



# R&S® Analysis Center

## At a glance

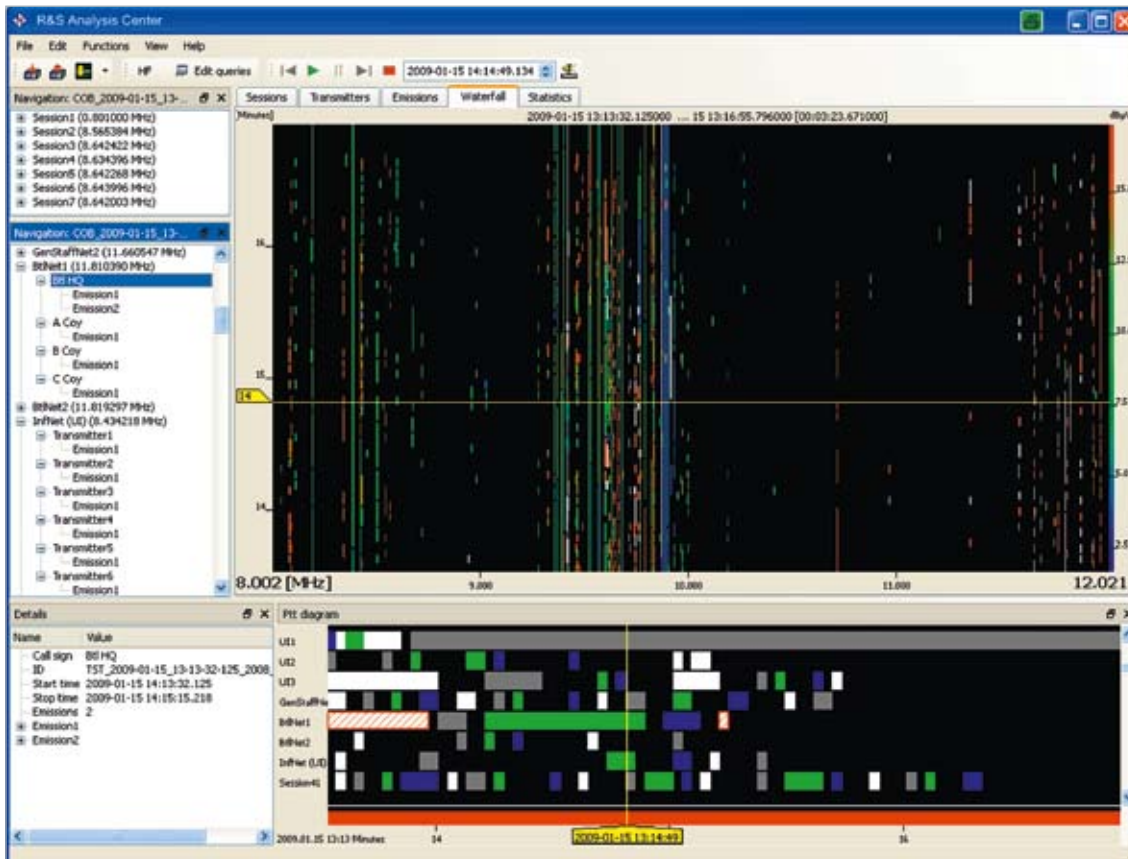
R&S® Analysis Center was developed to efficiently handle the constantly growing amounts of data from modern radiomonitoring systems. Powerful algorithms enable the software to automatically detect radio traffic and radio networks in intercepted electromagnetic emissions, which significantly accelerates evaluation.

The detected radio traffic, metadata and associated parameters are stored in a system database where they are available for further analysis. The user can load the automatically detected radio networks and radio traffic by means of detailed database queries. The information can then be displayed, edited, exported and saved using different visualization formats.

R&S® Analysis Center features a flexible, graphical user interface that can be customized as required. As a result, the operator has all important information available at a glance. The software is part of the tried-and-tested R&S® AMMOS-IT and R&S® RAMON software families and adds powerful technical and operational evaluation functions to these products.

