

# R&S®PR200 PORTABLE MONITORING RECEIVER

High-performance spectrum monitoring  
and direction finding in a handheld format



Product Brochure  
Version 11.00

**ROHDE & SCHWARZ**  
Make ideas real



Apart from the polychrome spectrum display and fast spectral overviews with scan speeds of up to 60 GHz/s, the R&S®PR200 features analog demodulation and versatile signal measurements, including level measurements, field strength measurements and ITU-compliant modulation parameter measurements. The R&S®PR200 also provides time domain analysis with simultaneous signal representation in the frequency and time domains. The gated spectrum application can even uncover hard-to-detect interference signals by computing the real-time spectrum only within an adjustable time gate when matched to particular time slots in time division multiplexing networks.

For evaluation and analysis, the R&S®PR200 offers comprehensive visualization modes, a wide range of markers and signal measurement functions, extensive mapping features, I/Q data streaming, a history mode, audio and trace recording as well as LAN remote control for later replay and documentation.

In addition to manual homing direction finding with R&S®HE400 or R&S®HE800 handheld directional antennas, the R&S®PR200 equipped with compact R&S®ADDx07 DF antennas can be upgraded to perform highly accurate angle of arrival (AoA) based direction finding from 20 MHz to 6 GHz. The high timestamp accuracy thanks to the internal GNSS module enables operation in a network of multiple receivers to perform precise time difference of arrival (TDOA) radiolocation.

The R&S®PR200 has an innovative application based user interface to quickly switch between measurement tasks, enabling signals of interest to be detected, analyzed and located in the shortest possible time. Thanks to its powerful feature set, low weight of 3.5 kg (with battery) and its battery life of over 3.5 h, the R&S®PR200 is one of the most sophisticated and easy-to-operate instruments for on-site spectrum monitoring and interference hunting.



## KEY FACTS

- ▶ Detect, analyze and locate RF signals from 8 kHz to 8 GHz; extendable up to 20 GHz with the R&S®HE400DC handheld directional antenna and from 18 GHz to 33 GHz with the R&S®HE800-DC30 handheld directional antenna both with an integrated downconverter
- ▶ Extensive preselection filtering and automatic overload protection
- ▶ High-speed panorama scanning with up to 60 GHz/s over the entire frequency range
- ▶ Simultaneous measurements in the frequency and time domain with time-gated spectrum calculation
- ▶ Accurate AoA based direction finding from 20 MHz to 6 GHz with compact Rohde & Schwarz DF antennas
- ▶ Optimized for demanding field operation with minimal size, weight and power consumption
- ▶ Innovative application based user interface for convenient, simple and intuitive operation

# HIGH-PERFORMANCE MONITORING WITH FAST SPECTRAL SCANS

## Monitoring and direction finding over wide frequency ranges

The R&S®PR200 has a 40 MHz real-time bandwidth and covers the monitoring frequency range from 8 kHz to 8 GHz, which can be extended up to 20 GHz with the R&S®HE400DC handheld directional antenna and from 18 GHz to 33 GHz with the R&S®HE800-DC30 handheld directional antenna both with an integrated downconverter, which is completely controlled by the R&S®PR200. When upgraded with the R&S®CS-DF option, the R&S®PR200 can perform angle of arrival (AoA) direction finding from 20 MHz to 6 GHz.

## Automatic adaptation to unknown signal environments

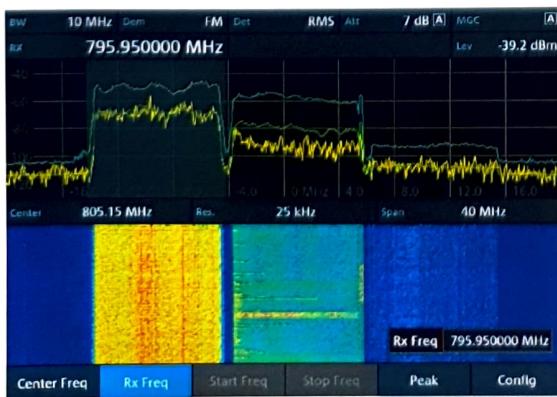
In contrast to spectrum analyzers, the R&S®PR200 is designed for operation on wideband antennas and features extensive preselection filtering to reduce signal load and protect against intermodulation from strong out-of-band signals. The R&S®PR200 also has an attenuator that can be operated manually or automatically. The automatic insertion of attenuation helps alleviate overload conditions in the receiver, which is essential when operating the instrument in unknown, dynamic or changing signal environments. Thanks to various preamplifier gain settings, the R&S®PR200 offers the sensitivity needed to reliably detect weak signals.

