

# R&S® MNT100

## RF Interference Locator

Radiolocation in mobile networks  
From the experts





# R&S®MNT100 RF Interference Locator At a glance

The increasing number of wireless products that can be bought globally over the internet contribute to the growing number of RF interferers experienced by mobile network operators. The R&S®MNT100 RF interference locator detects, analyzes and locates even complex pulsed interference signals. With the direction finding (DF) and PC-based radiolocation software upgrade, sources of interference can be located automatically and strikingly faster than with other solutions on the market.

## R&S®MNT100 extensive feature set as standard

- Spectrum and spectrogram (waterfall) display, recording and playback
- Fast panorama scans with up to 2 GHz/s
- Listening-in to signals with analog modulation
- Horizontal scan and tone-based manual DF
- Map display and triangulation
- Occupied bandwidth measurements
- SD card for data storage

Rohde&Schwarz has earned a high reputation among spectrum monitoring authorities worldwide for providing reliable high-performance equipment. This know-how and experience that has been built up over decades has now been used to make radiolocation of interferers in mobile networks much faster and more accurate.

The R&S®MNT100 guides the operator to the interferer location based on 600 bearings per minute in combination with sophisticated statistical analysis.

### Key facts

- Detect, analyze and locate sources of interference from 600 MHz to 6 GHz
- Easy-to-use solution that automatically locates interferers strikingly faster than other solutions on the market
- Designed for use with antennas in dense spectrum environments thanks to extensive preselection
- Exceptionally high spurious-free dynamic range and fastest realtime signal processing in its class
- Innovative handheld dual-mode antenna for accurate manual direction finding as option
- Fast automatic direction finding with magnet-mounted DF antenna and interference locator software as upgrade



R&S®MNT100LOC2 automatic locator package

**R&S® MobileLocator**



**After 30 s<sup>1)</sup>**





**After 3 min<sup>1)</sup>**





**After 6 min<sup>1)</sup>**



Result after 30 s into the mission. <sup>1)</sup>



Approaching the source of interference.



Position fix with 10 m accuracy after 6 min. <sup>1)</sup>



**Position of interferer**

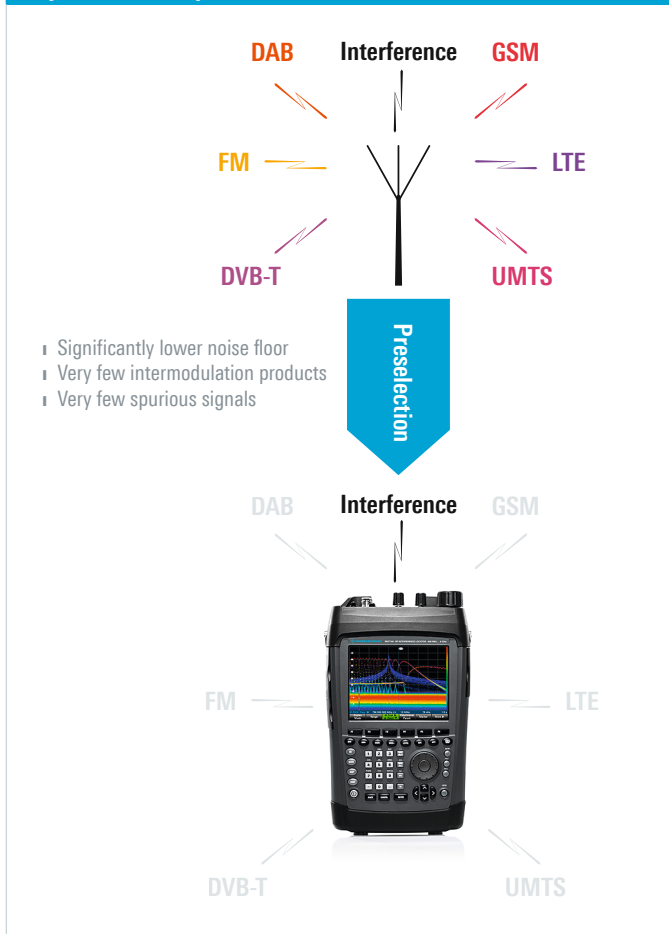


**Mobile direction finder (DF)**

<sup>1)</sup> The actual accuracy and processing time depends on the propagation environment.

