

# R&S® Spectrum Rider FPH Handheld Spectrum Analyzer Small form factor to handle big tasks

3 year  
warranty





# R&S® Spectrum Rider Handheld Spectrum Analyzer

## At a glance

The R&S® Spectrum Rider FPH is a versatile, user-friendly instrument in a rugged and appealing design. Each basic model has a unique frequency extension concept via keycode. The analyzer supports a wide frequency range up to 31 GHz.

The R&S® Spectrum Rider FPH is designed to suit both field and lab applications in indoor and in outdoor environments. Large buttons and a multifunction rotary control allow operation even with gloves. Its backlit keypad makes the analyzer also usable in the dark, and the bright non-reflecting display makes it readable in the sunshine. The battery lasts an entire working day. Its light weight, small form factor and ruggedness make the analyzer easy to carry. The instrument is a reliable companion even in harsh and difficult-to-reach environments.

Due to its fanless design, the analyzer operates noise free and is clean and reliable since no dust or water can slip in through the vent guard.

The small form factor does not limit the performance and capabilities of the R&S® Spectrum Rider FPH. Thanks to its solid RF performance, its short boot time and its ease of use, the R&S® Spectrum Rider FPH is the perfect instrument for spectrum measurements in the lab or in service applications.

The state-of-the-art touchscreen allows operation using smartphone-like touch gestures. An on-screen keyboard and many other functions make the life of the user easier.

### Key facts

- Frequency ranges from 5 kHz up to 31 GHz
- Frequency extensions via keycode
  - From 5 kHz down to 100 Hz (applicable to model .06/.13/.26)
  - From 2 GHz to 3 GHz or 4 GHz
  - From 6 GHz to 8 GHz
  - From 13.6 GHz to 20 GHz
  - From 26.5 GHz to 31 GHz
- Spectrum analysis for e.g.
  - Mobile communications
  - Radar and satellite communications
  - Broadcasting
- Solid RF performance
  - DANL: typ.  $-163$  dBm (10 MHz to 3 GHz, preamplifier on)
  - TOI measurement:  $+10$  dBm ( $f = 2.4$  GHz)
- Ideal for field use:  $> 6$  hour battery life, 2.5 kg (5.5 lb) weight, backlit keypad, fast boot time, nonreflective display, small footprint, ruggedized housing
- Large color display with touch and gesture operation
- Measurement wizard that supports measurement campaigns, speeds up measurements and avoids errors
- Features and options for various industries such as aerospace and defense, wireless communications, broadcasting, spectrum regulators and education
- Easy and cost-efficient upgrades of all options via software keycode
- 3-year warranty as standard (battery and accessories have one-year warranty)



# R&S® Spectrum Rider Handheld Spectrum Analyzer

## Benefits and key features

### Excellent in the field

- Lightweight, small and long battery life
  - Wide range of accessories
  - Nonreflective display and backlit keypad designed for outdoor use
  - Ruggedized in line with MIL-PRF-28800F class 2
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### Excellent for lab diagnostics

- Solid RF performance for diagnostics in the lab
  - EMI debugging with optional near-field probes
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### User-friendly

- Easy to use with smartphone-like gestures on the touchscreen
  - Configuration overview menu
  - Setting frequencies with channel tables
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### Future-ready

- Software-upgradeable frequency ranges
- Multipurpose use in various industries, R&D and education
- Easy upgrade of all options via software keycode
- Optional software applications
  - Power measurements with power sensors
  - Internal channel power meter
  - Pulse measurements with power sensors
  - AM/FM analysis

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### Increasing productivity through measurement wizard

- Simplified measurements
- Reproducible and fast measurements

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### Postprocessing and remote control

- R&S®InstrumentView software for measurement postprocessing and documentation
- Remote control via LAN or USB
- R&S®MobileView app for remote control and file transfer

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# Excellent in the field

## Lightweight, small and long battery life

The unique combination of low weight, small footprint, short boot time and the longest battery life on the market makes the R&S®Spectrum Rider FPH ideal for work in the field, even in remote, difficult-to-reach locations.

The R&S®Spectrum Rider FPH can operate an entire working day (more than 6 hours) without recharging or changing the battery. It weighs only 2.5 kg (5.5 lb) including battery.

## Examples of measurements in the field

- Verifying signal transmission (e.g. verifying 5G, broadcast, radar and satellite communications link)
- Spectrum checking, site survey
- Interference hunting
- EMF measurement
- Microwave link alignment



Protected connectors and interfaces

## Wide range of accessories

A soft carrying bag, battery charger, spare batteries and other accessories for work in the field are available.

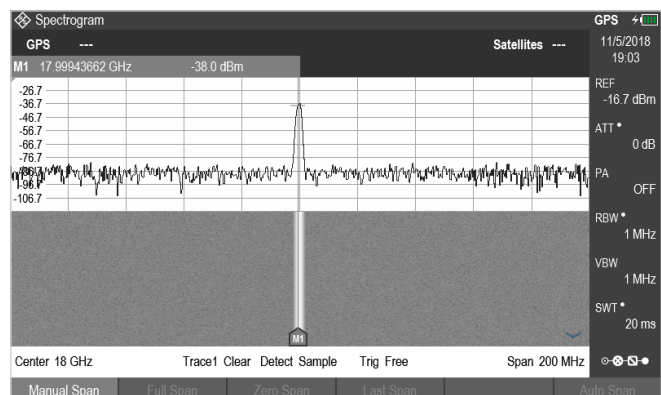
## Nonreflective display and backlit keypad designed for outdoor use

The 18 cm diameter (7") display is nonreflective, i.e. it shows the measurement result and not a mirror image of the operator. Adjusting the brightness makes the display easy to view in outdoor environments. The black-and-white mode makes it readable even in bright sunlight. The keypad can be illuminated for convenient work in dim environments. Large buttons and a rotary knob with enter function make it easy to operate the instrument even when wearing gloves.

## Ruggedized in line with MIL-PRF-28800F class 2

The R&S®Spectrum Rider FPH has no vents or fans that could suck in dirt or water. All interfaces and connectors are protected. The instrument is tested in line with the MIL-PRF-28800F class 2 mechanical test specification for work in rough environments. It is protected against dust and dripping water in line with the IP51 specification.

## High-contrast black and white display mode enhances screen readability



# Excellent for lab diagnostics

## Solid RF performance for diagnostics in the lab

With a phase noise of  $-105$  dBc (1 Hz) at 100 kHz offset from the carrier, a total measurement uncertainty of 0.5 dB and its high sensitivity (displayed average noise level (DANL) of typ.  $< -163$  dBm (10 MHz to 3 GHz with preamplifier on)), the R&S® Spectrum Rider FPH is a powerful and easy-to-use spectrum analyzer for RF diagnostics in service and development labs.

Examples of measurements in the lab:

- Frequency and amplitude of any RF device
- Accurate frequency readings with the frequency counter, e.g. for alignment of frequency references
- Measurement of spurious emissions
- Measurement of harmonics and intermodulation products
- Measurement of pulsed signals in the time domain

## EMI debugging with optional near-field probes

The R&S®HZ-15/R&S®HZ-17 near-field probes are used as diagnostic tools for EMI debugging, e.g. on circuit boards, integrated circuits, cables and shielding. The near-field probe set is ideal for emission measurements from 30 MHz to 3 GHz. The R&S®HZ-16 preamplifier improves measurement sensitivity up to 3 GHz, with approx. 20 dB gain and a noise figure of 4.5 dB. In combination with the R&S® Spectrum Rider FPH, the preamplifier and near-field probe set are a cost-effective means of analyzing and locating disturbance sources during development.

The R&S® Spectrum Rider FPH with near-field probes and DUT



# User-friendly

## Easy to use with smartphone-like gestures on the touchscreen

The R&S®Spectrum Rider FPH offers flexible and straightforward operation. Depending on the application, it can be operated either via its 7" capacitive touchscreen or with keys.

The analyzer's unique capacitive touchscreen enables users to adjust the most common settings, such as center frequency, span and reference level, and manage markers with intuitive gestures as with a smartphone.

Thanks to the large keys and the rotary knob with enter function, the R&S®Spectrum Rider FPH can be easily operated in outdoor environments and even with gloves in winter. There are dedicated softkeys and hardkeys for the most important settings such as frequency, span, amplitude, markers and limit lines.

For documentation purposes, the screenshot button makes it possible to save a graphics file with a single key-stroke. A USB flash drive or a microSD card can be used to collect large amounts of data.

The user interface is available in 11 languages: English, German, Korean, Japanese, Chinese, Russian, Italian, Spanish, Portuguese, French and Hungarian. All these languages are also supported by the convenient on-screen keyboard.

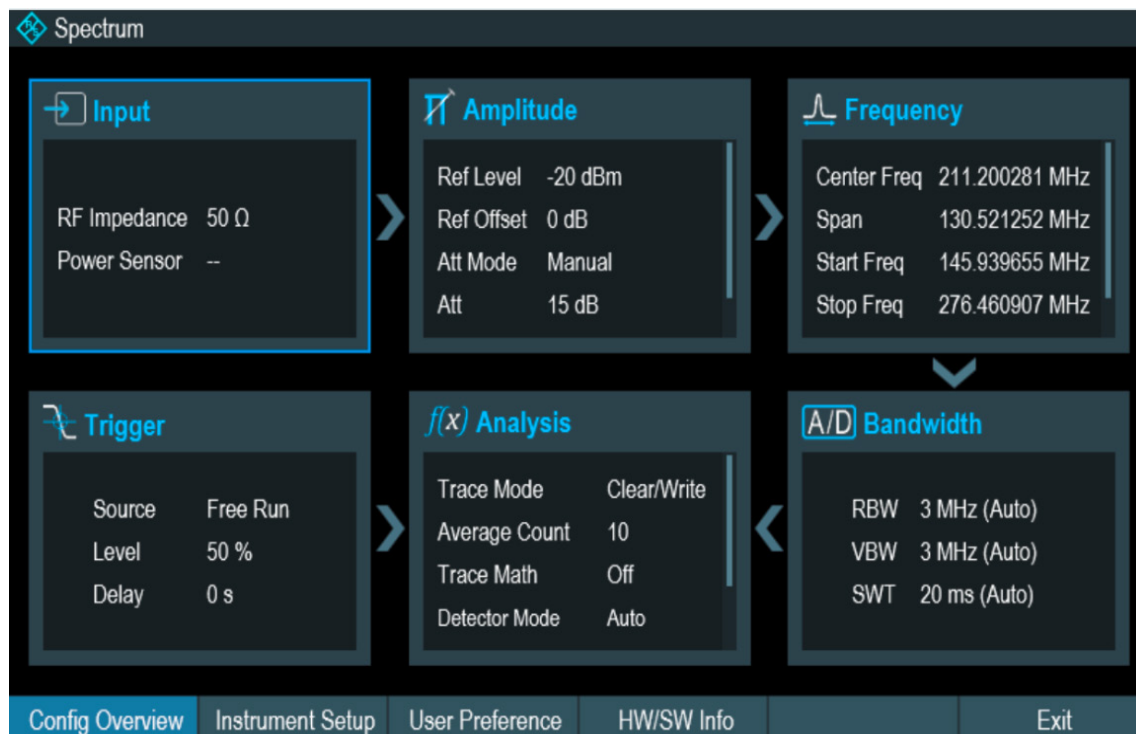
## Configuration overview menu

The configuration overview menu makes it easy for the user to get an overview of the main measurement settings. It shows the flow of spectrum measurements at different receiver stages, along with the relevant parameters that impact the measurements at each stage.

A click on the configuration overview icon provides quick access to the menu for checking and changing frequency, amplitude, bandwidth, etc.

