

4 Accessories

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New

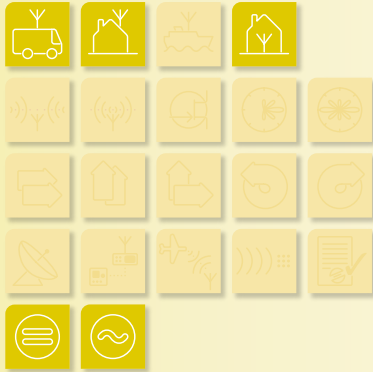
New

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Power Supply Unit R&S® IN 115



10 kHz to 1300 MHz

Power supply for up to three active receiving antennas via signal cable



Features

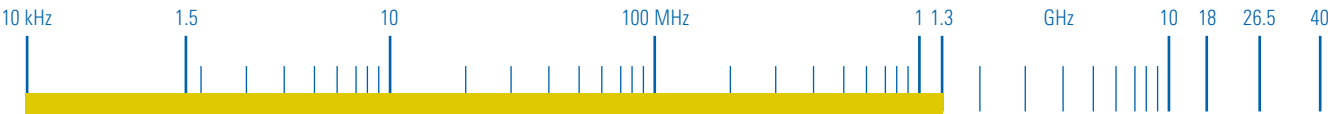
- ◆ AC supply or battery operation
- ◆ Wide supply voltage range (100 V to 240 V AC)
- ◆ Short-circuit-proof
- ◆ Wide frequency range 10 kHz to 1.3 GHz
- ◆ Three different DC feed sections
- ◆ Wall-mounting possible (clip for wall mounting included as an option)

Brief description

The Power Supply Unit R&S® IN 115 supplies active receiving antennas. The supply voltage is fed to the antennas via the inner conductor of the coaxial cable.

A regulated power supply unit generates the interference-free, smoothed DC voltage. Each DC voltage is fed to the inner conductor of the antenna connector via a DC feed section. The conductors of the receiver connectors are DC-free.

Three different antenna systems can be supplied simultaneously with the R&S® IN 115.

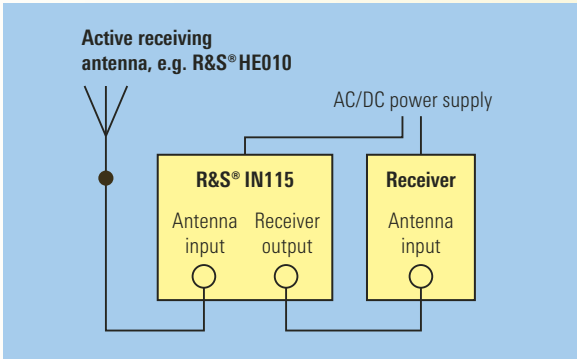


Specifications

Frequency range	10 kHz to 1.3 GHz	Load current	max. 500 mA per output
Input impedance	50 Ω	Short-circuit current	max. 200 mA
VSWR		RF connectors	3 × 2 N female
10 kHz to 1 GHz	<2	DC connector	MIL-C-5015
1 GHz to 1.3 GHz	<2.5	MTBF	>100 000 h
Insertion loss S ₂₁	<1.5 dB	MTTR	<0.5 h
Power supply		Operating	
AC/mains supply	100/120/220/240 V AC ±10 %	temperature range	−25 °C to +55 °C
DC/battery supply	22 V to 31 V DC	Dimensions (W × H × D)	approx. 170 mm × 125 mm × 350 mm
Power consumption	max. 50 VA	Weight	approx. 5.5 kg
Output voltage			
AC operation	3 × 24 V DC +5%, −10 %		
Battery operation	3 × 18 V DC ±5 % at 22 V DC power supply		

Ordering information

Power Supply Unit	R&S® IN 115	4004.1707.02
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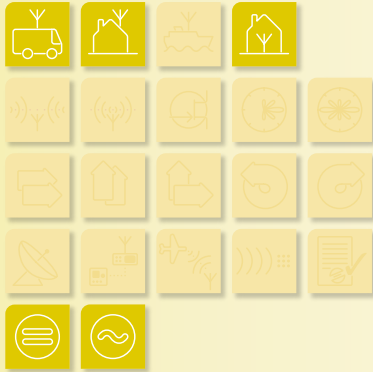


Block diagram



The R&S® IN 115 simultaneously supplies up to three independent active antenna systems

Bias Unit R&S® IN 500



20 MHz to 3000 MHz

**Power supply for active receiving
antennas via signal cable**

Features

- ◆ AC supply or battery operation
- ◆ 110 V or 230 V AC, selectable
- ◆ Short-circuit-proof
- ◆ Operating frequency range
20 MHz to 3 GHz
- ◆ Wall-mounting possible

Brief description

The Bias Unit R&S® IN 500 is used to supply power to an active receiving antenna. The supply voltage is fed to the antenna via the inner conductor of the coaxial cable.

A regulated power supply unit generates the interference-free, smoothed DC voltage. The DC voltage is applied to the inner conductor of the antenna connector via a bias unit. The conductor of the receiver connector is DC-free.

The AC supply voltage of the R&S® IN 500 is factory-set to 230 V AC. The unit can also be switched to 110 V AC or battery supply.

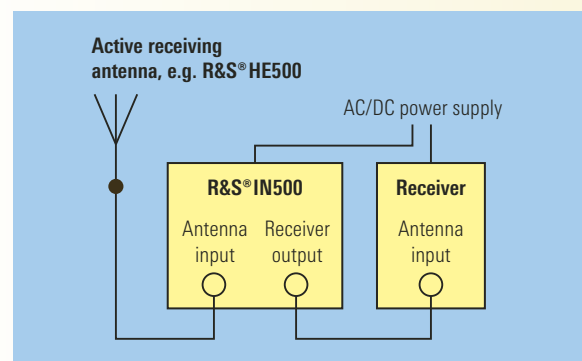
Recommended for use with the Active Receiving Antenna R&S® HE 500.

Specifications

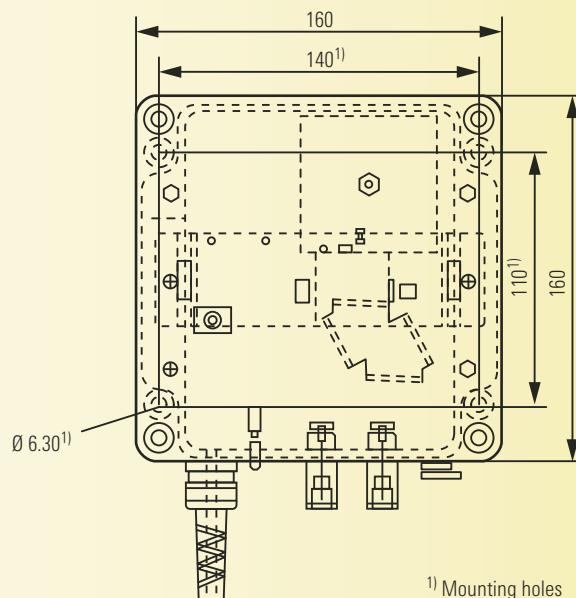
Frequency range	20 MHz to 3 GHz	Output voltage	
Input impedance	50 Ω	AC operation	20 V DC $\pm$ 1.5 V DC
VSWR	≤ 2	Battery operation	20 V DC $\pm$ 1.5 V DC at 24 V DC power supply
Insertion loss S_{21}	≤ 2 dB	Load current	max. 190 mA
Power supply		Connector	2 $\times$ N female
AC/mains supply	100/120/220/240 V AC $\pm$ 10 %	MTBF	>150 000 h
DC/battery supply	24 V DC +35 %/–20 %	Operating	
Power consumption	max. 10 VA	temperature range	–40 °C to +60 °C
		Dimensions (H $\times$ W $\times$ D)	approx. 90 mm $\times$ 160 mm $\times$ 170 mm
		Weight	approx. 1.7 kg

Ordering information

Bias Unit	R&S®IN 500	4062.0880.02
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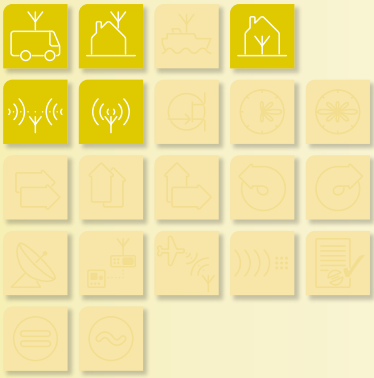


Block diagram



Dimensions for wall mounting (in mm)

VHF/UHF Diplexer R&S® FT 224



100 MHz to 162 MHz

225 MHz to 400 MHz

For connecting a broadband antenna to
transceivers with separate
VHF and UHF outputs

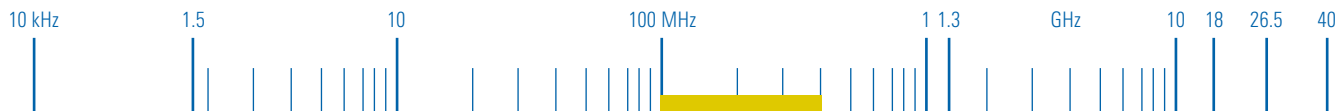
Features

- ◆ Low passband attenuation
- ◆ High stopband attenuation
- ◆ 200 W CW/800 W PEP
- ◆ Compact design
- ◆ Versatile applications

Brief description

The Diplexer R&S® FT 224 allows the connection of a broadband antenna (e.g. VHF/UHF Coaxial Dipole R&S® HK 014) to transceivers with separate VHF and UHF outputs or to separate VHF and UHF transceivers.

