

# R&S® EDS300

## DME/Pulse Analyzer

### Specifications



**3**  
year  
warranty

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# Definitions

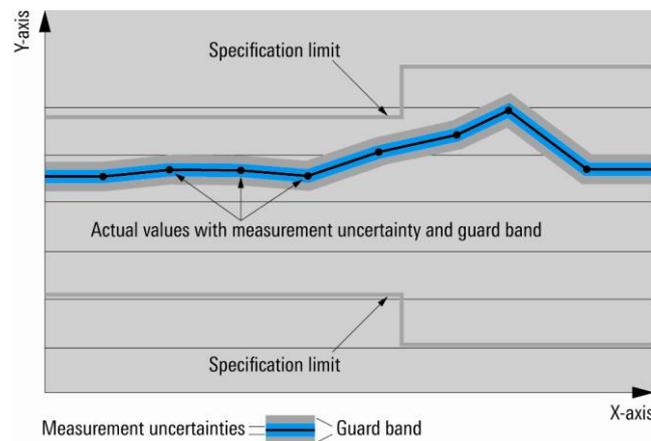
## General

Product data applies under the following conditions:

- Three hours storage at ambient temperature followed by 30 minutes warm-up operation
- Specified environmental conditions met
- Recommended calibration interval adhered to
- All internal automatic adjustments performed, if applicable

## Specifications with limits

Represent warranted product performance by means of a range of values for the specified parameter. These specifications are marked with limiting symbols such as  $<$ ,  $\leq$ ,  $>$ ,  $\geq$ ,  $\pm$ , or descriptions such as maximum, limit of, minimum. Compliance is ensured by testing or is derived from the design. Test limits are narrowed by guard bands to take into account measurement uncertainties, drift and aging, if applicable.



## Specifications without limits

Represent warranted product performance for the specified parameter. These specifications are not specially marked and represent values with no or negligible deviations from the given value (e.g. dimensions or resolution of a setting parameter). Compliance is ensured by design.

## Typical data (typ.)

Characterizes product performance by means of representative information for the given parameter. When marked with  $<$ ,  $>$  or as a range, it represents the performance met by approximately 80 % of the instruments at production time. Otherwise, it represents the mean value.

## Nominal values (nom.)

Characterize product performance by means of a representative value for the given parameter (e.g. nominal impedance). In contrast to typical data, a statistical evaluation does not take place and the parameter is not tested during production.

## Measured values (meas.)

Characterize expected product performance by means of measurement results gained from individual samples.

## Uncertainties

Represent limits of measurement uncertainty for a given measurand. Uncertainty is defined with a coverage factor of 2 and has been calculated in line with the rules of the Guide to the Expression of Uncertainty in Measurement (GUM), taking into account environmental conditions, aging, wear and tear.

Device settings and GUI parameters are indicated as follows: "parameter: value".

Typical data as well as nominal and measured values are not warranted by Rohde & Schwarz.

# Specifications

## Frequency

Frequency range		960 MHz to 1215 MHz
Frequency resolution		0.1 MHz

<b>Reference frequency, internal</b>		
Accuracy		±(time since last adjustment × aging rate + temperature drift + calibration accuracy)
Aging per year		≤ 1 ppm
Temperature drift	+5 °C to +40 °C	≤ 1 ppm
Achievable internal calibration accuracy		≤ 1 ppm

## Level <sup>1</sup>

<b>Max. input level</b>		
DC voltage		+25 V DC
RF power		+13 dBm

<b>Absolute level</b>		
Display range		-120 dBm to +20 dBm
Measurement range (average) <sup>2</sup>	low noise mode (preamplifier on)	-110 dBm to -10 dBm (nom.)
	normal mode (preamplifier off)	-100 dBm to +5 dBm (nom.)
	low distortion mode (attenuator on)	-85 dBm to +13 dBm (nom.)
	autorange mode	-110 dBm to +13 dBm (nom.)
Measurement range (peak) <sup>2</sup>	low noise mode	-100 dBm to -10 dBm (nom.)
	normal mode	-90 dBm to +5 dBm (nom.)
	low distortion mode	-75 dBm to +13 dBm (nom.)
	autorange mode	-100 dBm to +13 dBm (nom.)
Level resolution		0.1 dB
Average level deviation	-20 dBm, normal mode, DME mode, +20 °C to +30 °C	0.5 dB
Additional average linearity error	0 dB to -70 dB, normal mode, DME mode, +20 °C to +30 °C	0.5 dB
Spurious response	without input signal, low noise mode	< -95 dBm

<b>Total measurement uncertainty</b>		
Average level deviation	signal: 0 dBm to -70 dBm, 95 % confidence level, +20 °C to +30 °C	< 1 dB (nom.)
Peak level deviation	signal: 0 dBm to -70 dBm, 95 % confidence level, +20 °C to +30 °C	< 1 dB

<b>Intermodulation</b>		
1 dB compression point	normal mode	+10 dBm (nom.)
Third-order intercept point (TOI)	normal mode	+20 dBm (typ.)

