R&S®ZVH CABLE AND ANTENNA ANALYZER

For more efficiency in the field

3 year warranty

Product Brochure
Version 07.00

ROHDE&SCHWARZ
Make ideas real

AT A GLANCE

The R&S®ZVH is a rugged, handy cable and antenna analyzer, designed for use in the field. Its low weight and simple operation make it indispensable for anyone who needs an efficient measuring instrument outdoors for the installation and maintenance of antenna systems.

When it comes to the installation or maintenance of antenna systems for mobile radio, broadcasting or radiocommunications, the R&S®ZVH cable and antenna analyzer performs fast, reliable and highly accurate measurements. Even in its basic configuration, the R&S®ZVH detects cable faults, measures the matching of filters and amplifiers and checks the loss of cable connections – the three most important tasks involved in setting up transmitter systems and putting them into operation. For further measurements such as the isolation between transmit and receive antennas or the output power of output amplifiers, suitable options are available to the RF service engineer or maintenance team.

Weighing only 3 kg, the R&S®ZVH is a handy instrument. Frequently used functions have their own function keys and are within fingertip reach. The built-in wizard lets users perform even extended test sequences fast and flawlessly. Using the R&S®InstrumentView software, test reports can be generated in just a few simple operating steps.

The brilliant color display is easy to read even under poor lighting conditions, and it has a monochrome mode for extreme conditions. The capacity of the R&S®ZVH battery enables uninterrupted operation for up to 4.5 hours. The battery is changed within seconds. And if it rains? No problem – all connectors are splash-proof.

Distance-to-fault measurement at a mobile radio antenna system with the R&S®ZVH

KEY FACTS

- Frequency range from 100 kHz to 3.6 GHz or 8 GHz
- 100 dB (typ.) dynamic range for filter and antenna isolation measurements
- Factory calibration over entire frequency range
- Built-in DC voltage supply (bias) for active components such as amplifiers
- Power meter option
- Saving of measurement results on SD memory card or USB memory stick
- Easy operation with user-configurable test sequences (wizard)
- Easy-to-replace Lithium-ion battery for up to 4.5 h of operation
- Rugged, splash-proof housing for rough work in the field
- Easy handling due to low weight (3 kg with battery) and easy-to-reach function keys

BENEFITS AND KEY FEATURES

Installation of antenna systems

- Distance-to-fault measurements (DTF)
- One-port cable loss measurements
- Reflection measurement
- Transmission measurements
- Built-in DC voltage supply
- Position finding using GPS receiver
- Factory calibration of the R&S®ZVH
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Maintenance of antenna systems

- Two-port vector network analysis
- Vector voltmeter
- Terminating and directional power measurements
- Pulse analysis with wideband power sensors
- Internal channel power meter
- Spectrum analysis measurements
- Spectrogram measurements
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Easy operation

- Test report in just a few steps using the R&S®ZVH wizard
- Channel tables for frequency setting
- Optimal reading of measurement results in any situation
- Operation in different languages
- Easy-to-access, well-protected connectors
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Documentation and remote control

- R&S®InstrumentView software for documenting measurement results
- Remote control via LAN or USB
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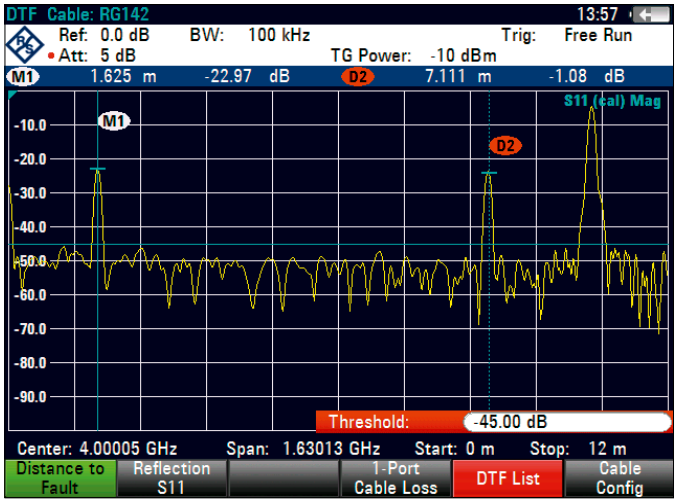
INSTALLATION OF ANTENNA SYSTEMS

The R&S®ZVH masters all measurements required for the installation of antenna systems: distance-to-fault measurements on cables, one-port cable loss measurements and measurement of antenna matching.



Distance-to-fault (DTF) measurement

List display of cable faults that exceed a predefined threshold

After an antenna system has been installed, the next step is to ensure it provides the coverage specified by the network planner. The installer must perform an acceptance test to verify that the antenna cable and the antenna are functioning properly. For this type of work, the R&S®ZVH provides all of the necessary test functions in its standard version.

Distance-to-fault measurements (DTF)

Pinched cables and loose or corroded cable connections severely impair the transmission of the transmit or receive signal. The distance-to-fault function measures the exact distance to the location of the fault. A threshold value defines which cable faults are out of tolerance and are to be added to the list of faults. This considerably simplifies the evaluation of the measurement.

One-port cable loss measurements

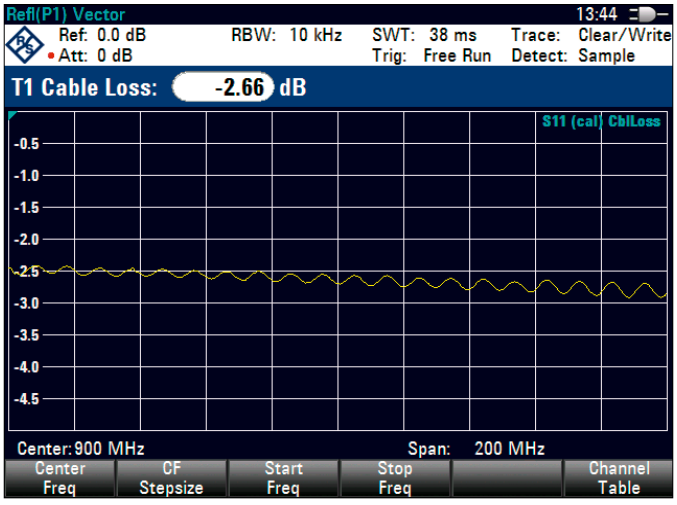
The R&S®ZVH makes it easy to determine the cable loss of already installed cables. Simply connect one end of the cable to the R&S®ZVH test port and terminate the other end with a short or leave it open.

Reflection measurement

A reflection measurement measures with high precision the matching of antennas and amplifiers. The measurement is based on vector system error correction. Results are displayed either as return loss (dB) or as VSWR.