The diplexer has a maximum input power of 200 W CW and 800 W PEP. These values (for one channel) also apply for simultaneous operation of both channels.

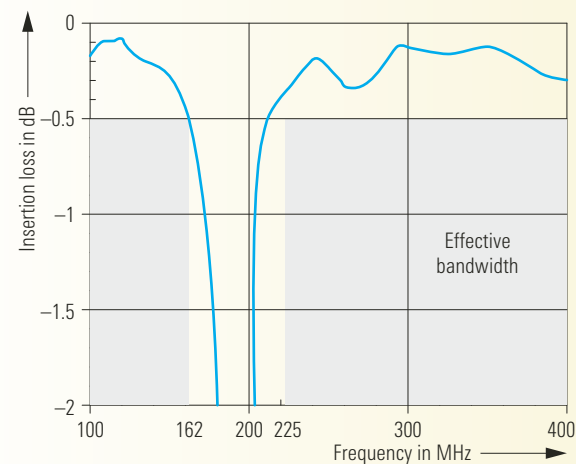


Specifications

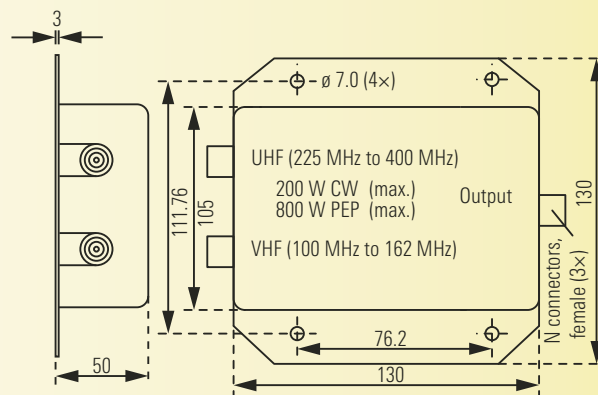
Frequency range	100 MHz to 162 MHz 225 MHz to 400 MHz	Max. input power	200 W CW, 800 W PEP (per branch with simultaneous operation)
Input impedance	50 Ω	Connectors	N female
VSWR	≤ 1.5 (with 50 Ω termination) ≤ 2.0 (with R&S®HK014)	MTBF	>100 000 h
Insertion loss		Operating	
In passband	≤ 0.3 dB (VHF) ≤ 0.5 dB (UHF)	temperature range	-20 °C to +55 °C
In stopband	>30 dB (VHF/UHF)	Dimensions (L x W x H)	approx. 130 mm x 130 mm x 50 mm
		Weight	approx. 0.5 kg

Ordering information

VHF/UHF Diplexer	R&S®FT 224	0525.5117.03	Recommended extras
			Coaxial Dipole R&S®HK014 0644.1514.02
			Coaxial Dipole R&S®HK033 4062.8369.02

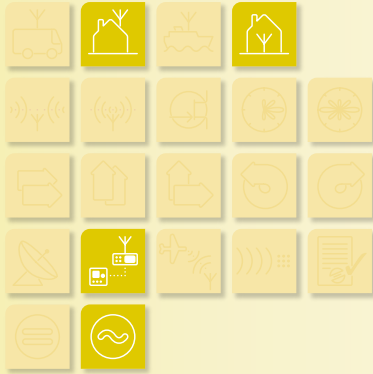


Typical filter characteristic



Dimensions and installation bore holes

Junction Unit R&S® GX 002A1



1.5 MHz to 30 MHz

For connecting the HF Dipole

R&S® HX 002A1 to the HF Transceiver

R&S® XK 852 or to 100 W shortwave

transceivers from other manufacturers

Features

- ◆ Power supply of ATU in the R&S® HX 002A1
- ◆ Control of ATU
- ◆ Transmission of supply voltage and serial data via coaxial line
- ◆ Status indication
- ◆ Remote control possible

Brief description

The Junction Unit R&S® GX 002A1 allows the HF Dipole R&S® HX 002A1 to be operated together with transceivers of the R&S® XK 852 family or with 100 W shortwave transceivers from other manufacturers.

Since supply voltage and serial data for ATU control are transmitted via the coaxial cable, no separate control lines are required for operation.

The R&S® GX 002A1 can be remote-controlled via a parallel interface to which a virtual front panel can be connected.

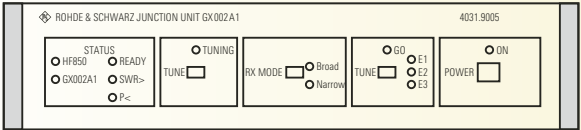


Specifications

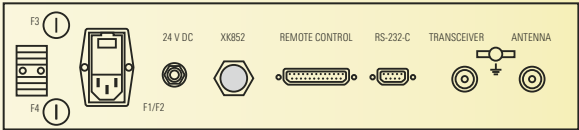
Frequency range	1.5 MHz to 30 MHz	Power supply	
Max. transmitter power	150 W PEP/100 W CW	AC/mains supply	100/120/230 V AC ±10 %
Input impedance	50 Ω		47 Hz to 63 Hz (80 VA)
VSWR		DC/battery supply	22 V to 32 V DC, approx. 2 A (at 24 V DC)
Antenna connector terminated with 50 Ω	<1.3	MTBF	>15 000 h
Antenna connector terminated with any passive impedance	<2	Operating temperature range	−25 °C to +55 °C
Storable channels	max. 100 (0 to 99)	RF connector	N female
Required tuning power for R&S®HX002A1		Dimensions (W × H × D)	approx. 480 mm × 130 mm × 390 mm
With R&S®XK852	30 W to 100 W	Weight	approx. 8.5 kg
With any other transmitter	50 W to 100 W		

Ordering information

Junction Unit			Recommended extras		
(19" bench model)	R&S®GX002A1	4031.9005.02	HF Dipole with ATU	R&S®HX002A1	4031.8009.02
			HF Dipole with ATU	R&S®HX002M1	4021.6003.02

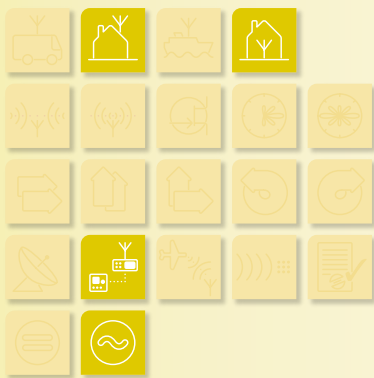


Front view



Rear view

Junction Unit R&S® GX 007



**Control, display and power supply unit
for the HF Dipole R&S® HX 002 and the
Antenna Tuning Unit R&S® FK 859**

Features

- ◆ Power supply for the HF Dipole R&S® HX 002 and the Antenna Tuning Unit R&S® FK 859
- ◆ Control and display unit for the R&S® HX 002 and R&S® FK 859
- ◆ Selection of tuning mode
- ◆ Antenna switchover
- ◆ Integrated function test

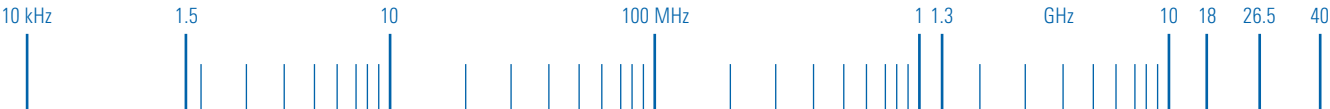
Brief description

The Junction Unit R&S® GX 007 is the display, control and power supply unit for the HF Dipole R&S® HX 002 and for the Antenna Tuning Unit R&S® FK 859.

The control section permits selection of the required tuning mode (auto, hold, tune), switchover between antenna 1 and 2 (R&S® FK 859) and a function test.

The display section indicates the operating status of the ATU or the dipole.

The power supply section provides the required DC voltage of 30 V.

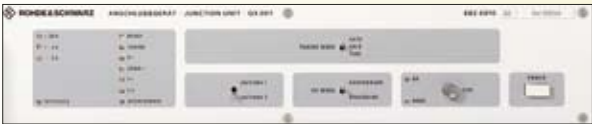


Specifications

Power supply	115/125/220/235 V AC, 47 Hz to 63 Hz, max. 300 VA (with R&S®FK 859)	Control elements	on/off, broadband reception (RX mode), tuning mode, antenna 1/antenna 2, test
Connectors	AC supply, connector for R&S®FK 859, 25-contact connector (V.24 interface), 9-contact connector (for carrier loop, fault signals, transmit/receive switch)	MTBF	>9000 h
Visual displays	LEDs for operating voltages, carrier loop, READY, TUNING, power threshold, VSWR threshold, fault signals	Operating temperature range	–25 °C to +55 °C
		Dimensions (W × H × D)	approx. 490 mm × 120 mm × 390 mm
		Weight	approx. 6.5 kg

Ordering information

Junction Unit	R&S®GX 007	0682.6010.02	Recommended extras		
			Antenna Tuning Unit	R&S®FK 859	0682.1018.02
			Antenna Tuning Unit	R&S®FK 859M1	4000.1802.14
			HF Dipole	R&S®HX 002	0682.3010.24



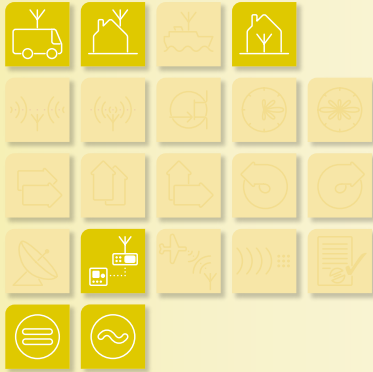
Front view



Rear view

Accessories

Control Unit R&S® GB 016



Control of polarization networks as well as amplifier and bypass circuits for crossed log-periodic antenna feeds

Features

- ◆ Manual or remote control
- ◆ Mobile or stationary use
- ◆ AC or DC voltage supply
- ◆ Suitable for wide AC voltage range
- ◆ Little maintenance required

Brief description

The Control Unit R&S®GB 016 is used for selecting the polarization as well as for activating or bypassing amplifiers and power supplies of the following log-periodic antenna feeds:

- R&S®HL 024S2, R&S®HL 024S7
- R&S®HL 024S8, R&S®HL 024S9
- R&S®HL 050S7
- R&S®ZS 107 (model .02)
- R&S®ZS 107 (model .04)

Polarization can be selected either manually using four keys or remote-controlled via a serial RS-232-C interface. The polarity for the switchover (positive or negative logic) is set by means of device-internal jumpers.