## DME signal analysis

Standard		ICAO Annex 10, ICAO Doc 8071
Input level range	pulse recognition efficiency > 70 %	-95 dBm to +10 dBm (nom.)
<b>DME measurement</b>		
Peak level deviation	-20 dBm, +20 °C to +30 °C	0.6 dB
Peak level linearity error	0 dB to -70 dB, +20 °C to +30 °C	0.5 dB
Total peak level deviation	standard DME signal in line with ICAO Annex 10, level range 0 dBm to -70 dBm, 95 % confidence level, +20 °C to +30 °C	< 1 dB (nom.)

<sup>1</sup> Without R&S®EDS-B1 option.

<sup>2</sup> Overload display in the event of an overload condition caused by in-band or out-of-band signals.

<b>Pulse spacing</b>		
Resolution		0.001 $\mu$ s
Deviation		< 0.05 $\mu$ s
Pulse repetition rate		< 8000/s (nom.)
Additional measurement values		identifier frequency, identifier code, pulse repetition rate, RF frequency offset

## TACAN signal analysis (R&S®EDS-K1 option, export license required)

<b>Standard</b>		STANAG 5034, MIL-STD-291C
<b>Input level range</b>		-92 dBm to +10 dBm
<b>Modulation depth</b>	5 % to 50 %	
Resolution		0.01 %
Deviation	15/135 Hz $\pm$ 5 % <sup>3</sup>	< 0.5 %
<b>AF</b>		
Resolution		0.01 Hz
Deviation	15/135 Hz $\pm$ 5 % <sup>3</sup>	< 0.1 Hz
<b>Bearing</b>		
Resolution		0.01°
Deviation	-80 dBm to +10 dBm, standard TACAN signal in line with STANAG 5034, modulation depth of 15 Hz and 135 Hz signals = 20 %, measurement time $\geq$ 1 s	< 0.2°
Additional bearing error	-80 dBm to +10 dBm, standard TACAN signal in line with STANAG 5034, modulation depth of 15 Hz and 135 Hz signals = 7 % to 30 %, measurement time $\geq$ 1 s	< 0.1°
Deviation	-90 dBm to -80 dBm, standard TACAN signal in line with STANAG 5034, modulation depth of 15 Hz and 135 Hz signals = 20 %, measurement time $\geq$ 1 s	< 0.5°
Bearing acquisition time		< 3 s
<b>Phase angle 15 Hz/135 Hz</b>		
Resolution		0.01°
Deviation	standard TACAN signal in line with STANAG 5034, modulation depth of 15 Hz and 135 Hz signals = 20 %, measurement time $\geq$ 500 ms	< 0.5° (nom.)
Additional measurement values		MRB/ARB pulse count, MRB/ARB pulse spacing

## Pulse shape analysis (R&S®EDS-K2 option)

<b>Resolution bandwidth</b>		
Resolution bandwidth	selectable	0.5 MHz, 10 MHz (nom.)
<b>Display range</b>		displayed noise floor up to +20 dBm
Time/division		0.5/1/2/5/10/20/50 $\mu$ s, selectable
Reference level		-70 dBm to +20 dBm
Trace functions		clear/write, average, max. hold
<b>Trigger</b>		
Trigger source		level/external/DME pulse/interrogator
	with R&S®EDS-K1 option	additionally MRB/ARB trigger source
Trigger delay		-500 $\mu$ s to +8000 $\mu$ s
<b>DME pulse shape analysis</b>	standard	ICAO Annex 10, ICAO Doc 8071
<b>Pulse shape analysis</b>	rise time, duration, decay time	
Resolution		0.01 $\mu$ s
Deviation		< 0.1 $\mu$ s (nom.)
<b>Pulse spacing</b>		
Resolution		0.001 $\mu$ s
Deviation		< 0.05 $\mu$ s
Additional measurement values		peak variation

<sup>3</sup> Max. frequency drift of modulation signal.

## DME distance measurement <sup>4</sup>

<b>Standard</b>		ICAO Annex 10, ICAO Doc 8071
<b>Input level range</b>		-97 dBm to +10 dBm (nom.)
<b>Distance measurement</b>		
Distance range		0 NM to 400 NM (nom.)
Resolution		0.01 $\mu$ s, 0.001 km, 0.001 NM
Deviation	-80 dBm to +10 dBm, measurement time $\geq$ 100 ms 95 % confidence level	$\leq$ 100 ns, $\leq$ 15 m (nom.), $\leq$ 0.01 NM (nom.)
Deviation	-90 dBm to -80 dBm, reply efficiency > 70 %, measurement time $\geq$ 500 ms 95 % confidence level	$\leq$ 500 ns, $\leq$ 75 m (nom.), $\leq$ 0.05 NM (nom.)
Deviation	-97 dBm to -90 dBm, measurement time $\geq$ 500 ms 95 % confidence level	500 ns, (nom.) 75 m (nom.), 0.05 NM (nom.)
<b>Pulse rate</b>		
	search mode	5/s to 150/s
	track mode	5/s to 30/s
	test mode (with R&S <sup>®</sup> EDS-B2 option only)	max. 3000/s (output power range -30 to +15 dBm) max. 1500/s (output power range +15 to +43 dBm)
Lock-on time	reply efficiency > 70 %, pulse rate search mode = 150/s	< 3 s
<b>Modes</b>		
Additional measurement values		search, track, memory reply efficiency, velocity

