# R&S<sup>®</sup>InstrumentView Software Manual





## ROHDE&SCHWARZ

Make ideas real



The software manual describes the following:

R&S<sup>®</sup>InstrumentView

The R&S<sup>®</sup>InstrumentView supports the following product series:

- R&S<sup>®</sup>FPH
- R&S<sup>®</sup>FPC
- R&S<sup>®</sup>FSC
- R&S<sup>®</sup>FSH4
- R&S<sup>®</sup>ZNH
- R&S<sup>®</sup>ZPH
- R&S<sup>®</sup>ZVH
- R&S<sup>®</sup>PR200
- R&S<sup>®</sup>EM200
- R&S<sup>®</sup>ESMW
- R&S<sup>®</sup>RTA4000
- R&S<sup>®</sup>RTB2000
- R&S<sup>®</sup>RTC1000
- R&S<sup>®</sup>RTH1000
- R&S<sup>®</sup>RTM3000

The contents of this manual correspond to software version 3.20 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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Throughout this manual, products from Rohde & Schwarz are indicated without the <sup>®</sup> symbol, e.g. R&S<sup>®</sup>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:

- Analyzers: R&S FPH, R&S FPC, R&S FSC, R&S FSH4, R&S ZPH, R&S ZVH and R&S ZNH.
- Receivers: R&S PR200, R&S EM200 and R&S ESMW.
- 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 I on the PC desktop.

#### About the software information

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

🖶 About Inst	About InstrumentView				
	For use with RTH1 RTC1000 series.	ntView , ZVH, FSC, FPH, ZPH, FP 000, RTA4000, RTM3000 0, EM200 and ESMW.			
Legal Info	ormation		License Terms		
Instrumer Copyright All Rights		Acknowledgment			
	oorts V11.1.9726 Copyright © GrapeCit	y, Inc. 1987-2018. All Ri	abts Reserved		
All Rights		.,, me. 1967-2010. All Ki	gno neserved		
		Copy to Clipboa	rd Close		



## 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	
Connected	One or more instruments are connected withe the PC	
Not Connected	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  $\rightleftharpoons$  , you can connect or disconnect the instrument from the connection manager list.

	ction Manag	er ( USI		Connections 3		×
	Name		Serial Nr.	IP-Address		5
*	Default			172.17.75.1	Ø	Ŵ
*	FPH			172.25.56.28	Ø	ŵ
-	ZPH	4	999991	172.25.56.170	ø	Ŵ
		Add D	6			
	+	Add D	evices	렂 Disconnect		8
						Done

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  $\mathscr{I}$  .

#### To add a new instrument (LAN connection manually)

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

The "Add Single Device" dialog opens.

Gonnection Manag	ger X	1
움금 LAN	VSB 😝 Connections	
Add Sing	gle Device	
Name	Default	
IP-Address / Hostname	172.17.75.1 Default	
	Supports port Port 5555	
Discover	r Network Devices	
Network Adapter	Ethernet 2 🔹 🔍	
Scan Port	Ethemet 2 Default	
	Ethemet 3	
	WI-FI	
	Local Area Connection* 1	
	Local Area Connection® 2	
	Ethemet 4 Dk Cancel	
	Bluetooth Network Connection	

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)

- In the "Connection Manager" dialog, select "Add Devices". The "Add Single Device" dialog opens. See Figure 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, R&S EM200 and R&S ESMW.

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

The "Edit Device Information" dialog opens.

Connection manager menu

🖶 Connection Mana	ger			×
공공 LAN ·	🛶 USB 😝 Connection	ns		
Edit Devi	ce Information			
Name	PR200			
IP-Address / Hostname	172.17.75.154		Defa	ult
[	Supports port  Port Port	5555		
Discover	Network Devices			
Network Adapter	Laptop Ethernet Port	•	Q	
Scan Port	5556		Defa	ult
		_		
		0	k	Cancel

- 2. Select "Supports port configuration" checkbox.
- 3. Set the "Port" configuration.
- Select "OK" to edit the port configuration for the device. Note: The default port for R&S PR200, R&S EM200 and R&S ESMW 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 R&S PR200, R&S EM200 and R&S ESMW.

However, you can establish a USB connection with analyzers and oscilloscopes. Some of them, such as R&S FPH, R&S FSH, R&S ZVH and R&S ZPH, use USB type mini-B. Others, such as R&S FPC or R&S RTB2000, use other types of USB connectors.

For details, refer to their user manuals.



Figure 2-3: Connecting R&S FPH to a laptop with a USB cable

- 1 = R&S FPH
- 2 = USB type mini-B
- 3 = USB Type A
- 4 = Laptop, for connecting to R&S InstrumentView

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.

You can verify if the driver is properly installed using "Device Manager" in the computer.



Figure 2-4: Verification of driver installation using Device Manager

There is only one USB instance in the connection manager list. See Figure 2-5.

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

Connection manager menu

🖶 Connection Manager			×
문 LAN	USB	Connections	
Name	Serial Nr.	IP-Address	
<table-cell-rows> FPH</table-cell-rows>	000000	172.16.10.10	
	😝 Disco	onnect	
			Done

Figure 2-5: USB connection

### 2.1.3 List of connections

(i)

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  $\Leftrightarrow$ , LAN  $\triangleq$ .

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

		-		
	Name	Serial Nr.	IP-Address	
물	ZPH	999991	172.25.56.170	
- <del>2</del> 3 - ←	FPC	101061	172.25.57.26	
•	FPH	000000	172.16.10.10	
		😝 Disco	nnect	
			Done	

Figure 2-6: List of connected devices

#### 2.1.4 Context menu

Right-click in the connection manager list to access the following menus: *Table 2-2: Context menu* 

Connect All	"Connect All": Connects all the listed instruments in the connection manager list.
Connect Selection	"Connect Selection": Connects only the selected instrument in the con- nection manager list.
Disconnect All	"Disconnect All": Disconnects all the listed instruments in the connec- tion manager list.
Disconnect Selection	"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 5-13.
- 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
🖵 Print	Prints and displays the print preview of the trace measurements. See Chapter 4.1, "Printing trace windows", on page 20.
Report Generator	Customizes the report generation for the trace measurement results. See Chapter 4.2, "Report generator", on page 22.
🛼 Open	Opens an existing trace measurement from the PC. See Chapter 4.4, "Open instrument", on page 27.
Save	Saves the trace measurements and dataset. See Chapter 4.3, "Save instrument", on page 25.

R&S InstrumentView menu	Function
-	Retrieves a trace measurement from the connected instrument.
🛱 Get Trace	See Chapter 5.1.1, "Get trace", on page 38.
	See Chapter 6, "Using R&S InstrumentView with an oscilloscope", on page 116.
Ht Add Trace	Adds a trace measurement from the connected instrument to the existing trace measurement.
	See Chapter 5.1.2, "Add trace", on page 43.
	See Chapter 6, "Using R&S InstrumentView with an oscilloscope", on page 116.
🖬 Instrument 🕨	Remote display and control of the instrument from PC. See Chapter 5.2.1, "Remote display", on page 45.
	Provides a snapshot of all connected devices. See Chapter 5.2.2, "Lab display", on page 48.
	Files transfer between the instrument and PC. See Chapter 5.2.3, "File transfer", on page 49.
	Synchronizing files between instrument and PC. See Chapter 5.2.4, "Synchronization", on page 52.
	Multiple transfers of trace measurements from the instrument to PC. See Chapter 5.2.5, "Multi-transfer", on page 54.
	Captures a screenshot from the instrument. See Chapter 5.2.6, "Screenshot", on page 56
	Date time synchronization. See Chapter 5.2.7, "Date time synchronization", on page 57.
	Saves current active instrument dataset. See Chapter 5.2.8, "Save active dataset", on page 58.
	Activates dataset from PC to instrument. See Chapter 5.2.9, "Activate dataset to instrument", on page 58.
	Edits the different datasets supported by the instrument family.
🖋 Preparation 🔸	See Chapter 5.3, "Working with instrument datasets", on page 61.
	Provides post data analysis for spectrogram and map analysis.
¬🎕 Analysis →	Provides GPX conversion to KMZ and CSV file format.
	See Chapter 5.3.14, "Map creator", on page 86.
	Provides color settings on the different elements in trace window.
🗙 Options 🕨	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 instru- ment.
	Displays the keyboard shortcuts key.
	Displays the application software information.
	See Chapter 4.5, "Options", on page 27.

#### 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 Zoom", "Reset Move": Resets to original zoom level or moved position.	
Reset Move	"Copy Graphics": Copies the selected trace from the trace window to the clipboard.	
Copy Graphics	"Copy Graphic with Label": Available with R&S ZPH and R&S ZNH product series, this context menu copies the trace window and the "Measurement Setup" details to the clipboard.	
Copy Data	"Copy Data": Copies the instrument setup and trace data from the trace window to the clipboard.	
Copy Active Sweep	"Copy Active Sweep": Copies the selected trace from the trace win- dow. When a trace is selected, the corresponding grid color on the Y-	
Paste Sweep	axis changed accordingly.	
	"Paste Sweep": Trace copied to the clipboard is pasted into the trace window.	
Delete Active Sweep		
	"Delete Active Sweep": Deletes the selected trace from the trace win- dow. When a trace is selected, the corresponding grid color on the Y-	
View Display Line	axis changed accordingly.	
<ul> <li>View Grid</li> </ul>	"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.

Context menu

#### Horizontal scrollbar:

Scroll Here
Left Edge
Right Edge
Page Left
Page Right
Scroll Left
Scroll Right

"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
Тор
Bottom
Page Up
Page Down
Scroll Up
Scroll Down

"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

#### 🛄 Print

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.

#### **General settings**

Printing trace windows



#### 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

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 measure- ment window.
Page width (Ctrl+2)	Previews the whole width size of the trace measure- ment 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.

