

R&S® FU129

Antenna Filter Unit



75 Years of
Driving
Innovation


ROHDE & SCHWARZ

R&S®FU129

Antenna Filter Unit

At a glance

Because of high transmitter density and the upward expansion of the frequency ranges, modern radiomonitoring systems must fulfill demanding requirements with respect to simultaneously providing high level stability and good sensitivity. Therefore, filters as well as attenuator and amplifier elements must be installed very close to the antennas. Directional antennas are to be positioned in all directions using azimuth and polarization rotators. The R&S®FU129 fulfills these requirements with flying colors.

The R&S®FU129 antenna filter unit is placed close to the receiving antennas. It comes standard with an antenna input selector for switching up to six antenna inputs to one output by remote control. Unwanted signals, such as those caused by nearby mobile radio base stations and strong sound and TV broadcast transmitters, can be reduced to levels suitable for the connected receiver by applying optional filters. This allows the suppression of powerful useful signals as well as interfering signals.

If the levels are generally too high, an optional attenuator group can be used to set various levels of attenuation. For weak signals, an optional wideband amplifier group is available to boost levels so that even longer cable connections or cable losses at high frequencies are no longer an issue. The R&S®FU129 is also designed for connecting to and controlling azimuth and polarization/elevation rotators.

All switching functions are remotely controlled via a control cable with the tried and tested R&S®GB127S antenna control unit. The R&S®GB127S is accommodated in a rack together with the other system devices and can be fully automatically controlled with the R&S®ARGUS spectrum monitoring and management system software. Users can thus take full advantage of the wide range of functions available with the R&S®FU129.

Key facts

- 1-out-of-6 antenna input selector
- Frequency range from DC to 26.5 GHz
- Suitable for outdoor use very close to antennas
- Integrated rotator control (azimuth and polarization/elevation)
- Powerful options:
 - Five selectable attenuators for reducing strong signal levels
 - Three selectable amplifiers for different frequency ranges
 - Up to ten selectable filters with different characteristics



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Benefits and key features

Simple retrofitting of existing antenna systems

Customers who operate Rohde&Schwarz radiomonitoring systems at sites that are impacted by powerful nearby transmitters can profit from this advantage.

All Rohde&Schwarz radiomonitoring systems that are equipped with rotators, the R&S®GB127S antenna control unit and the R&S®RD127 rotator control unit can be retrofitted with the R&S®FU129 antenna filter unit (compatible replacement for existing R&S®RD127 rotator control units).

Compatible with the R&S®GB127S antenna control unit interface

Much simpler site selection

The R&S®FU129 antenna filter unit allows the use of sites that to date have been excluded.

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Attenuation, filtering and amplification in the right place

Installing the R&S®FU129 antenna filter unit very close to the antennas offers several advantages.

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Mobile applications in vehicles

An antenna filter unit such as the R&S®FU129 is essential, especially for vehicle applications that involve the constant changing of sites, because attenuator elements and selective filters in particular are frequently required for daily monitoring tasks.

Future-ready due to vastly expanded frequency range – new antennas can also be connected

Due to the permanent shortage of useful frequencies, the upper end of the frequency range used is increasingly being expanded. The upper limit for radiomonitoring systems is no longer 3 GHz or 6 GHz. Because many transmission systems already operate up to 26.5 GHz, the R&S®FU129 was developed to support this expanded frequency range.

Universal power supply concept

Depending on whether the application is stationary or mobile, different types of power supply are used. DC-buffered power supply is also possible in stationary applications. Universal wide-range inputs for supplying AC and DC power (factory installed) provide the necessary flexibility.

Complete control via R&S®ARGUS, including path correction

When using the comprehensive and convenient R&S®ARGUS radiomonitoring software, the integration of the R&S®FU129 offers the opportunity to carry out extremely comprehensive and complex measurement series fully automatically. This includes selecting one of various antennas and switching the antenna paths as required, with and without filters, amplifiers, etc. The area of reception is covered by directional antennas that are turned with rotators.

The software comes standard with path correction tables to compensate for the insertion loss in defined paths. This allows R&S®ARGUS to display the correct field strength levels for all configurations.

