

R&S® ADDx

Single-Channel DF Antennas

Product overview





R&S®ADD107 mounted on R&S®ADD17XZ6.

R&S®ADDx Single-Channel DF Antennas

The R&S®ADDx DF antennas are decisive for the high efficiency of the Rohde & Schwarz single-channel direction finders 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 active/passive switchover allows them to flexibly adapt to the signal environment and considerably increases their immunity to strong signals (see below).

Key facts

- High DF accuracy and sensitivity, as well as high immunity to reflections due to the large number of antenna elements
- Active/passive switchover by mouse click for adapting the R&S®ADD196/197/295 antennas to the signal environment
- Antenna elements with variable electrical length for automatic adaptation to the current receive frequency (R&S®ADD196/197/295)
- Effective, integrated lightning protection with optional extension for applications with high likelihood of lightning strikes (R&S®ADD196/197/295)

Benefits and key features

Twelve 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 exceptionally large number of antenna elements

▷ [page 12](#)

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 DF antenna 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 strikes
- No impairment of DF accuracy
- No time-consuming calibration after installation of the DF antenna

▷ [page 16](#)







Easy replacement of DF antennas

- No individual calibration due to detailed development and precise production
- Replacement of a DF antenna model without renewed administration/input of calibration data







▷ [page 18](#)

Model overview

R&S® ADDx single-channel DF antennas

	<p>R&S® ADD119 HF DF antenna</p> <p>mobile and portable</p>	<ul style="list-style-type: none"> ■ Frequency range from 300 kHz to 30 MHz ■ Vertical polarization <p>▷ page 6</p>
	<p>R&S® ADD196 VHF/UHF DF antenna</p> <p>mobile and stationary</p>	<ul style="list-style-type: none"> ■ Frequency range from 20 MHz to 1.3 GHz ■ Vertical polarization <p>▷ page 6</p>
	<p>R&S® ADD197 dual-polarized VHF/UHF DF antenna</p> <p>mobile and stationary</p>	<ul style="list-style-type: none"> ■ Frequency range from 20 MHz to 1.3 GHz ■ Vertical and horizontal polarization <p>▷ page 7</p>
	<p>R&S® ADD295 VHF/UHF wideband DF antenna</p> <p>mobile and stationary</p>	<ul style="list-style-type: none"> ■ Frequency range from 20 MHz to 3 GHz ■ Vertical polarization <p>▷ page 7</p>
	<p>R&S® ADD175 compact UHF DF antenna for mobile radio frequency range</p> <p>mobile and portable</p>	<ul style="list-style-type: none"> ■ Frequency range from 690 MHz to 2.7 GHz ■ Vertical polarization <p>▷ page 8</p>
	<p>R&S® ADD071 UHF DF antenna</p> <p>mobile and stationary</p>	<ul style="list-style-type: none"> ■ Frequency range from 1.3 GHz to 3 GHz ■ Vertical polarization <p>▷ page 8</p>

R&S®ADDx single-channel DF antennas

	<p>R&S®ADD075 UHF/SHF DF antenna</p> <p>mobile and stationary</p>	<ul style="list-style-type: none"> ■ Frequency range from 1.3 GHz to 8.2 GHz ■ Vertical polarization <p>▷ page 9</p>
	<p>R&S®ADD107 compact VHF/UHF DF antenna</p> <p>mobile and portable</p>	<ul style="list-style-type: none"> ■ Frequency range from 20 MHz to 1.3 GHz ■ Vertical polarization <p>▷ page 9</p>
	<p>R&S®ADD207 compact UHF/SHF DF antenna</p> <p>mobile and portable</p>	<ul style="list-style-type: none"> ■ Frequency range from 600 MHz to 6 GHz ■ Vertical polarization <p>▷ page 10</p>
	<p>R&S®ADD307 collapsible VHF/UHF DF antenna</p> <p>portable</p>	<ul style="list-style-type: none"> ■ Frequency range from 20 MHz to 690 MHz ■ Vertical polarization <p>▷ page 10</p>
	<p>R&S®ADD317 VHF/UHF DF antenna</p> <p>stationary and portable</p>	<ul style="list-style-type: none"> ■ Frequency range from 20 MHz to 690 MHz ■ Vertical polarization <p>▷ page 10</p>
	<p>R&S®ADD095 VHF DF antenna</p> <p>stationary and portable</p>	<ul style="list-style-type: none"> ■ Frequency range from 20 MHz to 450 MHz <p>▷ page 11</p>

R&S®ADD119

- Mobile and portable DF antenna for the frequency range from 300 kHz to 30 MHz
- Suitable for ground waves and low-angle sky waves
- DF measurements up to ITU class A DF accuracy
- 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®ADD196

- Mobile and stationary DF antenna for the frequency range from 20 MHz to 1.3 GHz
- Multi-element DF antenna with nine elements
- DF measurements up to ITU class A DF accuracy
- Antenna elements with variable electrical length for optimal adaptation to the receive frequency
- Antenna elements with active/passive switchover for adaptation to the signal environment (models .1x)
- Integrated, extendible lightning protection with lightning rod; no impact on DF accuracy
- R&S®ADD-LP extended lightning protection (option)
- For installation on a mast by means of an R&S®ADD150A mast adapter or for use on an R&S®ADD1XTP tripod



R&S®ADD196.

R&S®ADD197

- 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 elements each for vertical and horizontal polarization
- DF measurements up to ITU class A DF accuracy
- Antenna elements with variable electrical length for optimal adaptation to the receive frequency (vertical polarization)
- Antenna elements with active/passive switchover for adaptation to the signal environment, for both vertical and horizontal polarization (models .1x)
- Integrated, extendible lightning protection with lightning rod; no impact on DF accuracy
- R&S®ADD-LP extended lightning protection (option)
- 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®ADD197.

R&S®ADD295

- Mobile and stationary DF antenna for the frequency range from 20 MHz to 3 GHz
- Multi-element DF antenna with nine 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)
- Antenna elements with active/passive switchover for adaptation to the signal environment
- Integrated, extendible lightning protection with lightning rod; no impact on DF accuracy
- R&S®ADD-LP extended lightning protection (option)
- 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®ADD295.

R&S®ADD175

- Mobile and portable DF antenna for the mobile radio frequency range from 690 MHz to 2.7 GHz
- Compact correlative interferometer DF antenna
- Multi-element DF antenna with eight elements
- DF measurements up to ITU class A DF accuracy
- Electronic compass and GPS integrated
- Easy installation on a vehicle roof using the R&S®ADD17XZ3 vehicle adapter with magnet mount and R&S®ADD17XZ4 cable set
- R&S®ADD17XZ6 wooden tripod (option)

R&S®ADD071

- Mobile and stationary DF antenna for the frequency range from 1.3 GHz to 3 GHz
- Multi-element DF antenna with eight elements
- DF measurements up to ITU class A DF accuracy
- Ready for installation of an additional DF antenna on top
- 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®ADD175.



R&S®ADD071.

R&S®ADD075

- Mobile and stationary DF antenna for the frequency range from 1.3 GHz to 8.2 GHz
- Multi-element DF antenna with two circular antenna arrays arranged on top of each other; each array contains eight elements
- DF measurements up to ITU class A DF accuracy
- Ready for installation of an additional DF antenna on top
- For installation on a mast by means of an R&S®ADD07XZB mast adapter or for use on an R&S®ADD1XTP tripod



R&S®ADD075.

R&S®ADD107

- Mobile and portable DF antenna for the frequency range from 20 MHz to 1.3 GHz
- Above 173 MHz:
 - Compact correlative interferometer DF antenna
 - Multi-element DF antenna with eight antenna elements
- Below 173 MHz:
 - Powerful Watson-Watt DF method
- Integrated electronic compass
- Integrated GPS module with GPS antenna
- R&S®ADD17XZ3 vehicle adapter with magnetic mount for fast antenna installation on a vehicle roof (option)
- R&S®ADD17XZ6 wooden tripod (option)



R&S®ADD107.