Specifications

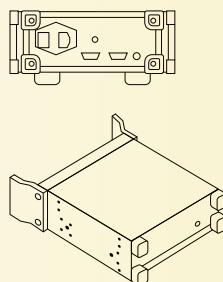
Power supply – AC/mains supply		Remote-control interface	serial RS-232-C, 9-contact
AC	85 V to 264 V AC, 50 Hz to 400 Hz	MTBF	>300 000 h (on-period 100 %)
DC	100 V to 375 V DC	Operating	
Power consumption	3 A	temperature range	–10 °C to +65 °C
Power supply – DC/battery supply		Dimensions (H × W × D)	approx. 0.11 m × 0.25 m × 0.3 m
DC	+15 V DC ±15 %	Weight	approx. 3 kg
Power consumption	max. <3.5 A		
Interface for			
antenna control	15-contact, D-Sub		
Supply voltage	+15 V DC (max. 1.5 A)		
	+12 V DC (max. 1.5 A)		
3 × control line	max. 0.5 A		

Ordering information

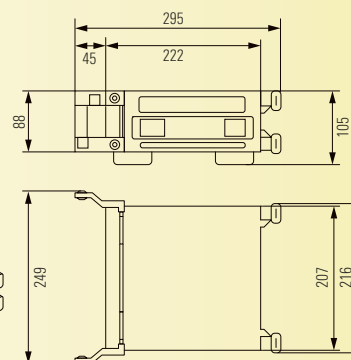
Control Unit	R&S® GB 016	4056.7006.02	Recommended extras		
			Control Cable, 10 m, for R&S® HL 024Sx and		
			R&S® HL 025S7/		
			R&S® HL 050S7	R&S® GB 016Z1	4056.7270.02
			Remote-Control Software for polarization switching		R&S® GB 016P1



Front and rear views

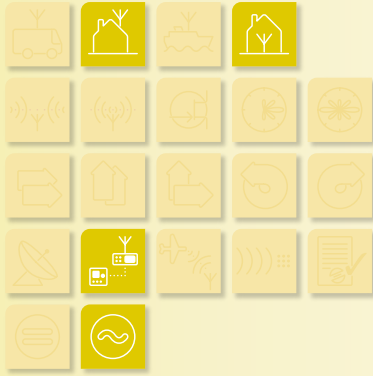


Dimensions



Control Unit R&S® GB 130

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Control of antenna rotators in azimuth and elevation

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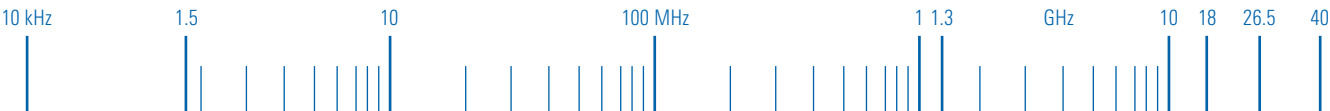
- ◆ Numeric keypad for direct data entry
- ◆ LCD for plain text display
- ◆ Manual or remote control possible
- ◆ Suitable for wide AC power range
- ◆ No maintenance required
- ◆ No calibration required

Brief description

The R&S® GB 130 is used for positioning antenna rotators in azimuth and elevation. It is equipped with an illuminated LCD for plain text display and a numeric keypad for data entry.

Positioning and data entry can also be remote-controlled via a controller interface (RS-232-C or RS-485). Optional control software is available for this purpose.

The control unit can be used, for instance, with the Antenna Rotator R&S® RD 130 (azimuth positioning only).



Specifications

Power supply	85 V to 264 V AC, 47 Hz to 63 Hz	Display accuracy	0.1°
Power consumption	max. 300 VA	MTBF	>10 000 h
Operating mode	manual or remote-control	Operating	
Controller interfaces	RS-232-C/RS-485	temperature range	0 °C to +50 °C
Power supply of rotator		Dimensions (W × H × L)	approx. 480 mm × 210 mm × 440 mm
Voltage	24 V DC	Weight	approx. 6 kg
Power	max. 300 VA		

Ordering information

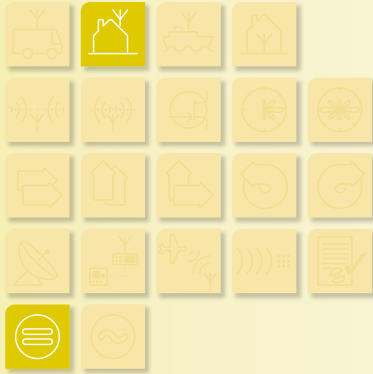
Control Unit	R&S®GB 130	4059.8755.02	Recommended extras		
			Antenna Rotator	R&S®RD 130	4059.8503.02
			Control Software	R&S®GB 130RC	4064.5944.02
			Cable Set	R&S®GK 130	
			Length 50 m		4059.8855.02
			Length 80 m		4059.8855.03
			Length 120 m		4059.8855.04
			Length 200 m		4059.8855.05



Control section and LCD display of the R&S®GB 130

Antenna Rotator R&S®RD 130

4



For azimuth positioning of antennas and antenna systems



Features

- ◆ High-precision gear
- ◆ Very short start-up time
- ◆ High efficiency
- ◆ Permanent lubrication/virtually maintenance-free
- ◆ Compact design

Brief description

The Antenna Rotator R&S®RD 130 is used for azimuth positioning of antennas such as the R&S®HL 451 or R&S®HL 471.

The high-precision gear is accommodated in sand-cast aluminum housing. The housing is sealed against splash water and equipped with a pressure compensation and ventilation system. The individual parts of the transmission are permanently lubricated and therefore largely maintenance-free.

The R&S®RD 130 is powered and controlled from the Control Unit R&S®GB 130. Remote control of the antenna rotator from a PC is also possible via the control unit.

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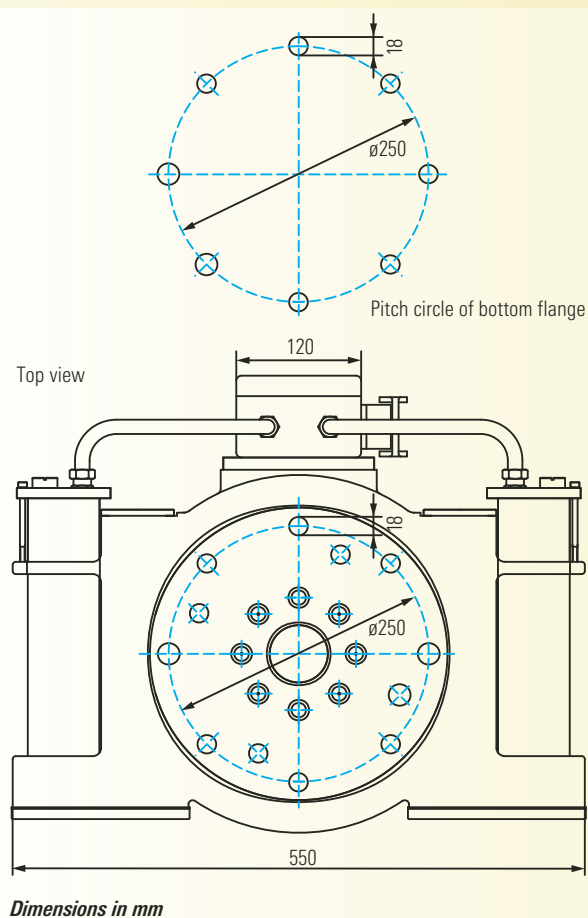
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Specifications

Voltage supply	24 V DC	Permissible bending	
Power consumption	2 × max. 80 W	moment at top flange	max. 6500 Nm
Setting range (azimuth)	$\pm(n \times 360^\circ)$	Permissible axial load	max. 3500 N
Speed of rotation	approx. 3°/s	MTBF	>40 000 h (at 25 % on-time)
Positioning accuracy	$\pm 0.1^\circ$	Operating	
Permissible driving torque	approx. 1800 Nm	temperature range	−35 °C to +63 °C
Starting torque	approx. 3000 Nm	Dimensions (H × W × D)	approx. 400 mm × 550 mm × 450 mm
		Weight	approx. 110 kg

Ordering information

Antenna Rotator	R&S® RD 130	4059.8503.02	Recommended extras		
			Control Unit	R&S® GB 130	4059.8755.02
			Cable Set	R&S® GK 130	
			Length 50 m		4059.8855.02
			Length 80 m		4059.8855.03
			Length 120 m		4059.8855.04
			Length 200 m		4059.8855.05



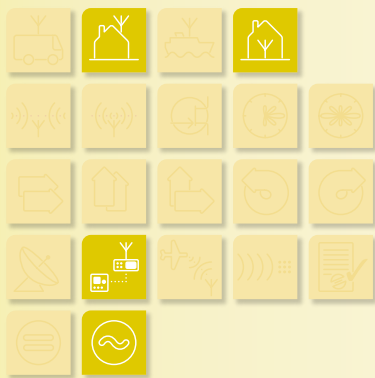
Antenna Rotator R&S® RD 130 with Control Unit R&S® GB 130

Accessories

Switch Units

R&S® ZS 129x

New



Intelligent RF and IF signal distribution

Features

- ◆ Suitable for stationary, portable and mobile applications
- ◆ Compact design
- ◆ Cost-effective implementation of customer-specific solutions due to modular design and wide variety of units and modules
- ◆ Manual operation and remote control for optimum hardware and software interworking
- ◆ Additional outputs for controlling additional switch units via the same control interface
- ◆ Tried and tested in various systems

Brief description

The family of Switch Units R&S® ZS 129x is a cost-effective and reliable approach to RF and IF signal distribution. Its flexible concept allows adaptation to system requirements by adding optional extensions.