### Key facts

- Automated creation and visualization of an electronic situation picture from data intercepted by Rohde&Schwarz radiomonitoring systems
- Flexible multi-user system with configurable user rights
- Wide range of applications from small systems to nationwide radiomonitoring platforms
- Part of the R&S® AMMOS-IT and R&S® RAMON system families (existing systems can be software-updated)



User interface of the R&S® Analysis Center software showing monitoring data from the 8 MHz to 12 MHz frequency range.

# R&S® Analysis Center

## Benefits and key features

### Automatic detection of radio networks and communications links

- ▮ Network identification by means of technical parameters and analysis of the push-to-talk (PTT) behavior
- ▮ Correlation of intercepted transmitters and comparison with profiles stored in the database
- ▮ Tracking of moving transmitters

▷ [page 4](#)

### All important data at a glance

- ▮ Graphical display of a situation picture on a digital map
- ▮ Quick and convenient formatting of important information
  - Static waterfall display
  - PTT graph
  - Statistical overview
  - Fast visualization and simple editing

▷ [page 6](#)

### Flexible and efficient user interface

- ▮ Multi-user system with configurable user rights
- ▮ Custom-configurable user interface

▷ [page 8](#)

### Integration into Rohde & Schwarz radiomonitoring systems

- ▮ Adding powerful evaluation functions to the R&S®AMMOS-IT and R&S®RAMON software families
- ▮ Easy upgrading of existing Rohde & Schwarz radiomonitoring systems

▷ [page 9](#)

### Single source solutions

- ▮ Rohde & Schwarz offers complete radiomonitoring solutions that ensure a high level of efficiency
- ▮ R&S® Analysis Center is suitable for use in both small and large-scale systems

▷ [page 10](#)

# Automatic detection of radio networks and communications links

## Network identification by means of technical parameters and analysis of the PTT behavior

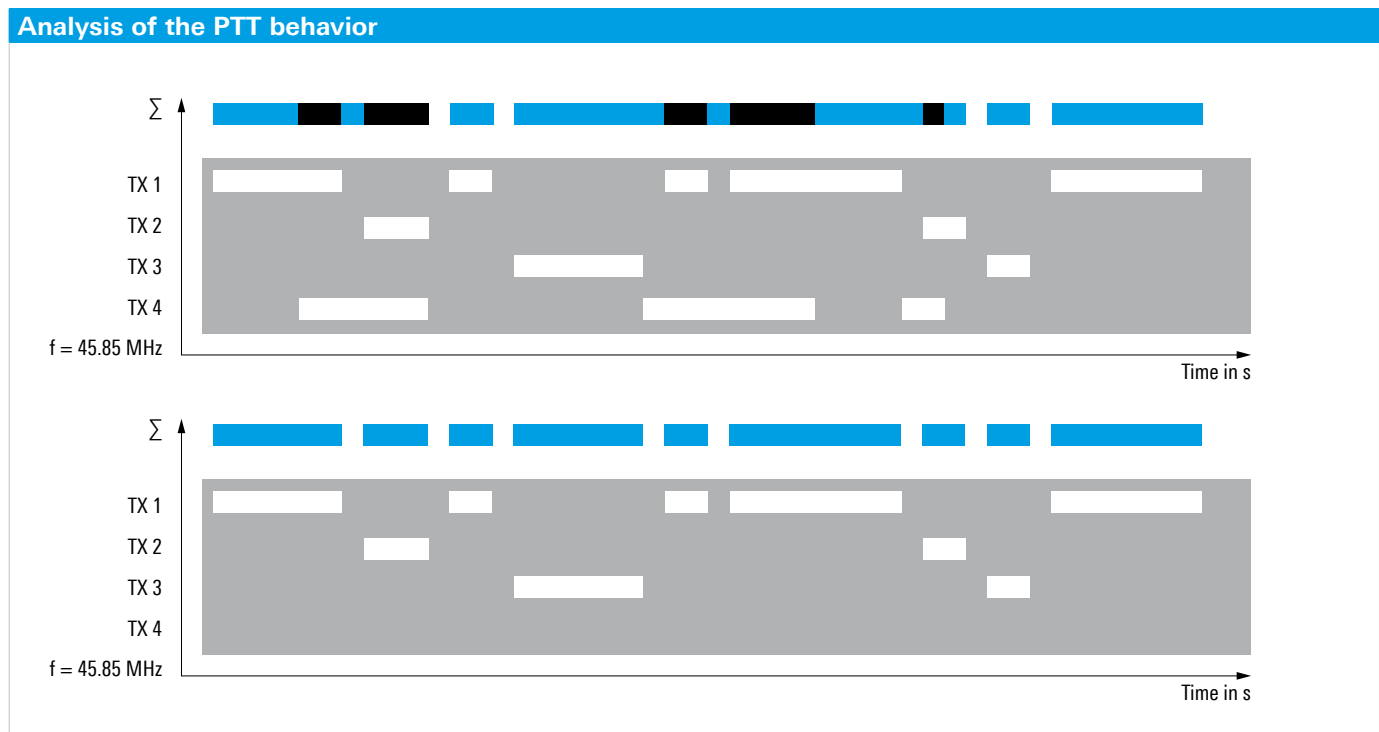
Apart from other important data such as frequency, modulation or location, the PTT behavior is a key factor in the detection of radio networks. R&S®Analysis Center analyzes the start and stop times of each individual transmission and combines correlated transmissions into radio traffic and correlated transmitters into radio networks.