## Setting frequencies with channel tables

Users who prefer to work with channel numbers instead of frequencies can easily do this using the predefined channel tables. The most common channel tables for wireless and broadcast systems are included as standard; users can also add their own channel tables.



Configuration overview menu



Front view



# Future-ready

## Software-upgradeable frequency ranges

The R&S®Spectrum Rider FPH is the first handheld analyzer with software-upgradeable frequency ranges. The units handle frequencies between 5 kHz and up to 31 GHz. There is no downtime for the upgrade and no recalibration needed after the upgrade. This allows users to extend the frequency range whenever required. For example, users who have the 26.5 GHz basic model can easily upgrade their analyzer to 31 GHz by purchasing the R&S®FPH-B31 keycode option when their measurement criteria change.

## Multipurpose use in various industries, R&D and education

The excellent price/performance ratio of the R&S®Spectrum Rider FPH makes it attractive for field engineering companies, repair centers and development labs. The analyzer will also find its place in any RF teaching lab in schools and universities. The R&S®Spectrum Rider FPH includes a wide range of standard features, such as two spectrum traces, AM/FM audio demodulation, remote control and frequency counter, which are used in everyday spectrum analysis tasks. Field engineers and repair labs in various industries will find optional measurement applications for their daily work, as for example peak and average power measurements.

In addition, field strength measurements can be performed by connecting to a directional or isotropic antenna.

## Easy upgrade of all options via software keycode

All options can be easily added using a software keycode. This eliminates extra installation costs and turnaround times because there is no need to send the instrument to a service center for calibration or alignment.

The R&S®Spectrum Rider FPH with an R&S®NRP8S three-path diode power sensor



### Software-upgradeable frequency ranges

R&S®Spectrum Rider FPH	Frequency range	Frequency range upgradable to
Model .02	5 kHz to 2 GHz	3 GHz (with R&S®FPH-B3 option), 4 GHz (with R&S®FPH-B4 option)
Model .06	5 kHz to 6 GHz	8 GHz (with R&S®FPH-B8 option)
Model .13	5 kHz to 13.6 GHz	20 GHz (with R&S®FPH-B20 option)
Model .26	5 kHz to 26.5 GHz	31 GHz (with R&S®FPH-B31 option)
Model .06/.13/.26	5 kHz down to 100 Hz	100 Hz (with R&S®FPH-B29 option)



## Optional software applications

### Power measurements with power sensors

For applications requiring very high accuracy to measure and align transmitter levels, the R&S®FPH-K9 option allows the R&S®Spectrum Rider FPH to be used for power measurements together with the R&S®NRP power sensor series, with a measurement range of -70 dBm to +45 dBm and covering frequencies up to 110 GHz.

When used with an R&S®HA-Z360/Z361 optical power sensor, the R&S®Spectrum Rider FPH power meter mode reads out optical absolute power in dBm as well as relative power in dB.

### Internal channel power meter

The R&S®FPH-K19 channel power meter option converts the R&S®Spectrum Rider FPH into a portable power meter with a level measurement accuracy of typ. 0.5 dB. This option makes it possible to achieve power measurement

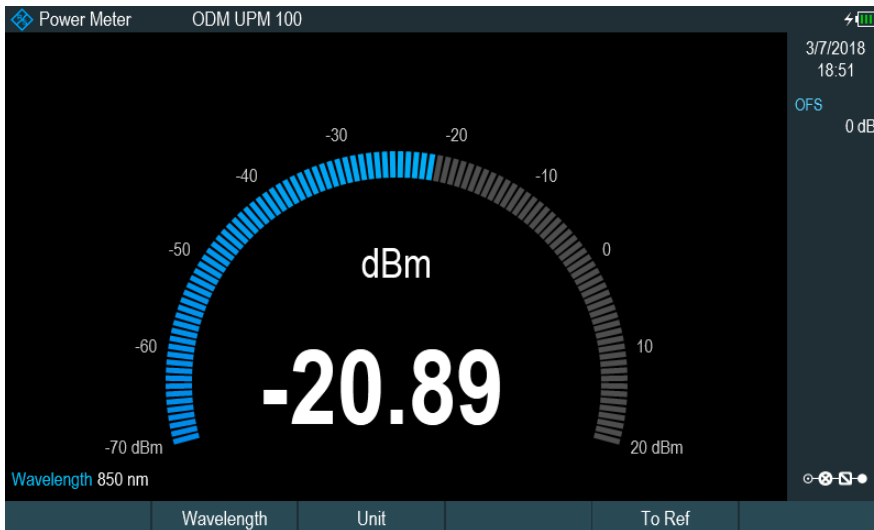
results fast and easily without needing a power sensor or the spectrum analyzer mode. This can help in applications such as checking power levels throughout the signal path of a field transmitter or verifying the power level of a device under test (DUT) in the lab.

### Pulse measurements with power sensors

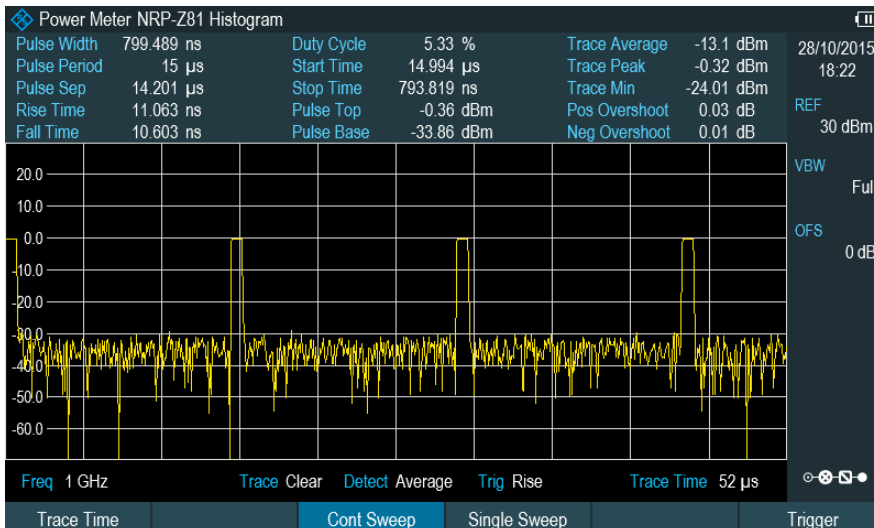
The R&S®FPH-K29 option enables precise pulse and peak power measurements using the R&S®Spectrum Rider FPH together with the R&S®NRP-Z8x wideband power sensor family. The R&S®NRP-Z8x wideband power sensors measure pulses with a resolution of up to 50 ns and support frequencies up to 44 GHz.

The main pulse parameters such as pulse width, rise/fall time and duty cycle will be displayed automatically. It is also possible to use the trigger function and markers and to zoom in on pulses by reducing the trace time. This is convenient for installation and maintenance measurements of radar systems.

Optical power measurement screen (R&S®FPH-K9)



Pulse analysis with the R&S®FPH-K29 option and R&S®NRP-Z8x wideband power sensors



## AM/FM analysis

The R&S®FPH-K7 option converts the R&S®Spectrum Rider FPH into an analog modulation analyzer to measure the quality of amplitude or frequency-modulated signals. The analog modulation display shows the waveform as well as measurement parameters such as carrier power, carrier offset, modulation index (depth) for AM signals, frequency deviation for FM signals, SINAD, THD, etc. The modulation summary display provides user-definable limits for each measurement.

## Interference analysis and signal strength mapping

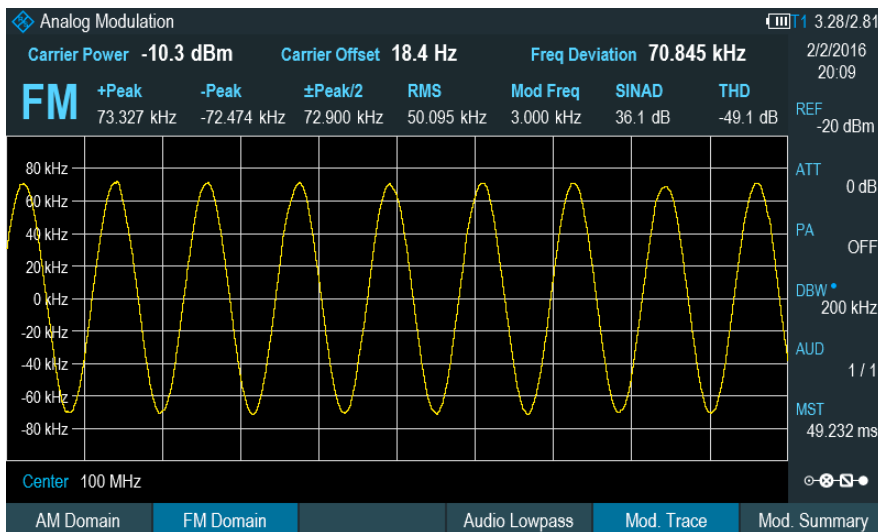
The R&S®FPH-K15 interference analysis and R&S®FPH-K16 signal strength mapping options are great tools for analyzing and locating ambiguous signals or interferers. When analyzing, long-time spectrogram recording allows up to 999 hours of on-air activity to be captured; the recording duration depends on the recording interval setting. The recorded data can be analyzed on the device or with the

R&S®InstrumentView software. The signal strength mapping displays a pictorial view of the signal power level on an indoor or outdoor map. The color indicator provides a good estimation of the signal coverage in a particular area or where the interferer or intended signal is most likely located.

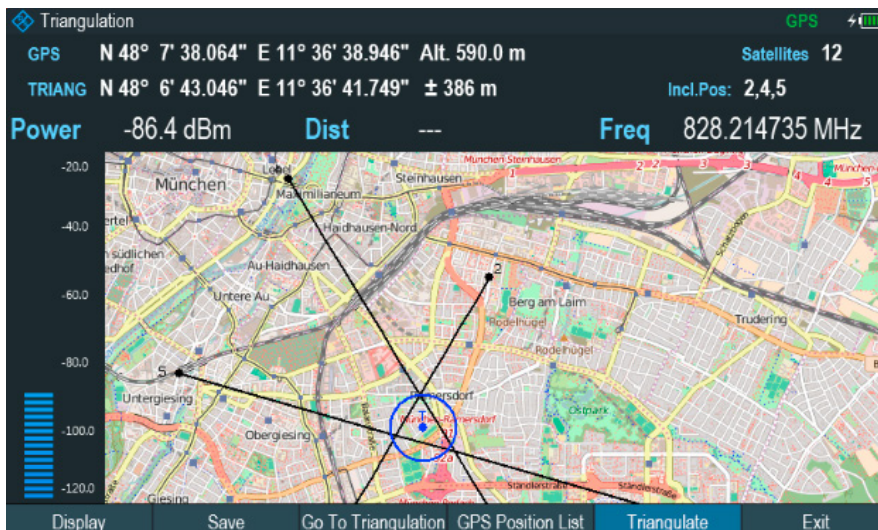
## Receiver mode

The R&S®FPH-K43 receiver mode option allows EMI diagnostics with weighted detectors such as the quasi-peak detector. Measurements are performed at a predefined frequency for an adjustable measurement time.