#### Table 4-1: Print preview tools

#### 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

#### 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.

Report generator



Report Settings	Measurement Settings
Measureme	ent
Dataset	Dataset2019050.set
Comments	Ι
	Add 🗑 Remove 🛠 Up 😵 Down 🕜
Pictures	<ul><li>12</li><li>✓ Open after Generation</li></ul>
Previe	w 13 Generate 14

#### 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 25
- 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.

#### Save instrument

Date: 10/5/2018	Instrument: ZPH - 999991/002
User:	Site:
Comments:	

Measurement Results

DTF



Markers			
M1 Position	19.68 m	M 2 Value	-46.81 dB
M 1 Value	-45.20 dB	M 3 Position	27.68 m
M2 Position	50 m	M 3 Value	-47.56 dB
Limit Line Results			
Threshold (Upper)		-36.00 dB PASS	
Measurement Setup			
Date	10/5/2018	Start Distance	9.000 m
Time	10:32:10 AM	Stop Distance	50.000 m
Instrument	ZPH - 999991/002	Start Frequency	1.270390417 GHz
Meas Mode	DTF	Stop Frequency	1.731609583 GHz
Calibration State	Default Calibration	Cable Model	<none></none>
Trace 1 Setup			
Trace Mode	Clear / Write	Format	Magnitude
Rance	50 dB	RefLevel	-12 dB

#### 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 62.	*.pritrd, *.sectrd, *.isotrd
Cable models See Chapter 5.3.5, "Using cable models", on page 69.	*.cblmod
Calibration kit See Chapter 5.3.6, "Using calibration kits", on page 70.	*.ckit
Relative limit line and absolute limit line See Chapter 5.3.7, "Using limit lines", on page 73.	*.relli, *.absli
Channel table See Chapter 5.3.8, "Using channel table", on page 74.	*.chnta
Standards table See Chapter 5.3.9, "Using standards", on page 76.	*.semst, *.chpst, *.obwst, *.tdmst
Quick name table See Chapter 5.3.10, "Using quick name table", on page 79.	*.qnt
Ama limits See Chapter 5.3.11, "Using analog modulation analysis AM limits", on page 80 and Chap- ter 5.3.12, "Using analog modulation analysis FM limits", on page 81.	*.aamlim, *.fmlim
Datasets See Chapter 5.2.8, "Save active dataset", on page 58 and Chapter 5.2.9, "Activate dataset to instrument", on page 58.	*.set, *xset, *cset,
EMF See Chapter 5.3.15.2, "EMF measurement set edi- tor", on page 92 and Chapter 5.3.15.1, "EMF mea- surement configuration editor", on page 89. See also Chapter 5.4.5, "EMF measurement result", on page 107.	*.emcf, *.emrf, *.emdf
Screenshot See Chapter 5.2.6, "Screenshot", on page 56.	*.png, *.bmp, jpg, *.gif
Trace measurement with setup configuration details See Chapter 5.1, "Working with trace windows", on page 38.	*.set
Measurement wizard set See Chapter 5.3.13, "Wizard set editor", on page 82	*.mdf, xmdf

Description	File format
Map data See Chapter 5.3.14, "Map creator", on page 86.	*.idm, *prj, *.gpx
Spectrogram See Chapter 5.4.1, "Spectrogram", on page 97.	*.spm
Scope waveforms with setup configuration details See Chapter 6, "Using R&S InstrumentView with an oscilloscope", on page 116	*scset
CSV instrument file reconstruction supportsTrans- ducer , Cable Model, Channel Table, Limit Line, AMA AM Limit, AMA FM Limit and Standard	*.csv
Touchstone export file formats. See Chapter 4.6, "Command-Line Tool", on page 33	*.slp, *.s2p
R&S PR200, R&S EM200 and R&S ESMW 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 5-2.

For supported dataset details, see Chapter 5.3, "Working with instrument datasets", on page 61.

For use with the oscilloscope waveforms, see Chapter 6, "Using R&S InstrumentView with an oscilloscope", on page 116.

#### Context menu

For details, see Chapter 3.1, "Context menu", on page 18.

## 4.5 **Options**

🛱 Options

🔪 Open

The "Options" menu allows you to configure the application preference such as trace elements color, directory path and general application settings. The "Options" menu also displays the available keyboard shortcuts and software information.

•	Color settings	28
	Directory settings	
	General application settings	
	Keyboard shortcuts	
	About	

### 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

Options



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.

Maps       C:\Use       This PC       Calibration Kits       11/17/2021 9:14 AM       File folde         GPX Files       C:\Use       3 D Objects       Calibration Standards       11/17/2021 9:14 AM       File folde         EMF Measurements and Definitions       C:\Use       Downloads       Datasets       11/17/2021 9:14 AM       File folde         EMF Results       C:\Use       Ownloads       Datasets       11/17/2021 9:14 AM       File folde         EMF Results       C:\Use       Music       Dig Mod Limits       11/17/2021 9:14 AM       File folde         EMF Results       C:\Use       My Network Doc       EMF Results       11/17/2021 9:14 AM       File folde         EMF Results       C:\Use       My Network Doc       EMF Results       11/17/2021 9:14 AM       File folde         EMF Sets       11/17/2021 9:14 AM       File folde       EMF Sets       11/17/2021 9:14 AM       File folde	efault Local Directories			
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	Default OK Cancel	Limit Files 11/1//2021 9:14	AM File folder	
(2) (3) (4) Folder: InstrumentView				
	$\bigcirc$ $\bigcirc$ $\bigcirc$	Folder: InstrumentView		

#### 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 General application settings

The "Settings" dialog allows you to configure general application settings of the R&S InstrumentView.

Application Settings		
Retrieve the full dataset. This includes calibration data when applicable.		
Network disconnect detection.		
Meter <ul> <li>Length unit to display.</li> </ul>		
Axis scaling		
X-Axis precision: 4 digits (Default: 4)		
Y-Axis precision:		
Visual Settings		
Home Screen Logo RS Logo Light 🔻		
Menu Visibility		
Enable Oscilloscope menu entries.		
Enable Spectrum, Network Analyzers and CAT menu entries.		
Enable Monitoring Receiver menu entries.		
Device Settings		
Monitoring Receiver		
Use TCP for external Remote Display (instead of UDP).		
OK Cancel		

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.

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

You can select the length unit shown in the calibration data (if applicable), by default it is configured as "Meter".

The "Axis scaling" for "X-Axis" / "Y-Axis" precision is currently set at 4 digits by default, you can adjust the axis scaling accordingly to your requirement.

In the "Visual Settings" section, you can select the available home screen logo and display the respective menu visibility based on the selection of oscilloscope, spectrum and network analyzers and/or monitoring receivers used in the R&S InstrumentView.

With "Device Settings" section, you can enable or disable the use of TCP for external remote display. See Chapter 5.2.1, "Remote display", on page 45.

#### 4.5.4 Keyboard shortcuts

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

🖶 Available Keyboard Shortcuts			×
Open Save Print Copy Graphics View Disp. Line Reset Zoom Screeshot Get Trace	CTRL + O CTRL + S CTRL + P CTRL + G CTRL + L CTRL + R CTRL + I CTRL + W		
			Close
Figure 4-8: Shortc	Figure 4-8: Shortcut keyboard		

#### 4.5.5 About

See "About the software information" on page 7.

### 4.6 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: 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: Syntax for the dataset -> .CSV converter

InstrumentView.exe -ConvertToCSV "input.set" "output.csv"

ConvertToCSV can be used to export CSV to and from device files such as transducers, limit lines, standards etc.

#### Example: Syntax for transducer -> .CSV converter

InstrumentView.exe -ConvertToCSV PTrans\_434.pritrd CSV\PTrans.CSV

#### Example: Syntax for limit line -> .CSV converter

InstrumentView.exe -ConvertToCSV TestDeviceFilesCommandline\GSM\_Lower.rellim CSV\RelLim.CSV

#### Example: Syntax for standards -> .CSV converter

InstrumentView.exe -ConvertToCSV "TestDeviceFilesCommandline\GSM EDGE.tdmstd" CSV\TDM.CSV

#### Table 4-4 shows the list of commands that can be used to convert from CSV to instrument file formats.

Table 4-4: CSV to device files

File type	Command parameter	Syntax example
Transducer	-ConvertToTransducer	InstrumentView.exe -ConvertToTransducer CSV\PTrans.CSV DF\PTrans
Cable Models	-ConvertToCablemodel	InstrumentView.exe -ConvertToCablemodel CSV\cm.CSV DF\cm
Limit Lines	-ConvertToLimitLine	InstrumentView.exe -ConvertToLimitLine CSV\abslim.CSV DF\abslim
Channel Tables	-ConvertToChanneltable	InstrumentView.exe -ConvertToChanneltable CSV\GSM.CSV DF\GSM
Standards	-ConvertToStandards	InstrumentView.exe -ConvertToStandards CSV\sem.CSV DF\sem

File type	Command parameter	Syntax example
AM Limits	-ConvertToAmlimits	InstrumentView.exe -ConvertToAmlimits CSV\TDM.CSV DF\TDM
FM Limits	-ConvertToFmlimits	InstrumentView.exe -ConvertToFmlimits CSV\FM.CSV DF\FM

ConvertToS1P

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

#### Example: 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: Syntax for export to S2P

InstrumentView.exe -ConvertToS2p "input.set" "output.s2p"

InstrumentView.exe -ConvertToS2P "inputDirectory" "outputDirectory"

An example of the file conversion result in the command prompt is shown in Figure 4-9.

The results are also recorded in the log files.



