

R&S® ADD597 DIRECTION FINDING AND MONITORING ANTENNA

Integrated high-performance
antenna system for single-channel
direction finders



Product Brochure
Version 03.00

ROHDE & SCHWARZ

Make ideas real



AT A GLANCE

The R&S®ADD597 direction finding and monitoring antenna system covers the frequency range from 20 MHz to 8.5 GHz (vertical polarization) and 20 MHz to 7.5 GHz (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 field strength and radiolocation measurement accuracy. In the new R&S®ADD597, all antenna elements required for VHF/UHF/SHF direction finding and monitoring are integrated and cleverly combined in a single compact radome.

The R&S®ADD597 can be combined with an R&S®ESMW, R&S®ESMD, R&S®ESME or R&S®EB500 monitoring receiver or with an R&S®UMS300 or R&S®UMS400 universal monitoring system.

The R&S®ADD597 has performance 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®ADD597 can be installed on a mast or vehicle roof with an optional mast or vehicle adapter and can also fit unobtrusively beneath a plastic vehicle roof extension. The R&S®ADD597 comes with an integrated electronic compass and can be equipped with a GNSS receiver for mobile applications.

The R&S®ADD597 can be equipped with a lightning rod instead of a GNSS receiver in fixed monitoring stations.

In line with ITU recommendations, the R&S®ADD597 contains only passive antenna elements or active antenna elements that can be switched to passive mode.

Key facts

- ▶ Frequency range from 20 MHz to 8.5 GHz (vertical polarization) and 20 MHz to 7.5 GHz (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®ADD597 direction finding and monitoring antenna system is a key element in fixed, mobile and transportable spectrum monitoring stations. Together with a single-channel direction finder, the R&S®ADD597 delivers reliable measurement results even in dense spectrum environments. Its high DF accuracy and sensitivity as well as superior immunity to reflections make the R&S®ADD597 a key component for all ITU-compliant monitoring, including the automated detection, identification and localization of interfering signals and unlicensed emissions.

The omnidirectional monitoring antenna output can be connected to a monitoring receiver for spectrum measurements parallel to and independent of direction finding.

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

Intercepting radiocommunications signals and gathering relevant information about their characteristics, origin and content is very important for the armed forces. The R&S®ADD597 direction finding and monitoring antenna system together with a single-channel direction finder is typically installed on mobile and transportable platforms for detecting and geolocating tactical critical conventional communications such as private mobile radios (PMR).

The monitoring antenna output integrated in the R&S®ADD597 is typically connected to handoff receivers for automatic signal classification and content generation.



Mobile monitoring station (MMS)/mobile COMINT platform.

FEATURES AND BENEFITS

The R&S®ADD597 provides two signal paths, a measurement path and a monitoring path to ease installation especially in mobile applications.

Measurement path

The measurement path supports the frequency range from 20 MHz to 8.5 GHz (vertical polarization) and 20 MHz to 7.5 GHz (horizontal polarization). It can also be set to DF mode or monitoring mode.

In DF mode, the R&S®ADD597 has excellent direction finding accuracy and sensitivity.

In monitoring mode, the R&S®ADD597 makes accurate signal level and field strength measurements that overcome the imperfect circularity typical of DF antennas.

Depending on the receive frequency, DF antennas tend to have irregular horizontal radiation diagrams, resulting in signal level readings that can vary by over 10 dB depending on the signal's direction of arrival. The field strength and spectrum occupancy measurement accuracy may be impaired.

The R&S®ADD597 is different. Multiple R&S®ADD597 antenna elements are cleverly combined so that direction dependent signal level fluctuations are typically reduced to 2 dB. This innovation brings the R&S®ADD597 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

The R&S®ADD597 also has 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). This allows for connecting hand-off receivers without the need for additional antennas on the platform.

R&S®ADD597 installed
on an extendable mast



Antenna elements adapt to signal scenario

In the frequency range up to 1.3 GHz, the R&S®ADD597 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®ADD597 offers higher sensitivity, and in passive mode more immune to strong unwanted signals in the spectrum. Passive antenna elements are used in the frequency range above 1.3 GHz.

True ITU-compliance

The R&S®ADD597 complies with all recommendations given in the ITU Handbook on Spectrum Monitoring (see table below). This ensures high performance even in dense signal scenarios.

Integrated GNSS module as an option

The R&S®ADD597 comes with the optional R&S®ADD-WCP9 integrated electronic compass. The R&S®ADD597 can also be equipped with the R&S®ADD-GNS GNSS module. When the GNSS option is installed, the antenna will not include the mount for the lightning rod but a modern GNSS module that supports GPS, GLONASS and BeiDou. The module delivers accurate geolocation and heading information (while driving).