The family includes the models R&S® ZS 129A1/A2/A5. The R&S® ZS 129A1 has been designed as an indoor RF and IF switch unit. The standard models are available with a 1-out-of-6 switch to 1-out-of-12 switch.

The Switch Unit R&S® ZS 129A2 has been designed as an outdoor unit for mounting on top of masts close to receiving antennas.

The configurable R&S® ZS 129A5 is ideal for a wide variety of indoor RF and IF switching applications. Its flexible concept allows integration of switches, power splitters and DC feeds.

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Specifications

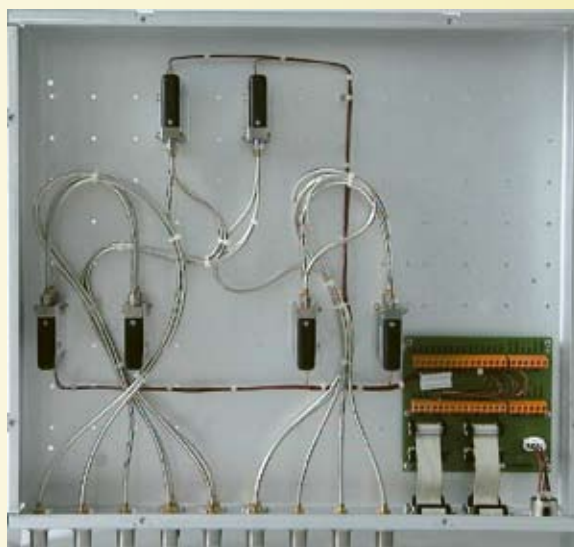
Interfaces		Storage temperature range	
R&S® ZS 129A1	RF INPUTS, RF OUTPUT, COM1, USB, TTL IN, EXP1, I2C REM CTRL, POWER IN	R&S® ZS 129A1/A2/A5	−40 °C to +70 °C
R&S® ZS 129A2	X1 to X8, OUTPUT, CTRL IN, CTRL OUT, EXT/AUX	Humidity	
R&S® ZS 129A5	SIGNAL1 to SIGNAL18, CTRL IN, CTRL OUT, POWER, SER CTRL	R&S® ZS 129A1	95 % relative humidity at +40 °C
		R&S® ZS 129A2/A5	95 % relative humidity at +55 °C
RF data (all models)		Power supply	
Frequency range	DC to 3 GHz	R&S® ZS 129A1	+10 V to +35 V DC/max. 8 A/60 W
Impedance	50 Ω	R&S® ZS 129A2	+28 V DC (via control input)
Switching time	≤15 ms	R&S® ZS 129A5	+28 V DC (via control input) or +5 V to +35 V DC (from ext. power supply)
General data		Dimensions (W × H × D)	
Operating temperature range		R&S® ZS 129A1	484 mm × 89 mm × 495 mm (overall)
R&S® ZS 129A1	−10 °C to +55 °C	19" rackmount, 2 height units	
R&S® ZS 129A2/A5	−35 °C to +55 °C	R&S® ZS 129A2	404 mm × 335 mm × 183 mm (overall)
		R&S® ZS 129A5	450 mm × 85 mm × 460 mm (overall)

Ordering information

Switch Unit	R&S® ZS 129A1		Options		
1-out-of-12		3026.3012.02	DC Feed, 100 kHz to 3 GHz	R&S® ZS 129F1	3024.6614.02
1-out-of-6		3026.3012.06	DC Feed, 100 kHz to 3 GHz	R&S® ZS 129F1	3024.6614.03
1-out-of-8		3026.3012.08	Switch		
2-out-of-2		3026.3012.22	1-out-of-2	R&S® ZS 129S1	3024.6514.02
Unused inputs terminated into 50 Ω			1-out-of-6	R&S® ZS 129S2	3024.6520.02
1-out-of-6		3026.3012.16	1-out-of-8	R&S® ZS 129S3	3024.6537.02
1-out-of-8		3026.3012.18	2-out-of-2	R&S® ZS 129S5	3024.6550.02
1-out-of-12		3026.3012.12	I²C Bus Control Board	R&S® ZS 129C1	3024.6714.02
Switch Unit	R&S® ZS 129A2		Power Splitter	R&S® ZS 129M1	3025.4515.02
1-out-of-8		3023.2015.02	Additional options are available on request.		
Switch Unit	R&S® ZS 129A5	3023.2515.05			



R&S® ZS 129A2 outdoor unit for mounting on antenna masts



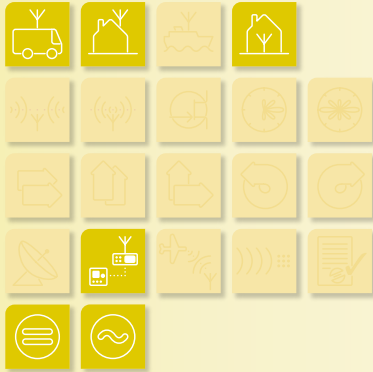
Example configuration of an R&S® ZS 129A5: Three independent switches, 1-out-of-3, unused inputs terminated, each implemented by means of two R&S® ZS 129S4

Accessories

Antenna Control Units

R&S®GB 127x

New



Rotator control plus RF and IF signal distribution

Features

- ◆ Suitable for stationary and mobile applications
- ◆ Compact design
- ◆ Split concept for stationary applications with remote Rotator Control Unit R&S®RD 127 mounted close to the antennas, thus minimizing cabling
- ◆ Manual operation and remote control
- ◆ Additional outputs for controlling additional switch units via the same control interface
- ◆ Antenna controllable in all three degrees of freedom (azimuth, polarization and height)

Brief description

The family of Antenna Control Units R&S®GB 127x is a cost-effective and reliable solution for controlling antenna rotators and distributing RF and IF signals. The family includes the models R&S®GB 127S/M/MU and R&S®RD 127. The Antenna Control Unit R&S®GB 127S has been designed as a universal antenna control unit for stationary systems. Normally, it is used in combination with the Rotator Control Unit R&S®RD 127, which contains the RF switching section and the control unit for the antenna rotators. The Antenna Control Unit R&S®GB 127M has been designed for mobile systems and contains the control unit for the antenna rotators. The Mast Control Unit R&S®GB 127MU is the interface between a telescopic mast and the Antenna Control Unit R&S®GB 127M.



Specifications

Interfaces

R&S®GB 127S	COM1 to 4, LPT, EXP1 to 2, I2C REM CTRL, POWER, loudspeaker, display, keypad, chipcard reader
R&S®GB 127M	COM1 to 4, LPT, EXP1 to 2, I2C REM CTRL, POWER, ELV/POL, AZIMUTH, loudspeaker, display, keypad, chipcard reader
R&S®GB 127MU	DC IN, ENCODER, MAST CONTROL, MAST ALARM, MAN/AUTO, MAN MAST CONTROL, COM1, REM CTRL
R&S®RD 127	RF IN, RF OUT, ELV/POL, AZIMUTH, ROTATOR CONTROL

General data

Operating temperature range

R&S®GB 127S/M 0 °C to +50 °C

R&S®GB 127MU -20 °C to +55 °C

R&S®RD 127 -35 °C to +55 °C

Storage temperature range

R&S®GB 127S/M/MU/

R&S®RD 127 -40 °C to +70 °C

Humidity

R&S®GB 127S/M/MU 95 % relative humidity at +40 °C

R&S®RD 127 95 % relative humidity at +55 °C

Power supply

R&S®GB 127S 100 V to 240 V AC/50 Hz to 60Hz

180 VA

R&S®GB 127M/MU 10 V to 33 V DC

R&S®RD 127 +28 V DC (via control input)

Dimensions (W × H × D)

R&S®GB 127S/M 484 mm × 89 mm × 495 mm (overall)

19" rackmount, 2 height units

R&S®GB 127MU 220 mm × 83 mm × 150 mm (overall)

R&S®RD 127 404 mm × 356 mm × 183 mm (overall)

RF data R&S®RD 127

Frequency range DC to 3 GHz

Impedance 50 Ω

Switching time ≤15 ms

Ordering information

Antenna Control Unit

(for indoor use, control via RS-232-C interface and manual operation)

With external

rotator control R&S®GB 127S 3022.2011.02

With integrated

rotator control R&S®GB 127M 3022.2511.02

Mast Control Unit

(for outdoor use, control

via R&S®GB 127M) R&S®GB 127MU 3027.4512.02

Options

Rotator Control Unit (for outdoor use, control via R&S®GB 127S)

With 1-out-of-4 switch R&S®RD 127 3021.9012.05

With 1-out-of-8 switch R&S®RD127 3021.9012.08

DC Feed, 100 kHz to 3 GHz R&S®ZS 129F1 3024.6614.02

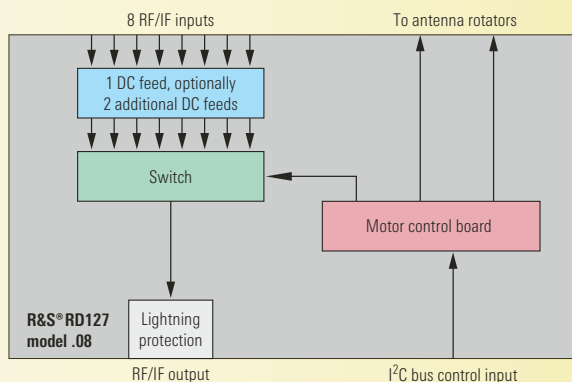
Equipment that is typically used: Yaesu G2800 and

Winter AR/AE1049 azimuth rotators as well as Yaesu G550

polarization/elevation rotator. Further models on request.



