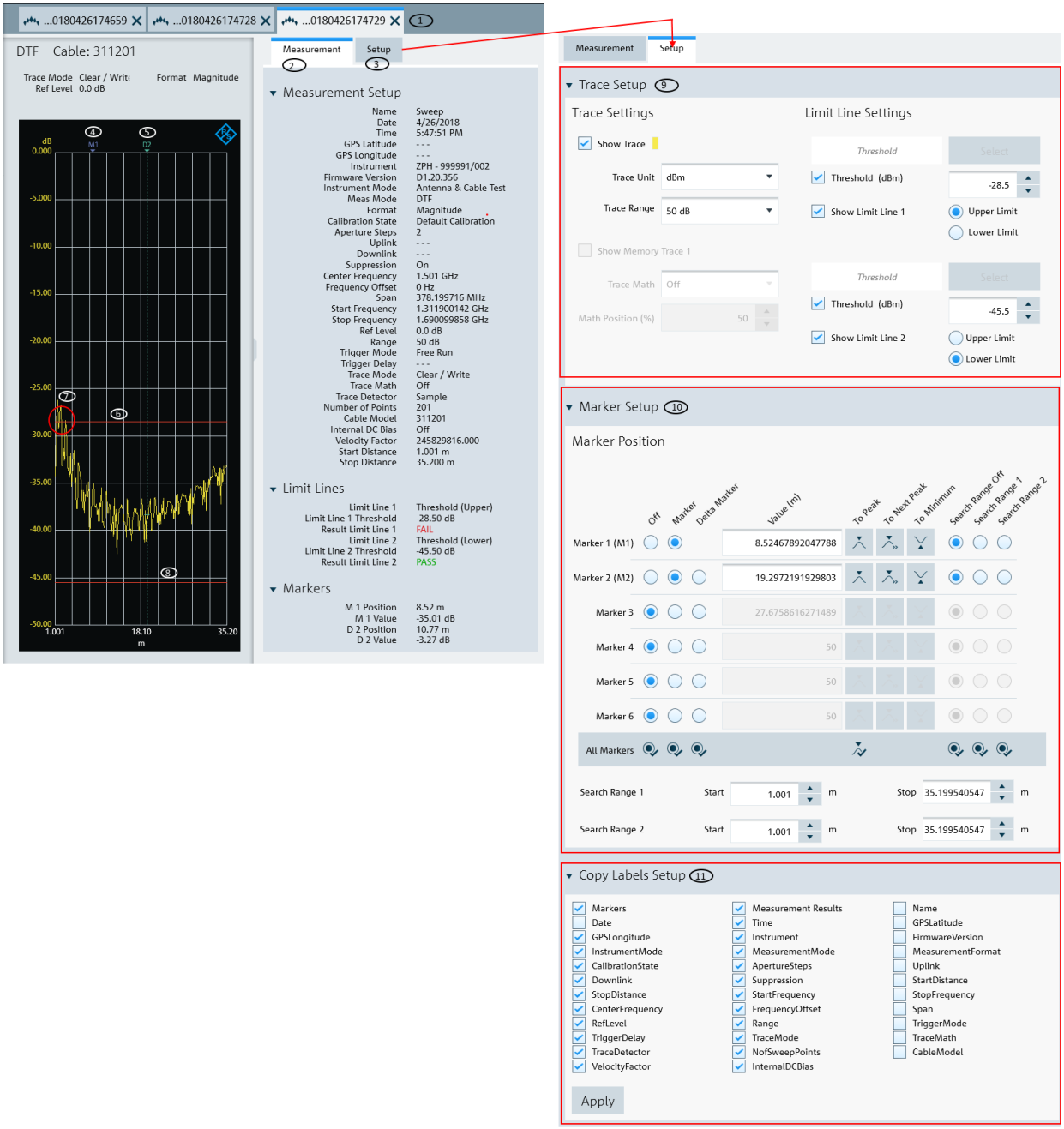


Figure 5-1: Trace measurement window

1 = Tab header bar
2 = "Measurement" tab
3 = "Setup" tab
4 = Marker position
5 = Delta marker position
6 = Upper limit of limit line 1
7 = Trace shows that result failed at limit line 1
8 = Lower limit of limit line 2

9 = Trace setup
10 = Marker setup
11 = Copy label setup

Trace setup

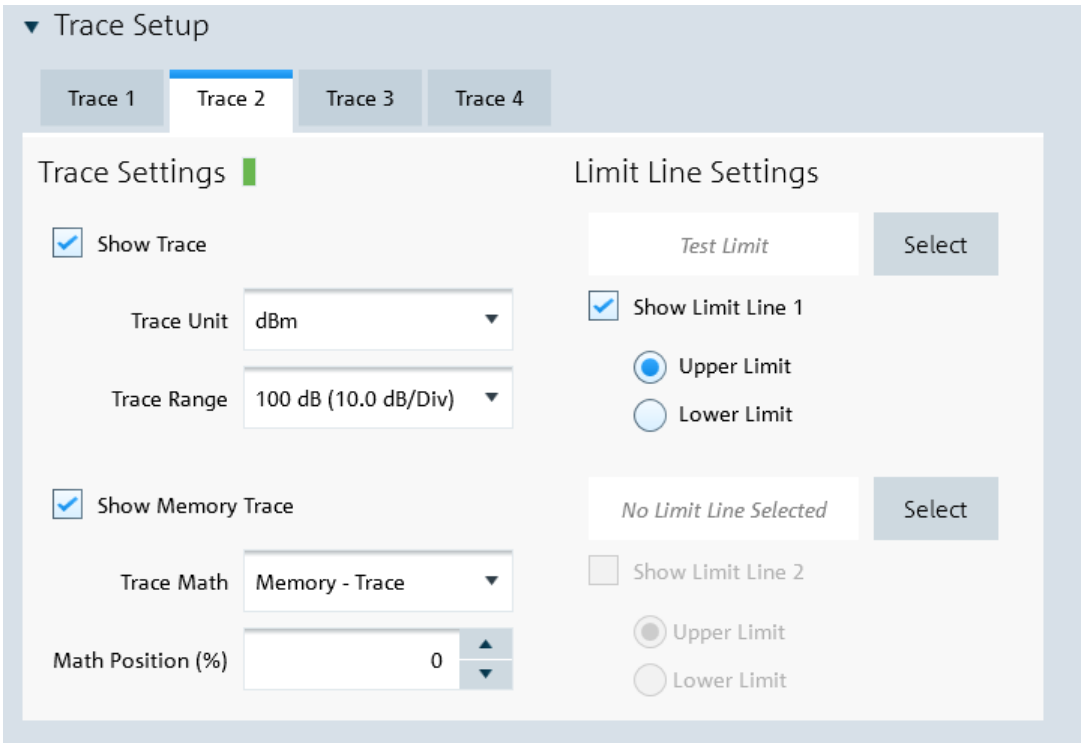


Figure 5-2: Trace setup

The "Trace Setup" dialog is divided into three different settings: trace setup, memory trace and limit line settings.

- Each trace is represented with a different trace color. If there is more than one trace in the same trace window, you can go to the individual trace tab to disable or enable the "Show Trace" checkbox to set the trace display. See Figure 5-2.
  The following "Trace Unit" and "Trace Range" are selectable:
  - "Trace Unit"
    "dBm", "dBmV", "dµV", "V", "W"
  - "Trace Range"
    "150 dB (15.0 dB/Div)", "130 dB (13.0 dB/Div)", "120 dB (12.0 dB/Div)", "100 dB (10.0 dB/Div)", "50 dB (5.0 dB/Div)", "30 dB (3.0 dB/Div)", "20 dB (2.0 dB/Div)", "10 dB (1.0 dB/Div)", "5 dB (0.5 dB/Div)", "3 dB (0.3 dB/Div)"," 2 dB (0.2 dB/Div)", "1 dB (0.1 dB/Div)", "Linear 0-100%"
- The "Show Memory Trace" is only enabled if the trace measurement captured from the instrument contains the memory trace information. With the memory trace, you can apply "Trace Math" method ("Trace - Memory", "Memory - Trace") between the trace and memory and see the result on the trace window.
  The "Math Position" shifts the trace resulted from "Trace Math" to the position defined in the entry box.

For more information on the memory trace, see the respective instrument user manual.

- The "Limit Line Settings" provides two sets of limit line that you can apply on the trace window. Each set of the limit line provides the selection to apply it as "Upper Limit" or "Lower Limit". The test result of the limit line is displayed in the "Measurement" tab. See index 2 in Figure 5-1.
  Selects "Select" to select the desired limit line from the "Limit Lines" folder directory in the PC. See Chapter 4.5.2, "Directory Settings", on page 29. You can enable or disable the display of the limit line using the "Show Limit Line 1" or "Show Limit Line 2" checkbox.

Marker setup

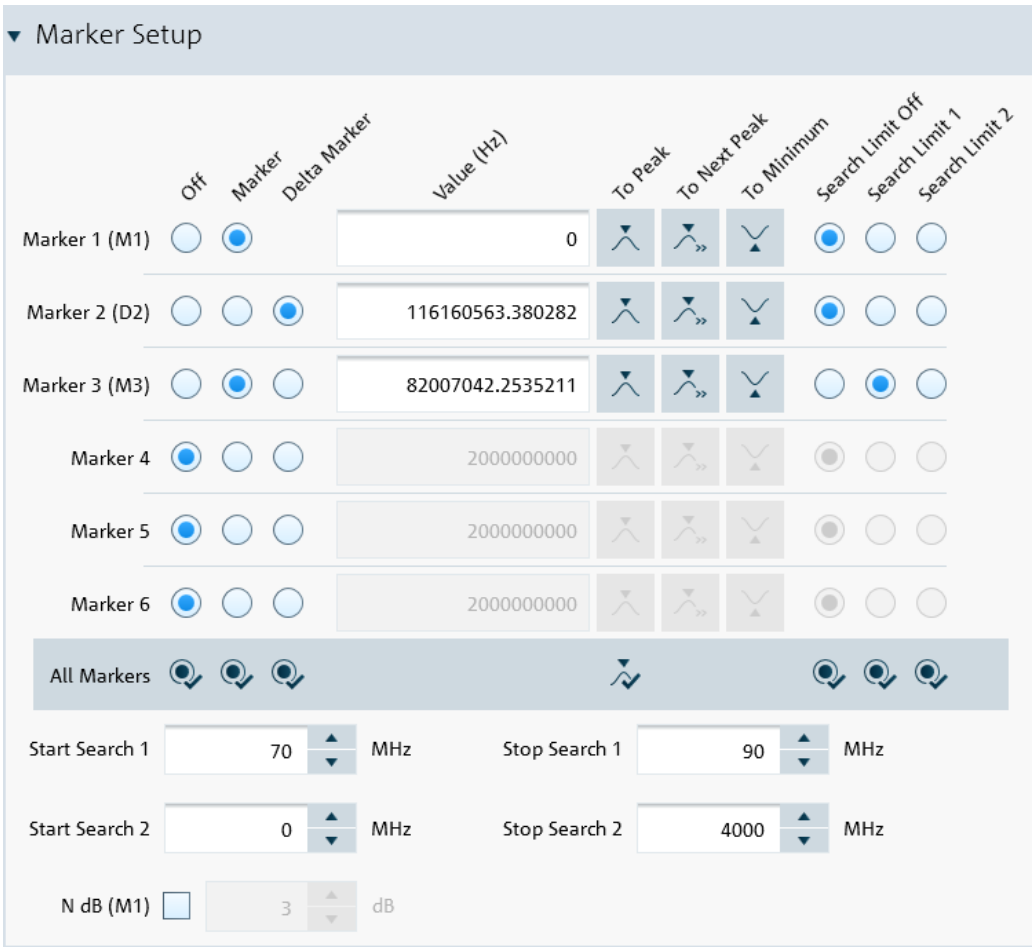


Figure 5-3: Marker setup

The "Marker Setup" allows you to label the trace measurement with up to six different markers. For more information on marker details, see the respective instrument user manual.

The first marker is always set as "M1" with the rest labeled as marker (M2, M3, M4, M5, M6) or delta marker (D2, D3, D4, D5, D6). See Figure 5-3.

The marker value can be individually positioned in the following ways:

- Value (Hz)
  Key in the desired frequency value in the entry box.
- "To Peak", "To Next Peak", "To Minimum"
  Auto-positioning of the marker value by selecting the peak, next peak or minimum value across the span width of the trace measurement.
- Auto positioning of marker value ("To Peak", "To Next Peak", "To Minimum") in the area defined by the search limit ("Search Limit 1" or "Search Limit 2").
  The "Start Search 1", "Start Search 2", "Stop Search 1" and "Stop Search 2" defined the search start and stop limit.
  You can also find the auto positioning of the marker value using the "N dB (M1)". This search function is only restricted to "M1" and available in spectrum operating mode.
- "All Markers"
  This section is used to synchronize the criteria of all the marker positions.

Cable setup

This setup is only available, if the instrument is in the "DTF" measurement mode.

You can set a DTF threshold and define the settings of your cable like velocity factor, frequency and cable loss. Optionally you can also import this setting from a file.

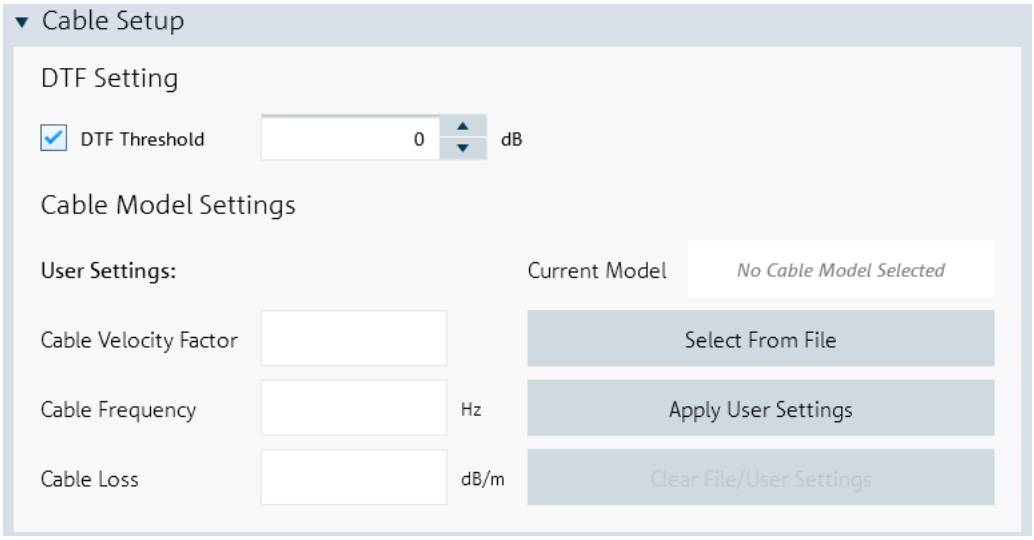


Figure 5-4: Cable setup for DTF measurements

Copy label setup

"Copy Label Setup" is only available with R&S ZPH and R&S ZNH product series.

The "Copy Label Setup" allows you to check or uncheck the measurement fields that are copied when using the context menu "Copy Graphic with Label".

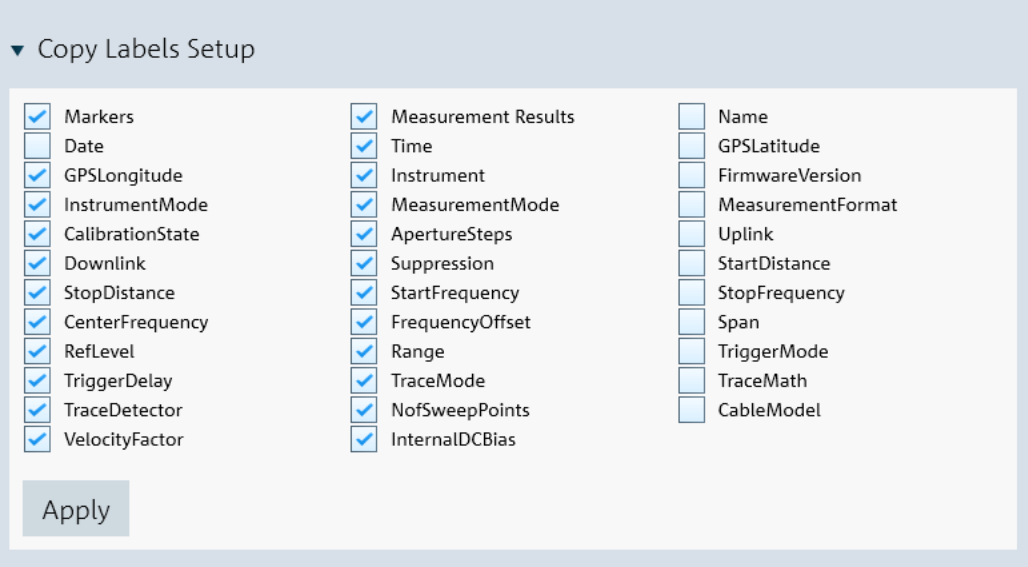


Figure 5-5: Copy Labels Setup dialog

5.1.2 Add Trace

The "Add Trace" is not applicable for R&S ZPH product series and R&S ZNH product series.

The "Add Trace" menu allows you to add additional trace measurement captured from the instrument to an existing trace measurement displayed in the trace window. Each trace is represented with a different trace color. See Figure 5-6.

See details of the "Measurement" tab in index 2 of Figure 5-1.

See details of the "Setup" tab in index 3 of Figure 5-1.

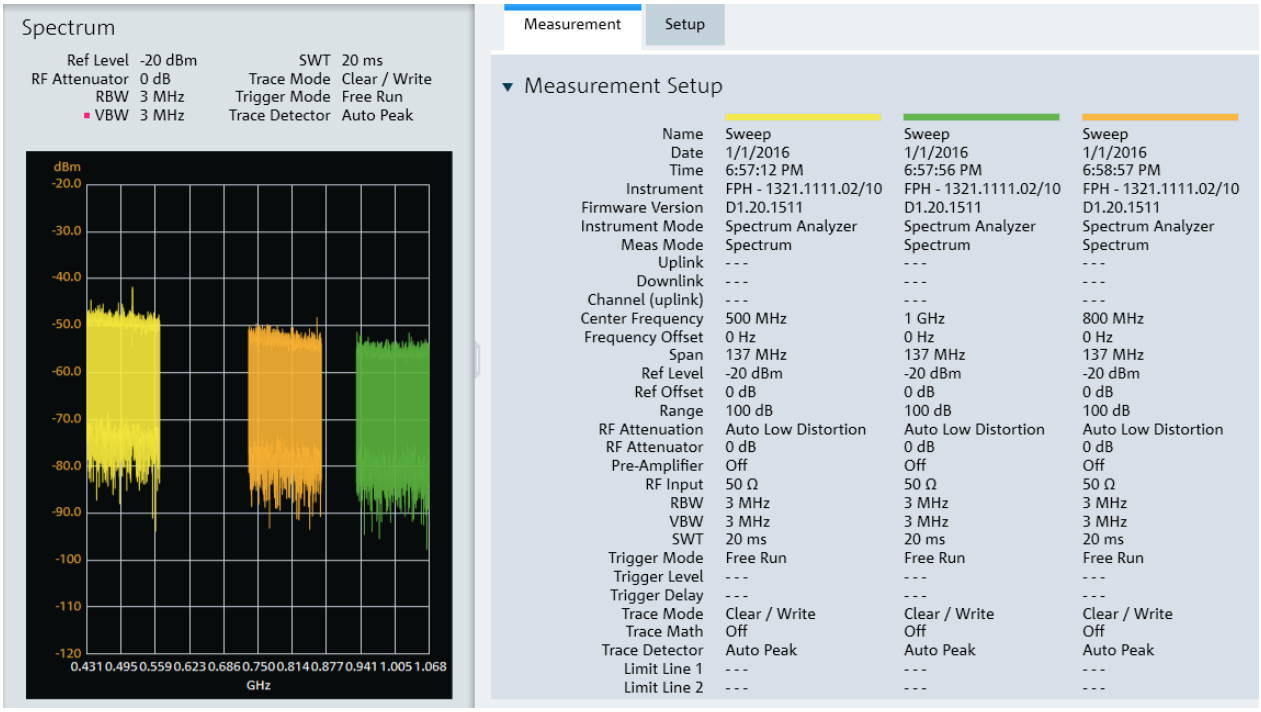


Figure 5-6: Add a trace to an existing trace measurement

5.2 Working with Instrument

The "Instrument" menu provides the following functions:

- Remote display and control of the instrument
- Snapshot display of all connected instrument
- Files transfer between instrument and PC
- File synchronization between instrument and PC
- Multiple updates of screenshot from instrument to PC
- Screenshot captured from the instrument
- Date and time synchronization between instrument and PC
- Saves a dataset from the instrument to PC
- Activates a dataset from PC to instrument
- Firmware update

- Remote Display....42
- Lab Display....45
- File Transfer....46
- Synchronization....49
- Multi-Transfer....51
- Screenshot....53
- Date Time Synchronization....54
- Save Active Dataset....55

- Activate Dataset to Instrument....55
- Firmware Update....56
- Antenna Firmware Update....57

5.2.1 Remote Display

To enter value:

- Select the left side of the rotary knob to decrease entry value and right side of the rotary knob to increase entry value.
- Select the center of the rotary knob to confirm the entry value

The "Remote Display" provides the remote display and control of the instrument. You can remotely control and display the instrument via the softkey and hardkey function displayed. See Figure 5-7.

See the respective instrument user manual for details of each of the softkey and hardkey functions.

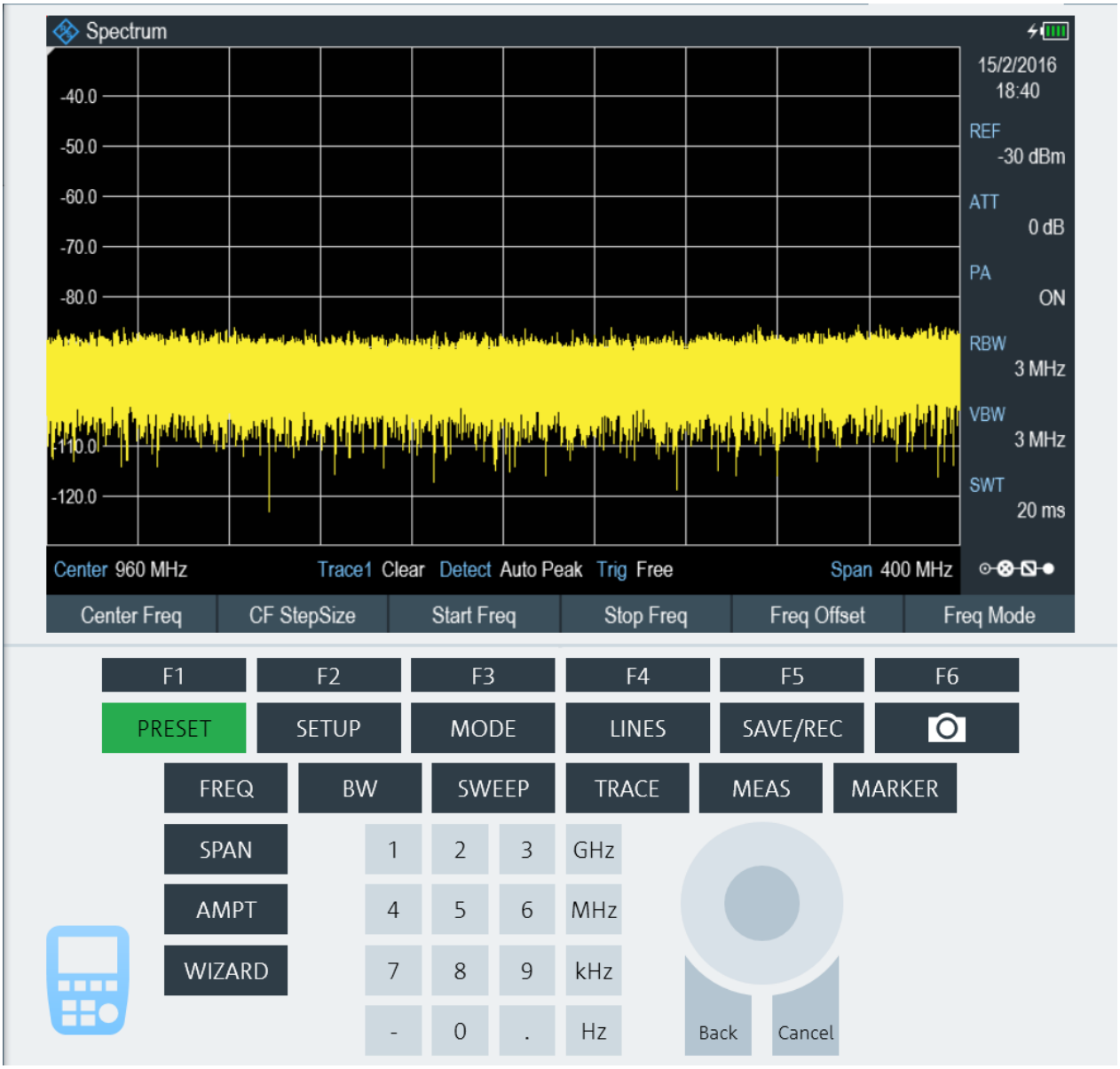
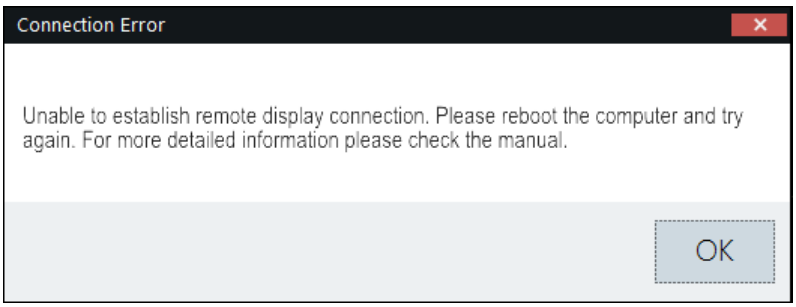


Figure 5-7: Remote display of the instrument

5.2.1.1 Remote Display with Troubleshooting

When establishing a remote connection with the instrument, a message "Establishing Remote Connection..." is displayed. When there is a connection failure, the "Connection Error" popup message is displayed. The timeout for connection error is 30 seconds.



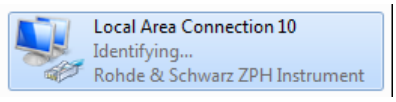
There are two possibilities for a connection failure:

USB device not initialized

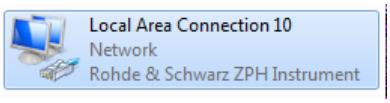
The virtual network adapter for the USB device has not yet initialized after plugging in the USB cable. This process takes at least 10 seconds and it varies per PC setup.

You can view the status of the USB device under `Control Panel\Network and Internet\Network Connections` settings in the PC operating system.

- USB device not ready

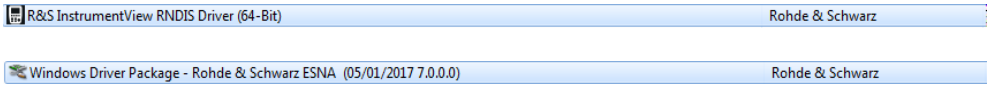
- USB device ready

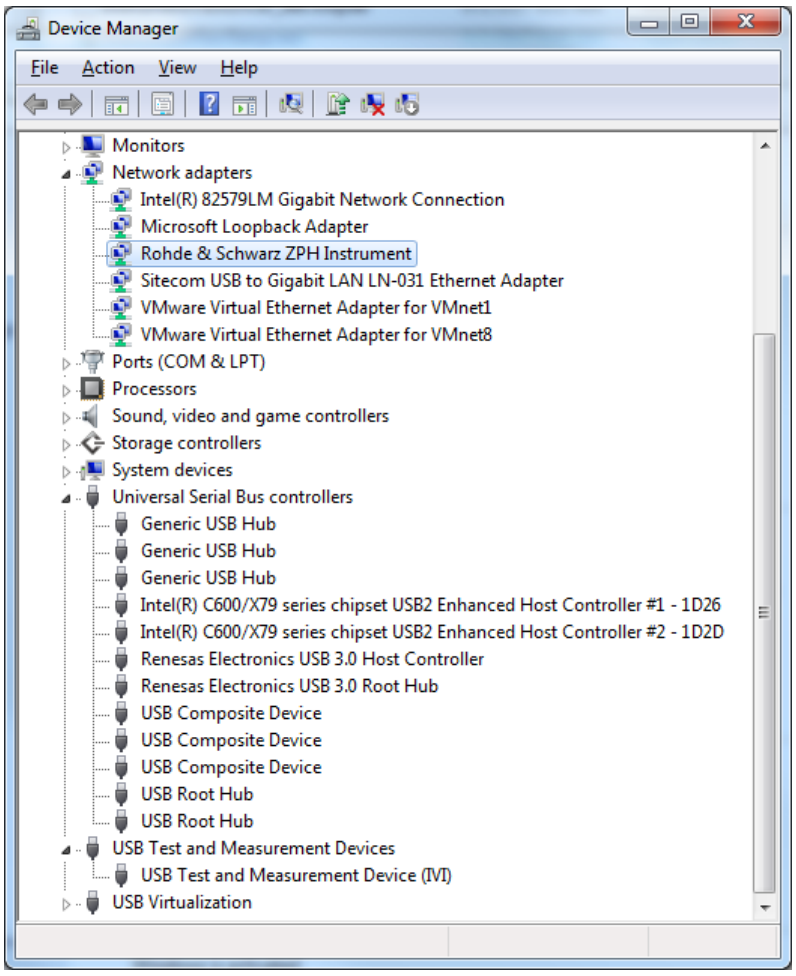
RNDIS drivers not properly installed

You can verify the RNDIS drivers status in two ways:

- Under `Control Panel\Programs\Programs and Features` settings:
  The R&S InstrumentView RNDIS Driver (32-Bit or 64-bit) and Windows Driver Package - Rohde & Schwarz ESNA installments must be present.

- Under `Control Panel\System and Security\System -> Device Manager` settings:
  For FPH/FPC/ZNH/ZPH, it should contain the following three devices:
  - USB Composite Device *with VID_0AAD*
  - USB Test and Measurement Device (IVI) *with VID_0AAD*
  - Network adapter with the name Rohde & Schwarz <device type> Instrument.
    The highlighted "Rohde & Schwarz ZPH Instrument" network adapter would not show up in case the RNDIS driver is not correctly installed on the PC.



