

R&S® ADDx

Multichannel DF Antennas

Product overview



R&S®ADDx Multichannel DF Antennas At a glance

The R&S®ADDx DF antennas are decisive for the high efficiency of the multichannel direction finders from Rohde & Schwarz because they offer unique technical innovations. The wide product range covers stationary, transportable and mobile applications. In development, the focus was on the lightning protection concept of the antennas and their immunity to harsh ambient conditions.

Due to the large number of antenna elements, the R&S®ADDx DF antennas offer high direction-finding accuracy and sensitivity, as well as outstanding immunity to reflections. The new active/passive switchover of the R&S®ADDxxxSR DF antennas allows them to flexibly adapt to the signal environment and considerably increases their immunity to strong signals.

The R&S®ADDxxxSR DF antennas are ready for the super-resolution DF method, with which bearings can be taken on multiple co-channel signals and the signals can be separated.

Key facts

- High DF accuracy and sensitivity, as well as high immunity to reflections due to the large number of antenna elements
- Ready for the super-resolution DF method for taking bearings on co-channel transmitters (R&S®ADDxxxSR)
- Active/passive switchover by mouse click for adapting the antenna to the signal environment (R&S®ADDxxxSR)
- Antenna elements with variable electrical length for automatic adaptation to the current receive frequency (R&S®ADD157/253/153SR)
- Effective, integrated lightning protection with optional extension for applications with high likelihood of lightning strikes (R&S®ADD157/253/050SR/153SR)



R&S®ADD070, R&S®ADD050SR,
R&S®ADD153SR and R&S®ADD-LP.

R&S®ADDx Multichannel DF Antennas Benefits and key features

Eleven efficient DF antenna models for any application

▷ [page 4](#)

Superior immunity to reflections

- ▮ Stable bearings even with a 50 percent share of reflections
- ▮ Above-average antenna base (aperture) due to the especially high number of antenna elements

▷ [page 11](#)

Ready for the super-resolution DF method

- ▮ Taking bearings of up to seven signals simultaneously on the same frequency
- ▮ Additional information such as receive level and DF quality for all signals whose bearings are taken
- ▮ Taking bearings of all users of a TDMA network on a specific frequency (e.g. TETRA)

▷ [page 13](#)

Exceptionally high DF sensitivity and dynamic range

- ▮ Use of antenna elements with electrically configurable structure
- ▮ Optimal adaptation to the individual receive frequency ranges
- ▮ Higher sensitivity and bandwidth than with elements without frequency-dependent adaptation of the antenna element structure – with same dimensions

▷ [page 14](#)

Active/passive switchover by mouse click

- ▮ Adaptation of the R&S®ADD011SR, R&S®ADD050SR and R&S®ADD153SR DF antennas to the signal environment
- ▮ Switchover from active to passive mode
- ▮ Active mode for maximum DF sensitivity; passive mode for maximum intermodulation suppression

▷ [page 15](#)

Integrated, extendible lightning protection

- ▮ Utmost protection against lightning
- ▮ No impairment of DF accuracy
- ▮ No time-consuming calibration after installation of the DF antenna

▷ [page 16](#)







Easy replacement of DF antennas and elements

- ▮ No individual calibration due to detailed development and precise production
 - Replacement of a DF antenna model without renewed administration/input of calibration data
 - Replacement of defective antenna elements on site; no time-consuming recalibration of the DF antenna on a turntable

▷ [page 18](#)

Model overview

R&S® ADDx multichannel DF antennas

	<p>R&S® ADD110 VLF DF antenna</p> <p>stationary and transportable</p>	<p>Frequency range from 9 kHz to 1 MHz ▷ page 6</p>
	<p>R&S® ADD119 HF DF antenna</p> <p>mobile</p>	<p>Frequency range from 300 kHz to 30 MHz ▷ page 6</p>
	<p>R&S® ADD011SR super-resolution HF DF antenna</p> <p>stationary and transportable</p>	<p>Frequency range from 300 kHz to 30 MHz ▷ page 6</p>
	<p>R&S® ADD050SR super-resolution VHF DF antenna</p> <p>stationary and transportable</p>	<p>Frequency range from 20 MHz to 450 MHz ▷ page 7</p>
	<p>R&S® ADD153SR super-resolution VHF/UHF DF antenna</p> <p>mobile and stationary</p>	<p>Frequency range from 20 MHz to 1.3 GHz ▷ page 7</p>
	<p>R&S® ADD157 dual polarized VHF/UHF DF antenna</p> <p>mobile and stationary</p>	<p>Frequency range from 20 MHz to 1.3 GHz (vertical)/ frequency range from 40 MHz to 1.3 GHz (horizontal) ▷ page 8</p>