R&S®ADD207

- Mobile and portable DF antenna for the frequency range from 600 MHz to 6 GHz
- Compact correlative interferometer DF antenna
- Two multi-element DF antennas mounted one above the other, each containing eight elements
- Integrated electronic compass
- Integrated GPS module with GPS antenna
- R&S®ADD17XZ3 vehicle adapter with magnetic mount for fast antenna installation on a vehicle roof (option)
- R&S®ADD17XZ6 wooden tripod (option)

R&S®ADD307

- Portable DF antenna for the frequency range from 20 MHz to 690 MHz
- Accurate correlative interferometer DF antenna, optimized for size and weight
- Collapsible lightweight design
- Integrated GPS and electronic compass
- Collapsible lightweight mast as option

R&S®ADD317

- Stationary and portable DF antenna for the frequency range from 20 MHz to 690 MHz
- Accurate correlative interferometer DF antenna, optimized for size and weight



R&S®ADD207 with R&S®ADD17XZ3 vehicle adapter and R&S®ADD17XZ5 cable set.



R&S®ADD307/R&S®ADD317.

R&S®ADD095

- ▮ Stationary and portable DF antenna for the frequency range from 20 MHz to 450 MHz
- ▮ Multi-element DF antenna with nine antenna elements
- ▮ DF measurements up to ITU class A DF accuracy
- ▮ Antenna elements with active/passive switchover for adaptation to the signal environment
- ▮ Integrated, extendible lightning protection with lightning rod (option); no impact on DF accuracy
- ▮ R&S®ADD-LP extended lightning protection (option)
- ▮ Installation of an additional DF antenna above the R&S®ADD095 possible (using the R&S®KM051 intermediate mast and the R&S®ADD150A mast adapter)



R&S®ADD095.

Superior immunity to reflections

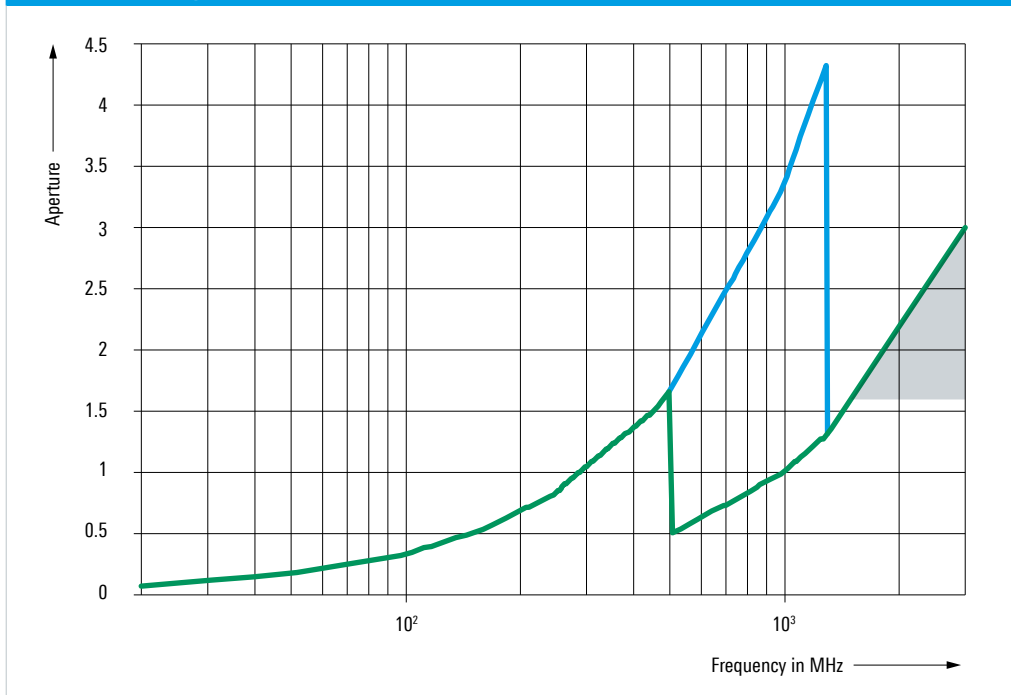
Due to multipath propagation (especially in urban areas), not only the direct wave but also reflections arrive at the DF antenna. Immunity to reflections is influenced to a large extent by the number of antenna elements in a DF antenna. Virtually all R&S®ADDx DF antennas comprise nine antenna elements for the VHF/UHF range, and eight for the UHF/SHF range. These DF antennas were designed to provide stable bearings even with a 50% share of reflections. If only five antenna elements are used (as is the case with typical commercially available antennas), substantial DF errors can be expected in certain frequency ranges (see shaded area 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 selected such that unambiguous phase differences are obtained between the antenna elements at the highest operating frequency and for all possible combinations of direct and reflected waves. Commercially available five-element DF antennas therefore have a much smaller aperture than DF antennas with nine elements across wide frequency ranges.

The aperture of a DF antenna is crucial to 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, section 4.7.1.1.3).

This advantage is not apparent from the specifications. For the purpose of comparison, data sheets always specify instrument and system accuracy based on ideal, reflection-free DF antenna environments and strong signals.

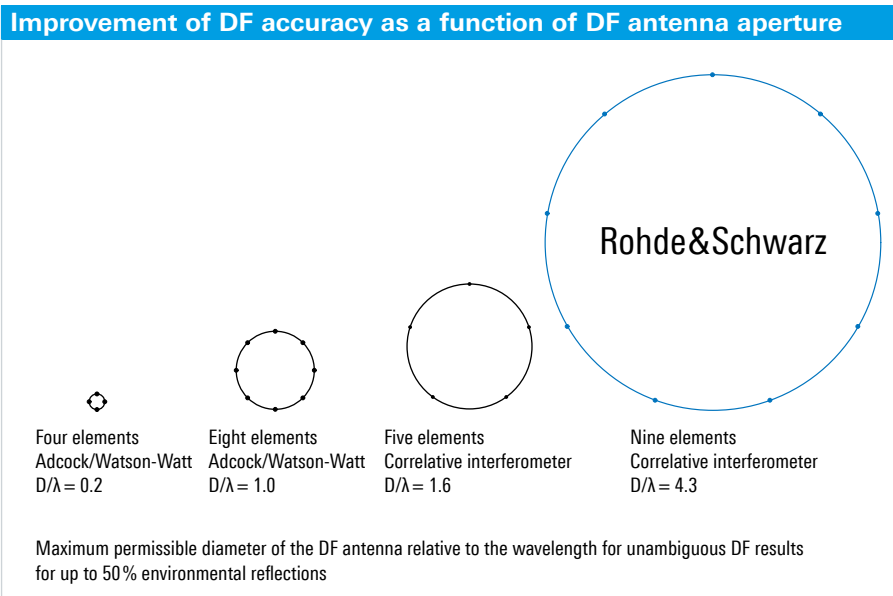
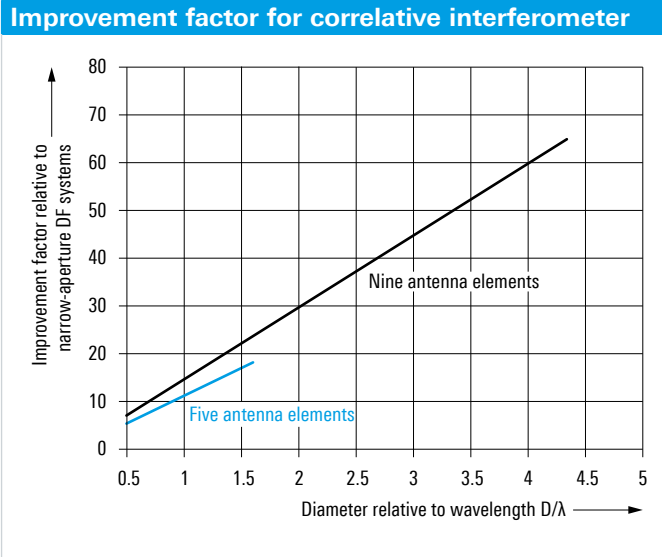
Comparison of aperture of commercially available five-element DF antennas (green) with that of Rohde & Schwarz DF antennas (blue)



DF antennas using nine elements and the correlative interferometer DF method offer by far the widest aperture and therefore enhanced accuracy and sensitivity (see top figure). As a result, they have a considerably greater improvement factor as compared with small-base DF antennas that only have five elements, for example.

The considerably higher immunity to reflections offered by 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 reflected wave). 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 reflected wave. Since the DF error depends on the frequency, the angle of incidence and the phase angle of the reflected wave, all possible combinations of these parameters are simulated. Then the RMS value is determined from the individual DF errors.

The table below shows that DF antennas with nine elements provide 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 use eight elements for direction finding in the frequency range above 1.3 GHz, an eight-element DF antenna is simulated in this frequency range.