Figure 4-9: Conversion result

## 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, "General application settings", on page 31.
<ul> <li>Retrieve the full dataset. This includes calibration data when applicable.</li> <li>Network disconnect detection.</li> <li>Meter</li> <li>Length unit to display.</li> <li>Axis scaling</li> </ul>
Meter <ul> <li>Length unit to display.</li> </ul>
Axis scaling
AND Sealing
X-Axis precision:
Y-Axis precision:
Visual Settings
Home Screen Logo RS Logo Light 🔻
Menu Visibility
Enable Oscilloscope menu entries.
Enable Spectrum, Network Analyzers and CAT menu entries.
Enable Monitoring Receiver menu entries.
Device Settings
Monitoring Receiver
Use TCP for external Remote Display (instead of UDP).
OK Cancel

Figure 5-1: Option settings dialog

# 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 18.

- Add trace.....43

## 5.1.1 Get trace

### 🖳 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 5-2.

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 5-2.
  - "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 5-2.

Working with trace windows





#### Figure 5-2: 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

Working with trace windows

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

### Trace setup

<ul> <li>Trace Setup</li> </ul>					
Trace 1 Trace	e 2 Trace 3	Trace 4			
Trace Settings			Limit Line Settings		
Show Trace			Test Limit	Select	
Trace Unit	ce Unit dBm 🗸 Show Limit Line 1				
Trace Range 100 dB (10.0 dB/Div)  Upper Limit Lower Limit					
Show Memory	Trace		No Limit Line Selected	Select	
Trace Math	Memory - Trace	•	Show Limit Line 2		
Math Position (%)		0	Upper Limit		

Figure 5-3: 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 5-3. 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 5-2.
 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 30. 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

<ul> <li>Marker Se</li> </ul>	tup													
Marker 1 (M1)	Oft	Mar	ter Delt	a Mart	e <sup>i</sup>	alue (HIZ)	0	10Pe2	TO Ne	to Mil	himun Sear	th Limit	n Limit	a limit?
	$\cup$	•		-			-	~	/ >>	•		$\cup$		
Marker 2 (D2)	$\bigcirc$	$\bigcirc$	0		116	160563.38	30282	×	<b>*</b> "	¥	$\bigcirc$	$\bigcirc$	$\bigcirc$	
Marker 3 (M3)	$\bigcirc$	0	$\bigcirc$		820	07042.253	35211	$\mathbf{X}$	<b>*</b> .»	¥	$\bigcirc$	$\bigcirc$	$\bigcirc$	
Marker 4	$\bigcirc$	$\bigcirc$	$\bigcirc$			200000	00000	$\overline{\mathbf{X}}$		$\searrow$	۲			
Marker 5	$\bigcirc$	$\bigcirc$	$\bigcirc$			200000	00000	X		$\searrow$				
Marker 6	$\bigcirc$	$\bigcirc$	$\bigcirc$			200000	00000	×	∕∽»	$\mathbf{Y}$	۲			
All Markers	Q,	٩	0,					~			Q,	Q	Q,	
Start Search 1			70	* •	MHz	Sto	op Searc	h 1		90	* *	ИНz		
Start Search 2			0	* *	MHz	Sto	op Searc	h 2		4000	* *	ИНz		
N dB (M1)			3	*	dB									

Figure 5-4: 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 5-4.

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

Working with trace windows

• 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.

▼ Cable Setup				
DTF Setting				
✓ DTF Threshold	0	🗘 dB		
Cable Model Settir	ngs			
User Settings:			Current Model	No Cable Model Selected
Cable Velocity Factor			2	Select From File
Cable Frequency		Hz	Ap	oply User Settings
Cable Loss		dB/m	Clea	r File/User Settings

Figure 5-5: 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".

Working with trace windows



Figure 5-6: 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.

🛃 Add Trace

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 5-7.

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

See details of the "Setup" tab in index 3 of Figure 5-2.



Figure 5-7: Add a trace to an existing trace measurement

# 5.2 Working with instrument

#### 🖶 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	. 45
	Lab display	
	File transfer	
	Synchronization	
	Multi-transfer	
	Screenshot	
	Date time synchronization	
	Save active dataset	

•	Activate dataset to instrument	.58
•	Firmware update	. 59
•	Antenna firmware update	. 60

## 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 5-8.

If you are using an oscilloscope, you can remotely display the instrument only if the device is connected through LAN. See Chapter 2.1.1, "LAN connection", on page 10.

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



Figure 5-8: 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.



Figure 5-9: Connection error dialog

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



Figure 5-10: USB device not ready

USB device ready



Figure 5-11: 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.
 R&S InstrumentView RNDIS Driver (64-Bit)

Figure 5-12: R&S InstrumentView RNDIS driver (64-Bit)

Windows Driver Package - Rohde & Schwarz ESNA (05/01/2017 7.0.0.0)

Figure 5-13: Windows driver package - Rohde & Schwarz ESNA

Under

Control Panel\System and Security\System -> Device Manager **settings**:

Rohde & Schwarz

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 Instrument-View", 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 5-14: Snapshot of all connected instruments

### **Context menu**

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

Table 5-1: Context menu of the instrument snapshot

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 clip- board of R&S InstrumentView to the selected device.				
Development and the last	Remote display				
Remote display	"Recall all from this device": Retrieves the measurement setup of the				
Recall all from this device	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 con- nected 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 5-15.

If you are using an oscilloscope, you can transfer files only if the device is connected through LAN. See Chapter 2.1.1, "LAN connection", on page 10.



#### Figure 5-15: 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 5-2: File transfer tools

Icon	Function
"Delete"	Deletes the selected file.
W	
"Lock"	Locks or unlocks the selected file.
	Alternative, you can select the $\blacksquare$ ${}^{\rm e^{\circ}}$ 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.
5	
"Search"	Performs a file search function in the selected folder directory.
Q	unectory.
"View"	Views the details of the trace measurement file.
•	For viewing, see Chapter 4.3, "Save instrument", on page 25 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 5-18.

### 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 30.

### 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 5-16

Limit Lines			×		
The destination folder a What would you like to	· · · ·	ins a file named 'GSM_	Lower.rellim'.		
Existing File: 191 Last Modifie 7/15/2015 8		New File: 191 Last Modified 9/9/2015 10:			
Overwrite older files					
Do this for all conf	licts				
	Skip	Overwrite	Cancel		

Figure 5-16: 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.

		5	-			(5)	
	\Public\Datasets	$\langle \rangle_{\odot}$	C:\Users\Public\Docume	nts\Rohde-Schwarz\Instrume	nt View\Datasets	$\hat{\mathbf{P}}$	
Ð	\Public\Screen Shots	$\langle \rangle$	C:\Users\Public\Docume	nts\Rohde-Schwarz\Instrume	nt View\Screen Shots		
	\Public\Wizard Results	<>	C:\Users\Public\Docume	nts\Rohde-Schwarz\Instrume	nt View\Wizard Results		
	\Public\Cable Models	<>	C:\Users\Public\Docume	nts\Rohde-Schwarz\Instrume	nt View\Cable Models		
	\Public\Calibration Kits	<>	C:\Users\Public\Docume	nts\Rohde-Schwarz\Instrume	nt View\Calibration Kits		
	\Public\Channel Tables	<>	C:\Users\Public\Docume	nts\Rohde-Schwarz\Instrume	nt View\Channel Tables		
	\Public\Limit Lines	<>	C:\Users\Public\Docume	nts\Rohde-Schwarz\Instrume	nt View\Limit Lines		
	\Public\Limit Files	<>	C:\Users\Public\Documents\Rohde-Schwarz\Instrument View\Limit Files				
	\Public\Quick Naming Table	<>		nts\Rohde-Schwarz\Instrume	nt View\Quick Naming Table	es	
	\Public\Standards	<>		nts\Rohde-Schwarz\Instrume	nt View\Standards		
	\Public\Transducers	1		nts\Rohda_Schwarz\Instruma	nt View\Transducers		
á		8	Overwrite Older Never Overwrite	š≣ Default	🕂 Add	🗑 Delete	
To R	emote Synchronize	To Local	Always Ask	10	🖆 Remote	🖆 Local	

Figure 5-17: Synchronization menu

- 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 5-3: File manager icons

File manager icon	Function
<b>ÿ</b> ≣ Default	Presets the file directories window to default config- uration.
🕂 Add	Adds a new entry to add new sync paths.
🐨 Delete	Removes the selected sync paths.
🖆 Remote	Accesses instrument file directories.
🖆 Local	Accesses to local home directory.

## Context menu

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

Table 5-4: Context menu of the instrument snapshot

Include All	"Include All", "Exclude All": includes or excludes all the directories for file transfer.
Exclude All	"Move Up", "Move Down": navigates the directories list.
Move Up	
Move Down	

Vertical scrollbar/ Horizontal scrollbar

• For details, see Chapter 3.1, "Context menu", on page 18.

## 5.2.5 Multi-transfer

The "Multi Transfer" menu allows you to capture and save trace measurements from the instrument. See Figure 5-18.



Figure 5-18: Multi-transfer dialog

- 1 = "Multi Transfer" tab displays the "Multi Transfer" dialog for settings
- 2 = Measurement results tab (see index 11 in Figure 5-18)
- 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 56 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 5-18.
- The individual trace measurement result in the "Tab header bar". See index 2 in Figure 5-18.
- 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 5-18.

See also Chapter 5.1.1, "Get trace", on page 38.

#### 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 5-18 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 5-19.

Multi Transfer			×
Do you want to save t	hese items?		
	Yes	No	Cancel

Figure 5-19: Unsaved data user prompt dialog box

The "Start" icon e measurement updates from the instrument.

Depending on the setting in the "Results" section (see index 5 in Figure 5-18), the trace measurement updates can be displayed in the overview area (see index 8 in Figure 5-18) or individually displayed as a new tab in the tab header bar (see index 2 in Figure 5-18).