If connection failure still persists, it is recommended to uninstall and reinstall the R&S InstrumentView software package. See Chapter 1, "Installing R&S InstrumentView", on page 7.

5.2.2 Lab Display

The "Lab" menu displays a snapshot of all the connected instruments in the display window.

Each snapshot provides you an instrument identity and overview of the current measurement:

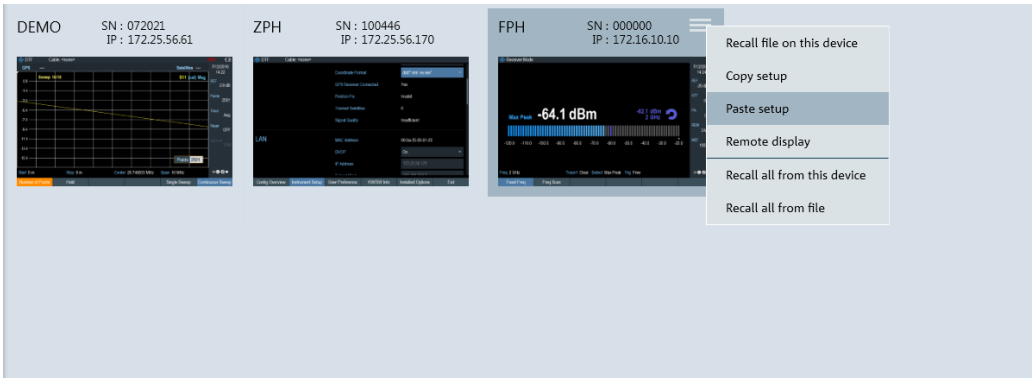


Figure 5-8: Snapshot of all connected instruments

Context menu

Right-click on the instrument snapshot for the following menus:

Recall file on this device	"Recall file on this device": Recalls a dataset stored on the PC to the selected device.
Copy setup	"Copy setup": Copies the measurement setup of the selected device to the internal clipboard of R&S InstrumentView.
Paste setup	"Paste setup": Pastes the measurement setup from the internal clipboard of R&S InstrumentView to the selected device.
Remote display	Remote display
Recall all from this device	"Recall all from this device": Retrieves the measurement setup of the selected device and recalls it on all currently connected devices in the display window.
Recall all from file	"Recall all from file": Recalls a dataset stored on the PC to the all connected devices in the display window.

5.2.3 File Transfer

The "File Transfer" provides the file transfer between the instrument and PC. You can make single or multiple files transfer or perform a file synchronization between the instrument and PC. See Figure 5-9.

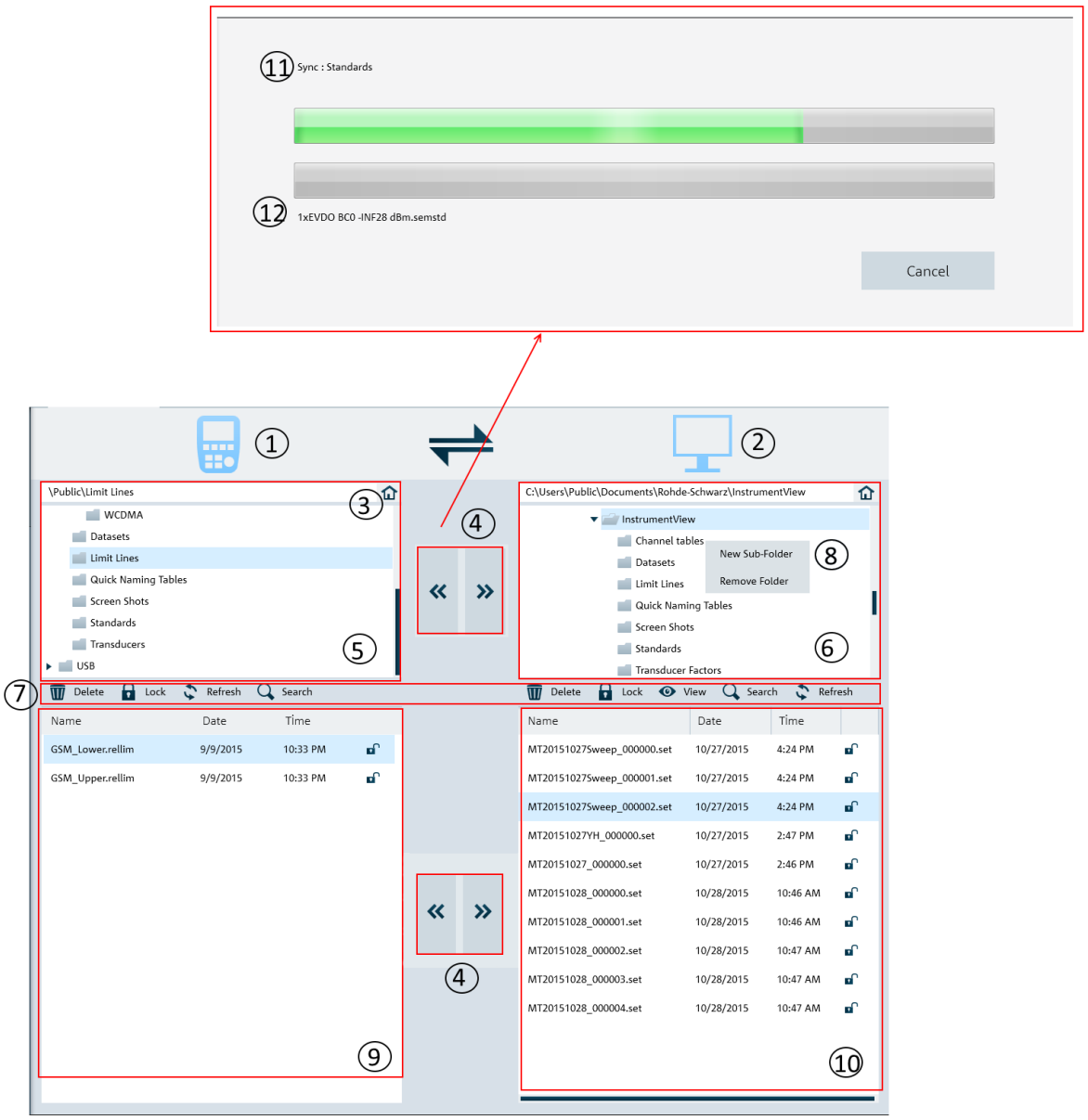


Figure 5-9: File transfer dialog

1 = Instrument icon.
2 = PC icon.
3 = Homepage
4 = File transfers from the instrument to PC and vice versa
5 = Instrument's folder directories
6 = PC's folder directories
7 = File transfer tools
8 = Right-click to create or remove folder
9 = List of selected files from the instrument

10 = List of selected files from the PC
11 = Progress bar showing the current folder synchronizing between the instrument and PC
12 = Progress bar showing the current file synchronizing between the instrument and PC

Table 5-1: File transfer tools

Icon	Function
"Delete"	Deletes the selected file.
"Lock"	Locks or unlocks the selected file. Alternative, you can select the icon to unlock or lock the file. Note: A locked file is a read-only file, it can only be viewed and transferred.
"Refresh"	Refreshes the file content in the selected folder directory.
"Search"	Performs a file search function in the selected folder directory.
"View"	Views the details of the trace measurement file. For viewing, see Chapter 4.3, "Save Instrument", on page 24 for a list of file format supported. When a file is selected to be viewed, a tab is displayed in the header bar of the screen layout. See index 11 of Figure 5-11.

Homepage

When activated, the homepage helps you to set the directory path back to the root directory.

- `\Public` for instrument
- `..\Users\Public\Documents\Rohde-Schwarz\InstrumentView` for PC

See Chapter 4.5.2, "Directory Settings", on page 29.

File transfer conflicts

When a file transfer conflict is detected during the process, the conflict dialog box is displayed to resolve the conflict. See Figure 5-10

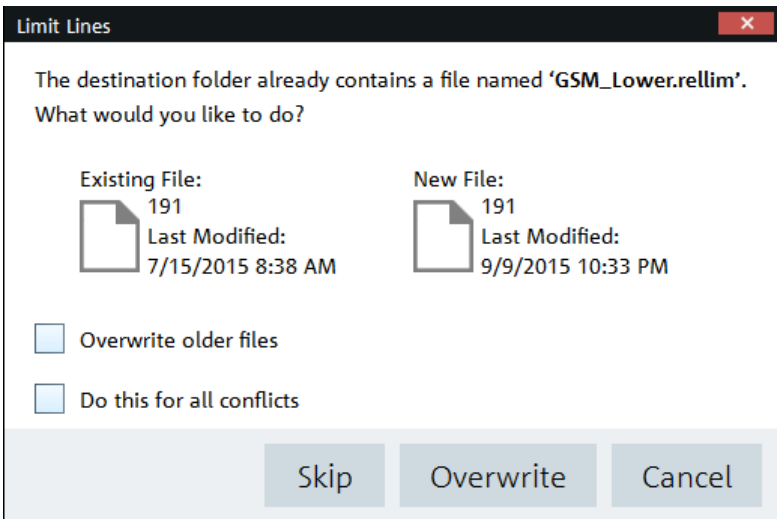


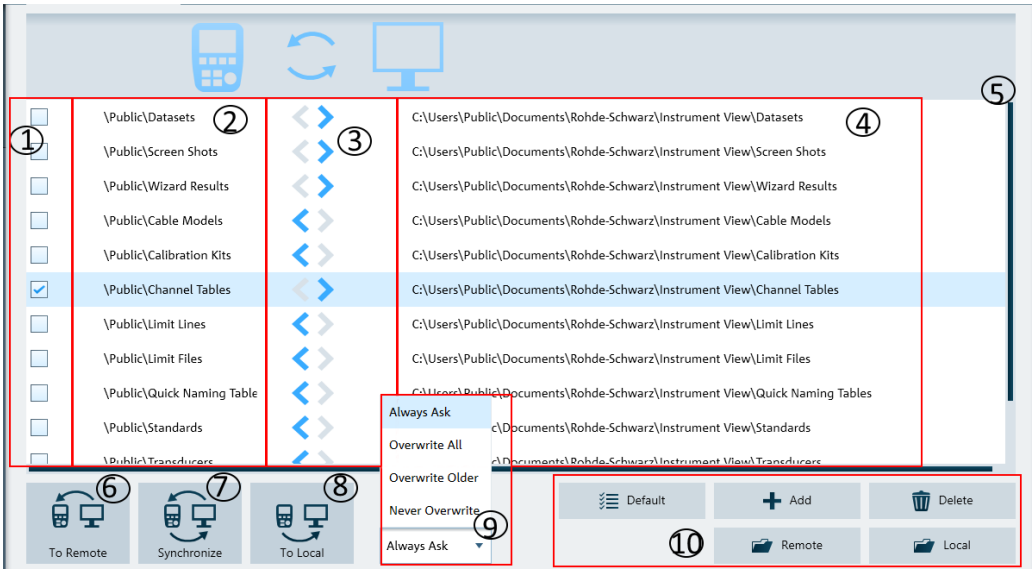
Figure 5-10: Conflict dialog box

1. Select "Overwrite older files" to overwrite older file with the newer file.
2. Select "Do this for all conflicts" to perform the "Skip" or "Overwrite" function in the current folder.

5.2.4 Synchronization

The "Synchronization" menu allows you to synchronize files between the local PC to instrument, vice versa.

You can use the overwriting option to decide how you want to synchronize the files when there is a conflict of files transfer.



1 = Checkbox to select file directories for transfer
2 = Instrument file directories
3 = Direction of files transfer
4 = PC file directories
5 = Scrollbar to navigate files directories window
6 = File transfer icon to active file transfer from PC to instrument
7 = File synchronization icon to active file synchronization between PC and instrument, vice versa
8 = File transfer icon to activate file transfer from instrument to PC
9 = Overwriting option dialog box
10 = File manger icons

Table 5-2: File manager icons

File manager icon	Function
	Presets the file directories window to default configuration.
	Adds a new entry to add new sync paths.
	Removes the selected sync paths.
	Accesses instrument file directories.
	Accesses to local home directory.

Context menu

Right-click on the instrument snapshot for the following menus:

"Include All", "Exclude All": includes or excludes all the directories for file transfer.

"Move Up", "Move Down": navigates the directories list.

Vertical scrollbar/ Horizontal scrollbar

- For details, see Chapter 3.1, "Context Menu", on page 17.

5.2.5 Multi-Transfer

The "Multi Transfer" menu allows you to capture and save trace measurements from the instrument. See Figure 5-11.

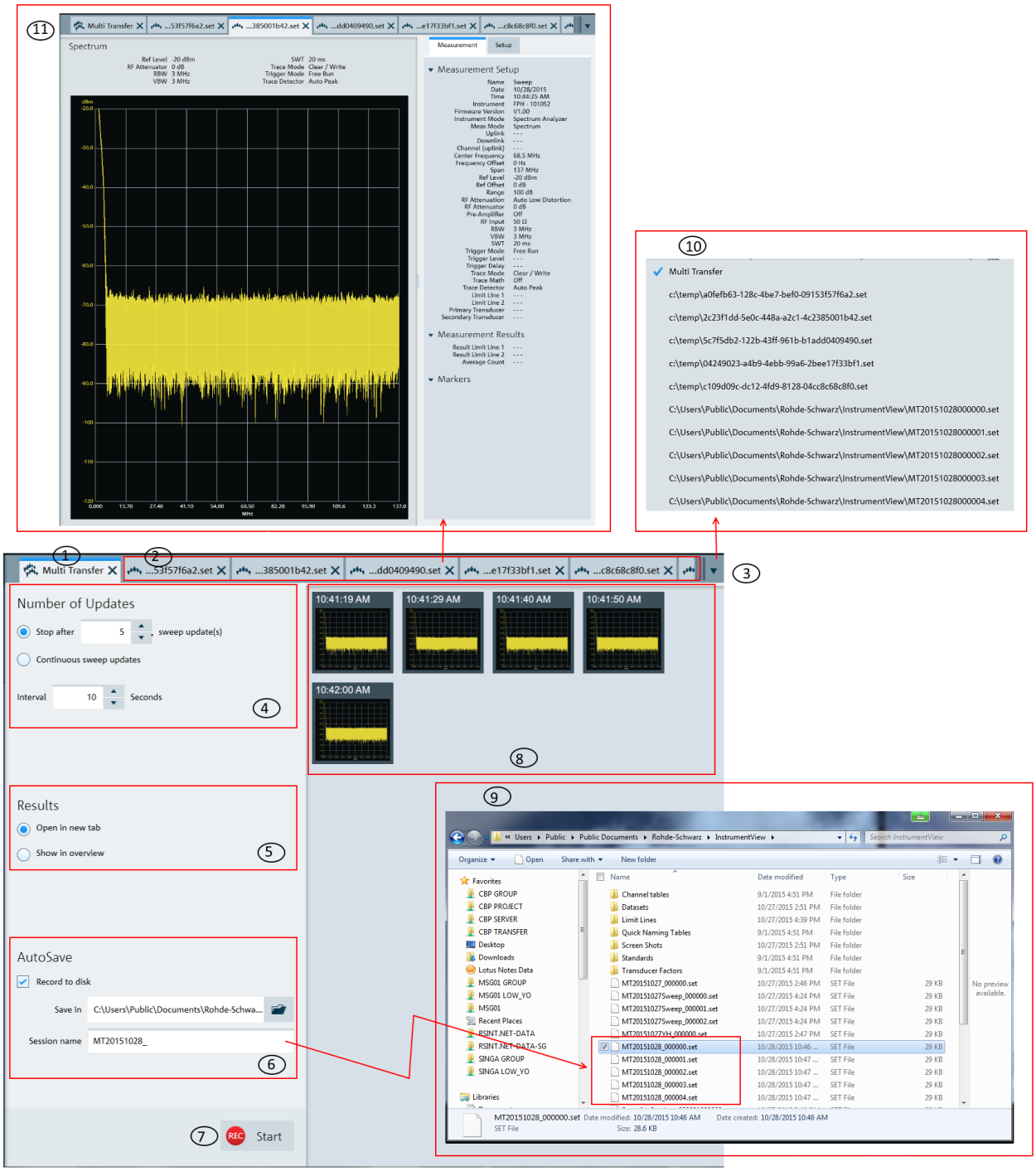


Figure 5-11: Multi-transfer dialog

1 = "Multi Transfer" tab displays the "Multi Transfer" dialog for settings
2 = Measurement results tab (see index 11 in Figure 5-11)
3 = Drop-down icon to display the tab hidden in the "Tab header bar" (see index 4 in Figure 3-1)
4 = Number of updates
5 = Display settings to configure the display of results for the trace measurement
6 = Auto save settings for the auto save function
7 = "Start/Stop icon" on page 53 to record or stop the trace measurements captured from instrument
8 = Overview display area for trace measurement captured from the instrument
9 = File browser to show that trace measurement files are captured with a prefix "MT20151028" defined in "Session name"
10 = Details of the hidden tab displayed from the drop-down icon
11 = Details of the selected trace measurement in the "Tab header bar"

Number of updates

The trace measurement can be updated with the following conditions:

- Single sweep with a fixed number.
  Default value is 5. Maximum value is 100000.
- Continuous sweep

The trace measurement is captured with a fixed interval timing defined by "Interval". Default value is 10. Maximum value is 3600.

Results

There are two ways to display the trace measurements captured from the instrument.

- The trace measurement in the overview area. See index 8 in Figure 5-11.
- The individual trace measurement result in the "Tab header bar". See index 2 in Figure 5-11.

► Select the individual trace measurement captured in the overview area to display the details information of trace measurement in the "Tab header bar".

See index 11 in Figure 5-11.

See also Chapter 5.1.1, "Get Trace", on page 35.

Auto save

The "AutoSave" performs an auto save function on the trace measurement updates from the instrument to PC hard disk.

The trace measurements are saved with a prefixed filename configure in the "Section name" and with an incremental order from _"000001" to _"xxxxxx". The "Save in" defined the file directory where these trace measurements are saved.

See index 9 in Figure 5-11 to view the trace measurements captured in the file directory.

Start/Stop icon

The R&S InstrumentView prompts you to save unsaved data captured in the last recording session when the "Start" function is activated. See Figure 5-12.

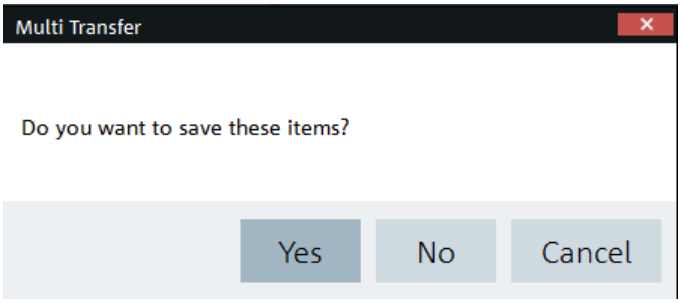


Figure 5-12: Unsaved data user prompt dialog box

The "Start" icon performs the recording function to capture the trace measurement updates from the instrument.

Depending on the setting in the "Results" section (see index 5 in Figure 5-11), the trace measurement updates can be displayed in the overview area (see index 8 in Figure 5-11) or individually displayed as a new tab in the tab header bar (see index 2 in Figure 5-11).

When the "Start" is activated, the "Start" icon changes to "Stop" icon . The "Stop" icon allows you to stop the recording process. When the "Stop" is activated, the R&S InstrumentView opens the "Delete" dialog. See Figure 5-13.

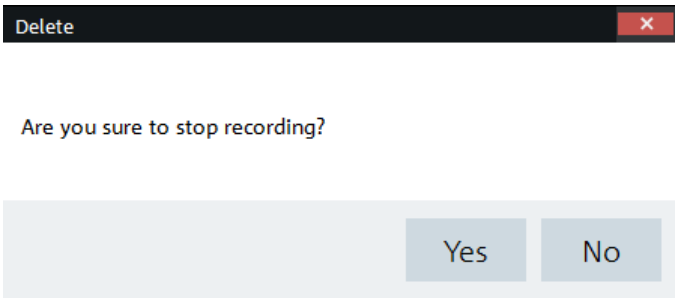


Figure 5-13: Delete dialog

► Select "Yes" to stop the recording process.

5.2.6 Screenshot

The "Screenshot" is used to capture the active instrument screen and display it in the trace window. See Figure 5-14.

This trace window is printed or saved for further editing in the application.

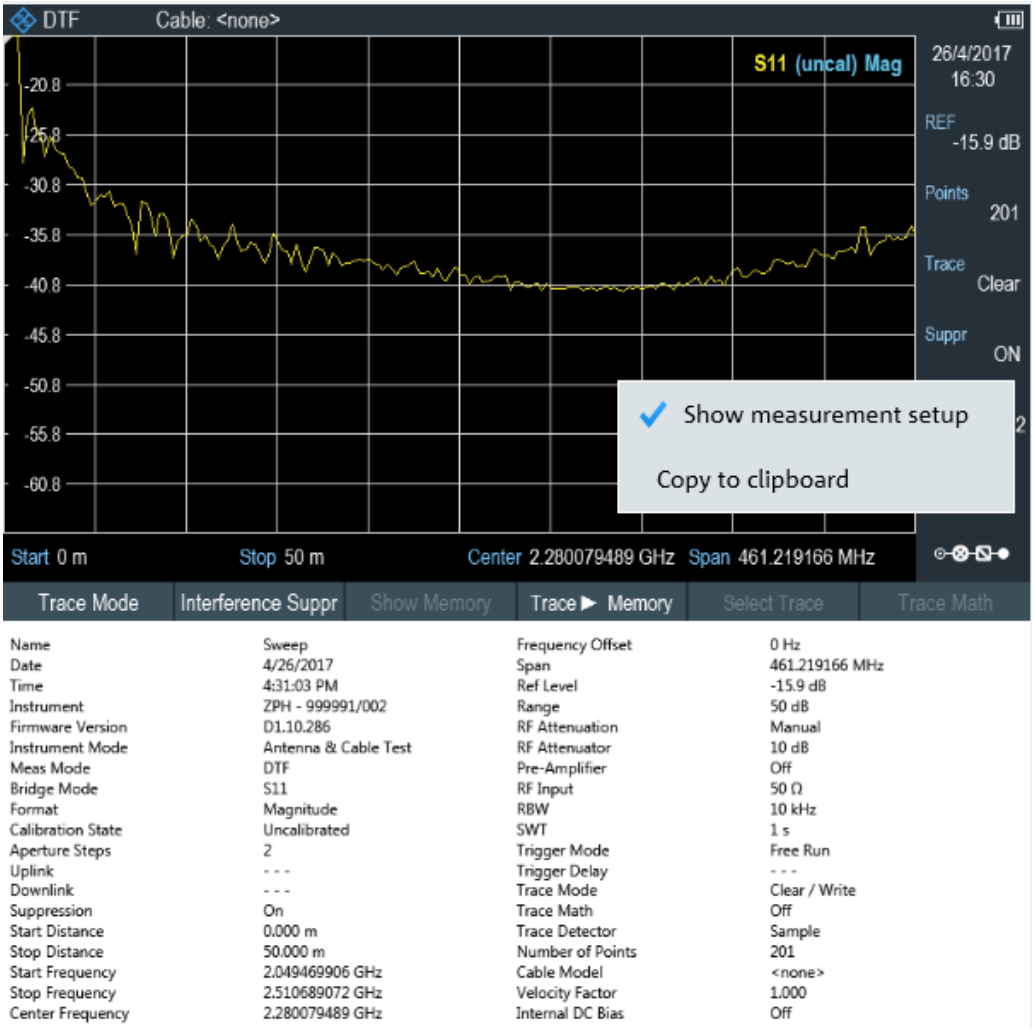


Figure 5-14: Screenshot

Context menu

Right-click on the instrument snapshot for the following menus:

Show measurement setup	"Show measurement setup": If enabled, the instrument settings and the trace data are displayed below the screenshot. See Figure 5-14.
Copy to clipboard	"Copy to clipboard": Copies the screenshot to the clipboard.

5.2.7 Date Time Synchronization

The" Date Time Sync" is used to synchronize the date and time of the connected instrument with PC.

► Select "OK" to confirm the " Date and Time" synchronization. See Figure 5-15.

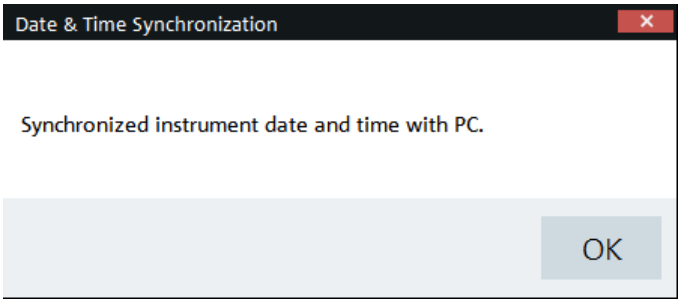
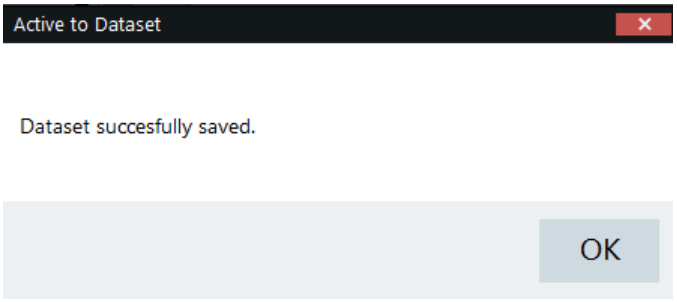


Figure 5-15: Date and time synchronization

5.2.8 Save Active Dataset

The "Active to Dataset" is used to save the current active dataset from the instrument to PC.

► Select "Active to Dataset" to browse to the local PC directories to save the dataset file.
A message is displayed when the dataset file is saved successfully.

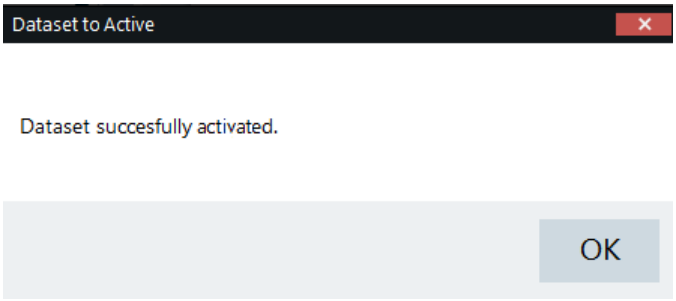


5.2.9 Activate Dataset to Instrument

The "Dataset to Active " menu is used to activate a dataset file from PC to the instrument.

To view dataset image, see Chapter 5.4.4, "Dataset Image", on page 103.

► Select "Dataset to Active" to browse a dataset file from the local PC directories and activate it to the instrument.
A message is displayed when the dataset file is activated successfully.



5.2.10 Firmware Update

Instrument selected for firmware update must be powered by a power adapter.
USB or SD card storage is needed in each device during the firmware update.

The "Firmware Update" menu provides the firmware update for the range of instruments supported by R&S InstrumentView.

Firmware update can be performed concurrently on the selected instruments belonging to the same instrument family.

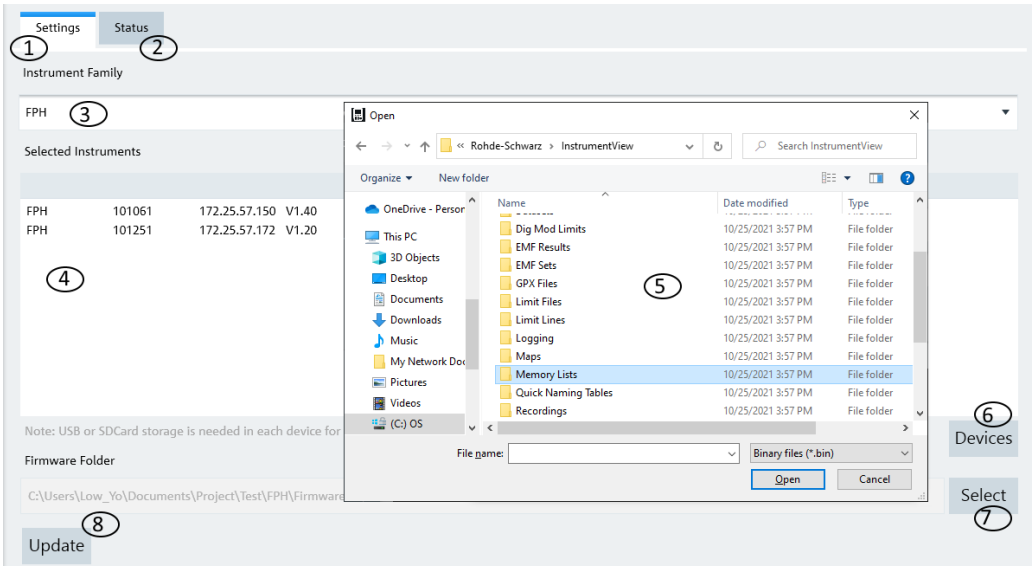


Figure 5-16: Firmware update dialog

1 = Settings for the firmware update
2 = Status of the firmware update process
3 = Instrument family selection (FPH, FPC, FSC, FSH4, ZNH, ZPH, ZVH4, PR200, EM200)
4 = Instrument list
5 = File browser to display the file folders
6 = Displays the Connection Manager
7 = Displays file browser to search instrument firmware

5.2.11 Antenna Firmware Update

In the "Firmware Update" feature, an "Antenna Firmware Update" tab is available for this function. The "Antenna Firmware Update" is available only for monitoring receivers, R&S PR200 and R&S EM200 as shown in Figure 5-17.

1. The antenna to be updated has to be attached to the connected device before starting the firmware update.
2. Click "Devices" to select the connected instrument.
3. Click "Retrieve" to obtain antenna information.
4. Select the location of the firmware .hex file type.
5. Click "Update".

