# R&S®UMS200
# Monitoring and Direction Finding System

## Compact two-channel monitoring and direction finding system

ROHDE&SCHWARZ

Radiomonitoring & Radiolocation

Product Brochure | 03.00

# R&S®UMS200 Monitoring and Direction Finding System

## At a glance

The R&S®UMS200 is a complete radiomonitoring and direction finding (DF) system for the frequency range from 9 kHz to 7.5 GHz (direction finding from 20 MHz to 3 GHz). The wide operating temperature range, the flexible power supply and the compact design place minimal demands on the infrastructure. Diverse options for remote control and local operation provide a high degree of flexibility and versatility.

The base unit consists of a receiver, control PC, LAN and power supply. It can be extended by adding a second receiver, a direction finder, compass and GPS receiver. All components are accommodated in compact, weatherproof, climate-controlled housing which can be mounted on a mast or a wall.

R&S®ARGUS and R&S®RAMON can also be used with the R&S®UMS200. These tried-and-tested monitoring software packages allow the R&S®UMS200 to be integrated quickly and easily into existing monitoring systems. The open interface enables customers and system integrators to develop their own software applications.

### Key facts

- True two-channel system for simultaneous direction finding and measurement or monitoring
- High sensitivity and outstanding system performance
- Designed for outdoor use
- Minimal infrastructure requirements

### Flexible operating concept

The R&S®UMS200 offers two control methods. In the basic configuration, the operating system (Windows XP Embedded) and all equipment interfaces are publicly available and documented. End customers and system integrators can develop their own software applications for customer-specific requirements. Rohde&Schwarz also provides optional monitoring software.

### Flexible remote control

The R&S®UMS200 was designed as an unattended, remote-controlled monitoring and DF system. The system comes with a LAN interface for remote control. High data transfer rates help ensure that all measured data (i.e. measurement values, bearings, audio data, IF spectra, I/Q data) is transferred without loss to the monitoring control center, where it can be analyzed and processed.

Users have the option of controlling the R&S®UMS200 remotely via 2G/3G mobile radio networks. The system can be factory-equipped with modules for GSM/UMTS and CDMA/CDMA2000®. 2G networks (GSM, CDMA) in particular have significantly lower transmission rates. The intelligent control mechanisms in the Rohde&Schwarz monitoring software make optimum use of the network bandwidth. Compression algorithms, for example, reduce the data volume in audio signals and help ensure that the monitoring control center receives the audio data needed for analysis and identification.

## Ready for local operation

The R&S®UMS200 has connections for a keyboard, mouse and monitor. After the protective plate has been removed, the R&S®UMS200 is ready for use in a fixed monitoring station or a vehicle. The changeover to local operation is fast and easy, an important prerequisite for integration in vehicles.

## Standalone solution and large network

Even a single R&S®UMS200 is an extremely high-performance monitoring station, both in local operation as a standalone solution or as an unattended remote-controlled station. The system's strengths become clear when it is networked with other stations: In a network with other direction finders, cross-bearing fixes and triangulation can be performed to determine the precise location of a transmitter.

To use the R&S®UMS200 in Rohde&Schwarz monitoring networks, the user only needs to update the system configuration. The R&S®UMS200 can also be integrated in other networks via its open interfaces.

## Four antenna inputs

Four antenna inputs are available for all tasks, frequencies and polarizations. Depending on the configuration (number of receivers and the presence of the direction finder), various switching options are implemented.

The optional R&S®UMS12-H6 DC feed allows the use of active antennas. The antennas receive their power directly from the R&S®UMS200.

## Extremely high frequency accuracy

The optional R&S®UMS20-B3 frequency reference delivers an extremely accurate time and frequency reference. The 10 MHz reference signal has an accuracy of up to $5 \times 10^{-12}$ (GPS synchronized, 24 h average).

## Compact design

The size of the R&S®UMS200 has been kept to an absolute minimum by systematically using modules and components instead of entire instruments. As a result, the system is so compact that it can be installed on the mast right next to the antennas. It is easy to find an installation location because a separate building or shelter is not necessary.