Transmission measurements

The R&S®ZVH-K39 option is used to measure the transmission characteristics of components such as filters and amplifiers. The R&S®ZVH delivers insertion loss or gain characteristics in just a few operating steps. The high dynamic range of typically up to 100 dB enables the user to measure the isolation between antennas.



One-port cable loss measurement

Reflection measurement

TMA transmission measurement: built-in voltage supply, current measurement with R&S®HA-Z240 GPS receiver connected

Built-in DC voltage supply

The built-in DC bias supplies power to active DUTs such as amplifiers at both test ports via the RF cable. This function is especially useful for tower-mounted amplifiers (TMA). The voltage of the internal DC source can be set in steps as small as 1 V in the range from 12 V to 32 V. The maximum current is 500 mA. If the power delivered by the internal source is not sufficient, an external voltage source of max. 50 V and 600 mA can be connected to supply active components, usually amplifiers.

Position finding using GPS receiver

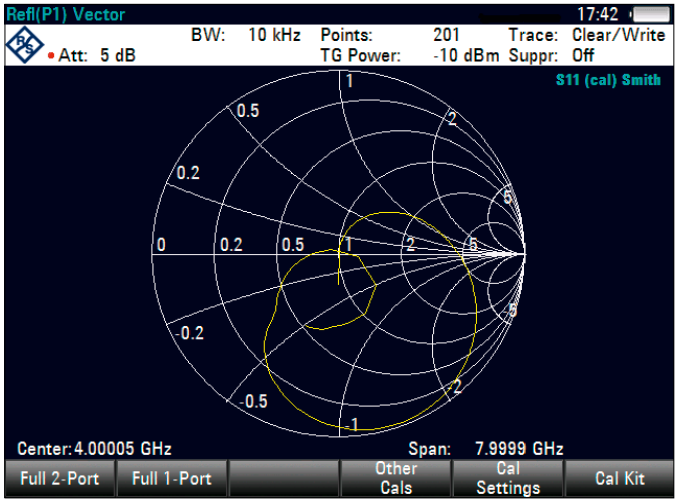
By using the R&S®HA-Z240 GPS receiver, the R&S®ZVH documents where a measurement is carried out. The display indicates the longitude, latitude and altitude of the site. If required, the position can be stored together with the measurement results for documentation purposes.

Factory calibration of the R&S®ZVH

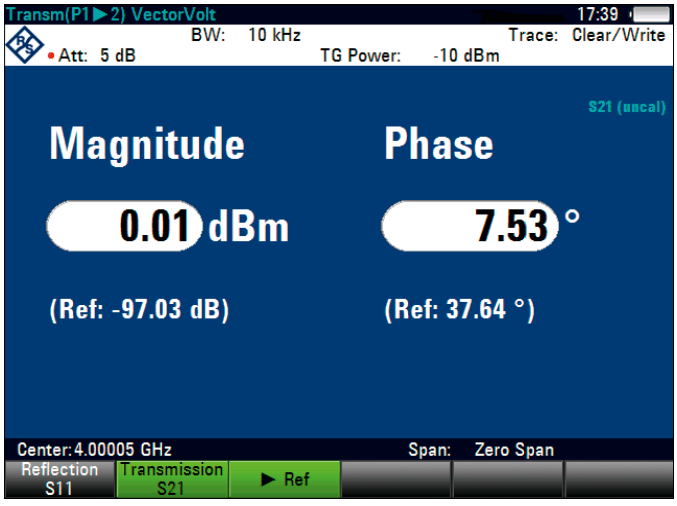
The R&S®ZVH is delivered factory-calibrated and ready to measure. There is no need to calibrate before making measurements such as return loss, VSWR, DTF and one-port cable loss in a base station cable and antenna system.

When using an RF jumper cable or an adapter to connect the R&S®ZVH to the DUT, the easy one-port normalization technique compensates the introduced attenuation. The easy one-port normalization is applied on top of the factory calibration and does not require a calibration standard.

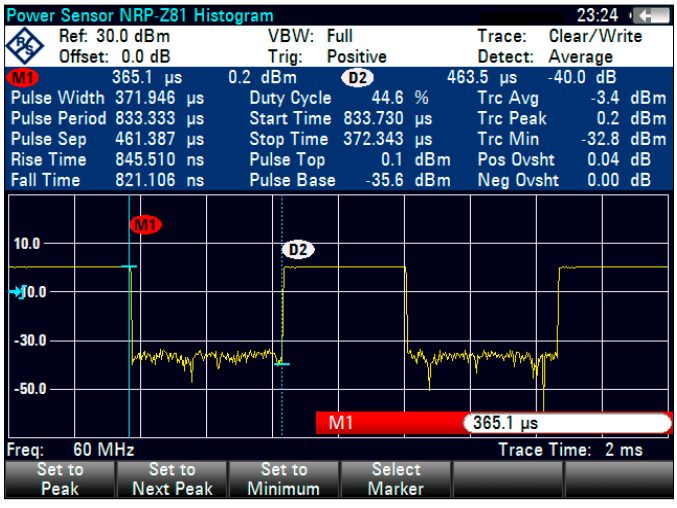
MAINTENANCE OF ANTENNA SYSTEMS



Vector network analysis: measurement with Smith chart



Vector voltmeter display



Pulse analysis with R&S®ZVH-K29 and R&S®NRP-Z81 wideband power sensors

By adding options, the R&S®ZVH is ready to handle additional requirements such as two-port vector network analysis, vector voltmeter, power measurements and spectrum analysis. Other functions can be easily added through software enabling or accessories – with no need for servicing.

Two-port vector network analysis

The R&S®ZVH-K42 option transforms the R&S®ZVH into a two-port vector network analyzer. Matching and transmission characteristics of filters, amplifiers, etc. can be determined quickly and with high accuracy in the forward and reverse direction with only one test setup.

