

R&S® ADD557SR DIRECTION FINDING AND MONITORING ANTENNA

Integrated high-performance
antenna system for multichannel
direction finders



Product Brochure
Version 02.00

ROHDE & SCHWARZ

Make ideas real



AT A GLANCE

The R&S®ADD557SR direction finding and monitoring antenna system covers the frequency range from 20 MHz to 6 GHz (direction finding) and 20 MHz to 8.5 GHz (monitoring) with both vertical and horizontal polarization for fixed, mobile and transportable applications. The system contains an omnidirectional monitoring antenna output for both polarizations (switchable).

Spectrum monitoring stations require multiple antennas for direction finding (DF) and monitoring to cover a large frequency range with the required signal polarizations. In the past, these antennas had to be placed next to each other on a mast or vehicle roof. This impairs the accuracy of field strength and radiolocation measurements. In the new R&S®ADD557SR, all antenna elements required for VHF/UHF/SHF direction finding and monitoring are integrated inside a single compact radome and combined in an innovative way.

The R&S®ADD557SR can be used in combination with an R&S®DDF550 or R&S®DDF5GTS multichannel direction finder and supports the super-resolution DF method.

The performance of the R&S®ADD557SR is in line with all relevant ITU recommendations and the ITU Handbook on Spectrum Monitoring. This high performance is maintained even with the integrated lightning protection installed.

The R&S®ADD557SR can be installed on a mast or vehicle roof by means of an optional mast or vehicle adapter. It even fits underneath a plastic rooftop as typically used to protect antennas. The R&S®ADD557SR comes with an integrated electronic compass and can be equipped with a GNSS receiver (instead of the lightning rod) for mobile applications.

As recommended by the ITU, the R&S®ADD557SR contains only passive antenna elements or active antenna elements that can be switched to passive mode.

Key facts

- ▶ Frequency range from 20 MHz to 6 GHz (direction finding) and 20 MHz to 8.5 GHz (monitoring)
- ▶ Vertical and horizontal polarization
- ▶ Omnidirectional monitoring antenna output for both polarizations (switchable)
- ▶ Active antenna elements with active/passive switchover (frequency range up to 1.3 GHz)
- ▶ Passive antenna elements (frequency range above 1.3 GHz)
- ▶ Performance in line with ITU recommendations, not affected by the integrated lightning protection

TYPICAL APPLICATIONS

ITU-compliant spectrum monitoring and radiolocation

Spectrum monitoring helps verify compliance with licenses, regulations and communications standards and facilitates network management and planning. The R&S®ADD557SR direction finding and monitoring antenna system is the key element in fixed, mobile and transportable spectrum monitoring stations. In combination with a multichannel direction finder, the R&S®ADD557SR delivers reliable measurement results even in dense spectrum environments. Thanks to its high DF accuracy and sensitivity as well as superior immunity to reflections, the R&S®ADD557SR is the key component for all ITU-compliant monitoring tasks, including automated detection, identification and localization of interfering signals and unlicensed emissions.

The omnidirectional monitoring antenna output can be connected to a monitoring receiver for conducting spectrum measurements in parallel with and independently from direction finding.

Communications intelligence (COMINT) and communications electronic support measures (CESM)

Intercepting radiocommunications signals to gather relevant information about their characteristics, origin and content is very important for armed forces. The R&S®ADD557SR direction finding and monitoring antenna system in combination with a multichannel direction finder is typically installed on mobile and transportable platforms and allows to detect and geolocate tactical low probability of intercept (LPI) communications as well as critical conventional communications such as private mobile radio (PMR).

For this application, the monitoring antenna integrated in the R&S®ADD557SR is typically connected to handoff receivers for automatic signal classification and content production.



Mobile monitoring system (MMS).



Transportable COMINT platform.

FEATURES AND BENEFITS

The R&S®ADD557SR provides two signal paths, a measurement path and a monitoring path.

Measurement path

The measurement path supports the frequency range from 20 MHz to 6 GHz for both vertical and horizontal polarization. It can be set to DF mode or monitoring mode.

In DF mode, the R&S®ADD557SR performs direction finding with class-leading DF accuracy and sensitivity.

In monitoring mode, it provides accurate signal level and field strength measurements as it overcomes the challenge of imperfect circularity typically encountered with DF antennas.

Depending on the receive frequency, DF antennas tend to have irregular horizontal radiation diagrams. This results in signal level readings that can vary by more than 10 dB depending on the direction of arrival of the signal. This may impair the accuracy of field strength and spectrum occupancy measurements.

This is different with the R&S®ADD557SR. Multiple antenna elements of the R&S®ADD557SR are combined in an innovative way so that direction dependent signal level fluctuations are reduced to typically 2 dB.

With this innovation, the R&S®ADD557SR is in line with the performance recommended in the ITU Handbook on Spectrum Monitoring and allows accurate field strength and spectrum occupancy measurements independent of the signal frequency and direction of arrival.

Monitoring path

In addition to the measurement path, the R&S®ADD557SR provides a monitoring path with an omnidirectional monitoring antenna output that supports the frequency range from 20 MHz to 8.5 GHz for both vertical and horizontal polarization (switchable).

Antenna elements adaptable to the signal scenario

In the frequency range up to 1.3 GHz, the R&S®ADD557SR features active antenna elements that can be switched to passive mode with a mouse click for both vertical and horizontal polarization.

In active mode, the R&S®ADD557SR offers higher sensitivity, and in passive mode it provides higher immunity against strong unwanted signals in the spectrum.