Average DF error of different DF antennas in a two-wave field			
	Frequency ranges	DF antenna diameter	DF accuracy in two-wave field (approx.)
Rohde & Schwarz DF antennas	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

Exceptionally high DF sensitivity and dynamic range

For DF antenna elements to exhibit good receive characteristics, adaptation to the subsequent 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:

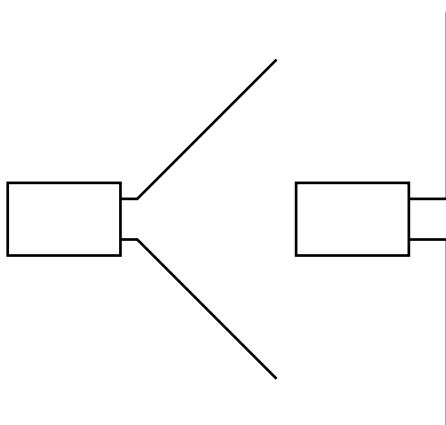
- At low frequencies, configuration of antenna element for maximum electrical length
- At high frequencies, selection of the most effective antenna length to achieve the best possible compromise between decoupled receive power and impact on the directional pattern due to mutual coupling

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

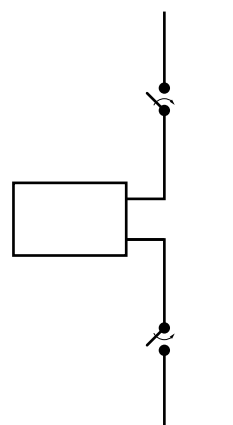
The antenna elements of the R&S®ADD196, R&S®ADD197 (vertical polarization) and R&S®ADD295 DF antennas are equipped with PIN diodes, allowing the electrically active structure to change very quickly in the VHF/UHF range. As a result, these elements are always optimally adapted to the receive frequency and offer exceptionally 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 length



Antenna element of variable electrical length

Active/passive switchover by mouse click

The number of radio services and transmitters is continuously growing, resulting 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 strong transmitters – which, particularly in urban 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 extremely linear, active antenna circuitry with top-quality components is used, very strong signals may cause intermodulation.

Passive antennas provide significantly 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 higher immunity to strong signals provided by passive DF antennas.

The R&S®ADD196/197/295 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 therefore offer the advantages of both methods.

Integrated, extendible lightning protection

DF antennas for the VHF/UHF/SHF 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.

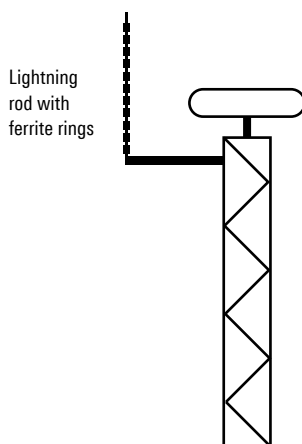
Most installed Rohde & Schwarz DF antennas that are at risk of being struck by lightning feature built-in, effective lightning protection up to an installation height of 20 m:

- Lightning rod that prevents 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 to 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 mounted 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, DF accuracy is considerably poorer than that specified in the data sheet for a reflection-free environment (see table on the next page). 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.

Lightning protection for antennas



DF antenna without integrated lightning protection



R&S®ADD197 with integrated lightning protection

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

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

For the R&S®ADD196, R&S®ADD197, R&S®ADD295 and R&S®ADD095 DF antennas, the R&S®ADD-LP extended lightning protection is available as an option. It is recommended for installation heights of more than 20 m above ground (e.g. masts > 20 m, tall buildings, mountaintops). The photo shows the extended lightning protection, which consist of two crossed lightning rods that protrude laterally beyond the DF antenna to provide an especially high level of protection against lightning striking from the side.



R&S®ADD197 with R&S®ADD-LP.

Comparison of specifications of DF antennas with and without integrated lightning protection

	DF antennas without integrated lightning protection¹⁾	Rohde & Schwarz DF antennas with integrated lightning protection (example: R&S®ADD196)
Average DF accuracy according to data sheet specifications (reflection-free environment)	1° RMS	1° RMS (2° RMS for f < 80 MHz)
Average DF accuracy with lightning protection, 20 MHz to 200 MHz	5° RMS	1° RMS (2° RMS for f < 80 MHz)
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

¹⁾ Measurement with separate lightning rod, lined with ferrite rings, two meters away from antenna.

Easy replacement of DF antennas

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

Rohde&Schwarz strives to avoid individual calibration of DF antennas at the development stage by implementing the following:

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

A DF antenna from Rohde&Schwarz can be replaced with the same model without having to manage new calibration data and store it in the direction finder.

System configuration

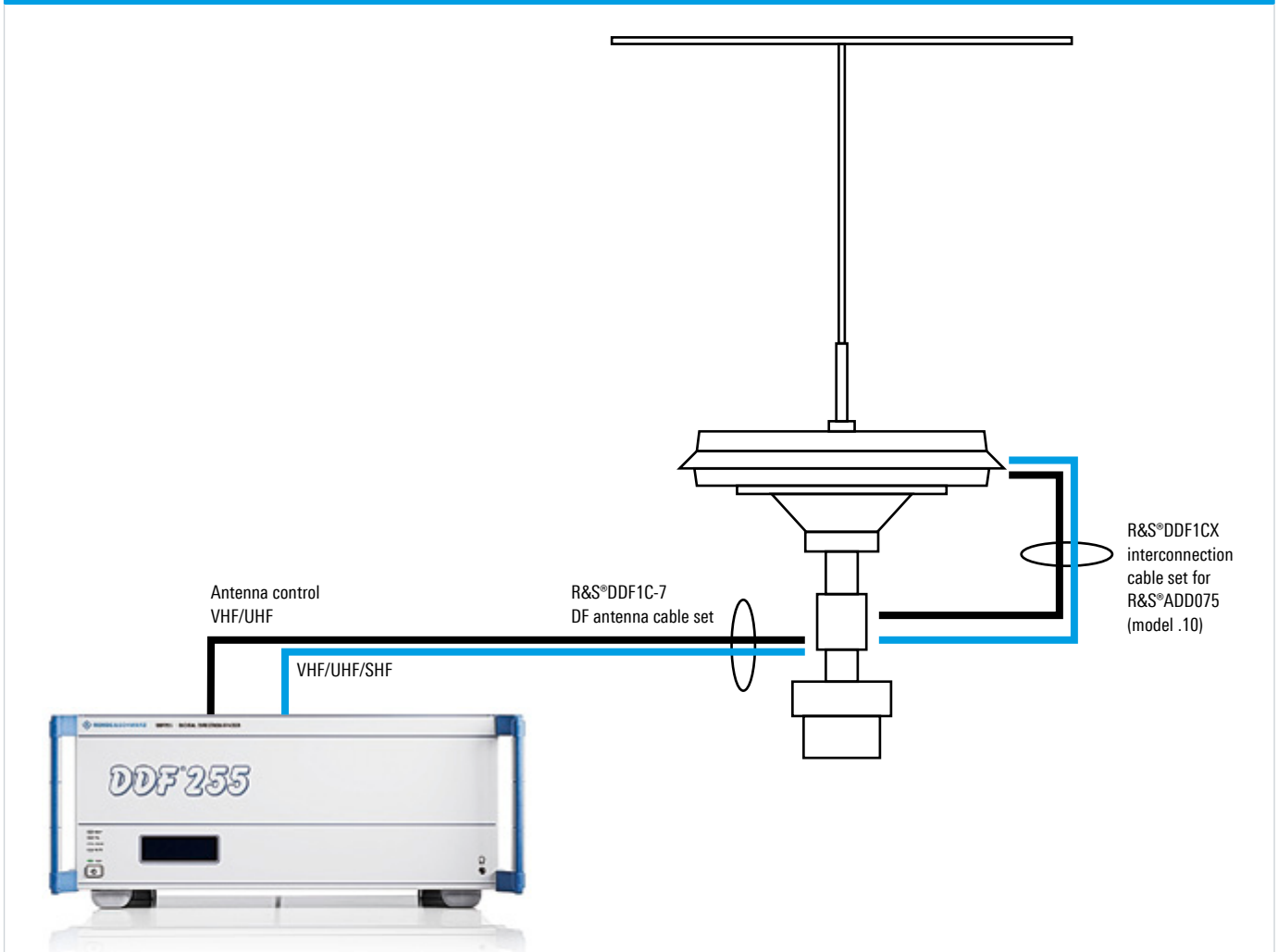
Stationary DF from 20 MHz to 6 GHz (R&S®DDF205) or from 20 MHz to 8.2 GHz (R&S®DDF255)