- Increased measurement accuracy due to vector system error correction
- Measurement of magnitude and phase of S-parameters S_{11}, S_{21}, S_{12} and S_{22}
- Simultaneous display of magnitude and phase in split-screen mode
- Simultaneous display of four different S-parameters
- Smith chart with zoom function
- Support of all conventional marker formats
- Input of a reference impedance for DUTs with an impedance other than 50 Ω
- Electrical length measurement
- Determination of group delay

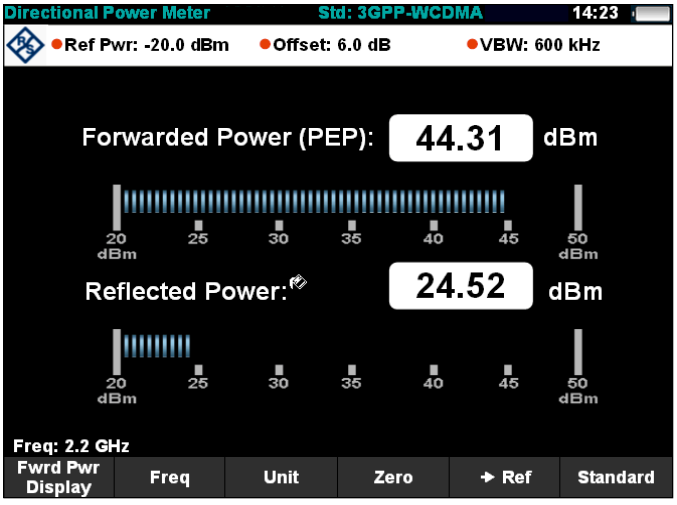
Vector voltmeter

The R&S®ZVH-K45 vector voltmeter option displays the magnitude and phase of a DUT on a fixed frequency. Therefore, the R&S®ZVH can replace a conventional vector voltmeter for many applications. The required signal source and bridge are already available in the R&S®ZVH. Costs are saved and the test setup is significantly simplified, making the R&S®ZVH-K45 ideal for field use. For relative measurements, the measurement results of a reference DUT are stored at the press of a button. Comparison measurements, e.g. between different RF cables and a reference cable (golden device), can be quickly and easily performed. Typical applications:

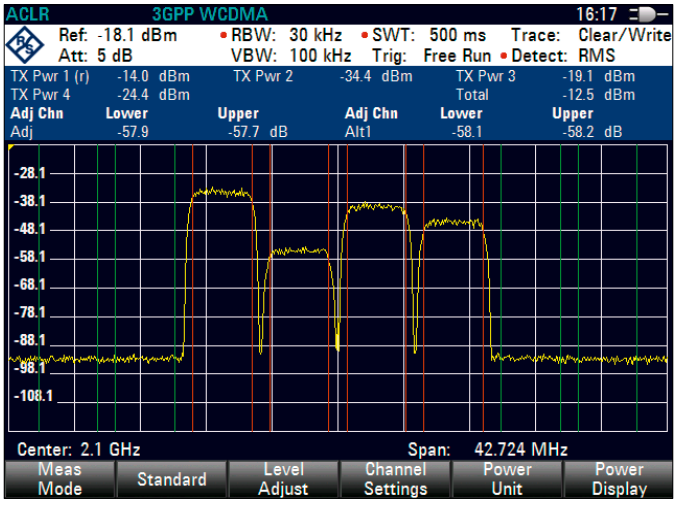
- Adjustment of electrical cable length
- Checking of phase-controlled antennas as used, for example, in air traffic control with an instrument landing system (ILS)

Terminating and directional power measurements

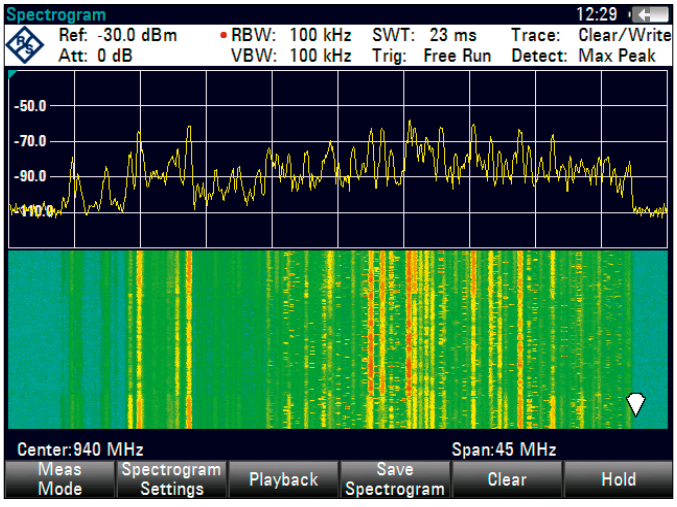
When equipped with R&S®NRP-Zxx or R&S®FSH-Zxx terminating power sensors and the R&S®ZVH-K9 option, the R&S®ZVH becomes an accurate RF power meter with a measurement range from –67 dBm to +45 dBm. Whichever sensor is used, the true RMS value of the measured signal is obtained over the entire measurement range regardless of the signal waveform. The R&S®ZVH-K9 option in combination with the R&S®FSH-Z14 and R&S®FSH-Z44



Measurement of the forward (TX output) and the reflected power of an antenna



ACLR measurement on a 3GPP WCDMA signal with four carriers



Simultaneous display of spectrum and spectrogram

directional power sensors transforms the R&S®ZVH into a full-featured directional power meter for the frequency ranges from 25 MHz to 1 GHz and from 200 MHz to 4 GHz. The R&S®ZVH can then simultaneously measure the output power and the matching of transmitter systems antennas under operating conditions. The power sensors measure average power up to 120 W and eliminate the need for extra attenuators. In addition, the peak envelope power (PEP) up to max. 300 W can be determined.

Pulse analysis with wideband power sensors

When equipped with the R&S®ZVH-K29 option and a R&S®NRP-Z81/-Z85/-Z86 wideband power sensor, the R&S®ZVH can measure peak power and the main pulse parameters up to 44 GHz.

Internal channel power meter

The R&S®ZVH-K19 option enables the R&S®ZVH to measure channel power without an external power sensor with the same accuracy as the R&S®ZVH-K1 spectrum analysis option. The measurement amplitude range goes up to +30 dBm. The frequency range covers the full R&S®ZVH frequency span. The channel bandwidth can be set up to 1 GHz and allows measuring all types of signals, including modulated signals such as LTE, WCDMA, etc.

Spectrum analysis measurements

The R&S®ZVH-K1 option equips the R&S®ZVH for spectrum analysis and offers the following measurement functions:

- Channel power
- Occupied bandwidth
- Power on pulsed TDMA signals
- Adjacent channel power (ACLR)
- Spurious emissions (spectrum emission mask)
- Measurements of the modulation spectrum on pulsed signals with gated sweep
- Field strength with directional or isotropic antenna
- Measurements of signal distortions caused by harmonics
- AM modulation depth measurements
- Frequency counter
- Noise marker
- AM/FM audio frequency demodulator

Spectrogram measurements

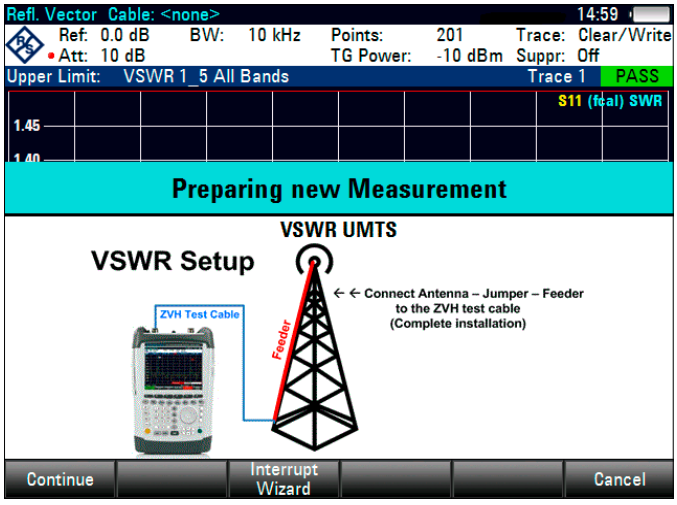
Equipped with the R&S®ZVH-K14 spectrogram measurement application, the R&S®ZVH can provide a history of the spectrum. This application can be used to analyze intermittent faults or time-dependent frequency and level variations. Specific analyses can be made by replaying recorded data and setting time lines and markers.