The modular design also minimizes power consumption, which reduces operating costs.

## Flexible power supply

The system can be supplied with power both from an AC network (100 V to 240 V AC) and a DC supply (10 V to 30 V DC).

It can be simultaneously fed with AC and DC power. AC power has priority. In the case of an AC power failure, the system automatically switches over to the DC power supply – with no interruption in operation.

## Prepared for all environments

The R&S®UMS200 was specifically developed for outdoor use. When the system starts up, the temperature control system integrated in the weatherproof, climate-controlled housing makes sure the operating temperature has been reached before components such as the receiver, direction finder and control PC are turned on. If necessary, the internal heater is switched on. If the internal temperature rises above the maximum operating temperature, due to continuous exposure to strong sunlight for example, the temperature control system automatically turns off components to prevent damage from overheating. They are only put back in operation when the temperature has returned to an uncritical level.

Internal fans provide constant air flow which distributes waste heat over a heat exchanger to the external walls where it is dissipated via cooling fins.

A weather protection cover (R&S®UMS20-B4) can be used to increase the operating temperature range. The cover protects the R&S®UMS200 from direct sunlight and is available as an accessory. The cover comes with integrated fans that improve the dissipation of waste heat via the cooling fins.

# System configuration

The R&S®UMS200 base unit includes a receiver (frequency range from 9 kHz to 3.5 GHz), control PC, LAN and power supply.

Other receiver options, such as frequency extension to 7.5 GHz and panorama scan, are also available.

The R&S®UMS20-B1 option is a second receiver. The system can be used for simultaneous radiomonitoring of two completely independent frequency ranges.

The R&S®UMS20-B2 option adds DF capability to the base unit. An integrated DF processor enables the receiver to also function as a DF receiver. The option includes a special DF control cable and an RF cable (each 5 m long).

The R&S®UMS20-H11 option enhances the DF option with a broadband DF antenna (frequency range from 20 MHz to 3000 MHz) and the R&S®ADD150A mast adapter.

The R&S®UMS20-B3 option increases the frequency accuracy by providing a 10 MHz reference signal with an accuracy of up to $5 \times 10^{-12}$ (GPS synchronized, 24 h average).

Various communications modules are available for remote control via mobile radio network. The R&S®UMS20-B11 and R&S®UMS20-B13 options support GSM, UMTS, CDMA und CDMA2000® networks.

These options are factory-added and are fully integrated in the housing (with the exception of the antenna).

The R&S®UMS20-SWB and R&S®UMS20-SWE options are ideal when using R&S®ARGUS to control the R&S®UMS200. These options offer efficient control of the receiver and antenna input switching. R&S®ARGUS also has options for additional requirements, such as other device drivers, measurement modes and open interfaces, which allow the R&S®UMS200 to be easily integrated into existing radiomonitoring systems.

Active antennas can be fed directly from the R&S®UMS200 using optional external R&S®UMS12-H6 DC feeds.

A compass and GPS are recommended when the R&S®UMS200 is equipped with a direction finder and is to be operated in a vehicle. Using these devices, both of which are available as accessories, the current position of the R&S®UMS200 and the DF results can be correctly displayed on a digital map, for example on R&S®MapView.

Additional antennas and cables need to be ordered separately according to project-specific requirements.

# Operation

Several software solutions are available for controlling the R&S®UMS200:

- Base unit with the R&S®EM100-Control remote control software for local operation of the receiver
- R&S®RAMON as system software for additional applications
- R&S®ARGUS standard software (with a wide range of functions and very user-friendly operation) for ITU-compliant monitoring
- Development of proprietary software applications thanks to open interface

## Remote control

The R&S®UMS200 is primarily designed for remote-controlled operation. The operator in the control center defines and controls measurements using the corresponding, locally installed R&S®UMS200 control software modules. LAN/WAN or mobile radio links are used for communications. Especially with GSM links, the output data rate of the R&S®UMS200 can be significantly higher than the available network bandwidth. Optimal utilization of existing capacity is only possible with the Rohde&Schwarz control software.