Analysis of a frequency-modulated signal with the R&S®FPH-K7 AM/FM analysis option



Locating a signal with the R&S®FPH-K15 interference analysis option





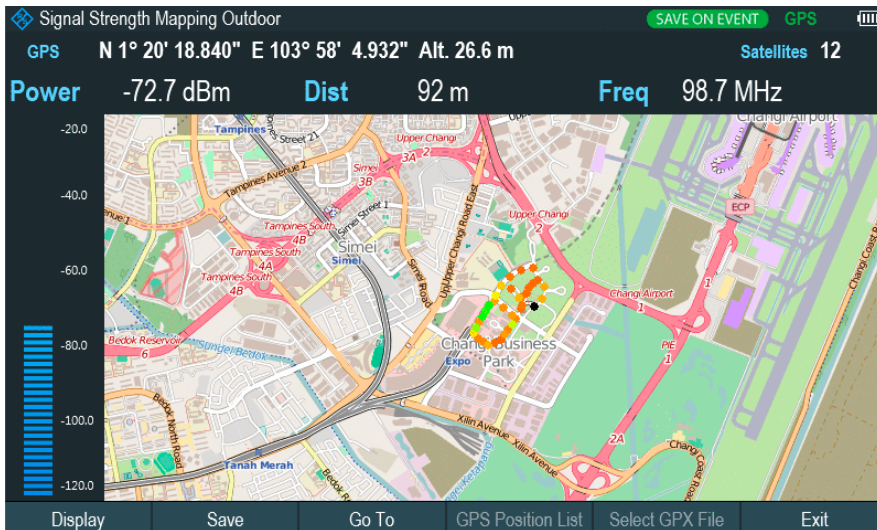
## Standard features

- Two spectrum traces
- Six markers, absolute or relative
- Noise marker
- Frequency counter with 0.1 Hz resolution
- AM/FM audio demodulator (audio via built-in loudspeaker or headphones)
- Limit line monitoring (pass/fail function)
- Remote control via USB/LAN interface
- Predefined channel tables
- Measurement wizard

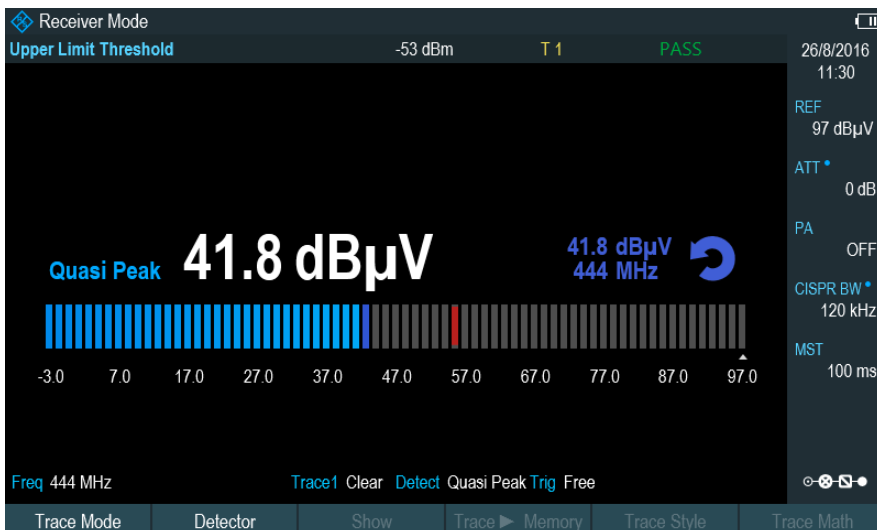
## Optional features

- Preamplifier (R&S®FPH-B22/-B23/-B24/-B25)
- Frequency extension down to 100 Hz (R&S®FPH-B29)
- Analog modulation analysis AM/FM (R&S®FPH-K7)
- Power sensor support (R&S®FPH-K9)
- Interference analysis (R&S®FPH-K15)
- Signal strength mapping (R&S®FPH-K16)
- Channel power meter (R&S®FPH-K19)
- Pulse measurements with power sensors (R&S®FPH-K29)
- Receiver mode (R&S®FPH-K43)

Display of the interferer signal strength on the map with the R&S®FPH-K16 signal strength mapping option



Measurement using quasi-peak detectors with the R&S®FPH-K43 receiver mode option



# Increasing productivity through measurement wizard

Site surveys or the installation and maintenance of transmitter stations often require a standard set of spectrum measurements. These measurements must be performed correctly to avoid additional costs and time on site.

## Simplified measurements

The measurement wizard simplifies measurements by automating, standardizing and optimizing test sequences. A sequence of standardized and recurring measurements can be performed quickly, easily and without mistakes.

First, a measurement expert centrally creates the test sequences, using the R&S®Spectrum Rider FPH and the R&S®Instrument View software running on a PC. Pictures and written instructions can be added to each measurement step.

After the measurement sequence has been configured, it can be transferred to the instruments in the field. The operator in the field only needs to start the wizard, select the measurement sequence and follow the predefined on-screen instructions. The instrument is correctly configured for each test step, so that the operator does not need to spend time on configuring the measurement instrument on site.

The results are saved automatically as soon as all measurements are completed, and can be transferred to a tablet or a PC. A complete measurement report in PDF, RTF or HTML format can be generated using the report generator in the R&S®InstrumentView software.

## Reproducible and fast measurements

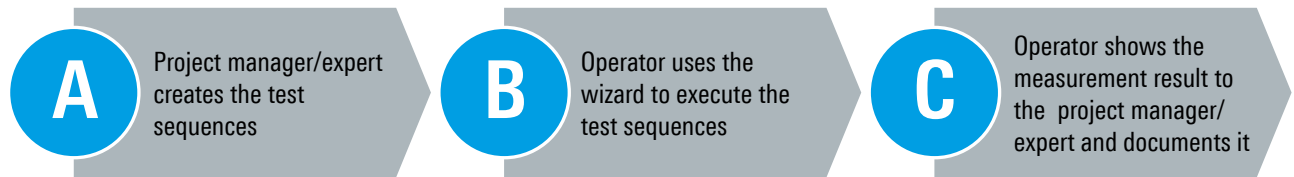
The measurement wizard and the report generator ensure the following:

- The results are correct and reproducible; all measurements are performed correctly with the right settings and in the right order; no need to come back to the site due to incorrect measurement settings or setup
- Measurement time is extremely reduced thanks to predefined instrument settings; there is no need to set up the instrument on site
- No training is required for novice users; less experienced operators can reliably conduct measurements thanks to on-screen instructions and preset measurement settings
- All measurement results are documented in a complete, customizable measurement report, which can include additional data such as operator or site name, company name, location and instrument serial number

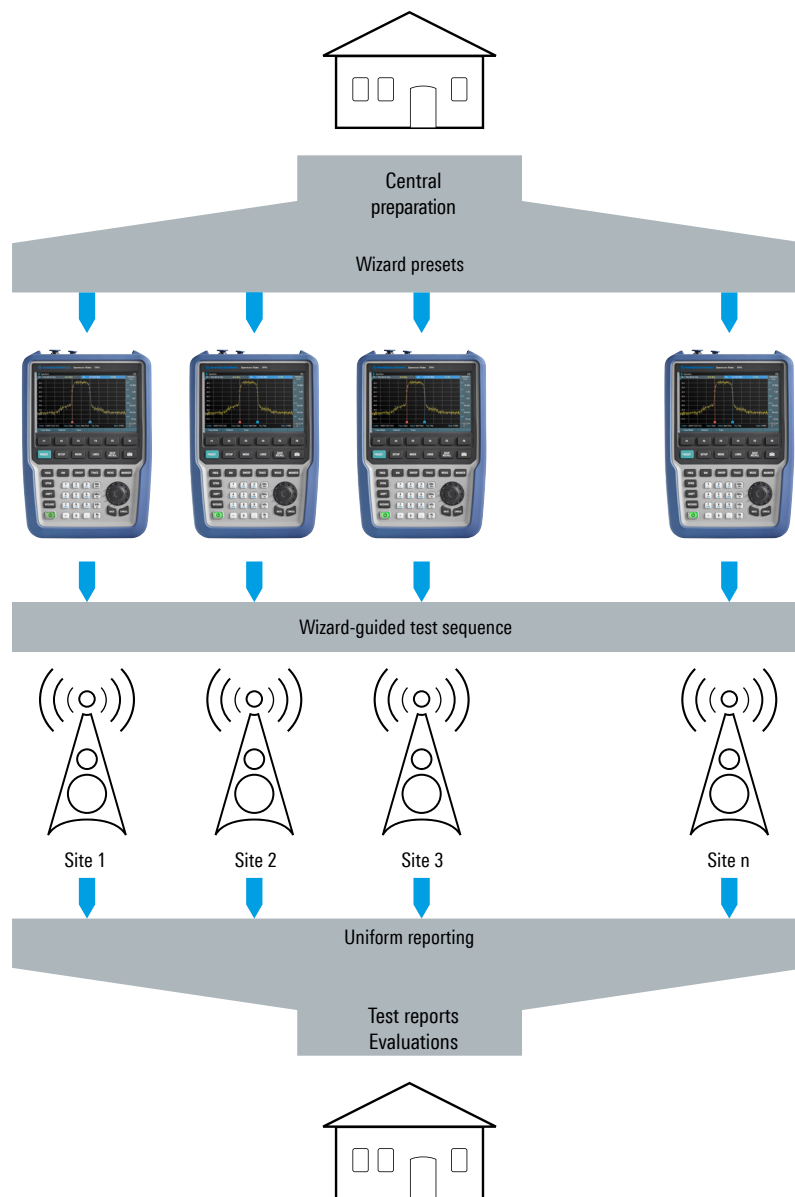




## Three simple steps needed to work with the measurement wizard



## Typical deployment setup with measurement preparations and postprocessing



# Postprocessing and remote control

## R&S®InstrumentView software for measurement postprocessing and documentation

The R&S®InstrumentView Windows software comes with the instrument. It makes it easy to postprocess and document measurement results and manage instrument settings.

### Features

- Fast data exchange between the R&S®Spectrum Rider FPH and a PC via USB or LAN connection
- Easy processing of measurement results
- Easy creation of test reports in PDF, HTML and RTF format
- Printout of all relevant data via Windows tablet or PC
- Editing of measurement results by displaying/hiding and shifting markers or limit lines, etc.
- Editor for generating limit lines, antenna factors and transducer factors for external attenuators and amplifiers as well as channel lists
- Compatible with Windows Vista (32/64 bit), Windows 7 (32/64 bit), Windows 8 (32/64 bit) and Windows 10 (32/64 bit)

## Remote control via LAN or USB

The R&S®Spectrum Rider FPH can be remotely controlled via the USB or LAN interface and integrated into user-specific programs. SCPI-compatible remote control commands are available as standard.

## R&S®MobileView app for remote control and file transfer

The R&S®MobileView app allows wireless remote control of the R&S®Spectrum Rider FPH within line of sight. Simply connect a third-party wireless router to the R&S®Spectrum Rider FPH LAN port. Download the R&S®MobileView app from an iOS or Android platform. The app offers seamless remote control of the R&S®Spectrum Rider FPH and conveniently transfers the screenshot and measured result from the device.