Rotator Control Unit R&S®RD 127



Block diagram of the R&S®RD 127

Glossary

A

Absorption

1. In the transmission of electrical, electromagnetic, or acoustic signals, the conversion of the transmitted energy into another form, usually thermal.
→ Absorption is one cause of signal attenuation.
→ The conversion takes place as a result of interaction between the incident energy and the material medium, at the molecular or atomic level. (ANS T1.523.201)
2. The irreversible conversion of energy of an electromagnetic wave into another form of energy as a result of its interaction with matter. (IEEE)

ANSI

American National Standards Institute
The U.S. standards organization that establishes procedures for the development and coordination of voluntary American National Standards. (ANS T1.523.201)

Antenna

1. Any structure or device used to collect or radiate electromagnetic waves. (ANS T1.523.201)
2. A device that converts radio frequency electrical energy to radiated electromagnetic energy and vice versa. (ANS T1.523.201)

Antenna Aperture

see "Aperture"

Antenna Array

An assembly of antenna elements with dimensions, spacing, and illumination sequence such that the fields for the individual elements combine to produce a maximum intensity in a particular direction and minimum field intensities in other directions. (ANS T1.523.201)

Antenna Dissipative Loss

A power loss resulting from changes in the measurable impedance of a practical antenna from a value theoretically calculated for a perfect antenna. (ANS T1.523.201)

Antenna Effective Area

see "Effective Area"

Antenna Efficiency

The ratio of the total radiated power to the total input power.
→ The total radiated power is the total input power less antenna dissipative losses. (ANS T1.523.201)

Antenna Factor

1. The antenna factor K is the quotient of the electric field strength E and the voltage V present at 50 Ω (e.g. a matched receiver input).

$$K = \frac{\text{Electric field strength}}{\text{Antenna output voltage at } 50\Omega}$$

- This factor includes the effects of antenna effective length or gain and mismatch and transmission line losses.
→ The factor for electric field strength is not necessarily the same as the factor for magnetic field strength. (IEEE)

Antenna Gain

1. The ratio of the power required at the input of a loss-free reference antenna to the power supplied to the input of the given antenna to produce, in a given direction, the same field strength at the same distance.
→ Antenna gain is usually expressed in dB.
→ Unless otherwise specified, the gain refers to the direction of maximum radiation. The gain may be considered for a specified polarization. Depending on the choice of the reference antenna, a distinction is made between:

- ◆ absolute or isotropic gain (Gi), when the reference antenna is an isotropic antenna isolated in space;
- ◆ gain relative to a half-wave dipole (Gd), when the reference antenna is a half-wave dipole isolated in space and with an equatorial plane that contains the given direction; (ANS T1.523.201)

2. The ratio of the radiation intensity, in a given direction, to the radiation intensity that would be obtained if the power accepted by the antenna were radiated isotropically.
→ Gain does not include losses arising from impedance and polarization mismatches.
→ If an antenna is without dissipative loss, then, in any given direction, its gain is equal to its directivity.
→ If the direction is not specified, the direction of the maximum radiation intensity is implied. (IEEE)

Antenna Gain-to-Noise-Temperature

see "G/T Ratio"

Antenna Lobe

see "Lobe"

Antenna Noise Temperature

The temperature of a hypothetical resistor at the input of an ideal noise-free receiver that would generate the same output noise power per unit bandwidth as that at the antenna output at a specified frequency.
→ The antenna noise temperature depends on antenna coupling to all noise sources in its environment as well as on noise generated within the antenna. (ANS T1.523.201)

Antenna Tuning Unit

see 'ATU'

Aperture

In a directional antenna, the portion of a plane surface very near the antenna normal to the direction of maximum radiant intensity, through which the major part of the radiation passes. (ANS T1.523.201)

Atmospheric Duct	A horizontal layer in the lower atmosphere in which the vertical refractive index gradients are such that radio signals (a) are guided or focused within the duct, (b) tend to follow the curvature of the Earth, and (c) experience less attenuation in the ducts than they would if the ducts were not present. → The reduced refractive index at the higher altitudes bends the signals back toward the Earth. Signals in a higher refractive index layer, i.e., duct, tend to remain in that layer because of the reflection and refraction encountered at the boundary with a lower refractive index material. (ANS T1.523.201)
Attenuation	1. A decrease in intensity of a signal, beam or wave as a result of absorption of energy and of scattering out of the path to the detector, but not including the reduction due to geometric spreading. (ANS T1.523.201) 2. A general term used to denote a decrease in signal magnitude in transmission from one point to another. Attenuation may be expressed as a scalar ratio of the input magnitude to the output magnitude or in decibels. (IEEE)
ATU	Antenna Tuning Unit A device used to match the impedance of an antenna to the impedance of a transmitter or receiver frequency selective to provide maximum power transfer.
Azimuth	The angle between a horizontal reference direction (usually north) and the horizontal projection of the direction of interest, usually measured clockwise. (IEEE)
B	
Bandwidth	The difference between the limiting frequencies within which performance of a device, in respect to some characteristic, falls within specified limits. (ANS T1.523.201)
Band	see "Electromagnetic Spectrum"
Beam	The main lobe of an antenna radiation pattern. (ANS T1.523.201)
Beamwidth	see "Half-power Beamwidth"
Bias Tee	A circuit which feeds a DC voltage to a RF path without affecting the RF parameters.
Boresight	The physical axis of a directional antenna. (ANS T1.523.201)
Boresight Error	1. The angular deviation of the electrical boresight of an antenna from its reference. (IEEE) 2. The deviation of the real main lobe direction to the theoretically available main lobe direction.
BW	see "Bandwidth"
C	
c	see "Speed of Light"
Carrier	1. In a frequency stabilized system, the sinusoidal component of a modulated wave whose frequency is independent of the modulating wave; or the output of a transmitter when the modulating wave is made zero; or a wave generated at a point in the transmitting system and subsequently modulated by the signal; or a wave generated locally at the receiving terminal which when combined with the side bands in a suitable detector, produces the modulating wave. (ANS T1.523.201) 2. The sinusoidal output signal of a transmitter at a typical frequency without any modulations.
Carrier Power	The radio frequency power available at the antenna terminal when no modulating signal is present. (IEEE)
CCIR	Consultative Committee for International Radio A predecessor organization of the ITU-R. (ANS T1.523.201)
CCITT	Consultative Committee for International Telegraph and Telephone A predecessor organization of the ITU-T. (ANS T1.523.201)
CISPR	International Special Committee on Radio Interference A committee that defines EMC measurement standards.
Clockwise Polarized Wave	see "Right-hand Polarized Wave"
Compromising Emanations	Unintentional signals that, if intercepted and analyzed, would disclose the information transmitted, received, handled, or otherwise processed by information systems equipment. (ANS T1.523.201)
Counterclockwise Polarized Wave	see "Left-hand Polarized Wave"

Glossary

D

dB

see "decibel"

dBc

dB relative to the carrier power (ANS T1.523.201)

dBd

In the expression of antenna gain, the number of decibels of gain of an antenna referenced to the gain of a half-wave dipole.

$$1\text{ dBd} \triangleq 2.15\text{ dBi}$$

dBi

In the expression of antenna gain, the number of decibels of gain of an antenna referenced to the zero dB gain of a free-space isotropic radiator. (ANS T1.523.201)

decibel

1. One tenth of the common logarithm of the ratio of relative powers, equal to 0.1 B (bel).

→ The ratio in dB is given by

$$dB = 10 \log_{10} \left(\frac{P_1}{P_2} \right),$$

where P_1 and P_2 are the actual powers. Power ratios may be expressed in terms of voltage and impedance, E and Z , or current and impedance, I and Z , since

$$P = I^2 \cdot Z = \frac{E^2}{Z}.$$

Thus dB is also given by

$$dB = 10 \log_{10} \left(\frac{E_1^2 / Z_1}{E_2^2 / Z_2} \right) = 10 \log_{10} \left(\frac{I_1^2 \cdot Z_1}{I_2^2 \cdot Z_2} \right)$$

If $Z_1 = Z_2$, these become

$$dB = 20 \log_{10} \left(\frac{E_1}{E_2} \right) = 20 \log_{10} \left(\frac{I_1}{I_2} \right). \quad (\text{ANS T1.523.201})$$

2. One tenth of a bel, the number of decibels denoting the ratio of the two amounts of power being ten times the logarithm to the base 10 of this ratio.