R&S®DDF255/205 with R&S®ADD075 and R&S®ADD196/197 on the same mast

Description	Type	Order No.
VHF/UHF DF Antenna or Dual-Polarized VHF/UHF DF Antenna	R&S®ADD196 or R&S®ADD197 (select one only)	4077.3000.03/.12 ¹⁾ 4068.1450.12
UHF/SHF DF Antenna	R&S®ADD075	4069.6603.12
Accessories		
Mast Adapter for compact DF antennas; color: light ivory	R&S®ADD150A	4041.2655.02
Antenna Mast Adapter for R&S®ADD075, top	R&S®ADD07XZT	4069.7200.02
Antenna Mast Adapter for R&S®ADD075, bottom	R&S®ADD07XZB	4069.7300.02
Extended Lightning Protection	R&S®ADD-LP	4069.6010.02
Electronic Compass	R&S®GH150	4041.8501.02
DF Antenna Cable Set for single-channel direction finders, frequency range 0.3 MHz to 6 GHz	R&S®DDF1C-7	4077.8001.xx (length: 5/10/20/30 m)
Power Supply (required for cable length ≥ 40 m)	R&S®IN061	4041.9508.02
Interconnection Cable Set for R&S®ADD075	R&S®DDF1CX	4077.8801.10

¹⁾ Model .12: with active/passive switch.

R&S®DDF255 with R&S®ADD075 and R&S®ADD196/197 on the same mast



Note: An additional type N (female) to SMA (male) adapter is required for interconnection to the R&S®DDF255 for operation above 3 GHz (not part of standard delivery).

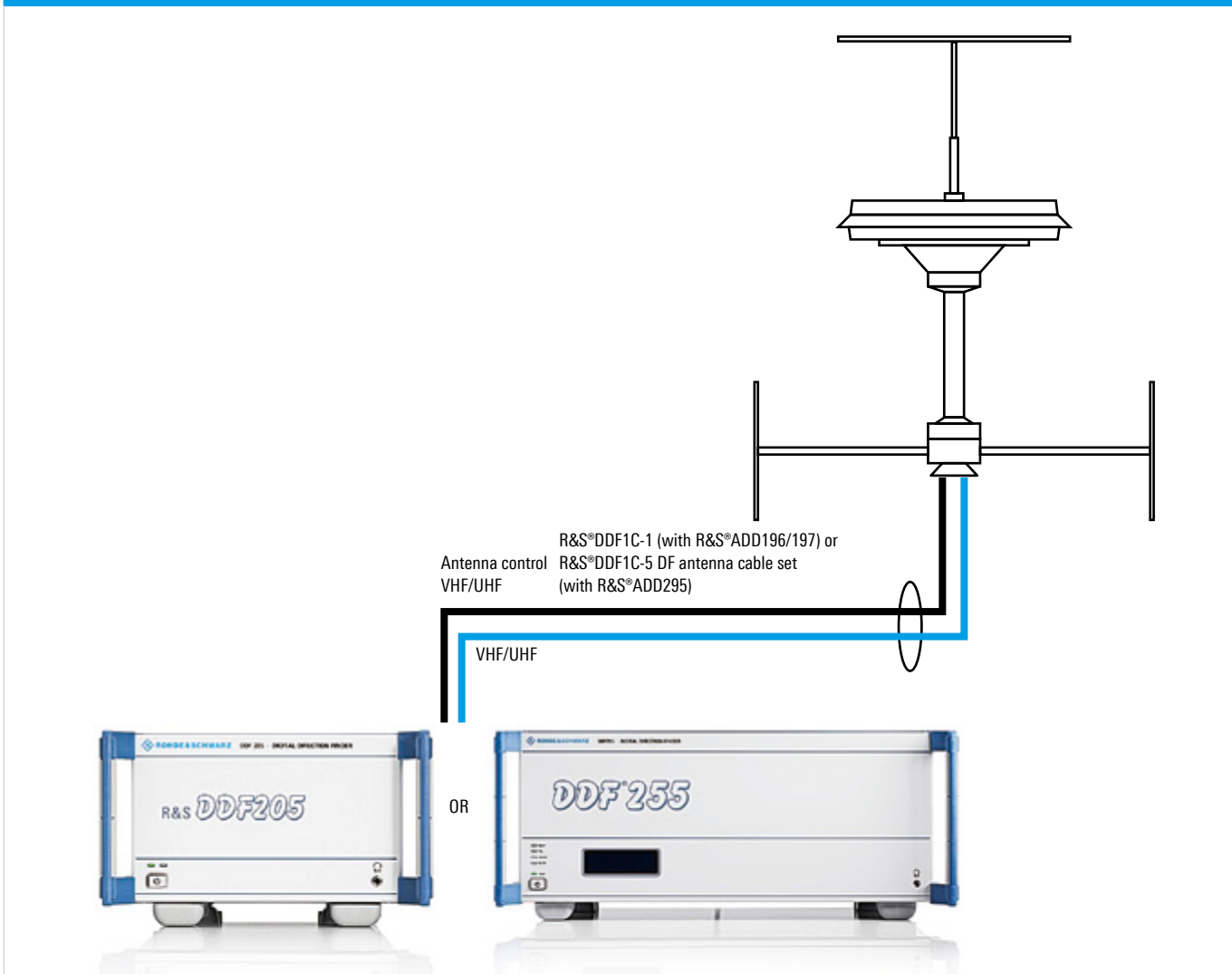
Stationary DF from 20 MHz to 1.3 GHz (with R&S®ADD19x) or 3 GHz (with R&S®ADD295)

R&S®DDF255/205 with R&S®ADD095 and R&S®ADD196/197/295

Description	Type	Order No.
VHF/UHF DF Antenna or Dual-Polarized VHF/UHF DF Antenna or VHF/ UHF Broadband DF Antenna	R&S®ADD196 or R&S®ADD197 or R&S®ADD295 (select one only)	4077.3000.12 4068.1450.12 4070.9002.12
VHF DF Antenna	R&S®ADD095	4109.0000.02
Accessories		
Mast Adapter for compact DF antennas; color: light ivory	R&S®ADD150A	4041.2655.02
Intermediate Mast	R&S®KM051	4041.9008.02
Power Supply (required for cable length \geq 40 m)	R&S®IN061	4041.9508.02
Extended Lightning Protection	R&S®ADD-LP	4069.6010.02
DF Antenna Cable Set for single-channel direction finders, frequency range 0.3 MHz to 1.3 GHz	R&S®DDF1C-1	4077.6009.xx (length: 5/10/20/40/50/60 m)
DF Antenna Cable Set for single-channel direction finders, frequency range 0.3 MHz to 3 GHz	R&S®DDF1C-5	4077.7005.xx (length: 5/10/20/30/40/50 m)

Note: Depending on the cable length, the R&S®IN061 power supply is required (included in the DF antenna cable set). The R&S®IN061 includes a 10 m control cable. A power cable is required for the R&S®IN061 (not part of the delivery).