**Interactive or automatic measurement mode**

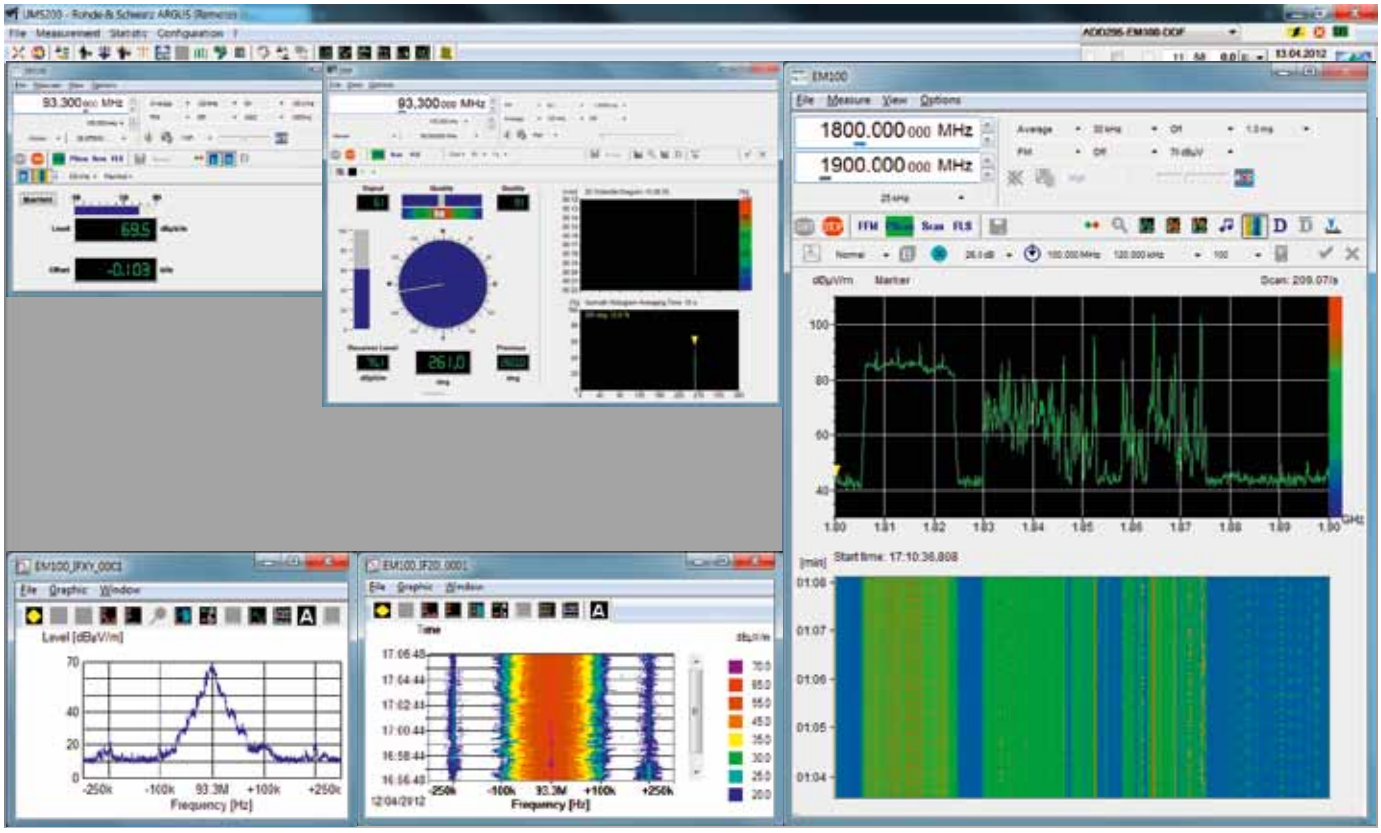
Measurements are performed interactively or automatically to suit the specific task. In interactive mode, the measured values, including IF spectrum and demodulated audio signal, are transmitted as a realtime data stream to the control application in the monitoring control center and are displayed as a table or chart. The operator can then directly evaluate the data and initiate further, required measures. In automatic mode, the measurement task is sent to the R&S®UMS200, where it is processed automatically. As a result, measurements are performed, for example, only in a specific, predefined time segment. The current measured value can also be compared directly with user-defined reference values, making it possible to detect interferers and illegal transmitters or unauthorized emissions from licensed transmitters. If suspicious activity is detected on an unassigned frequency, the R&S®UMS200 immediately analyzes the unknown source transmitter, activates additional direction finders and collects all information needed for identifying and localizing the transmitter. This is done automatically without operator intervention. The methods described here are already implemented in R&S®ARGUS and R&S®RAMON.