EASY OPERATION

The built-in wizard lets users easily and quickly run even complex test sequences for the installation and maintenance of antenna systems. All frequently used functions such as calibration, frequency, marker and measurement functions are directly accessible via keys.

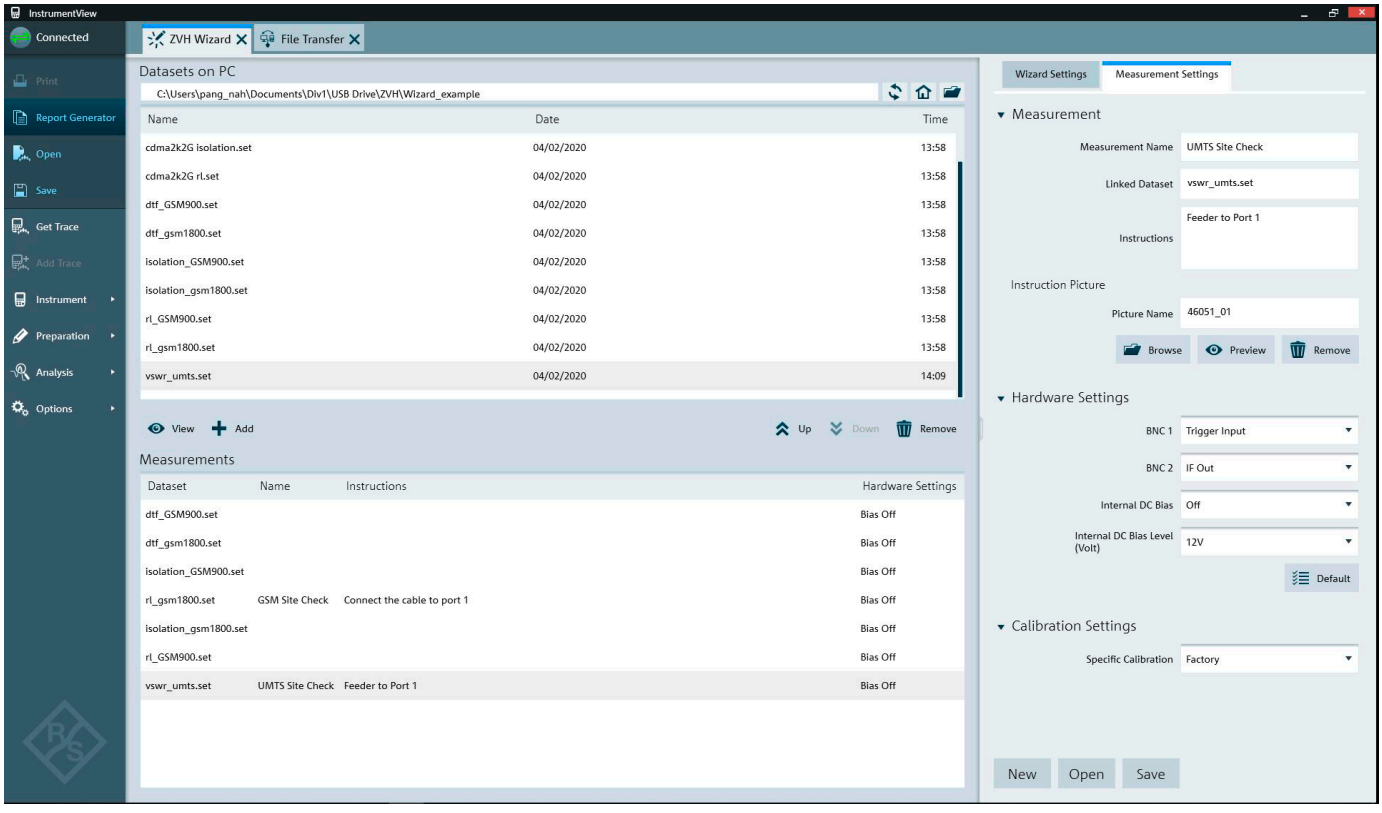
All basic settings can be conveniently made in a straightforward list. Measurement results and the instrument settings are saved to the internal memory, the replaceable SD memory card or the USB memory stick. Predefined instrument settings can be locked to prevent them from being changed unintentionally. This reduces the risk of incorrect measurements.

User-defined test sequences can be selected and started using the WIZARD key. For documentation purposes, the contents of a screenshot can be saved as a graphics file – with a single keystroke.



Each individual measurement in a test sequence can be assigned comments and pictures providing helpful information to the user

Using the wizard set in R&S®InstrumentView preparation tab, predefined instrument settings can be combined into test sequences on a PC and then transferred to the R&S®ZVH



Test report in just a few steps using the R&S®ZVH wizard

When an antenna is being installed, customers usually request a test report. The required measurements are defined in test instructions. The R&S®ZVH wizard makes this procedure easy for the user and eliminates the need to consult the installation instructions. Configuring the R&S®ZVH wizard is very simple.

First, the user makes the instrument settings on the R&S®ZVH for each of the individual measurements as described in the test instructions, saves them and transfers them to a PC. Next, using the R&S®InstrumentView on the PC, the user combines the settings of all individual measurements into a single test sequence. Here, the user can add comments and pictures with instructions for the field engineer to each measurement. These instructions will be displayed on the R&S®ZVH at the beginning of the measurement. Last, the user transfers the data set containing the complete test sequence to the R&S®ZVH. After the test sequence is started on the instrument, the dialog based wizard guides the user through the measurements and automatically saves the results.