R&S®DDF205/DDF255 with R&S®ADD095 and R&S®ADD196/197/295



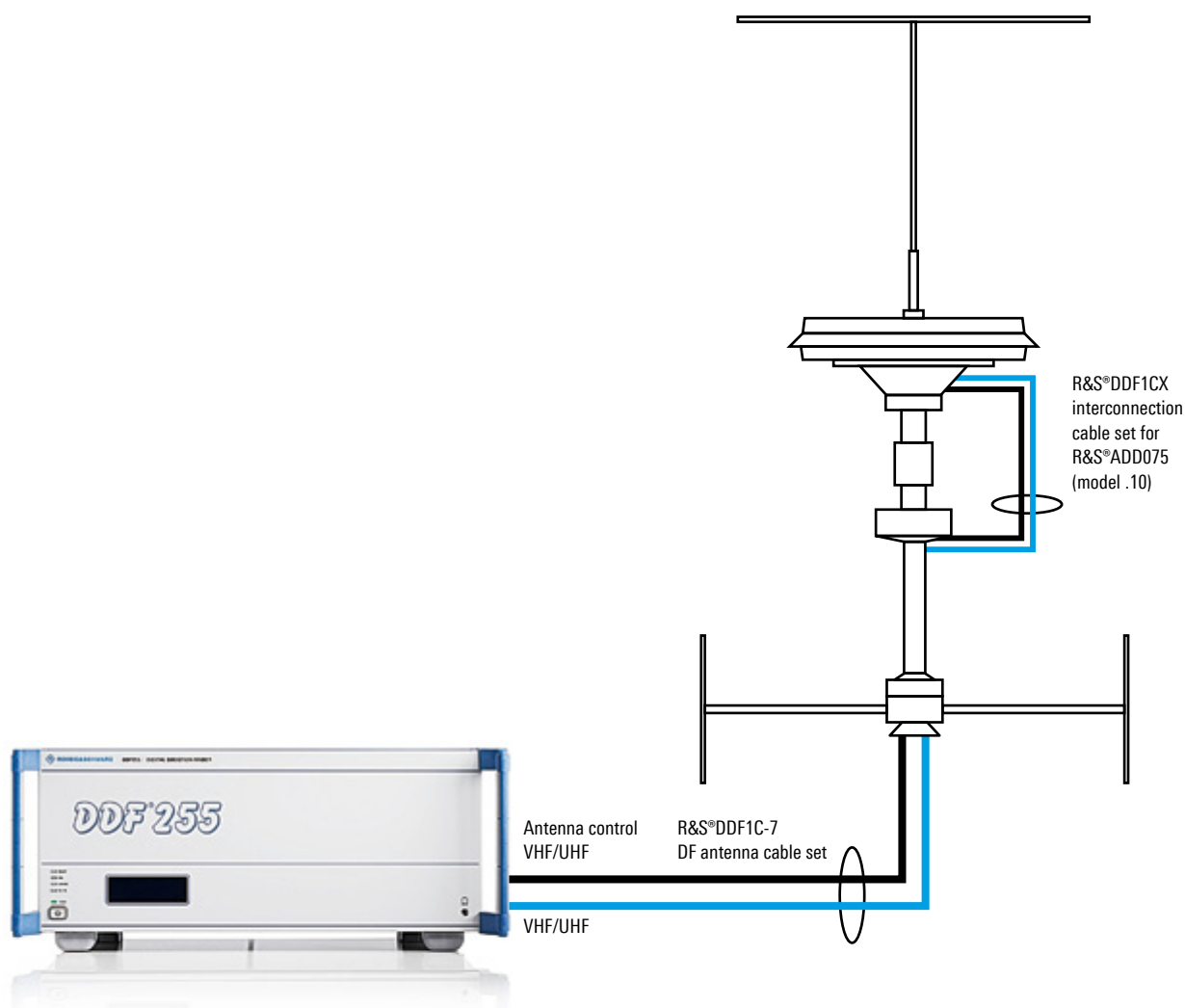
Note: Depending on the cable length, the R&S®IN061 power supply is required (included in the DF antenna cable set). The R&S®IN061 includes a 10 m control cable. A power cable is required for the R&S®IN061 (not part of the delivery).

Stationary DF from 20 MHz to 6 GHz (R&S®DDF205) or from 20 MHz to 8.2 GHz (R&S®DDF255)

R&S®DDF255/205 with R&S®ADD095, R&S®ADD075 and R&S®ADD196/197/295 on the same mast

Description	Type	Order No.
VHF/UHF DF Antenna or Dual-Polarized VHF/UHF DF Antenna or VHF/ UHF Broadband DF Antenna	R&S®ADD196 or R&S®ADD197 or R&S®ADD295 (select one only)	4077.3000.12 4068.1450.12 4070.9002.12
UHF/SHF DF Antenna	R&S®ADD075	4069.6603.12
VHF DF Antenna	R&S®ADD095	4109.0000.02
Accessories		
Mast Adapter for compact DF antennas; color: light ivory	R&S®ADD150A	4041.2655.02
Antenna Mast Adapter for R&S®ADD075, top	R&S®ADD07XZT	4069.7200.02
Antenna Mast Adapter for R&S®ADD075, bottom	R&S®ADD07XZB	4069.7300.02
Intermediate Mast	R&S®KM051	4041.9008.02
Extended Lightning Protection	R&S®ADD-LP	4069.6010.02
DF Antenna Cable Set for single-channel direction finders, frequency range 0.3 MHz to 6 GHz	R&S®DDF1C-7	4077.8001.xx (length: 5/10/20/30 m)
Interconnection Cable Set for R&S®ADD075	R&S®DDF1CX	4077.8801.10

R&S®DDF255 with R&S®ADD095, R&S®ADD075 and R&S®ADD196/197/295 on the same mast



Note: An additional type N (female) to SMA (male) adapter is required for interconnection to the R&S®DDF255 for operation above 3 GHz (not part of standard delivery)

Stationary DF from 20 MHz to 450 MHz

R&S®DDF205/DDF255 with R&S®ADD095 and R&S®ADD-LR

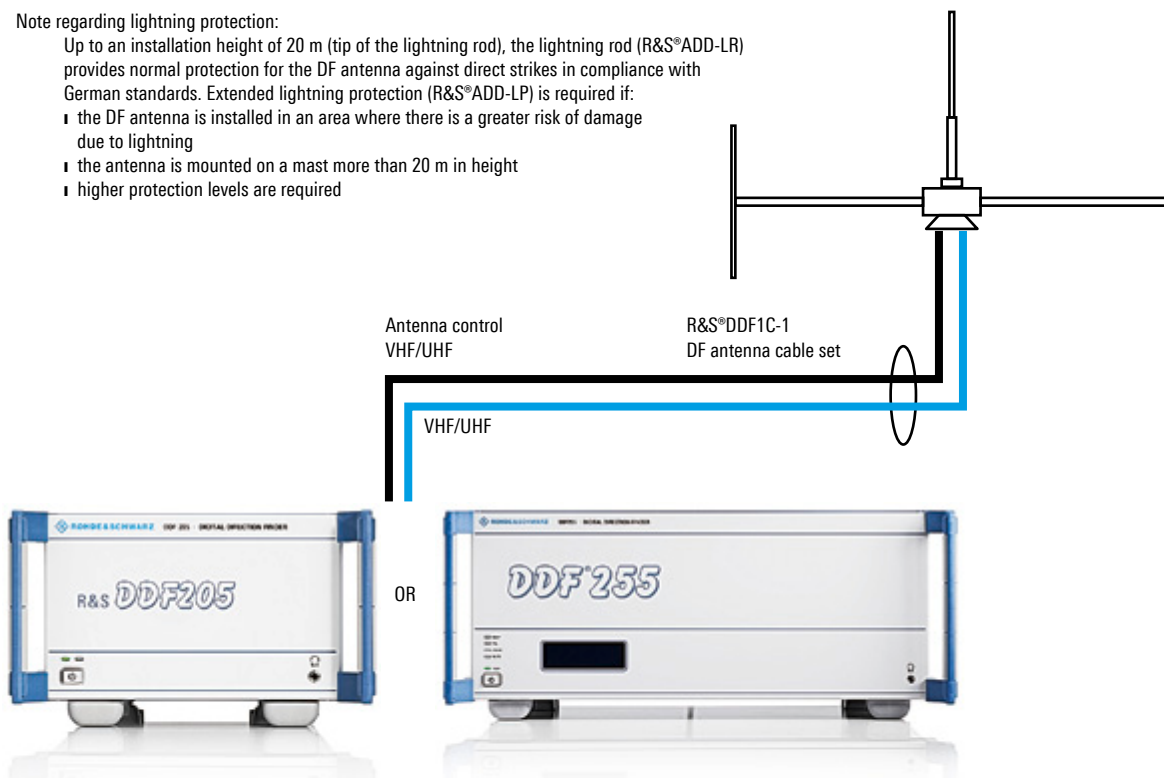
Description	Type	Order No.
VHF DF Antenna	R&S®ADD095	4109.0000.02
Accessories		
Power Supply	R&S®IN061	4041.9508.02
Lightning Protection		
Lightning Rod or	R&S®ADD-LR	4109.0800.02
Extended Lightning Protection	R&S®ADD-LP	4069.6010.02
DF Antenna Cable Set	R&S®DDF1C-1	4077.6009.xx (length: 5/10/20/40/50/60 m)

R&S®DDF205/DDF255 with R&S®ADD095 and R&S®ADD-LR

Note regarding lightning protection:

Up to an installation height of 20 m (tip of the lightning rod), the lightning rod (R&S®ADD-LR) provides normal protection for the DF antenna against direct strikes in compliance with German standards. Extended lightning protection (R&S®ADD-LP) is required if:

- the DF antenna is installed in an area where there is a greater risk of damage due to lightning
- the antenna is mounted on a mast more than 20 m in height
- higher protection levels are required



Note: As of 60 cm cable length, the R&S®IN061 power supply is required (included in the DF antenna cable set). The R&S®IN061 includes a 10 m control cable. A power cable is required for the R&S®IN061 (not part of the delivery).