## Local operation

The R&S®UMS200 can be operated locally. Opening the protective plate on the side of the housing provides access to all DVI and USB ports so that keyboard, mouse and monitor can be directly connected. This makes it easy to integrate the R&S®UMS200 into vehicles. Local operation is especially suitable for system integration/configuration and for developing proprietary software applications.

## Two independent receive paths for parallel processing

A special highlight of the R&S®UMS200 are the two independent receive paths, which allow simultaneous, parallel processing of more than one task. For example, two different frequency ranges can be monitored at the same time. The uplink and downlink frequencies of a service are completely covered without information loss. One receiver scans the frequency range in master/slave operation. If an emission of interest is detected, the second receive path can analyze it in detail, take its bearings and identify it, while the first receiver continues to monitor the spectrum.




The example shows two independent receive paths: While the first transmitter (93.3 MHz) is analyzed (level, frequency offset, IF spectrum) and its bearings taken, the second receiver simultaneously monitors the frequency range from 1800 MHz to 1900 MHz.

# Application examples

The flexible, high-performance R&S®UMS200 system can be used for a wide variety of tasks, such as:

- Automatic detection and location of unknown signals
- Automatic detection and location of interferers
- Automatic license violation detection
- Monitoring of large areas (borders and coastlines)
- Monitoring of important buildings (harbors, industrial facilities, military installations)

The R&S®UMS200 as a combined monitoring and DF station.

The R&S®UMS200 as a monitoring station.

# Specifications

| Specifications | | |
|---|---|---|
| **Receiver data** | | |
| Frequency range | | 9 kHz to 3.5 GHz, optionally up to 7.5 GHz |
| Scan speed | | up to 1.8 GHz/s |
| IF spectrum display range | | 10 kHz to 10 MHz |
| Preselection | | included |
| Demodulation | | AM, FM, USB, LSB, ISB, PULSE, CW, I/Q |
| **DF data** | | |
| Frequency range | | 20 MHz to 3 GHz<br>(depending on the DF antennas) |
| DF method | | correlative interferometer |
| **Interfaces** | | |
| RF IN 1 to 4 | | antenna inputs, 4 × N female, 50 Ω |
| AC IN | | AC power supply,<br>4-contact circular connector |
| DC IN | | DC power supply,<br>7-contact circular connector |
| LAN | | 10/100 Mbit LAN |
| COM ANTENNA | | connector for communications antenna |
| GPS SENSOR | | connector for external GPS receiver |
| COMP SUPPLY, COMP COM | | connector for external compass |
| GPS ANTENNA | | GPS antenna input for frequency reference option |
| REF OUT | | 10 MHz reference frequency for external devices |
| DC OUT | | DC output for supplying active antennas |
| EXT FAN | | connector for external fan |
| **General data** | | |
| Power supply | | 100 V to 240 V AC, 50 Hz to 60 Hz,<br>max. 350 VA |
| | | 10 V to 30 V DC, max. 15 A |
| Operating temperature range | without direct sunlight | |
| | base unit without options | –30 °C to +45 °C |
| | maximum configuration, without external fans | –30 °C to +35 °C |
| | with weather protection cover<br>(R&S®UMS20-B4 option) | –30 °C bis +50 °C |
| Storage temperature range | | –40 °C to +70 °C |
| Relative humidity | | 95 % cyclic test, at +25 °C/+40 °C |
| Protection class | | IP 65 |
| Vibration | sinusoidal | 5 Hz to 55 Hz<br>0.15 mm amplitude constant (1.8 g at 55 Hz)<br>55 Hz to 150 Hz<br>0.5 g constant |
| | random | 10 Hz to 500 Hz, 1.9 g RMS |
| Shock | MIL-STD-810E, method 516.4, procedure I | 40 g shock spectrum, 11 ms interval |
| Dimensions (W × H × D) | | 300 mm × 570 mm × 292 mm<br>(11.81 in × 22.44 in × 11.50 in) |
| | without handles | 300 mm × 480 mm × 292 mm<br>(11.81 in × 18.90 in × 11.50 in) |
| Weight | maximum configuration | 28 kg (61.73 lb) |
| | with weather protection cover<br>(R&S®UMS20-B4 option) | 33 kg |