R&S® ADDx multichannel DF antennas

	<p>R&S® ADD170 UHF DF antenna for GSM</p> <p>mobile</p>	<p>Frequency range from 800 MHz to 2 GHz ▷ page 8</p>
	<p>R&S® ADD070 UHF DF antenna</p> <p>stationary and transportable</p> <p>R&S® ADD070 mounted below an R&S® ADD153SR.</p>	<p>Frequency range from 1.3 GHz to 3 GHz ▷ page 9</p>
	<p>R&S® ADD070M mobile UHF DF antenna</p> <p>mobile</p>	<p>Frequency range from 1.3 GHz to 3 GHz ▷ page 9</p>
	<p>R&S® ADD253 broadband VHF/UHF DF antenna</p> <p>mobile</p>	<p>Frequency range from 20 MHz to 3 GHz ▷ page 10</p>
	<p>R&S® ADD216 compact LF UHF DF antenna</p> <p>mobile</p>	<p>Frequency range from 300 kHz to 3 GHz ▷ page 10</p>

R&S®ADD110

- ▀ Stationary and transportable DF antenna for the frequency range from 9 kHz to 1 MHz
- ▀ Suitable for ground waves
- ▀ Combination of crossed-loop and vertical rod antenna
- ▀ Installation preferably at the center of an R&S®ADD011SR
- ▀ Allows direction finding up to class A bearing accuracy in line with ITU

R&S®ADD119

- ▀ Mobile DF antenna for the frequency range from 300 kHz to 30 MHz
- ▀ Suitable for ground waves and low-angle sky waves
- ▀ Allows direction finding up to class A bearing accuracy in line with ITU
- ▀ For installation on a vehicle roof by means of an R&S®AP502Z1 vehicle adapter or for use on an R&S®ADD1XTP tripod

R&S®ADD119.



R&S®ADD011SR

- ▀ Stationary and transportable DF antenna for the frequency range from 300 kHz to 30 MHz
- ▀ Suitable for ground waves and sky waves
- ▀ Multi-element DF antenna with 9/18 antenna elements
- ▀ Allows direction finding up to class A bearing accuracy in line with ITU
- ▀ Available in different diameters (50 m, 100 m and 150 m)
- ▀ Model with 18 antenna elements in two concentric DF circles for especially high DF sensitivity and accuracy
- ▀ Measurement of elevation enabling single station location (SSL) (optional)
- ▀ Ready for the super-resolution DF method
- ▀ Antenna elements with active/passive switchover for adaptation to the signal environment



R&S®ADD110.



R&S®ADD011SR.

R&S®ADD050SR

- Stationary and transportable DF antenna for the frequency range from 20 MHz to 450 MHz
- Multi-element DF antenna with nine antenna elements
- Allows direction finding up to class A bearing accuracy in line with ITU
- Ready for the super-resolution DF method
- Antenna elements with active/passive switchover for adaptation to the signal environment
- Integrated, extendible lightning protection concept with lightning rod; no impact on DF accuracy
- Optional R&S®ADD-LP lightning protection extension
- Installation of an additional DF antenna above the R&S®ADD050SR possible (using the R&S®KM051 intermediate mast and the R&S®ADD150A mast adapter)

R&S®ADD153SR

- Mobile and stationary DF antenna for the frequency range from 20 MHz to 1.3 GHz
- Multi-element DF antenna with nine antenna elements
- Allows direction finding up to class A bearing accuracy in line with ITU
- Antenna elements with variable electrical length for optimal adaptation to the receive frequency
- Ready for the super-resolution DF method
- Antenna elements with active/passive switchover for adaptation to the signal environment
- Integrated, extendible lightning protection concept with lightning rod; no impact on DF accuracy
- Optional R&S®ADD-LP lightning protection extension
- For installation on a mast by means of an R&S®ADD150A mast adapter, on a vehicle roof by means of an R&S®AP502Z1 vehicle adapter or for use on an R&S®ADD1XTP tripod



R&S®ADD050SR.