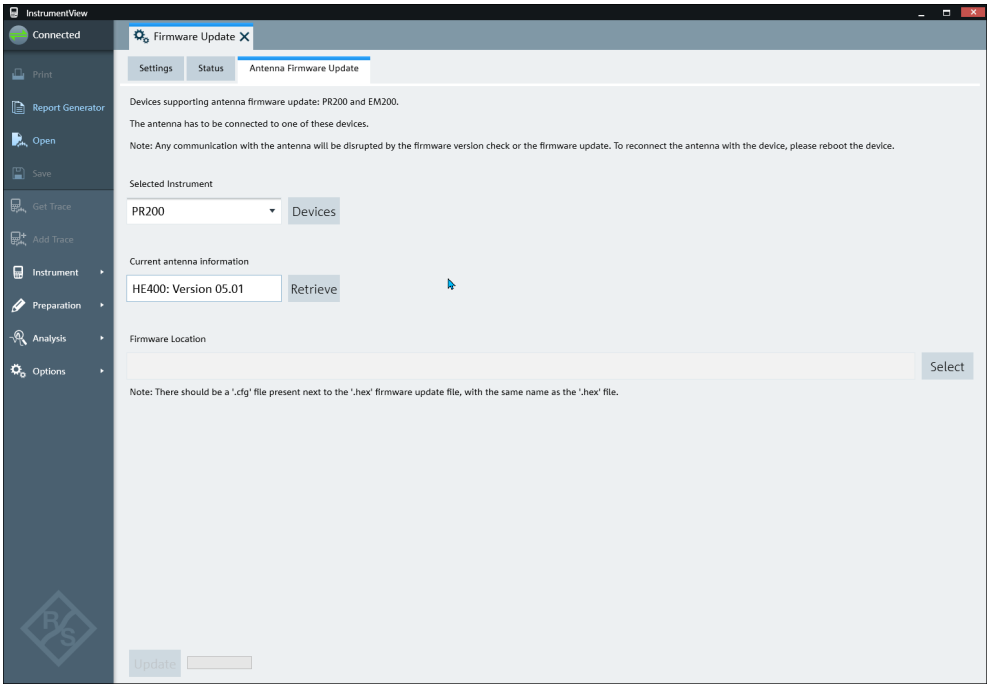


Figure 5-17: Before antenna firmware update

6. The application starts the antenna firmware update.

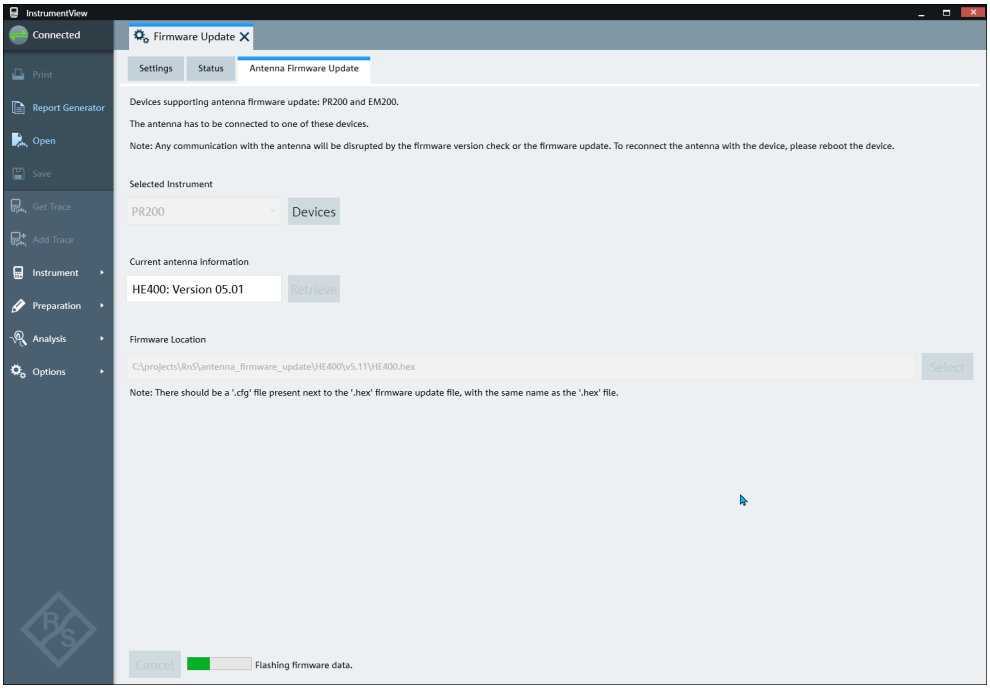


Figure 5-18: Antenna firmware update in progress

7. Once completed, the application displays the updated firmware version as shown below.

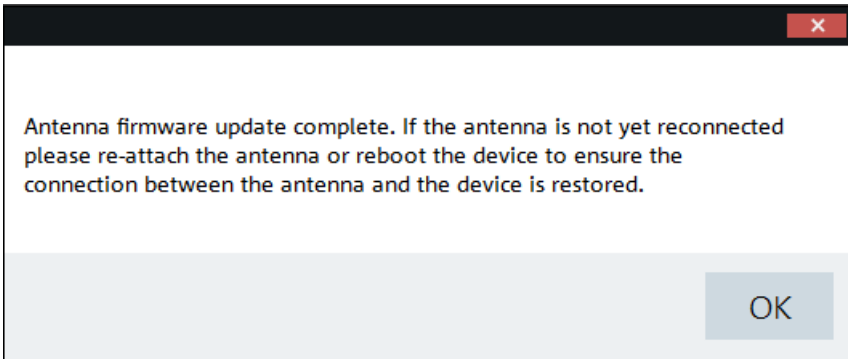


Figure 5-19: Antenna firmware update completed

5.3 Working with Instrument Datasets

The "Preparation" menu allows you to configure various types of files used in the instrument. See the following sections for more information on the dataset editor.

- Using Transducers 59
- Using Memory List 61
- Using Suppress List 63
- Using Correction Set 64

- Using Cable Models....66
- Using Calibration Kits....67
- Using Limit Lines....69
- Using Channel Table....71
- Using Standards....72
- Using Quick Name Table....76
- Using Analog Modulation Analysis AM Limits....77
- Using Analog Modulation Analysis FM Limits....78
- Wizard Set Editor....79
- Map Creator....83
- EMF Editor Tool....85

5.3.1 Using Transducers

The frequency-dependent transducers table is used to correct the level values of the trace measurement for frequency-dependent components such as antennas, splitters and cables used in the test measurements. It supports both R&S spectrum analyzers and monitoring receiver devices.

The R&S InstrumentView comes with a list of predefined transducers tables for R&S spectrum analyzer components such as antennas and matching pad only. Using the "Transducers" editor menu, you can customize the transducers tables used for the frequency-dependent components introduced in your test measurements. Each transducer table may consist of up to 1000 reference values. You can create transducers tables or upload saved transducers tables. See "Transducers table editor for spectrum analyzer" on page 60 and "Transducers table editor for monitoring receiver" on page 60.

Instrument selection

Depending on the instrument you are working on, you can select the instrument or instrument family for using the transducers table. See Figure 5-20.

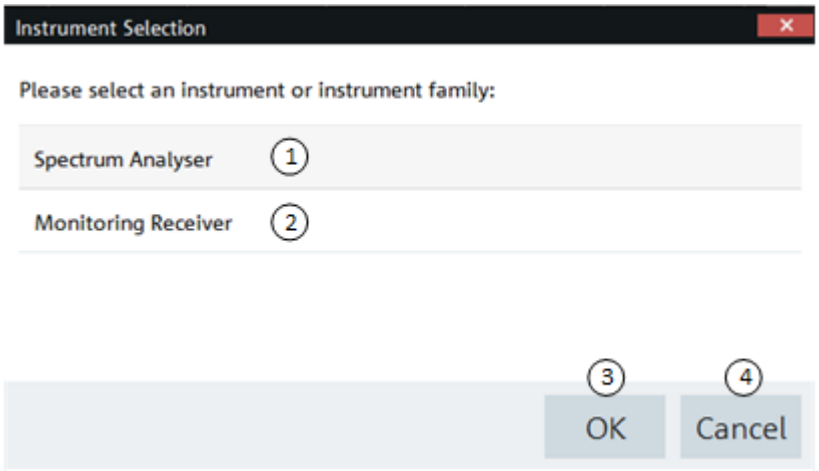


Figure 5-20: Instrument selection

1 = Selects "Spectrum Analyser" as the instrument type
2 = Selects "Monitoring Receiver" as the instrument type
3 = "OK" button confirms the selection
4 = "Cancel" button exits the instrument selection window

Transducers table editor for spectrum analyzer

The "Transducers" table editor allows you to open, edit and save the transducers table for spectrum analyzer. See Figure 5-21.

See also "Transducers table editor for monitoring receiver" on page 60.

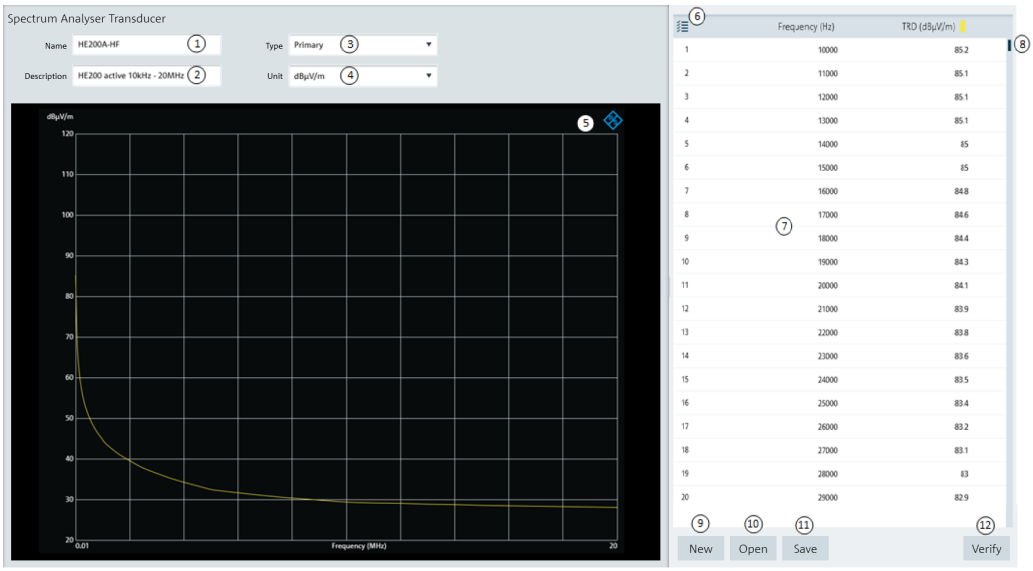


Figure 5-21: Transducer table editor for spectrum analyzer

1 = Name of the transducers table (maximum 32 characters)
2 = Description of the transducers table (maximum 32 characters)
3 = "Type" defines the type of transducer factor: "Primary", "Secondary", "Isotopic"
4 = "Unit" defines the unit of the signal strength: "dBµV/m" and "dBµA/m" for either primary or isotropic transducer, "dBµV" and "dBµA" for primary transducer only, "dB" for secondary transducer only
5 = Graphical representation of the transducers table
6 = Details of the transducers table
7 = Editor of the transducers table
8 = Scroll bar
9 = "New" button creates a transducer table for entry
10 = "Open" button loads an existing transducers table: .pritrd for "Primary" spectrum analyzer, .sectrd for "Secondary" spectrum analyzer, .isotrd for "Isotropic" spectrum analyzer
11 = "Save" button saves the current transducers table if the name of the transducers table is not empty
12 = "Verify" button verifies if there is any possible unintended loss of data when there is local data present that is not related to the currently selected transducer type

Transducers table editor for monitoring receiver

The "Transducers" table editor allows you to open, edit and save the transducers table for monitoring receivers. See Figure 5-22.

See also "Transducers table editor for spectrum analyzer" on page 60.

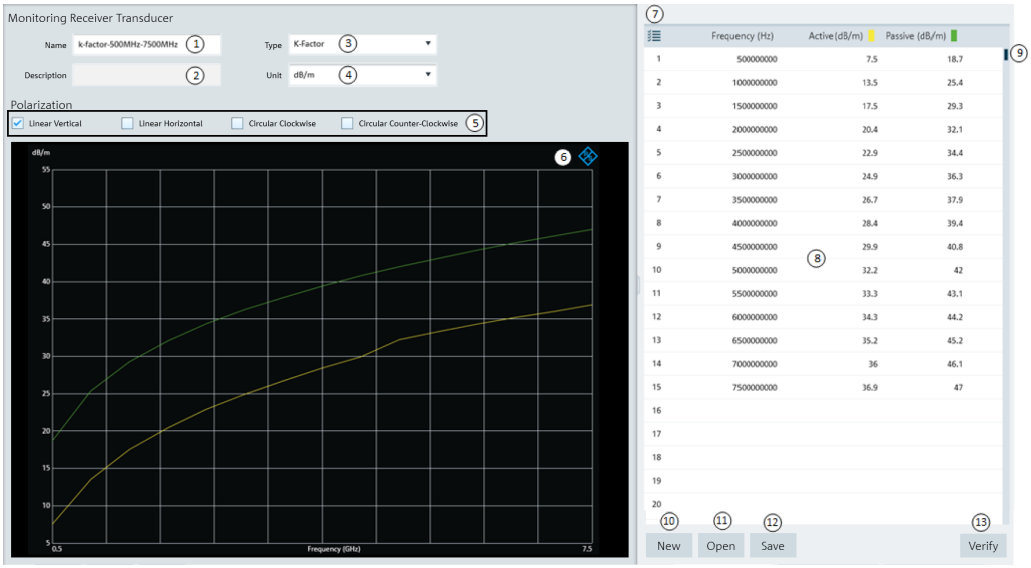


Figure 5-22: Transducer table editor for monitoring receiver

1 = Name of the transducers table (maximum 32 characters)
2 = Description of the transducers table (maximum 32 characters)
3 = "Type" defines the type of transducer factor: "K-Factor", "Cable Attenuation"
4 = "Unit" defines the level unit used in the transducers table: "dB/m" for K-Factor transducer, "dB" for cable attenuation transducer
5 = "Polarization" defines the types of polarization for a K-Factor transducer: "Linear Vertical", "Linear Horizontal", "Circular Counter-Clockwise", "Circular Clockwise"
6 = Graphical representation of the transducers table
7 = Details of the transducers table
8 = Editor of the transducers table
9 = Scroll bar
10 = "New" button creates a transducer table for entry
11 = "Open" button loads an existing transducers table: .bin or .csv
12 = "Save" button saves the current transducers table (.bin or .csv) if the name of the transducers table is not empty
13 = "Verify" button verifies if there is any possible unintended loss of data when there is local data present that is not related to the currently selected transducer type

5.3.2 Using Memory List

The "Memory List" editor workspace is only applicable for R&S PR200 and R&S EM200. With the "Memory List" editor, you can prepare and configure the "Memory List" according to your requirement. See Figure 5-23.

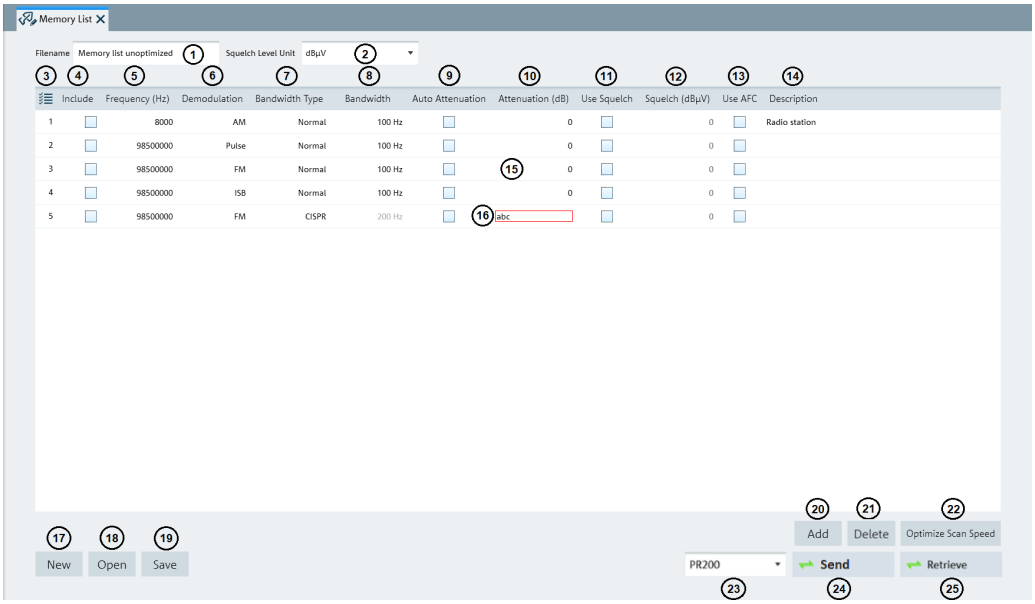


Figure 5-23: Memory List

1 = Name of the "Memory List"
2 = Selection of "Squelch Level Unit" dBµV or dBm
3 = Index column
4 = "Include" indicates you can deselect the entries not required for use at the moment and select them in the future when needed.
5 = "Frequency (Hz)" defines the frequency in Hz (editable)
6 = Defines the Demodulation Type
7 = Bandwidth type selector "Normal" or "CISPR"
8 = "Bandwidth" allows the selection of bandwidth
9 = Enables / disables auto-attenuation option
10 = "Attenuation (dB)" defines the attenuation level in dB. You can only edit the attenuation level if "Auto Attenuation" is disabled.
11 = Enables / disables squelch option
12 = "Squelch (dBµV)" defines the squelch level in dBµV. You can edit the squelch level if "Use Squelch" is enabled
13 = Enables / disables auto frequency control (AFC) option
14 = "Description" of the entry
15 = "Memory List" editor
16 = Error notification if invalid data has been entered
17 = "New" button resets all entered data
18 = "Open" button loads an existing "Memory List" (supported formats .xml and .csv)
19 = "Save" button saves the "Memory List" if the name of the "Memory List" is not empty (supported formats .xml and .csv)
20 = "Add" button appends a new "Memory List" entry
21 = "Delete" button deletes a selected "Memory List" entry
22 = "Optimized Scan Speed" allows the "Memory List" to be sorted for optimal scan speed
23 = Selection of connected compatible devices for activate and retrieve.
24 = "Send" button transfers the configured Memory List to a connected device and activates the Memory List. (Supported devices PR200 and EM200)
25 = "Retrieve" button retrieves a Memory List from a connected device and loads it in the editor. (Supported devices PR200 and EM200)

Demodulation type

You can define the following "Demodulation" types:

- "AM"
- "FM"
- "Pulse"
- "PM"
- "IQ"
- "ISB"
- "CW"
- "USB"
- "LSB"

Bandwidth selection

You can select the required bandwidth:

Normal

"40 MHz"	"300 kHz"	"3.1 kHz"
"20 MHz"	"250 kHz"	"2.7 kHz"
"15 MHz"	"150 kHz"	"2.4 kHz"
"12.5 MHz"	"120 kHz"	"2.1 kHz"
"10 MHz"	"75 kHz"	"1.5 kHz"
"8 MHz"	"50 kHz"	"1 kHz"
"5 MHz"	"30 kHz"	"600 Hz"
"2 MHz"	"15 kHz"	"300 Hz"
"1.5 MHz"	"12 kHz"	"200 Hz"
"1.25 MHz"	"9 kHz"	"150 Hz"
"1 MHz"	"6 kHz"	"100 Hz"
"800 kHz"	"4.8 kHz"	"50 Hz"
"500 kHz"	"4 kHz"	"30 Hz"
"ATC 25 kHz"	"ATC 8.333 kHz"	"10 Hz"

CISPR

"200 Hz"	"9 kHz"	"120 kHz"
"1 MHz"	"250 kHz"	"2.7 kHz"

5.3.3 Using Suppress List

The "Suppress List" editor workspace is only applicable for R&S PR200 and R&S EM200. With the "Suppress List" editor, you can prepare and configure the "Suppress List" according to your requirement. See Figure 5-24.

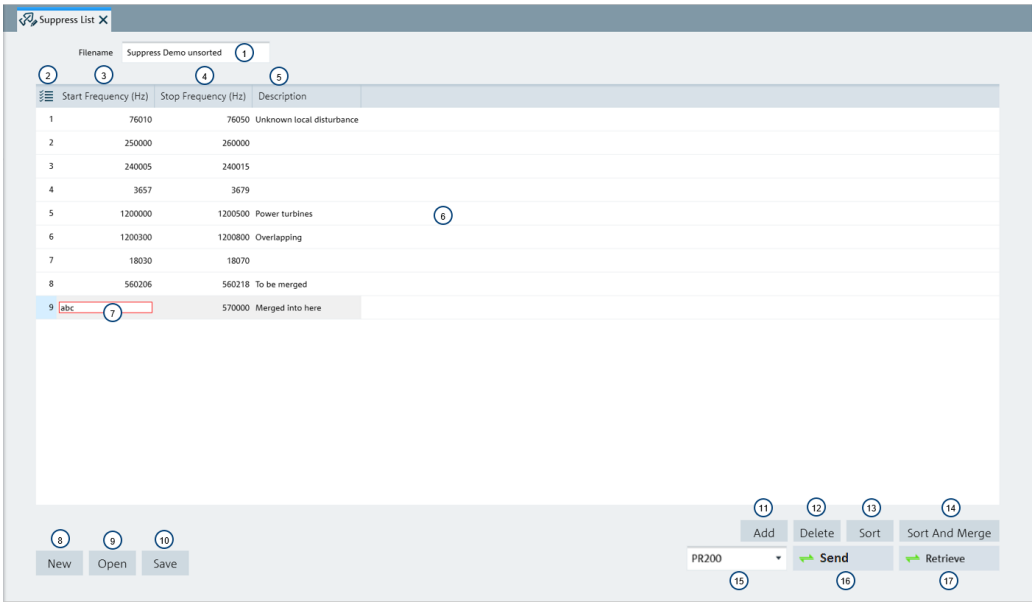


Figure 5-24: Suppress List

1 = Name of the "Suppress List"
2 = Index column
3 = "Start Frequency (Hz)" defines the start frequency in Hz
4 = "Stop Frequency (Hz)" defines the stop frequency in Hz
5 = "Description"of the entry
6 = "Suppress List" editor
7 = Error notification if invalid data was entered
8 = "New" button resets all entered data
9 = "Open" button loads an existing "Suppress List" (supported formats .xml and .csv)
10 = "Save" button saves a "Suppress List" (supported formats .xml and .csv)
11 = "Add" button appends a new "Suppress List" entry
12 = "Delete" button deletes a selected "Suppress List" entry
13 = "Sort" the suppress list on start frequency
14 = "Sort And Merge" overlapping suppress list items with smallest frequency used as the start frequency. The R&S InstrumentView combines the descriptions when suppress list items are merged.
15 = Selection of connected compatible devices for activate and retrieve.
16 = "Send" button transfers the configured Suppress List to a connected device and activates the Suppress List. (Supported devices PR200 and EM200)
17 = "Retrieve" button retrieves a Suppress List from a connected device and loads it in the editor. (Supported devices PR200 and EM200)

5.3.4 Using Correction Set

The "Correction Set" editor workspace is only applicable for R&S PR200 and R&S EM200. With the "Correction Set" editor, you can prepare the "Correction Set" and edit the item properties of the selected "Correction Models" according to your requirement. See Figure 5-25.

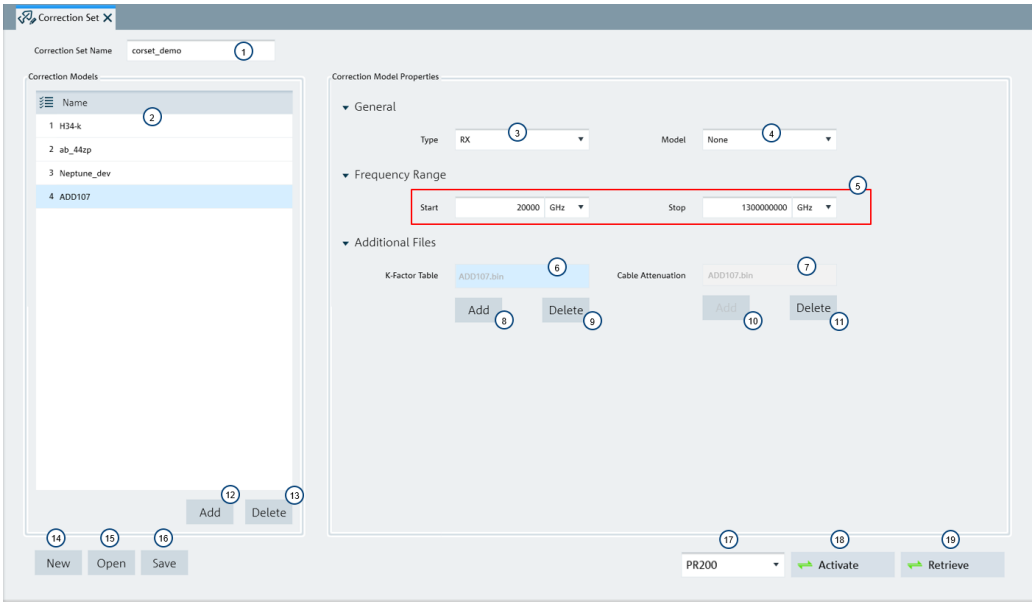


Figure 5-25: Correction Set

1 = Name of the correction set
2 = Data grid with a list of "Correction Models"
3 = Selects the antenna type: "DF", "RX"
4 = Selects the antenna model
5 = Edits the start and stop frequency in Hz
6 = Filename of the added K-Factor table(s)
7 = Filename of the added "Cable Attenuation" transducer
8 = "Add" button browses for a K-Factor transducer and allows adding of multiple K-Factor transducers to the "K-Factor Table"
9 = "Delete" button removes a selected K-Factor transducer from the "K-Factor Table"
10 = "Add" button adds a "Cable Attenuation" transducer
11 = "Delete" button removes the added "Cable Attenuation" transducer
12 = "Add" button adds an item in the"Correction Models" data grid
13 = "Delete" button removes a selected entry from the "Correction Models"
14 = "New" button resets all entered data and creates a "Correction Set" for configuration
15 = "Open" button loads a "Correction Set"
16 = "Save" button saves a "Correction Set"
17 = Selection of connected compatible devices for activate and retrieve.
18 = "Activate" button transfers the configured "Correction Set" to a connected device (overrides the default Correction Set) and activates the "Correction Set". Greyed out when no compatible device is connected.
19 = "Retrieve" button retrieves the default "Correction Set" (Correction Set 1) from a connected device and loads it in the editor. Greyed out when no compatible device is connected.

Antenna type option

You can specify an optional antenna model when the antenna type is configured as "Type" "DF" or "RX":

Type DF Antennas			
ADD071	ADD190	ADD119	ADD195
ADD090S	ADD090	ADD090_VAR12	ADD197

ADD075	ADD295	ADD196	ADD107
ADD175	ADD207	ADD295_VAR1x	ADD307
ADD075_VAR1x	ADD197_VAR1x	ADD196_VAR1x	ADD095
ADD597	ADD317	ZT255	
Type RX Antennas			
None	HE300	HL300 450-8000MHz	HE400
MON@ADD597	HE400MW	HE400DC	HE800DC

5.3.5 Using Cable Models

The "Channel Models" editor is only applicable for R&S FSH4, R&S FSC, R&S ZPH, R&S ZNH and R&S ZVH product series.

The R&S InstrumentView comes with a list of channel models which describes the cable characteristics. Using the "Cable Models" editor menu, you can customize the cable model according to your requirements.

Cable models editor

The "Channel Models" editor allows you to open, edit and save the cable model. See Figure 5-26.

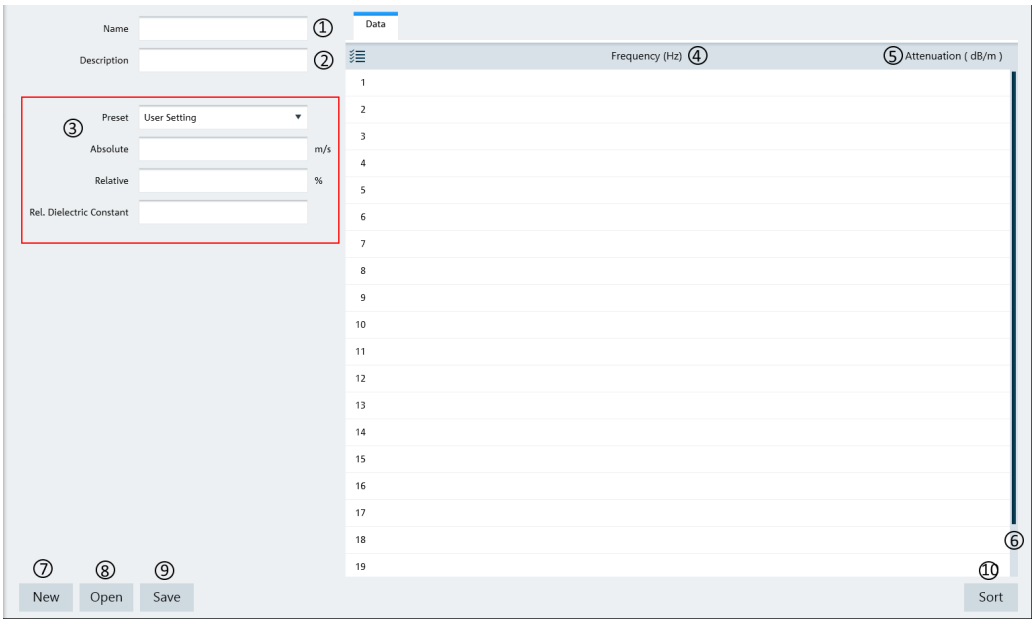


Figure 5-26: Cable models editor

1 = Name of the cable model
2 = Description of the cable model
3 = Propagation velocity of the cable model
4 = Cable frequency
5 = Cable attenuation

6 = Scroll bar to navigate the cable model editor
7 = "New" button creates a cable model for entry
8 = "Open" button loads an existing cable model
9 = "Save" button saves the current cable model
10 = "Sort" button sorts the "Frequency (Hz)" of the cable model in ascending order

Propagation velocity

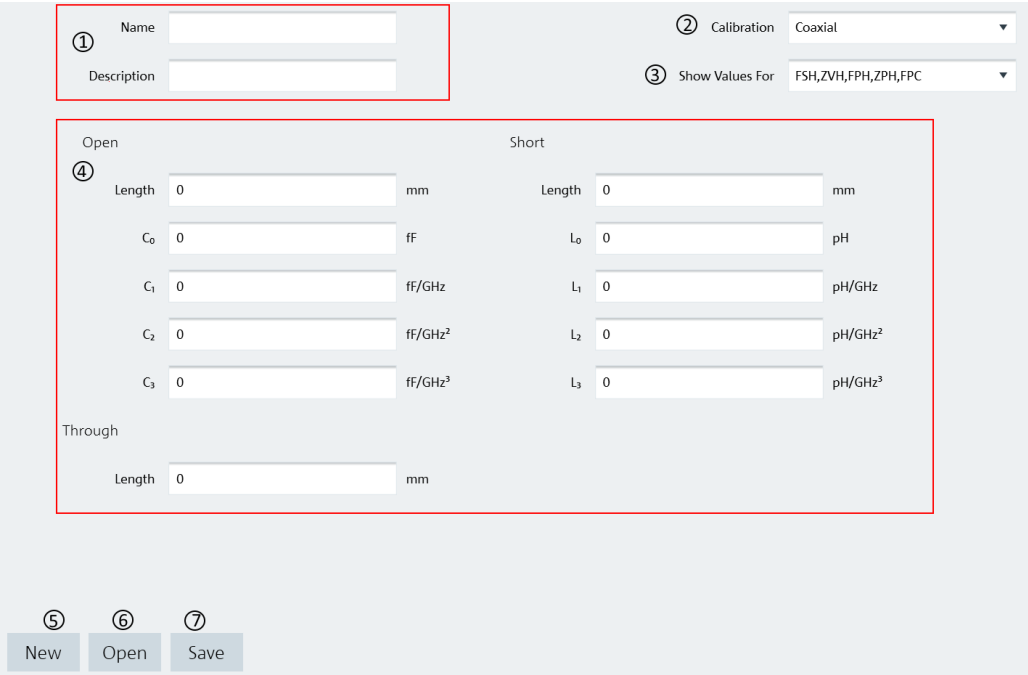
You can customize the propagation velocity for the cable model or use the following preset configuration:

Type	Absolute m/s	Relative %	Rel. dielectric constant
Solid polyethelene	197700000	65.9	2.3
Foam polyethelene	240000000	80.1	1.56
Foam polystyrene	273000000	91.1	1.21
Solid teflon	208200000	69.4	2.07

5.3.6 Using Calibration Kits

The "Calibration Kits" editor is only applicable for R&S FSH4, R&S ZPH, R&S ZNH and R&S ZVH product series.