→ The abbreviation dB is commonly used for the term decibel. With P_1 and P_2 designating two amounts of power and n the number of decibel denoting their ratio,

$$n = 10 \log_{10} \left(\frac{P_1}{P_2} \right) \text{ decibel},$$

When the conditions are such that the ratios of currents or ratios of voltages (or analogous quantities in other fields) are the square roots of the corresponding power ratios, the number of decibels by which the corresponding powers differ is expressed by the following equations:

$$n = 20 \log_{10} \left(\frac{I_1}{I_2} \right) \text{ decibel}$$

$$n = 20 \log_{10} \left(\frac{U_1}{U_2} \right) \text{ decibel}$$

Where I_1/I_2 and U_1/U_2 are the given current and voltage ratios, respectively. By extension, these relations between numbers of decibels and ratios of currents or voltages are sometimes applied where these ratios are not the square roots of the corresponding power ratios; to avoid confusion, such usage should be accompanied by a specific statement of this application. Such extensions of the term described should preferably be avoided. (IEEE)

Directive Gain

see "Directivity"

Directivity

The value of the directive gain in the direction of its maximum value. (IEEE)

E

Effective Area

The functionally equivalent area from which an antenna directed toward the source of the received signal gathers or absorbs the energy of an incident electromagnetic wave.

→ Antenna effective area is usually expressed in square meters. (ANS T1.523.201)

Effective Aperture

1. In a given direction, the ratio of the available power at the terminals of a receiving antenna to the power flux density of a plane wave incident on the antenna from that direction, the wave being polarization matched to the antenna.

→ If the direction is not specified, the direction of maximum radiation intensity is implied. (IEEE)

2. A measure of the receive-power which an antenna can take out of the total incoming power of a certain electromagnetic power density. The effective aperture is normally smaller than the geometrical aperture.

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Effective Height

1. The height of the center of radiation of an antenna above the effective ground level. (ANS T1.523.201)
 2. In low-frequency applications involving loaded* or nonloaded vertical antennas, the moment of the current distribution in the vertical section divided by the input current.
 → For an antenna with symmetrical current distribution, the center of radiation is the center of distribution. For an antenna with asymmetrical current distribution, the center of radiation is the center of current moments when viewed from points near the direction of maximum radiation. (ANS T1.523.201)
 *(Note: 'loaded antennas' means electrically short antennas)

Efficiency

The ratio of the useful power output to the total power input. (IEEE)

EIRP

Equivalent Isotropic Radiated Power
 The product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna (absolute or isotropic gain).

Electrical Beam Tilt

The shaping of the radiation pattern in the vertical plane of a transmitting antenna by electrical means – so that maximum radiation occurs at an angle below (downtilt) or above (uptilt) the horizontal plane.

Electric Field

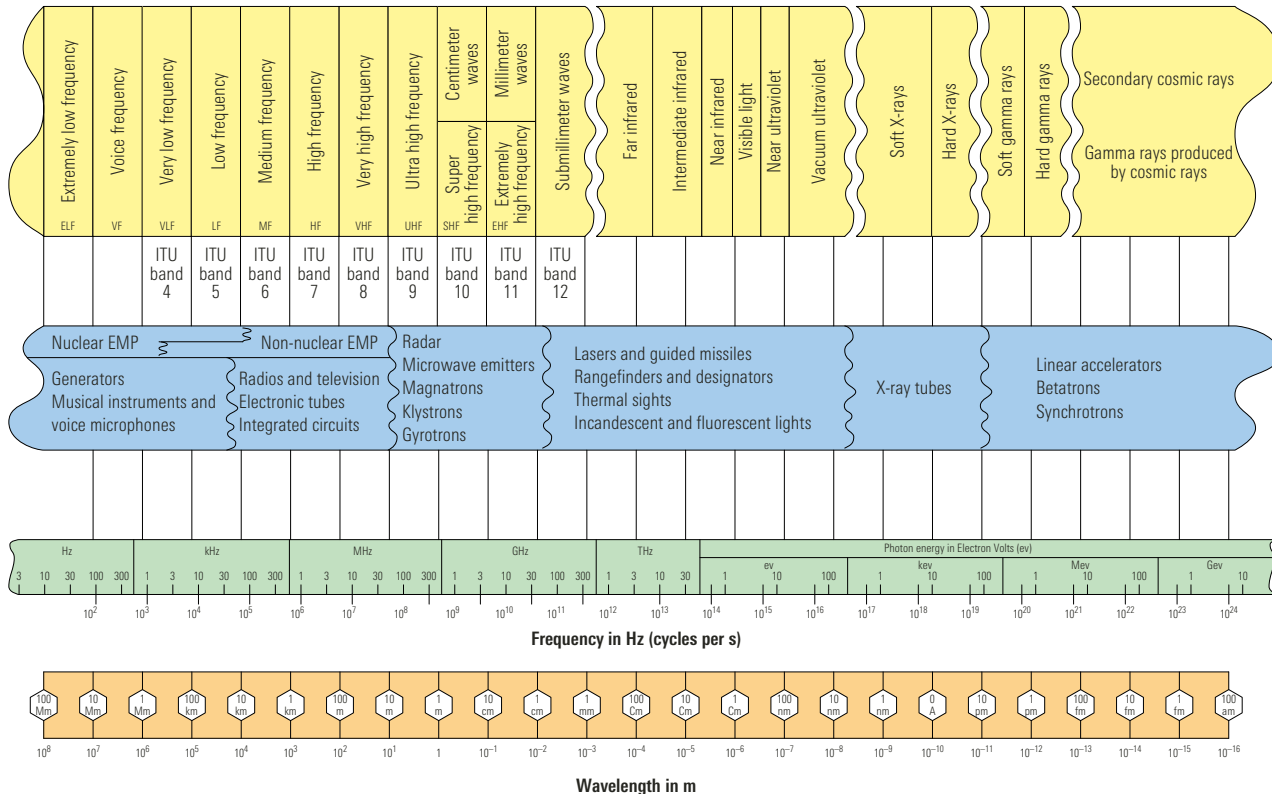
The effect produced by the existence of an electric charge, such as an electron, ion, or proton, in the volume of space or medium that surrounds it.
 → Each of a distribution of charges contributes to the whole field at a point on the basis of superposition. A charge placed in the volume of space or in the surrounding medium has a force exerted on it. (ANS T1.523.201)

Electric Field Strength

see "Field Strength"

Electromagnetic Spectrum

1. The range of frequencies of electromagnetic radiation from zero to infinity.
 → The electromagnetic spectrum was, by custom and practice, formerly divided into 26 alphabetically designated bands. This usage still prevails to some degree. However the ITU formally recognizes 12 bands, from 30 Hz to 3000 GHz. New bands, from 3 THz to 3000 THz, are under active consideration for recognition. Refer to the figure below. (ANS T1.523.201)
 2. The spectrum of electromagnetic radiation: in wavelengths, gamma ray, shorter than 0.006 nm; X-ray, 0.006 to 5 nm; ultraviolet, 5 nm to 0.4 mm; visible light, 0.4 to 0.7 μm; infrared, 0.7 μm to 1 mm; radio frequency, >1 mm. (IEEE)



Electromagnetic spectrum

Electromagnetic Wave

A wave produced by the interaction of time-varying electric and magnetic fields.
 → Electromagnetic waves are known as radio waves, heat rays, light rays, etc., depending on the frequency. (IEEE)

Elevation

The angle between the axis of a searchlight drum and the horizontal. For angles above the horizontal, elevation is positive, and below the horizontal negative. (IEEE)

Glossary

EMC

Electromagnetic Compatibility

1. Electromagnetic compatibility is the condition which prevails when telecommunications equipment is performing its individually designed function in a common electromagnetic environment without causing or suffering unacceptable degradation due to unintentional electromagnetic interference to or from other equipment in the same environment. (ANS T1.523.201)
2. A measure of equipment tolerance to external electromagnetic fields. (IEEE)

EMS

Electromagnetic Susceptibility

1. Of an electronic circuit or device, the degree to which it is subject to malfunction or failure under the influence of electromagnetic radiation. (ANS T1.523.201)
2. Electromagnetic Susceptibility includes all function tests to prove that a technical device is not disturbed by any occurring incoming electromagnetic radiation equal to the defined maximum limit-values.

EMI

Electromagnetic Interference

1. Any electromagnetic disturbance that interrupts, obstructs, or otherwise degrades or limits the effective performance of electronics/electrical equipment. It can be induced intentionally, as in some forms of electronic warfare, or unintentionally, as a result of spurious emissions and responses, intermodulation products, and the like. (ANS T1.523.201)
2. An engineering term used to designate interference in a piece of electronic equipment caused by another piece of electronic or other equipment. EMI sometimes refers to interference caused by nuclear explosion. (ANS T1.523.201)
3. Electromagnetic Interference includes all inspection measurements to prove that a technical device does not emit any electromagnetic radiation higher than the predefined limit-values.

Emission

Electromagnetic energy propagated from a source by radiation or conduction.

→ The emission may be either desired or undesired and may occur anywhere in the electromagnetic spectrum. (ANS T1.523.201)

E Plane

The plane containing the electric field vector and the direction of maximum radiation. (IEEE)

F

Feed (Element)

1. For continuous aperture antennas, the primary radiator, for example, a horn feeding a reflector. (IEEE)
2. For array antennas, that portion of the antenna which functions to produce the excitation coefficients. (IEEE)

Far-field

see "Far-field region"

Far-field region

The region where the angular field distribution is essentially independent of distance from the source.

→ If the source has a maximum overall dimension D that is large compared to the wavelength, the far-field region is commonly taken to exist at distances greater than $2D^2/\lambda$ from the source (λ being the wavelength). (ANS T1.523.201)

Field

The volume of influence of a physical phenomenon, expressed vectorially. (ANS T1.523.201)

Field Strength

The magnitude of an electric, magnetic, or electromagnetic field at a given point.