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 5-20.

Delete		×
Are you sure to stop recording?		
···· ) - · ···· · · · · · · · · · · · ·		
	Yes	No

Figure 5-20: Recording 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 5-21.

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



Figure 5-21: Screenshot of an active instrument screen

### **Context menu**

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

Table 5-5: Context menu of the instrument snapshot

Show measurement setup": If enabled, the instrument settings and the trace data are displayed below the screenshot. See Figure 5-21.

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 5-22.



Figure 5-22: 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.

Active to Dataset	×
Dataset succesfully saved.	
	OK
	OK

Figure 5-23: Dataset saved dialog

## 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 106.

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.



Figure 5-24: Dataset activated dialog

## 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.

н (3)	E Open	×
ected Instruments	← → × ↑ - « Rohde-Schwarz > InstrumentView	ィーマーマン C Search InstrumentView
	Organize 👻 New folder	100
PH 101061 172.25.57.150 V1.40	OneDrive - Persor Name	Date modified Type
PH 101251 172.25.57.172 V1.20	Dia Mad Limite	10/25/2021 3:57 PM File folder
	EMF Results	10/25/2021 3:57 PM File folder
	3D Objects EMF Sets	10/25/2021 3:57 PM File folder
(4)	Desktop GPX Files	5 10/25/2021 3:57 PM File folder
0	Documents	10/25/2021 3:57 PM File folder
	Downloads	10/25/2021 3:57 PM File folder
	h Music	10/25/2021 3:57 PM File folder
	My Network Doc	10/25/2021 3:57 PM File folder
	Pictures     Memory Lists	10/25/2021 3:57 PM File folder
	Quick Naming Tables	10/25/2021 3:57 PM File folder
	Recordings	10/25/2021 3:57 PM File folder 🗸
ote: USB or SDCard storage is needed in each device fo	r 🖆 (C:) OS 🗸 <	>
rmware Folder	File name:	✓ Binary files (*.bin) ✓

#### Figure 5-25: 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 5-26.

- 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".

lnstrumentView		_ 🗆 🗙
Connected	🖧 Firmware Update 🗙	
🗳 Print	Settings Status Antenna Firmware Update	
Report Generator	Devices supporting antenna firmware update: PR200 and EM200. The antenna has to be connected to one of these devices.	
🔍 Open	me amenina has to be connected to one or mese devices. Note: Any communication with the antenna will be disrupted by the firmware version check or the firmware update. To reconnect the antenna with the device, please reboot the device.	
Save	Selected instrument	
🖳 Get Trace	PR200	
Add Trace		
🖶 Instrument 🔸	Current antenna information	
🔗 Preparation 🔸	HE400: Version 05.01 Retrieve	
ିନ୍ଦ୍ୱ Analysis 🔸	Firmware Location	
🛱 Options 🕨		Select
	Note: There should be a '.cfg' file present next to the '.hex' firmware update file, with the same name as the '.hex' file.	

Figure 5-26: Before antenna firmware update

6. The application starts the antenna firmware update.



Figure 5-27: Antenna firmware update in progress

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



Figure 5-28: Antenna firmware update completed

# 5.3 Working with instrument datasets

🔗 Preparation

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	62
	Using memory list	
	Using suppress list	
	Using correction set	

•	Using cable models	69
	Using calibration kits	
	Using limit lines	
	Using channel table	
	Using standards	
	Using quick name table	
•	Using analog modulation analysis AM limits	80
•	Using analog modulation analysis FM limits	81
•	Wizard set editor	82
•	Map creator	86
•	EMF editor tool	88

## 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 63 and "Transducers table editor for monitoring receiver" on page 63.

### 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 5-29.



- 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 5-30.

See also "Transducers	table editor f	or monitoring	receiver" or	n page 63.
-----------------------	----------------	---------------	--------------	------------



#### Figure 5-30: 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 5-31.

See also "Transducers table editor for spectrum analyzer" on page 63.



#### Figure 5-31: 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, R&S EM200 and R&S ESMW. With the "Memory List" editor, you can prepare and configure the "Memory List" according to your requirement. See Figure 5-32.

P,	Memory	/ List 🗙												
F	ilename	Memory list u	noptimized	1	Squelch Level I	Jnit dBµV	2	•						
	-													
3	š≣ Inc 1	lude Frequ	ency (Hz) 8000	Demodul	lation Bandw	vidth Type Normal	Bandwidth 100 Hz	Auto Attenuation	Attenuation (dB)	Squelch (dBµV)		Description Radio station		
	2		98500000		Pulse	Normal	100 Hz		0	 0		Radio station		
	3		98500000		FM	Normal	100 Hz		0	 0				
	4		98500000		ISB	Normal	100 Hz		0	0				
	5		98500000		FM	CISPR	200 Hz	. 4	abc	0				
	5	6									10	1	)	12
	Add	Delete								Optin	nize Scan Spe	ed Activa	te All	Deactivate All
	New	Open	Save							PR20	D	🔹 🔶 Sene	d	럳 Retrieve
	Ø	8	9								13	14	)	15

#### Figure 5-32: Memory list

- 1 = Name of the "Memory List"
- 2 = Selection of "Squelch Level Unit"  $dB\mu V$  or dBm
- 3 = Memory list editor
- 4 = Error notification if invalid data has been entered
- 5 = "Add" button appends a new "Memory List" entry
- 6 = "Delete" button deletes a selected "Memory List" entry
- 7 = "New" button resets all entered data
- 8 = "Open" button loads an existing "Memory List" (supported formats .xml and .csv)
- 9 = "Save" button saves the "Memory List" if the name of the "Memory List" is not empty (supported formats .xml and .csv)
- 10 = "Optimized Scan Speed" allows the "Memory List" to be sorted for optimal scan speed
- 11 = "Activate All" allows the selection of all memory list in the memory list editor.
- 12 = "Deactivate All" allows the deselection of all memory list in the memory list editor.
- 13 = Selection of connected compatible devices for activate and retrieve
- 14 = "Send" button transfers the configured "Memory List" to a connected device and activates the "Memory List"
- 15 = "Retrieve" button retrieves a "Memory List" from a connected device and loads it in the memory list editor

#### Table 5-6: Memory list editor

Parameter	Descriptions
18	Index column.
"Include"	Checkbox to include or exclude entry for the mem- ory list.
"Frequency (Hz)"	Frequency defines in Hz.
"Demodulation"	Defines the demodulation type.
"Badwidth Type"	Bandwidth type selector "Normal" or "CISPR", see also bandwidth.
"Bandwidth"	Defines the bandwidth.

Parameter	Descriptions
"Auto Attenuation"	Checkbox to enable or disable auto-attenuation option.
"Attenuation (dB)"	Attenuation level defines in dB. You can edit the attenuation level if "Auto Attenuation" is disabled.
"Use Squelch"	Checkbox to enable or disable squelch level.
"Squelch (dBµV)"	Squelch level defines in dBµV. You can edit the squelch level if "Use Squelch" is enabled.
"Use AFC"	Checkbox to enable or disable auto frequency con- trol (AFC).
"Description"	Entry to describe memory listing

## **Demodulation type**

You can define the following "Demodulation" types:

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

### **Bandwidth selection**

You can select the required bandwidth:

### Normal

### Table 5-7: Bandwidth selection

"125 MHz"	"80 MHz"	
"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, R&S EM200 and R&S ESMW. With the "Suppress List" editor, you can prepare and configure the "Suppress List" according to your requirement. See Figure 5-33.

58	Suppress L	ist 🗙						
	F	Ilename Suppres	ss Demo unsorted 1	)				
			-					
2	) ∬≣ Start	Frequency (Hz)	Stop Frequency (Hz)	Description				
	1	76010	76050	Unknown local disturbance				
	2	250000	260000					
	3	240005	240015					
	4	3657	3679					
	5	1200000	1200500	Power turbines				
	6	1200300	1200800	Overlapping				
	7	18030	18070					
	8	560206		To be merged				
	9 abc		570000	Merged into here				
	3	)						
	4	5					9	10
	Add	Delete					Sort	Sort And Merge
	New		Save			PR200 •	- Send	- Retrieve
	6	$\bigcirc$	8			1	12	13

#### Figure 5-33: Suppress list

- 1 = Name of the "Suppress List"
- 2 = Suppress list editor
- 3 = Error notification if invalid data was entered
- 4 = "Add" button appends a new "Suppress List" entry
- 5 = "Delete" button deletes a selected "Suppress List" entry
- 6 = "New" button resets all entered data
- 7 = "Open" button loads an existing "Suppress List" (supported formats .xml and .csv)
- 8 = "Save" button saves a "Suppress List" (supported formats .xml and .csv)
- 9 = "Sort" the suppress list on start frequency
- 10 = "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
- 11 = Selection of connected compatible devices for activate and retrieve
- 12 = "Send" button transfers the configured "Suppress List" to a connected device and activates the "Suppress List"
- 13 = "Retrieve" button retrieves a "Suppress List" from a connected device and loads it in the editor

Table	5-8:	Suppress	list table
-------	------	----------	------------

Parameter	Descriptions
12	Index column.
"Start Frequency (Hz)"	Start frequency defines in Hz.
"Start Frequency (Hz)"	Stop frequency defines in Hz.
"Description"	Entry to describe suppress listing

## 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 5-34.



Figure 5-34: 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 5-35.

Name		1	Data		
Description		2	<u>ا</u>	Frequency (Hz)	(5) Attenuation ( dB/m )
		Ŭ	1		
Preset	User Setting 🔻		2		
(3) Preset Absolute		m/s	3		
			4		
Relative		%	5		
Rel. Dielectric Constant			6		
			7		
			8		
			9		
			10		
			11		
			12		
			13		
			14		
			15		
			16		
			17		
			18		6
78	9		19		1
New Open	Save				Sort

#### Figure 5-35: 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:

Туре	Absolute m/s	Relative %	Rel. dielectric constant
Solid polyethelene	197700000	65.9	2.3
Foam polyethelene	24000000	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.