The detected radio networks and radio traffic can be displayed on a digital map using R&S®MapView. In addition, these networks and their radio stations (main stations and substations) are represented in a hierarchical network tree.

The network correlations detected by the software and the designations of the individual transmitters and radio networks can be edited, modified and stored in the database or saved as a situation picture at any time by the operator. After they have been saved, the situation pictures can be loaded from the database, processed and exported as XML files.

Top: The emissions from four transmitters (TX 1 to TX 4) at the 45.85 MHz frequency are displayed versus time. The sum signal shows that the individual transmissions overlap in time. This is an indication that the transmitters do not all belong to the same radio network.

Bottom: After TX4 has been deleted, there is no more overlap in the sum signal. This means that TX 1, TX 2 and TX 3 very probably belong to the same network.



## Correlation of detected transmitters and comparison with profiles stored in the database

The detected transmitters are compared with profiles stored in the database. In case the profile parameters coincide, the corresponding database entry is updated. If a new transmitter is intercepted, a separate database entry can be created. This expands the database on an on-going basis.

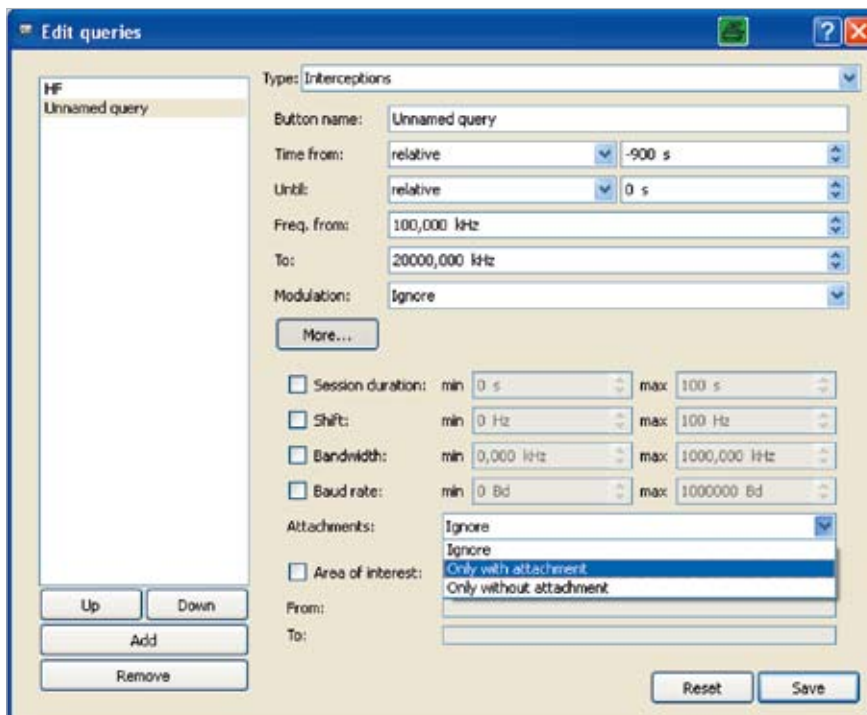
When performing evaluation and analysis tasks, the interception data can be queried from the database, displayed or restricted by applying configurable filter criteria. The system is capable of simultaneously handling multiple database queries. Displayed data can be kept up-to-date by means of the online update function. This enables the operator, for example, to display only the transmitters that appear for the first time. Additional filter criteria can be applied to limit the analysis to the selected frequency range, a period of time or a specific area of interest, for example. The filters can be saved and re-used at a later date, making it possible to display, for example, the chronological development of a situation in an area of interest.