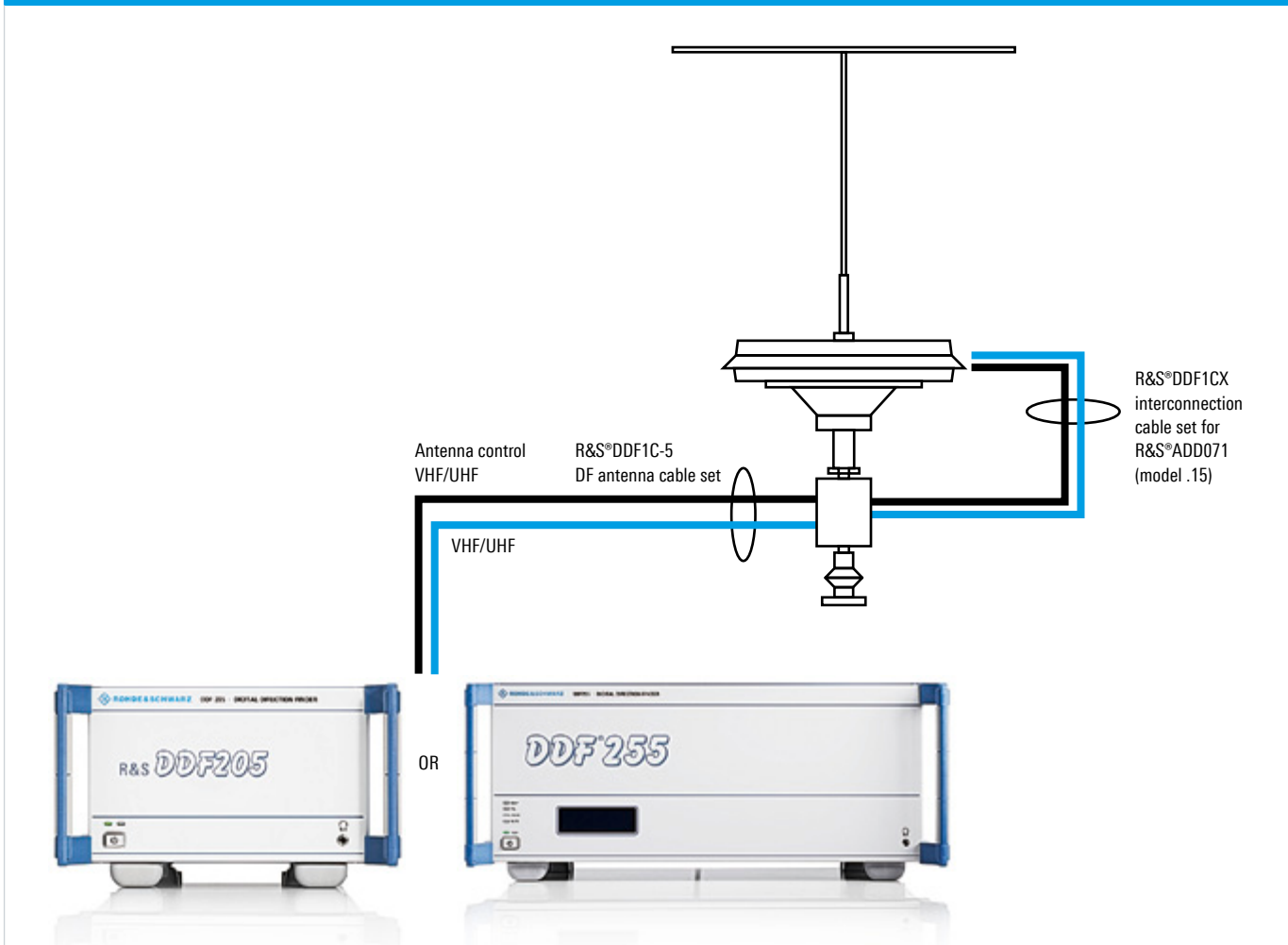
Stationary DF from 20 MHz to 3 GHz

R&S®DDF255/205 with R&S®ADD071 and R&S®ADD196/197 on the same mast

Description	Type	Order No.
VHF/UHF DF Antenna or Dual-Polarized VHF/UHF DF Antenna	R&S®ADD196 or R&S®ADD197 (select one only)	4077.3000.03/.12 ¹⁾ 4068.1450.12
UHF DF Antenna	R&S®ADD071	4043.6006.02
Accessories		
Mast Adapter for compact DF antennas; color: light ivory	R&S®ADD150A	4041.2655.02
Antenna Adapter for R&S®ADD071, without cable inlet/ flange, top	R&S®ADD071Z	4043.7002.03
Antenna Adapter for R&S®ADD071, with cable outlet, bottom	R&S®ADD071Z	4043.7002.02
Extended Lightning Protection	R&S®ADD-LP	4069.6010.02
Electronic Compass	R&S®GH150	4041.8501.02
DF Antenna Cable Set for single-channel direction finders, frequency range 0.3 MHz to 3 GHz	R&S®DDF1C-5	4077.7005.xx (length: 5/10/20/30/40/50 m)
Power Supply (required for cable length \geq 40 m)	R&S®IN061	4041.9508.02
Interconnection Cable Set for R&S®ADD071	R&S®DDF1CX	4077.8801.15

¹⁾ Model .12: with active/passive switch.

R&S®DDF255/205 with R&S®ADD071 and R&S®ADD196/197 on the same mast



Mobile/stationary DF from 20 MHz to 3 GHz

R&S®DDF255/205 with R&S®ADD295 on mast, vehicle roof or tripod

Description	Type	Order No.
VHF/UHF Wideband DF Antenna	R&S®ADD295	4070.9002.12
Accessories		
DF Antenna Cable Set for single-channel direction finders, frequency range 0.3 MHz to 3 GHz	R&S®DDF1C-5	4077.7005.xx (length: for 5/10/20/30/40/50 m)
Power Supply (required for cable length ≥ 40 m)	R&S®IN061	4041.9508.02
Mast Adapter for compact DF antennas; color: light ivory	R&S®ADD150A	4041.2655.02
Extended Lightning Protection	R&S®ADD-LP	4069.6010.02
Vehicle Adapter for portable DF antennas; color: light ivory	R&S®AP502Z1	0515.1419.02
Tripod with Adapter	R&S®ADD1XTP	4063.4409.02
Electronic Compass	R&S®GH150	4041.8501.02

Mobile/stationary DF from 20 MHz to 1.3 GHz

R&S®DDF255/205 with R&S®ADD196/197 on mast, vehicle roof or tripod

Description	Type	Order No.
VHF/UHF DF Antenna or Dual-Polarized VHF/UHF DF Antenna	R&S®ADD196 or R&S®ADD197 (select one only)	4077.3000.03/.12 ¹⁾ 4068.1450.12
Accessories		
DF Antenna Cable Set for single-channel direction finders, frequency range 0.3 MHz to 1.3 GHz	R&S®DDF1C-1	4077.6009.xx (length: 5/10/20/40/50/60 m)
Power Supply (required for cable length ≥ 50 m)	R&S®IN061	4041.9508.02
Mast Adapter for compact DF antennas; color: light ivory	R&S®ADD150A	4041.2655.02
Extended Lightning Protection	R&S®ADD-LP	4069.6010.02
Vehicle Adapter for portable DF antennas; color: light ivory	R&S®AP502Z1	0515.1419.02
Tripod with Adapter	R&S®ADD1XTP	4063.4409.02
Electronic Compass	R&S®GH150	4041.8501.02

¹⁾ Model .12: with active/passive switch.