→ The field strength of an electromagnetic wave is usually expressed as the rms value of the electric field, in volts per meter.

The field strength of a magnetic field is usually expressed in amperes per meter.

Synonym: radio field intensity (ANS T1.523.201)

Figure of Merit

see "G/T Ratio"

Flux

The rate of flow of energy through a surface. (IEEE)

Frequency

1. The number of cycles occurring per second of an electrical or electromagnetic wave; a number representing a specific point in the electromagnetic spectrum. (ANS T1.523.201)
2. The number of periods per unit time. (IEEE)

Front-to-Back Ratio

Of an antenna, the gain in a specified direction, i.e., azimuth, usually that of maximum gain, compared to the gain in a direction 180° from the specified azimuth.

→ Front-to-back ratio is usually expressed in dB. (ANS T1.523.201)

G

G/T ratio

Gain-to-Noise-Temperature, synonym: figure of merit

In the characterization of antenna performance, a figure of merit, where G is the antenna gain in decibels at the receive frequency, and T is the equivalent noise temperature* of the receiving system in kelvins. (ANS T1.523.201)

*(including antenna noise temperature)

Gain

see "Antenna Gain"

Ground Wave

1. In radio transmission, a surface wave that propagates close to the surface of the Earth. The Earth has one refractive index and the atmosphere has another, thus constituting an interface that supports surface wave transmission. These refractive indices are subject to spatial and temporal changes. Ground waves do not include ionospheric and tropospheric waves. (ANS T1.523.201)
2. A radio wave that is propagated over the earth and is ordinarily affected by the presence of the ground and troposphere. The ground wave is refracted because of variations in the dielectric constant of the troposphere including the condition known as surface duct. (IEEE)

H

Half-power Beamwidth

Of an antenna pattern, the angle between the half-power (3 dB) points of the main lobe, when referenced to the peak effective radiated power of the main lobe.
→ Beamwidth is usually expressed in degrees. (ANS T1.523.201)

Hertz

The SI unit of frequency, equal to one cycle per second.
→ A periodic phenomenon that has a period of one second has a frequency of one hertz. (ANS T1.523.201)

H Plane

The plane containing the magnetic field vector and the direction of maximum radiation.

HPBW

see "Half-power Beamwidth"

Hz

see "Hertz"

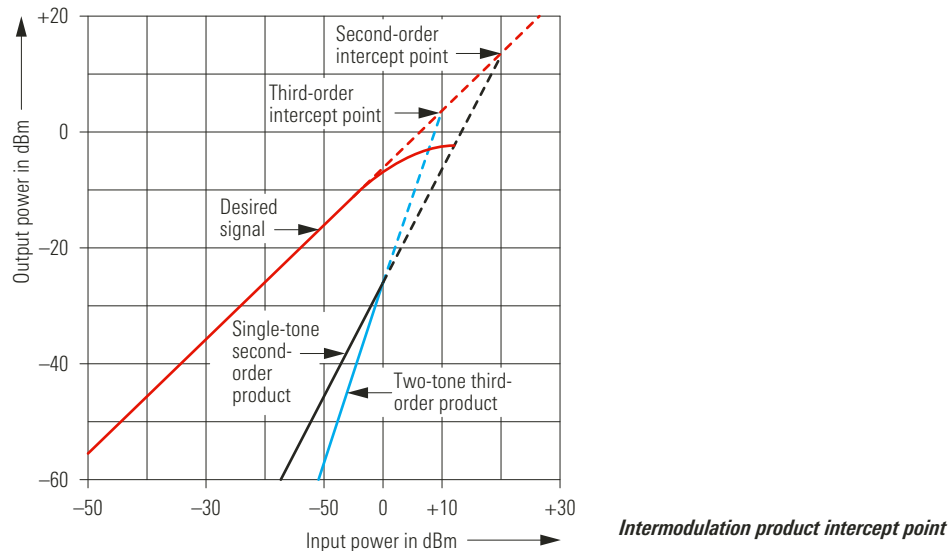
I

Impedance

The total passive opposition offered to the flow of electric current.
→ Impedance is determined by the particular combination of resistance, inductive reactance, and capacitive reactance in a given circuit.
→ Impedance is normally a function of frequency, except in the case of purely resistive networks. (ANS T1.523.201)

Intercept Point

1. Intermodulation products have an output-versus-input characteristic which, when graphically displayed, would theoretically intercept the plot of the desired output-versus-input if the nonlinear device continued to operate linearly without compression. The signal input level at which this theoretical point would occur is called the intercept point and is usually defined in dBm (decibel referred to one milliwatt). The figure below is a graphical representation of the intercept points for a single-tone second order and a two-tone third-order intermodulation product. (IEEE)



2. A point that is an extrapolated convergence – not directly measurable – of intermodulation distortion products in the desired output. That point indicates how well a receiver performs in the presence of strong nearby signals.

Intermodulation

The production, in a nonlinear element of a system, of frequencies corresponding to the sum and difference frequencies of the fundamentals and harmonics thereof that are transmitted through the element. (ANS T1.523.201)

Intermodulation Product

In the output of a nonlinear system, a frequency produced by intermodulation of harmonics of the frequencies present in the input signal. (ANS T1.523.201)

Ionosphere

That part of the atmosphere, extending from about 70 to 500 kilometers, in which ions and free electrons exist in sufficient quantities to reflect and/or refract electromagnetic waves. (ANS T1.523.201)

Glossary

Isotropic Antenna

A hypothetical antenna that radiates or receives equally in all directions.

→ Isotropic antennas do not exist physically but represent convenient reference antennas for expressing directional properties of physical antennas. (ANS T1.523.201)

Isotropic Radiator

see "Isotropic Antenna"

ITU

International Telecommunication Union

A civil international organization established to promote standardized telecommunications on a worldwide basis. The ITU-R and ITU-T are committees under the ITU. The ITU headquarters is located in Geneva, Switzerland. While older than the United Nations, it is recognized by the U.N. as the specialized agency for telecommunications. (ANS T1.523.201)

ITU-R

International Telecommunication Union - Radiocommunications Sector

The Radiocommunications Sector of the ITU; responsible for studying technical issues related to radiocommunications, and having some regulatory powers.

→ A predecessor organization was the CCIR. (ANS T1.523.201)

ITU-T

International Telecommunication Union - Telecommunication Standardization Sector

The Telecommunication Standardization Sector of the International Telecommunication Union (ITU).

→ ITU-T is responsible for studying technical, operating, and tariff questions and issuing recommendations on them, with the goal of standardizing telecommunications worldwide.

→ In principle, the ITU-T combines the standards-setting activities of the predecessor organizations formerly called the International Telegraph and Telephone Consultative Committee (CCITT) and the International Radio Consultative Committee (CCIR). (ANS T1.523.201)

K

K Factor

see "Antenna Factor"

L

Left-hand Polarized Wave

An elliptically or circularly polarized wave, in which the electric field vector, observed in the fixed plane, normal to the direction of propagation, whilst looking in the direction of propagation, rotates with time in a left-hand or anticlockwise direction.

→ also called anticlockwise polarized wave (ANS T1.523.201)

Lobe

1. A lobe is a portion of the directional pattern bounded by one or two cones of nulls. (IEEE)

2. A three-dimensional section of the radiation pattern of a directional antenna, bounded by one or more cones of nulls or by regions of diminished irradiance. (ANS T1.523.201)

Loss

1. The diminution, usually expressed in dB, of signal level in a communications medium. (ANS T1.523.201)

2. The power, usually expressed in watts, consumed or dissipated by a circuit or component without accomplishing useful work or purpose; e.g., heating (hysteresis loss) that occurs in the core of a transformer. (ANS T1.523.201)

3. The attenuation of a signal level in a communications medium. (usually expressed in dB)

M

Main Beam

see "Main Lobe"

Main Lobe

or Major Lobe

Of an antenna radiation pattern, the lobe containing the maximum power (exhibiting the greatest field strength).

→ The width of the main lobe is usually specified as the angle encompassed between the points where the power has fallen 3 dB below the maximum value. (ANS T1.523.201)

Matched

Matched means that the impedance of e.g. an antenna is equal to the impedance of the RF cable as well as to the impedance of the connected device (e.g. transmitter or receiver). No reflections degrade the power transmission. A matched system offers the highest efficiency.

Mean Power

The average power supplied to the antenna transmission line by a transmitter during an interval of time sufficiently long compared with the lowest frequency encountered in the modulation taken under normal operating conditions.