The "Calibration Kits" editor provides the necessary parameters for you to define the calibration kit file associated with the calibration kit.



1 = Name and description of the calibration kit
2 = Calibrtion type
3 = Instrument type

4 = Parameters for calibration standard
5 = "New" button creates a calibration kit file for entry
6 = "Open" button loads an existing calibration kit file for modification
7 = "Save" button saves the current calibration kit file

5.3.6.1 Calibration Standard

Depending on the calibration type and instrument type selected, different calibration standards are displayed.

The R&S InstrumentView supports calibration standards for coxial and waveguide measurements. See Table 5-3 for the types of calibration standard requirements.

Table 5-3: Calibration standard

Calibration type		Calibration standard
"Coxial"	"FSH, ZVH, FPH, ZPH, FPC"	"Open", "Short", "Through", see Figure 5-27.
	"ZNH"	"Open", "Short", "Through", "Match", see Figure 5-28.
"Waveguide"	"Short / Offset Short / Match"	"Offset Short", see Figure 5-29.
	"Short / Offs Short 1 / Offs Short 2"	"Offset Short 1" and "Offset Short 2", see Figure 5-29.

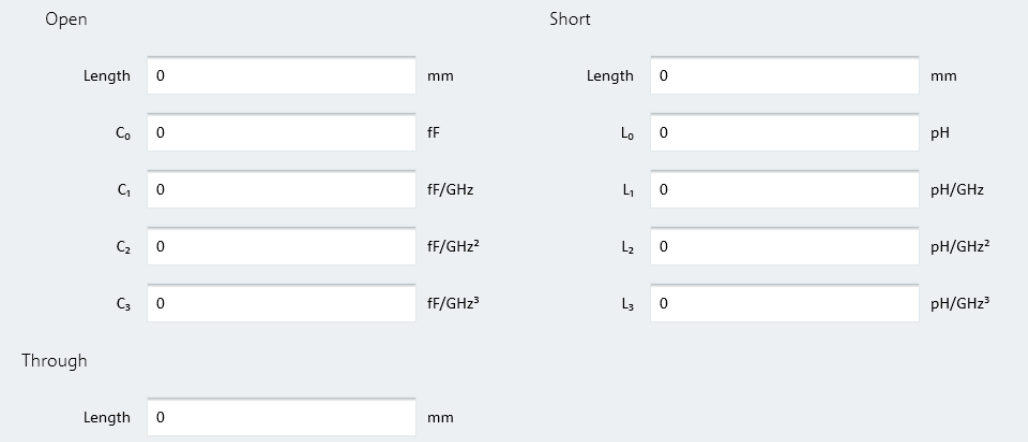


Figure 5-27: Coxial calibration standard for R&S FPH, R&S FPC, R&S ZPH and R&S ZVH

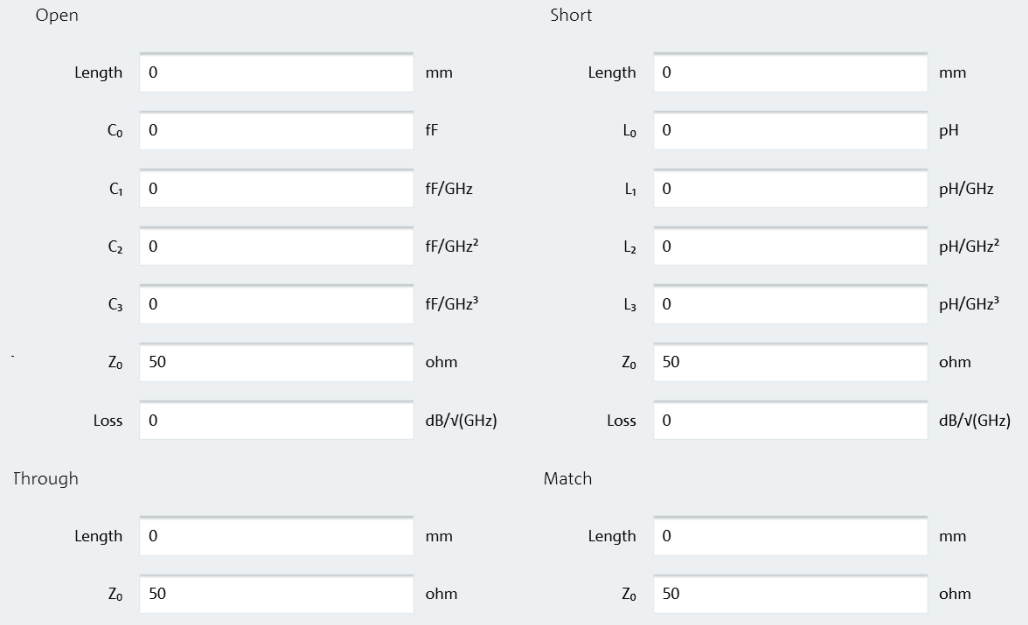


Figure 5-28: Coxial calibration standard for R&S ZNH

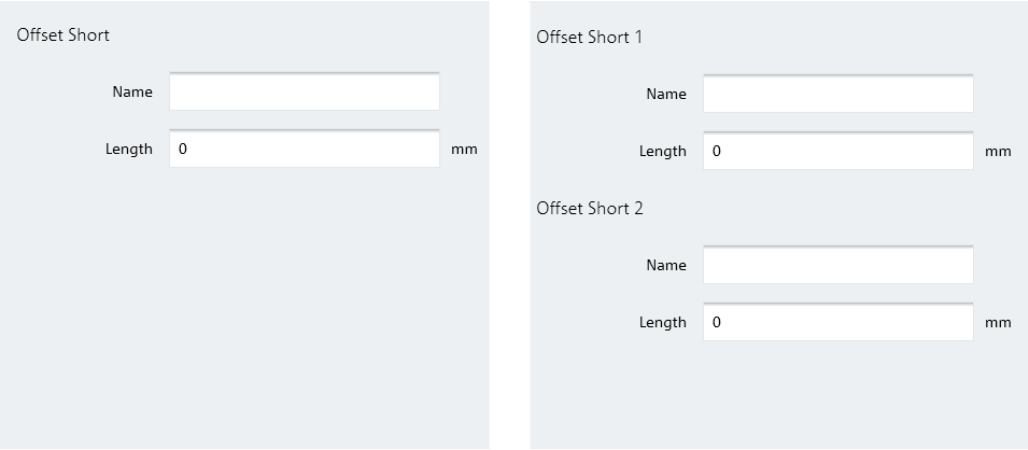


Figure 5-29: Calibration standard for waveguide Short / Offset Short / Match and waveguide Short / Offs Short 1 / Offs Short 2

5.3.7 Using Limit Lines

The limit line is used to identify if a signal complies with a certain level of characteristics. It is made up of two or more points that are connected to a line and each of the point that defines the shape of the limit line consist of two coordinates. One coordinate defines the absolute, relative or logarithmic value of the X-Unit position ("Hz", "s","m") and the other coordinate is the Y-Unit position ("dB", "dBm", "dBµV", "dBmV", "dBµA/m", "V", "V/m", "W", "W/m^2", "VSWR"). See "Limit lines table editor" on page 70.

The R&S InstrumentView comes with a list of limit lines table which is according to the test transmission standards. Using the "Limit Line" editor menu, you can customize the limit lines table which is deviated from the test transmission standards. See "Limit lines table editor" on page 70.

Instrument selection

Depending on the instrument you are working on, you can select the instrument or instrument family for using the limit lines table. See Figure 5-30.

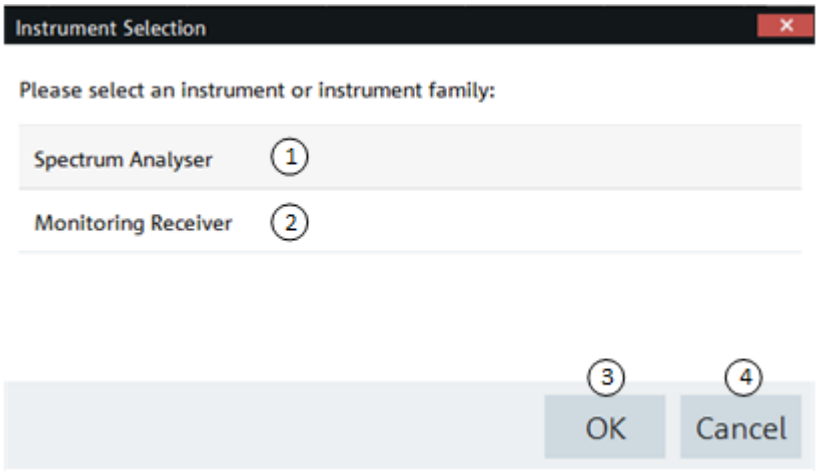


Figure 5-30: Instrument selection

1 = Selects "Spectrum Analyser" as the instrument type
2 = Selects "Monitoring Receiver" as the instrument type
3 = "OK" button confirms the selection
4 = "Cancel" button exits the instrument selection window

Limit lines table editor

The "Limit Line" table editor allows you to open, edit and save the limit lines table. See Figure 5-31.

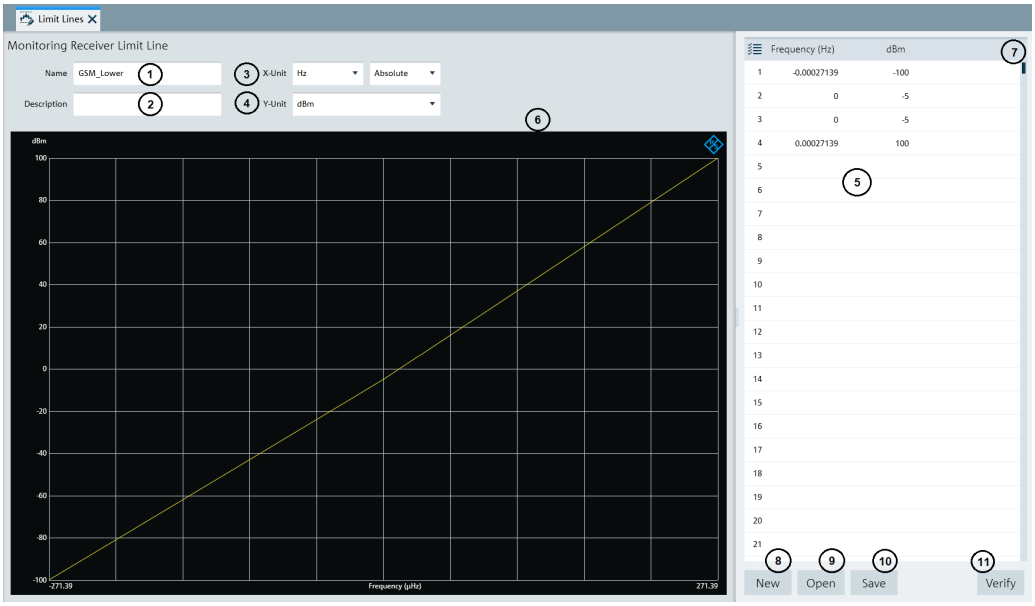


Figure 5-31: Limit lines table editor

1 = Name of the limit lines table
2 = Description of the limit lines table
3 = "X-Unit" defines the unit used on the x axis of the limit lines table
4 = "Y-Unit" defines the unit used on the y axis of the limit lines table
5 = Editor of the limit lines table
6 = Preview display of the limit lines in a chart. It provides an overview of the frequency response of the limit lines
7 = Scroll bar
8 = "New" button creates a limit line table for entry
9 = "Open" button loads an existing limit lines table
10 = "Save" button saves the current limit lines table
11 = "Verify" button validates the data entries, range and sequence

5.3.8 Using Channel Table

The R&S InstrumentView comes with a list of channel tables which are according to the test transmission standards. Using the "Channel Table" editor menu, you can customize the channel table which is deviated from the test transmission standards. See "Channel table editor" on page 71.

Channel table editor

The "Channel Table" editor allows you to open, edit and save the channel table. See Figure 5-32.

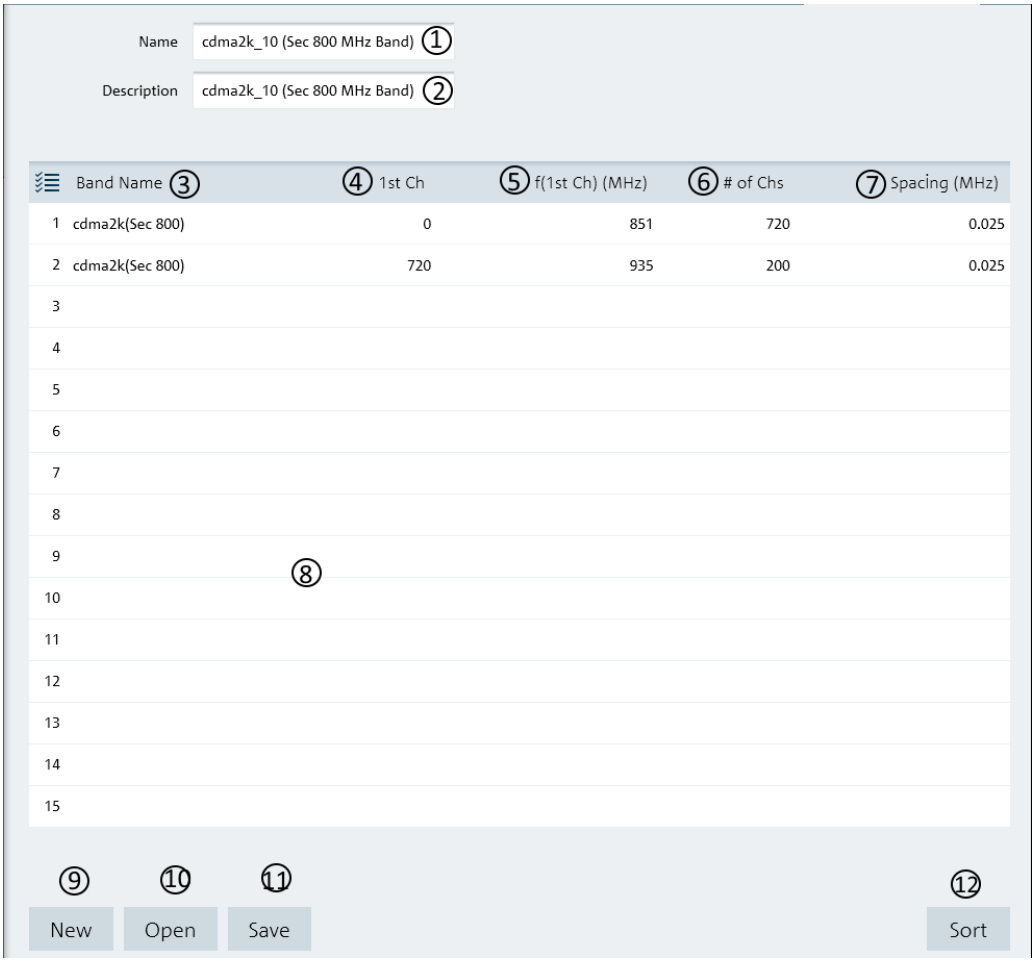


Figure 5-32: Channel table editor

1 = Name of the channel table
2 = Description of the channel table
3 = Band name in the channel table
4 = Starting channel number in the frequency band
5 = Starting frequency of the "1st Ch" channel
6 = Number of channels in the frequency band
7 = Channel spacing between two channels
8 = Editor of the channel table
9 = "New" button creates a channel table for entry
10 = "Open" button loads an existing channel table
11 = "Save" button saves the current channel table
12 = "Sort" button sorts the "1st Ch" of the channel table in ascending order

5.3.9 Using Standards

The "Standards" table editor is only applicable for R&S FPH, R&S FSC, R&S FSH4 and R&S ZVH product series. For R&S ZPH, only the .12 model with R&S ZPH K1 option is applicable.

The R&S InstrumentView comes with a list of mobile radio standards with predefined test measurement settings according to the standard's requirements. Using the "Stand-

ards" editor menu, you can customize the test measurement settings which are deviated from the standards. See Chapter 5.3.9.1, "Standards Table Editor", on page 73.

5.3.9.1 Standards Table Editor

The "Standards" table editor allows you to open, edit and save the measurement settings for a test standard. See Figure 5-33.

See the respective instrument user manual for details of each of the measurement settings in the dialog.

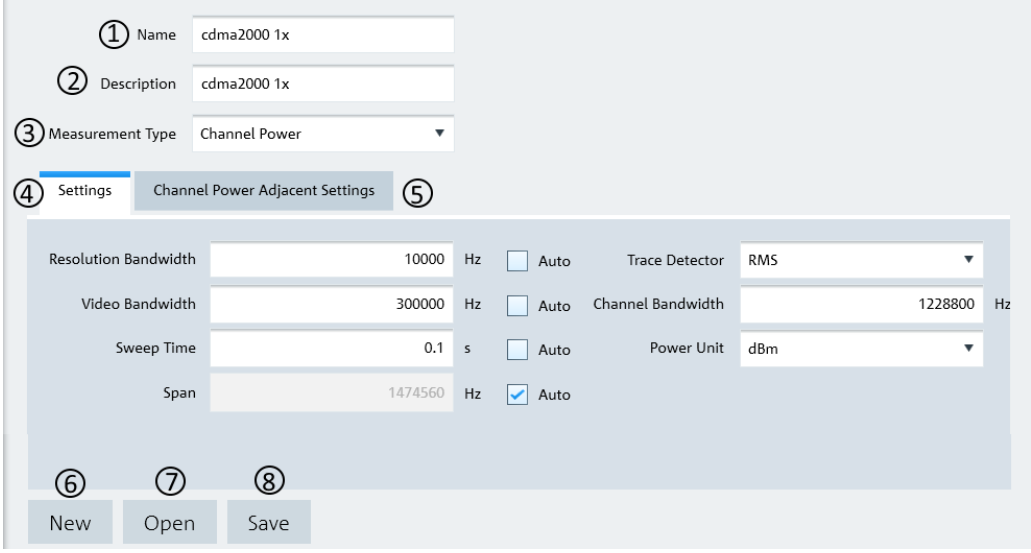


Figure 5-33: Standard table editor

1 = Name of the standard table
2 = Description of the standard table
3 = Measurement Type ("Channel Power", "Occupied Bandwidth", "TDMA", "Spectrum Emission Mask")
4 = Details of the "Settings" tab are associated with the "Measurement Type" selected (see Chapter 5.3.9.2, "Measurement Type", on page 73)
5 = Details of the "Channel Power Adjacent Settings" tab are associated with the Measurement Type selected
8 = "New" button creates a new standard table for entry
9 = "Open" button loads an existing standard table
10 = "Save" button saves the current standard table

5.3.9.2 Measurement Type

Depending on the mobile radio standard used in the test measurements, there are four different types of "Measurement Type" which you can select to customize your measurement settings.

See the respective instrument user manual for details of each of the measurement type.

Channel power

The channel power measurement selectively measures the power of a specified transmission channel and adjacent channels. The following dialog provides the required measurement settings in the "Settings" tab and the TX channels and adjacent channels configuration in the "Channel Power Adjacent Settings" tab.

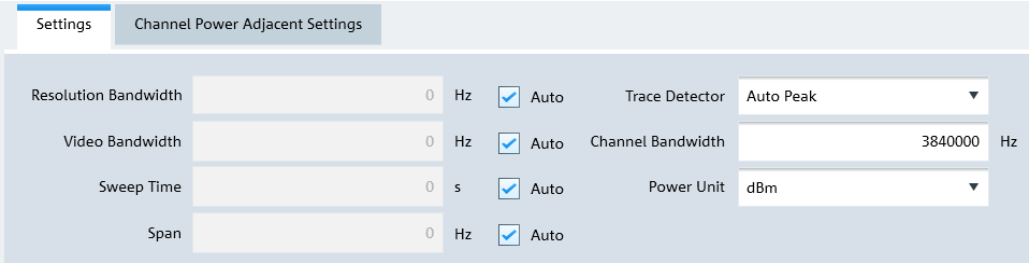


Figure 5-34: Channel power settings

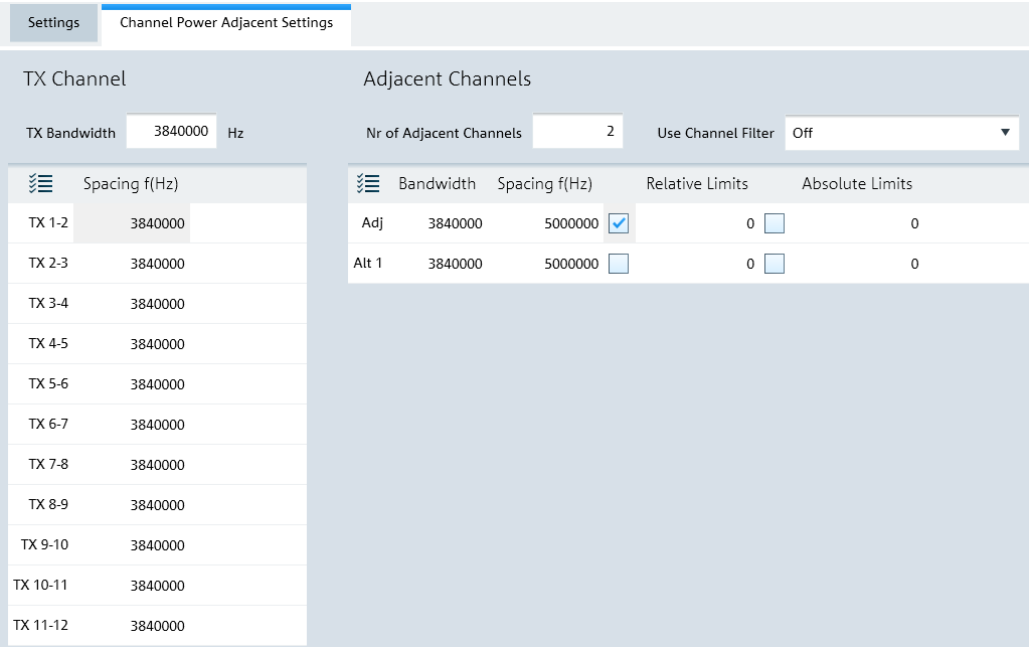


Figure 5-35: Channel power adjacent settings

Occupied bandwidth

The occupied bandwidth is defined as the bandwidth that contains a specified percentage of the entire power of the transmitter. Default occupied bandwidth for the entire power of the transmitter is predefined at 99%. The following dialog provides the required measurement settings in the "Settings" tabs.

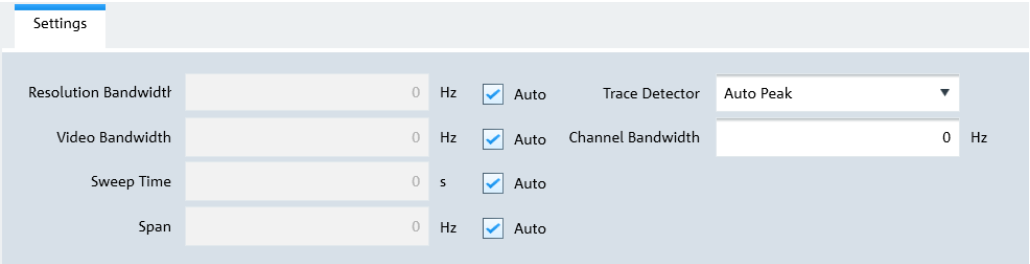


Figure 5-36: Occupied bandwidth settings

TDMA power

The TDMA (time division multiple access) power is measured in the time domain of the instrument. In the mobile radio standard like, e.g. GSM, several users share a channel and each user is assigned a period of time or timeslot for usage. With TDMA power measurement, you can determine the power over one of the timeslot. The following dialog provides the required measurement settings in the "Settings" tabs.

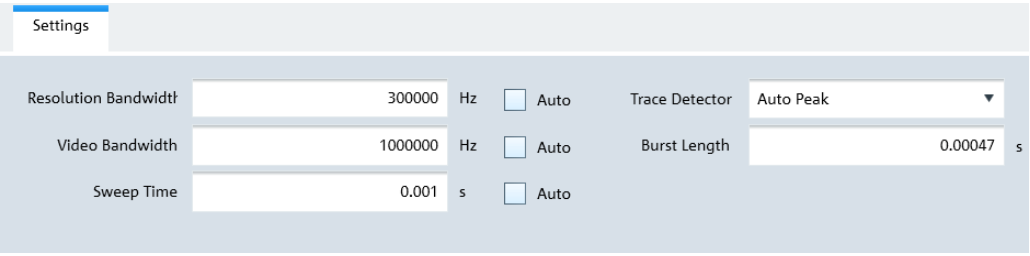
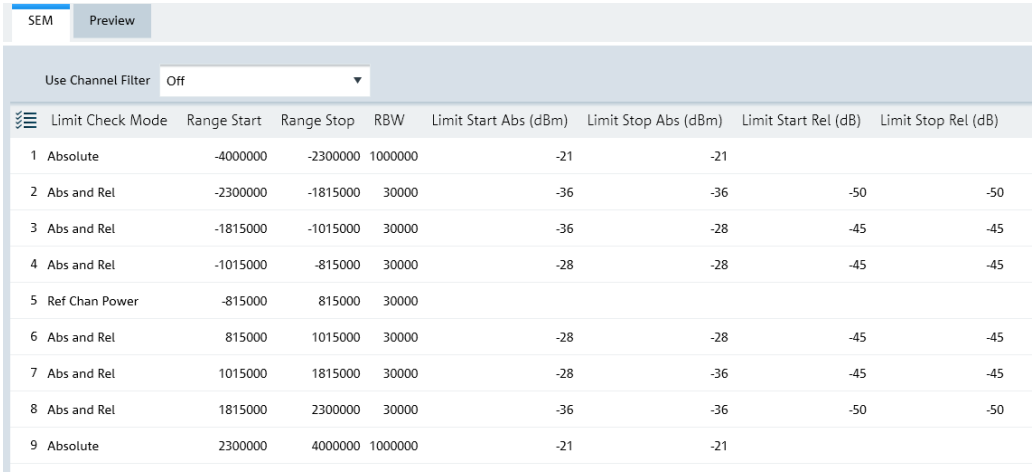


Figure 5-37: TDMA settings

Spectrum emission mask

The spectrum emission mask (SEM) measurement is a method used to detect the spurious emissions or intermodulation products of a signal. When performing the SEM measurement, the instrument checks the signal against a spectral mask to determine whether the signal complies with a specific standard. The following dialog provides the required settings to define the spectral mask in the "SEM" tab. The "Preview" tab illustrates the spectral mask defined in the "SEM" tab.



	Limit Check Mode	Range Start	Range Stop	RBW	Limit Start Abs (dBm)	Limit Stop Abs (dBm)	Limit Start Rel (dB)	Limit Stop Rel (dB)
1	Absolute	-4000000	-2300000	1000000	-21	-21		
2	Abs and Rel	-2300000	-1815000	30000	-36	-36	-50	-50
3	Abs and Rel	-1815000	-1015000	30000	-36	-28	-45	-45
4	Abs and Rel	-1015000	-815000	30000	-28	-28	-45	-45
5	Ref Chan Power	-815000	815000	30000				
6	Abs and Rel	815000	1015000	30000	-28	-28	-45	-45
7	Abs and Rel	1015000	1815000	30000	-28	-36	-45	-45
8	Abs and Rel	1815000	2300000	30000	-36	-36	-50	-50
9	Absolute	2300000	4000000	1000000	-21	-21		

Figure 5-38: SEM settings

5.3.10 Using Quick Name Table

The "Quick Name Table" is only applicable for R&S FSC, R&S FSH4 and R&S ZVH product series.

The R&S InstrumentView comes with a predefined quick name table which provides a set of naming elements that can be used to create meaningful name in a faster and convenient manner. Using the "Quick Name Table" editor menu, you can customize the frequently used terms when compiling a filename. See "Quick name table editor" on page 76.