The database can be loaded with basic data prior to an operation so that the users on-site can identify electromagnetic emissions more quickly. This speeds up threat analysis and increases security.

## Tracking of moving transmitters

By using powerful matching algorithms, the software can determine if a currently intercepted transmitter has already been intercepted in the past. In this case, the software compares the location data, adapts it if required and updates the position on the digital map. This is an on-going process since the system keeps track of previous radio locations in a history file. It is therefore possible to plot the movement of a transmitter on the map. The user can determine how long the interception data should be saved.

Specific combinations of transmitter data can be selected, such as the type and number of transmitters or the transmission behavior. This enables the user, for example, to draw conclusions about the platform or type of radio being used.



Database query dialog box.

# All important data at a glance

## Graphical display of a situation picture on a digital map

To graphically represent the results as a situation picture, the system uses R&S®MapView to display the detected transmitters as well as the identified radio networks and communications links on a digital map. The individual radio stations are displayed as symbols while the identified traffic correlations are shown as a line between the participating stations. Different types of radios (e.g. fixed-frequency or hopper radios) are represented on the map by different symbols. The intercepted traffic correlations are highlighted on the display with the number of links and an initial assignment by means of color-coded symbols. Detailed information regarding a particular transmitter can be displayed and processed by clicking the appropriate map symbol. If the database contains audio or frequency scans of the intercepted networks, for example, they can easily be played back from the R&S®Analysis Center software using the playback toolbar.

For further evaluation, the transmitters can be assigned specific symbols, such as those found in the MIL-STD-2525B symbol set. The transmitters can also be correlated to units, persons or carrier platforms (e.g. helicopters and equipment classes). Assignments made can be changed if new information becomes available. All additional information is saved in the database.

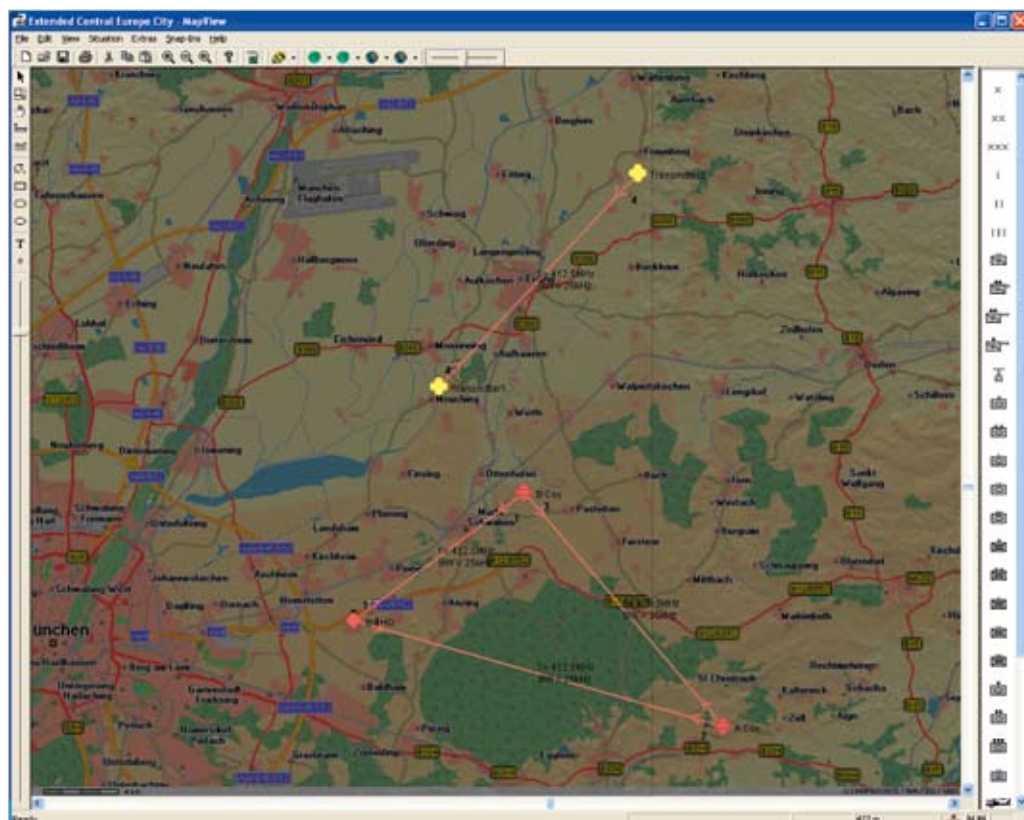
The system can be customized and enhanced with additional functions designed especially for updating situation pictures in military applications.