# Specifications

## Frequency

Frequency range	R&S®Spectrum Rider FPH model .02	5 kHz to 2 GHz
	with R&S®FPH-B3 option installed	5 kHz to 3 GHz
	with R&S®FPH-B3 and R&S®FPH-B4 options installed	5 kHz to 4 GHz
	R&S®Spectrum Rider FPH model .06	5 kHz to 6 GHz
	with R&S® FPH-B8 option installed	5 kHz to 8 GHz
	R&S®Spectrum Rider FPH model .13	5 kHz to 13.6 GHz
	with R&S® FPH-B20 option installed	5 kHz to 20 GHz
	R&S®Spectrum Rider FPH model .26	5 kHz to 26.5 GHz
with R&S® FPH-B31 option installed	5 kHz to 31 GHz	
R&S®Spectrum Rider FPH models .06/.13/.26 with R&S® FPH-B29 option installed <sup>1</sup>	from 5 kHz down to 100 Hz	
Frequency resolution		1 Hz

<b>Reference frequency, internal</b>		
Aging per year		$1 \times 10^{-6}$
Temperature drift	0 °C to +50 °C	$1 \times 10^{-6}$
Achievable initial calibration accuracy		$5 \times 10^{-7}$
Total reference uncertainty		(time since last adjustment × aging rate) + temperature drift + calibration accuracy

<b>Frequency readout</b>		
Marker resolution		1 Hz
Uncertainty		$\pm(\text{marker frequency} \times \text{reference uncertainty} + 10\% \times \text{resolution bandwidth} + \frac{1}{2}(\text{span}/(\text{sweep points} - 1) + 1 \text{ Hz}))$
Number of sweep (trace) points		711
Marker tuning frequency step size		span/710
Frequency counter resolution		0.1 Hz
Count uncertainty	SNR > 25 dB	$\pm(\text{frequency} \times \text{reference uncertainty} + \frac{1}{2}(\text{last digit}))$
Frequency span		0 Hz, 10 Hz to 2/3/4/6/8/13.6/20/26.5/31 GHz
Span uncertainty		nom. 1 %

<b>Spectral purity SSB phase noise</b>		
Carrier offset	30 kHz	f = 500 MHz < -88 dBc (1 Hz), typ. -95 dBc (1 Hz)
	100 kHz	< -98 dBc (1 Hz), typ. -105 dBc (1 Hz)
	1 MHz	< -118 dBc (1 Hz), typ. -125 dBc (1 Hz)

## Sweep time

Sweep time	span = 0 Hz	1 ms to 1000 s
	10 Hz ≤ span ≤ 600 MHz	20 ms to 1000 s
	span > 600 MHz	20 ms × span/1600 MHz to 1000 s
Uncertainty	span = 0 Hz	nom. 1 %
	span ≥ 10 Hz	nom. 3 %

<sup>1</sup> For serial number ≥ 103100. Not applicable to R&S®Spectrum Rider FPH model .02.

## Bandwidths

<b>Resolution bandwidths</b>		
Range	-3 dB bandwidth	1 Hz to 3 MHz in 1/3 sequence
Bandwidth accuracy	$1 \text{ Hz} \leq \text{RBW} \leq 300 \text{ kHz}$	nom. < 5 %
	$300 \text{ kHz} < \text{RBW} \leq 1 \text{ MHz}$	nom. < 10 %
Selectivity 60 dB:3 dB		nom. < 5 (Gaussian type filters)
<b>Video filters</b>		
Range	-3 dB bandwidth	1 Hz to 3 MHz in 1/3 sequence

## Level

Display range		displayed noise floor to +30 dBm	
<b>Maximum rated input level</b>			
DC voltage		50 V	
CW RF power		33 dBm (= 2 W)	
Peak RF power	duration < 3 s	36 dBm (= 4 W)	
Max. pulse voltage		150 V	
Max. pulse energy	pulse width 10 $\mu$ s	10 mWs	
<b>Intermodulation</b>			
Third-order intercept (TOI)	intermodulation-free dynamic range, signal level $2 \times -20 \text{ dBm}$ , RF attenuation = 0 dB, RF preamplifier = off		
	R&S®Spectrum Rider FPH model .02		
	f = 1 GHz	+7 dBm (meas.)	
	f = 2.4 GHz	+10 dBm (meas.)	
	R&S®Spectrum Rider FPH models .06/.13/.26		
	f = 1 GHz	+7 dBm (meas.)	
	f = 4.5 GHz	+8 dBm (meas.)	
	f = 9.5 GHz	+10 dBm (meas.)	
	f = 12 GHz	+9 dBm (meas.)	
	f = 22 GHz	+8 dBm (meas.)	
	f = 26.5 GHz	+10 dBm (meas.)	
	Second-harmonic intercept (SHI)	RF attenuation = 0 dB, RF preamplifier = off, signal level = -40 dBm	
		R&S®Spectrum Rider FPH model .02	
		$f_{in} = 20 \text{ MHz to } 1.5 \text{ GHz}$	nom. -60 dBc
$f_{in} = 1.5 \text{ GHz to } 2 \text{ GHz}$		nom. -80 dBc	
R&S®Spectrum Rider FPH models .06/.13/.26			
$f_{in} = 20 \text{ MHz to } 1.5 \text{ GHz}$		nom. -60 dBc	
$f_{in} = 1.5 \text{ GHz to } 4 \text{ GHz}$		nom. -90 dBc	
$f_{in} = 4 \text{ GHz to } 10 \text{ GHz}$		nom. -90 dBc	
$f_{in} = 10 \text{ GHz to } 14 \text{ GHz}$		nom. -90 dBc	
$f_{in} = 14 \text{ GHz to } 15.4 \text{ GHz}$		nom. -85 dBc	
Displayed average noise level (DANL)		0 dB RF attenuation, termination 50 $\Omega$ , RBW = 1 kHz, VBW = 10 Hz, sample detector, log scaling, normalized to 1 Hz	
		R&S®Spectrum Rider FPH model .02	
	preamplifier = off		
	1 MHz to 10 MHz	< -135 dBm, typ. -142 dBm	
	10 MHz to 1 GHz	< -142 dBm, typ. -146 dBm	
	1 GHz to 4 GHz	< -140 dBm, typ. -144 dBm	
	preamplifier = on		
	1 MHz to 10 MHz	< -150 dBm, typ. -160 dBm	
	10 MHz to 3 GHz	< -158 dBm, typ. -163 dBm	
	3 GHz to 4 GHz	< -156 dBm, typ. -161 dBm	
	R&S®Spectrum Rider FPH models .06/.13/.26		
	preamplifier = off		
	1 MHz to 10 MHz	< -122 dBm, typ. -130 dBm	
	10 MHz to 25 MHz	< -130 dBm, typ. -135 dBm	
	25 MHz to 1 GHz	< -140 dBm, typ. -145 dBm	
	1 GHz to 4 GHz	< -135 dBm, typ. -140 dBm	
	4 GHz to 8 GHz	< -135 dBm, typ. -140 dBm	
	8 GHz to 19 GHz	< -135 dBm, typ. -138 dBm	
	19 GHz to 20 GHz	< -130 dBm, typ. -138 dBm	
	20 GHz to 27 GHz	< -130 dBm, typ. -138 dBm	
27 GHz to 29 GHz	< -125 dBm, typ. -130 dBm		
29 GHz to 31 GHz	< -120 dBm, typ. -123 dBm		

	preamplifier = on	
	1 MHz to 20 MHz	< -147 dBm, typ. -152 dBm
	20 MHz to 1 GHz	< -158 dBm, typ. -162 dBm
	1 GHz to 3 GHz	< -158 dBm, typ. -162 dBm
	3 GHz to 4 GHz	< -155 dBm, typ. -158 dBm
	4 GHz to 4.5 GHz	< -155 dBm, typ. -158 dBm
	4.5 GHz to 8 GHz	< -150 dBm, typ. -155 dBm
	8 GHz to 20 GHz	< -150 dBm, typ. -155 dBm
	20 GHz to 27 GHz	< -150 dBm, typ. -155 dBm
	27 GHz to 29 GHz	< -140 dBm, typ. -145 dBm
	29 GHz to 31 GHz	< -130 dBm, typ. -133 dBm

Immunity to interference		
Image frequencies	R&S®Spectrum Rider FPH model .02	
	$f_{in} - 2 \times 30.15 \text{ MHz}$	nom. < -70 dBc
	$f_{in} - 2 \times 830.15 \text{ MHz}$	nom. < -70 dBc
	$f < 3 \text{ GHz}, f_{in} - 2 \times 830.15 \text{ MHz}$	nom. < -70 dBc
	$f < 3 \text{ GHz}, f_{in} - 2 \times 4042.65 \text{ MHz}$	nom. -60 dBc
	$f \geq 3 \text{ GHz}, f_{in} + 2 \times 830.15 \text{ MHz}$	nom. -60 dBc
	R&S®Spectrum Rider FPH model .06/.13/.26	
	$f_{in} - 2 \times 30.15 \text{ MHz}$	nom. < -70 dBc
	$f_{in} - 2 \times 830.15 \text{ MHz}$	nom. < -70 dBc
	$f < 4 \text{ GHz}, f_{in} - 2 \times 830.15 \text{ MHz}$	nom. < -70 dBc
	$f < 4 \text{ GHz}, f_{in} + 2 \times 5582.35 \text{ MHz}$	nom. < -50 dBc
	$f < 4 \text{ GHz}, f_{in} + 2 \times 7230.15 \text{ MHz}$	nom. < -50 dBc
	$4 \text{ GHz} \leq f < 8 \text{ GHz},$ $f_{in} - 2 \times 830.15 \text{ MHz}$	nom. < -70 dBc
	$8 \text{ GHz} \leq f < 20 \text{ GHz},$ $f_{in} - 2 \times 830.15 \text{ MHz}$	nom. < -70 dBc
	$8 \text{ GHz} \leq f < 20 \text{ GHz},$ $f_{in} + 2 \times 4030.15 \text{ MHz}$	nom. < -70 dBc
	$8 \text{ GHz} \leq f < 20 \text{ GHz},$ $f_{in} + 2 \times 5582.35 \text{ MHz}$	nom. < -70 dBc
	$8 \text{ GHz} \leq f < 20 \text{ GHz},$ $f_{in} + 2 \times 7230.15 \text{ MHz}$	nom. < -70 dBc
	$20 \text{ GHz} \leq f < 26.5 \text{ GHz},$ $f_{in} - 2 \times 4030.15 \text{ MHz}$	nom. < -40 dBc
	$26.5 \text{ GHz} \leq f < 28.5 \text{ GHz},$ $f_{in} - 2 \times 7230.15 \text{ MHz}$	nom. < -60 dBc
	Intermediate frequencies	R&S®Spectrum Rider FPH model .02
30.15 MHz, 830.15 MHz, 4042.65 MHz		nom. < -60 dBc
R&S®Spectrum Rider FPH models .06/.13/.26		
30.15 MHz, 830.15 MHz, 4030.15 MHz		nom. < -60 dBc
5582.35 MHz		nom. < -50 dBc
	7230.15 MHz	nom. < -40 dBc
Other interfering signals, signal level – RF attenuation < -30 dBm	R&S®Spectrum Rider FPH model .02	
	$f \leq 3 \text{ GHz},$ spurious at $f_{in} - 2021.325 \text{ MHz}$	nom. < -60 dBc
	R&S®Spectrum Rider FPH models .06/.13/.26	
	$f < 4 \text{ GHz},$ spurious at $f_{in} + 2015.075 \text{ MHz}$	nom. < -60 dBc
	$4 \text{ GHz} \leq f < 8 \text{ GHz},$ $f_{in} - 415.075 \text{ MHz}$	nom. < -60 dBc
	$8 \text{ GHz} \leq f < 20 \text{ GHz},$ $f_{in} + 2015.075 \text{ MHz}$	nom. < -60 dBc
	$8 \text{ GHz} \leq f < 20 \text{ GHz},$ $f_{in} + 2791.175 \text{ MHz}$	nom. < -60 dBc
	$8 \text{ GHz} \leq f < 20 \text{ GHz},$ $f_{in} + 3615.075 \text{ MHz}$	nom. < -60 dBc
	$20 \text{ GHz} \leq f < 26.5 \text{ GHz},$ $f_{in} - 2015.075 \text{ MHz}$	nom. < -60 dBc
	$26.5 \text{ GHz} \leq f < 28.5 \text{ GHz},$ $f_{in} - 3615.075 \text{ MHz}$	nom. < -60 dBc