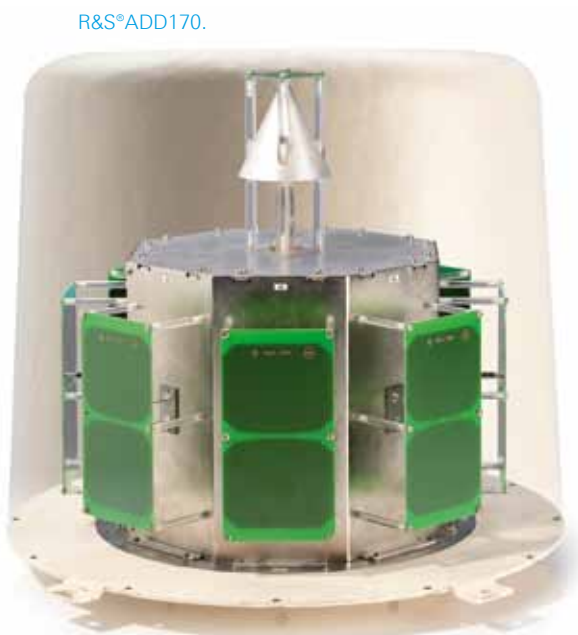
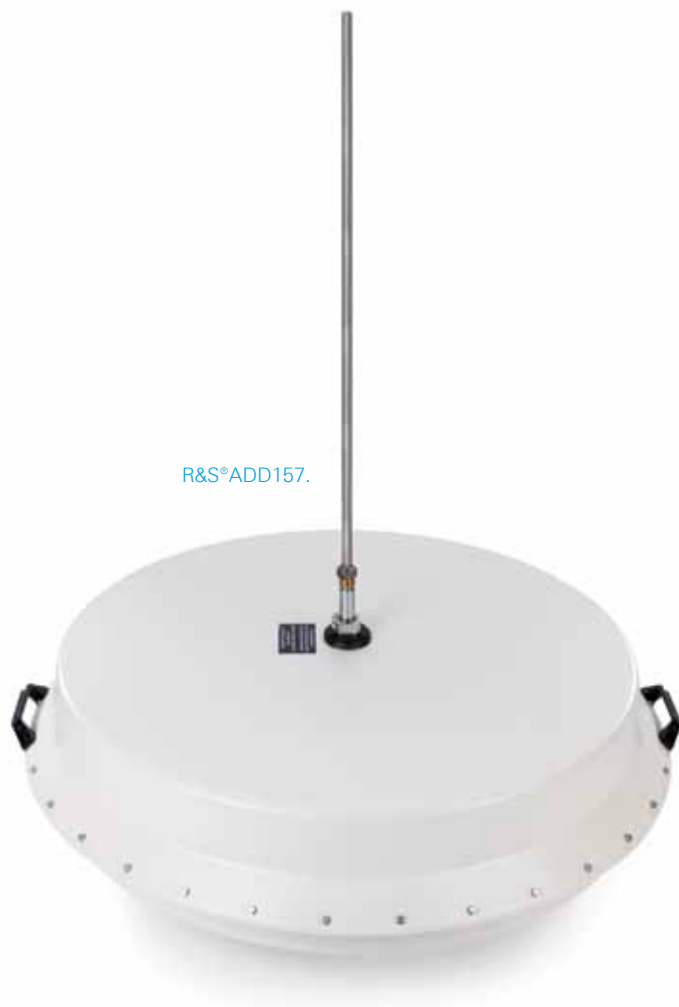
R&S®ADD153SR
open.

R&S®ADD157

- Mobile and stationary DF antenna for the frequency range from 20 MHz to 1.3 GHz (vertical polarization) or from 40 MHz to 1.3 GHz (horizontal polarization)
- Switchable between horizontal and vertical polarization
- Multi-element DF antenna with nine antenna elements each for vertical and horizontal polarization
- Allows direction finding up to class A bearing accuracy in line with ITU
- Antenna elements with variable electrical length for optimal adaptation to the receive frequency (vertical polarization)
- Integrated, extendable lightning protection concept with lightning rod; no impact on DF accuracy
- Optional R&S®ADD-LP lightning protection extension
- For installation on a mast by means of an R&S®ADD150A mast adapter, on a vehicle roof by means of an R&S®AP502Z1 vehicle adapter or for use on an R&S®ADD1XTP tripod

R&S®ADD170

- Mobile DF antenna for the frequency range from 800 MHz to 2 GHz
- Optimized for direction finding in the cellular radio bands
- Multi-element DF antenna with eight antenna elements and one reference element
- Allows direction finding up to class A bearing accuracy in line with ITU
- Protected against overvoltage caused by nearby lightning strikes
- For installation directly on a vehicle roof



R&S®ADD070

- Stationary and mobile DF antenna for the frequency range from 1.3 GHz to 3 GHz
- Multi-element DF antenna with eight antenna elements
- Allows direction finding up to class A bearing accuracy in line with ITU
- Ready for installation below another DF antenna (model .12, see picture below)
- Protected against overvoltage caused by nearby lightning strikes
- Especially stable version (model .02) available for installing the R&S®ADD050SR and another DF antenna (see picture on page 2)
- For installation on a mast by means of an R&S®ADD071Z mast adapter or for use on an R&S®ADD1XTP tripod



R&S®ADD070 mounted below an R&S®ADD153SR.

R&S®ADD070M

- Mobile DF antenna for the frequency range from 1.3 GHz to 3 GHz
- Multi-element DF antenna with eight antenna elements
- Allows direction finding up to class A bearing accuracy in line with ITU
- Protected against overvoltage caused by nearby lightning strikes
- For installation directly on a vehicle roof

R&S®ADD070M.