## Efficient and intuitive spectrum monitoring

The R&S®PR200 provides a quick spectral overview with its well-organized spectrum and waterfall display. With up to three configurable spectrum traces and selectable resolution bandwidths, no signal goes unnoticed. Easily accessible marker sets and mathematical trace functions enable fast spectrum measurements and comparisons.

## Fast spectral scans with dedicated scan modes

Whether the operational focus is on detecting unknown signals over wide frequency ranges or monitoring known communications channels, the R&S®PR200 offers various dedicated scan modes for every task. While the R&S®CS-PS panorama scan option provides a fast spectral overview with adjustable frequency resolution and speeds of up to 60 GHz/s, frequency scan (FSCAN) and memory scan (MSCAN) modes can scan through equi-spaced or distinct communications channels at up to 2000 channels/s. Configurable squelch levels and dwell times enable demodulation and listening into active channels while scanning.



40 MHz real-time bandwidth with an adjustable demodulation bandwidth (gray) and up to three configurable spectrum traces.



Fast spectral scan (panorama scan) with waterfall display across wide frequency ranges.

# TYPICAL APPLICATIONS

## Spectrum monitoring in the field

Spectrum monitoring helps detect and locate unknown interference signals, verify compliance with licenses, regulations and communications standards and facilitates network management. The R&S®PR200 is designed to perform these tasks during mobile operation in both indoor and outdoor environments. The wideband operation with gapless 40 MHz real-time processing, various spectrum scan modes and powerful measurement toolset including polychrome spectrum, time domain analysis, direction finding and ITU-compliant measurements enable efficient and convenient spectrum monitoring sessions in the field.

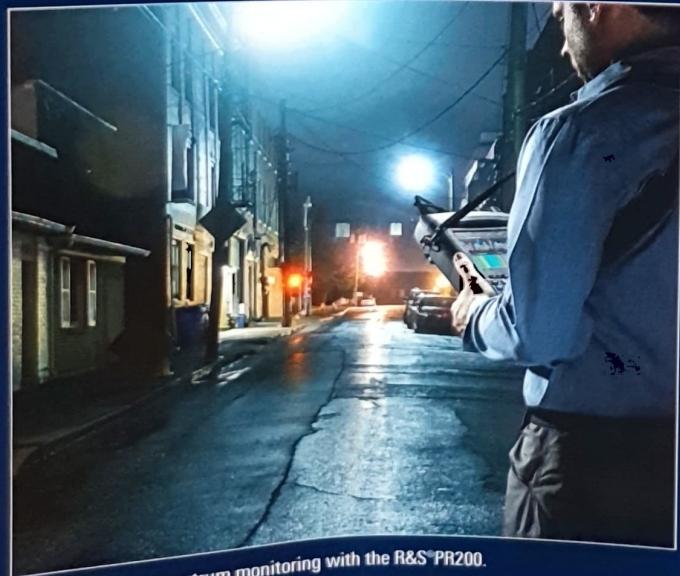
## Interference hunting

With the rapid increase in wireless transmission devices in urban areas, a growing number of unwanted interference signals can disrupt the communications link quality. Mitigating these interferers is crucial to proper spectrum use. The R&S®PR200 is ideal for quickly detecting, analyzing and locating interferers in indoor and outdoor operations. Thanks to its real-time operation, polychrome

spectrum and time domain analysis with time-gated spectrum function, even hard-to-detect interference can be spotted reliably. Once found, interferers can be located with manual homing and direction finding, automatic AoA based direction finding or from a moving vehicle in combination with the PC based R&S®MobileLocator software.

## Many other applications

The R&S®PR200 is a powerful instrument for many other applications that require flexibility and mobility. Whether performing on-site signal measurements in the frequency and time domains to ensure proper network performance, online signal analysis in combination with PC based signal analysis software in communication intelligence (COMINT) applications or detecting and locating miniature transmitters indoors with a differential spectrum, the R&S®PR200 is a compact, battery-operated and easy-to-operate solution.