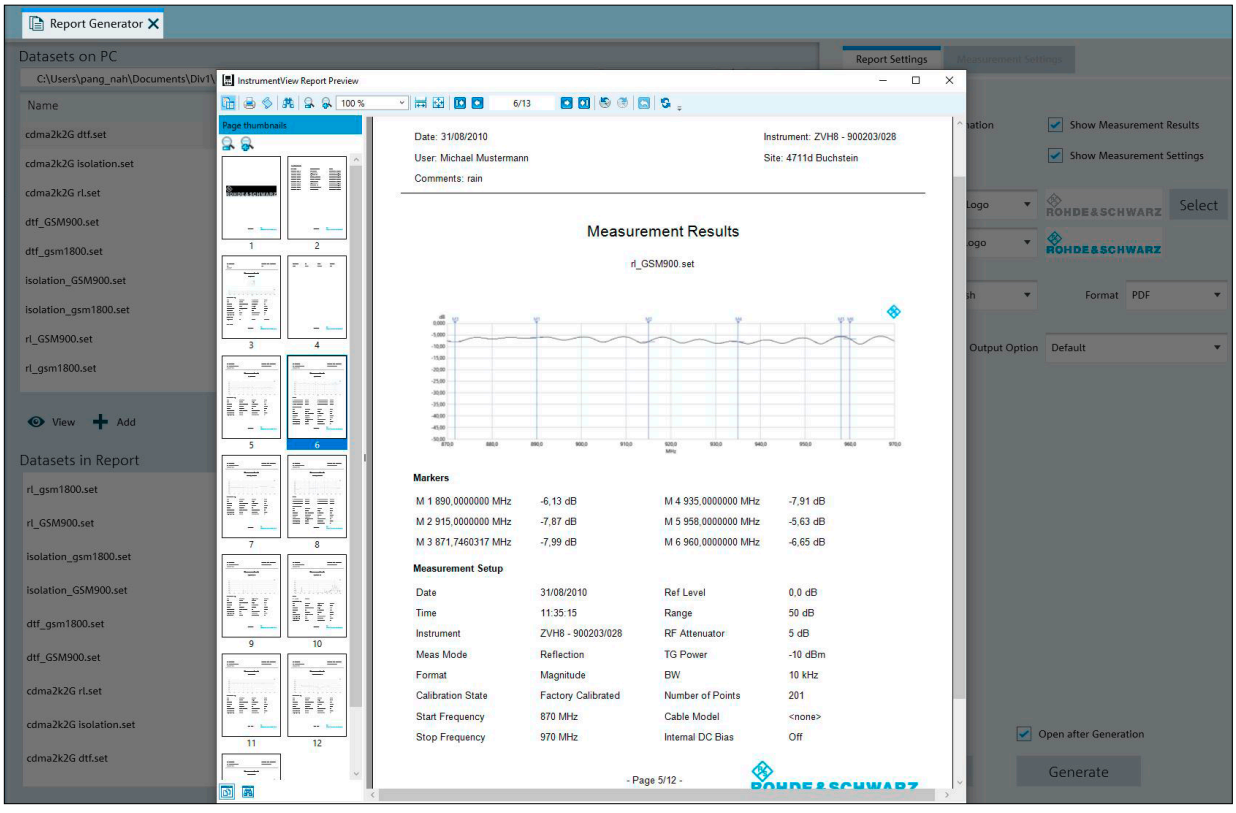
Consequently, for the user on site, it takes only four steps to generate a test report:

First step: Select the test sequence via the WIZARD key
Second step: Perform the specified measurements
Third step: Save the results on the R&S®ZVH
Fourth step: Transfer the measurement results to the PC and generate a test report

The advantages for the user:

- Easy creation of test sequences using the wizard
- Incorrect measurements are avoided thanks to predefined test sequences and on-screen instructions
- Reproducible measurement results
- Time is saved by speeding up the installation process
- All members of an installation team use the same test sequence
- Uniform test report format

With just a few mouse clicks, the individual results of a test sequence are combined into a conclusive test report



Selecting the channel table

Channel tables for frequency setting

As an alternative to entering a frequency, the R&S®ZVH can be tuned using channel numbers. Both the channel number and the center frequency are displayed. Users who are familiar with the channel assignments commonly used in mobile communications or TV/broadcast applications can operate the R&S®ZVH even more easily. For a large number of countries, channel tables for the GSM, 3GPP WCDMA, TD-SCDMA, CDMA2000® and LTE mobile communications standards as well as TV channel tables are supplied with the R&S®ZVH.

Optimal reading of measurement results in any situation

The measurement results on the bright, straightforward 6.5" VGA color display are very easy to read. The backlighting of the display can be adjusted to the ambient lighting conditions. For use in extremely strong sunlight, a special monochrome mode provides optimal contrast.

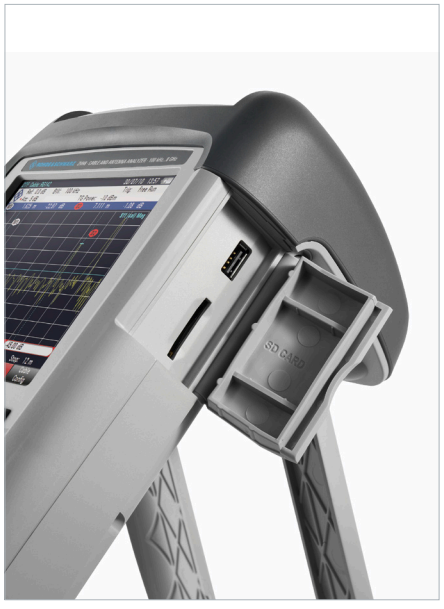
Operation in different languages

The R&S®ZVH user interface is available in various languages. Almost all of the softkeys, operating instructions and messages will be displayed in the selected language. The R&S®ZVH supports the following languages: English, German, Korean, Japanese, Chinese, Russian, Italian, Spanish, Portuguese, French and Hungarian.

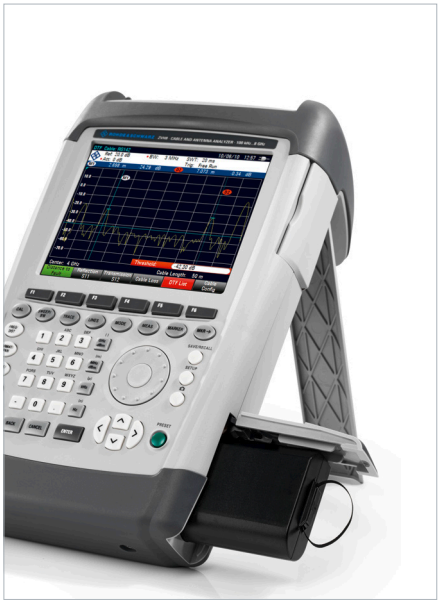
Easy-to-access, well-protected connectors

Additional inputs/outputs such as the DC voltage supply (bias), interfaces and the SD memory card are easily accessible under dust-proof hinged covers on the side of the instrument.