R&S®ADD253

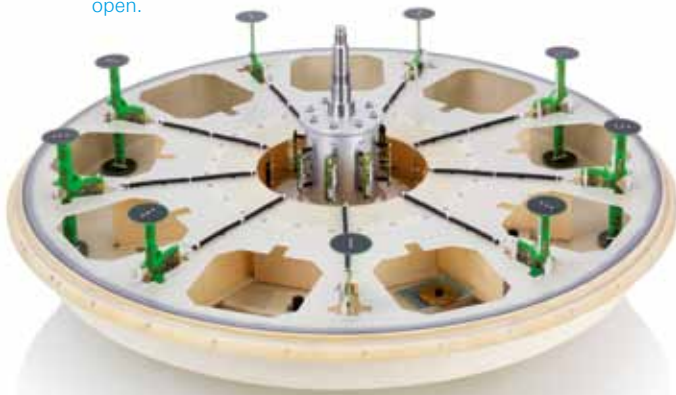
- Mobile broadband DF antenna for the frequency range from 20 MHz to 3 GHz
- Multi-element DF antenna with nine antenna elements for the VHF/UHF range and eight antenna elements for the UHF range
- Antenna elements with variable electrical length for optimal adaptation to the receive frequency (20 MHz to 1.3 GHz)
- Integrated, extendible lightning protection concept with lightning rod; no impact on DF accuracy
- Optional R&S®ADD-LP lightning protection extension
- For installation on a mast by means of an R&S®ADD150A mast adapter, on a vehicle roof by means of an R&S®AP502Z1 vehicle adapter or for use on an R&S®ADD1XTP tripod

R&S®ADD216

- Mobile broadband DF antenna for the frequency range from 300 kHz to 3 GHz
- Highly integrated antenna system with unique DF sensitivity and accuracy
- Especially suitable for use on board ships
- Multi-element DF antenna for VHF/UHF with eight antenna elements each and additional reference antennas
- Two independent omnidirectional reception antennas for the HF and VHF/UHF ranges already integrated for connecting separate receivers
- Protected against overvoltage caused by nearby lightning strikes

R&S®ADD253

open.



R&S®ADD216.

Superior immunity to reflections

Due to multipath propagation (especially in metropolitan areas) not only the direct wave but also reflections arrive at the DF antenna. The R&S®ADDx multichannel DF antennas offer (due to their design) a higher immunity to such reflections than most other commercially available antennas, since they feature an exceptionally large number of antenna elements. Virtually all R&S®ADDx DF antennas comprise nine antenna elements for the HF/VHF/UHF range, or eight for the UHF range. Commercially available DF antennas typically have only five. The R&S®ADDx (except the R&S®ADD110 and R&S®ADD119) enable stable bearings even with a 50 percent share of reflections. If only five antenna elements are used, however, such conditions may result in substantial DF errors in certain frequency ranges (see shaded areas in diagram).

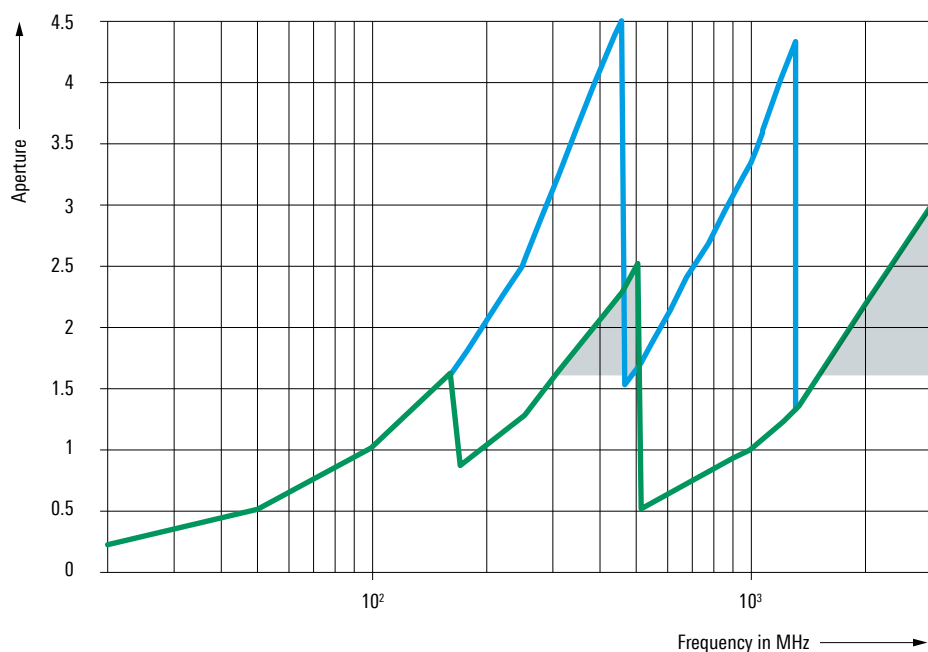
The aperture of a DF antenna (diameter/wavelength) can be considerably enlarged by increasing the number of antenna elements. The distance between two adjacent antenna elements of a DF antenna is defined such that for all wave angles of incidence, at least one pair of elements has a distance that – at the maximum operating frequency – is less than half the wavelength. In wide frequency ranges, commercially available five-element DF antennas therefore have a much smaller aperture than DF antennas with nine elements.