Quick name table editor

The "Quick Name Table" editor allows you to open, edit and save the quick name table. See Figure 5-39.

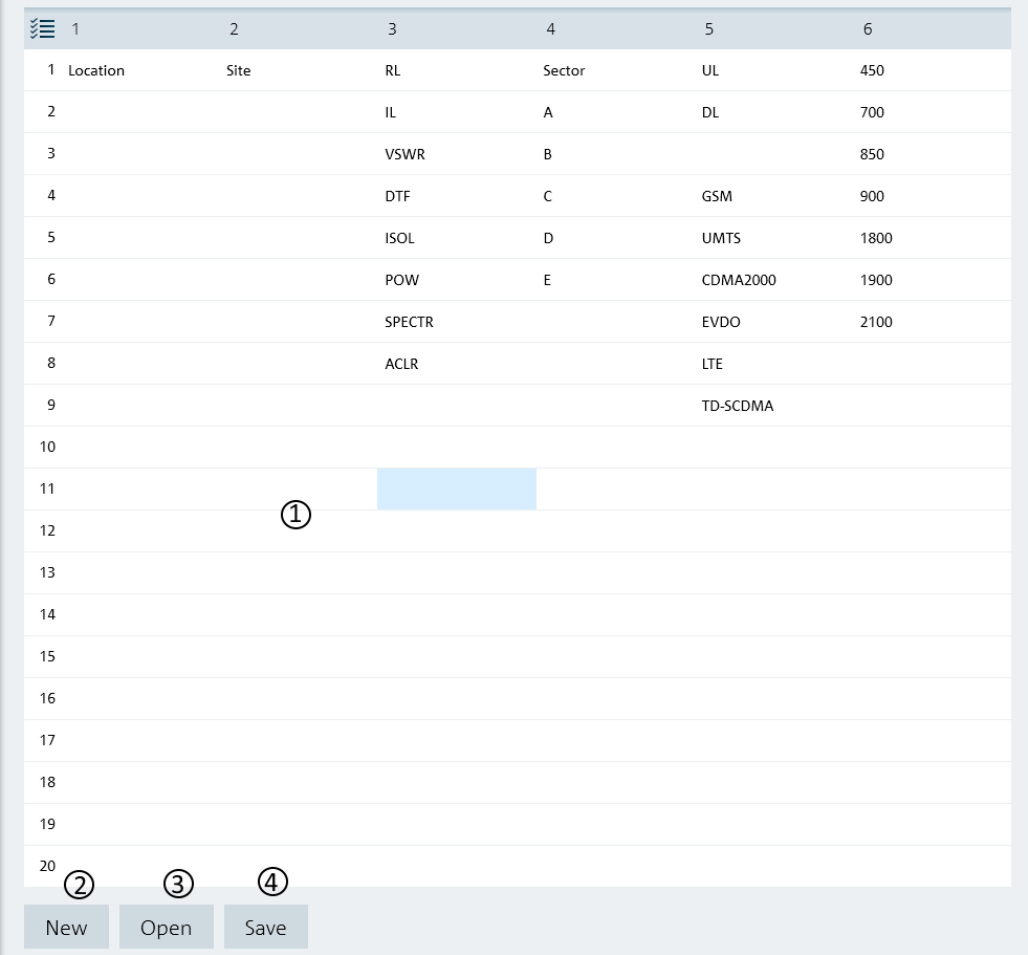


Figure 5-39: Quick name table editor

1 = Editor of the "Quick Name Table"
2 = "New" button creates a new quick name table for entry
3 = "Open" button loads an existing quick name table
4 = "Save" button saves the current quick name table

5.3.11 Using Analog Modulation Analysis AM Limits

The "Analog Modulation Analysis (AMA) AM Limits" is only applicable for R&S FPH and R&S FPC product series. For R&S ZPH, only the .12 model with R&S ZPH K7 option is applicable.

Using the "AMA AM Limits" editor menu, you can customize the "AMA AM Limits" table which is used to evaluate the performance of the amplitude modulated signal. See Figure 5-40.

AMA AM limits table editor

The "AMA AM Limits" table editor allows you to open, edit and save the AMA AM limits table . See Figure 5-40.

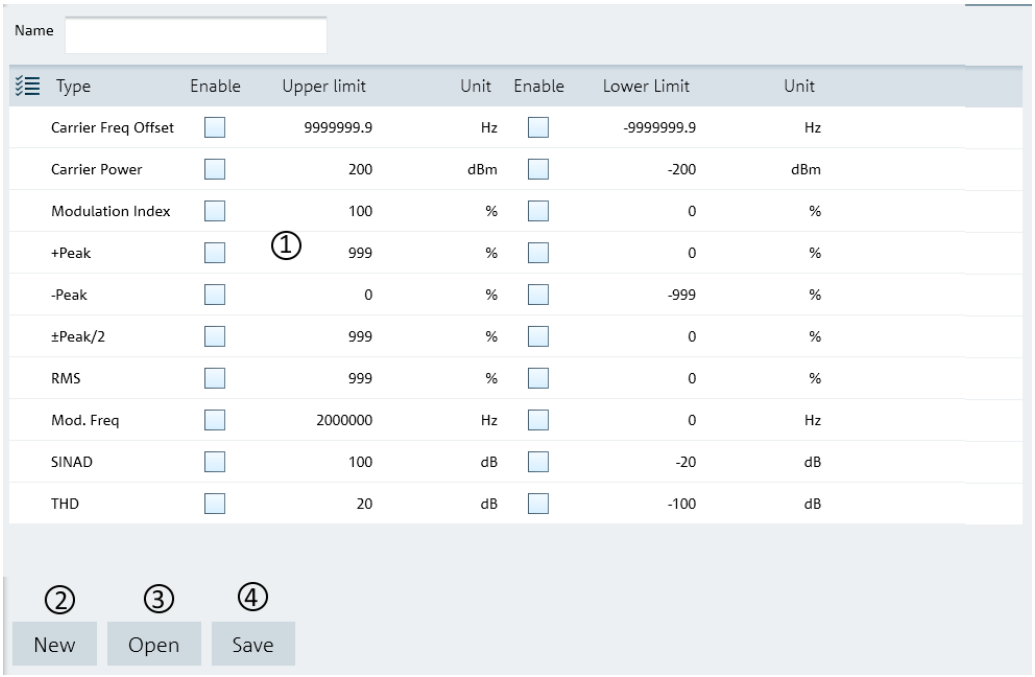


Figure 5-40: AMA AM limits table editor

1 = Editor of the "AMA AM Limits" table
2 = "New" button creates an AMA AM limits table for entry
3 = "Open" button loads an existing AMA AM limits table
4 = "Save" button saves the current AMA AM limits table

5.3.12 Using Analog Modulation Analysis FM Limits

The "Analog Modulation Analysis (AMA) FM Limits" is only applicable for R&S FPH and R&S FPC product series. For R&S ZPH, only the .12 model with R&S ZPH K7 option is applicable.

Using the "AMA FM Limits" editor menu, you can customize the "AMA FM Limits" table which is used to evaluate the performance of the frequency modulated signal. See Figure 5-41.

AMA FM limits table editor

The "AMA FM Limits " table editor allows you to open, edit and save the AMA FM limit table . See Figure 5-41.

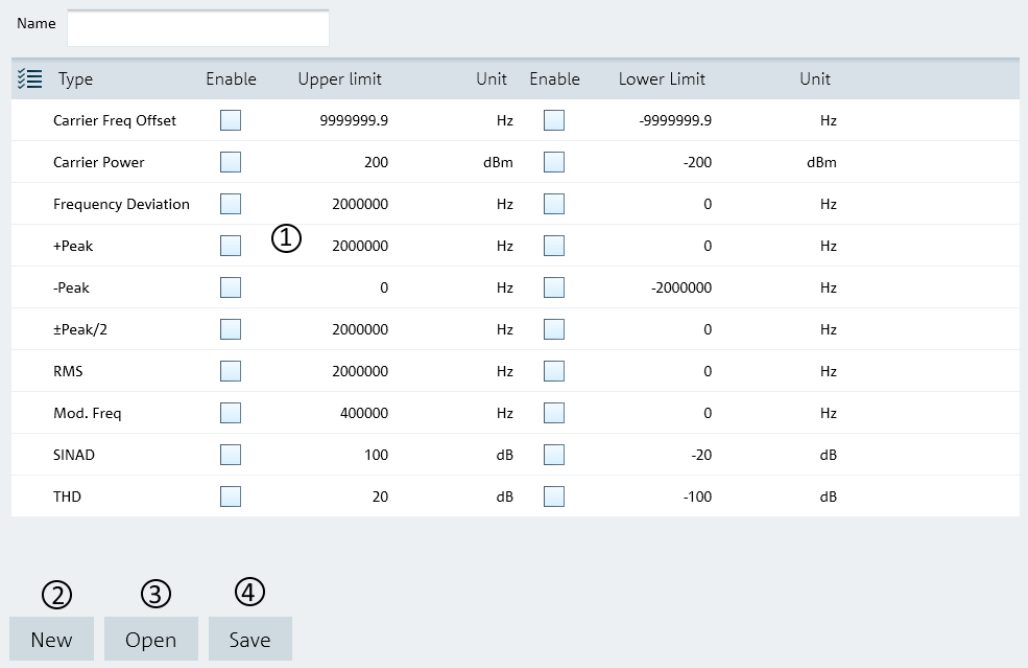


Figure 5-41: AMA FM limits table editor

1 = Editor of the "AMA FM Limits" table
2 = "New" button creates an AMA FM limits table for entry
3 = "Open" button loads an existing AMA FM limits table
4 = "Save" button saves the current AMA FM limits table

5.3.13 Wizard Set Editor

The "Wizard Set Editor" is not applicable for the R&S FSC product series.

Using the "Wizard Set Editor" menu, you can customize the measurement table list which consists of several datasets used to perform a specific instrument setting and measurements, for example frequency setting, power meter measurement, analog modulation measurement. To acquire a dataset, set up the instrument as per your requirement and save the configuration. You can also use one of the predefined datasets to customize the measurement table list.

For instrument setup using the R&S FSH4 or R&S ZVH, the editor provides additional selection for calibration method use in the wizard measurement. See the respective instrument user manual for the list of available calibration method.

The section for "Cable Definition for Antenna & Cable Test" is not available for instrument setup using the R&S FPC and R&S FPH.

The measurement table list forms the measurement sequence in the wizard set. See item 5 in Figure 5-42

For more information on dataset, see Chapter 4.3, "Save Instrument", on page 24.

Wizard

The "Wizard " editor allows you to open, edit and save the measurement wizard set. See Figure 5-42.

To arrange the measurement sequence in the wizard set, double clicked or "Add" the desired dataset from the PC folder directory to the measurement table list. See index 4 and 5 of Figure 5-42.

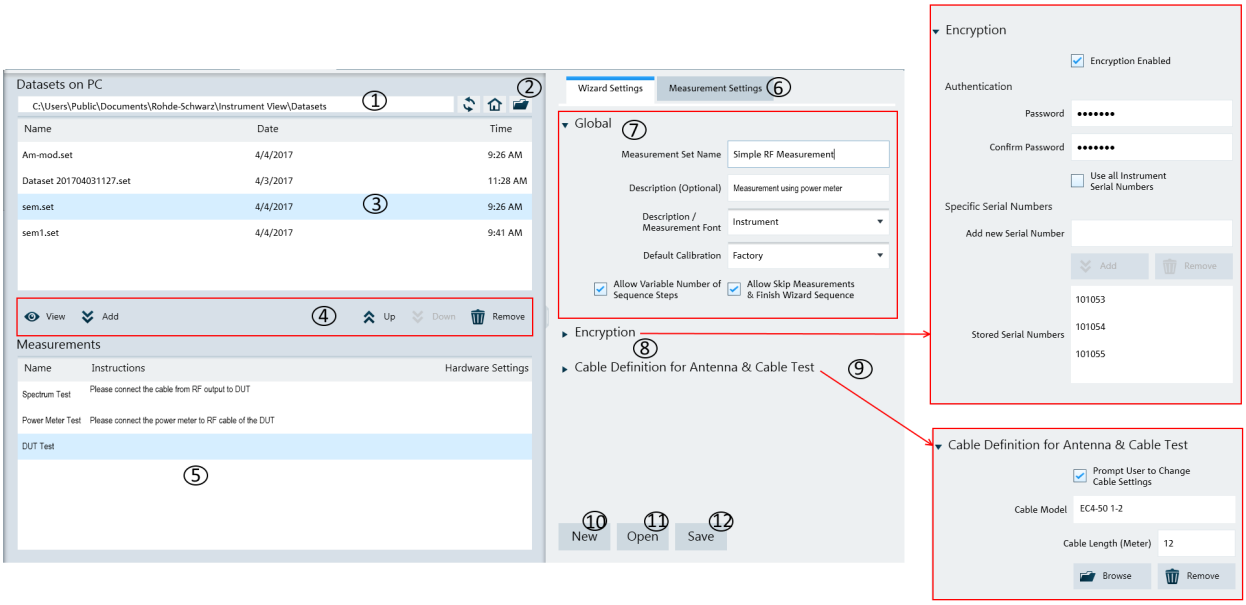


Figure 5-42: Wizard editor

1 = Homepage icon
2 = Opens the PC window explorer
3 = List of datasets that are available in the PC
4 = Navigation icon to preview, add, navigate and remove dataset in the measurement table list
5 = List of selected datasets used in the measurement table list. The "Name", "Instructions" and "Hardware_Setting" column are defined in the Measurement Settings dialog.
6 = Measurement settings tab
7 = Global dialog box
8 = Encryption dialog box
9 = Cable definition for antenna & cable test dialog box
10 = "New" button creates a wizard set for entry
11 = "Open" button loads an existing wizard set entry
12 = "Save" button saves the current wizard set entry

Navigation icon

Navigation icon	Function
	Previews a selected dataset in the measurement table list.
	Adds a selected dataset from the PC dataset list into the measurement table list.
	Navigates upward in the measurement table list.
	Navigates downward in the measurement table list.
	Removes a selected dataset from the wizard set.

Global

The "Global" dialog box provides the following settings that configure the wizard set:

- "Measurement Set Name"
  Name of the measurement wizard set. This field is displayed in the instrument as a read-only parameter.
- "Description (Optional)"
  Description of the measurement task. This field is displayed in the instrument as a read-only parameter.
- "Description / Measurement Font"
  Font type for on-screen instructions (Latin, Chinese/Japanese and Korean fonts are supported).
- Default calibration
  Sets the default calibration method use during the wizard measurement. See the respective instrument user manual for the calibration method information.
- "Allow Variable Number of Sequence Steps"
  If enabled, this field is configurable in the instrument and it allows you to remove steps from the measurement wizard set.
  If not enabled, this field is displayed in the instrument as a read-only parameter.
- "Allow Skip Measurements & Finish Wizard Sequence"
  If enabled, this field is configurable in the instrument and it allows you to skip the measurement step or finished the measurement wizard set.
  If not enabled, this field is displayed in the instrument as a read-only parameter.

Encryption

The "Encryption" dialog box provides the encryption function to secure the edited measurement wizard set.

The encrypted wizard set is only visible in the instrument with serial number configured in the "Encryption" dialog.

To enable the "Encryption" dialog, activate the "Encryption Enabled" checkbox.

To limit the usage of the wizard set on a selective number of instruments, add the instrument serial number defined in the field of "Specific Serial Numbers".

Cable definition for antenna & cable test

The "Cable Definition for Antenna & Cable Test" dialog box configures the cable model and cable length used in the instrument antenna & cable test mode.

To enable a different cable characteristic after each individual measurement in a wizard sequence (such as to perform same measurement for different cables), enable the checkbox "Prompt User to Cange Cable Settings".

Measurement settings

The "Measurement" tab configures the individual dataset used in the measurement table list.

Navigates from the list of datasets in the measurement table list (see index 5 of Figure 5-42) and select the desired dataset for configuration.

Defines the "Measurement Name" and describes the "Instructions" necessary for the measurement step.

Note: The description defined in the "Instructions" is displayed in the wizard message box during the exaction of the wizard set. See index 2 of Figure 5-44.

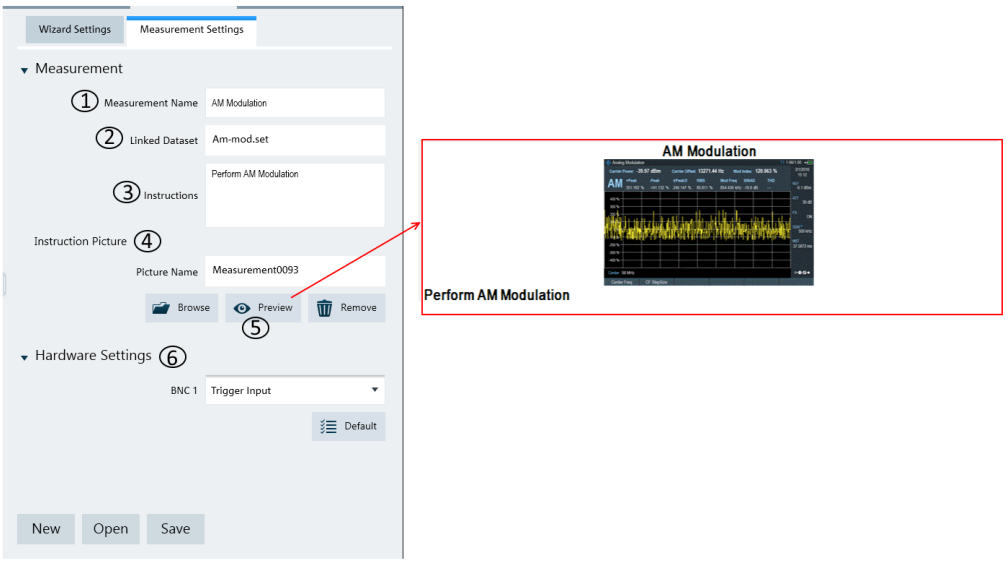


Figure 5-43: Measurement settings tab

1 = Defines the measurement name of the selected dataset
2 = Identifies the dataset filename that the measurement setting is linked to
3 = Defines the instruction description displayed in the wizard message box
4 = Instruction picture dialog
5 = Previews the configured measurement wizard dialog
6 = Hardware settings to configure the instrument's BNC input ("Trigger Input" or "Reference Input")

Instruction picture

The "Instruction Picture" section allows you to display a graphical image during the execution of the measurement wizard set. See Figure 5-44.

To select the desired picture, selects "Browse" button to open the PC window explorer and select the graphic image to use.

The "Preview" button allows you to preview the selected graphical image.

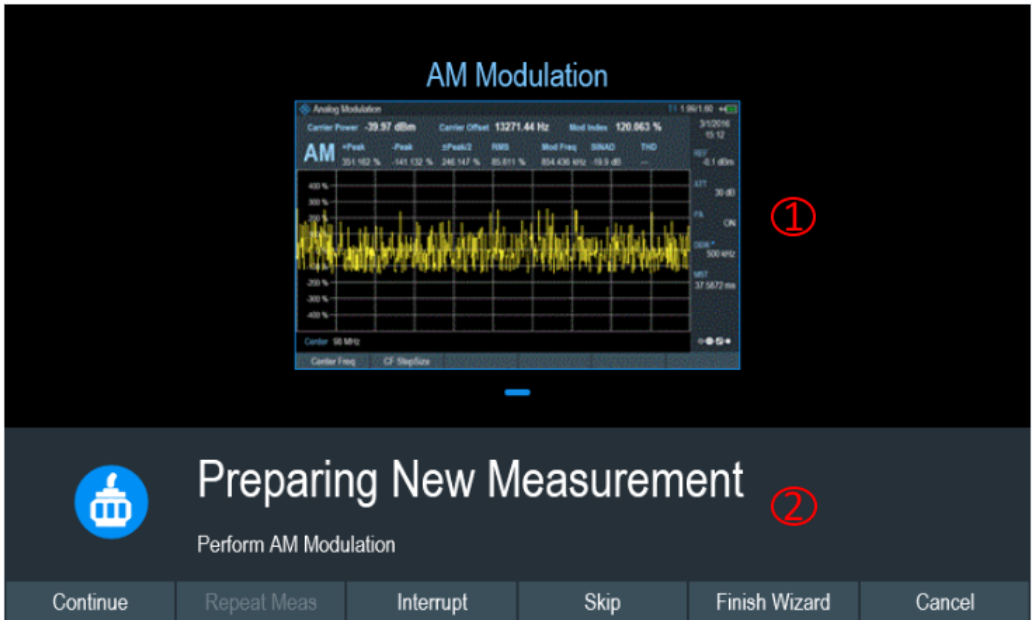


Figure 5-44: Wizard dialog box

1 = Instruction picture image
2 = wizard message box

5.3.14 Map Creator

The "Map Creator" is only applicable for R&S PR200, R&S EM200, R&S FPH and R&S FSH4 product series. For R&S ZPH, only the .12 model with R&S ZPH K16 option is applicable.

The purpose of the "Map Creator" tool is to generate a small archive of images including an IDM or PRJ file for use on the instrument and in the maps workspace. The tool is divided into the map section and the setup section.

In addition to creating a map, you can also specify the exact geographical location of the area you are measuring. To do so, you can specify three GPS reference points in

the entry field (see item 4 of Figure 5-45) . With a GPS referenced map, it provides the following useful features:

- The map created is automatically rotated with the north side faces up.
- The instrument calculates and displays the distance between measurement points (in meters or feet, depending on the regional settings).
- You are able to embed the collected data into maps with a larger scale. Thus, you are able to, for example, combine measurement data recorded with the "Outdoor Mapping" application and data recorded with the "Indoor Mapping" application in a single map. For more information on collecting map data, see the respective chapters in the user manual.

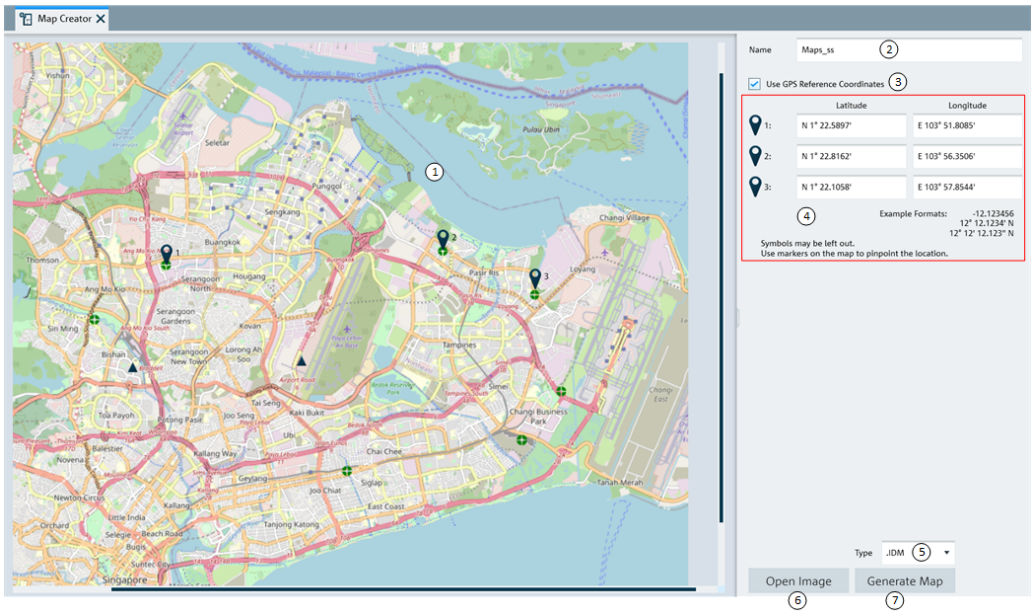


Figure 5-45: Map creator dialog box

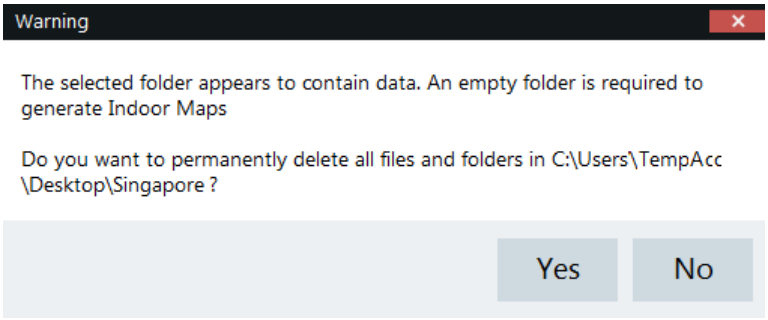
1 = Map section
2 = Map folder name
3 = GPS reference coordinate
4 = Entry fields for the GPS reference coordinates.
5 = File format for map generation: ".IDM", ".PRJ"
6 = Load image supporting file format: "*.png", ".bmp", ".tiff," ".gif", ".jpg"
7 = Generate map

GPS reference coordinates

This GPS reference coordinate allows you to create a georeferenced map (with GPS coordinates) or a non-geo-reference map (without GPS coordinates). When enabled, three GPS reference coordinate positions ("Latitude" and "Longitude") are required to enter in the setup section with reference of the GPS targets shown on the map. You can move the GPS target on the map which represents the corresponding values of the GPS reference coordinates.

Generate map

When generating the map, the R&S InstrumentView deletes all existing content in the selected folder.



Generated map data

The generated map data consists of different zoom levels of images stored in separate folders. A corresponding PNG file image, KML file image and IDM or PRJ file of the map data are also generated.

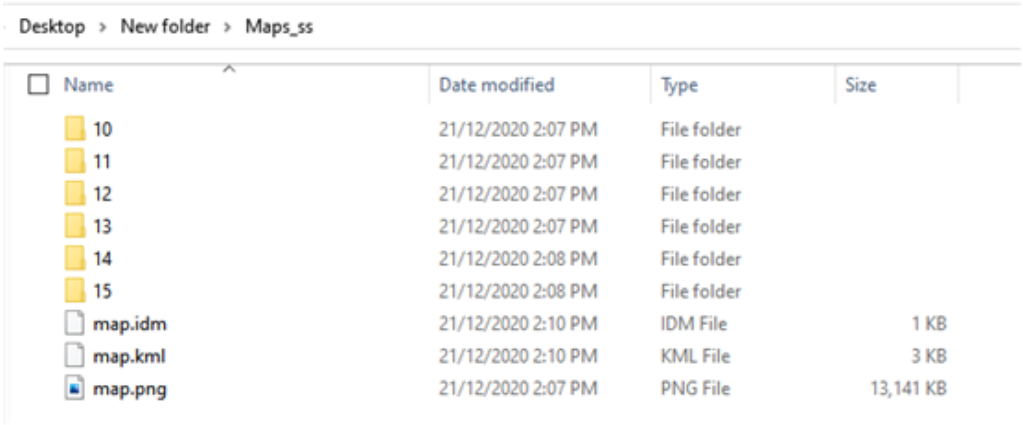


Figure 5-46: Sample of map generation folder

Context menu

Move the mouse scroll wheel to zoom in or zoom out on the map.

5.3.15 EMF Editor Tool

The EMF editor tool is used to configure the EMF measurement configuration file. The EMF editor tool is only applicable to R&S FPH.

It consists of the EMF measurement set editor and EMF measurement configuration editor.

5.3.15.1 EMF Measurement Configuration Editor

Live editing

Live editing requires an EMF receiver to be connected to R&S InstrumentView and can be enabled using the "Live Editing" button.

To ensure consistency, settings are communicated with the connected EMF receiver upon change. Any inconsistences are solved by the EMF receiver and the settings are then immediately read back by R&S InstrumentView.

The EMF measurement configuration editor is used to configure the EMF measurement configuration file (`*.emcf`). The configuration file contains the information on the instrument settings, transducer factor for the equipment (antenna and cable) and also the necessary site-specific correction factor for the equipment and measurement.

Each measurement configuration file is made up of a list of center frequencies for measurement. Each center frequency represents a sub-measurement in the measurement configuration file.

EMF measurement modes

There are six types of "Measurement Mode" supported:

- "Quick Scan": determines the strongest peak field strength values in a defined frequency range. Frequencies that violate a threshold line are noted as result.
- "Spectrum": the field strength of the center frequency is used as EMF result value.
- "Channel Power": the channel power level is used as EMF result value.
- "3GPP WCDMA": the P-CPICH signal power is used as EMF result value.
  Up to 10 strongest scrambling code signal strength results per sub-measurement.
- "LTE-FDD": the power display (displayed cell property) is used as EMF result value. The possible power display modes are PSYNC, SSYNC, RSRP and RSPWR (default).
  Up to 8 strongest cell ID signal strength results per sub-measurement.
- "TD-LTE": the power display (displayed cell property) is used as EMF result value. The possible power display modes are PSYNC, SSYNC, RSRP and RSPWR (default).
  Up to 8 strongest cell ID signal strength results per sub-measurement.

See also Table 5-5.