Description				3 Show Values For	FSH,ZVH,FPH,ZPH,FPC
Open			Short		
4 Length	0	mm	Length	0	mm
C₀	0	fF	Lo	0	рН
C <sub>1</sub>	0	fF/GHz	Lı	0	pH/GHz
C2	0	fF/GHz <sup>2</sup>	L <sub>2</sub>	0	pH/GHz <sup>2</sup>
C3	0	fF/GHz <sup>3</sup>	L <sub>3</sub>	0	pH/GHz <sup>3</sup>
hrough					
Length	0	mm			

### Figure 5-36: Calibration kits editor

- 1 = Name and description of the calibration kit
- 2 = Calibration 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 coaxial and waveguide measurements. See Table 5-9 for the types of calibration standard requirements.

Table 5-9: Calibration standard

Calibration type		Calibration standard
"Coaxial"	"FSH, ZVH, FPH, ZPH, FPC"	"Open", "Short", "Through", see Figure 5-37.
	"ZNH"	"Open", "Short", "Through", "Match", see Figure 5-38.
"Waveguide"	"Short / Offset Short / Match"	"Offset Short", see Fig- ure 5-39.

Calibration type		Calibration standard
	"Short / Offs Short 1 / Offs Short 2"	"Offset Short 1" and "Offset Short 2", see Figure 5-39.
	"Through / Reflect / Line"	"Through" and "Line", see Figure 5-39.
		The values for "Reflect" are default value.

Open			Short		
Length	0	mm	Length	0	mm
Co	0	fF	Lo	0	pН
C <sub>1</sub>	0	fF/GHz	L <sub>1</sub>	0	pH/GHz
C <sub>2</sub>	0	fF/GHz <sup>2</sup>	L <sub>2</sub>	0	pH/GHz²
C3	0	fF/GHz <sup>3</sup>	L <sub>3</sub>	0	pH/GHz <sup>3</sup>
Through					
Length	0	mm			

Figure 5-37: Coaxial calibration standard for R&S FPH, R&S FPC, R&S ZPH and R&S ZVH

Open			Short		
Length	0	mm	Length	0	mm
Co	0	fF	Lo	0	рН
C <sub>1</sub>	0	fF/GHz	L1	0	pH/GHz
C <sub>2</sub>	0	fF/GHz²	L <sub>2</sub>	0	pH/GHz²
C3	0	fF/GHz <sup>3</sup>	L3	0	pH/GHz <sup>3</sup>
- Z <sub>0</sub>	50	ohm	Zo	50	ohm
Loss	0	dB/√(GHz)	Loss	0	dB/√(GHz)
Through			Match		
Length	0	mm	Length	0	mm
Zo	50	ohm	Zo	50	ohm

Figure 5-38: Coaxial calibration standard for R&S ZNH
Offset Short			Offset Short 1			Through		
Name			Name			Name		
Length	0	mm	Length	0	mm	Length	0	mm
			Offset Short 2			Line		
			Name			Name		
			Length	0	mm	Length	0	mm

Figure 5-39: Calibration standard for waveguide Short / Offset Short / Match, waveguide Short / Offs Short 1 / Offs Short 2 and waveguide Through / Reflect / Line

## 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/m<sup>2</sup>", "VSWR"). See "Limit lines table editor" on page 74.

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 74.

## 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 5-40.

Instrument Selection			×
Please select an instrument or in	strument family:		
Spectrum Analyser			
Monitoring Receiver (2)			
		3	(4)
		OK	Cancel
Figure 5-40: Instrument selection	1		

- 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 5-41.

🖧 Limit Lines 🗙		
Monitoring Receiver Limit Line	§≣ Frequency (Hz)	dBm 7
Name GSM_Lower 1 3 X-Unit Hz  Absolute	1 -0.00027139	-100
Description	2 0	-5
	3 0	-5
dBm 🔗	4 0.00027139	100
	· •	
20	6 (5)	
	7	
60	8	
	9	
40	10	
20	11	
	13	
	14	
20	15	
	16	
40	17	
	18	
	19	
80	20	
	21	(1) (1)
-100 -271.39 Frequency (uhtz) 271.39		ve Verify
ause cuckent flam ause		

Figure 5-41: 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 75.

## **Channel table editor**

The "Channel Table" editor allows you to open, edit and save the channel table. See Figure 5-42.

	Name Description		800 MHz Band) (1)			
	Description	cdma2k_10 (Sec 8	300 MHz Band) (2)			
ĭ≡	Band Name 3	)	4 1st Ch	🕤 f(1st Ch) (MHz)	6 # of Chs	Spacing (MHz)
1	cdma2k(Sec 800)		0	851	720	0.025
2	cdma2k(Sec 800)		720	935	200	0.025
3						
4						
5						
6						
7						
8						
9		8	)			
10						
11						
12						
13						
14						
15						
(	9 0	$\bigcirc$				
N	ew Oper	n Save				Sort

#### Figure 5-42: 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 "Standards" 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 76.

### 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 5-43.

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

(1) Name	cdma2000 1x							
2 Description	cdma2000 1x							
(3) Measurement Type	Channel Power	•						
4 Settings Chann	nel Power Adjacent Settings	5						
Resolution Bandwidt	1	10000	Hz	Auto	Trace Detector	RMS	•	
Video Bandwidtł	1	300000	Hz	Auto	Channel Bandwidth		1228800	Hz
Sweep Time	2	0.1	s	Auto	Power Unit	dBm	•	
Spar	1	1474560	Hz	🖌 Auto				
6 7	8							
New Oper	Save							

#### Figure 5-43: 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 77)
- 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.

Settings	Channel	Power Adjacent Settings							
Resolution E	Bandwidth		0	Hz	🖌 Auto	Trace Detector	Auto Peak	•	
Video B	Bandwidth		0	Hz	🖌 Auto	Channel Bandwidth		3840000	Hz
Sv	veep Time		0	5	🖌 Auto	Power Unit	dBm	•	
	Span		0	Hz	🖌 Auto				

Figure 5-44: Channel power settings

Settings Channel Power Adjacent Setti	ngs
TX Channel	Adjacent Channels
TX Bandwidth 3840000 Hz	Nr of Adjacent Channels 2 Use Channel Filter Off
§≣ Spacing f(Hz)	≸≣ Bandwidth Spacing f(Hz) Relative Limits Absolute Limits
TX 1-2 3840000	Adj 3840000 5000000 🖌 0 🗌 0
TX 2-3 3840000	Alt 1 3840000 5000000 0 0
TX 3-4 3840000	
TX 4-5 3840000	
TX 5-6 3840000	
TX 6-7 3840000	
TX 7-8 3840000	
TX 8-9 3840000	
TX 9-10 3840000	
TX 10-11 3840000	
TX 11-12 3840000	

Figure 5-45: 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.

Settings							
Resolution Bandwidtł	0	Hz	🗹 Auto	Trace Detector	Auto Peak	•	
Video Bandwidth	0	Hz	🖌 Auto	Channel Bandwidth		0	Hz
Sweep Time	0	5	🗹 Auto				
Span	0	Hz	🖌 Auto				

Figure 5-46: 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.

Settings							
Resolution Bandwidtł	300000	Hz	Auto	Trace Detector	Auto Peak	•	
Video Bandwidth	1000000	Hz	Auto	Burst Length		0.00047	s
Sweep Time	0.001	s	Auto				



#### 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.

SEM Preview							
Use Channel Filter	Off	•					
§≣ 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 5-48: 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 79.

### Quick name table editor

The "Quick Name Table" editor allows you to open, edit and save the quick name table. See Figure 5-49.

∬≣ 1	2	3	4	5	6
1 Location	Site	RL	Sector	UL	450
2		IL	А	DL	700
3		VSWR	В		850
4		DTF	С	GSM	900
5		ISOL	D	UMTS	1800
6		POW	E	CDMA2000	1900
7		SPECTR		EVDO	2100
8		ACLR		LTE	
9				TD-SCDMA	
10					
11	1				
12	Ū				
13					
14					
15					
16					
17					
18					
19					
20 3	) (4)				
New Oper					

#### Figure 5-49: 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 5-50.

### 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 5-50.

ime							
Туре	Enable l	Jpper limit	Unit	Enable	Lower Limit	Unit	
Carrier Freq Offset		9999999.9	Hz		-99999999.9	Hz	
Carrier Power		200	dBm		-200	dBm	
Modulation Index		100	%		0	%	
+Peak		999	%		0	%	
-Peak		0	%		-999	%	
±Peak/2		999	%		0	%	
RMS		999	%		0	%	
Mod. Freq		2000000	Hz		0	Hz	
SINAD		100	dB		-20	dB	
THD		20	dB		-100	dB	
2 3	4						
New Open	Save						

#### Figure 5-50: 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 5-51.

### 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 5-51.

Туре	Enable	Upper limit	Unit	Enable	Lower Limit	Unit	
Carrier Freq Offset		9999999.9	Hz		-99999999.9	Hz	
Carrier Power		200	dBm		-200	dBm	
Frequency Deviation		2000000	Hz		0	Hz	
+Peak		1 2000000	Hz		0	Hz	
-Peak		0	Hz		-2000000	Hz	
±Peak/2		2000000	Hz		0	Hz	
RMS		2000000	Hz		0	Hz	
Mod. Freq		400000	Hz		0	Hz	
SINAD		100	dB		-20	dB	
THD		20	dB		-100	dB	
2 3	4						
New Open	Save						

#### Figure 5-51: 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 5-52

For more information on dataset, see Chapter 4.3, "Save instrument", on page 25.