Mobile/stationary DF from 300 kHz to 30 MHz

R&S®DDF255/205 with R&S®ADD119 on vehicle roof or tripod

Description	Type	Order No.
HF DF Antenna	R&S®ADD119	4053.6509.02
Accessories		
DF Antenna Cable Set for single-channel direction finders, frequency range 0.3 MHz to 1.3 GHz	R&S®DDF1C-1	4077.6009.xx (length: 5/10/20/40/50/60 m)
Power Supply (required for cable length ≥ 80 m)	R&S®IN061	4041.9508.02
Vehicle Adapter for portable DF antennas; color: light ivory	R&S®AP502Z1	0515.1419.02
Tripod with Adapter	R&S®ADD1XTP	4063.4409.02
Electronic Compass	R&S®GH150	4041.8501.02

Mobile/stationary DF from 1.3 GHz to 3 GHz

R&S®DDF255/205 with R&S®ADD071 on mast or tripod

Description	Type	Order No.
UHF DF Antenna	R&S®ADD071	4043.6006.02
Accessories		
DF Antenna Cable Set for single-channel direction finders, frequency range 0.3 MHz to 3 GHz	R&S®DDF1C-5	4077.7005.xx (length: 5/10/20/30/40/50 m)
Power Supply (required for cable length ≥ 40 m)	R&S®IN061	4041.9508.02
Antenna Adapter, with cable outlet, bottom	R&S®ADD071Z	4043.7002.02
Tripod with Adapter	R&S®ADD1XTP	4063.4409.02
Electronic Compass	R&S®GH150	4041.8501.02

Mobile/stationary DF from 1.3 GHz to 6 GHz (R&S®DDF205) or from 1.3 GHz to 8.2 GHz (R&S®DDF255)**R&S®DDF255/205 with R&S®ADD075 on vehicle roof, mast or tripod**

Description	Type	Order No.
UHF/SHF DF Antenna	R&S®ADD075	4069.6603.12
Accessories		
DF Antenna Cable Set for single-channel direction finders, frequency range 0.3 MHz to 6 GHz	R&S®DDF1C-7	4077.8001.xx (length: 5/10/20/30 m)
Power Supply (required for cable length ≥ 40 m)	R&S®IN061	4041.9508.02
Mast Adapter, bottom	R&S®ADD07XZB	4069.7300.02
Tripod with Adapter	R&S®ADD1XTP	4063.4409.02
Electronic Compass	R&S®GH150	4041.8501.02

Transportable/portable DF from 20 MHz to 690 MHz**R&S®DDF255/205/007 with R&S®ADD307 on mast or tripod**

Description	Type	Order No.
Collapsible VHF/UHF DF Antenna	R&S®ADD307	4098.2002.07
Accessories		
Wooden Tripod, for compact DF antennas	R&S®ADD17XZ6	4090.8860.02
Tripod Bag for R&S®ADD17XZ6	R&S®ADD17XZ7	4096.1450.02
Cable set for installation with R&S®DDF255/DDF205		
DF Antenna Cable Set for single-channel direction finders, frequency range 0.3 MHz to 1.3 GHz	R&S®DDF1C-1	4077.6009.xx (length: 5/10/20/40/50/60 m)
Cable set for connection with R&S®DDF007		
Antenna Cable with Converter for R&S®ADD307, length: 5 m	R&S®ADD17XZ9	4098.3615.05

Portable DF from 20 MHz to 6 GHz**R&S®DDF007/EM100-DF with R&S®ADD107/207 on vehicle roof or tripod**

Description	Type	Order No.
Compact VHF/UHF DF Antenna	R&S®ADD107	4090.7005.02
Compact UHF/SHF DF Antenna	R&S®ADD207	4096.0002.02
Accessories		
Vehicle Adapter with Magnet Mount	R&S®ADD17XZ3	4090.8801.02
Antenna Cable Set, length: 5 m	R&S®ADD17XZ5	4090.8660.02
Wooden Tripod, for compact DF antennas	R&S®ADD17XZ6	4090.8860.02
Tripod Bag, for R&S®ADD17XZ6	R&S®ADD17XZ7	4096.1450.02
DF Antenna Backpack, for R&S®DDF007, R&S®ADD107 or R&S®ADD207, R&S®ADD17XZ5 and R&S®ADD17XZ3	R&S®ADD17XZ8	4096.1580.02

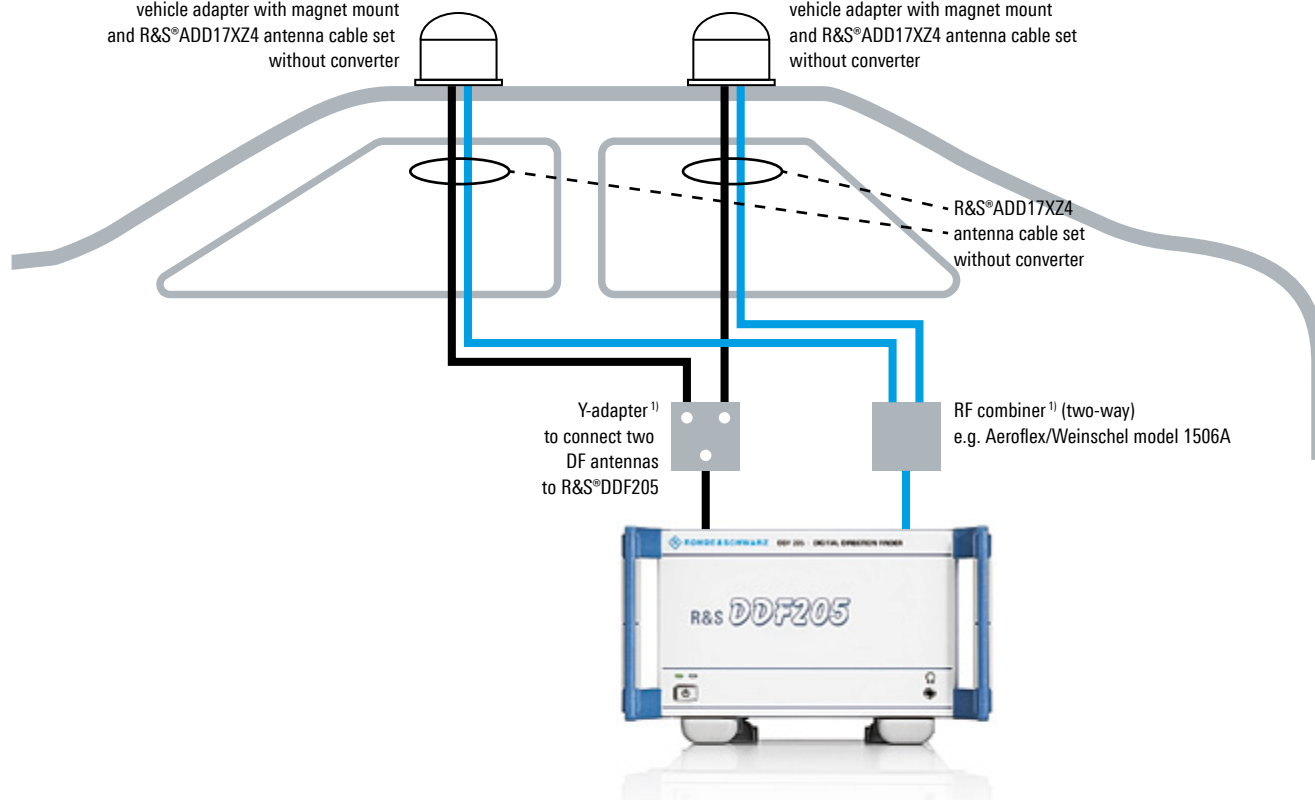
Mobile DF from 20 MHz to 6 GHz**R&S®DDF255/205 with R&S®ADD107/207/175 on vehicle roof or tripod**

Description	Type	Order No.
Compact VHF/UHF DF Antenna	R&S®ADD107	4090.7005.02
Compact UHF/SHF DF Antenna	R&S®ADD207	4096.0002.02
UHF DF Antenna	R&S®ADD175	4079.4003.02
Accessories		
Vehicle Adapter with Magnet Mount	R&S®ADD17XZ3	4090.8801.02
Antenna Cable Set without Converter, length: 5 m	R&S®ADD17XZ4	4090.8730.02
Wooden Tripod, for compact DF antennas	R&S®ADD17XZ6	4090.8860.02
Tripod Bag for R&S®ADD17XZ6	R&S®ADD17XZ7	4096.1450.02

R&S®DDF205 with R&S®ADD107/207 on vehicle roof or tripod

E.g. R&S®ADD207 with R&S®ADD17XZ3 vehicle adapter with magnet mount and R&S®ADD17XZ4 antenna cable set without converter

E.g. R&S®ADD107 with R&S®ADD17XZ3 vehicle adapter with magnet mount and R&S®ADD17XZ4 antenna cable set without converter