The aperture of a DF antenna largely determines the efficiency of a direction finder. The wider the DF antenna's aperture, the higher the DF accuracy and sensitivity as well as the immunity to reflections (see ITU SMH 2002 chapter 4.7.1.1.3).

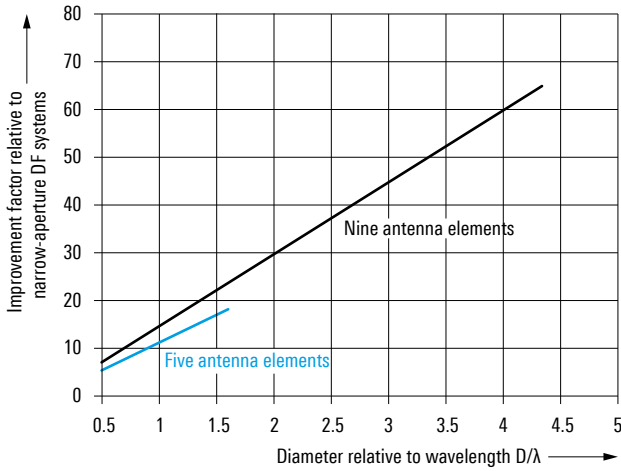
This advantage is not apparent from the specifications, since data sheets always specify the instrument and system accuracy for ideal, reflection-free DF antenna environments and strong signals to allow comparisons.

DF antennas featuring nine elements and the correlative interferometer DF method offer by far the widest aperture and therefore higher accuracy and sensitivity (see figure at top of next page). As a result, they have a considerably greater improvement factor (relative to small-base DF antennas) than DF antennas with only five elements (see figure at center of next page).

Comparison of aperture of commercially available five-element DF antennas (green) with that of Rohde & Schwarz DF antennas (blue)



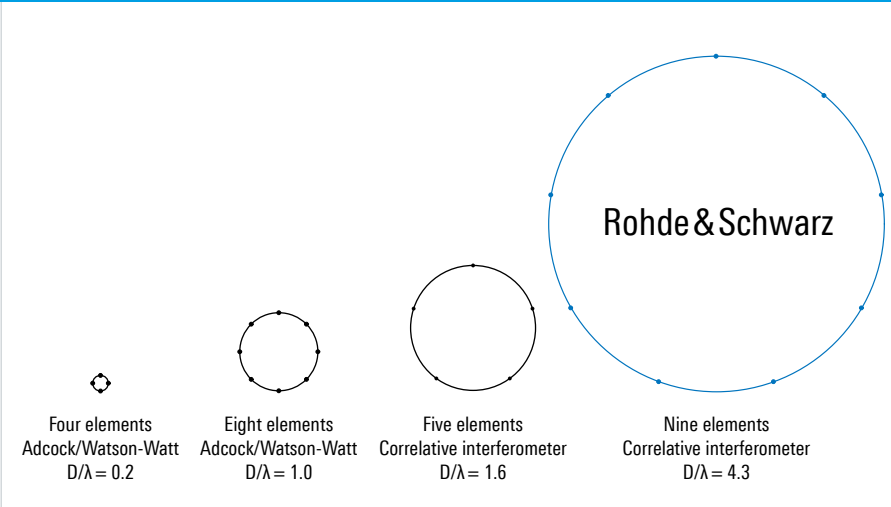
Improvement factor for correlative interferometer



The considerably higher immunity to reflections of DF antennas with nine elements (compared with five-element DF antennas) can be mathematically proven by simulating the DF antennas in a two-wave field (direct wave and reflection). First, the DF values that a DF antenna in a two-wave field would produce are calculated one after the other, the field strength of the direct wave being twice as high as that of the reflection. Since the DF error depends on the frequency, the angle of incidence and the phase angle of the reflection, all combinations are simulated. Then the RMS value is determined based on the detected individual errors.

As the table shows, DF antennas with nine elements provide a considerably higher DF accuracy than commercially available five-element DF antennas. It is assumed that the five-element DF antennas exhibit a system DF accuracy of 1° RMS in a reflection-free environment. Since the Rohde&Schwarz DF antennas take bearings in the frequency range above 1.3 GHz using eight elements, an eight-element DF antenna is simulated in this frequency range.