# Ordering information

| Designation | Type | Order No. |
|---|---|---|
| Monitoring and Direction Finding System<br>(base unit includes waterproof housing with RF module (9 kHz to 3.5 GHz), control PC, power supply, heater and communications) | R&S®UMS200 | 3039.3000.02 |
| **Options** | | |
| Second Receiver | R&S®UMS20-B1 | 3039.3100.02 |
| Direction Finder | R&S®UMS20-B2 | 3039.3200.02 |
| Broadband DF Antenna with R&S®ADD150A Mast Adapter | R&S®UMS20-H11 | 3039.3500.02 |
| Frequency Reference | R&S®UMS20-B3 | 3039.3300.02 |
| Wireless Module for GSM/UMTS | R&S®UMS20-B11 | 3039.3700.02 |
| Wireless Module for CDMA/CDMA2000® | R&S®UMS20-B13 | 3039.3800.02 |
| R&S®UMS200 – R&S®ARGUS Basic Software<br>(includes basic module, audio recording and replay, drivers for one receiver and one switch; for installation on the R&S®UMS200) | R&S®UMS20-SWB | 3039.3400.02 |
| R&S®UMS200 – R&S®ARGUS Extension Software<br>(includes drivers for one receiver, one direction finder, one GPS and one compass; for installation on the R&S®UMS200) | R&S®UMS20-SWE | 3039.3416.02 |
| External DC Feed, 100 kHz to 3 GHz | R&S®UMS12-H6 | 3035.1202.02 |
| Weather Protection Cover | R&S®UMS20-B4 | 3039.3222.02 |

Additional DF antennas, monitoring antennas and cables are not included in the scope of delivery and can be ordered separately according to project-specific requirements. The use of outdoor-suitable connectors requires special control cables for the DF antennas.

Please refer to the current R&S®EM100 product brochure (PD 5214.0560.11) and the R&S®ARGUS data sheet (PD 5213.9657.32) for information about receiver options such as frequency extension from 3.5 GHz to 7.5 GHz, panorama scan and other R&S®ARGUS options. If R&S®ARGUS is used for remote-controlled operation, the control center must be equipped with a computer that includes the corresponding R&S®ARGUS modules.

Other options and accessories available on request.

When the R&S®UMS200 is used in additional applications, the R&S®RAMON software modules can be used. The R&S®RAMON product brochure (PD 5214.3152.12) provides an overview of available modules and their functions.



Your local Rohde&Schwarz expert will help you determine the optimum solution for your requirements.
To find your nearest Rohde&Schwarz representative, visit
www.sales.rohde-schwarz.com

## Service you can rely on

- Worldwide
- Local and personalized
- Customized and flexible
- Uncompromising quality
- Long-term dependability

### About Rohde&Schwarz

Rohde&Schwarz is an independent group of companies specializing in electronics. It is a leading supplier of solutions in the fields of test and measurement, broadcasting, radiomonitoring and radiolocation, as well as secure communications. Established more than 75 years ago, Rohde&Schwarz has a global presence and a dedicated service network in over 70 countries. Company headquarters are in Munich, Germany.

### Environmental commitment

- Energy-efficient products
- Continuous improvement in environmental sustainability
- ISO 14001-certified environmental management system

Certified Quality System
ISO 9001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