## Quick and convenient formatting of important information

R&S®Analysis Center offers various ways to visualize the relevant information.

## Static waterfall display

The waterfall display shows statically the radio traffic present within the selected frequency range as a function of time. This display makes it possible, for example, to detect radio networks in which the participants use separate transmit and receive frequencies (duplex operation). The signal level is highlighted by means of a color scale.



Screenshot of R&S®MapView showing a situation picture (radio stations, communications links, etc.).

The data is preclassified so that the transmissions are displayed with the most important parameters such as frequency and bandwidth. Detailed information regarding the transmitters and transmissions appears in a separate window, which is automatically updated when another transmitter or transmission is selected.

### PTT graph

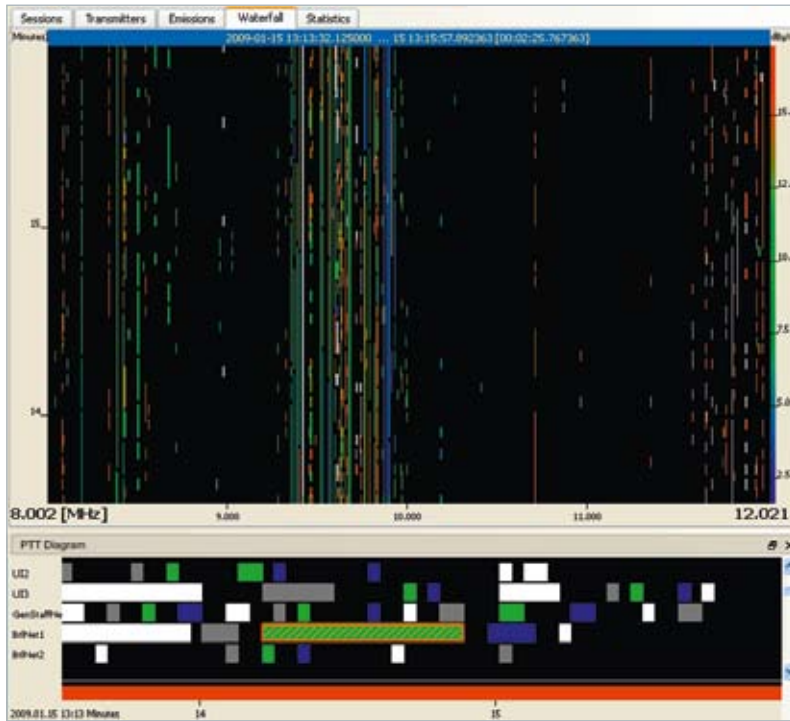
Another powerful function is the option to display a PTT graph for selected transmitters and radio networks. The graph offers a quick chronological overview of the radio traffic intercepted in these networks. Different transmitters are represented by different colors. The PTT graph is a powerful tool for further verifying or editing the automatically detected traffic correlations and radio networks.