Improvement of DF accuracy as a function of DF antenna aperture



Maximum permissible diameter of the DF antenna relative to the wavelength for unambiguous DF results for up to 50% environmental reflections.

Average DF error of different DF antennas in two-wave field

Stationary applications			
	Frequency ranges	DF antenna diameter	DF accuracy in two-wave field (approx.)
DF antennas from Rohde&Schwarz	20 MHz to 450 MHz	3 m	1.6° RMS
	450 MHz to 1.3 GHz	1 m	1.1° RMS
	1.3 GHz to 3 GHz	0.3 m	2.2° RMS
Commercially available five-element DF antennas	20 MHz to 160 MHz	3 m	4.6° RMS
	160 MHz to 500 MHz	1 m	5.8° RMS
	500 MHz to 3 GHz	0.3 m	10° RMS
Mobile applications			
DF antennas from Rohde&Schwarz	20 MHz to 1.3 GHz	1 m	1.7° RMS
	1.3 GHz to 3 GHz	0.3 m	2.2° RMS
Commercially available five-element DF antennas	20 MHz to 500 MHz	1 m	6.1° RMS
	500 MHz to 3 GHz	0.3 m	10° RMS

Ready for the super-resolution DF method

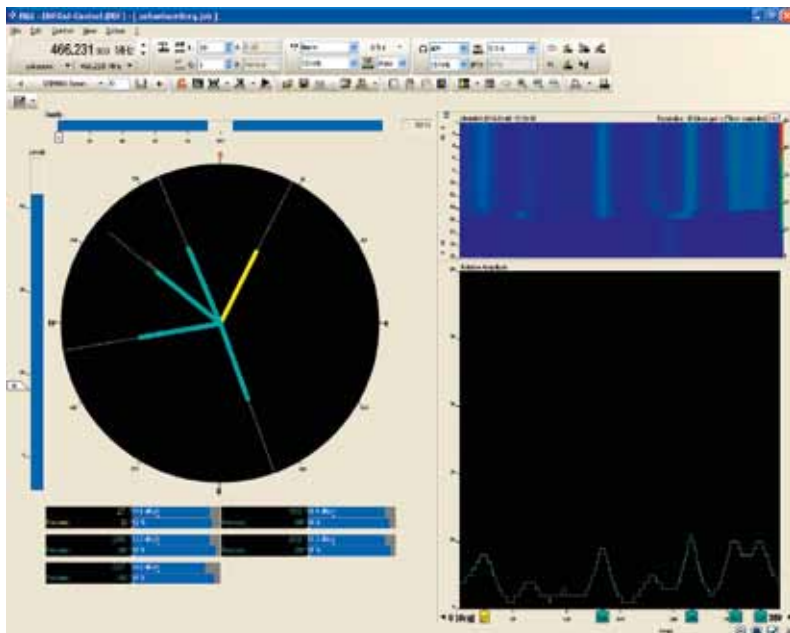
Most radio DF methods are based on the assumption that a specific frequency is occupied exclusively by the transmitter of interest. However, if other transmitters simultaneously occupy the same frequency, direction finding may be impaired. This is referred to as co-channel interference, where the DF result depends on the level ratio of the transmitters. Two variants are possible:

- One of the transmitters is clearly stronger than the others; its direction is displayed with slight DF errors
- The transmitters have similar levels; the DF result is normally incorrect

These results apply equally to all classic DF principles including correlative interferometer, Doppler and Watson-Watt methods.

To allow the bearings of co-channel signals to be taken, Rohde&Schwarz is now providing a super-resolution DF method for its R&S®DDF0xA/E family of direction finders. This method is offered as the R&S®DDFx-SR option and supplements the DF methods already available. This new DF method is able to resolve a wave field with multiple signals on the same frequency. The number and angle of incidence of the waves in the field are first calculated precisely and then displayed. This new option makes it possible to take separate bearings of up to seven different signals on the same frequency. The number of signals depends on the angle of incidence and the S/N ratio.

An excellent price/performance ratio is attained through optimal use of the three receive channels of the R&S®DDF0xA/E DF family. To make this possible, DF antennas whose antenna elements can be combined into various subgroups must be utilized. The new R&S®ADDxxxSR DF antennas meet these requirements.