# Key features

## Sophisticated preselection

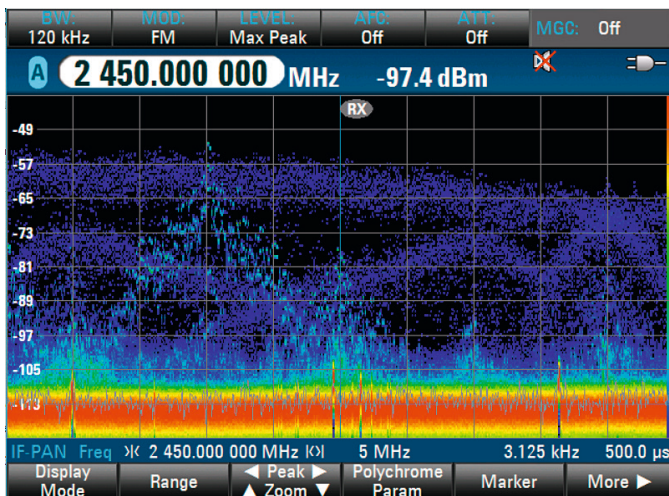


## Exceptionally high spurious-free dynamic range (SFDR)

Received radio interference often has a low level because it occurs inside buildings and is emitted at low transmit power. At the same time, there are many other signals in the spectrum that are typically stronger than the signal of interest. Under these conditions, reliable detection of such signals requires high SFDR. The R&S®MNT100 offers higher SFDR than other solutions in its class. In practice, the signal is received much further away from the source, which significantly speeds up the search.

## Extensive preselection to suppress strong broadcast signals and signals outside the measurement window

The spectrum contains many broadcast signals (FM, DVB-T, DAB, TV, etc.) that are normally much stronger than the wanted signal. The sum of all signals at the antenna input limits the detectability of weak signals. The higher the sum level, the higher the noise floor. Signals outside the measurement window must be filtered out to prevent weak signals from being concealed by noise (see figure). Equipped with a tracking filter and multiple band-pass filters, the R&S®MNT100 suppresses strong out-of-band signals much more effectively than solutions without preselection.



## Fastest realtime signal processing

Thanks to fast, gap-free, realtime fast Fourier transform (FFT), the R&S®MNT100 does not miss short emissions. Even signals that are transmitted for only 20 ns are detected at 100% probability of intercept (depending on signal level).

## Polychrome display for detection of superimposed pulsed signals

The polychrome display allows you to detect and differentiate superimposed pulsed signals that are not visible on traditional swept-tuned spectrum analyzers.

A low-amplitude pulsed signal (Bluetooth®) superimposed by a pulsed signal with higher amplitude (WLAN) can only be seen by using the polychrome spectrum

The Bluetooth® word mark and logos are registered trademarks owned by the Bluetooth SIG, Inc. and any use of such marks by Rohde&Schwarz is under license. CDMA2000® is a registered trademark of the Telecommunications Industry Association (TIA-USA).

# Key use cases



R&S®HE400LP log-periodic antenna module



R&S®HE400 handheld antenna with R&S®HE400CEL cellular antenna module, 700 MHz to 2.5 GHz (optional)



R&S®HE400 handheld antenna with R&S®HE400SCB S and C band antenna module, 1.7 GHz to 6 GHz (optional)



R&S®HA-Z222 carrying holster



R&S®HE400Z2 transport bag



R&S®MNT100 RF interference locator

## Triangulation of interferers with directional antenna

The R&S®HE400LP log-periodic antenna module features a constant gain and distinctive radiation pattern facing to the front over the entire frequency range of the R&S®MNT100. Bearings are found by manually pointing the antenna in the direction where the signal is strongest. The R&S®HE400LP is part of the R&S®MNT100LOC1 standard locator package.