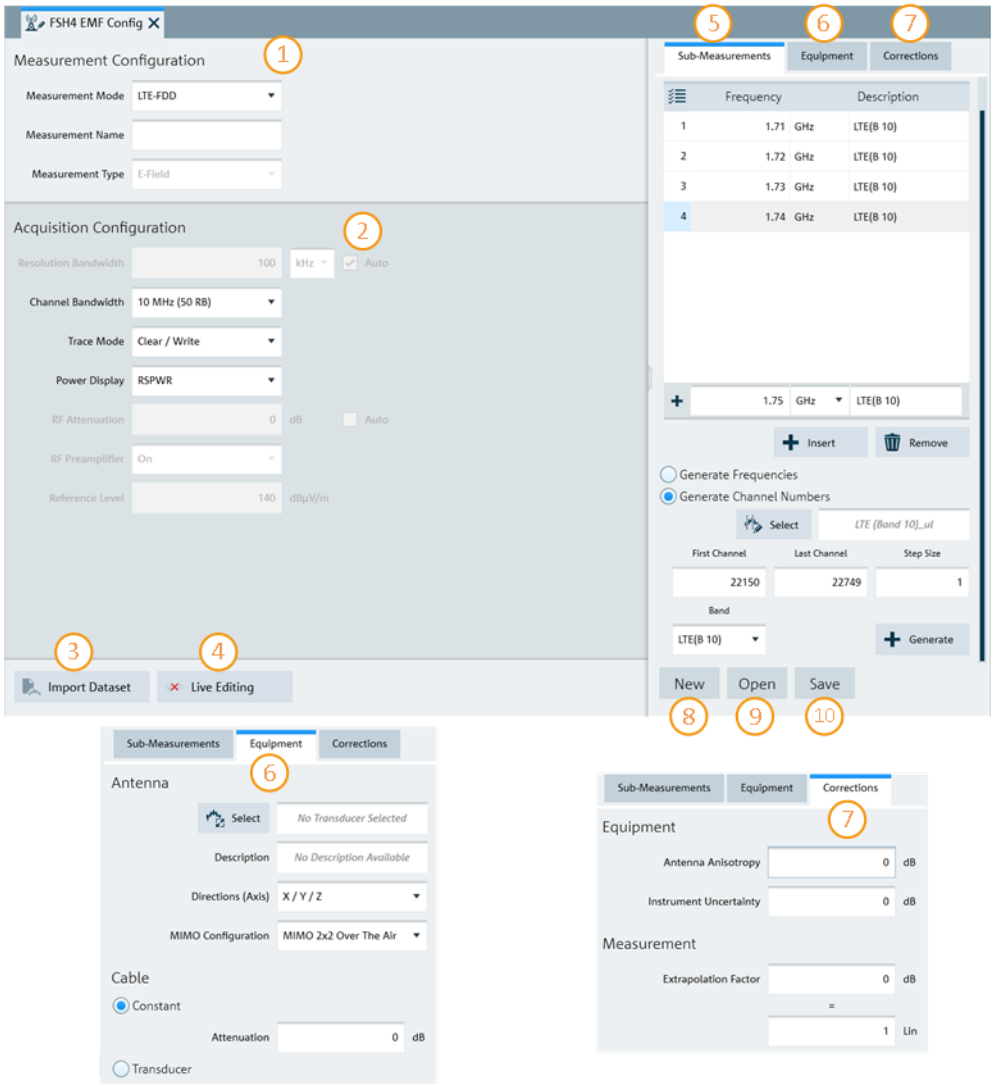


Figure 5-47: EMF measurement configuration editor

1 = "Measurement Configuration" provides general information of the configuration file. See Table 5-4
2 = Availability of acquisition settings depends on the selected "Measurement Type" and most settings are not editable. See Table 5-5
3 = Only compatible dataset can be imported to the "Acquisition Configuration". See Table 5-5
4 = Allows "Live Editing" from InstrumentView to the instrument. The reference level can only be edited live, if an antenna is selected.
5 = Sub-measurement contains a list of center frequencies for execution
6 = Equipment tab provides control settings such as antenna and cable transducer factors
7 = Correction tab provides settings for site-specific correction factor for equipment and measurements
8 = New button resets all data and creates a measurement configuration file for entry
9 = Open button loads an existing measurement configuration file for entry
10 = Save button saves the currently configured measurement configuration file

Table 5-4: Measurement configuration layout

Parameters	Function
Measurement configurations	Provides settings of the EMF measurement modes. Provides a text box to configure "Measurement Name". This name is used as a filename suggestion when saving a new EMF measurement configuration file. Selection of the "Measurement Type". Only Electric Field (E-field, field strength expressed in V/m, dBuV/m or W/m²) is available.
Acquisition configurations	Availability of the acquisition settings depends on the selected EMF measurement modes. For details on the acquisition settings, see the respective user manual for information. See also information on Table 5-5. **Note**: "RF attenuation" and "Reference level" are editable only in "Live Edit " mode.
Sub-Measurements	Contains a list of center frequencies for execution. Each center frequency in the frequency list represents a sub-measurement. The amount of sub-measurement that can be added to the frequency list is limited based on the selected measurement mode: • Spectrum and channel measurement: Up to 99 sub-measurements • WCDMA: Up to 10 sub-measurements • LTE-FDD and TD-LTE: Up to 10 sub-measurements Each sub-measurement can be added by the followings: • Inserting a single center frequency within the frequency list • "Generate Frequencies": Adding a range of center frequencies with a fixed "Step Width" in Hertz • "Generate Channel Numbers": Adding a range of center frequencies by specifying a channel table and providing the channel range. You can remove a single or multiple center frequencies from the frequency list.
Equipment settings	Contains the controls regarding the equipment settings such as antenna and cable transducer factors. You can specify an antenna transducer factor such as primary (`*.pritrd`) or an isotropic transducer file (`*.isotrd`) at the window browser dialog (e.g. file types). The Y-unit of the transducer file must be compatible with the selected measurement type. If the unit is not compatible, the file is rejected and error message is displayed. You can also define the antenna's direction of measurement ("X", "Y", "Z" or "X/Y/Z (All)") and the MIMO configuration for LTE measurement ("SISO Over The Air", "MiMO 2x2 Over The Air", "MiMO 4x4 Over The Air") Cable attenuation can be specified by either using a constant value (dB) or using a secondary transducer file (`*.sectrd`). For viewing the response of the transducer file, see Transducers table editor for spectrum analyzer.
Corrections	Defines the site-specific correction factors for equipment and measurements. You can set the antenna anisotropy (correction made for any deformities in all orientation of an isotropic antenna for incoming waves) and instrument uncertainty in dB level. For measurement type selected for WCDMA, LTE-FDD and TD-LTE, an additional extrapolation factor is available for correction. It can either set as dB or as a dimensionless linear value. For measurement type selected for LTE-FDD, you can also make correction factor for "Time Division Duplex" in dB.

Table 5-5: Relation between configurable dataset settings and measurement modes

Measurement mode	Resolution bandwidth	Video bandwidth	Span	Channel bandwidth[1]	Trace mode[1]	Power display[1]	Detector	RF Attenuation	Reference level
Quick Scan	✓	✓	✓		✓		✓	✓	✓
Spectrum	✓	✓	✓		✓		✓	✓	✓
Channel Power	✓	✓	✓	✓	✓		✓	✓	✓
3GPP WCDMA	✓			✓	✓			✓	✓
LTE-FDD	✓			✓	✓	✓		✓	✓
TD-LTE	✓			✓	✓	✓		✓	✓

[1]Configurable dataset settings

5.3.15.2 EMF Measurement Set Editor

The EMF measurement set editor is used to configure the EMF measurement definition file (`*.emdf`). The definition file consists the sequence order of one or more EMF measurement configuration files for execution. The following EMF measurement set editor illustrates the different sections to configure the EMF measurement definition file.

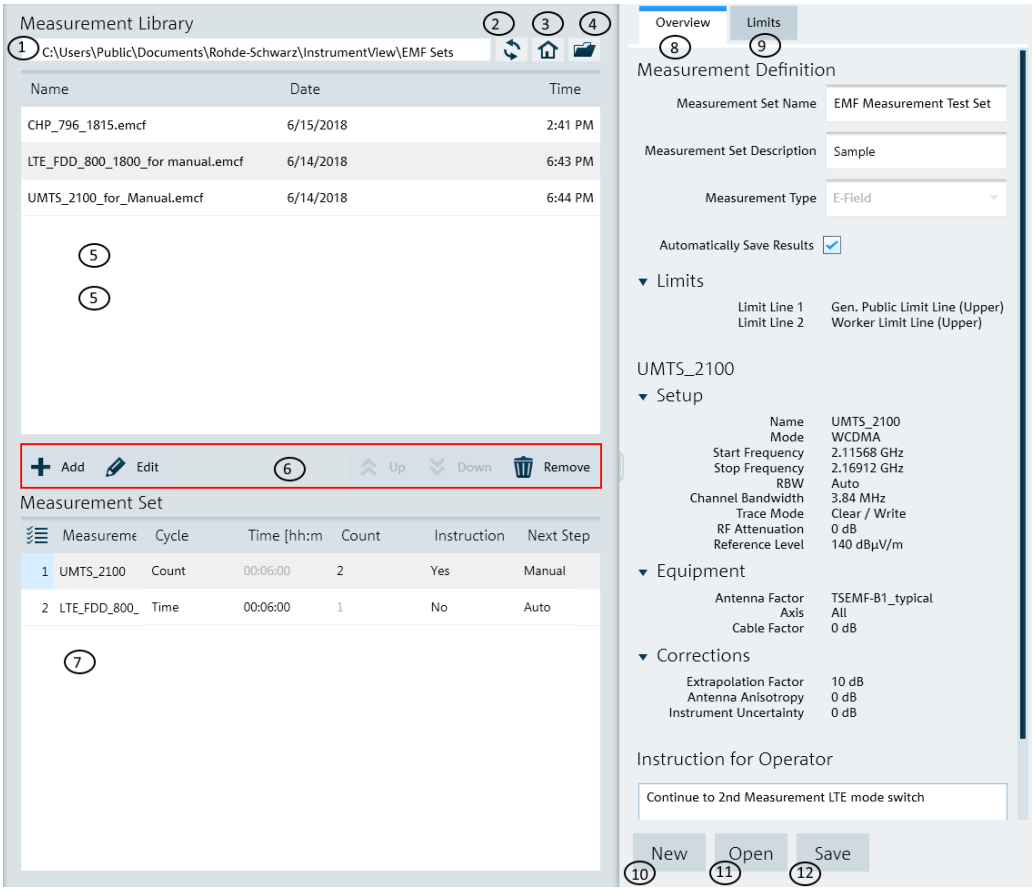


Figure 5-48: EMF measurement set editor

1 = Displays measurement library directory path
2 = "Refresh" button refreshes file content in the selected measurement library directory
3 = Homepage
4 = Opens the PC window explorer to set measurement library directory path
5 = List of EMF measurement configuration files
6 = Measurement set navigator
7 = List of currently configured measurement set
8 = Overview tab
9 = Limits tab
10 = New button resets all data and creates a measurement definition file for entry
11 = Open button loads an existing measurement definition file for entry
12 = Save button saves the currently configured measurement definition file

Table 5-6: Measurement set layout

Editor layout	Function
Measurement library table	The measurement library populates the table with EMF measurement configuration files (`*.emcf`) extracted from the selected "Measurement Library" path.
Measurement set table	The EMF measurement set table provides a list of currently configured EMF measurement set. It displays the sequence order of individual EMF measurement configuration files. Each measurement configuration contains five inline controls which you can use to define the execution behavior: • "Cycle": Provides a dropdown box to select "Time" or "Count". If selected as "Time", sub-measurements are individually executed for the specified minimum duration. If selected as "Count", sub-measurements are individually executed for a specified number of runs. • "Time [hh:mm:ss]": Defines the minimum amount of time each sub-measurement is executed for. • "Count": Defines the number of times each sub-measurement is executed for. • "Instruction": If instruction is set "Yes", an instruction popup box is displayed on the EMF receiver before the starting of this measurement . If "Instruction" is set "No", the EMF receiver starts this measurement without showing an instruction. The instruction description is entered in the "Instruction for Operator" text box. • "Next Step": Provides a dropdown box to select "Auto" or "Manual". If selected as "Auto", the EMF receiver automatically proceeds to next step when this measurement is finished. If selected as "Manual", the EMF receiver holds before proceeding to the next step when this measurement is finished. During this time, you can analyze the last measurement result. To navigate the table in the measurement set table, see Measurement set navigator.
Overview setup	Provides an overview of the selected EMF measurement configuration file including the measurement-specific information. See Overview display and limit lines
Limits settings	Provides the limit setup for the selected EMF measurement configuration file in the measurement set table. See Overview display and limit lines.

Measurement set navigator

The measurement set navigator allows you to edit the sequence order in the EMF measurement set table.

Navigator	Function
Add	Adds the selected EMF measurement configuration file from the measurement library table.
Edit	Edits the selected EMF measurement configuration file in the measurement set table. For more information, see Chapter 5.3.15.1, "EMF Measurement Configuration Editor", on page 86.
Up / Down	Moves up / down the selected EMF measurement file in the table.
Remove	Deletes the selected EMF measurement file from the table.

Overview display and limit lines

The "Overview" tab contains information regarding the entire EMF measurement set. It contains the general information and displays measurement-specific details of the measurement setup. The "Limits" tab allows you to define the limit settings used in the measurement set.

Limit Lines

The limit lines are always treated as upper limit settings. This means that values exceeding the specified boundaries may result in an exposure warning or failed measurement result.

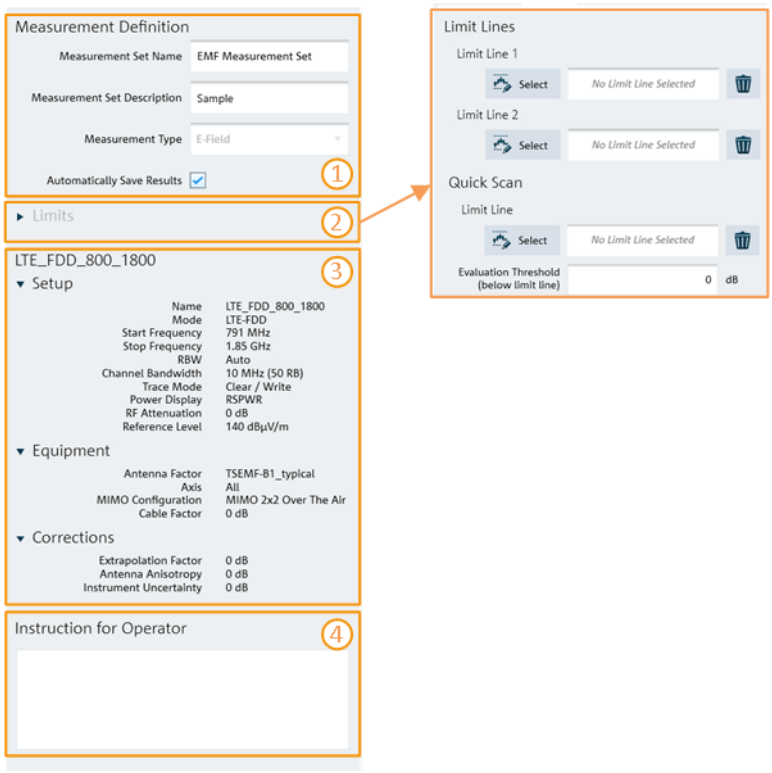


Figure 5-49: Overview and Limits Tab

1 = "Measurement Definition" provides general information of the EMF measurement definition file. See Table 5-6
2 = Limit line displays the upper limits settings. See "Limit Lines" on page 92
3 = Measurement-specific setup. See details in Chapter 5.3.15.1, "EMF Measurement Configuration Editor", on page 86
4 = Text box to set instructions

Parameters	Function
"Measurement Definitions"	Provides a text box to configure the name of the "Measurement Set Name". This name is used as a filename suggestion when saving a new EMF definition file. Provides a text box to configure the optional description of the measurement set. This description is visible on the EMF receiver after loading the measurement set. You can also enable "Automatically save reults". Selection of the "Measurement Type". Only "Electric Field" (E-field, field strength expressed in V/m, dBuV/m or W/m^2) is available. This setting determines the type of EMF measurement configuration that can be added in the measurement set table
"Limits"	Displays the limit line configured in the "Limits" tab. See Overview display and limit lines. For the "Quick Scan" measurement "Evaluation Threshold" is available. This is a configurable margin below the selected Limit Line. It can be seen as virtual line. Measurement peaks greater than this virtual line are displayed during analysis (evaluation). Peaks below the line are not displayed in the graphical representation (neither peak list or bar chart).
Measurement-specific information	Displays measurement-specific information configured in Chapter 5.3.15.1, "EMF Measurement Configuration Editor", on page 86.
"Instruction for Operator"	Text box to set instructions for operator. When "Instruction" is enabled in the "Measurement Set" table, a popup box with the instruction is displayed on the EMF receiver before the start of the measurement.

Context menu

Right-click in the measurement library table to access the following menus:

- "Edit" - edits the selected measurement configuration file, it opens the measurement configuration editor, see Chapter 5.3.15.1, "EMF Measurement Configuration Editor", on page 86
- "Add": adds the selected measurement configuration file to the measurement set table
- "Delete": deletes the selected measurement configuration file from the measurement library path directory

Right-click in the measurement set table to access the following menus:

- "Up" / "Down": navigates the selected measurement configuration file up/down in the table
- "Remove" : removes the selected measurement configuration file in the table

Vertical / horizontal scrollbar

- For details, see Chapter 3.1, "Context Menu", on page 17.

5.4 Analyze the Instrument Dataset

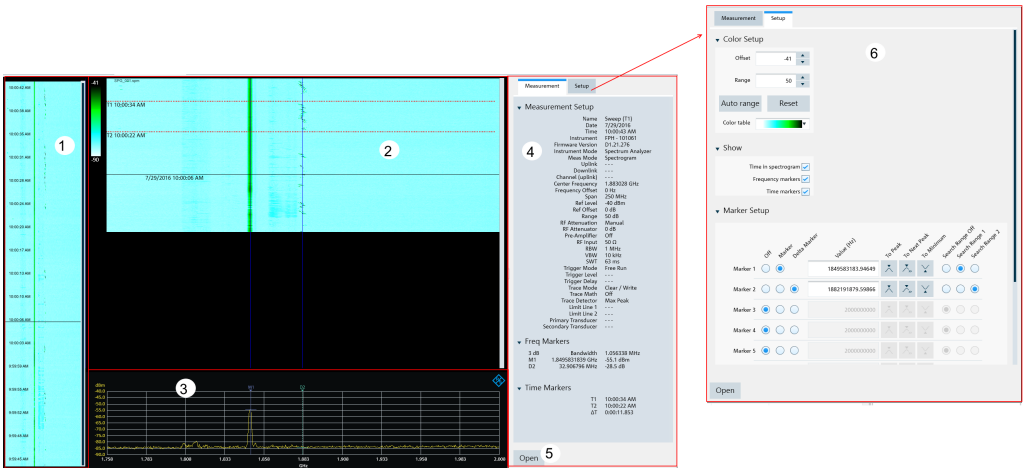
The "Analysis" menu allows you to perform data analysis for instrument data collected from spectrogram, map measurement and EMF measurement results. It also allows you to export GPX file to KMZ and CSV file format.

- Spectrogram....94
- Map Analysis....98
- GPX Conversion....101
- Dataset Image....103
- EMF Measurement Result....104

5.4.1 Spectrogram

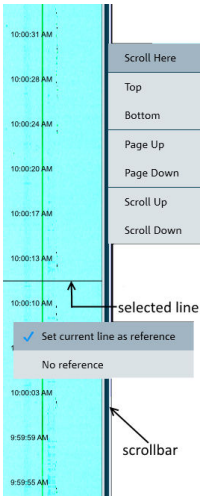
Spectrogram is only applicable for R&S FPH, R&S FSC, R&S FSH4 and R&S ZVH product series. For R&S ZPH, only the .12 model with R&S ZPH K15 option is applicable.

The spectrogram provides a workspace to analyze the spectrogram which is also known as long time recording. The workspace is divided into five sections, each providing specific information and or means to analyze the spectrogram data further.



1 = Compression spectrogram
2 = Spectrogram section
3 = Spectrum section
4 = Measurement section
5 = Selects "Open" button to load the spectrogram file
6 = Setup section

Compression spectrogram



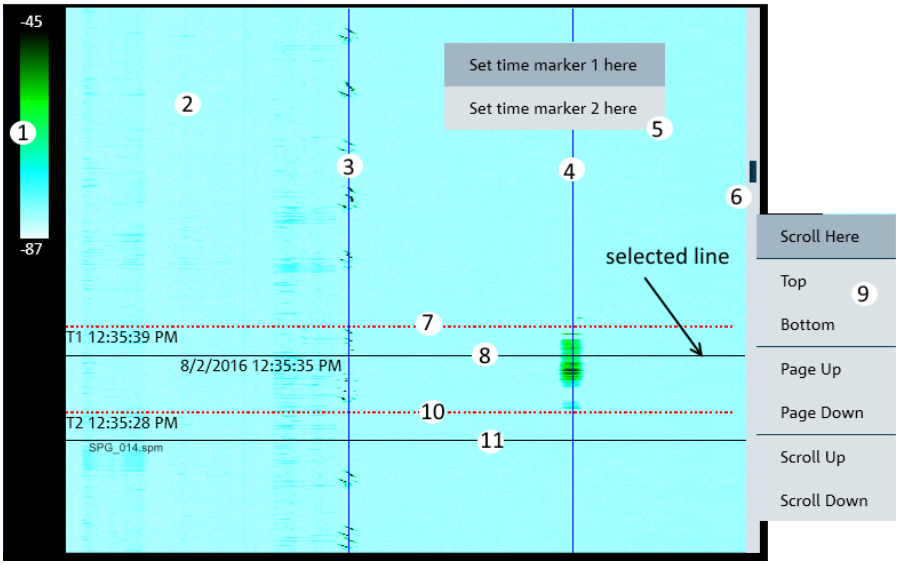
The compressed spectrogram displays a compressed overview of the recorded spectrogram data. In the compressed spectrogram view, a selected line is displayed showing the location of the part that is currently displayed in the spectrogram and the spectrum section. You can use the mouse to move the line in the compressed spectrogram to analyze the data in the spectrogram.

You can right-click on the compressed spectrogram to set the current line as reference value. When using the current line as a reference, the reference is subtracted from all the records in the compressed spectrogram and the color spectrum changed accordingly. You can also right-click on the scroll bar to display the different scrolling options to navigate the data in the compressed spectrogram view.

Upon loading the next spectrogram, the R&S InstrumentView will prompt you to save the generated compressed spectrogram file.

Spectrogram section

The spectrogram section shows a part of the recorded spectrogram in the highest time resolution, e.g. one line in a spectrogram file represents in one sweep on the spectrum section. You can change the spectrogram frequency resolution by holding the CTRL key and moving the mouse scroller in the spectrum view. For more information on the mouse behavior, see Table 5-7. The amplitude of the signal in the spectrogram view is displayed in color spectrum according to the configuration setup in the "Color Setup" dialog box"Setup section" on page 97.



1 = Displays of color table
2 = Spectrogram section
3 = Displays of marker 1 line
4 = Displays of marker 2 line
5 = Context menu for spectrogram
6 = Scroll bar
7 = Displays of T1 time-line
8 = Left-click on the mouse to display of current selection line. This line is synchronized to the information displayed in the compressed spectrogram and spectrum section.

9 = Context menu for vertical scrollbar
10 = Displays of T2 time-line
11 = Indication of the spectrogram filename loaded

Spectrum section

The spectrum shows the spectrum at the current selected line in the spectrogram view. The spectrogram shows the amplitude as colors, the spectrum view shows the amplitude as Y deflection in the graph. It is possible to move the markers display, change and move the zoom area of the spectrum display by using the mouse. For more information on the mouse behavior, see Table 5-7

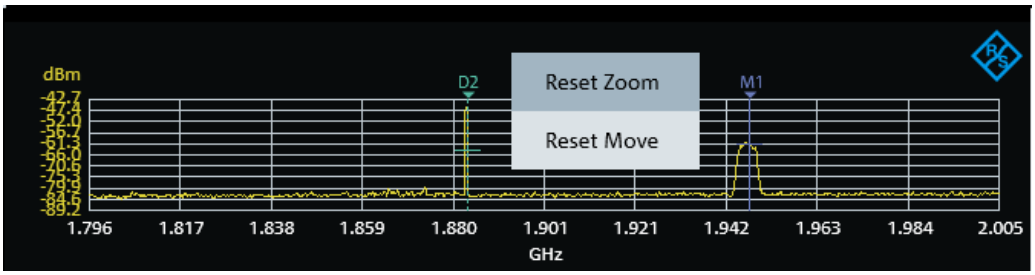
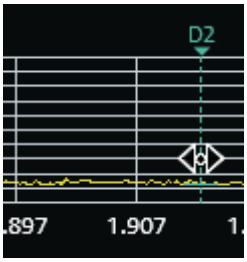
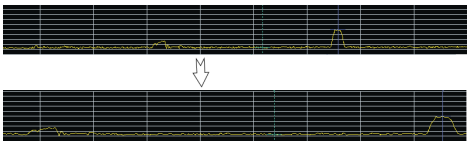
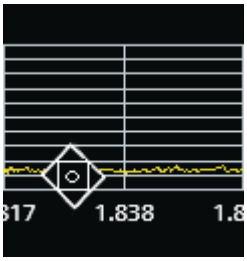
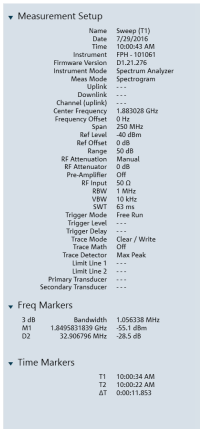


Table 5-7: Mouse behavior in spectrum section

Mouse behavior	Function
	Positions the mouse icon over the marker line until the icon display changed. Hold and left-click on the mouse and drag to move the marker display.
	Positions the mouse icon anywhere on the spectrum view, hold the CTRL key and move the mouse scroller to change the frequency resolution of the spectrum and spectrogram display.
	Positions the mouse icon over the spectrum display until the icon display changed. Left-click and hold on the mouse key to change the spectrum position.

Measurement section



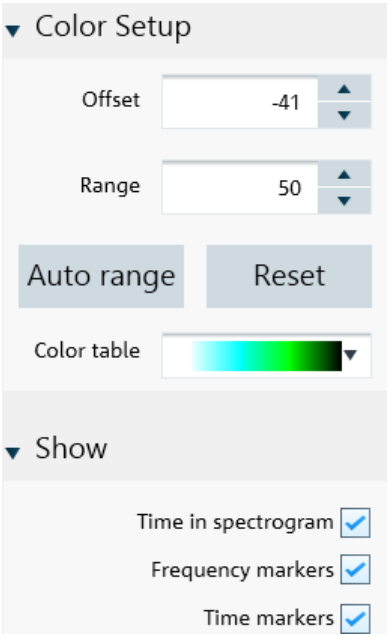
The measurement section consists of three subsections:

- Measurement setup
  The measurement setup contains all the setup properties required for specific measurement. The data displayed in this section is the same as the spectrum section.
- Frequency maker
  The data displays in the frequency marker corresponds to the settings in the "Marker Setup" configured in the setup section.
- Time marker
  The time markers section is used to display the time marker value and results as positioned in the spectrogram section.

Setup section

The setup consists of two sections:

- Viewer setup
  The viewer setup allows you to configure the display view ("Time", "Frequency markers" and "Time markers") in the spectrogram section and define the maximum reference level and range different for the color table.
  Using the "Auto range" function, you can automatically adjust the maximum reference level and the range different of the color table for optimum display. For more information, see "Working with the Spectrogram Result Display" in the user manual.



- Marker setup
  For more information, see "Marker setup" on page 38.

Context menu

Right-click on the spectrogram, vertical scrollbar or spectrum to access the following menus:

Spectrogram

- "Set time marker 1/2 here": displays a vertical blue line in the spectrogram.

Vertical scrollbar

- For details, see Chapter 3.1, "Context Menu", on page 17.

Spectrum

- "Reset Zoom", "Reset Move": resets the spectrum display to original zoom level or position.

5.4.2 Map Analysis

Map is only applicable for R&S PR200 and R&S EM200 (.PRJ), and R&S FPH, R&S FSC and R&S FSH4 product series (.IDM or .PRJ). For R&S ZPH, only the .12 model with R&S ZPH K16 option is applicable.

The "Map Analysis" menu allows you to view maps and overlay it with the signal strength level from the GPX file. The "Map Analysis" workspace is divided into the map section and the setup section.

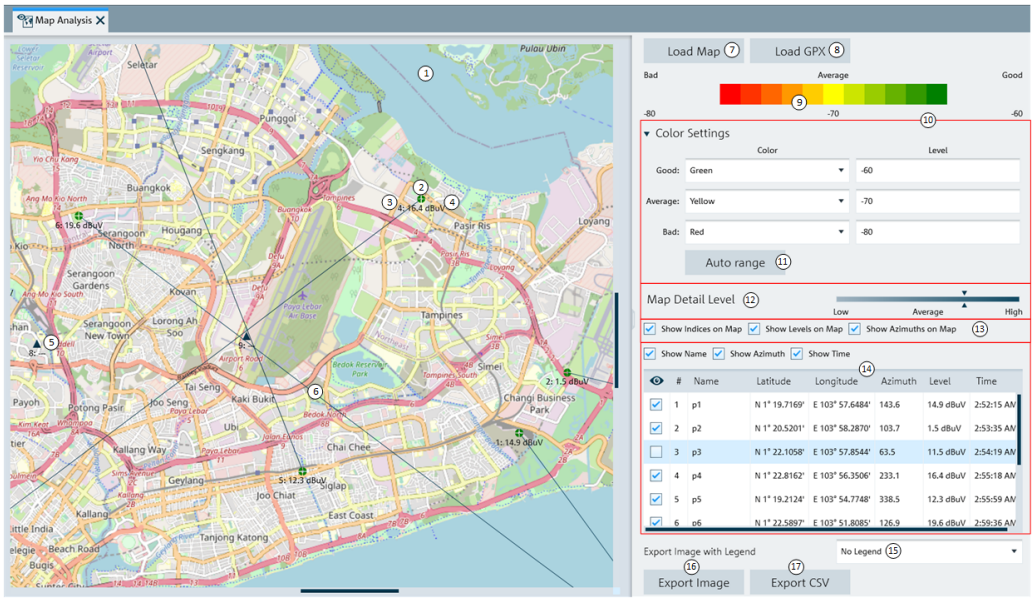


Figure 5-50: PRJ map with azimuth bearings

1 = Map section
2 = GPX position ("Latitude", "Longitude" or "X (Pixels)", "Y (Pixels)") of the measurement
3 = Indices of the measurement
4 = Signal strength level of the measurement
5 = Triangulation result location linked to corresponding item within the data grid
6 = Azimuth display for valid azimuth value (For R&S PR200 and R&S EM200 only)
7 = Selects "Load Map" to open file browser and search for IDM or PRJ map file
8 = Selects "Load GPX" to load the GPX file
9 = Legend of the color spectrum used for signal strength level
10 = Color settings dialog
11 = "Auto Range" the colour ranging from bad, to average, to good
12 = Adjust "Map Detail Level" using the slider

13 = Option to enable or disable the display of GPX index, signal strength and azimuth values (if applicable) on the map
14 = Data grid with option to enable or disable the display of the name, azimuth value and time of the measurement data
15 = Option to include legend on the exported image
16 = Selects "Export Image" to file format (*.png, *.gif, *.bmp, *.jpg, *.tiff, *.tif)
17 = Exports selected measurement data in CSV format

Loading of maps and GPX

Both the map and GPX files must contain either valid GPS coordinates or no GPS coordinates to be compatible. When a compatibility mismatch occurs between the map and GPX files, the R&S InstrumentView unloads the first loaded file.