Additional connectors (e.g. for SD memory card and USB interface) are protected by hinged covers



Easy-to-replace lithium-ion battery for up to 4.5 h of operation



OPERATING ELEMENTS

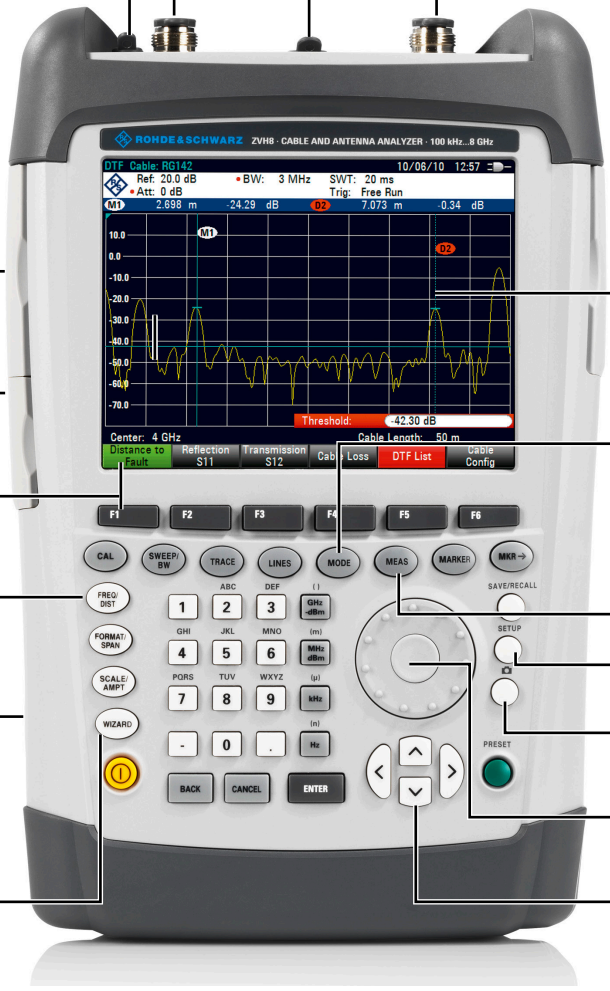
RF input

Connector for power sensor

Connector for headphones

Tracking generator output

- External trigger input
- External reference input
- Bias input
- Connector for GPS receiver



Color LCD (640 × 480 pixel), can be switched to high-contrast monochrome display in extreme sunlight

LAN/USB interface for remote control

Selection of operating mode (cable and antenna measurements, power measurement, etc.)

Simple menu based operation via softkeys

Selection of measurement function (distance-to-fault, reflection or transmission measurement, etc.)

Function keys

General instrument setup

Kensington lock

Screenshot

Rotary knob with Enter button

Wizard for calling up user-defined test sequences

Cursor keys

The R&S®ZVH with terminating power sensor

The R&S®ZVH with directional power sensor

DOCUMENTATION AND REMOTE CONTROL

The supplied R&S®InstrumentView software makes it easy to document measurement results and manage instrument settings.

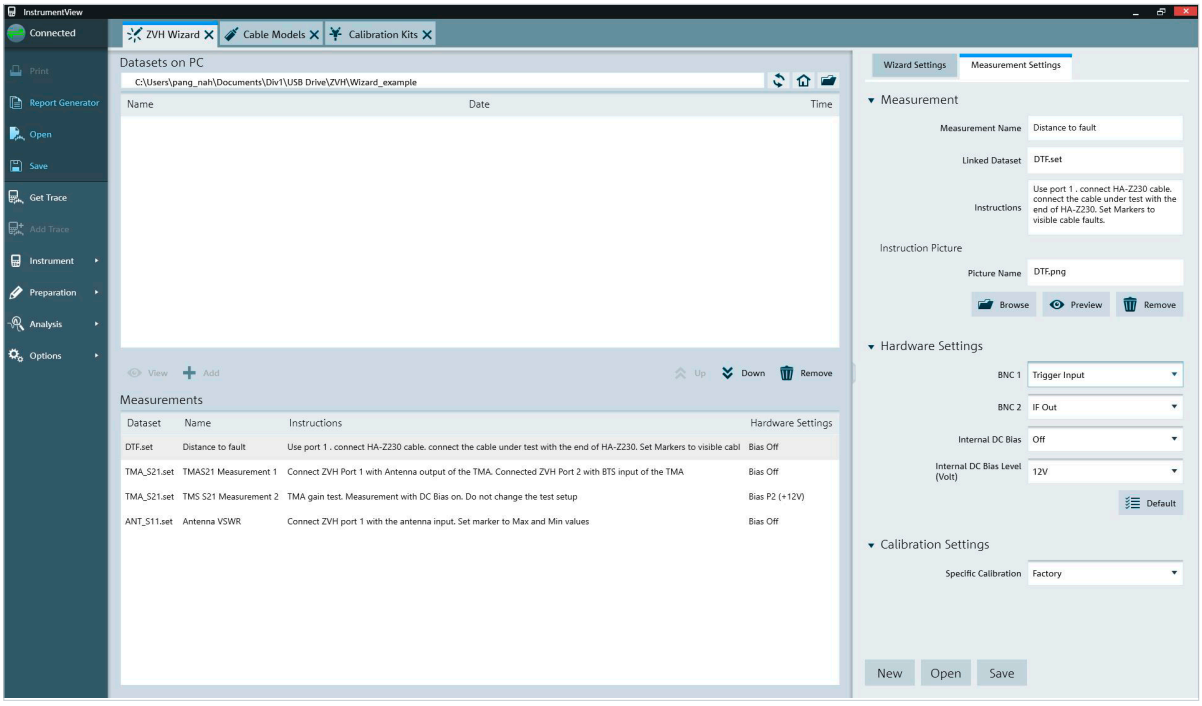
R&S®InstrumentView software for documenting measurement results

- High-volume data exchange between the R&S®ZVH and a PC via a USB or LAN connection
- Easy processing of measurement results thanks to data export in Excel format (.csv)
- Storage of graphics data in .jpg, .tiff, .jpg, .png and .bmp format
- Generation of user-defined test sequences (wizard)
- Easy creation of test reports in .pdf, .html and .rtf format
- Printout of all relevant data via Windows PC
- Remote signal monitoring via USB/LAN with a remote display and lab display
- Simple comparison of measurement results within the same workspace by using the “Add Trace” function
- Automatic storage of measurement results with “Multi Transfer” (continuous sweep retrieval with interval) in AutoSave session
- Subsequent analysis of measurement results by displaying/hiding and moving markers
- Generation of cable data using a cable model editor and file transfer to download to the R&S®FSH for distance-to-fault measurements
- R&S®InstrumentView supports the following editors:
  - Transducers
  - Cable models
  - Calibration kits
  - Limit lines
  - Channel tables
  - Standards
  - Quick name tables
  - AM/FM limits
  - Wizard sets
  - (Indoor) Maps
- Compatible with
  - Windows Vista (32/64 bit)
  - Windows 7 (32/64 bit)
  - Windows 8 (32/64 bit)
  - Windows 10 (32/64 bit)

Remote control via LAN or USB

The R&S®ZVH can be remotely controlled via the USB or LAN interface and integrated into user-specific programs. The SCPI-compatible remote control commands are activated by the R&S®ZVH-K40 option. The remote display included with the R&S®InstrumentView software shows the R&S®ZVH screen in real time and allows users to operate the instrument remotely via USB or LAN for training and presentation purposes.