→ Normally, a time of 0.1 second, during which the mean power is greatest, will be selected. (ANS T1.523.201)

Medium

In telecommunications, the transmission path along which a signal propagates, such as a wire pair, coaxial cable, waveguide, optical fiber, or radio path. (ANS T1.523.201)

Modulation

The process, or result of the process, of varying a characteristic parameter of a carrier, in accordance with an information-bearing signal. (ANS T1.523.201)

MTBF	Mean Time Between Failure An indicator of expected system reliability calculated on a statistical basis from the known failure rates of various components of the system. MTBF is usually expressed in hours. (ANS T1.523.201)
MTTR	Mean Time To Repair The time interval (hours) that may be expected to return a failed equipment to proper operation. (IEEE)
N	
Near Field	see "Near-field Region"
Near-field Region	The close-in region of an antenna wherein the angular field distribution is dependent upon the distance from the antenna. (ANS T1.523.201)
Near Zone	see "Near-field Region"
NF	see "Noise Figure"
Noise	An undesired disturbance within the frequency band of interest; the summation of unwanted or disturbing energy introduced into a communications system from man-made and natural sources. (ANS T1.523.201)
Noise Factor	see "Noise Figure"
Noise Figure	1. Of an active device, over the bandwidth of interest, the contribution by the device itself to thermal noise at its output. The noise figure is usually expressed in decibels (dB), and is with respect to thermal noise power at the system impedance, at a standard noise temperature (usually 20 °C, 293 K) over the bandwidth of interest. It is determined by (a) measuring (determining) the ratio, usually expressed in dB, of the thermal noise power at the output, to that at the input, and (b) subtracting from that result, the gain, in dB, of the system. Typical noise figures range from 0.5 dB for very low noise devices, to 4 to 8 dB. In some systems, e.g., heterodyne systems, total output noise power includes noise from other than thermal sources, such as spurious contributions from image-frequency transformation, but noise from these sources is not considered in determining the noise figure. In this example, the noise figure is determined only with respect to that noise that appears in the output via the principal frequency transformation of the system, and excludes noise that appears via the image frequency transformation. (ANS T1.523.201) 2. At a selected input frequency the ratio of (A) the total noise power per unit bandwidth (at a corresponding output frequency) delivered by the system into an output termination to (B) the portion thereof engendered at the input frequency by the input termination, whose noise temperature is standard (290 K (Kelvins) at all frequencies). (IEEE)
Noise Temperature	At a pair of terminals, the temperature of a passive system having an available noise power per unit bandwidth at a specified frequency equal to that of the actual terminals of a network. → The noise temperature of a simple resistor is the actual temperature of that resistor. The noise temperature of a diode may be many times the actual temperature of the diode. (ANS T1.523.201) → Noise temperature of an antenna depends on its coupling to all noise sources in its environment as well as noise generated within the antenna. (IEEE)
NVIS	Near-vertical-incidence Skywave In radio propagation, a wave that is reflected from the ionosphere at a nearly vertical angle and that is used in short-range communications to reduce the area of the skip zone and thereby improve reception beyond the limits of the ground wave. (ANS T1.523.201)
O	
Omnidirectional Antenna	An antenna that has a radiation pattern that is nondirectional in azimuth. → The vertical radiation pattern may be of any shape. (ANS T1.523.201)
P	
Peak Envelope Power	see "PEP"
PEP	Peak envelope power The average power supplied to the antenna transmission line by a transmitter during one radio frequency cycle at the crest of the modulation envelope taken under normal operating conditions. (ANS T1.523.201)
Phantom Feeding	A DC supply voltage is fed into a RF cable via a bias tee circuit

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Glossary

Polarization

Of an electromagnetic wave, the property that describes the orientation, i.e., time-varying direction and amplitude, of the electric field vector.

→ States of polarization are described in terms of the figures traced as a function of time by the projection of the extremity of a representation of the electric vector onto a fixed plane in space, which plane is perpendicular to the direction of propagation. In general, the figure, i.e., polarization, is elliptical and is traced in a clockwise or counterclockwise sense, as viewed in the direction of propagation. If the major and minor axes of the ellipse are equal, the polarization is said to be circular. If the minor axis of the ellipse is zero, the polarization is said to be linear. Rotation of the electric vector in a clockwise sense is designated right-hand polarization, and rotation in a counterclockwise sense is designated left-hand polarization. (ANS T1.523.201)

Polarization Decoupling

The attenuation between a signal with a certain polarization and a signal with the same frequency but a differing polarization, e.g. cross-polarization decoupling.

Polarization Diversity

Diversity transmission and reception wherein the same information signal is transmitted and received simultaneously on orthogonally polarized waves with fade-independent propagation characteristics. (ANS T1.523.201)

Power

The rate of transfer or absorption of energy per unit time in a system. (ANS T1.523.201)

Propagation

The motion of waves through or along a medium.

→ For electromagnetic waves, propagation may occur in a vacuum as well as in material media. (ANS T1.523.201)

Propagation Channel

The physical medium in which the electromagnetic wave propagation takes place. This channel includes everything that influences the propagation between two antennas.

Propagation Path

see "Propagation Channel"

R

Radiant Power

The rate of flow of electromagnetic energy, i.e., radiant energy.

→ Radiant power is usually expressed in watts, i.e., joules per second. (ANS T1.523.201)

Radiation

In radio communication, the emission of energy in the form of electromagnetic waves. The term is also used to describe the radiated energy. (IEEE)

Radio Frequency

see "RF"

Radio Path

In the medium air, the channel or path through which the propagation between two antennas takes place.

Radiation Pattern

The variation of the field intensity of an antenna as an angular function with respect to the antenna axis.

→ A radiation pattern is usually represented graphically for the far-field conditions in either horizontal or vertical plane. (ANS T1.523.201)

Reciprocity

For antennas, this means that the same antenna can be used either for receiving as well as for transmitting purposes.

→ One exception to this rule are the active antennas. These can generally be used for receiving only.

Reference Antenna

An antenna that may be real, virtual, or theoretical, and has a radiation pattern that can be used as a basis of comparison with other antenna radiation patterns.

→ Examples of reference antennas are unit dipoles, half-wave dipoles, and isotropic, i.e., omnidirectional antennas. (ANS T1.523.201)

RF

Of, or pertaining to, any frequency within the electromagnetic spectrum normally associated with radio wave propagation.

→ For designation of subdivisions, see 'Electromagnetic Spectrum' and its associated diagram. (ANS T1.523.201)

Right-hand Polarized Wave

An elliptically or circularly polarized wave, in which the electric field vector, observed in any fixed plane, normal to the direction of propagation, whilst looking in the direction of propagation, rotates with time in a right-hand or clockwise direction.

Synonym: clockwise polarized wave. (ANS T1.523.201)

Rotary Joint

A device transmitting cable-bound RF signals via a mechanically rotating joint to a device which is rotated.

Slip rings at a rotary joint are used for feeding e.g. control signals through the mechanically rotating joint. They are not meant for RF signals.

S

Side Lobe

A radiation lobe in any direction other than that of the major lobe. (IEEE)

Side Lobe Suppression

1. Any process, action of adjustment to reduce the level of the side lobes or to reduce the degradation of the intended antenna system performance resulting from the presence of side lobes. (IEEE)

2. Also the value of the side lobe suppression.

Silent Tuning	A feature of some ATUs. → After a first learning tuning cycle the ATU stores it's frequency-depending setting values in a built-in memory. The now available 'Silent Tuning' mode can set the ATU to the stored values without initiating a new tuning process.
Silent Zone	see "Skip Zone"
Skip Zone	An annular region within the transmission range of an antenna, within the signals from the transmitter are not received. The skip zone is bounded by the locus of the farthest points at which the ground wave can be received and the nearest points at which reflected sky waves can be received. Synonyms: silent zone, zone of silence. (ANS T1.523.201)
Sky Wave	A radio wave that travels upward from the antenna. → A sky wave may be reflected to Earth by the ionosphere. (ANS T1.523.201)
Speed of Light (c)	The speed of an electromagnetic wave in free space, precisely 299,792,458 m/s. → The speed of an electromagnetic wave, e.g. light, is equal to the product of wavelength and frequency. $c = \lambda \cdot f$ → In any physical medium, the velocity of propagation of light is lower than the speed of light in free space. Since the frequency is not changed, in any physical medium, the wavelength is also decreased. (ANS T1.523.201)
Spillover	In a (reflector) antenna, the part of the radiated energy from the feed that does not impinge on the reflectors. (ANS T1.523.201)
Surface Duct	An atmospheric duct for which the lower boundary is the surface bounding the atmosphere. (IEEE)

T

TEMPEST	Telecommunications Electronics Material Protected from Emitting Spurious Transmissions 1. Short name referring to investigation, study, and control of compromising emanations from information systems (IS) equipment. (ANS T1.523.201) 2. To shield against compromising emanation. (ANS T1.523.201)
Terminated Folded Dipole	see "TFD"
TFD	Terminated Folded Dipole Type of an antenna built. The dipole radiators are folded backwards at its half length. Both radiator ends are terminated to 'burn' all power which was not emitted via the radiator. In either case the reflected power would negatively influence the radiation pattern of the antenna and decrease the usability.

Troposphere	1. The lower layers of atmosphere, in which the change of temperature with height is relatively large. It is the region where clouds form, convection is active, and mixing is continuous and more or less complete. (ANS T1.523.201) 2. That part of the earth's atmosphere in which temperature generally decreases with altitude, clouds form, and convection is active. Experiments indicate that the troposphere occupies the space above the earth's surface up to a height ranging from 6 km (kilometers) at the poles to about 18 km at the equator. (IEEE)
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V

Voltage Standing Wave Ratio	see "VSWR"
VSWR	Voltage Standing Wave Ratio In a transmission line, the ratio of maximum to minimum voltage in a standing wave pattern. → The VSWR is a measure of impedance mismatch between the transmission line and its load. The higher the VSWR, the greater the mismatch. The minimum VSWR, i.e., that which corresponds to a perfect impedance match, is unity. (ANS T1.523.201)

W

Wavelength	The distance between points of corresponding phase of two consecutive cycles of a wave. → The wavelength, λ, is related to the propagation velocity, v, and the frequency, f, by $\lambda = v / f$. (ANS T1.523.201) → In air the propagation velocity v is equal to c, the speed of light.
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Z

Zone of Silence	see "Skip Zone"
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References:

ANS T1.523.201:	www.atis.org/tg2k/
IEEE:	Standard Dictionary of Electrical and Electronics Terms

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