Color settings

The "Color Settings "dialog allows you to select the color representing the signal strength level to display on the map. After the configuration, the legend of the color spectrum reflects the color changes accordingly.

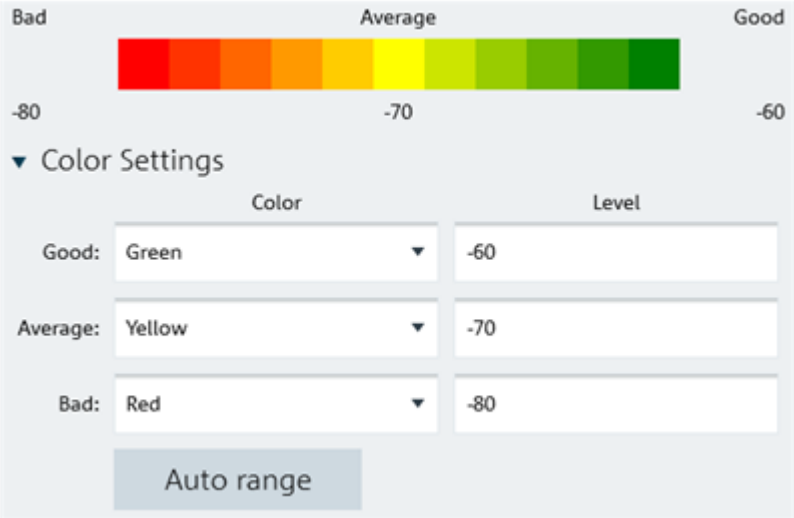


Figure 5-51: Color settings dialog

Data grid

The data grid is the table representation of the measurements on the map. By default, the data grid displays information as shown in Figure 5-52. Data with GPS coordinates displays "Latitude" and "Longitude" information and data without GPS coordinates displays "X (Pixels)" and "Y (Pixels)".

You can also choose to display azimuth value (if applicable), signal strength level and time of the measurement data by selecting the relevant checkbox.

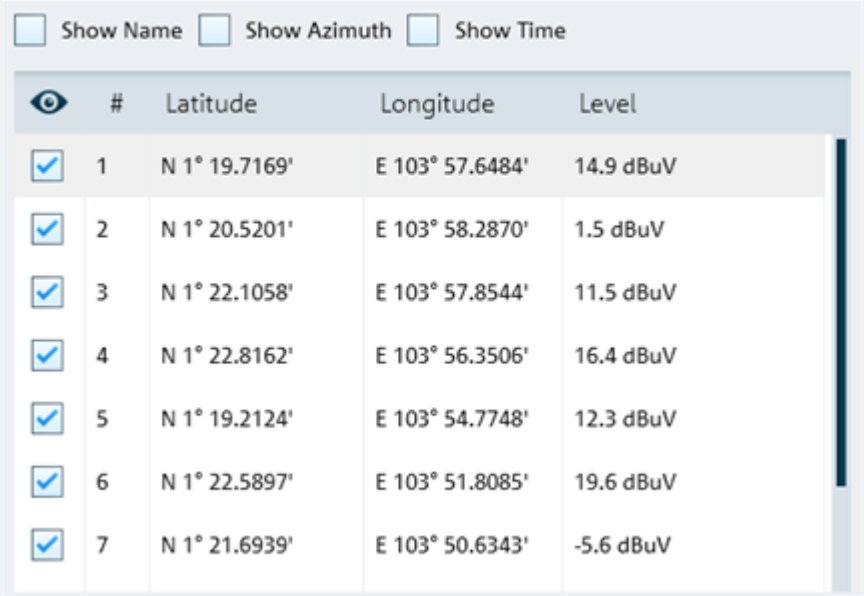


Figure 5-52: Data grid

Legend

You can add a legend to the exported map. Positions of the legend include: "Top Left", "Top Right", "Bottom Left", "Bottom Right".

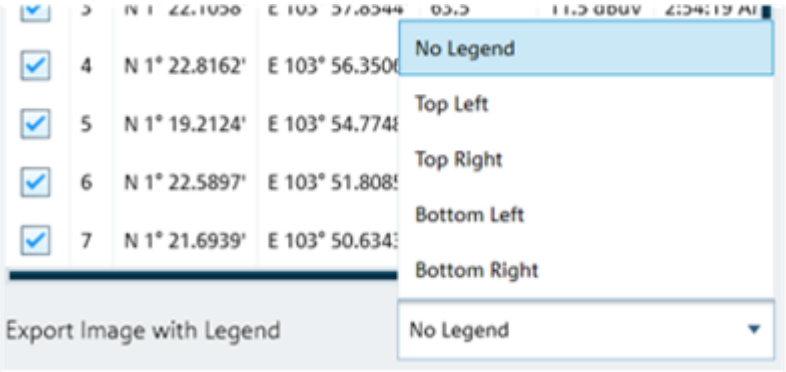


Figure 5-53: Legend position

Sample IDM map

When loaded, the indoor map orientates according to the GPX details, as shown in Figure 5-54.

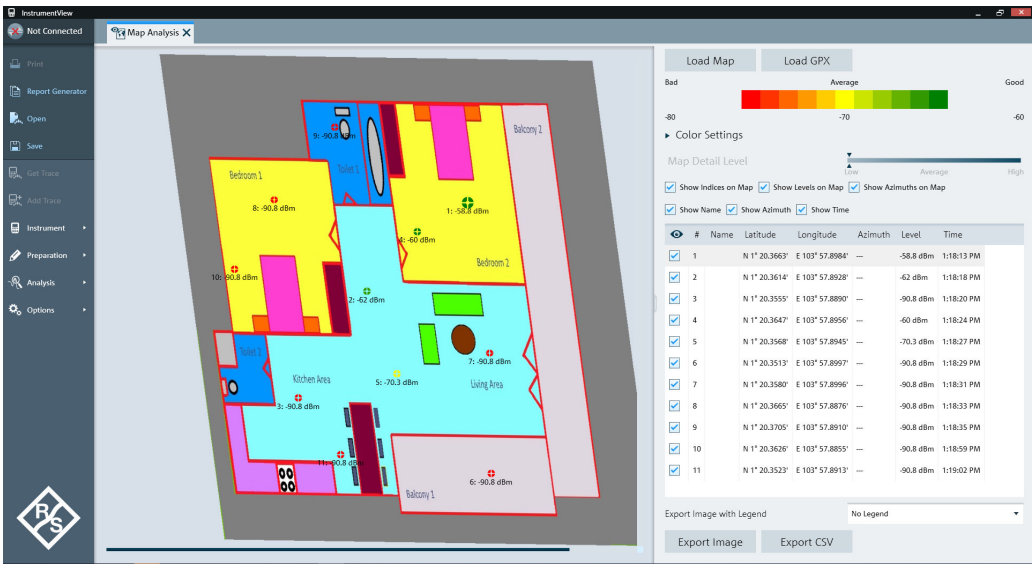


Figure 5-54: Indoor map

5.4.3 GPX Conversion

GPX conversion is only applicable for R&S FPH, R&S FSC and R&S FSH4 product series. For R&S ZPH, only the .12 model with R&S ZPH K16 option is applicable.

The "GPX Conversion" provides a workspace where you can merge different GPX files into a single collection of measurement list and export the merge GPX data to KMZ or CSV file format. You can then edit the data within this collection by adding "Name" and "Description". Furthermore, you can also modify the colorized representation of the GPS positions for use in Google Maps.

The tool is divided into the grid section and setup section.

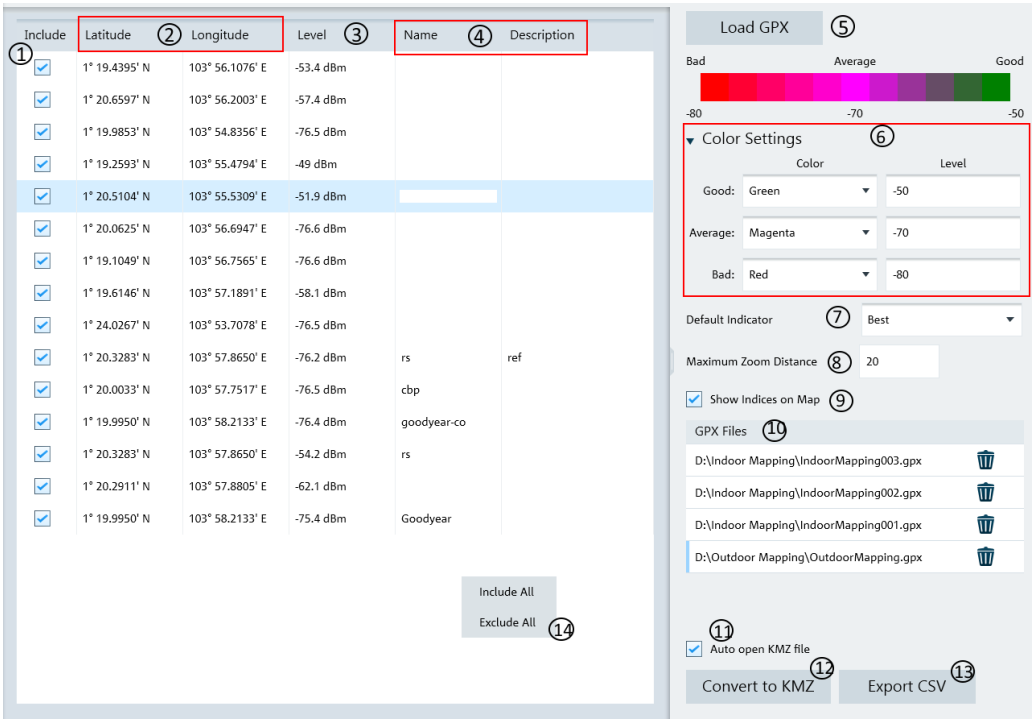


Figure 5-55: GPX conversion dialog box

1 = Checkbox to include or exclude the measurement indices in the CSV or KMZ file
2 = GPS position of the measurement ("Latitude" and "Longitude")
3 = Measured result of the measurement
4 = Editable field ("Name" and "Description")
5 = Load GPX file with valid GPS coordinates
6 = Color setting dialog
7 = Default indicator determines the preferred visible measurement when multiple measurements are grouped at a certain zoom level ("Best", "Average", "Worst")
8 = "Maximum Zoom Distance" determines the number of zoom layers stored in KMZ file. A higher zoom distance means fewer zoom layers and vice versa
9 = Checkbox to enable or disable the display of measurement indices on the map
10 = GPX files list table
11 = Checkbox to auto-open the KMZ file in Google Earth after creation
12 = Converts the GPX file list to KMZ file format
13 = Exports the GPX file list to CSV file format
14 = Context menu in GPX list

Color setting dialog

You can define the different color used to represent the level measured at the GPS position. Available colors for selection:

- "Magenta"
- "Light Blue"
- "Cyan"
- "Green"
- "Yellow"
- "Red"

Context menu

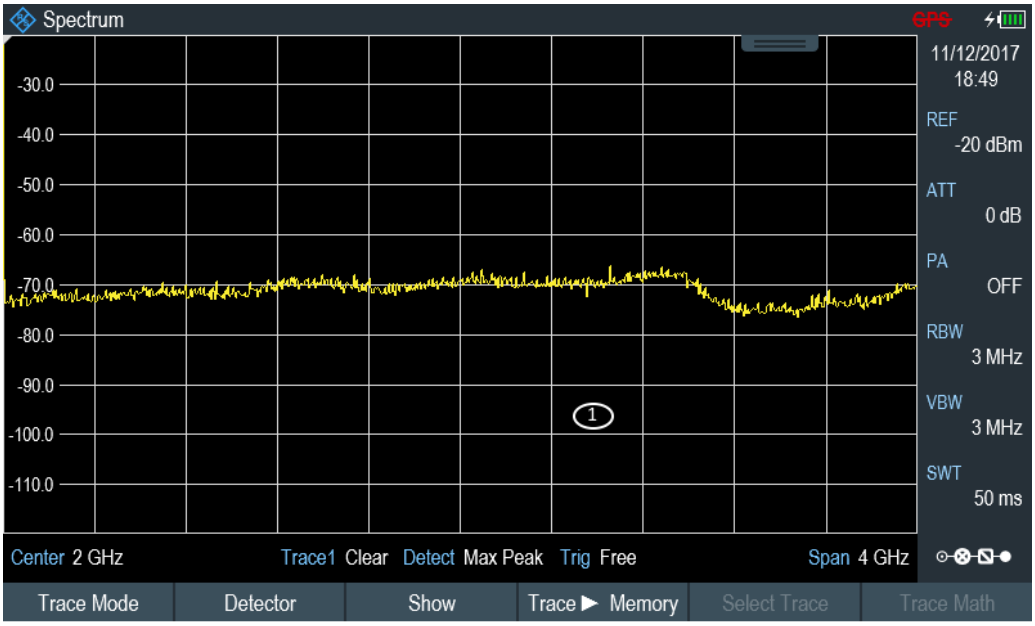
Right-click on the GPX list to access the following menus:

- "Include All": includes all the GPS coordinates in the GPX list.
- "Exclude All": excludes all the GPS coordinates in the GPX list.

5.4.4 Dataset Image

The "Dataset Image" menu is used to view screenshot embedded in the saved dataset with the optional display of measurement settings (if enabled).

This is a useful feature which allows the viewing of dataset image before activating dataset file from PC to the instrument. See Chapter 5.2.9, "Activate Dataset to Instrument", on page 55



Name	Sweep (T1)	Ref Offset	0.00 dB
Date	12/11/2017	Range	100.00 dB
Time	6:49:20 PM	RF Attenuation	Auto Low Distortion
GPS Latitude	- - -	RF Attenuator	0.00 dB
GPS Longitude	- - -	Pre-Amplifier	Off
Instrument	FPH - 101061	RF Input	50 Ω
Firmware Version	D1.50.3260	RBW	3.00 MHz
Country of Origin	Malaysia	VBW	3.00 MHz
Instrument Mode	Spectrum Analyzer	SWT	50.00 ms
Meas Mode	Spectrum	Trigger Mode	Free Run
Uplink	- - -	Trigger Level	- - -
Downlink	- - -	Trace Mode	Clear / Write
Channel	- - -	Trace Math	Off
Center Frequency	2.0000000000 GHz	Trace Detector	Max Peak
Frequency Offset	0.0 Hz	Primary Transducer	- - -
Span	4.00 GHz	Secondary Transducer	- - -
Ref Level	-20.00 dBm	Isotropic Antenna	Off

2

Figure 5-56: Dataset image with measurement settings

1 = Dataset image
2 = Measurement settings

Context menu

Right-click on the trace window to access the following menus:

- "Show measurement setup": if enabled, the instrument settings and trace data are displayed below the screenshot. See Figure 5-14.
- "Copy to clipboard": if enabled, the dataset image with instrument settings and trace data is copied to the clipboard.

5.4.5 EMF Measurement Result

The EMF analysis is not applicable for R&S ZNH product series. For R&S ZPH, only the .12 model with R&S ZPH K1 option is applicable.

The EMF analysis workspace allows you to analyze and export EMF measurement results stored in the EMF result files (EMRF). You can analyze the measurement set and the sub-measurements results. The result values in the measurement set are presented in the following:

- Result: result value per center frequency, cell ID or scrambling code presented in "Sub-Measurement" tab
- Subtotal: sum of all sub-measurement results presented in "Measurement" and "Sub-Measurement" tab
- Total: sum of all totals of all measurements presented in "Measurement" tab

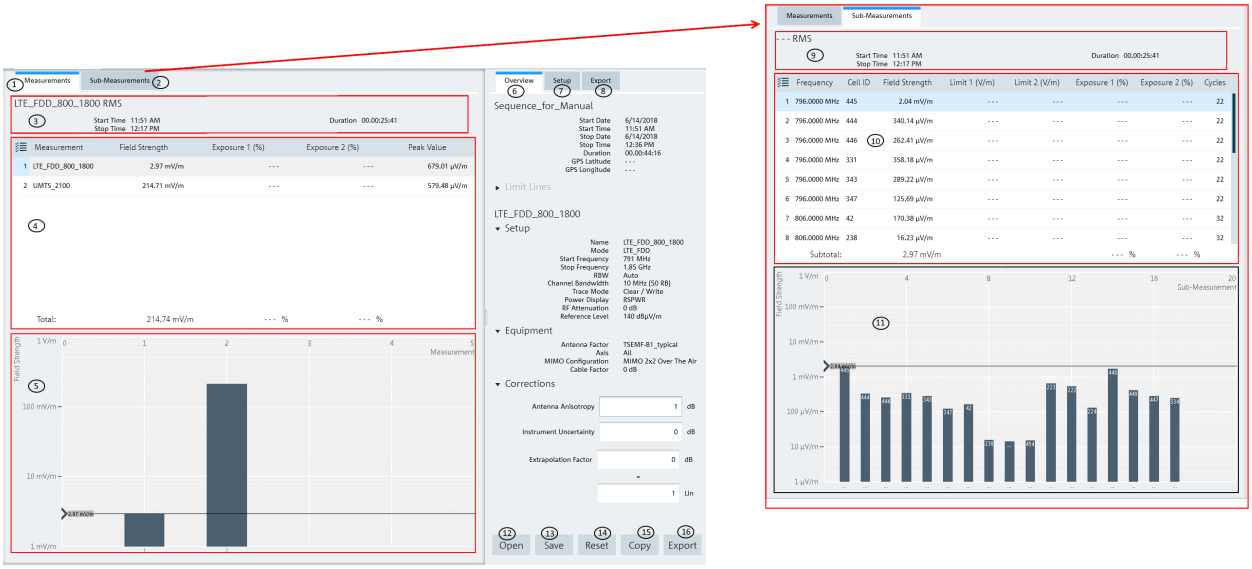


Figure 5-57: EMF Analysis measurement overview

1 = Measurement results including measurement totals. Results are presented in data grid and are visualized using a bar chart
2 = Sub-measurement results per center frequency and scrambling code or cell ID, including measurement subtotals. Results are presented in a data grid and are visualized using a bar chart.
3 = Measurement header
4 = Measurement result table
5 = Measurement result bar chart

6 = Overview tab containing global measurement set information and measurement-specific data
7 = Setup tab contains controls which affect all measurements in the measurement set
8 = Export tab containing result export options
9 = Sub-measurement header
10 = Sub-measurement result table
11 = Sub-measurement result bar chart
12 = Open button loads an existing EMRF file
13 = Save button saves post measurements corrections and limits in the EMRF file (*.emrf)
14 = Reset button reverts corrections and limits to how they were originally specified
15 = Copy button copies CSV data of the measurement to the operating system clipboard
16 = Export button exports the available data into a report

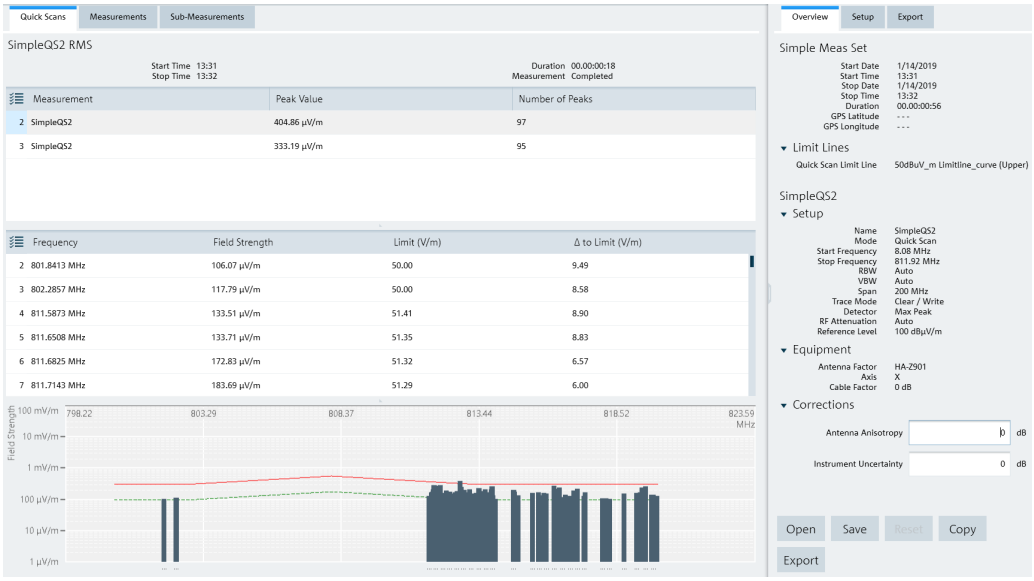


Figure 5-58: EMFQuick Scan analysis measurement overview

Table 5-8: Details of measurement and sub-measurement results tab

Parameters	Function
Measurement header	Displays the name of the selected measurement following by the result mode (Avg, Max, Min, RMS) in which the results are presented. Displays the measurement start time, stop time and measurement duration (stop time - start time).
Measurement result table	Overview of the available results of all measurements in the EMF measurement set. It displays the subtotal results of the sub-measurements ("Field Strength", "Exposure 1 (%)", "Exposure 2 (%)") and the total sum results of these subtotal values for all measurements. The "Peak Value" displays the maximum single value of the field strength measurement.
Measurement result bar chart	Visual display of the measurement result (field strength) of all the measurement set. A marker line is placed on the selected measurement identify the exact field strength on th bar chart.
Sub-measurement header	Displays the selected sub-measurement result mode (Avg, Max, Min, RMS) in which the results are presented. Displays the measurement start time, stop time and measurement duration (stop time - start time).

Parameters	Function
Sub-measurement result table	Detailed displays of the selected measurement. The sub-measurement contains a list of measurements (Field Strength, Limit 1 (V/m), Limit 2 (V/m), Exposure 1 (%), Exposure 2 (%)) on frequencies configured in the selected measurement including a subtotal sum of "Field Strength", "Exposure 1 (%)" and "Exposure 2 (%)"). Note: Limit 1 (V/m), Limit 2 (V/m) can be configured in the "Setup" tab. Depending on the selected meaurement mode, additional parameters of "Scrambling Code" or "Cell ID" is displayed. The "Cyces" shows the number of runs the sub-measurement was executed.
Sub measurement result bar chart	Visual display of the sub-measurement result (field strength). A marker line is placed on the selected measurement identify the exact field strength on th bar chart.
Quick Scan	Quick Scan measurement results. The Quick Scan tab is only available if a Quick Scan measurement is part of the EMRF.

Overview

The "Overview" tab contains information regarding the entire measurement, it includes the general information, limit lines results and measurement-specific details of the selected measurement.

For more information on the measurement-specific details, see Chapter 5.3.15.2, "EMF Measurement Set Editor", on page 89 and Chapter 5.3.15.1, "EMF Measurement Configuration Editor", on page 86.

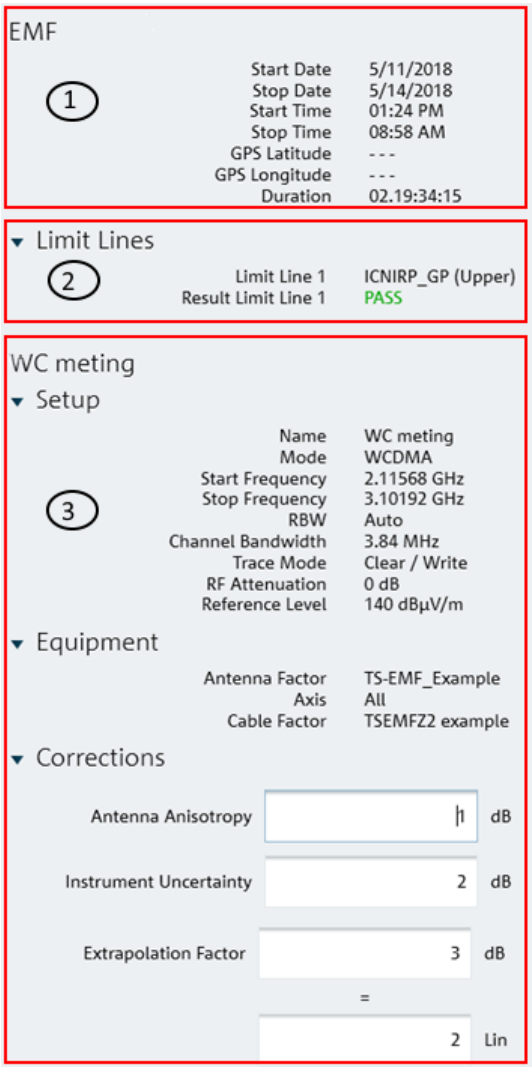


Figure 5-59: Overview tab dialog

1 = General information for the measurement set
2 = Displays limit line details and limit test result
3 = Displays of measurement-specific details reflected from settings in Chapter 5.3.15.2, "EMF Measurement Set Editor", on page 89 and Chapter 5.3.15.1, "EMF Measurement Configuration Editor", on page 86

Table 5-9: Details of overview tab

Parameters	Function
General information	Displays start date, start time, stop date, stop time and measurement duration of the selected measurement. Displays the GPS latitude and longitude reading.
Limit Lines	Displays the selected limit lines from the setup tab. It also displays the global pass / fail limit lines test result. If a single sub-measurement's field strength result exceeds the interpolated limit at that specific frequency, the limit result is considered failed. "Exposure Ratios" below 100%, indicates a passed limit result
Measurement-specific details	The measurement-specific details reflect the settings from Chapter 5.3.15.2, "EMF Measurement Set Editor", on page 89 and Chapter 5.3.15.1, "EMF Measurement Configuration Editor", on page 86. The parameters in "Setup" and "Equipment" sections are read-only parameters. The parameters in "Corrections" section can be overwritten and the settings affect the results in both "Measurements" and "Sub-Measurements" tab. Note: "Extrapolation Factor" - Only applicable for "3GPP WCDMA", "LTE-FDD" and "TD-LTE" measurement mode. Note: "Time Division Duplex" - Only applicable for "TD-LTE" measurement modes.

Setup tab

The "Setup" tab contains controls affect all measurements in the measurement set.

For details on the affected parameters, see Chapter 5.3.15.2, "EMF Measurement Set Editor", on page 89, Chapter 5.3.15.1, "EMF Measurement Configuration Editor", on page 86 and Overview.

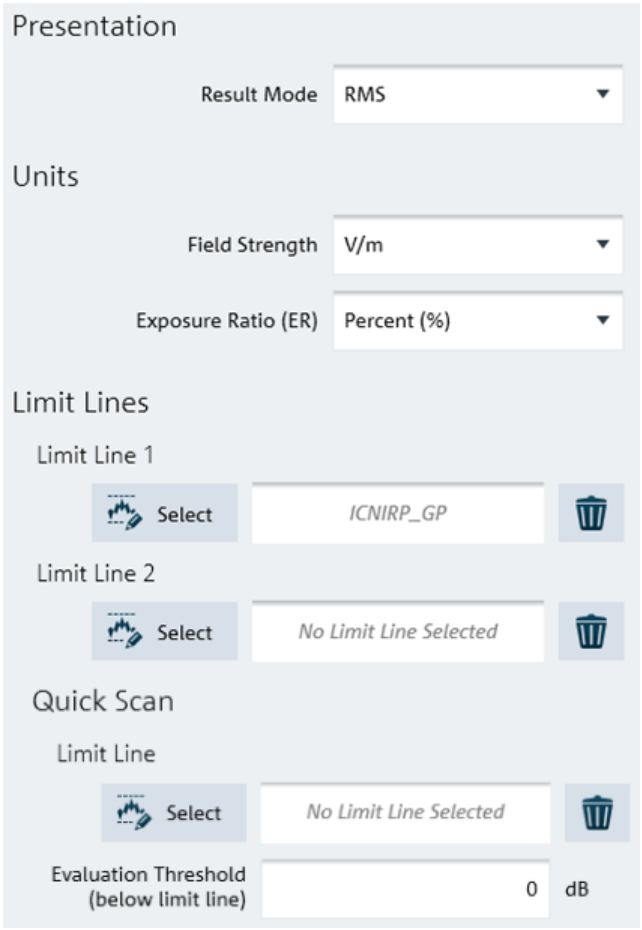


Figure 5-60: Setup tab dialog

Parameters	Function
Presentation	Sets the result mode in the measurement set. Available result modes are: "Average", "RMS", "Maximum" and "Minimum". By default, result mode is set to "RMS".
Units	Sets the field strength unit in the measurement set: • E-Field measurement sets - dBuV/m, V/m and W/m^2. Sets the "Exposure Ratio (ER)" unit: Available units are E^2 / L^2, %, ‰ and PPM (parts per million).

Parameters	Function
Limit Lines	Defines the limit lines using limit line files. The Y-Unit of the limit line file must be compatible with the selected field strength unit. If unit is not compatible, the file is rejected and an error message is displayed. Selects the to discard limit line selection.
Quick Scan	Defines the limit lines for the quick scan using limit line files. Also the "Evaluation Threshold" is available. This is a configurable margin below the selected Limit Line. It can be seen as virtual line. Measurement peaks greater than this virtual line are displayed during analysis (evaluation). Peaks below the line are not displayed in the graphical representation (neither peak list or bar chart).

Export tab

The "Export" tab contains controls which determine the content and format of reports for exporting. Selects the checkbox "Open after Generation" to open report file after exporting the report.