Exceptionally high DF sensitivity and dynamic range

In order for the DF antenna elements to exhibit good receive characteristics, adaptation to the following stage must be optimized and coupling to the adjacent elements minimized. These requirements can best be met over a wide frequency range by using configurable antenna structures:

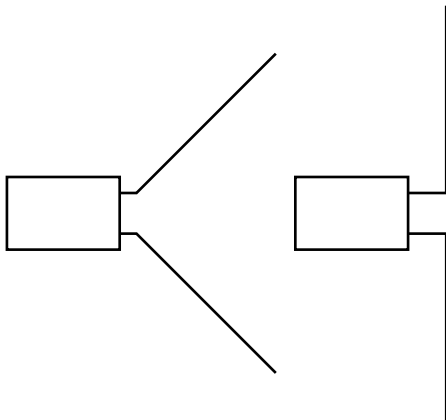
- At low frequencies, configuration of the element for maximum electrical length
- At high frequencies, selection of the most effective antenna length to achieve the best possible compromise between decoupled receive power and impact on the directional pattern due to mutual coupling

Optimal results are achieved using electric switches that connect or disconnect parts of the antenna element (see figure, right).

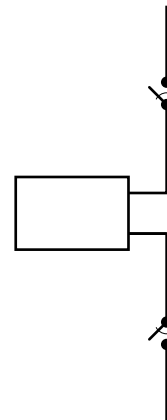
The antenna elements of the R&S®ADD153SR, R&S®ADD253, R&S®ADD157 and R&S®ADD216 DF antennas are subdivided in the VHF/UHF range by means of PIN diodes and allow the electrically effective structure to change very quickly. As a result, they are always optimally adapted to the receive frequency and offer especially high sensitivity.

Commercially available DF antennas that cover a very wide frequency range with antenna elements of constant length (see figure, left) are usually optimized for the UHF range and are considerably less sensitive in the VHF range than the Rohde&Schwarz models with variable electrical length.

Antenna structures



Antenna elements of constant electrical length



Antenna element of variable electrical length

Active/passive switchover by mouse click

The number of radio services and transmitters is continuously growing, which results in an increasing cumulative load on the antenna input and the receiver input. Especially digital broadcasting services such as DVB-T and DAB with their high bandwidths represent a growing challenge to the linearity of antennas and receivers. The problem may intensify if the DF antenna is in the vicinity of a strong transmitter – which, particularly in metropolitan areas, can hardly be avoided.

If the number of strong signals becomes too high, intermodulation products may become visible in the spectrum. In the worst case, they would mask signals of interest and make it impossible to take bearings.

Most DF antennas from Rohde & Schwarz are equipped with active antenna elements which provide significantly higher sensitivity than passive elements – and also have compact dimensions. Although an extremely linear, active antenna circuitry with top-quality components is used, very strong signals may cause intermodulation.

Passive antennas provide a much higher linearity and therefore generate virtually no intermodulation products; however, they are either less sensitive or considerably larger than active antennas. In applications where only compact antennas can be used, passive DF antennas are substantially less sensitive in the VHF and the lower UHF range than active models.

Up until now, users have had to decide what is more important to them: the higher sensitivity offered by active DF antennas or the immunity to strong signals provided by passive DF antennas.

The R&S®ADD011SR, R&S®ADD050SR and R&S®ADD153SR DF antennas for the first time make it possible to bypass the active circuitry of the antenna elements. The user can switch the active elements to passive mode by a simple mouse click. These DF antennas unite the advantages of both methods without their disadvantages.

Integrated, extendible lightning protection

DF antennas for the VHF/UHF range are usually positioned as high as possible in order to achieve wide coverage. The higher a DF antenna is located, the more likely it will be struck by lightning. This applies especially to areas with frequent thunderstorms.

All Rohde&Schwarz DF antennas that are exposed to the danger of being struck by lightning after installation feature built-in, efficient lightning protection up to an installation height of 20 m:

- Lightning rod that prevents the lightning from striking the DF antenna from the side
- Massive metal core inside the DF antenna to divert the lightning current to the mast so that the current flows off safely via the ground
- Gas arresters at all critical spots prevent voltage peaks (caused by lightning bolts) from destroying the DF antenna circuitry

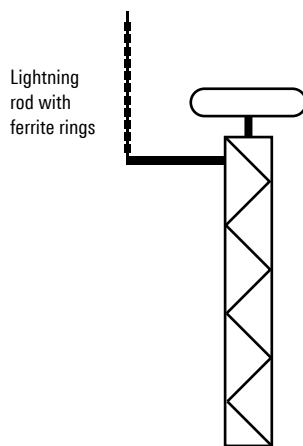
This lightning protection concept was taken into account in development right from the start and does not impair DF accuracy. As a result, the DF accuracy specified in the data sheets is attained even with the lightning rod.

Commercially available DF antennas without integrated lightning protection have a lightning rod that is erected next to the DF antenna, which leads to considerable DF errors (especially in the VHF range). Even if this type of lightning rod is lined with ferrite rings and is positioned two meters away from the DF antenna, the DF accuracy is considerably poorer than specified in the data sheet for a reflection-free environment (see table on page 17). At certain frequencies where the lightning rod is in resonance, considerable DF errors of more than 20° can occur. It is not possible to predict precisely how high the DF errors will be.