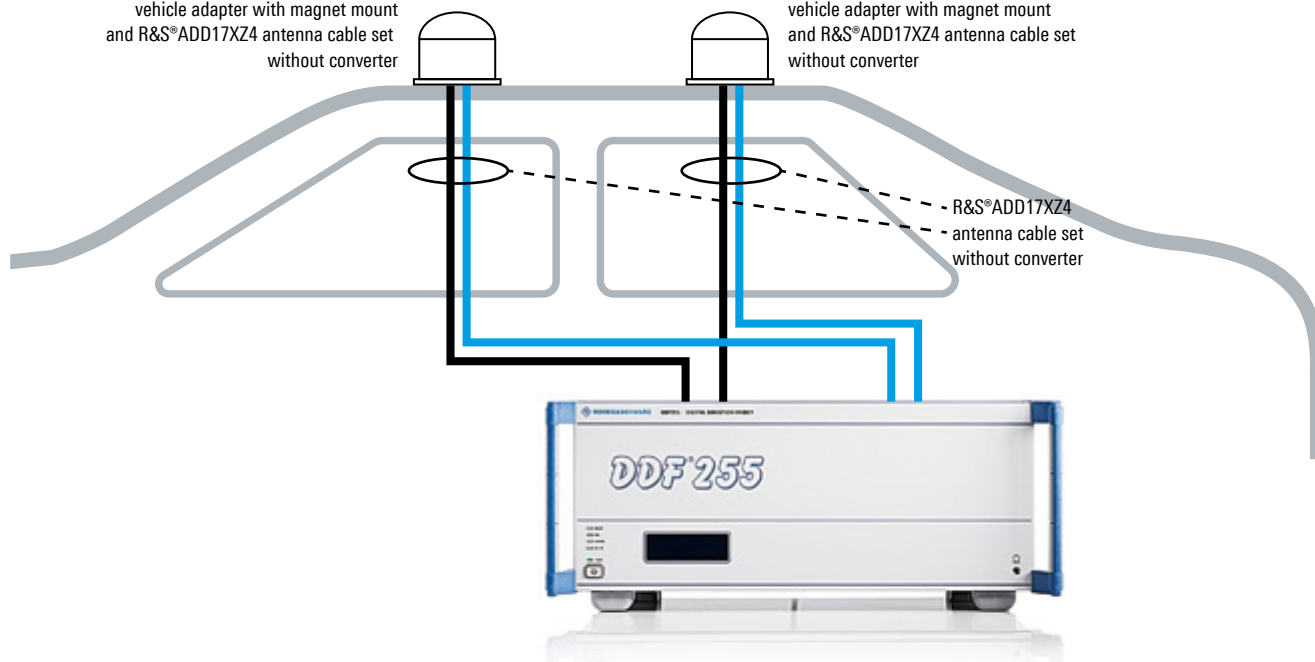
Note: It is recommended to mount only one DF antenna on the vehicle roof at a time since any additional antenna will cause DF errors.

¹⁾ The Y-adaptor and RF combiner must be purchased separately.

R&S®DDF255 with R&S®ADD107/207 on vehicle roof or tripod

E.g. R&S®ADD207 with R&S®ADD17XZ3 vehicle adapter with magnet mount and R&S®ADD17XZ4 antenna cable set without converter

E.g. R&S®ADD107 with R&S®ADD17XZ3 vehicle adapter with magnet mount and R&S®ADD17XZ4 antenna cable set without converter



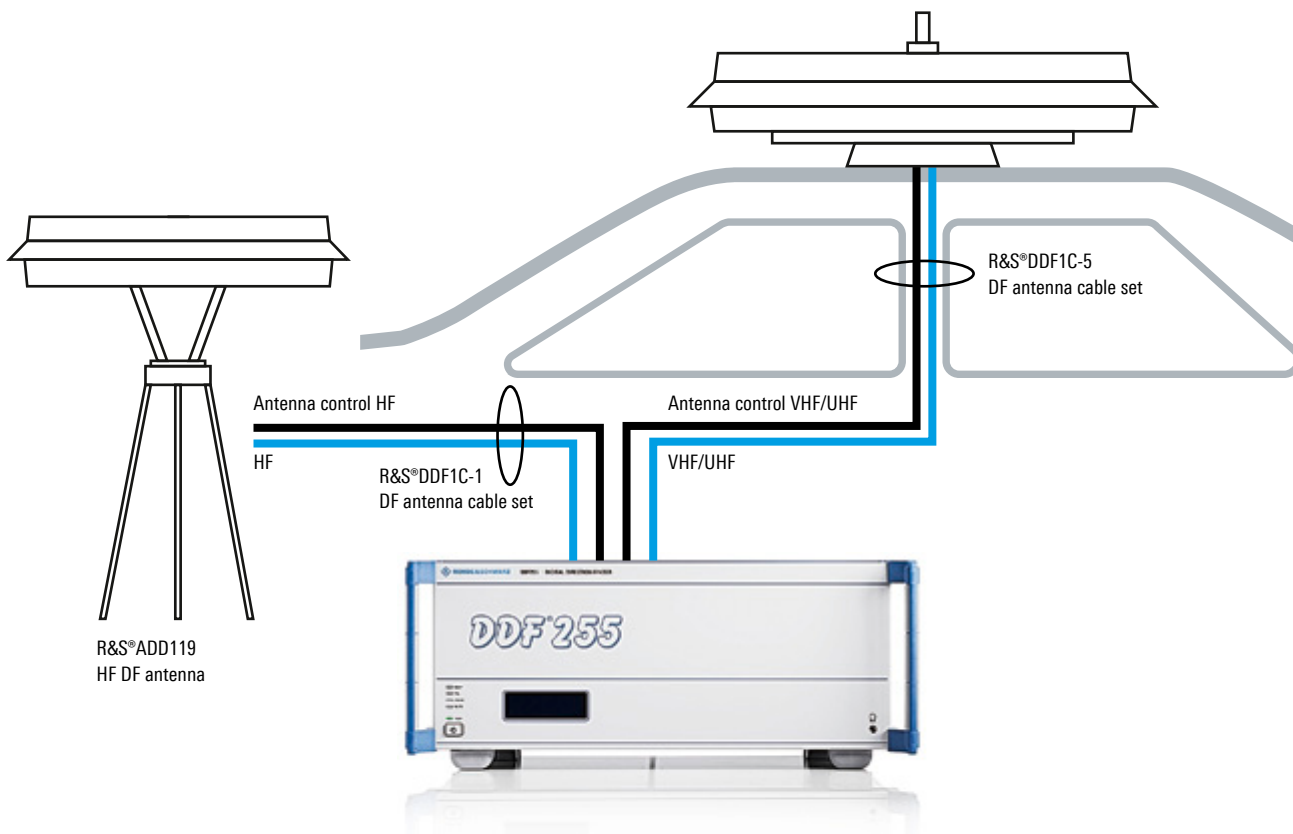
Note: It is recommended to mount only one DF antenna on the vehicle roof at a time since any additional antenna will cause DF errors. An additional type N (female) to SMA (male) adapter is required for interconnection to the R&S®DDF255 for operation above 3 GHz (not part of standard delivery).

Mobile DF from 300 kHz to 3 GHz

R&S®DDF255/205 with R&S®ADD119/295 on vehicle roof and tripod

Description	Type	Order No.
HF DF Antenna	R&S®ADD119	4053.6509.02
VHF/UHF Wideband DF Antenna	R&S®ADD295	4070.9002.12
Accessories		
Vehicle Adapter, for portable DF antennas; color: light ivory	R&S®AP502Z1	0515.1419.02
DF Antenna Cable Set for single-channel direction finders, frequency range 0.3 MHz to 1.3 GHz	R&S®DDF1C-1	4077.6009.xx (length: 5/10/20/40/50/60 m)
DF Antenna Cable Set for single-channel direction finders, frequency range 0.3 MHz to 3 GHz	R&S®DDF1C-5	4077.7005.xx (length: 5/10/20/30/40/50 m)
Tripod with Adapter	R&S®ADD1XTP	4063.4409.02
Electronic Compass	R&S®GH150	4041.8501.02

R&S®DDF255 with R&S®ADD119/295 on vehicle roof and tripod



Note: Recommended minimum distance between R&S®ADD119 and vehicle: 100 m.

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R&S®ADDx Single-Channel DF Antennas

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