Other interfering signals, related to local oscillators	f = receive frequency	
	R&S®Spectrum Rider FPH model .02	
	$\Delta f \geq 300$ kHz	nom. < -60 dBc
	R&S®Spectrum Rider FPH models .06/.13/.26	
	$\Delta f \geq 300$ kHz, $\Delta f \leq 1600$ MHz	nom. < -60 dBc except otherwise stated
Residual spurious response	$\Delta f \leq -422.5$ MHz, 21440 MHz $\leq f_{in}$ < 23400 MHz	nom. < -35 dBc
	$\Delta f \geq 1115$ MHz, 23400 MHz $\leq f_{in}$ < 24400 MHz	nom. < -40 dBc
	input matched with 50 $\Omega$ , without input signal, RBW $\leq 30$ kHz, f $\geq 3$ MHz, RF attenuation = 0 dB	nom. < -90 dBm

<b>Level display</b>		
Logarithmic level axis		1/2/3/5/10/20/30/50/100/120/150 dB, 10 divisions
Linear level axis		0 % to 100 %, 10 divisions
Number of traces		2
Trace detectors		max. peak, min. peak, auto peak, sample, RMS
Trace functions		clear/write, max. hold, min. hold, average, view
Setting range of reference level		-130 dBm to +30 dBm
Units of level axis		dBm, dBmV, dB $\mu$ V, V, W
<b>Level measurement uncertainty</b>		
Absolute level uncertainty at 100 MHz	in the temperature range of +20 °C to +30 °C	< 0.3 dB
Frequency response <sup>2</sup>	in the temperature range of +20 °C to +30 °C	
	100 Hz $\leq f$ < 5 kHz	nom. < 3.0 dB (only with R&S® FPH-B29 option installed, preamplifier off and attenuator settings $\leq 15$ dB)
	5 kHz $\leq f$ < 10 MHz	nom. < 1.5 dB
	10 MHz $\leq f$ < 8 GHz	< 1 dB
	8 GHz $\leq f$ < 20 GHz	< 1.5 dB
20 GHz $\leq f \leq 31$ GHz	< 2 dB	
Attenuator uncertainty		< 0.3 dB
Uncertainty of reference level setting		nom. < 0.1 dB
Display nonlinearity	SNR > 16 dB, 0 dB to -50 dB, logarithmic level display	< 0.3 dB
Bandwidth switching uncertainty	reference: RBW = 10 kHz	nom. < 0.1 dB
Total measurement uncertainty	95 % confidence level, +20 °C to +30 °C, SNR > 16 dB, 0 dB to -50 dB below reference level, RF attenuation auto	
	10 MHz $\leq f \leq 31$ GHz	< 1.25 dB, typ. 0.5 dB

## Trigger functions

<b>Trigger</b>		
Trigger source		free run, video, external
External trigger level threshold	low $\rightarrow$ high transition	2.4 V
	high $\rightarrow$ low transition	0.7 V
	maximum	3.0 V

## Inputs and outputs

<b>RF input</b>		
Impedance		nom. 50 $\Omega$
Connector	R&S®Spectrum Rider FPH models .02/.06/.13	N female
	R&S®Spectrum Rider FPH model .26	PC 3.5 mm male

<sup>2</sup> For specifications with R&S®FPH-B100 option installed, see section "R&S®FPH-B100 N type RF input connector for model .26".

VSWR <sup>2</sup>	R&S®Spectrum Rider FPH model .02	
	100 kHz ≤ f ≤ 1 GHz	nom. < 1.5
	1 GHz < f ≤ 4 GHz	nom. < 2
	R&S®Spectrum Rider FPH models .06/.13/.26	
	100 kHz ≤ f ≤ 100 MHz	nom. < 2
	100 MHz ≤ f ≤ 1 GHz	nom. < 1.5
	1 GHz < f ≤ 31 GHz	nom. < 2
Input attenuator	RF input only	0 dB to 40 dB in 5 dB steps
<b>AF output</b>		
AF demodulation types		AM and FM
Connector		3.5 mm mini jack
Output impedance		nom. 32 Ω
Voltage (open circuit)		adjustable from 0 V to > 100 mV (RMS)
<b>External reference, external trigger</b>		
Connector		BNC, 50 Ω
Mode		external reference, external trigger
External reference	required level	0 dBm
	frequency	10 MHz
External trigger threshold	low → high transition	2.4 V
	high → low transition	0.7 V

## General data

<b>Manual operation</b>		
Languages		Chinese, Chinese Traditional, English, French, German, Italian, Hungarian, Japanese, Korean, Portuguese, Russian, Spanish
<b>Remote control</b>		
Command set		SCPI 1997.0
LAN interface		10/100BASE-T, RJ-45
USB		mini B plug, version 2.0
<b>Display</b>		
Resolution		WVGA, 800 × 480 pixel
<b>Audio</b>		
Speaker		internal, external headphone supported
<b>USB interface</b>		type A plug, version 2.0
	number of interfaces	2
<b>Mass memory</b>		
Mass memory	not supplied	USB flash drive, USB version 1.1 or 2.0, size ≤ 32 Gbyte micro SD card, size ≤ 32 Gbyte
Data storage	internal	> 160 instrument settings and traces
	on USB stick or micro SD card, ≥ 1 Gbyte	> 10000 instrument settings and traces
<b>Temperature</b>	operating temperature range	-10 °C to +55 °C
	storage temperature range	-40 °C to +70 °C
	battery charging mode	0 °C to +40 °C
<b>Climatic loading</b>	relative humidity	+25/+55 °C at 95 % relative humidity, in line with EN 60068-2-30
	protection class	IP51
<b>Altitude</b>	operating with battery	15 000 m (49 210 ft)
	operating with AC to DC adapter	3000 m (9840 ft)
<b>Mechanical resistance</b>		
Vibration	sinusoidal	in line with EN 60068-2-6, MIL-PRF-28800F class 2
	random	in line with EN 60068-2-64, MIL-PRF-28800F class 2
Shock		40 g shock spectrum, in line with MIL-STD-810E, method 516.4 procedure 1, MIL-PRF-28800F
<b>Power supply</b>		
R&S®HA-Z301 AC power supply	input specifications	100 V to 240 V AC, 50 Hz/60 Hz, 1.0 A to 0.5 A
	output specifications	15 V, 2.67 A, max. 40 W
	operating temperature range	-30 °C to +60 °C
	storage temperature range	-40 °C to +85 °C
	test mark	CE, UL, PSE, TUV

External DC voltage		14.65 V to 15.45 V
Battery		lithium-ion battery
Capacity	R&S®HA-Z306	72 Wh
Voltage		nom. 11.25 V
Operating time with new, fully charged battery	R&S®HA-Z306	
	model .02	8 h
	model .06	7 h
	models .13/.26	6 h
Charging time	instrument switched off or charge with R&S®HA-Z303 battery charger	3.5 h
	instrument switched on	4 h
Life time	charging cycles	> 80 % or more of its initial capacity after 300 charge/discharge
Power consumption	model .02	8 W (meas.)
	model .06	10 W (meas.)
	model .13/.26	12 W (meas.)
Safety		IEC 61010-1, EN 61010-1, UL 61010-1 (Third Edition), CAN/CSA-C22.2 No. 61010-1-12
Test mark		VDE, CSA, CSA-NRTL
EMC	in line with European EMC Directive 2004/108/EC	<ul style="list-style-type: none"> <li>EN 61326-1 class B (emission)</li> <li>CISPR 11/EN 55011/group 1 class B (emission)</li> <li>EN 61326-1 table 2 (immunity, industrial)</li> </ul>
Dimensions	W x H x D	202 mm x 294 mm x 76 mm (8.0 in x 11.6 in x 3 in)
Weight		2.5 kg (5.5 lb)
<b>Recommended calibration interval</b>		1 year

## Equivalence of specifications for different R&S®FPH part numbers

- The specifications for part number 1321.1111.02 are equivalent to part number 1321.1111.52 and 1321.1111P01.
- The specifications for part number 1321.1111.06 are equivalent to part number 1321.1111.56 and 1321.1111P04.
- The specifications for part number 1321.1111.13 are equivalent to part number 1321.1111.63 and 1321.1111P06.
- The specifications for part number 1321.1111.26 are equivalent to part number 1321.1111.76 and 1321.1111P08.

## R&S®FPH-B100 N type RF input connector for model .26

Frequency range	R&S®Spectrum Rider FPH model .26 with R&S® FPH-B100 option (R&S®FPH-B31 option is not available in combination with R&S®FPH-B100 option)	5 kHz to 26.5 GHz
Frequency response	in the temperature range of +20 °C to +30 °C	
	5 kHz ≤ f < 10 MHz	nom. < 1.5 dB
	10 MHz ≤ f < 8 GHz	< 1 dB
	8 GHz ≤ f < 20 GHz	< 2 dB
	20 GHz ≤ f ≤ 26.5 GHz	< 2.5 dB
VSWR	100 kHz ≤ f ≤ 100 MHz	nom. < 2
	100 MHz < f ≤ 1 GHz	nom. < 1.5
	1 GHz < f ≤ 15.7 GHz	nom. < 2
	15.7 GHz < f ≤ 26.5 GHz	nom. < 2.7



## R&S®FPH-K7 modulation analysis

<b>Measurement of analog modulation signals (AM,FM)</b>		
Center frequency	R&S®Spectrum Rider FPH model .02	500 KHz to 2 GHz
	with R&S®FPH-B3 option installed	500 KHz to 3 GHz
	with R&S®FPH-B3 and R&S®FPH-B4 options installed	500 KHz to 4 GHz
	R&S®Spectrum Rider FPH model .06	500 KHz to 6 GHz
	with R&S®FPH-B8 option installed	500 KHz to 8 GHz
	R&S®Spectrum Rider FPH model .13	500 KHz to 13.6 GHz
	with R&S®FPH-B20 option installed	500 KHz to 20 GHz
Demodulation bandwidth	R&S®Spectrum Rider FPH model .26	500 KHz to 26.5 GHz
	with R&S®FPH-B31 option installed	500 KHz to 31 GHz
Bandwidth accuracy		2 MHz, 1 MHz, 500 kHz, 300 kHz, 200 kHz, 100 kHz, 50 kHz, 30 kHz, 20 kHz, 10 kHz (nom.)
Display	AM	nom. < ±5%
Display	FM	carrier power, carrier frequency offset, AM modulation depth, modulation frequency, THD, SINAD, SNR
		carrier power, carrier frequency offset, FM deviation, modulation frequency, THD, SINAD, SNR

<b>Carrier power</b>		
Carrier power measurement accuracy		add 0.2 dB, see section level measurement uncertainty
Display resolution		0.1 dB

<b>AF (modulation frequency) <sup>3</sup></b>		
Range	AM	nom. 20 Hz to 100 kHz
	FM	nom. 20 Hz to 200 kHz
Resolution		1 Hz
Measurement uncertainty	$1 \text{ kHz} \leq \text{AF} \leq 200 \text{ kHz}$	nom. ±(1 % of measured value)
	$20 \text{ Hz} \leq \text{AF} < 1 \text{ kHz}$	nom. ±1 Hz
AF filters		
Lowpass	audio decimation	bypass, 1/10, 1/30, 1/100 (nom.)
De-emphasis	FM demodulation and demodulation bandwidth 200 kHz and 300 kHz	off, 50 µs, 75 µs (nom.)

<b>AM demodulation <sup>4</sup></b>		
Measurement range	modulation depth	nom. 2 % to 100 %
Modulation depth uncertainty		nom. ±(4 %)

<b>FM demodulation <sup>5</sup></b>		
Measurement range	frequency deviation	nom. 10 kHz to 400 kHz, max. 0.4 x demodulation bandwidth
Deviation uncertainty		nom. ±(0.04 x (AF + deviation))

<b>Modulation distortion <sup>3, 4, 5</sup></b>		
Measurement functions		THD, SINAD
Measurement range		-50 dB to 0 dB (THD)
		0 dB to 50 dB (SINAD, AM)
		0 dB to 40 dB (SINAD, FM)
Display resolution		0.1 dB
Measurement uncertainty		nom. 1 dB
AF frequency range		nom. 20 Hz to 100 kHz

<sup>3</sup> Min. and max. detectable audio frequency and harmonics depend on the demodulation bandwidth and audio filter settings.