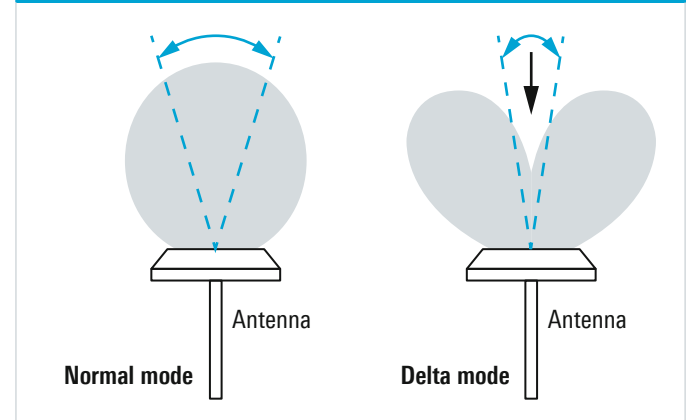
## Innovative handheld dual-mode antenna

The optionally available R&S®HE400CEL cellular antenna module and the R&S®HE400SCB antenna module provide even more accurate manual direction finding. Both antenna modules contain two antenna elements that can be combined in normal/delta mode. In normal mode, the antenna modules provide high directivity over the entire frequency range from 700 MHz to 6 GHz.

## More accurate than any Yagi antenna

In delta mode, the R&S®HE400CEL and R&S®HE400SCB provide a steep notch at the boresight of the antenna for highly accurate manual direction finding, much better than with any Yagi antenna.

## Operating modes





R&S®MobileLocator PC-based automatic radiolocation software with ...



... R&S®ADD207 compact UHF/SHF DF antenna

## Fast automatic location of interferers from a moving vehicle

With the R&S®MNT100LOC2 automatic locator package upgrade, the R&S®MNT100 turns a commercial vehicle into an accurate mobile direction finder within minutes.

## PC-based automatic radiolocation software

In order to overcome misleading information from reflections in urban scenarios, up to 600 DF results per minute from the R&S®MNT100 are fed to the R&S®MobileLocator PC-based automatic radiolocation software, which applies sophisticated statistical analysis to discard irrelevant readings.

## Others hunt, we locate

Equipped with the R&S®MNT100LOC2 automatic locator package, the R&S®MNT100 automatically locates sources of interference strikingly faster than other solutions on the market.

## User-friendly software optimized for one-man operation

The R&S®MobileLocator software allows a single operator to automatically locate sources of interference.

## Report generation by mouse click

R&S®MobileLocator generates an interference location report by mouse click.

## Overcome multipath propagation

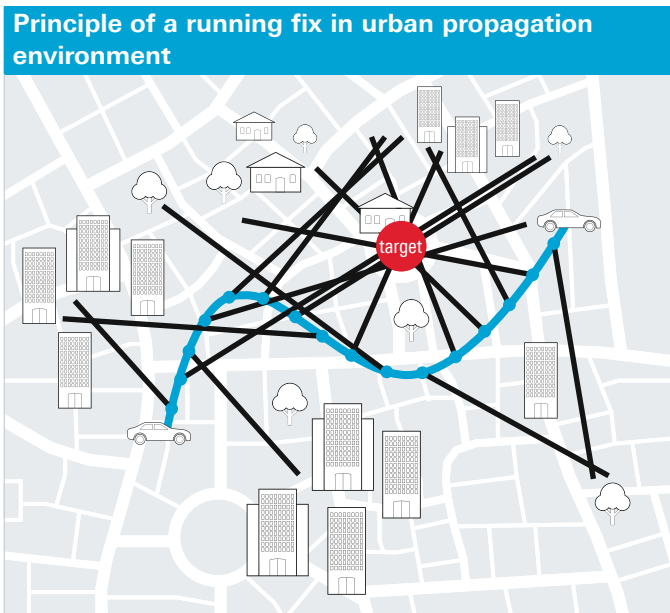
In urban scenarios where many reflections are received, interference hunting solutions based on measurement of signal level only, such as power of arrival (POA), can be misleading and time-consuming. This can be solved with fast automatic direction finders that measure the direction to the source of interference up to 600 times per minute.