The R&S®FU129 antenna filter unit integrates seamlessly into the portfolio of the Rohde&Schwarz radiomonitoring systems.

Much simpler site selection

The search for suitable sites to perform radiomonitoring is proving increasingly problematic since the goal is to find a location that is not only close to the desired, but more importantly close to the undesired signals. After a suitable site has been found, it often happens that strong sound or TV broadcast transmitters are in the vicinity or the site is completely surrounded by base stations operated by a mobile radio network (telephone, trunked radio, paging services, etc.).

To avoid overloading the receiver input, different attenuator elements can be switched into the signal path to reduce the overall level of the receive spectrum. However, this also reduces the sensitivity of the system in the unassigned frequency ranges.

In this case, selective attenuation is called for (filtering of a specific frequency range). A choice of highpass/lowpass filters as well as bandstop/bandpass filters are available that allow the user to optimally adapt the R&S®FU129 to the local conditions.

Signals of interest can sometimes be nearly masked by noise because of long cables between the antenna and the receiver. To offset this effect, especially at high frequencies, the R&S®FU129 can be optionally equipped with a group of three amplifiers that support the various frequency ranges.

Attenuation, filtering and amplification in the right place

Installing the R&S®FU129 antenna filter unit very close to the antennas offers several advantages:

- Each antenna and the rotators for azimuth and polarization/elevation are connected with a short cable
- There is only one long RF feeder cable that extends from the R&S®FU129 antenna filter unit to the receiver in the equipment room
- Required amplifiers are placed near the antennas – ahead of a feeder cable that may cause significant loss – so that the highest possible signal level is maintained
- Only one cable is required to control all functions, including the rotators
- As to the length of the control cable to the R&S®GB127S, the same rules apply for the combination of R&S®GB127S/R&S®FU129 and of R&S®GB127S/R&S®RD127 (maximum length of 100 m using a special cable)