<sup>4</sup> Modulation frequency 1 kHz sine, AM modulation depth 50 %, carrier level 0 dBm, center frequency = 499 MHz, reference level 6 dBm, demodulation bandwidth = 20 kHz, SNR > 60 dB, audio filter = bypass.

<sup>5</sup> Modulation frequency 1 kHz sine, FM deviation = 75 kHz, carrier level 0 dBm, center frequency = 499 MHz, reference level 6 dBm, demodulation bandwidth = 300 kHz, SNR > 60 dB, audio filter = 1/10, de-emphasis = off.

<b>Measurement of digital modulation signals (ASK, FSK)</b>		
Center frequency	R&S®Spectrum Rider FPH model .02	10 MHz to 2 GHz
	with R&S®FPH-B3 option installed	10 MHz to 3 GHz
	with R&S®FPH-B3 and R&S®FPH-B4 options installed	10 MHz to 4 GHz
	R&S®Spectrum Rider FPH model .06	10 MHz to 6 GHz
	with R&S®FPH-B8 option installed	10 MHz to 8 GHz
	R&S®Spectrum Rider FPH model .13	10 MHz to 13.6 GHz
	with R&S®FPH-B20 option installed	10 MHz to 20 GHz
Demodulation bandwidth	R&S®Spectrum Rider FPH model .26	10 MHz to 26.5 GHz
	with R&S®FPH-B31 option installed	10 MHz to 31 GHz
Display	ASK diagram	400 Hz to 2 MHz auto-set corresponding to signal and demodulation bandwidth requirements eye diagram, symbols, modulation depth, modulation error
	ASK numerical results	carrier power, carrier frequency error, modulation depth and index, modulation error
	FSK diagram	eye diagram, symbols, modulation deviation, modulation error
	FSK numerical results	carrier power, carrier frequency error, frequency deviation, modulation error, magnitude error

<b>Demodulation parameters</b>		
Modulation and demodulation filters	transmit filter	root raised cosine (RRC) raised cosine (RC) Gaussian (GAUSS) unfiltered <sup>6</sup> (measurement and reference filters are internally adapted to signal parameters)
Points/symbol		4, 8, 16 internally adapted to signal parameters
Filter length		internally adapted to signal parameters
Demodulation length		20 symbols to max. 1000 symbols (at 4 points/symbol)

<b>Carrier power</b>		
Carrier power measurement accuracy		add 0.2 dB, see section level measurement uncertainty
Carrier power range		-30 dBm to +20 dBm (nom.)
Display resolution		0.1 dB

<b>ASK demodulation<sup>7</sup></b>		
Measurement range	symbol rate	1 kHz to 100 kHz (nom.)
	modulation depth	5 % to 95 % (nom.)
Modulation depth uncertainty		±(4 %) (nom.)
Display resolution		0.1 %

<sup>6</sup> Reference signal is generated with a Gauss filter, BT = 3.

<sup>7</sup> ASK modulation index 50 %, symbol rate = 100 kHz, Gauss BT = 1.0, modulation signal PSBS.

<b>FSK demodulation</b> <sup>8</sup>		
Measurement range	symbol rate	1 kHz to 100 kHz (nom.)
	frequency deviation	1 kHz to 400 kHz (nom.)
	symbol rate	
	1 kHz to 20 kHz	$1 \leq \beta^9 \leq 20$
	> 20 kHz to 50 kHz	$1 \leq \beta \leq 8$
	> 50 kHz to 100 kHz	$1 \leq \beta \leq 4$
Accuracy		$\pm (4 \%)$ (nom.)
Display resolution		0.1 Hz

## R&S®FPH-K19 channel power meter

Frequency range	R&S®Spectrum Rider FPH model .02	5 kHz to 2 GHz
	with R&S®FPH-B3 option installed	5 kHz to 3 GHz
	with R&S®FPH-B3 and R&S®FPH-B4 options installed	5 kHz to 4 GHz
	R&S®Spectrum Rider FPH model .06	5 kHz to 6 GHz
	with R&S®FPH-B8 option installed	5 kHz to 8 GHz
	R&S®Spectrum Rider FPH model .13	5 kHz to 13.6 GHz
	with R&S®FPH-B20 option installed	5 kHz to 20 GHz
	R&S®Spectrum Rider FPH model .26	5 kHz to 26.5 GHz
	with R&S®FPH-B31 option installed	5 kHz to 31 GHz
Channel bandwidth		100 kHz to 1 GHz
Amplitude		offset, dB relative, zeroing
Unit		dBm, W
Limits		on/off, upper limit, lower limit, beep on fail
Measurement range		-120 dBm to +30 dBm
<b>Level measurement uncertainty</b>		
Absolute level uncertainty at 100 MHz	+20 °C to +30 °C	< 0.3 dB
Frequency response (+20 °C to +30 °C)	100 kHz ≤ f < 10 MHz	nom. < 1.5 dB
	10 MHz ≤ f ≤ 4 GHz	< 1.25 dB

## R&S®FPH-K29 pulse measurements with power sensor

In combination with one of the R&S®NRP-Z81, R&S®NRP-Z85 or R&S®NRP-Z86 power sensors, the R&S®Spectrum Rider FPH supports measurements on pulsed signals. The achievable RF performance is documented in the data sheet specifications of the R&S®NRP-Z81/-Z85/-Z86 power sensors. The list below shows which measurements are supported by the R&S®FPH-K29.

Measurements	R&S®FPH-K29
Pulse power parameters	•
Peak power	•
Pulse top power	•
Average power	•
Base power	•
Minimum power	•
Positive overshoot	•
Negative overshoot	•
Pulse timing parameters	•
Pulse duration	•
Pulse period	•
Pulse start/stop time	•
Rise/fall time	•
Duty cycle	•

<sup>8</sup> FSK modulation deviation 100 kHz, symbol rate = 100 kHz, Gauss BT = 1.0, modulation signal PRBS.

<sup>9</sup> Beta is the ratio of frequency deviation to symbol rate.



## R&S®FPH-K43 receiver mode and channel scan measurement application

The specifications below apply to the R&S®Spectrum Rider FPH. They are based on the data sheet specifications of the R&S®Spectrum Rider FPH, have not been checked separately and are not verified during instrument calibration.

Measurements	R&S®FSH-K43
Fixed frequency	•
Frequency scan	•
Channel scan	•
User defined channel list	•
EMI precompliance	•
CISPR bandwidths	•
CISPR detectors	•

Frequency range		see basic instrument
Measurement modes		fixed frequency, frequency scan, channel scan
Frequency scan stepsize		
Scan stepsize		100 Hz to max. frequency
Max. number of steps		10000
Channel scan		
Channel spacing		user definable
Max. number of channels		10000
Resolution bandwidths	-3 dB bandwidth	1 Hz to 3 MHz in 1/3 sequence
	CISPR bandwidths (-6 dB)	200 Hz, 9 kHz, 120 kHz, 1 MHz
Detectors		max. peak, average, RMS, quasi-peak
Level		see basic instrument

## R&S®HA-Z350 log-periodic OEM antenna

Frequency range		700 MHz to 4 GHz
Gain		typ. 4 dBi
Impedance		50 Ω
VSWR		nom. < 1:2
Connector type		SMA (f)
Dimensions	W x H x D	340 mm x 200 mm x 25 mm (13.3 in x 7.9 in x 1 in)
Weight		270 g (0.6 lb)
Accessories supplied		hardcase with foam, typical calibration data in 10 MHz steps, pistol grip with mini-tripod function, one set of SMA toolset

## R&S®FSH-Z14 directional power sensor <sup>10</sup>

Frequency range		25 MHz to 1 GHz
Power measurement range		30 mW to 300 W
VSWR referenced to 50 Ω		< 1.06
Power handling capacity	depending on temperature and matching (see diagram on page 14)	100 W to 1000 W
Insertion loss		< 0.06 dB
Directivity		> 30 dB

Average power		
Power measurement range		
CW, FM, PM, FSK, GMSK	CF: ratio of peak envelope	30 mW to 300 W
Modulated signals	power to average power	30 mW to 300 W/CF
Measurement uncertainty		
25 MHz to 40 MHz	sine signal	4.0 % of measured value (0.17 dB)
40 MHz to 1 GHz	+18 °C to +28 °C, no zero offset	3.2 % of measured value (0.14 dB)
Zero offset	after zeroing	±4 mW
Range of typical measurement error with modulation	FM, PM, FSK, GMSK	0 % of measured value (0 dB)
	AM (80 %)	±3 % of measured value (±0.13 dB)
	two CW carriers with identical power	±2 % of measured value (±0.09 dB)
	EDGE, TETRA	±0.5 % of measured value (±0.02 dB) <sup>11</sup>

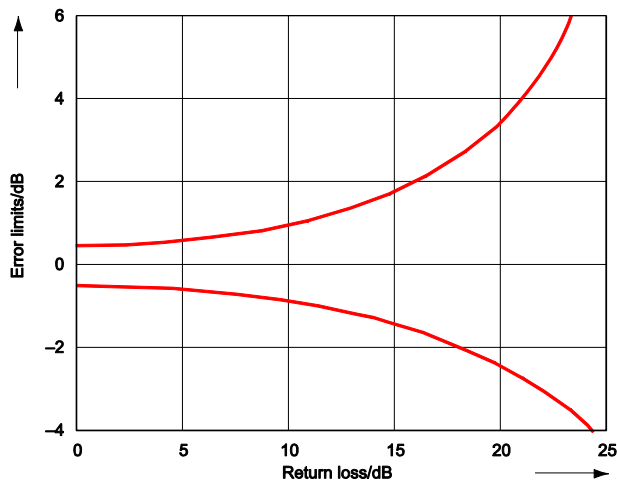
<sup>10</sup> Requires R&S®FSH-Z144 adapter cable.

<sup>11</sup> If standard is selected on the R&S®Spectrum Rider FPH.