In the frequency range above 1.3 GHz, passive antenna elements are used.

Truly ITU-compliant

The R&S®ADD557SR is in line with all recommendations given in the ITU Handbook on Spectrum Monitoring (see table below).

Integrated GNSS module as an option

In addition to the integrated electronic compass, the R&S®ADD557SR can optionally be equipped with the R&S®ADD-GNS GNSS module. In this case, the R&S®ADD557SR comes without the mount for the lightning rod. Instead, a modern GNSS module that supports GPS, GLONASS and BeiDou is integrated. This module delivers accurate geolocation and heading information (while driving).

In addition, the performance in areas with poor or no satellite reception is significantly improved. The antenna position is estimated by means of inertial sensors integrated in the GNSS module.

Parameter or feature	Recommendation	In line with
Passive antenna elements or active antenna elements that can be switched to passive mode	antenna should use passive antenna elements	ITU Handbook on Spectrum Monitoring, edition 2010, chapter 3.2.4.1
System DF accuracy	1° RMS (typ.)	ITU Handbook on Spectrum Monitoring, edition 2010, table 3.4-2
DF sensitivity (2° RMS fluctuation, 1 kHz bandwidth and 1 s integration time)	10 µV/m	ITU Handbook on Spectrum Monitoring, edition 2010, table 3.4-2
Lightning protection setup that does not impair DF performance	lightning rod should be mounted vertically above the antenna system	ITU Handbook on Spectrum Monitoring, edition 2010, chapter 2.6.2.4.6
Horizontal radiation diagram in monitoring mode	deviation of horizontal radiation diagram from a non-directional diagram should not exceed 3 dB	ITU Handbook on Spectrum Monitoring, edition 2010, chapter 4.4.3.2
Verification of system DF accuracy	system DF accuracy should be measured in line with ITU-R SM.2060 recommendation	ITU-R SM.2060 recommendation
Verification of DF sensitivity	DF sensitivity should be measured in line with ITU-R SM.2096 recommendation	ITU-R SM.2096 recommendation

SPECIFICATIONS IN BRIEF

Specifications in brief		
Frequency range	direction finding (DF)	20 MHz to 6 GHz
	monitoring	20 MHz to 8.5 GHz
Polarization	switchable	horizontal and vertical
System DF accuracy	in reflection-free environment, vertical polarization, with lightning rod	1° RMS (typ.)
Antenna element types	DF and monitoring, both horizontal and vertical polarization	active antenna elements that can be switched to passive mode with a mouse click; passive antenna elements
Circularity in monitoring mode (measurement path)	deviation of horizontal radiation diagram from a non-directional diagram, with lightning rod	2 dB (nom.)
Dimensions	D × H, with R&S®ADD-GNS GNSS module	approx. 1.1 m × 0.48 m (43.3 in × 18.9 in)
Weight	with lightning rod	approx. 34 kg (75 lb)

ORDERING INFORMATION

Designation	Type	Order No.
Base unit		
Integrated direction finding and monitoring antenna system, with lightning rod mount (unless ordered with R&S®ADD-GNS), color: light ivory	R&S®ADD557SR	4111.8004.02
Integrated direction finding and monitoring antenna system, with lightning rod mount (unless ordered with R&S®ADD-GNS), color: squirrel gray	R&S®ADD557SR	4111.8004.04
Integrated direction finding and monitoring antenna system, with lightning rod mount (unless ordered with R&S®ADD-GNS), color: bronze green	R&S®ADD557SR	4111.8004.05
Integrated direction finding and monitoring antenna system, with lightning rod mount (unless ordered with R&S®ADD-GNS), color: pure white	R&S®ADD557SR	4111.8004.06
Integrated direction finding and monitoring antenna system, with lightning rod mount (unless ordered with R&S®ADD-GNS), color: jet black	R&S®ADD557SR	4111.8004.07
Option		
GNSS module for R&S®ADD557SR, instead of lightning rod mount	R&S®ADD-GNS	4111.7008.02
Accessories		
Lightning rod, for R&S®ADD557SR and R&S®ADD597	R&S®ADD-LR1	4111.7608.02
Mast adapter, for R&S®ADD557SR and R&S®ADD597	R&S®ADD-MA1	4111.7208.02
Vehicle roof adapter, for R&S®ADD557SR and R&S®ADD597	R&S®ADD-VA1	4111.7408.02
Mast section, for stacking R&S®ADD557SR on top of R&S®ADD050SR	R&S®KM051	4041.9008.22
DF antenna cable set, 20 MHz to 6 GHz, length: 5 m	R&S®DDF3C-7	4098.4757.05
DF antenna cable set, 20 MHz to 6 GHz, length: 10 m	R&S®DDF3C-7	4098.4757.10
DF antenna cable set, 20 MHz to 6 GHz, length: 20 m	R&S®DDF3C-7	4098.4757.20
DF antenna cable set, 20 MHz to 6 GHz, length: 30 m	R&S®DDF3C-7	4098.4757.30
Service options		
Extended warranty, one year	R&S®WE1	
Extended warranty, two years	R&S®WE2	Please contact your local Rohde & Schwarz sales office.
Extended warranty, three years	R&S®WE3	
Extended warranty, four years	R&S®WE4	

Service that adds value

- ▶ Worldwide
- ▶ Local and personalized
- ▶ Customized and flexible
- ▶ Uncompromising quality
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