## First handheld automatic DF system with 1° RMS DF accuracy on the global market

The R&S®MNT100LOC2 automatic locator package upgrade turns the R&S®MNT100 into a DF system with 1° RMS DF accuracy based on the correlative interferometer DF method. With the magnet mount, it only takes minutes to install the R&S®ADD207 compact multi-element UHF/SHF DF antenna with integrated GPS on vehicle roofs.

## Manages pulsed, narrowband and wideband signals

Thanks to the correlative interferometer DF method, the R&S®MNT100 based DF system manages virtually all types of interferers, irrespective of bandwidth and modulation type.



# Training courses

The interference hunting courses are a combination of classroom-based theory lessons and practical exercises. They cover most of the important topics to help users effectively carry out their interference hunting task.

In these courses, the participants will learn which types of interference can occur in a mobile communications network and what their effects on network performance and user experience are. The participants will analyze typical sources of interference and identify them in the spectrum. Moreover, they will study radio wave propagation in an urban environment and develop strategies to localize sources of interference, including the use of an automatic DF system to search a wide area.

Included in the R&S®IH-Basic basic operator training, the participants will learn how to configure the R&S®MNT100 and use its scanning and spectrum measurement functions to detect interference signals. They will use the R&S®HE400 handheld directional antenna to localize sources of interference by homing and by triangulation.

For the R&S®IH-ADVND advanced operator training, the participants will additionally learn how to configure and set up the R&S®MNT100, the R&S®ADD207 compact DF antenna and the R&S®MobileLocator software for automatic localization of interference signals with a vehicle.

All courses are 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. Extensive hands-on exercises on all functions will enhance familiarity and knowledge of the devices.

There are no prerequisites for participating in the courses.

Course overview			
Course title	Target audience	Aim	Duration
R&S®IH-Basic basic operator training	Operators of the R&S®MNT100LOC1	Participants know typical causes and effects of interference in communications networks and are able to localize a source of interference with the R&S®MNT100 and the R&S®HE400.	1 day
R&S®IH-ADVND advanced operator training	Operators of the R&S®MNT100LOC2 and R&S®MNT100LOC3	Participants know typical causes and effects of interference in communications networks and are able to localize a source of interference with the R&S®MNT100, the R&S®ADD207, R&S®MobileLocator and the R&S®HE400.	2 days

# Specifications in brief

Specifications in brief		
Frequency range		600 MHz to 6 GHz
Preselection	600 MHz to 1.5 GHz	tuned bandpass filters
	1.5 GHz to 6 GHz	highpass/lowpass filter combination
Displayed average noise level (DANL)	600 MHz to 3.4 GHz spectral path, 10 kHz IF bandwidth, normalized to 1 Hz RBW, averaged over 1 s, Blackman window, attenuator off	typ. -160 dBm (1 Hz)
Third-order intercept (TOI) (input)	600 MHz to 3.5 GHz at $\geq 300$ kHz test signal offset, -10 dBm test level, attenuator on	typ. 20 dBm
Spurious-free dynamic range (SFDR)	600 MHz to 3 GHz, 1 kHz realtime bandwidth, 0.625 Hz channel resolution	typ. 106 dB
Inherent spurious response	600 MHz to 6 GHz 50 $\Omega$ termination at antenna socket, operating mode = PScan, RBW = 125 Hz, measurement time = 100 ms, RF spectrum = AVG	typ. 7 dB $\mu$ V
Demodulation modes	demodulation in realtime, depends on demodulation bandwidth	AM, FM, pulse, PM, USB, LSB, CW, ISB
Minimum detectable pulse duration, 100% POI	operating mode = FFM, IF spectrum = max. hold, measurement time = 1 s, center frequency = 1 GHz, test level = typ. -37 dBm	typ. 20 ns
Scan speed	RBW = 100 kHz, measurement time = 500 $\mu$ s, RF spectrum = normal, clear/write, display mode = RF spectrum	up to 2 GHz/s
System DF accuracy	with R&S®MNT100LOC2 automatic locator package, reflection-free environment, additional DF antenna and cable set required	typ. 1.5° RMS