### Wizard

The "Wizard " editor allows you to open, edit and save the measurement wizard set. See Figure 5-52.

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 5-52.

				- Encryption
Datasets on PC			Wizard Settings Measurement Settings 6	Encryption Enabled Authentication
C:\Users\Public\Documents\Rohde-Schwa	rz\Instrument View\Datasets	1 🕈 🕯		Password ••••••
Name	Date	Time	• Global	
Am-mod.set	4/4/2017	9:26 AM	Measurement Set Name Simple RF Measurement	Confirm Password
Dataset 201704031127.set	4/3/2017	11:28 AM	Description (Optional) Measurement using power meter	Use all Instrument Serial Numbers
sem.set	4/4/2017	3 9:26 AM	Description /	Specific Serial Numbers
sem1.set	4/4/2017	9:41 AM	Measurement Font	Add new Serial Number
			Default Calibration Factory	💥 Add 🍿 Remove
			Allow Variable Number of Sequence Steps & Allow Skip Measurements & Finish Wizard Sequence	W Renove
💿 View 🗴 Add	(4)	🗴 Up 👋 Down 🍿 Remove	Sequence Steps & Finish Wizard Sequence	101053
- •	4	× op v bown w remove	Encryption	Stored Serial Numbers
Measurements			<ul> <li>Cable Definition for Antenna &amp; Cable Test</li> </ul>	101055
Name Instructions	refrect to DUT.	Hardware Settings	Cable Definition for Antenna & Cable Test	
Spectrum lest				
Power Meter Test Please connect the power meter to	RF cable of the DUT			
DUT Test				Cable Definition for Antenna & Cable Test
5	)			Prompt User to Change Cable Settings
				Cable Model EC4-50 1-2
			New Open Save	Cable Length (Meter) 12
				🗃 Browse 前 Remove

#### Figure 5-52: 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
View	Previews a selected dataset in the measurement table list.
😽 Add	Adds a selected dataset from the PC dataset list into the measurement table list.
ᄎ Up	Navigates upward in the measurement table list.
😵 Down	Navigates downward in the measurement table list.
🗑 Remove	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 5-52) 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 5-54.



Figure 5-53: 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 5-54.

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 5-54: 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 5-55). 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 5-55: 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  $\ref{eq:georetic}$  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

-		
	Ť.	
	-	-

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

Warning		×
The selected folder appears to contain data. An emp generate Indoor Maps	oty folder is req	uired to
Do you want to permanently delete all files and fold \Desktop\Singapore ?	lers in C:\Users	\TempAcc
	Yes	No

#### 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.

] Name	Date modified	Туре	Size
<mark>  </mark> 10	21/12/2020 2:07 PM	File folder	
<mark></mark> 11	21/12/2020 2:07 PM	File folder	
12	21/12/2020 2:07 PM	File folder	
13	21/12/2020 2:07 PM	File folder	
14	21/12/2020 2:08 PM	File folder	
15	21/12/2020 2:08 PM	File folder	
idm map.idm	21/12/2020 2:10 PM	IDM File	1 KB
📄 map.kml	21/12/2020 2:10 PM	KML File	3 KB
🛋 map.png	21/12/2020 2:07 PM	PNG File	13,141 KB

Figure 5-56: 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 applicable to R&S FSH, R&S FPH and R&SZPH Combi analyzer (with R&S ZPH-K105 option).

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 5-11.

👷 FSH4 EMF C	ionfig 🗙	_		(5)		6	(7)	
Measurement	Configuration (	1)		Sub-Measurer	ments	Equipment	Corrections	
Measurement Mo	de LTE-FDD 🔻		31	Free	quency	D	escription	
Measurement Nar	ne			1	1.71	GHz LT	E(B 10)	
Measurement Ty	pe E-Fleid Y			2	1.72		E(B 10)	- 1
			_	3	1.73		E(B 10) E(B 10)	
Acquisition Co		(2)						
Resolution Bandwid	100	kHz 🔻 🗹 Auto						
Channel Bandwid	Ith 10 MHz (50 RB)							
Trace Mo	de Clear / Write 🔻							
Power Displ	ay RSPWR •				1.75	GH2 <b>T</b> IT	E(B 10)	-1
RF Attenuati	on 0	dB Auto						
RF Preamplif	ler On 👻			Generate Fr	-	Insert	W Remov	ve
Reference Le	vel 140			Generate Ch				
					Select		E (Band 10)_ul	_
				First Channel	1 L 150	ast Channel 22749	Step Size	1
				Band				
3	(4)			LTE(B 10)	•		🕂 Gener	ate
Import Data	iset 💉 Live Editing			New (	Dpen	Save		
			(	8 (	9	10		
		ment Corrections						
	Antenna 6		Sub-Measure	ements 6	quipment	Correctio	ns	
	Select	No Transducer Selected	 Equipment			7		
	Description	No Description Available	An	tenna Anisotro	ору		0 dB	
	Directions (Axis)	x/y/z •	Instru	ment Uncertai	inty		0 dB	
	MIMO Configuration	MIMO 2x2 Over The Air 🔹	Measureme	ent				
	Cable		Ext	rapolation Fac	tor		0 dB	
	<ul> <li>Constant</li> </ul>					-		
	Attenuation	0 dB					1 Lin	
	<ul> <li>Transducer</li> </ul>							

#### Figure 5-57: EMF measurement configuration editor

- 1 = "Measurement Configuration" provides general information of the configuration file. See Table 5-10
- 2 = Availability of acquisition settings depends on the selected "Measurement Type" and most settings are not editable. See Table 5-11
- 3 = Only compatible dataset can be imported to the "Acquisition Configuration". See Table 5-11
- 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

Parameters	Function					
Measurement	Provides settings of the EMF measurement modes.					
configurations	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/m <sup>2</sup> ) is available.					
Acquisition	Availability of the acquisition settings depends on the selected EMF measurement modes					
configurations	For details on the acquisition settings, see the respective user manual for information.					
	See also information on Table 5-11.					
	Note: "RF attenuation" and "Reference level" are editable only in "Live Edit " mode.					
Sub-Measure- ments	Contains a list of center frequencies for execution. Each center frequency in the fre- quency 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					
	<ul> <li>Each sub-measurement can be added by the followings:</li> <li>Inserting a single center frequency within the frequency list</li> <li>"Generate Frequencies": Adding a range of center frequencies with a fixed "Step Width" in Hertz</li> </ul>					
	<ul> <li>"Generate Channel Numbers": Adding a range of center frequencies by specifying a channel table and providing the channel range.</li> </ul>					
	You can remove a single or multiple center frequencies from the frequency list.					
Equipment set- tings	Contains the controls regarding the equipment settings such as antenna and cable trans- ducer factors.					
	You can specify an antenna transducer factor such as primary (*.pritrd) or an isotropi 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 sec- ondary transducer file (*.sectrd).					
	For viewing the response of the transducer file, see Transducers table editor for spectrur 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.					
	For measurement type selected for LTE-FDD, you can also make correction factor for					

### Table 5-10: Measurement configuration layout

			-		•				
Mea- sure- ment mode	Resolu- tion band- width	Video band- width	Span	Chan- nel band- width <sup>1</sup>	Trace mode <sup>1</sup>	Power display <sup>1</sup>	Detec- tor	RF Attenu- ation	Refer- ence level
Quick Scan	1	✓	1		✓		✓	1	✓
Spec- trum	1	✓	1		✓		✓	1	✓
Channel Power	1	✓	1	✓	1		✓	1	✓
3GPP WCDMA	1			✓	✓			1	✓
LTE- FDD	1			✓	1	1		✓	✓
TD-LTE	1			1	1	1		1	✓

Table 5-11: Relation between configurable dataset settings and measurement modes

<sup>1</sup>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.

Name	Date			Time	Measurement Definitio	
CHP_796_1815.emcf	6/15/20	)18		2:41 PM	Measurement Set Name	EMF Measurement lest 5
TE_FDD_800_1800_for manual.emcf	6/14/20	018		6:43 PM	Measurement Set Description	Sample
JMT5_2100_for_Manual.emcf	6/14/20	)18		6:44 PM	Measurement Type	E-Field
(5)					Automatically Save Results	
					▼ Limits	
(5)					Limit Line 1 Limit Line 2	Gen. Public Limit Line (Up Worker Limit Line (Upper)
					UMTS_2100	
					UMTS_2100 • Setup	
🕂 Add 🔗 Edit	6	🛠 Up	🎖 Down	Remove		UMT5_2100 WCDMA 2.11568 GHz 2.16912 GHz
	6	ᄎ Up	🎖 Down	Remove	✓ Setup Name Mode Start Frequency	WCDMA 2.11568 GHz
leasurement Set	6 Time [hh:m	Count	Down Instruction	Remove Next Step	✓ Setup Name Mode Start Frequency Stop Frequency RBW	WCDMA 2.11568 GHz 2.16912 GHz Auto
Measurement Set	0		·		✓ Setup Mode Start Frequency Stop Frequency RBW Channel Bandwidth Trace Mode RF Attenuation	WCDMA 2.11568 GHz 2.16912 GHz Auto 3.84 MHz Clear / Write 0 dB
Aeasurement Set	Time [hh:m	Count	Instruction	Next Step	✓ Setup Mode Start Frequency Stop Frequency RBW Channel Bandwidth Trace Mode RF Attenuation Reference Level	WCDMA 2.11568 GHz 2.16912 GHz Auto 3.84 MHz Clear / Write 0 dB
Aeasurement Set	Time [hh:m 00:06:00	Count 2	Instruction Yes	Next Step Manual	<ul> <li>Setup</li> <li>Name Mode</li> <li>Star Frequency</li> <li>Stop Frequency</li> <li>Stop Frequency</li> <li>Channel Bandwidth</li> <li>Trace Mode</li> <li>RF Attenuation</li> <li>Reference Level</li> <li>Equipment</li> <li>Antenna Factor Axis</li> </ul>	WCDMA 2.11568 GHz 2.15912 GHz Auto 3.84 MHz 3.84 MHz 0.687 / Write 0 dB 140 dBµV/m TSEMF-B1_typical All
Aeasurement Set	Time [hh:m 00:06:00	Count 2	Instruction Yes	Next Step Manual	<ul> <li>Setup</li> <li>Name Mode</li> <li>Star Frequency</li> <li>Stop Frequency</li> <li>Stop Frequency</li> <li>Channel Bandwidth</li> <li>Trace Mode</li> <li>R Attenuation</li> <li>Reference Level</li> <li>Equipment</li> <li>Antenna Factor</li> <li>Axis</li> <li>Cable Factor</li> </ul>	WCDMA 2.11568 GHz 2.15912 GHz Auto 3.84 MHz 3.84 MHz 0.687 / Write 0 dB 140 dBµV/m TSEMF-B1_typical All
Aeasurement Set	Time [hh:m 00:06:00	Count 2	Instruction Yes	Next Step Manual	<ul> <li>Setup</li> <li>Name Mode</li> <li>Star Frequency</li> <li>Stop Frequency</li> <li>Stop Frequency</li> <li>BW</li> <li>Channel Bandwidth</li> <li>Trace Mode</li> <li>RF Attenuation</li> <li>Reference Level</li> <li>Equipment</li> <li>Axis</li> <li>Cable Factor</li> <li>Corrections</li> <li>Extrapolation Factor</li> <li>Antenna Anisotropy</li> </ul>	WCDMA 2.11568 GHz 2.11568 GHz 2.16912 GHz Auto 0 dB 140 dBµV/m TSEMF-B1_typical All 0 dB 0 dB 0 dB 0 dB