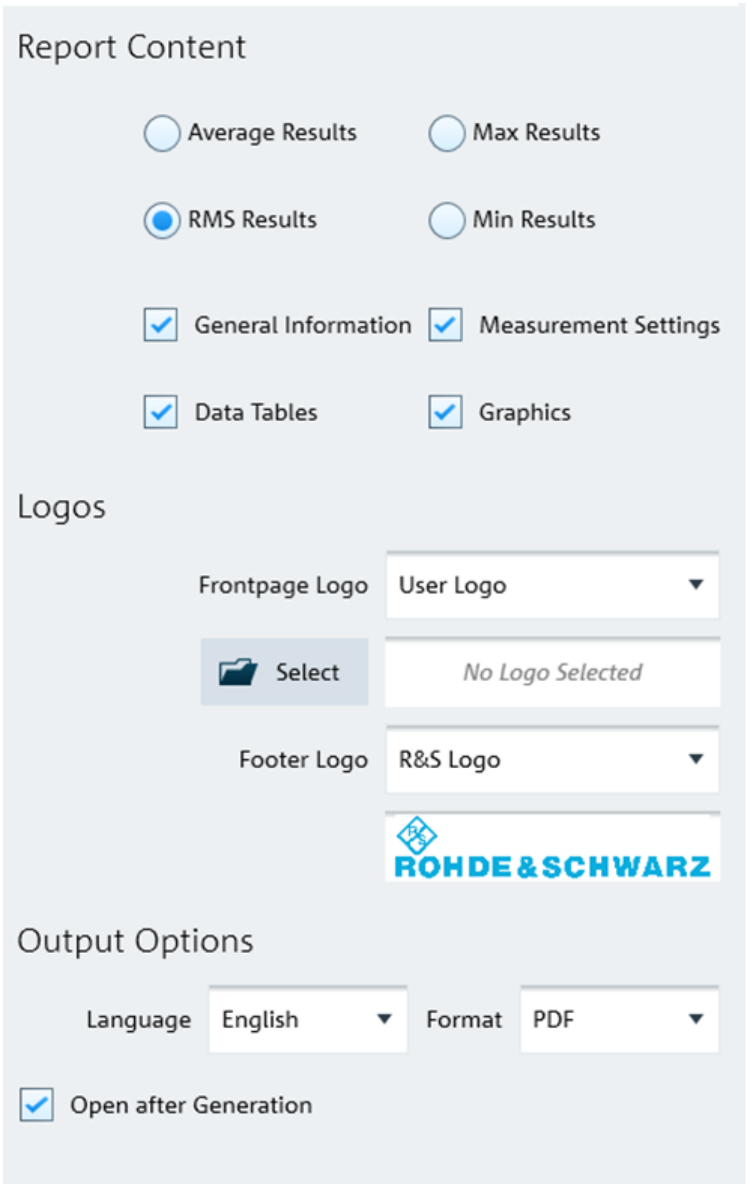


Figure 5-61: Export tab dialog

Table 5-10: Details of export tab

Parameters	Function
Report content	Selection of result mode to be presented in the report. Available selections are Average, RMS, Max and Mini results. Selection of the details to be presented in the report. Available selections are "General Information", "Data Tables" for sub-measurement results, "Measurement Settings " for measurement-specific details and "Graphics" presentation.
Logo	Selection of logo file used in the front page and footer of the report.

Context menu

Right-click in the measurement table to access the following items:

- "Copy Data": copies all data in the measurement list to the clipboard as comma-separated values (e.g. Excel).
- "Copy Graphics": copies the bar chart graph to the clipboard.

Vertical/horizontal scrollbar

- For details, see Chapter 3.1, "Context Menu", on page 17.

6 Using R&S InstrumentView with an Oscilloscope

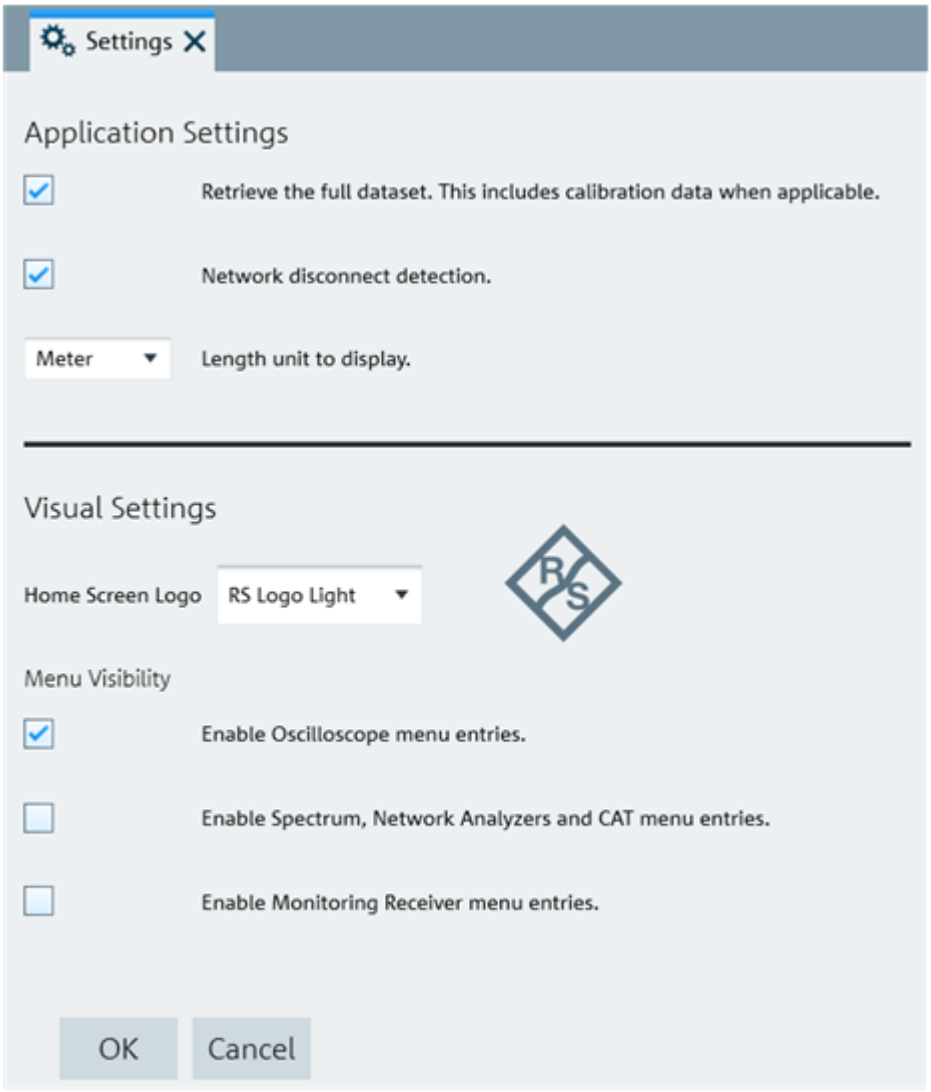
The oscilloscope settings are only applicable for the following R&S oscilloscopes:

- R&S RTA4000
- R&S RTB2000
- R&S RTC1000
- R&S RTH1000
- R&S RTM3000

In the scope workspace, you can analyze imported oscilloscopes waveforms (working in offline mode) or analyze waveforms on a connected oscilloscope (working in online mode).

Menu visibility

To show only the oscilloscope functionalities for the R&S InstrumentView, enable "Show Oscilloscope menu entries only" in the "Option > Settings " dialog. See also Chapter 4.5.3, "Application Settings", on page 31.



6.1 Working in Offline Mode

When working in an offline mode, you do not need a connection to the oscilloscope. You can import the following waveforms:

- Files in `*csv` format with waveform details from your oscilloscope.
- Files in `*scset` format, which is a custom combined setting file generated from R&S InstrumentView when saved from the scope workspace.

To open a saved waveform:

1. Select "Open".
2. In the dialog, select the waveform file you want to analyze.

The scope workspace dialog opens. You can now view the waveform information and display measurement results on the active waveform.

3. In the "Setup" tab, enable the measurements you want to perform. See "Measurement functions setup" on page 123.
4. If necessary, enable a cursor.
5. View the results of the measurements and information about the waveform in the "Measurement" tab.

6.2 Working in Online Mode

When working in online mode, you can connect to an oscilloscope and get its trace, show measurement results or make a screenshot.

To work in online mode:

1. Connect to an oscilloscope. See Chapter 2, "Connecting the Instrument", on page 9.
2. Select "Get Trace".

   The scope workspace dialog opens. You can now view the waveform information and display measurement results on the active waveform.
3. In the "Setup" tab, enable the measurements you want to perform. See "Measurement functions setup" on page 123.
4. If necessary, enable a cursor.
5. View the results of the measurements and information about the waveform in the "Measurement" tab.
6. Optionally, press "Add Trace" to add a new trace.
7. Optionally, you can make a screenshot of your measurement and the current settings of your connected oscilloscope. See Chapter 6.6, "Screenshot", on page 124

6.3 Scope Workspace Settings

The scope workspace allows you to analyze your oscilloscope waveforms. It looks the same for the offline and online mode.

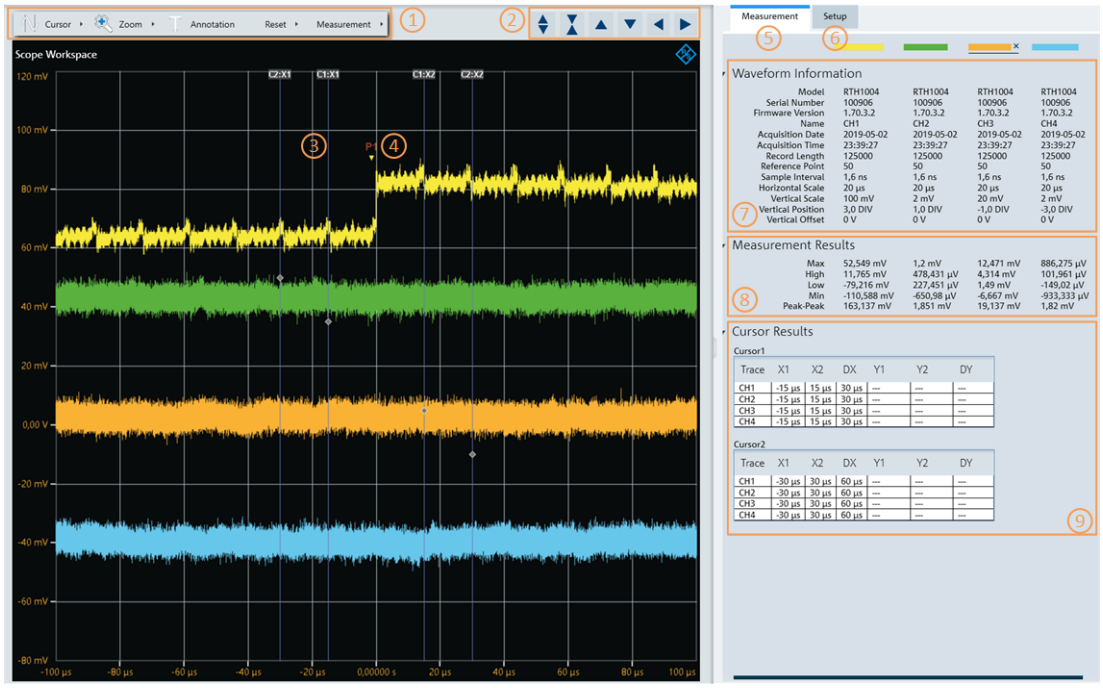


Figure 6-1: Scope workspace dialog

1 = Header for measurement selection
2 = Diagram settings
3 = Enabled cursor
4 = Annotation
5 = Measurement tab
6 = Setup tab
7 = Waveform data
8 = Measurement results data
9 = Cursor data

In the diagram, the waveform of each channel is displayed in a different color. You can change this color in the "Options > Color Settings" menu, see Chapter 4.5.1, "Color Settings", on page 27.

You can click a waveform to select it and movie it up and down on the diagram. You can also change the vertical scale by moving the mouse scroll wheel or by using the header bar buttons (see Diagram settings).

Each scope workspace measurement result consists of two tabs:

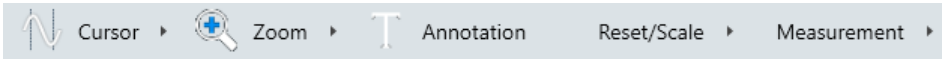
- "Measurement ":
  - "Waveform data": waveform measurement settings. See the user manual of the respective instrument for details of measurement settings.
  - "Measurement results data": displays the result for all enabled measurements.
  - "Cursor data": displays the trace of the enabled cursors.
- "Setup"
  - "Cursor settings": see "Cursor settings" on page 122.
  - "Graph settings": see "Graph settings" on page 123.

– "Measurement Functions Setup": see "Measurement functions setup" on page 123.

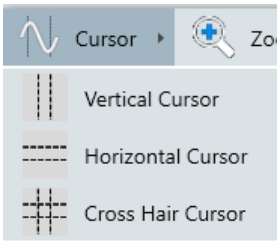
In the tab you can define the cursors, the graph settings and select the measurement functions.

6.3.1 Scope Workspace Header Settings

In the following sections, the different settings that you can access through the scope workspace header bar are described.



Cursor



You can add up to two horizontal, vertical or cross-hair cursors. For further available cursor settings, see "Cursor settings" on page 122.

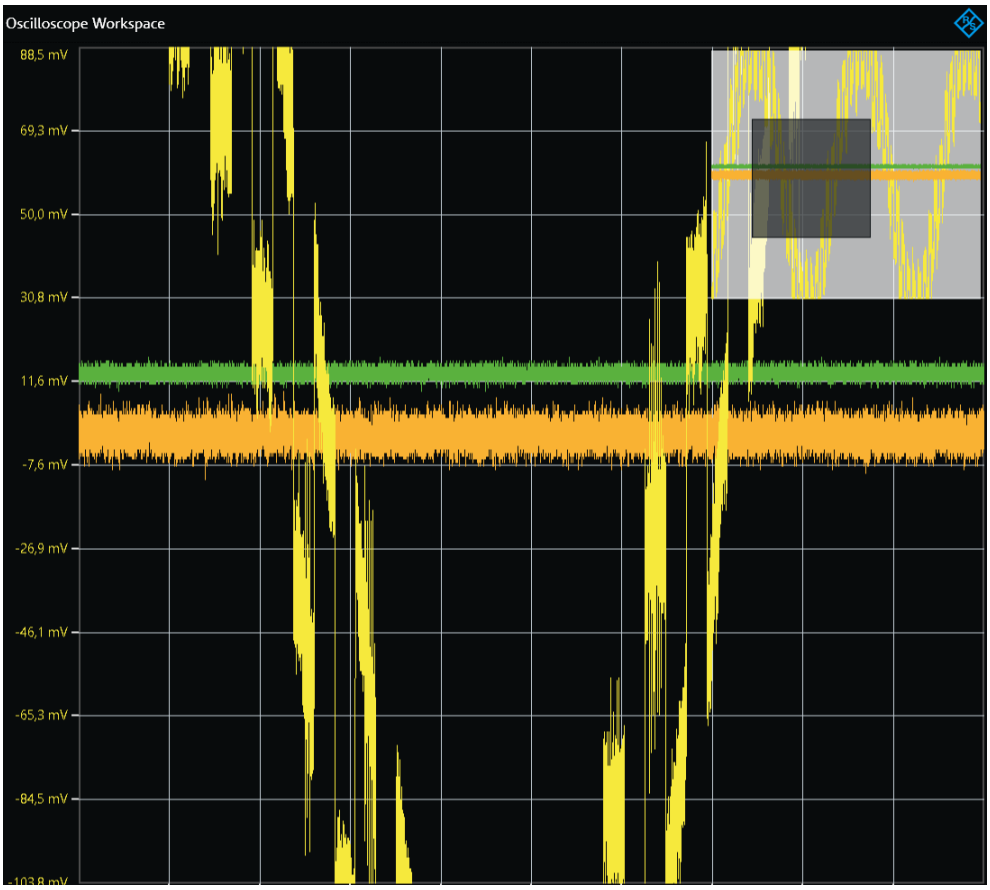
Zoom

You can zoom in on your measurement or reset the settings.

To zoom in on the diagram

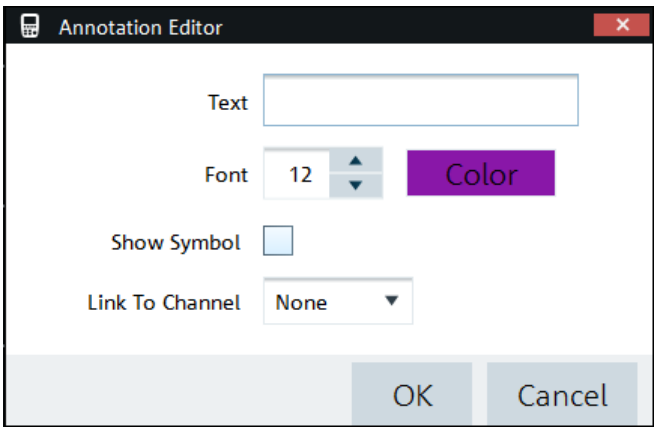
1. In the header bar, select "Zoom > Zoom In".

2. In the scope workspace, click and hold. A rectangular appears with which you can select the zoom area.



You can further move the rectangle shown in the zoom area to change the displayed area.

Annotation editor

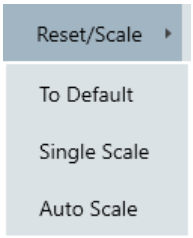


In the annotation editor dialog, you can create annotations and display them on the screen.

The following settings are available:

Settings	Description
Text	Sets the text for the annotation that is displayed
Font	Sets the font size
Color	Sets the color of the annotation text.
Show symbol	Shows a small triangle marker symbol below the text.
Link to channel	Links the annotations to a selected channel. If no channel is selected, you can move the mark free on the screen.

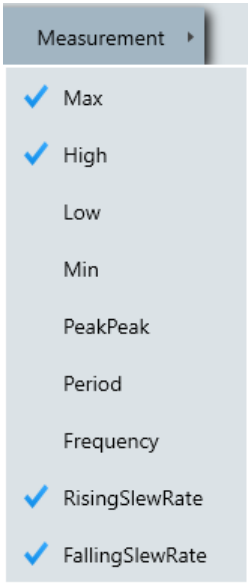
Reset /Scale



In the "Reset" menu, you can select a scale for the display. The following settings are available:

Settings	Description
"To Default"	Selects a default measurement scale. The waveforms of the different channels are shown on the screen with an offset.
"Single Scale"	Overlaps the waveforms of all channels on a single scale, without an offset.
"Auto Scale"	Zooms out on the measurements to display the most of the waveform.

Measurements



You can perform one of the following measurements on your waveform:

Measurement	Description
"Max"	Maximum value within the displayed waveform.
"High"	High level of the displayed waveform - the upper maximum of the sample distribution, or the mean value of the high level of a square wave without overshoot. The measurement requires at least one complete period of the signal.
"Low"	Low level of the displayed waveform - the lower maximum of the sample distribution, or the mean value of the low level of a square wave without overshoot. The measurement requires at least one complete period of the signal.
"Min"	Minimum value within the displayed waveform.
"Peak to Peak"	Difference of maximum and minimum values.
"Period"	Time of the first period, measured on the 50% level. The measurement requires at least one complete period of the signal.
"Frequency"	Frequency of the signal, reciprocal value of the measured first period.
"Rising Slew Rate"	Steepness of the first rising edge, measured between the signal reference levels set in the "Setup" tab.
"Falling Slew Rate"	Steepness of the first falling edge, measured between the signal reference levels set in the "Setup" tab.

The results of the measurements are displayed in the "Measurement" tab.

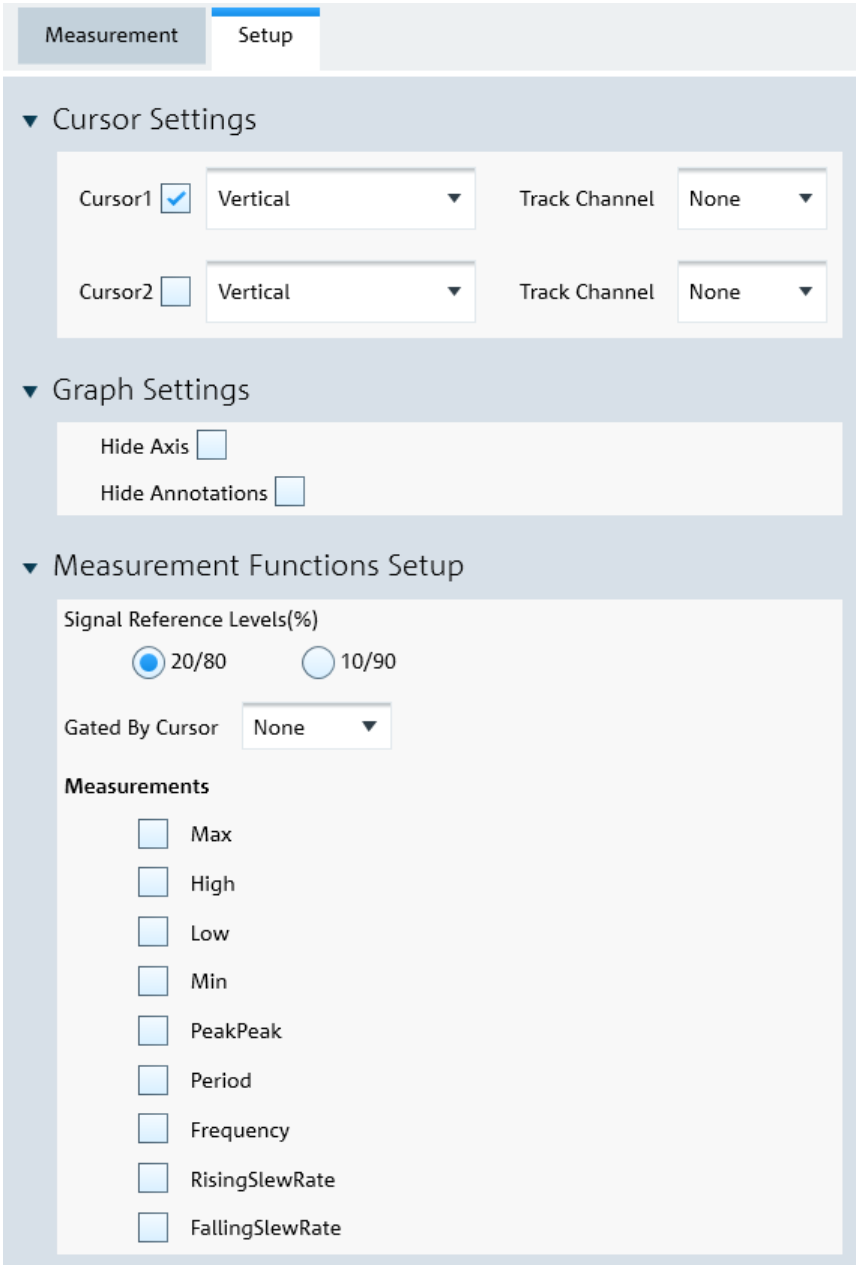
Diagram settings

You can change the scale and position of your diagram using the buttons in the header bar.

	Description
	Moves the vertical scale up/down
	Moves the vertical position up/down
	Moves the horizontal position to the left/right

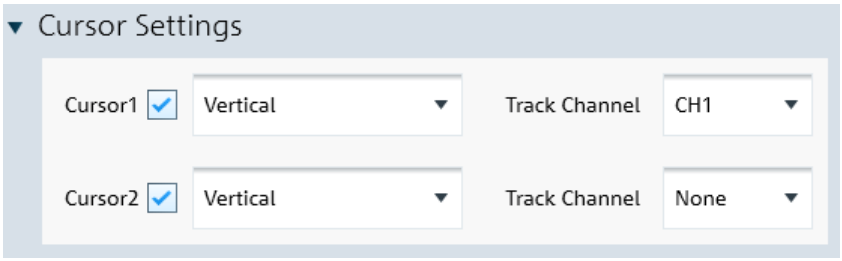
6.3.2 Setup Dialog

In the "Setup" dialog you can define the cursors, the graph settings and select the measurement functions.



Cursor settings

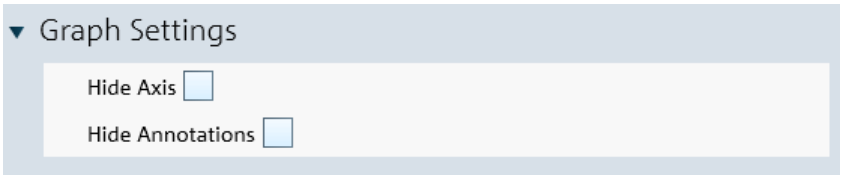
Access: "Setup" tab.



You can enable and define two separate cursors to analyze your data. Available are "Horizontal", "Vertical" and "CrossHair"(horizontal and vertical) settings. With "Track Channel", you can attach the cursor to a specific channel.

Graph settings

Access: "Setup" tab.

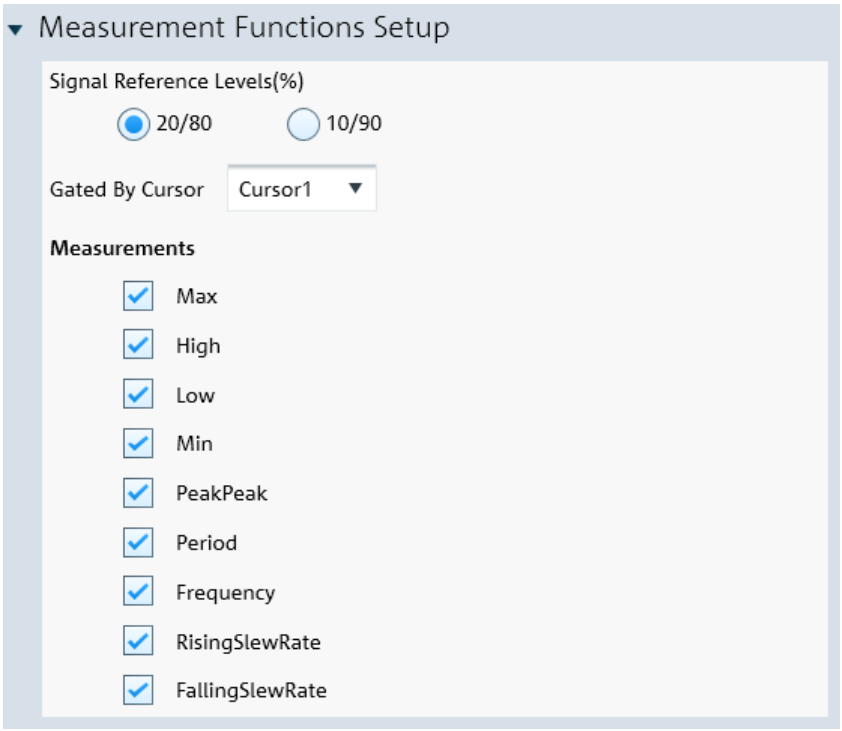


In the graph settings menu you can select, if the axis and the annotations are displayed in the scope workspace or not.

Measurement functions setup

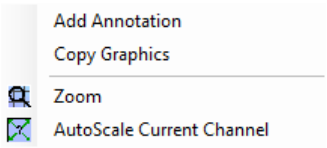
In the measurement function setup menu, you can select which measurements are enabled. For a list of the available measurements, see "Measurements" on page 120.

You can also select the "Signal Reference Levels (%)" and gate them to a cursor.



6.3.3 Context Menu

Right-click on the measurement diagram to access the context menu with the following settings:



- "Add Annotation": opens a dialog to add an annotation, see "Annotation editor" on page 118.
- "Edit Annotation": opens a dialog to edit the annotation.
- "Delete Annotation": deletes the selected annotation. Only available, if you right-click on an existing annotation.
- "Copy Graphics": copies the current graphic window into your clipboard.
- "Zoom": zooms in on the measurement window.
- "Autoscale Current Channel": changes the scale of the selected channel to the autoset settings.
- "Remove Cursor": removes an enabled cursor. Only available, if you right-click on the displayed cursor.

6.4 Get Trace

The get trace functionalities are available only when there is a connection to an oscilloscope.

The "Get Trace" menu allows you to capture the current trace measurement from the instrument and display it in the scope workspace. A new tab is formed in the "Tab header bar" for every new trace captured from the instrument.

For information about the available settings, see Chapter 6.3, "Scope Workspace Settings", on page 115.

6.5 Add Trace

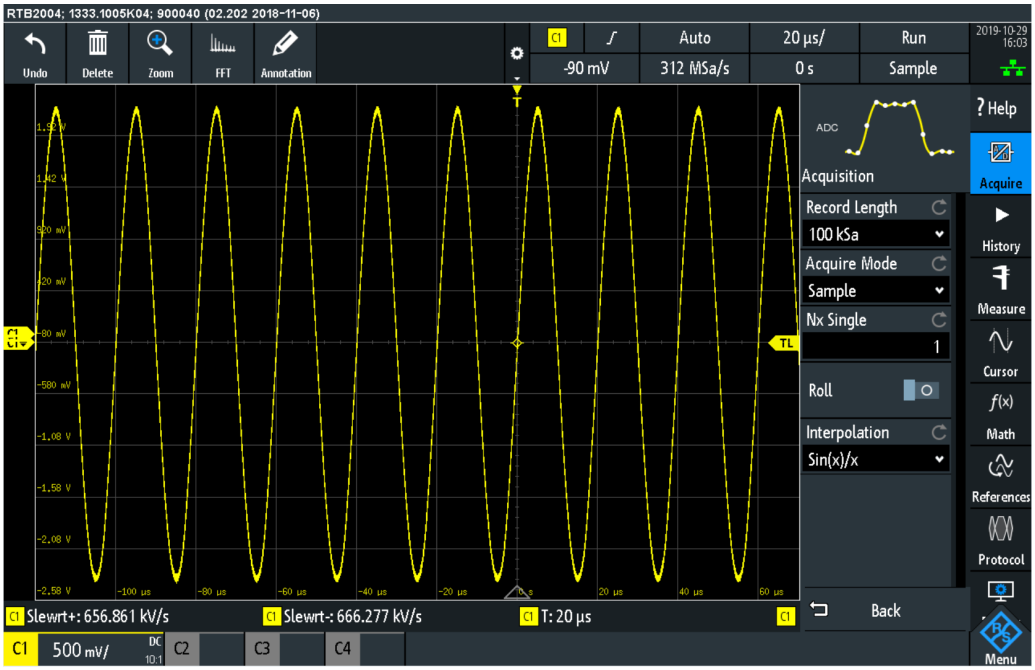
The add trace functionalities are available only when there is a connection to an oscilloscope.

The "Add Trace" menu allows you to add additional trace measurement captured from the instrument to an existing trace measurement displayed in the trace window. Each trace is represented with a different trace color.

6.6 Screenshot

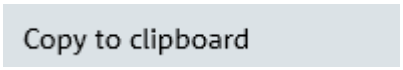
The screenshot functionalities are available only when there is a connection to an oscilloscope.

The "Screenshot" is used to capture the active instrument screen and display it in the trace window. This trace window is printed or saved for further editing in the application.



Context menu

Right-click on the instrument snapshot for the following menus:



- "Copy to clipboard": copies the screenshot to the clipboard.

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