Performance is also significantly improved in areas with little or no satellite reception. The antenna position is estimated with inertial sensors integrated in the GNSS module.

The R&S®IN061 power supply is required for antenna cables longer than 32 m.

Feature or parameter	Recommendation (in line with ...)	Benefit
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)	Intermodulation on the frequency of interest can be impeded by a simple mouse click
System DF accuracy: 1° RMS (typ.)	System DF accuracy: 1° RMS (typ.) (ITU Handbook on Spectrum Monitoring, edition 2010, table 3.4-2)	High radiolocation accuracy especially for distant transmitters
DF sensitivity ¹⁾ : 10 µV/m to 20 µV/m (typ.)	DF sensitivity ¹⁾ : 10 µV/m to 20 µV/m (ITU Handbook on Spectrum Monitoring, edition 2010, table 3.4-2)	The monitoring station provides wide coverage
Integrated lightning protection	Lightning rod should be mounted vertically above the antenna system (ITU Handbook on Spectrum Monitoring, edition 2010, chapter 2.6.2.4.6)	High DF accuracy that is not affected by the lightning rod
Even horizontal antenna pattern	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)	Accurate signal level measurements for all signals independent from the angle of arrival
Test reports with comparable measurement results for DF accuracy and DF sensitivity in line with ITU recommendations	System DF accuracy should be measured in line with Recommendation ITU-R SM.2060, DF sensitivity should be measured in line with Recommendation ITU-R SM.2096	Trustworthy performance that allows for comparison

¹⁾ 2° RMS fluctuation, 1 kHz bandwidth and 1 s integration time.

SPECIFICATIONS IN BRIEF

Specifications in brief

Frequency range	direction finding (vertical polarization)	20 MHz to 8.5 GHz
	direction finding (horizontal polarization)	20 MHz to 7.5 GHz
	monitoring (vertical and horizontal polarization)	20 MHz to 8.5 GHz
Polarization	direction finding and monitoring	horizontal and vertical, switchable
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	
	20 MHz to 1.3 GHz	active antenna elements that can be switched to passive mode with a mouse click
	1.3 GHz to 8.5 GHz	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	Ø × 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®ADD597	4111.4009.02
Integrated direction finding and monitoring antenna system, with lightning rod mount (unless ordered with R&S®ADD-GNS), color: squirrel gray	R&S®ADD597	4111.4009.04
Integrated direction finding and monitoring antenna system, with lightning rod mount (unless ordered with R&S®ADD-GNS), color: bronze green	R&S®ADD597	4111.4009.05
Integrated direction finding and monitoring antenna system, with lightning rod mount (unless ordered with R&S®ADD-GNS), color: pure white	R&S®ADD597	4111.4009.06
Integrated direction finding and monitoring antenna system, with lightning rod mount (unless ordered with R&S®ADD-GNS), color: jet black	R&S®ADD597	4111.4009.07
Hardware options		
GNSS module, for R&S®ADD557SR and R&S®ADD597, instead of lightning rod mount, can only be purchased together with the base unit	R&S®ADD-GNS	4111.7008.02
R&S®ADD597 without electronic compass, can only be purchased together with the base unit	R&S®ADD-NCP9	4111.5263.52
R&S®ADD597 with electronic compass, can only be purchased together with the base unit	R&S®ADD-WCP9	4111.5263.02
Accessories		
Adapter for masts		
Mast adapter, for R&S®ADD557SR and R&S®ADD597, color: light ivory	R&S®ADD-MA1	4111.7208.02
Mast adapter, for R&S®ADD557SR and R&S®ADD597, color: squirrel gray	R&S®ADD-MA1	4111.7208.05
Mast adapter, for R&S®ADD557SR and R&S®ADD597, color: jet black	R&S®ADD-MA1	4111.7208.07
Mast adapter, for R&S®ADD557SR and R&S®ADD597, color: bronze green, dull matt	R&S®ADD-MA1	4111.7208.35
Adapter for vehicles		
Vehicle roof adapter, for R&S®ADD557SR and R&S®ADD597	R&S®ADD-VA1	4111.7408.02
Lightning protection		
Lightning rod, for R&S®ADD557SR and R&S®ADD597	R&S®ADD-LR1	4111.7608.02
Extended lightning protection for DF antennas	R&S®ADD-LP	4069.6010.02
Power supply		
Power supply	R&S®IN061	4041.9508.02
Service options		
Extended warranty, one year	R&S®WE1	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	

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