#### Figure 5-58: 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

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	<ul> <li>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:</li> <li>"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.</li> <li>"Time [hh:mm:ss]": Defines the minimum amount of time each sub-measurement is executed for.</li> <li>"Count": Defines the number of times each sub-measurement is executed for.</li> <li>"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.</li> <li>"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 result.</li> <li>To navigate the table in the measurement set table, see Measurement set navigator.</li> </ul>
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.

#### Table 5-12: Measurement set layout

### 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 89.
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.

Measurement Definition		Limit	Lines			
Measurement Set Name EMF Measureme	nt Set	Limit	Line 1			
			Select	No Limit Line Selected		Ŵ
Measurement Set Description Sample		Limit	Line 2			
Measurement Type E-Field	× .		🏹 Select	No Limit Line Selected		Ŵ
Automatically Save Results 🖌		Quic	k Scan			
► Limits	0	Limi	it Line			
			🐴 Select	No Limit Line Selected		Ŵ
LTE_FDD_800_1800 Setup	3		uation Threshold below limit line)		0	dB
Name UTE-FDD. Mode UTE-FDD. Start Frequency 791 MHz Stop Frequency 791 MHz RBW Auto Channel Bandwidth 10 MHz (50 Charle Wardwidth 10 MHz (50 Charle Wardwidth 10 MHz (50 Charle Wardwidth 10 MHz (50 RF Attenuation 0 dB RF Attenuation 0 dB Reference Level 140 dBµJ/r ↓ Equipment Antenna Factor TSEMF-81_1 Axis All MIMO Configuration MIMO 2x2. Cable Factor 0 dB ↓ Corrections Extrapolation Factor 0 dB Antenna Anisotropy 0 dB Instruction for Operator	n RB)					
	(4)					

#### Figure 5-59: Overview and limits tab

- 1 = "Measurement Definition" provides general information of the EMF measurement definition file. See Table 5-12
- 2 = Limit line displays the upper limits settings. See "Limit Lines" on page 95
- 3 = Measurement-specific setup. See details in Chapter 5.3.15.1, "EMF measurement configuration editor", on page 89
- 4 = Text box to set instructions

Parameters	Function
"Measurement Defi- nitions"	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 <sup>2</sup> ) 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-spe- cific information	Displays measurement-specific information configured in Chapter 5.3.15.1, "EMF measurement configuration editor", on page 89.
"Instruction for Operator"	Text box to set instructions for operator. When "Instruction" is enabled in the "Mea- surement 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 89
- "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 18.

# 5.4 Analyze the instrument dataset

#### - 🔍 Analysis

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	97
	Map analysis	
	GPX conversion	
•	Dataset image	. 106
	EMF measurement result	

## 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.



Figure 5-60: Spectrogram display

- 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 accord-ingly. 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 5-13. 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 100.



#### Figure 5-61: Spectrogram section

- 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 5-13



Figure 5-62: Spectrum section

Mouse behavior	Function
.897 1.907 1.	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.
x x x x x x x x x x x x x x	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.

Table 5-13: Mouse behavior in spectrum section

### 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.



Figure 5-63: Color setup dialog

• Marker setup For more information, see "Marker setup" on page 41.

## 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 18.

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 5-64: 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 5-65: 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 5-66. 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.

Analyze the instrument dataset

Show Name Show Azimuth Show Time					
ø	#	Latitude	Longitude	Level	
<ul> <li>Image: A start of the start of</li></ul>	1	N 1° 19.7169'	E 103° 57.6484'	14.9 dBuV	
<b>~</b>	2	N 1° 20.5201'	E 103° 58.2870'	1.5 dBuV	
✓	3	N 1° 22.1058'	E 103° 57.8544'	11.5 dBuV	
<ul> <li>✓</li> </ul>	4	N 1° 22.8162'	E 103° 56.3506'	16.4 dBuV	
<ul> <li>Image: A start of the start of</li></ul>	5	N 1° 19.2124'	E 103° 54.7748'	12.3 dBuV	
<ul> <li>✓</li> </ul>	6	N 1° 22.5897'	E 103° 51.8085'	19.6 dBuV	
✓	7	N 1° 21.6939'	E 103° 50.6343'	-5.6 dBuV	

Figure 5-66: 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".

<b>_</b>	э	IN 1 22.1000	E 103 37.034	03.2 11.2 0DUV 2:24:13 AI
	4	N 1° 22.8162'	E 103° 56.350	No Legend
	5	N 1° 19.2124'	E 103° 54.774	Top Left
	6	N 1° 22.5897'	E 103° 51.808	Top Right
	7	N 1° 21.6939'	E 103° 50.634	Bottom Left
_	-			Bottom Right
Export	t Imi	age with Lege	nd	No Legend 🔹

Figure 5-67: Legend position

## Sample IDM map

When loaded, the indoor map orientates according to the GPX details, as shown in Figure 5-68.

### Analyze the instrument dataset



Figure 5-68: 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.

## **R&S InstrumentView features**

Analyze the instrument dataset

lude	Latitude	Longitude	Level 3	Name (4)	Description	Load	GPX (5)	
	1° 19.4395' N	103° 56.1076' E	-53.4 dBm			Bad	Avera	ge
-	1° 20.6597' N	103° 56.2003' E	-57.4 dBm				70	
-	1° 19.9853' N	103° 54.8356' E	-76.5 dBm			-80	-70 ettings	6
•	1° 19.2593' N	103° 55.4794' E	-49 dBm				Color	0
-	1° 20.5104' N	103° 55.5309' E	-51.9 dBm			Good: 0	Green	-50
-	1° 20.0625' N	103° 56.6947' E	-76.6 dBm			Average: /	Magenta 🔹	-70
-	1° 19.1049' N	103° 56.7565' E	-76.6 dBm			Bad: F	ted .	-80
<ul> <li>Image: A set of the set of the</li></ul>	1° 19.6146' N	103° 57.1891' E	-58.1 dBm			bau. r		-00
<	1° 24.0267' N	103° 53.7078' E	-76.5 dBm			Default Indic	ator (7)	Best
<ul> <li>Image: A set of the set of the</li></ul>	1° 20.3283' N	103° 57.8650' E	-76.2 dBm	rs	ref	Maximum Zo	om Distance 🛞	20
-	1° 20.0033' N	103° 57.7517' E	-76.5 dBm	cbp		Show In	dices on Map (9)	
-	1° 19.9950' N	103° 58.2133' E	-76.4 dBm	goodyear-co		GPX Files	~ ~	
-	1° 20.3283' N	103° 57.8650' E	-54.2 dBm	rs		D:\Indoor I	Mapping\IndoorMappi	ing003.gpx
•	1° 20.2911' N	103° 57.8805' E	-62.1 dBm			D:\Indoor I	Mapping\IndoorMappi	ing002.gpx
-	1° 19.9950' N	103° 58.2133' E	-75.4 dBm	Goodyear		D:\Indoor I	Mapping\IndoorMappi	ing001.gpx
						D:\Outdoo	Mapping\OutdoorMa	apping.gpx
				Inc	lude All			
				Exc	lude All 1		en KMZ file	Export CS

#### Figure 5-69: 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 58



Figure 5-70: 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 5-21.
- "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 feature is available in R&S FSH, R&S FPH and R&S ZPH Combi analyzer (with R&S ZPH-K105 option).