Reliable outdoor spectrum monitoring with the R&S®PR200.



Manual homing direction finding with the R&S®PR200 and the R&S®HE400.

# MANUAL DIRECTION FINDING

## Manual homing direction finding

With the R&S®PR200 connected to the R&S®HE400 handheld directional antenna, continuous unwanted emissions up to 8 GHz can be detected and manually located based on the received signal level in indoor and outdoor operation. The R&S®HE400DC and the R&S®HE800-DC30 handheld directional antennas with an integrated downconverter can be used for interference hunting up to 20 GHz and from 18 GHz to 33 GHz. The built-in tone function also emits a tone with a varying pitch or pulse rate representing the received signal level that is then transmitted to the built-in speaker or a headset to aid in the homing operation.

## Mobile app for convenient homing

The R&S®PR200 mobile app for iOS or Android smartphones helps simplify homing operations and allows users to focus on the task at hand. A smartphone running the R&S®PR200 mobile app can be easily mounted on the antenna handle with a commercial, off-the-shelf mobile phone holder. The app provides a spectrum view with various settings to control the R&S®PR200 with wireless LAN. A wireless connection can be set up between the receivers USB port and the mobile phone using an external Wi-Fi router.



R&S®HE800-DC30 handheld directional antenna with an integrated downconverter.



Triangulation based on multiple DF results recorded at several locations.

## Triangulation based on manual DF results

The R&S®CS MAP mapping option provides the R&S®PR200 with an integrated map display for localizing signals of interest. Once several DF results and positions have been recorded from the internal GNSS module, automatic triangulation determines the location of the interferer. All map applications include a convenient integrated spectral display, allowing users to keep track of signals during signal hunting and homing operations. OpenStreetMap (OSM) maps can be easily downloaded with the OSM wizard and transferred to the receiver via SD card, USB stick or the remote control PC drive.

## Horizontal scan

The horizontal scan (HSCAN) function as part of the R&S®CS-MAP option plots the level of the signal received via the directional antenna on a polar diagram. It helps users easily determine the point of highest signal strength and its direction.



Interference hunting using the R&S®PR200 mobile app with gesture operation.



Horizontal scan plot on a polar diagram visualizes the direction of the incoming signal.

# COMPLEX SIGNAL MEASUREMENTS

## Level and field strength measurements

The R&S®PR200 features simultaneous level measurements of up to three detectors with peak indicators. When equipped with the R&S®CS-FS field strength measurement option and paired with the R&S®HE400 handheld antenna, the R&S®PR200 performs field strength measurements in line with ITU-R SM.378-7. The connected R&S®HE400xx antenna module is automatically recognized and the pre-stored antenna factors in the R&S®PR200 are applied to convert the received signal level to field strength.

## Analog modulation measurements

The R&S®CS-MM modulation measurement option enables RDS decoding and simultaneous measurements of the modulation parameters for AM, FM and PM modulated signals in line with the ITU Handbook on Spectrum Monitoring. The modulation depth, frequency deviation and phase deviation can be determined concurrently. Digitally modulated signals can be analyzed, classified and demodulated with the PC based R&S®CA100<sup>1)</sup> signal analysis software, which also enables manual parameter measurements in line with ITU-R SM.1600.

<sup>1)</sup> See R&S®CA100 product brochure (PD 3606 9340 12).



The results of up to three level detectors along with their field strength measurements can be displayed simultaneously.



ITU-compliant measurements of AM depth, FM deviation and PM deviation in a single view.

## Polychrome spectrum to distinguish superimposed signals

The R&S®CS-PC polychrome spectrum option makes it possible to separate superimposed, pulsed signals that cannot be differentiated with conventional methods such as spectrum, waterfall and the max. hold detector. To detect such pulsed interferers in a complex signal scenario, the frequency of the signal level occurrence is color-coded in the spectrum. The waterfall display can track changes in signal variation over time adding another dimension to characterize the signal.

## Bandwidth and channel power measurements

The R&S®CS-SPM spectral measurement option provides occupied bandwidth, bandwidth center offset and channel power measurements. In combination with the R&S®CS-PS panorama scan option, these measurements can be performed on signals wider than 40 MHz bandwidth during a panorama scan. Two methods are available for bandwidth measurements: x dB and β %. Bandwidth measurements are in line with ITU-R Recommendations SM.328-11 and SM.443-4 and the ITU Handbook on Spectrum Monitoring, chapter 4.5.