### Statistical overview

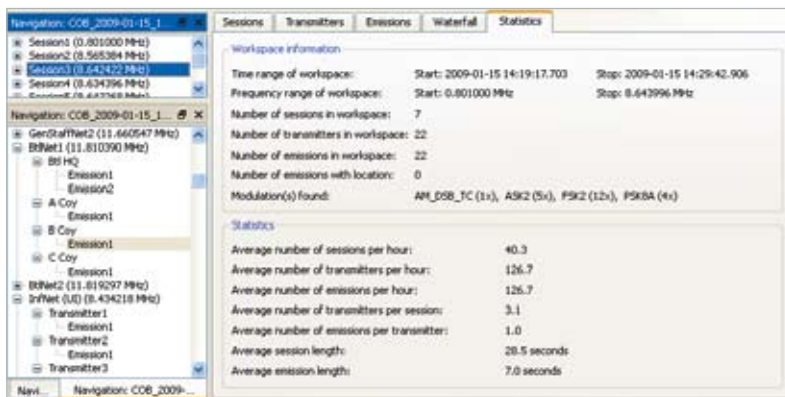
In addition to windows that provide overviews of the transmitters and transmissions, R&S®Analysis Center also features a statistical overview of the selected data, such as the average number of intercepted transmissions per hour or information concerning frequency occupancy and activity in the target range. This data can be used to draw conclusions about typical radio network activity in specific areas of interest or frequency ranges.

### Fast visualization and simple editing

The radio network assignment is displayed in a hierarchical list for fast visualization. Single or multiple entries can be moved, deleted or copied by "drag and drop". The changes can be saved in the database.



Waterfall and PTT graph.



Network lists and statistics window.

# Flexible and efficient user interface

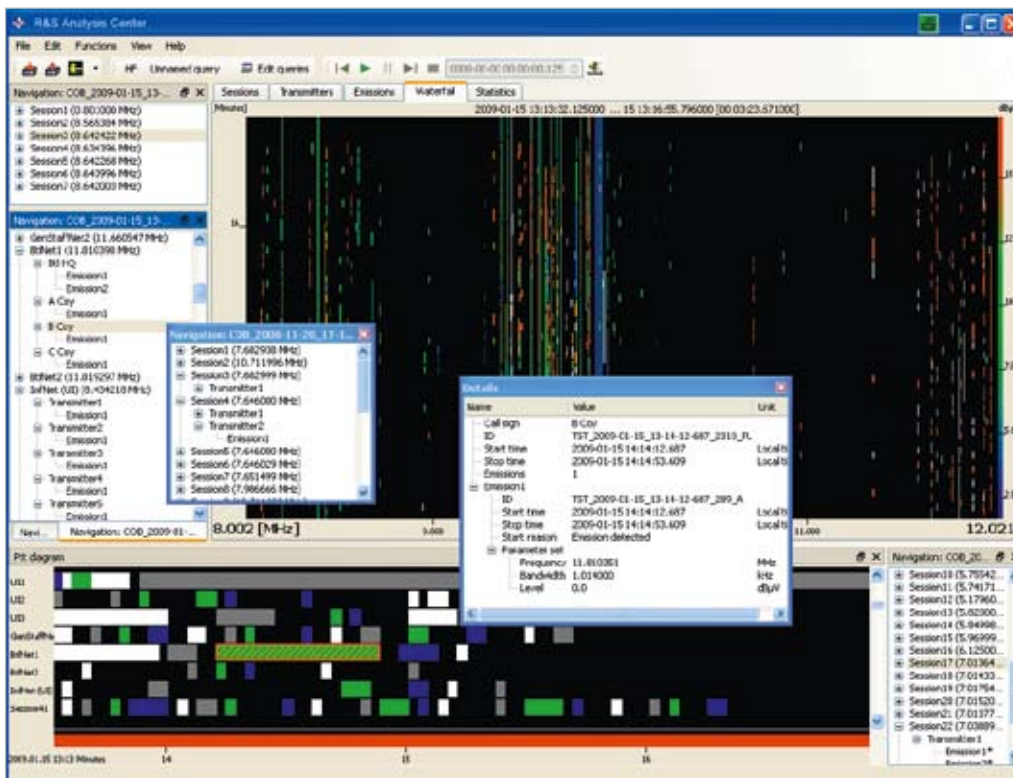
## Multi-user system with configurable user rights

Evaluating information intercepted by advanced radio-monitoring systems is personnel-intensive. Several people are normally involved in evaluating the data in the various phases. R&S®Analysis Center has the right tools and functions for each phase of the evaluation – for intercept operators and the persons responsible for pre-evaluation, content evaluation or basic evaluation.