# Ordering information

Designation	Type	Order No.
Standard locator package Includes: <ul style="list-style-type: none"> <li>▮ R&amp;S®MNT100 RF interference locator</li> <li>▮ R&amp;S®HE400LP handheld directional antenna with log-periodic module</li> <li>▮ Handle and cable set</li> <li>▮ R&amp;S®HA-Z222 carrying holster with R&amp;S®PR100-AP1 sunroof</li> <li>▮ R&amp;S®HE400Z2 transport bag (small)</li> </ul>	R&S®MNT100LOC1	4081.0218.00
Automatic locator package Includes: <ul style="list-style-type: none"> <li>▮ R&amp;S®ADD207 compact UHF/SHF DF antenna with R&amp;S®ADD17XZ5 antenna cable set (length: 5 m) and R&amp;S®ADD17XZ3 magnet mount</li> <li>▮ Tablet PC with pre-installed R&amp;S®MobileLocator</li> <li>▮ R&amp;S®MNT100-TC transport case</li> <li>▮ R&amp;S®HA-Z202 vehicle power adaptor</li> </ul>	R&S®MNT100LOC2	4081.0224.00
Complete locator package Includes standard and automatic locator packages	R&S®MNT100LOC3	4081.0230.00
<b>Accessories</b>		
Cellular antenna module	R&S®HE400CEL	4104.7306.02
S and C band antenna module for R&S®HE400, 1.7 GHz to 6 GHz	R&S®HE400SCB	4104.7606.02
Rechargeable battery	R&S®HA-Z206	1309.6146.00
Rechargeable battery, with charging cradle	R&S®PR100-BP	4071.9206.02
RF interference locator	R&S®MNT100	4079.9011.32
<b>Documentation</b>		
Documentation of calibration values	R&S®MNT100-DCV	4071.9906.32

Operator training courses		
Designation	Type	Order No.
Basic operator training	R&S®IH-Basic	3641.2990.02
Advanced operator training	R&S®IH-ADVND	3641.2654.02

Service 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, three years	R&S®WE3	
Extended warranty, four years	R&S®WE4	
Extended warranty with calibration coverage, one year	R&S®CW1	
Extended warranty with calibration coverage, two years	R&S®CW2	
Extended warranty with calibration coverage, three years	R&S®CW3	
Extended warranty with calibration coverage, four years	R&S®CW4	

## Service that adds value

- | Worldwide
- | Local and personalized
- | Customized and flexible
- | 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.

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

## Mobile network testing

The company's broad and diverse product portfolio for mobile network testing addresses every test scenario in the network lifecycle – from base station installation to network acceptance and network benchmarking, from optimization and troubleshooting to interference hunting and spectrum analysis, from IP application awareness to QoS and QoE of voice, data, video and app based services.

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

## Regional contact

- | Europe, Africa, Middle East | +49 89 4129 12345  
[customersupport@rohde-schwarz.com](mailto:customersupport@rohde-schwarz.com)
- | North America | 1 888 TEST RSA (1 888 837 87 72)  
[customer.support@rsa.rohde-schwarz.com](mailto:customer.support@rsa.rohde-schwarz.com)
- | Latin America | +1 410 910 79 88  
[customersupport.la@rohde-schwarz.com](mailto:customersupport.la@rohde-schwarz.com)
- | Asia Pacific | +65 65 13 04 88  
[customersupport.asia@rohde-schwarz.com](mailto:customersupport.asia@rohde-schwarz.com)
- | China | +86 800 810 82 28 | +86 400 650 58 96  
[customersupport.china@rohde-schwarz.com](mailto:customersupport.china@rohde-schwarz.com)

R&S® is a registered trademark of Rohde & Schwarz GmbH & Co. KG

Trade names are trademarks of the owners

PD 5215.3762.12 | Version 02.00 | January 2019 (sk)

R&S®MNT100 RF Interference Locator

Data without tolerance limits is not binding | Subject to change

© 2017 - 2019 Rohde & Schwarz GmbH & Co. KG | 81671 Munich, Germany



5215376212