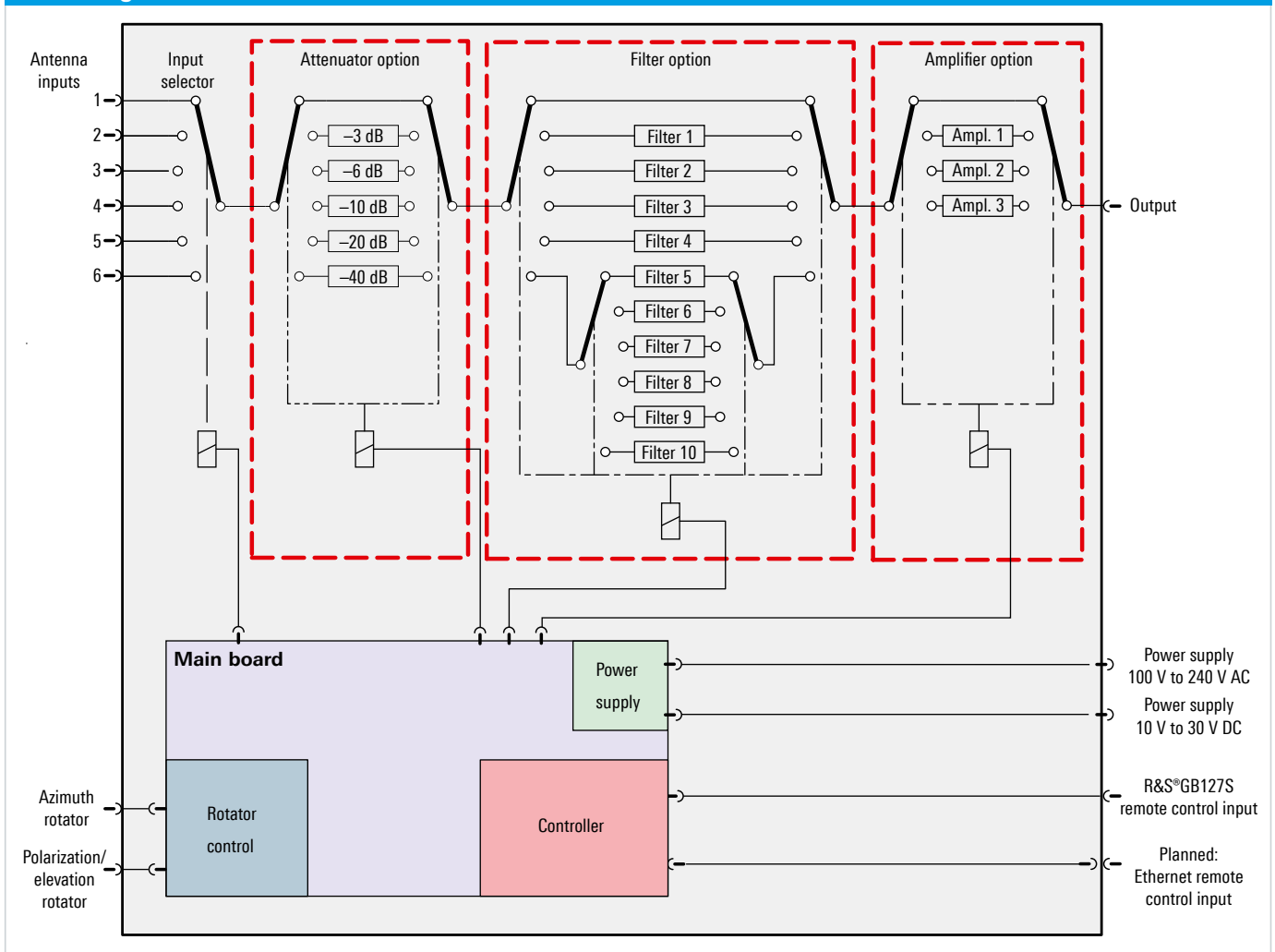
System configuration

In its basic configuration, the R&S®FU129 antenna filter unit consists of an antenna input selector (1-out-of-6), a wide-range power supply for AC and DC voltages and a rotator control unit for azimuth and polarization/elevation rotators (available models on request).

The following function groups can be optionally integrated at the factory:

- Six-stage attenuator group (0/3/6/10/20/40 dB)
- Five-stage or ten-stage filter group for up to 10 different filters of various types (highpass, lowpass, bandpass, bandstop)
- Amplifier group with three different amplifiers for covering the entire frequency range (HF, VHF, UHF, SHF)

Block diagram of the R&S®FU129



Specifications

RF characteristics, base unit

Frequency range		DC to 26.5 GHz
Impedance		50 Ω
Insertion loss	up to 3 GHz	≤ 0.8 dB
	3 GHz to 6 GHz	≤ 1.1 dB
	6 GHz to 12 GHz	≤ 1.7 dB
	12 GHz to 26.5 GHz	≤ 3.0 dB
Input VSWR	up to 6 GHz	≤ 1.4
	6 GHz to 12 GHz	≤ 1.8
	12 GHz to 26.5 GHz	≤ 2.0
Contact switching time		≤ 15 ms

RF characteristics, options

Attenuator option (DC to 26.5 GHz)	without attenuation	bypassed
	stages 2 to 6	typ. 3/6/10/20/40 dB
Amplifier option	without amplification: DC to 26.5 GHz	bypassed
	amplifier 1: 0.5 MHz to 35 MHz	typ. +22 dB
	amplifier 2: 20 MHz to 3 GHz	typ. +12 dB
	amplifier 3: 1 GHz to 26.5 GHz	typ. +30 dB
Filter option	without filter: DC to 26.5 GHz	bypassed
	stages 2 to 6 (11): for frequency ranges, see filter type	attenuation depending on filter type

Interfaces

RF inputs (X1 to X6)	SMA female (26.5 GHz)	DC = 0 V
RF level		depending on options installed
RF output	SMA female (26.5 GHz)	
External control input	MIL female	10 pin
	RJ-45 female (for future expansions)	
Azimuth rotator	MIL female	8 pin
Elevation/polarization rotator	MIL female	6 pin
AC input	circular connector	4 pin
DC input	circular connector	7 pin
DC outputs (1 and 2)	mini circular connector	5 pin