The system administrator can assign user-specific access and editing rights for each workstation. This ensures that no data becomes lost or is unintentionally modified.

## Custom-configurable user interface

R&S®Analysis Center features a flexible graphical user interface. The arrangement of the subwindows on the screen can be defined and saved on a user basis. The database information is displayed in multiple, clearly arranged subwindows that can be moved and scaled as needed. The subwindows are linked to one another so that when selecting a transmission in the PTT graph, for example, the same transmission will also appear in the other windows (e.g. waterfall graph). Windows that are not currently in use can be blanked out. The use of tabs provides a clear layout even when numerous windows are open. R&S®Analysis Center optimally supports the display of the information on enhanced desktops, i.e. multiple monitors.



Flexible user interface layout.

# Integration into Rohde & Schwarz radiomonitoring systems

## **Adding powerful evaluation functions to the R&S®AMMOS-IT and R&S®RAMON software families**

R&S®Analysis Center is integrated as a module in the tried-and-tested R&S®AMMOS-IT and R&S®RAMON software families and adds powerful technical and operational evaluation functions to the Rohde&Schwarz radiomonitoring systems. It is the first in a series of evaluation software solutions from Rohde&Schwarz, and its functionality will be enhanced by the forthcoming R&S®Analysis Center EDM (emitter data manager). R&S®Analysis Center EDM will be used to generate and edit basic data and metadata such as units and transmitter platforms used, as well as to collocate transmitters and units.

As it is now available, R&S®Analysis Center identifies automatically intercepted transmitters and radio traffic and displays them in graphical and text form. The software automatically detects traffic correlations between the transmitters and identifies correlated radio networks. All steps can be verified and corrected if required.

## **Easy upgrading of existing Rohde&Schwarz radiomonitoring systems**

R&S®Analysis Center was developed and designed for seamless integration into existing R&S®AMMOS or R&S®RAMON systems. The upgrade is carried out by means of a system-specific software update.

# Single source solutions

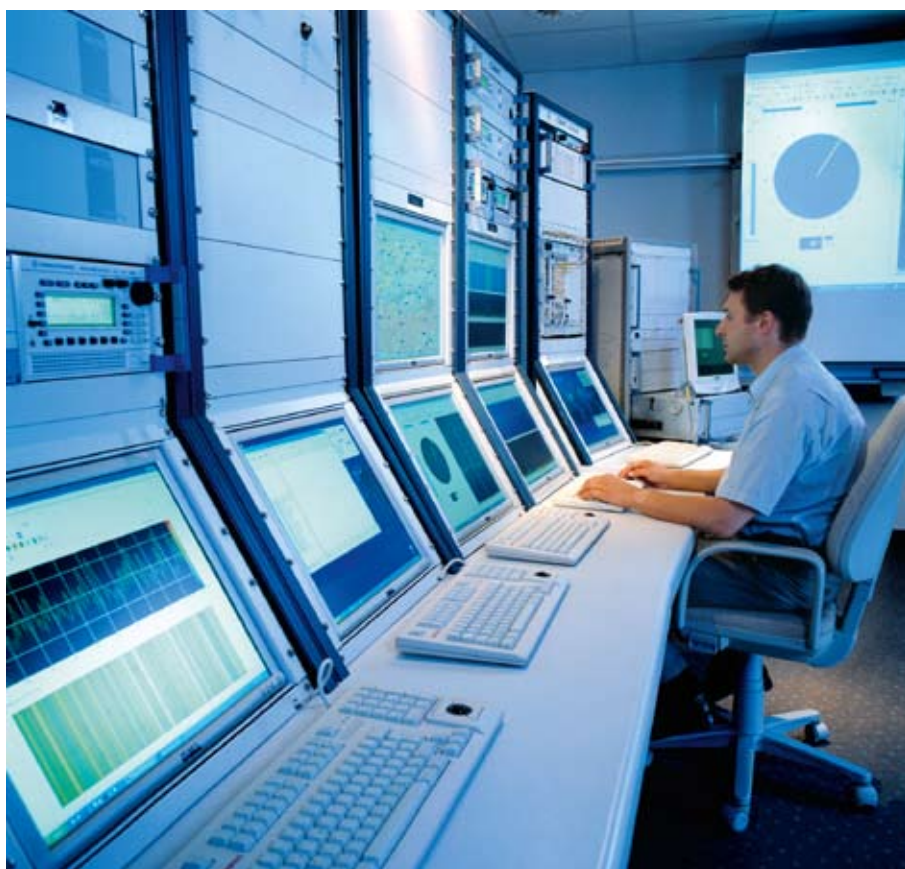
## Rohde & Schwarz offers complete radiomonitoring solutions