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 5-71: 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

Quick Scans Measuremen	ts Sub-Measurements			Overvier	v Setup	Export
SimpleQS2 RMS	Start Time 13:31 Stop Time 13:32		Duration 00.00:00:18 Measurement Completed	Simple M	Start Date Start Time	1/14/2019
§≣ Measurement	Peak Value		Number of Peaks		Stop Date Stop Time Duration	1/14/2019 13:32 00.00:00:56
2 SimpleQS2	404.86 μV/m		97		GPS Latitude GPS Longitude	
3 SimpleQS2	333.19 µV/m		95	👻 Limit		
				Quick	can Limit Line	50dBuV_m Limitline_curve (Upper)
				SimpleG Setup	S2	
j≣ Frequency	Field Strength	Limit (V/m)	∆ to Limit (V/m)		Name Mode	SimpleQS2 Quick Scan 8.08 MHz
2 801.8413 MHz	106.07 µV/m	50.00	9.49		art Frequency op Frequency RBW	811.92 MHz Auto
3 802.2857 MHz	117.79 µV/m	50.00	8.58		VBW Span Trace Mode	Auto 200 MHz Clear / Write
4 811.5873 MHz	133.51 µV/m	51.41	8.90		Detector F Attenuation	Max Peak Auto
5 811.6508 MHz	133.71 µV/m	51.35	8.83	▼ Equip	nent	100 dBµV/m
6 811.6825 MHz	172.83 µV/m	51.32	6.57		ntenna Factor	HA-Z901 X
7 811.7143 MHz	183.69 µV/m	51.29	6.00		Axis Cable Factor	X 0 dB
5 100 mV/m 798.22 10 mV/m-	803.29	808.37 813.4-	818.52	823.59 MHz	tions Antenna Aniso	tropy 0 d8
1 mV/m -				Ins	trument Uncer	tainty 0 dB
100 μV/m -						
10 μV/m –				Open	Save	Reset Copy
1 μV/m				Export		

Figure 5-72: EMFQuick Scan analysis measurement overview

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 mea- surement.
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 92 and Chapter 5.3.15.1, "EMF measurement configuration editor", on page 89.

		-	
EMF			
Start Date	5/11/2018 5/14/2018		
1 Stop Date Start Time	01:24 PM		
Stop Time GPS Latitude	08:58 AM		
GPS Longitude			
Duration	02.19:34:15		
<ul> <li>Limit Lines</li> </ul>			
2 Limit Line 1	ICNIRP_GP (Upper	)	
Result Limit Line 1	PASS		
WC meting			
▼ Setup			
Name	WC meting		
Mode	WCDMA		
C Stop Frequency	Start Frequency 2.11568 GHz Stop Frequency 3.10192 GHz		
3 RBW	RBW Auto		
Channel Bandwidth Trace Mode	3.84 MHz Clear / Write		
RF Attenuation	0 dB		
Reference Level	140 dBµV/m		
<ul> <li>Equipment</li> </ul>			
Antenna Factor	TS-EMF_Example		
Axis Cable Factor	All TSEMFZ2 example		
<ul> <li>Corrections</li> </ul>			
Antenna Anisotropy	ի ав		
Instrument Uncertainty	2 dB	,	
Extrapolation Factor	3 dB		
	=		
	2 Lin		
	2 Lin		

#### Figure 5-73: 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 92 and Chapter 5.3.15.1, "EMF measurement configuration editor", on page 89

Parameters	Function	
General information	Displays start date, start time, stop date, stop time and measurement duration of the selected measure- ment.	
	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 set- tings from Chapter 5.3.15.2, "EMF measurement set editor", on page 92 and Chapter 5.3.15.1, "EMF measurement configuration editor", on page 89.	
	The parameters in "Setup" and "Equipment" sec- tions 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" mea- surement mode.	
	Note: "Time Division Duplex" - Only applicable for "TD-LTE" measurement modes.	

#### Table 5-15: Details of overview tab

#### 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 92, Chapter 5.3.15.1, "EMF measurement configuration editor", on page 89 and Overview.

Presentation					
	Resul	t Mode	RMS		•
Units					
	Field St	trength	V/m		•
	Exposure Ra	tio (ER)	Percent (%)		•
Limit L	ines				
Limit	Line 1				
	Select		ICNIRP_GP		Ŵ
Limit	Line 2				
	Select	No	Limit Line Selected		Ŵ
Quic	k Scan				
Limi	it Line				
	Select	No	Limit Line Selected		Ŵ
	ation Threshold below limit line)			0	dB

Figure 5-74: Setup tab dialog

#### Table 5-16: Setup parameters

Parameters	Function
Presentation	Sets the result mode in the measurement set. Avail- able result modes are: "Average", "RMS", "Maxi- mum" and "Minimum".
	By default, result mode is set to "RMS".
Units	<ul> <li>Sets the field strength unit in the measurement set:</li> <li>E-Field measurement sets - dBuV/m, V/m and W/m<sup>2</sup>.</li> </ul>
	Sets the "Exposure Ratio (ER)" unit: Available units are E <sup>2</sup> / L <sup>2</sup> , %, $\%_o$ 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 dis- played. Selects the <b>1</b> 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.

Report Content				
$\bigcirc$	Average Results	Max Results		
۲	RMS Results	Min Results		
$\checkmark$	General Informati	on 🗹 Meas	surement Settings	
$\checkmark$	Data Tables	🖌 Grap	hics	
Logos				
	Frontpage Logo	User Logo	•	
	Select	No Log	go Selected	
	Footer Logo	R&S Logo	•	
		ROHDE 8	SCHWARZ	
Output Options				
Language	English	Format	PDF 🔻	
Open after	Generation			

Figure 5-75: Export tab dialog

Table 5-17: 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, "Mea- surement 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 commaseparated 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 18.

# 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, "General application settings", on page 31.

Ø₀ Settings ×
Application Settings
Retrieve the full dataset. This includes calibration data when applicable.
✓ Network disconnect detection.
Meter <ul> <li>Length unit to display.</li> </ul>
Visual Settings
Home Screen Logo RS Logo Light 🔻
Menu Visibility
Enable Oscilloscope menu entries.
Enable Spectrum, Network Analyzers and CAT menu entries.
Enable Monitoring Receiver menu entries.
OK Cancel

Figure 6-1: Option settings dialog

# 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.

- In the "Setup" tab, enable the measurements you want to perform. See "Measurement functions setup" on page 126.
- 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:

- 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.

- In the "Setup" tab, enable the measurements you want to perform. See "Measurement functions setup" on page 126.
- 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.
- Optionally, you can make a screenshot of your measurement and the current settings of your connected oscilloscope. See Chapter 6.6, "Screenshot", on page 128

# 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.

Scope workspace settings



#### Figure 6-2: 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 28.

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 125.
  - "Graph settings": see "Graph settings" on page 126.

 "Measurement Functions Setup": see "Measurement functions setup" on page 126.

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.



Figure 6-3: Scope workspace header settings

#### Cursor

$\wedge$	Cursor	F	Q	Zo
	Vertica	l Cu	irsor	
	Horizo	ntal	Curso	r
-++-	Cross H	lair	Curso	r

Figure 6-4: Cursor menu

You can add up to two horizontal, vertical or cross-hair cursors. For further available cursor settings, see "Cursor settings" on page 125.

#### Zoom

Zoom In Zoom Reset

Figure 6-5: Zoom menu

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".

Scope workspace settings

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

Figure 6-6: Selected zoom area

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

## Annotation editor

Annotation Editor			×
Text	12	<b>•</b>	olor
Show Symbol		•	
Link To Channel	None	•	
		OK	Cancel

Figure 6-7: Annotation editor dialog

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

The following settings are available:

## Table 6-1: Annotation editor settings

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**

Reset/Scale	Þ
To Default	
Single Scale	
Auto Scale	

Figure 6-8: Reset/Scale menu

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 wave- forms 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.

#### Table 6-2: Reset/Scale settings

#### **Measurements**





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

Table 6-3: Measurement settings

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 over- shoot. The measurement requires at least one com- plete period of the signal.
"Min"	Minimum value within the displayed waveform.
"Peak to Peak"	Difference of maximum and minimum values.

Measurement	Description
"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.

Table 6-4: Diagram settings

	Description
<b>♦ X</b>	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.

Scope workspace settings

Measurement Setup		
▼ Cursor Settings		
Cursor1 🖌 Vertical 🔹	Track Channel	None 🔻
Cursor2 Vertical 🔹	Track Channel	None 🔻
<ul> <li>Graph Settings</li> </ul>		
Hide Axis		
Hide Annotations		
<ul> <li>Measurement Functions Setup</li> </ul>		
Signal Reference Levels(%)		
20/80 10/90		
Gated By Cursor None 🔻		
Measurements		
Max		
High		
Low		
Min		
PeakPeak		
Period		
Frequency		
RisingSlewRate		
FallingSlewRate		

Figure 6-10: Setup dialog

#### **Cursor settings**

Access: "Setup" tab.

Scope workspace settings

▼ (	Cursor Setti	ings				
	Cursor1 🗹	Vertical	•	Track Channel	CH1	•
	Cursor2 🗸	Vertical	•	Track Channel	None	•



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.

•	Graph Settings	
	Hide Axis	
	Hide Annotations	

Figure 6-12: Graph settings dialog

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 123.

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

•	Measurement Functions Setup					
	Signal Reference Levels(%)					
	<ul><li>20/80</li><li>10/90</li></ul>					
	Gated By Cursor Cursor1 🔻					
	Measurements					
	Max					
	✓ High					
	✓ Low					
	Min					
	✓ PeakPeak					
	Period					
	Frequency					
	✓ RisingSlewRate					
	✓ FallingSlewRate					

## 6.3.3 Context menu

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

	Add Annotation		
	Copy Graphics		
<b>Q</b>	Zoom		
$\times$	AutoScale Current Channel		

Figure 6-13: Context menu of the measurement diagram

- "Add Annotation": opens a dialog to add an annotation, see "Annotation editor" on page 122.
- "Edit Annotation": opens a dialog to edit the annotation.
- "Delete Annotation": deletes the selected annotation. Only available, if you rightclick 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 118.

# 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.

Screenshot



Figure 6-14: Screenshot of an active instrument screen

#### Context menu

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

•

Table 6-5: Context menu of the instrument snapshot

Copy to clipboard

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

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