The R&S®InstrumentView software



SPECIFICATIONS IN BRIEF

Specifications in brief			
		R&S®ZVH4	R&S®ZVH8
Frequency range		100 kHz to 3.6 GHz	100 kHz to 8 GHz
Standard measurement functions		reflection measurement, distance-to-fault measurement, one-port cable loss measurement	
Output power (port 1, port 2)		0 dBm to –40 dBm (nom.), in 1 dB steps	
Maximum permissible spurious signal level		+17 dBm (nom.)	
Number of points		101, 201, 401, 601, 631, 801, 1001, 1201	
Distance-to-fault (DTF) measurement			
Display modes		return loss (dB), VSWR	
Resolution in meters		(1.58 × velocity factor/span)	
Horizontal display range		3 m to 1500 m	
Reflection measurement			
Directivity	100 kHz to 3 GHz (nom.)	> 43 dB (nom.)	> 43 dB (nom.)
	3 GHz to 3.6 GHz	> 37 dB (nom.)	> 37 dB (nom.)
	3.6 GHz to 6 GHz	–	> 37 dB (nom.)
	6 GHz to 8 GHz	–	> 31 dB (nom.)
Display modes		S_{11}, return loss (dB), VSWR, one-port cable loss	
	vector network analysis (R&S®ZVH-K42)	S_{11}, S_{22}, magnitude, phase, magnitude + phase, Smith chart, VSWR, reflection coefficient, mp, one-port cable loss, electrical length, group delay	
	vector voltmeter (R&S®ZVH-K45)	magnitude + phase, Smith chart	
Transmission measurement (with R&S®ZVH-K39 or R&S®ZVH-K42)			
Dynamic range (S_{21}, S_{12})	100 kHz to 300 kHz	> 50 dB (nom.)	> 50 dB (nom.)
	300 kHz to 2.5 GHz	> 80 dB, typ. 100 dB	> 80 dB, typ. 100 dB
	2.5 GHz to 3.6 GHz	> 70 dB, typ. 90 dB	> 70 dB, typ. 90 dB
	3.6 GHz to 6 GHz	–	> 70 dB, typ. 90 dB
	6 GHz to 8 GHz	–	> 50 dB (nom.)
Display modes	transmission measurement (R&S®ZVH-K39)	S_{21}, magnitude in dB (loss, gain)	
	vector network analysis (R&S®ZVH-K42)	S_{21}, S_{12}, magnitude (loss, gain), phase, magnitude + phase, electrical length, group delay	
	vector voltmeter (R&S®ZVH-K45)	magnitude + phase	
DC voltage supply (DC bias, port 1 and port 2)			
Voltage range	internal voltage supply	+12 V to +32 V, in 1 V steps	
Maximum output power		4 W (battery), 10 W (AC supply)	
Maximum current		500 mA	
Maximum voltage	external voltage supply	50 V	
Maximum current		600 mA	
General data			
Display		6.5" color LCD with VGA resolution	
Battery operating time	R&S®HA-Z204, 4.2 Ah	up to 3 h	
	R&S®HA-Z206, 6.3 Ah	up to 4.5 h	
Dimensions (W × H × D)		194 mm × 300 mm × 69 mm (144 mm) [1] (7.6 in × 11.8 in × 2.7 in (5.7 in)) [1]	
Weight		< 3 kg (6.6 lb)	

[1] With carrying handle.

ORDERING INFORMATION

Designation	Type	Order No.
Base unit		
Cable and antenna analyzer, 100 kHz to 3.6 GHz	R&S®ZVH4	1309.6800.24
Cable and antenna analyzer, 100 kHz to 8 GHz	R&S®ZVH8	1309.6800.28
Accessories supplied		
Lithium-ion battery pack (4.2 Ah), USB cable, LAN cable, plug-in power supply, CD-ROM with R&S®InstrumentView software and documentation, quick start guide		
Software options (usually via software license)		
Spectrum analysis application	R&S®ZVH-K1	1309.6823.02
Power meter measurement application with R&S®FSH-Zxx or R&S®NRP-Zxx power sensors (R&S®FSH-Zxx or R&S®NRP-Zxx power sensors required) [1]	R&S®ZVH-K9	1309.6852.02
Channel power meter	R&S®ZVH-K19	1304.5987.02
Spectrogram measurement application	R&S®ZVH-K14	1309.7007.02
Pulse measurements with power sensor [2]	R&S®ZVH-K29	1304.0491.02
Transmission measurement application	R&S®ZVH-K39	1309.6830.02
Remote control via USB or LAN application	R&S®ZVH-K40	1309.7013.02
Vector network analysis application	R&S®ZVH-K42	1309.6846.02
Vector voltmeter measurement application	R&S®ZVH-K45	1309.6998.02
Accessories		
RF cable (length: 1 m), N male/N female, for R&S®FSH-K41 option, DC to 8 GHz	R&S®FSH-Z320	1309.6600.00
RF cable (length: 3 m), N male/N female, for R&S®FSH-K41 option, DC to 8 GHz	R&S®FSH-Z321	1309.6617.00
Calibration unit, 2 MHz to 4 GHz	R&S®ZN-Z103	1321.1828.02
Calibration unit, 1 MHz to 6 GHz	R&S®ZN-Z103	1321.1828.12
Combined open/short/50 Ω load calibration standard, for calibrating the VSWR and DTF measurements, DC to 3.6 GHz	R&S®FSH-Z29	1300.7510.03
Combined open/short/50 Ω load calibration standard, for calibrating the VSWR and DTF measurements, DC to 8 GHz	R&S®FSH-Z28	1300.7810.03
Calibration kit, N male, 50 Ω, open/short/match/through combination, 0 Hz to 9 GHz	R&S®ZV-Z170	1317.7683.02
Calibration kit, N female, 50 Ω, open/short/match/through combination, 0 Hz to 9 GHz	R&S®ZV-Z170	1317.7683.03
Matching pad, 50 Ω/75 Ω, bidirectional, 0 Hz to 2.7 GHz, N female/N male, load capacity 2 W, series resistor 25 Ω	R&S®RAZ	0358.5714.02
Matching pad, 50 Ω/75 Ω, bidirectional, 0 Hz to 2.7 GHz, N female/N male, load capacity 2 W, series resistor 25 Ω	R&S®RAM	0358.5414.02
Matching pad, 50 Ω/75 Ω, bidirectional, 0 Hz to 1 GHz, BNC female/N male, load capacity 1 W	R&S®FSH-Z38	1300.7740.02
Adapter, N male/BNC female		0118.2812.00
Adapter, N male/N male		0092.6581.00
Adapter, N male/SMA female		4012.5837.00
Adapter, N male/7/16 female		3530.6646.00
Adapter, N male/7/16 male		3530.6630.00
Adapter, N male/FME female		4048.9790.00
Adapter, BNC male/banana female		0017.6742.00
Attenuator, 50 W, 20 dB, 50 Ω, DC to 6 GHz, N female/N male	R&S®RDL50	1035.1700.52
Attenuator, 100 W, 20 dB, 50 Ω, DC to 2 GHz, N female/N male	R&S®RBU100	1073.8495.20
Attenuator, 100 W, 30 dB, 50 Ω, DC to 2 GHz, N female/N male	R&S®RBU100	1073.8495.30
GSM/UMTS/CDMA antenna, with magnetic mount, 850/900/1800/1900/2100 MHz band, N connector	R&S®TS95A16	1118.6943.16
Lithium-ion battery pack, 4.2 Ah	R&S®HA-Z204	1309.6130.00
Lithium-ion battery pack, 6.3 Ah	R&S®HA-Z206	1309.6146.00
Battery charger for lithium-ion battery pack, 4.2 Ah/6.3 Ah [3]	R&S®HA-Z203	1309.6123.00
12 V car adapter	R&S®HA-Z202	1309.6117.00
Soft carrying bag (W × H × D: 260 mm × 360 mm × 280 mm; 10.3 in × 14.2 in × 11.0 in)	R&S®HA-Z220	1309.6175.00