General data

Temperature range	operation	-40°C to +55°C (without direct sunlight)
	storage	-40°C to +70°C
Protection class		IP 65
Relative humidity		95% cyclic test, +25°C/+55°C
Vibration	sinusoidal	5 Hz to 150 Hz
	random	10 Hz to 500 Hz
Shock	shock spectrum	40 g
EMC		in line with ETSI EN301489-1 V1.6.1 (2005-09) ETSI EN301489-22 V1.3.1 (2003-11) EN55022:1998 + A1:1999 + A2:2003 EN61000-3-2:2000 + A2:2005 EN61000-3-3:1995 + A1:2001 + A2:2005
Electrical safety		EN61010
MTBF		21500 h
Power supply	AC	100 V to 240 V, 50 Hz to 60 Hz
	DC	10 V to 30 V
Power consumption	depending on options installed with both rotators in operation	typ. 25 W to 40 W/25 VA to 40 VA typ. 100 W/100 VA
Dimensions (without connectors)	W × H × D	404 mm × 313 mm × 183 mm (19.91 in × 12.32 in × 7.21 in)
Weight	base unit without options	typ. 11.4 kg (25.13 lb)
	base unit with all options/fully configured	typ. 14.6 kg (32.19 lb)

Ordering information

Designation	Type	Order No.
Base unit		
Antenna Filter Unit	R&S®FU129	3040.3300.02
Options		
Attenuator Option (max. 1)	R&S®FU129-ATT	3040.3400.02
Amplifier Option (max. 1)	R&S®FU129-AMP	3040.3500.02
Filter Option including five filters (max. 2 filter options can be installed)	R&S®FU129-FIL	3040.3600.02
Filters for filter option		
Lowpass Filter DC to 80 MHz	R&S®FU129-F1	3040.3616.02
Lowpass Filter DC to 530 MHz	R&S®FU129-F2	3040.3622.02
Lowpass Filter DC to 3 GHz	R&S®FU129-F3	3040.3639.02
Highpass Filter 27.5 MHz to 800 MHz	R&S®FU129-F4	3040.3645.02
Highpass Filter 133 MHz to 1 GHz	R&S®FU129-F5	3040.3651.02
Highpass Filter 225 MHz to 3 GHz	R&S®FU129-F6	3040.3668.02
Highpass Filter 910 MHz to 3 GHz	R&S®FU129-F7	3040.3674.02
Highpass Filter 1.9 GHz to 2.7 GHz	R&S®FU129-F8	3040.3680.02
Highpass Filter 2.3 GHz to 5.5 GHz	R&S®FU129-F9	3040.3697.02
Highpass Filter 3.9 GHz to 9.8 GHz	R&S®FU129-F10	3040.3700.02
Highpass Filter 6 GHz to 11.5 GHz	R&S®FU129-F11	3040.3716.02
Bandpass Filter 0.8 GHz to 1.05 GHz	R&S®FU129-F12	3040.3722.02
Bandpass Filter 1.73 GHz to 2.27 GHz	R&S®FU129-F13	3040.3739.02
Bandpass Filter 2 GHz to 2.26 GHz	R&S®FU129-F14	3040.3745.02
Bandstop Filter 88 MHz to 108 MHz	R&S®FU129-F15	3040.3751.02



R&S®FU129 front view.

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 75 years ago, Rohde & Schwarz has a global presence and a dedicated service network in over 70 countries. Company headquarters are in Munich, Germany.

Regional contact

Europe, Africa, Middle East

+49 1805 12 42 42* or +49 89 4129 137 74

customersupport@rohde-schwarz.com

North America

1 888 TEST RSA (1 888 837 87 72)

customer.support@rsa.rohde-schwarz.com

Latin America

+1 410 910 79 88

customersupport.la@rohde-schwarz.com

Asia/Pacific

+65 65 13 04 88

customersupport.asia@rohde-schwarz.com

Certified Quality System

ISO 9001

Certified Environmental System

ISO 14001

Rohde & Schwarz GmbH & Co. KG

Mühldorfstraße 15 | 81671 München

Phone +49 89 41 290 | Fax +49 89 41 29 121 64

www.rohde-schwarz.com

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