Polychrome spectrum uses color coding to indicate the relative level occupancy over time.



Automatic occupied bandwidth measurement of a DVB-T signal (β % method).

# RECORDING AND DOCUMENTATION

## History mode and history buffer export

If a signal is missed during observation, users can activate the history mode with the play&pause button to review the signal in the spectrum. The R&S®PR200 history memory buffer can store minutes of recordings and has a time resolution of up to 100 µs per line in the waterfall display. The history buffer can be exported to the internal memory, a USB stick or an SD card.

## Trace and audio recording and replay

The R&S®CS-IR trace recording and replay option allows users to record monitoring traces with demodulated audio and geolocation, which can be replayed on the device or via the PC based R&S®PR200 GUI. Recorded information is saved internally or onto a USB stick or SD card. Recording and replay is particularly useful for continuous measurements in unattended or mobile monitoring missions or simply for documentation. Recordings made during mobile operations can be replayed on a map with the R&S®CS-MAP mapping option.

## High-precision timestamps for synchronization

Equipped with the R&S®CS-TSA time stamp accuracy option, the R&S®PR200 built-in GNSS module provides extremely precise timestamps for measured I/Q data with an RMS error of less than 50 ns. The R&S®PR200 can also be operated as a sensor in a network of multiple receivers for accurate TDOA radiolocation. The R&S®CS-TSA option supports third-party navigation equipment such as gyro compasses or external GPS receivers (NMEA 0183) via the AUX 2 port.

## Coverage measurements with digital maps

In addition to map display and triangulation, the R&S®CS-MAP mapping option enables easy level mapping, which is ideal for typical geotagging applications such as coverage measurements, interference hunting and transmitter range testing. While on the move, both the received signal strength and the receiver's GNSS position are collected and saved. Measurements are either triggered manually as "save an event" or automatically over distance or time. The results are overlaid on the map as a color-coded track, where different colors represent different signal strength levels. During level mapping, the spectral overview is maintained with the integrated spectrum view.



Replay and LAN remote control using the R&S®PR200 GUI running on a Windows laptop or tablet.



A missed signal event during the panorama scan is revisited using the history mode.



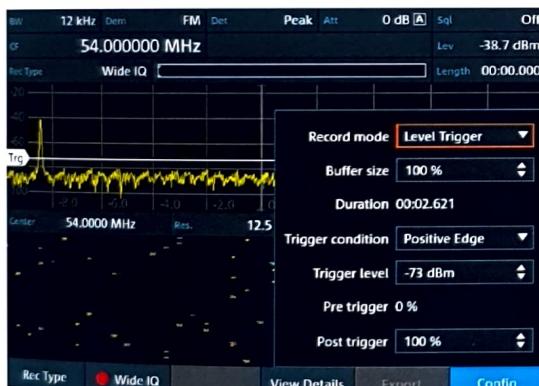
Coverage measurements via level mapping with integrated spectrum view.

# RECORDING, REPLAY AND ANALYSIS OF WIDEBAND DIGITAL I/Q DATA

## I/Q snapshot recording and replay

The R&S®CS-IQ I/Q snapshot recording and replay option supports the recording and replay of digital I/Q data up to 40 MHz real-time bandwidth. I/Q data replay is limited only by the recorded bandwidth and the internal memory size (512 Mbyte) of the R&S®PR200. A wide range of user-definable trigger conditions is available to start a recording. These include manual triggering at the press of a button, external triggering via the AUX 2 port (caused by events such as gate, positive/negative edge), and a level trigger that can be defined directly on the instrument GUI.

Recorded digital I/O data is replayed from the internal memory and displayed directly on the R&S®PR200. It can also be replayed and evaluated offline using the I/Q analysis app. During a replay, all receiver functions are available, and parameters can be changed by the user. For a deeper analysis, the time resolution in the waterfall diagram can be increased to one microsecond per line. This provides users with a detailed view of the spectral signal characteristics even for very short events. Recorded I/Q data can be easily transferred from the internal memory to an external storage medium in various file formats (IQ, HDF5, ARB and WAV).