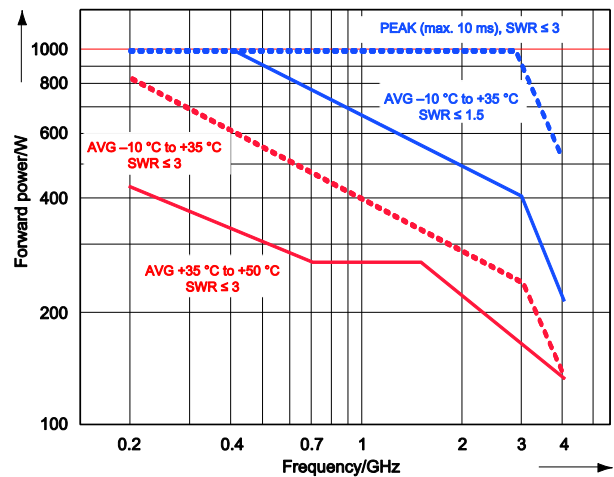
Temperature coefficient	25 MHz to 40 MHz	0.40 %/K (0.017 dB/K)
	40 MHz to 1 GHz	0.25 %/K (0.011 dB/K)

<b>Max. peak envelope power</b>		
Power measurement range		
Video bandwidth	4 kHz	0.4 W to 300 W
	200 kHz	1 W to 300 W
	600 kHz	2 W to 300 W
Measurement uncertainty	same as for average power plus effect of peak hold circuit	+18 °C to +28 °C
Error limits of peak hold circuit for burst signals	duty cycle $\geq 0.1$ and repetition rate $\geq 100/s$	
	video bandwidth 4 kHz	$\pm(3\%$ of measured value + 0.05 W) starting from a burst width of 200 $\mu s$
	video bandwidth 200 kHz	$\pm(3\%$ of measured value + 0.20 W) starting from a burst width of 4 $\mu s$
	video bandwidth 600 kHz	$\pm(7\%$ of measured value + 0.40 W) starting from a burst width of 2 $\mu s$
Temperature coefficient	25 MHz to 40 MHz	0.50 %/K (0.022 dB/K)
	40 MHz to 1 GHz	0.35 %/K (0.015 dB/K)
<b>Load matching</b>		
Matching measurement range		
Return loss		0 dB to 23 dB
VSWR		> 1.15
Minimum forward power	specifications complied with $\geq 0.4$ W	0.06 W

<b>Dimensions and weight</b>		
Dimensions (W x H x D)		120 mm x 95 mm x 39 mm (4.72 in x 3.74 in x 1.53 in)
	connecting cable	1.5 m (59 in)
Weight		0.65 kg (1.43 lb)



Error limits for matching measurements



Power handling capacity

## R&S®FSH-Z44 directional power sensor <sup>12</sup>

Frequency range		200 MHz to 4 GHz
Power measurement range		30 mW to 300 W
VSWR referenced to 50 Ω	200 MHz to 3 GHz	< 1.07
	3 GHz to 4 GHz	< 1.12
Power handling capacity	depending on temperature and matching (see diagram on page 16)	120 W to 1000 W
Insertion loss	200 MHz to 1.5 GHz	< 0.06 dB
	1.5 GHz to 4 GHz	< 0.09 dB
Directivity	200 MHz to 3 GHz	> 30 dB
	3 GHz to 4 GHz	> 26 dB

<b>Average power</b>		
Power measurement range	CF: ratio of peak envelope power to average power	
	CW, FM, PM, FSK, GMSK	30 mW to 300 W
	LTE, 3GPP WCDMA, cdmaOne, CDMA2000®, DAB, DVB-T	30 mW to 120 W
	other modulated signals	30 mW to 300 W/CF
Measurement uncertainty	sine signal, +18 °C to +28 °C, no zero offset	
	200 MHz to 300 MHz	4.0 % of measured value (0.17 dB)
	300 MHz to 4 GHz	3.2 % of measured value (0.14 dB)
Zero offset	after zeroing	±4 mW
Range of typical measurement error with modulation	FM, PM, FSK, GMSK	0 % of measured value (0 dB)
	AM (80 %)	±3 % of measured value (±0.13 dB)
	two CW carriers with identical power	±2 % of measured value (±0.09 dB)
	π/4-DQPSK	±2 % of measured value (±0.09 dB)
	EDGE	±0.5 % of measured value (±0.02 dB) <sup>13</sup>
	cdmaOne, DAB	±1 % of measured value (±0.04 dB) <sup>9</sup>
	3GPP WCDMA, CDMA2000®	±2 % of measured value (±0.09 dB) <sup>9</sup>
Temperature coefficient	200 MHz to 300 MHz	0.40 %/K (0.017 dB/K)
	300 MHz to 4 GHz	0.25 %/K (0.011 dB/K)

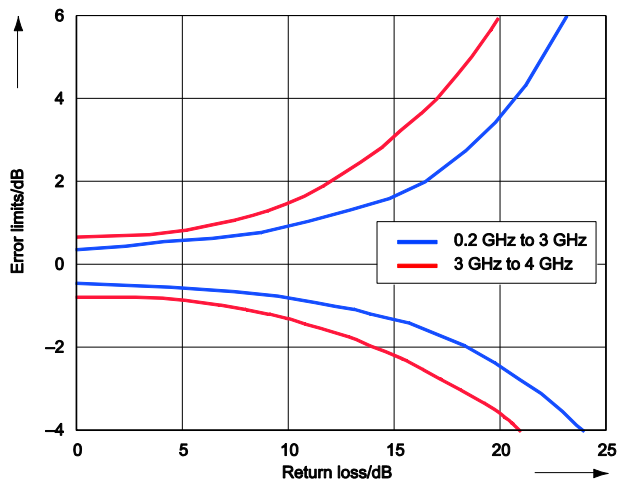
<b>Max. peak envelope power</b>		
Power measurement range		
DAB, DVB-T, cdmaOne, CDMA2000®, 3GPP WCDMA		4 W to 300 W
Other signals at video bandwidth	4 kHz	0.4 W to 300 W
	200 kHz	1 W to 300 W
	4 MHz	2 W to 300 W
Measurement uncertainty	+18 °C to +28 °C	same as for average power plus effect of peak hold circuit
Error limits of peak hold circuit for burst signals	duty cycle ≥ 0.1 and repetition rate ≥ 100/s	
	video bandwidth 4 kHz	±(3 % of measured value + 0.05 W) starting from a burst width of 100 μs
	video bandwidth 200 kHz	±(3 % of measured value + 0.20 W) starting from a burst width of 4 μs
	video bandwidth 4 MHz	±(7 % of measured value + 0.40 W) starting from a burst width of 1 μs
	20/s ≤ repetition rate < 100/s	plus ±(1.6 % of measured value + 0.15 W)
	0.001 ≤ duty cycle < 0.1	plus ±0.10 W
	burst width ≥ 0.5 μs	plus ±5 % of measured value
Range of typical measurement error of peak hold circuit	video bandwidth 4 MHz and standard selected on the R&S®FSH4/8/13/20	
	cdmaOne, DAB	±(5 % of measured value + 0.4 W)
	DVB-T, CDMA2000®, 3GPP WCDMA	±(15 % of measured value + 0.4 W)
Temperature coefficient	200 MHz to 300 MHz	0.50 %/K (0.022 dB/K)
	300 MHz to 4 GHz	0.35 %/K (0.015 dB/K)

<sup>12</sup> Requires R&S®FSH-Z144 adapter cable.

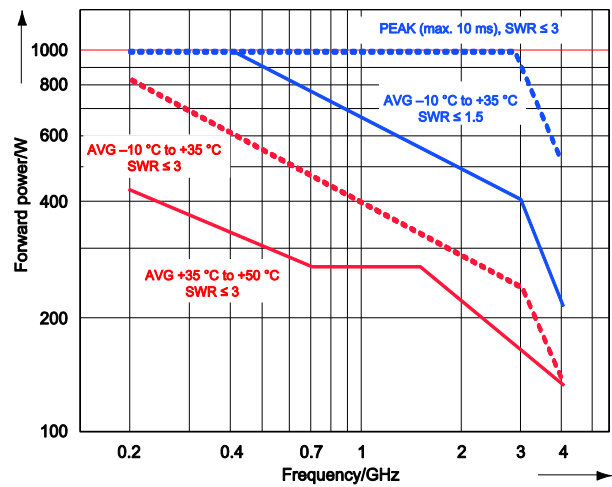
<sup>13</sup> If standard is selected on the R&S®Spectrum Rider FPH.

Load matching		
Matching measurement range		
Return loss	200 MHz to 3 GHz	0 dB to +23 dB
VSWR	3 GHz to 4 GHz	0 dB to +20 dB
VSWR	200 MHz to 3 GHz	> 1.15
	3 GHz to 4 GHz	> 1.22
Minimum forward power	specifications complied with $\geq 0.2$ W	0.03 W

Dimensions and weight		
Dimensions (W x H x D)		120 mm x 95 mm x 39 mm (4.72 in x 3.74 in x 1.53 in)
	connecting cable	1.5 m (59 in)
Weight		0.65 kg (1.43 lb)



Error limits for matching measurements



Power handling capacity



## Ordering information

Designation	Type	Order No.
Handheld spectrum analyzer, 5 kHz to 2 GHz	R&S®Spectrum Rider FPH	1321.1111.02
Handheld spectrum analyzer, 5 kHz to 6 GHz	R&S®Spectrum Rider FPH	1321.1111.06
Handheld spectrum analyzer, 5 kHz to 13.6 GHz	R&S®Spectrum Rider FPH	1321.1111.13
Handheld spectrum analyzer, 5 kHz to 26.5 GHz	R&S®Spectrum Rider FPH	1321.1111.26
<b>Accessories supplied</b>		
Lithium-ion battery pack, USB cable, AC power supply with country specific adapters for EU, GB, US, AUS, CH, documentation, quick start guide, side strap		

## Options

Designation	Type	Order No.
Spectrum analyzer frequency upgrade, 2 GHz to 3 GHz <sup>14</sup>	R&S®FPH-B3	1321.0667.02
Spectrum analyzer frequency upgrade, 3 GHz to 4 GHz <sup>10</sup> (requires R&S®FPH-B3)	R&S®FPH-B4	1321.0673.02
Spectrum analyzer frequency upgrade, 6 GHz to 8 GHz <sup>15</sup>	R&S®FPH-B8	1321.0767.02
Spectrum analyzer frequency upgrade, 13.6 GHz to 20 GHz <sup>16</sup>	R&S®FPH-B20	1321.0773.02
Spectrum analyzer frequency upgrade, 26.5 GHz to 31 GHz <sup>17, 18</sup>	R&S®FPH-B31	1321.0780.02
Spectrum analyzer preamplifier, 5 kHz to 4 GHz <sup>10</sup>	R&S®FPH-B22	1321.0680.02
Spectrum analyzer preamplifier, 5 kHz to 8 GHz <sup>11</sup>	R&S®FPH-B23	1321.0867.02
Spectrum analyzer preamplifier, 5 kHz to 20 GHz <sup>12</sup>	R&S®FPH-B24	1321.0850.02
Spectrum analyzer preamplifier, 5 kHz to 31 GHz <sup>13</sup>	R&S®FPH-B25	1321.0873.02
N type RF input connector for model .26 (factory installed) <sup>14</sup>	R&S®FPH-B100	1321.0596.02
Spectrum analyzer 100 Hz frequency extension, from 5 kHz down to 100 Hz <sup>19</sup>	R&S®FPH-B29	1334.8532.02
Analog modulation analysis AM, FM, ASK, FSK	R&S®FPH-K7	1321.0696.02
Power sensor support	R&S®FPH-K9	1321.0709.02
Interference analysis	R&S®FPH-K15	1321.0715.02
Signal strength mapping	R&S®FPH-K16	1321.0615.02
Channel power meter	R&S®FPH-K19	1321.0721.02
Pulse measurements with power sensor	R&S®FPH-K29	1321.0738.02
Receiver mode and channel scanner	R&S®FPH-K43	1321.0621.02

## Accessories

Designation	Type	Order No.
Battery charger for R&S®HA-Z306 <sup>20</sup>	R&S®HA-Z303	1321.1328.02
Lithium-ion battery pack, 6.4 Ah	R&S®HA-Z306	1321.1334.02
Spare power supply, incl. mains plug for EU, GB, US, AUS, CH	R&S®HA-Z301	1321.1386.02
Car adapter	R&S®HA-Z302	1321.1340.02
Carrying holster	R&S®HA-Z322	1321.1370.02
Rainproof carrying holster	R&S®HA-Z322	1321.1370.03
Soft carrying bag	R&S®HA-Z220	1309.6175.00
Hardcase	R&S®HA-Z321	1321.1357.02
Hard shell protective carrying case	R&S®RTH-Z4	1326.2774.02
Headphones	R&S®FSH-Z36	1145.5838.02
Spare USB cable	R&S®HA-Z211	1309.6169.00
Spare Ethernet cable	R&S®HA-Z210	1309.6152.00

## Antennas and antenna accessories

Designation	Type	Order No.
Yagi antenna, 1710 MHz to 1990 MHz	R&S®HA-Z1900	1328.6825.02
Yagi antenna, 824 MHz to 960 MHz	R&S®HA-Z900	1328.6283.02
RF cable (length: 1 m), DC to 6 GHz, N male – N male connectors	R&S®HA-Z901	3626.2757.02
Carrying bag, for R&S®HA-Z900 or R&S®HA-Z1900 Yagi antenna	R&S®HA-Z902	1328.6883.02

<sup>14</sup> Applicable only to base unit with order no. 1321.1111.02.