If the spacing between the DF antenna and the lightning rod next to it is less than two meters, or if the rod is not thoroughly ferritized, the DF errors to be expected are even significantly higher.

The additional DF errors due to the separate lightning rod can be slightly reduced by calibration. This calibration, however, is very complicated and can correct only some of the DF errors. But even after calibration, additional DF errors in the VHF range can occur at any time.

Lightning protection for antennas



DF antenna without integrated lightning protection



R&S®ADD157 with integrated lightning protection

For the R&S®ADD050SR, R&S®ADD153SR, R&S®ADD253 and R&S®ADD157 DF antennas, the R&S®ADD-LP extended lightning protection is optionally available. It is recommended for installation heights of more than 20 m above ground (e.g. masts > 20 m, tall buildings, mountaintops). The picture shows the R&S®ADD-LP lightning protection, which consists of two crossed lightning rods that protrude laterally beyond the DF antenna and therefore provide an especially high level of protection against lightning striking from the side.

R&S®ADD157 with
R&S®ADD-LP lightning protection.



Comparison of specifications of DF antennas with and without lightning protection

	DF antenna without integrated lightning protection (measurement with separate lightning rod, lined with ferrite rings, two meters away from antenna)	DF antennas from Rohde & Schwarz with integrated lightning protection (example: R&S®ADD050SR)
Average DF accuracy according to data sheet (reflection-free environment)	1° RMS	1° RMS
Average DF accuracy with lightning protection, 20 MHz to 200 MHz	5° RMS	1° RMS
Average DF accuracy with lightning protection, > 200 MHz	2° RMS	1° RMS
Additional DF error due to lightning protection	depending on frequency, up to 20°	no additional DF error

Easy replacement of DF antennas and elements

Unlike other commercially available antennas, DF antennas from Rohde&Schwarz do not need to be individually calibrated. Owing to precise production, the R&S®ADDx DF antennas behave exactly as foreseen in theory. They provide the high DF accuracy specified in the data sheet without subsequent correction by means of individual calibration.

When developing antennas, Rohde&Schwarz already strives to avoid individual calibration. This is ensured by the following:

- High decoupling of obstacles (e.g. cables)
- High common-mode rejection
- Minimal mutual coupling between antenna elements

If, for example, a DF antenna from Rohde&Schwarz is irreparably damaged after being struck by lightning, it can be replaced with the same model without having to manage new calibration data and store it in the direction finder.

If an antenna element fails, it can likewise be replaced with a new one. The DF antenna does not have to be subsequently measured again on a turntable and recalibrated. That is an important prerequisite for fast on-site service.

Ordering information

Designation	Type	Order No.
DF antennas		
VLF DF Antenna	R&S®ADD110	4078.3003.02
HF DF Antenna	R&S®ADD119	4053.6509.02
Super-Resolution HF DF Antenna, diameter: 100 m	R&S®ADD011SR	4078.0004.02
Super-Resolution VHF DF Antenna	R&S®ADD050SR	4071.7003.02
Super-Resolution VHF/UHF DF Antenna	R&S®ADD153SR	4071.6007.02
Dual Polarized VHF/UHF DF Antenna	R&S®ADD157	4069.4800.02
UHF DF Antenna for GSM	R&S®ADD170	4055.7502.02
UHF DF Antenna	R&S®ADD070	4043.4003.02
Mobile UHF DF Antenna	R&S®ADD070M	4059.6000.02
Broadband VHF/UHF DF Antenna	R&S®ADD253	4071.4004.12
Compact LF UHF DF Antenna	R&S®ADD216	4068.3000.02
External accessories		
Lightning Protection	R&S®ADD-LP	4069.6010.02 4069.6010.03 (for R&S®ADD050SR)
Electronic Compass	R&S®GH150	4041.8501.02
Mast Adapter	R&S®ADD150A	4041.2655.02
Vehicle Adapter	R&S®AP502Z1	0515.1419.02
Intermediate Mast	R&S®KM051	4041.9008.02
Antenna Adapter, with cable outlet	R&S®ADD071Z	4043.7002.02
Antenna Adapter, without cable inlet/flange	R&S®ADD071Z	4043.7002.03
Tripod with Adapter	R&S®ADD1XTP	4063.4409.02
HF Cable Set	R&S®DDF®1XZ	4064.6286.xx ¹⁾
VHF/UHF Cable Set	R&S®DDF®5XZ	4064.6728.xx ¹⁾
UHF Cable Set	R&S®DDF®7XZ	4064.8043.xx ¹⁾

¹⁾ The DF antenna cable sets are available in various lengths, designated by the last two digits of the order number.

For data sheet, see PD 0758.1106.22 and www.rohde-schwarz.com

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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PD 0758.1106.12 | Version 02.01 | July 2011 | R&S®ADDx

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