Easy selection of trigger events for I/Q snapshot recording on a live spectrum.



Recorded signals can be evaluated offline using the I/Q analysis app.

## Maximum recording capacity of the internal memory

Span	Max. record length (approx.)
500 kHz	1.2 min
5 MHz	10.48 s
10 MHz	5.24 s
20 MHz	2.62 s
40 MHz	1.31 s



Detailed display of spectral signal characteristics with increased time resolution.

# OPERATOR TRAINING COURSES

Our R&S®PR200 operator training courses range from eTraining courses and virtual classroom courses to classroom courses that include theory and practical exercises. They cover the most important topics to effectively help users with their operational tasks.

In these courses, participants learn how to configure the R&S®PR200 and use its scanning and spectrum measurement functions to detect signals of interest. They become familiar with the real-time capabilities and related functions to characterize the signal parameters. Optionally, they will use the R&S®HE400 handheld directional antenna to localize interference sources with homing and triangulation. Where automatic direction finding is important, participants will learn how to configure and set up the R&S®PR200 with our R&S®ADDx07 compact DF antennas. Finally, they can operate the R&S®PR200 with the R&S®MobileLocator software for the automatic localization of interferers from a moving vehicle.

Courses are mostly instructor-led with an interactive approach. The instructor uses a mixture of question and answer sessions, continuous assessment and a final exam to ensure an effective knowledge transfer. All training participants receive a certificate after the completion of each course. In eTraining courses, participants can conveniently follow the guided exercises with their own R&S®PR200 device. In virtual classroom courses, modules are available in several web sessions with a trainer who demonstrates how to operate the R&S®PR200. The participants can ask questions at any time. In the classroom based training courses, extensive hands-on exercises improve familiarity with the R&S®PR200.

To benefit from these courses, participants should have a certain level of basic receiver and direction-finding knowledge. However, we also offer receiver and direction-finding basics as eTraining courses to refresh or to fill in any gaps. Please contact the local Rohde & Schwarz sales office for more information.

## R&S®PR200 web based operator trainings

Course title	Target audience	Objective	Duration
Module 1: Receiver operations	Operators of the R&S®PR200	Participants configure and operate the R&S®PR200 as a receiver	4 eTrainings; with approx. 1 hour duration per eTraining
Module 2: Operations with R&S®HE400	Operators of the R&S®PR200 with R&S®HE400	Participants configure and operate the R&S®PR200 with the R&S®HE400 to localize a signal source	1 hour
Module 3: Direction finder operations	Operators of the R&S®PR200 with R&S®ADDx07 compact DF antennas	Participants configure and operate the R&S®PR200 with R&S®ADDx07 to perform automatic direction finding	1 hour
Module 4: Operations with R&S®MobileLocator	Operators of the R&S®PR200 with R&S®MobileLocator	Participants set up, configure and operate R&S®MobileLocator in a vehicle to localize a signal source.	1 hour

## R&S®PR200 classroom operator trainings

Course title	Target audience	Objective	Duration
Receiver operations and operations with R&S®HE400	Operators of the R&S®PR200 with R&S®HE400	Participants configure and operate the R&S®PR200 with the R&S®HE400 to localize a signal source	1 day
Receiver operations, operations with R&S®HE400, direction finder and R&S®MobileLocator	Operators of the R&S®PR200 with R&S®HE400, R&S®ADDx07 compact DF antennas and R&S®MobileLocator	Participants configure and operate the R&S®PR200 with R&S®HE400, R&S®ADDx07 and R&S®MobileLocator. They can install the system in a vehicle and localize a signal source.	2 days

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- Uncompromising quality
- Long-term dependability

## Rohde & Schwarz

The Rohde & Schwarz technology group is among the trailblazers when it comes to paving the way for a safer and connected world with its leading solutions in test & measurement, technology systems and networks & cybersecurity. Founded more than 85 years ago, the group is a reliable partner for industry and government customers around the globe. The independent company is headquartered in Munich, Germany and has an extensive sales and service network with locations in more than 70 countries.

[www.rohde-schwarz.com](http://www.rohde-schwarz.com)

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- Environmental compatibility and eco-footprint
- Energy efficiency and low emissions
- Longevity and optimized total cost of ownership

Certified Quality Management  
ISO 9001

Certified Environmental Management  
ISO 14001

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