<sup>15</sup> Applicable only to base unit with order no. 1321.1111.06.

<sup>16</sup> Applicable only to base unit with order no. 1321.1111.13.

<sup>17</sup> Applicable only to base unit with order no. 1321.1111.26.

<sup>18</sup> R&S®FPH-B31 option is not available in combination with R&S®FPH-B100 option.

<sup>19</sup> For serial number  $\geq$  103100. Not applicable to R&S®Spectrum Rider FPH model .02.

<sup>20</sup> The battery charger is dedicated for charging an additional battery outside the instrument. The battery can be charged via the instrument as well.

Designation	Type	Order No.
Handheld directional antenna (antenna handle)	R&S®HE400BC	4104.6000.04
Cable set for R&S®HE400BC	R&S®HE400-KB	4104.7770.04
Handheld directional antenna (antenna handle)	R&S®HE400	4104.6000.02
Handheld directional microwave antenna (antenna handle)	R&S®HE400MW	4104.6000.03
Cable set for R&S®HE400 and R&S®HE400MW (requires R&S®HE300USB)	R&S®HE400-K	4104.7770.02
HF antenna module, 8.3 kHz to 30 MHz	R&S®HE400HF	4104.8002.02
VHF antenna module, 20 MHz to 200 MHz	R&S®HE400VHF	4104.8202.02
UWB antenna module, 30 MHz to 6 GHz	R&S®HE400UWB	4104.6900.02
Log-periodic antenna module, 450 MHz to 8 GHz	R&S®HE400LP	4104.8402.02
Cellular antenna module, 700 MHz to 2500 MHz	R&S®HE400CEL	4104.7306.02
S band and C band antenna module, 1.7 GHz to 6 GHz	R&S®HE400SCB	4104.7606.02
SHF antenna module, 5 GHz to 20 GHz (with R&S®HE400BC and R&S®HE400MW antenna handle)	R&S®HE400SHF	4104.8602.02
USB adapter, for R&S®HE400 handheld directional antenna	R&S®HE300USB	4080.9440.02
Log-periodic OEM antenna, 700 MHz to 4 GHz	R&S®HA-Z350	1321.1405.02
RF cable (length: 1 m), DC to 8 GHz, armored, N male/N female connectors	R&S®FSH-Z320	1309.6600.00
RF cable (length: 3 m), DC to 8 GHz, armored, N male/N female connectors	R&S®FSH-Z321	1309.6617.00
GPS receiver for R&S®Spectrum Rider FPH	R&S®HA-Z340	1321.1392.02
Portable EMF measurement system, hard case	R&S®TS-EMF	1158.9295.05
Isotropic antenna, 30 MHz to 3 GHz for R&S®TS-EMF	R&S®TSEMF-B1	1074.5719.02
Isotropic antenna, 700 MHz to 6 GHz for R&S®TS-EMF	R&S®TSEMF-B2	1074.5702.02
Isotropic antenna, 9 kHz to 200 MHz for R&S®TS-EMF	R&S®TSEMF-B3	1074.5690.02
Converter cable	R&S®TSEMF-CV	1158.9250.02
Matching pad, 50/75 Ω, L section	R&S®RAM	0358.5414.02
Matching pad, 50/75 Ω, series resistor 25 Ω	R&S®RAZ	0358.5714.02
Matching pad, 50/75 Ω, L section, N to BNC	R&S®FSH-Z38	1300.7740.02
Adapter N (m) – BNC (f)		0118.2812.00
Adapter N (m) – N (m)		0092.6581.00
Adapter N (m) – SMA (f)		4012.5837.00
Adapter N (m) – 7/16 (f)		3530.6646.00
Adapter N (m) – 7/16 (m)		3530.6630.00
Adapter N (m) – FME (f)		4048.9790.00
Adapter BNC (m) – Banana (f)		0017.6742.00
Attenuator, 50 W, 20 dB, 50 Ω, DC to 6 GHz, N(f) – N(m)	R&S®RDL50	1035.1700.52
Attenuator, 100 W, 20 dB, 50 Ω, DC to 2 GHz, N(f) – N(m)	R&S®RBU100	1073.8495.20
Attenuator, 100 W, 30 dB, 50 Ω, DC to 2 GHz, N(f) – N(m)	R&S®RBU100	1073.8495.30
Compact probe set for E and H near-field measurements, 30 MHz to 3 GHz	R&S®HZ-15	1147.2736.02
Near-field probe set H-field	R&S®HZ-17	1339.4141.02
Preamplifier (3 GHz, 20 dB), power adapter (100 V to 230 V), for R&S®HZ-15	R&S®HZ-16	1147.2720.02
Omnidirectional antenna for circular right-hand polarization, 18 GHz to 26.5 GHz	R&S®AC004R1	0749.3000.03
Omnidirectional antenna for circular left-hand polarization, 18 GHz to 26.5 GHz	R&S®AC004L1	4078.4000.02
Omnidirectional antenna for circular right-hand polarization, 26.5 GHz to 40 GHz	R&S®AC004R2	0749.3251.03
Omnidirectional antenna for circular left-hand polarization, 26.5 GHz to 40 GHz	R&S®AC004L2	4078.5006.02
Broadband omnidirectional antenna, 800 MHz to 26.5 GHz	R&S®HF907OM	4070.3279.02
Standard gain horn antenna, 26 GHz to 40 GHz, mid band gain 20 dB, WR 28	R&S®FH-SG-40	3629.2393.02
Standard gain horn antenna adapter	R&S®HA-Z370	1334.8432.02
Mast and tripod adapter	R&S®KM011Z8	4090.4006.02
Wooden tripod	R&S®HZ-1	0837.2310.02
Test port cable, 0 Hz to 26.5 GHz 3.5 mm female to 3.5 mm male, length: 635 mm	R&S®ZV-Z93	1301.7595.25
Test port cable, 0 Hz to 26.5 GHz 3.5 mm female to 3.5 mm male, length: 965 mm	R&S®ZV-Z93	1301.7595.38
Test port cable, 0 Hz to 26.5 GHz 3.5 mm female to 3.5 mm male, length: 610 mm	R&S®ZV-Z193	1306.4520.24
Test port cable, 0 Hz to 26.5 GHz 3.5 mm female to 3.5 mm male, length: 914 mm	R&S®ZV-Z193	1306.4520.36
Test port cable, 0 Hz to 26.5 GHz 3.5 mm female to 3.5 mm male, length: 1524 mm	R&S®ZV-Z193	1306.4520.60

Designation	Type	Order No.
Test port cable, 0 Hz to 40 GHz 2.92 mm female to 2.92 mm male, length: 635 mm	R&S®ZV-Z95	1301.7608.25
Test port cable, 0 Hz to 40 GHz 2.92 mm female to 2.92 mm male, length: 965 mm	R&S®ZV-Z95	1301.7608.38
Test port cable, 0 Hz to 40 GHz 2.92 mm female to 2.92 mm male, length: 610 mm	R&S®ZV-Z195	1306.4536.24
Test port cable, 0 Hz to 40 GHz 2.92 mm female to 2.92 mm male, length: 914 mm	R&S®ZV-Z195	1306.4536.36

## R&S®NRP-Zxx power sensors supported by the R&S®Spectrum Rider FPH <sup>21</sup>

Designation	Type	Order No.
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, 10 MHz to 8 GHz, 100 mW, two-path	R&S®NRP-Z211	1417.0409.02
Universal power sensor, 10 MHz to 18 GHz, 100 mW, two-path	R&S®NRP-Z221	1417.0309.02
Wideband power sensor, 50 MHz to 18 GHz, 100 mW	R&S®NRP-Z81	1137.9009.02
Wideband power sensor, 50 MHz to 40 GHz, 100 mW (2.92 mm)	R&S®NRP-Z85	1411.7501.02
Wideband power sensor, 50 MHz to 40 GHz, 100 mW (2.40 mm)	R&S®NRP-Z86	1417.0109.40
Wideband power sensor, 50 MHz to 44 GHz, 100 mW (2.40 mm)	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, 10 MHz to 40 GHz	R&S®NRP40S	1419.0041.02
Three-path diode power sensor, 100 pW to 200 mW, 10 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
<b>R&amp;S®NRP-Zxx power sensors require the following adapter cable for operation on the R&amp;S®Spectrum Rider FPH</b>		
USB adapter cable for R&S®FSH-Z14/ R&S®FSH-Z44 power sensors	R&S®FSH-Z144	1145.5909.02
USB adapter cable (passive), length: 2 m, to connect R&S®NRP-Zxx S/SN power sensors to the R&S®Spectrum Rider FPH	R&S®NRP-Z4	1146.8001.02
<b>R&amp;S®NRP power sensors require the following adapter cable for operation on the R&amp;S®Spectrum Rider FPH</b>		
USB interface cable, length: 1.5 m, to connect R&S®NRP sensors to the R&S®Spectrum Rider FPH	R&S®NRP-ZKU	1419.0658.03

## Optical power sensors and accessories

Designation	Type	s
OEM USB optical power meter (Germanium)	R&S®HA-Z360	1334.5162.00
OEM USB optical power meter (filtered InGaAs)	R&S®HA-Z361	1334.5179.00
SC adapter for optical power meter	R&S®HA-Z362	1334.5185.00
LC adapter for optical power meter	R&S®HA-Z363	1334.5191.00
2.5 mm universal adapter for optical power meter	R&S®HA-Z364	1334.5204.00
1.25 mm universal adapter for optical power meter	R&S®HA-Z365	1334.5210.00
Patch cord SC-LC SM, SX, length: 1 m	R&S®HA-Z366	1334.5227.00
Patch cord SC-SC SM, SX, length: 1 m	R&S®HA-Z367	1334.5233.00

<sup>21</sup> For average power measurements only.

## Service options

Warranty		
Base unit		3 years
All other items <sup>22</sup>		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	

### Extended warranty with a term of one and two years (WE1 and WE2)

Repairs carried out during the contract term are free of charge <sup>23</sup>. Necessary calibration and adjustments carried out during repairs are also covered.

### Extended warranty with calibration coverage (CW1 and CW2)

Enhance your extended warranty by adding calibration coverage at a package price. This package ensures that your Rohde & Schwarz product is regularly calibrated, inspected and maintained during the term of the contract. It includes all repairs <sup>19</sup> and calibration at the recommended intervals as well as any calibration carried out during repairs or option upgrades.

### Extended warranty with accredited calibration (AW1 and AW2)

Enhance your extended warranty by adding accredited calibration coverage at a package price. This package ensures that your Rohde & Schwarz product is regularly calibrated under accreditation, inspected and maintained during the term of the contract. It includes all repairs <sup>19</sup> and accredited calibration at the recommended intervals as well as any accredited calibration carried out during repairs or option upgrades.

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<sup>22</sup> For options that are installed, the remaining base unit warranty applies if longer than 1 year. Exception: all batteries have a 1 year warranty.

<sup>23</sup> Excluding defects caused by incorrect operation or handling and force majeure. Wear-and-tear parts are not included.



## Service that adds value

- ▮ Worldwide
- ▮ Local and personalized
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- ▮ Uncompromising quality
- ▮ Long-term dependability

## Rohde & Schwarz

The Rohde & Schwarz electronics group offers innovative solutions in the following business fields: test and measurement, broadcast and media, secure communications, cybersecurity, monitoring and network testing. Founded more than 80 years ago, the independent company which is headquartered in Munich, Germany, has an extensive sales and service network with locations in more than 70 countries.

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R&S® Spectrum Rider FPH Handheld Spectrum Analyzer

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