Modern radiomonitoring systems are extremely powerful yet very complex. This complexity requires system components that are particularly well matched. Rohde & Schwarz supplies complete radiomonitoring systems, from sensor technology (receivers, direction finders, analysis equipment) to technical and operational evaluation. By relying on Rohde & Schwarz systems, customers can carry out a wealth of tasks ranging from interception to evaluation.

R&S® Analysis Center is part of the Rohde & Schwarz radiomonitoring systems and adds vital functions to these products. All elements of the system are optimally matched to ensure a high level of efficiency.

## R&S® Analysis Center is suitable for use in both small and large-scale systems

R&S® Analysis Center can be used together with various radiomonitoring systems. The functionality can be selected to match the size and complexity of the system. R&S® Analysis Center offers a solution for every system – from small, mobile, laptop-based platforms (e.g. R&S® TMSR) to large-scale, stationary radiomonitoring systems.



Stationary radiomonitoring system:  
R&S® Analysis Center can significantly speed up the analysis and evaluation of the enormous volumes of data generated by large-scale radiomonitoring systems.

# Ordering information

Designation	Type	Order No.
Software for automatically generating session and activity data from R&S®AMMOS single-channel IPCs; storage of the data in the database	R&S®RA-AGSC	3020.9054.02
Software for automatically generating session and activity data from R&S®AMMOS IPC conventional detection; storage of the data in the database	R&S®RA-AGMC	3020.9060.02
Software for automatically generating session and activity data from the RF spectrum of Rohde&Schwarz receivers/direction finders; storage of the data in the database	R&S®RA-AGED	3020.9125.02
Graphical User Interface for visualizing session data from the database	R&S®RA-AC-SDM	3020.9077.02
Graphical User Interface for editing, saving and exporting situation pictures from session data in the database	R&S®RA-AC-COB	3020.9083.02
Graphical User Interface for loading, editing, saving and exporting metadata and basic data from the database <sup>1)</sup>	R&S®RA-AC-EDM	3020.9102.02

<sup>1)</sup> The software modules are not sold as single products. Additional products/licenses are required depending on the system and configuration. Rohde&Schwarz sales representatives can answer questions regarding configuration and licensing.

Your local Rohde&Schwarz sales partner will be glad to help you find the optimum configuration for your requirements.

You can find your local contact at [www.sales.rohde-schwarz.com](http://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 75 years ago, Rohde & Schwarz has a global presence and a dedicated service network in over 70 countries. Company headquarters are in Munich, Germany.

## Regional contact

Europe, Africa, Middle East

+49 1805 12 42 42\* or +49 89 4129 137 74

customersupport@rohde-schwarz.com

North America

1 888 TEST RSA (1 888 837 87 72)

customer.support@rsa.rohde-schwarz.com

Latin America

+1 410 910 79 88

customersupport.la@rohde-schwarz.com

Asia/Pacific

+65 65 13 04 88

customersupport.asia@rohde-schwarz.com

Certified Quality System  
**ISO 9001**

Certified Environmental System  
**ISO 14001**

## Rohde & Schwarz GmbH & Co. KG

Mühldorfstraße 15 | 81671 München

Phone +49 89 41 290 | Fax +49 89 41 29 121 64

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

R&S® is a registered trademark of Rohde & Schwarz GmbH & Co. KG  
Trade names are trademarks of the owners | Printed in Germany (ch)  
PD 5214.0024.32 | Version 01.00 | June 2009 | R&S® Analysis Center  
Data without tolerance limits is not binding | Subject to change

\*0.14 €/min within German wireline network; rates may vary in other networks (wireline and mobile) and countries.