Designation	Type	Order No.
Hard case	R&S®HA-Z321	1321.1357.02
Carrying holster including chest harness and rain cover	R&S®HA-Z222	1309.6198.00
SD memory card, 8 Gbyte	R&S®HA-Z232	1309.6223.00
GPS receiver	R&S®HA-Z240	1309.6700.03
Spare USB cable	R&S®HA-Z211	1309.6169.00
Spare LAN cable	R&S®HA-Z210	1309.6152.00
Spare AC adapter	R&S®HA-Z201	1309.6100.00
Spare CD-ROM with R&S®InstrumentView software and documentation	R&S®ZVH-Z45	1309.6946.00
Printed quick start guide for R&S®ZVH, English	R&S®ZVH-Z46	1309.6900.12
Printed quick start guide for R&S®ZVH, German	R&S®ZVH-Z47	1309.6900.11
Power sensors supported by the R&S®ZVH-K9 option (average power measurement)		
Directional power sensor, 25 MHz to 1 GHz	R&S®FSH-Z14	1120.6001.02
Directional power sensor, 200 MHz to 4 GHz	R&S®FSH-Z44	1165.2305.02
Universal power sensor, 1 nW to 100 mW, 10 MHz to 8 GHz [1),2)]	R&S®NRP-Z211	1417.0409.02
Universal power sensor, 1 nW to 100 mW, 10 MHz to 18 GHz [1),2)]	R&S®NRP-Z221	1417.0309.02
Wideband power sensor, 1 nW to 100 mW, 50 MHz to 18 GHz [1),2)]	R&S®NRP-Z81	1137.9009.02
Wideband power sensor, 1 nW to 100 mW, 50 MHz to 40 GHz (2.92 mm) [1),2)]	R&S®NRP-Z85	1411.7501.02
Wideband power sensor, 1 nW to 100 mW, 50 MHz to 40 GHz (2.40 mm) [1),2)]	R&S®NRP-Z86	1417.0109.40
Wideband power sensor, 1 nW to 100 mW, 50 MHz to 44 GHz (2.40 mm) [1),2)]	R&S®NRP-Z86	1417.0109.44
Three-path diode power sensor, 100 pW to 200 mW, 10 MHz to 8 GHz	R&S®NRP8S	1419.0006.02
Three-path diode power sensor, 100 pW to 200 mW, 10 MHz to 18 GHz	R&S®NRP18S	1419.0029.02
Three-path diode power sensor, 100 pW to 200 mW, 10 MHz to 33 GHz	R&S®NRP33S	1419.0064.02
Three-path diode power sensor, 100 pW to 200 mW, 50 MHz to 40 GHz	R&S®NRP40S	1419.0041.02
Three-path diode power sensor, 100 pW to 200 mW, 50 MHz to 50 GHz	R&S®NRP50S	1419.0087.02
Thermal power sensor, 300 nW to 100 mW, DC to 18 GHz	R&S®NRP18T	1424.6115.02
Thermal power sensor, 300 nW to 100 mW, DC to 33 GHz	R&S®NRP33T	1424.6138.02
Thermal power sensor, 300 nW to 100 mW, DC to 40 GHz	R&S®NRP40T	1424.6150.02
Thermal power sensor, 300 nW to 100 mW, DC to 50 GHz	R&S®NRP50T	1424.6173.02
Thermal power sensor, 300 nW to 100 mW, DC to 67 GHz	R&S®NRP67T	1424.6196.02
Thermal power sensor, 300 nW to 100 mW, DC to 110 GHz	R&S®NRP110T	1424.6215.02
Average power sensor, 100 pW to 200 mW, 8 kHz to 6 GHz	R&S®NRP6A	1424.6796.02
Average power sensor, 100 pW to 200 mW, 8 kHz to 18 GHz	R&S®NRP18A	1424.6815.02

[1)] For the R&S®NRP-Zxx power sensors, the R&S®NRP-Z4 USB adapter is also required.
[2)] Requires R&S®FSH-Z129 for R&S®ZVH4 with serial numbers < 115331 and R&S®ZVH8 with serial numbers < 115239.
[3)] Battery charger is required to charge the battery pack outside the R&S®ZVH.

Warranty		
Base unit		3 years
All other items [1)]		1 year
Options		
Extended warranty, one year	R&S®WE1	Please contact your local Rohde&Schwarz sales office.
Extended warranty, two years	R&S®WE2	
Extended warranty with calibration coverage, one year	R&S®CW1	
Extended warranty with calibration coverage, two years	R&S®CW2	
Extended warranty with accredited calibration coverage, one year	R&S®AW1	
Extended warranty with accredited calibration coverage, two years	R&S®AW2	

[1)] For options that are installed, the remaining base unit warranty applies if longer than 1 year. Exception: all batteries have a 1 year warranty.

Your local Rohde&Schwarz expert will help you to determine the optimum solution for your requirements.
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