## Multi-DME measurement (R&S<sup>®</sup>EDS-K5 option) <sup>5</sup>

<b>Standard</b>		ICAO Annex 10, ICAO Doc 8071
<b>Distance measurement</b>	search/track mode	up to 10 DME channels
<b>Input level range</b>		-95 dBm to +10 dBm (nom.)
Additional level measurement uncertainty		< 1 dB
<b>Distance measurement</b>		
Distance range		0 NM to 310 NM (nom.)
Resolution		0.001 km, 0.001 NM
Deviation	-80 dBm to +10 dBm, measurement time 5 ms/channel 95 % confidence level	$\leq$ 0.03 NM, $\leq$ 45 m (nom.)
Deviation	-90 dBm to -80 dBm, reply efficiency > 70 %, measurement time 100 ms/channel 95 % confidence level	$\leq$ 0.05 NM, $\leq$ 75 m (nom.)
Deviation	-95 dBm to -90 dBm, measurement time 100 ms/channel 95 % confidence level	0.05 NM (nom.) 75 m (nom.)
<b>Pulse rate</b>		
	search/track mode	20/s (nom.)/channel
Lock-on time	reply efficiency > 70 %	< 5 s
<b>Modes</b>		
Additional measurement values for every channel		search, track, memory pulse spacing, frequency offset, ID code, reply efficiency

<sup>4</sup> Minimum requirement: 20 W low-power interrogator (R&S<sup>®</sup>EDS-B2), optional: 500 W high-power interrogator (R&S<sup>®</sup>EDS-B4).

<sup>5</sup> Minimum requirement: R&S<sup>®</sup>EDS-B1, R&S<sup>®</sup>EDS-B2 (optional: R&S<sup>®</sup>EDS-B4).

## Low-power interrogator (R&S®EDS-B2 option)

<b>Standard</b>		ICAO Annex 10, ICAO Doc 8071
<b>Maximum output power</b>	DME peak power, into 50 Ω load	20 W (+43 dBm) ± 1.5 dB
Setting range		-30 dBm to +43 dBm, in 0.5 dB steps
Peak variation	coded pulse pair on 50 Ω load	< 0.5 dB
<b>Pulse rate</b>	up to +15 dBm	3000/s (max.)
	+15 dBm to +43 dBm	1500/s (max.)
<b>Pulse spacing</b>	X mode	12 μs (default)
	Y mode	36 μs (default)
Setting range	X/Y mode	11 μs to 42 μs in 0.1 μs steps
Deviation		0.05 μs
Pulse duration	50 % points	3.5 μs ± 0.2 μs
Pulse rise time	10 % to 90 %	2.5 μs ± 0.25 μs
Pulse decay time	90 % to 10 %	2.5 μs ± 0.3 μs
Pulse spectrum		in line with ICAO Annex 10
<b>Modes</b>		X, Y

## High-power interrogator (R&S®EDS-B4 option)

<b>Standard</b>		ICAO Annex 10, ICAO Doc 8071
<b>Maximum output power</b>	DME peak power, into 50 Ω load	500 W (+57 dBm) ± 1.5 dB
Power steps		100 W, 250 W, 500 W
Peak variation	coded pulse pair on 50 Ω load	< 0.5 dB
<b>Pulse rate</b>		max. 150/s
<b>Pulse spacing</b>	X mode	12 μs
	Y mode	36 μs
Setting range	X/Y mode	11 μs to 42 μs in 0.1 μs steps
Deviation		0.1 μs
Pulse duration	50 % points	3.5 μs ± 0.3 μs
Pulse rise time	10 % to 90 %	2.5 μs ± 0.25 μs
Pulse decay time	90 % to 10 %	2.5 μs ± 0.5 μs
Pulse spectrum		in line with ICAO Annex 10
<b>Modes</b>		X, Y

## Inputs and outputs (front)

RF 1 IN/OUT	RF input/output	N connector, 50 Ω
RF 2 IN	RF input	N connector, 50 Ω
AF OUT	output for headphone	3.5 mm female connector
Antenna supply		12 V ± 0.5 V (nom.)
USB	USB 2.0 double A connector	USB stick for data logging, R&S®EDS-K1 and software update

## Inputs and outputs (rear)

Analog OUT	analog output	BNC connector, 50 Ω (nom.)
Analog IN	analog input	BNC connector, 50 Ω (nom.)
Trigger OUT	trigger output	BNC connector, 20 Ω (nom.)
Trigger IN	trigger input	BNC connector, 100 kΩ (nom.)
Suppress IN/OUT	input/output for suppressor line	BNC connector, 30 kΩ in (nom.) 0.5 kΩ out (nom.)
Ref 10 MHz IN/OUT		BNC connector, 50 Ω (nom.)
LAN	LAN interface	RJ-45, 100BaseT
RS-232		RS-232, 9-pin D-Sub connector
USB	USB 2.0 double A connector	USB stick for data logging, R&S®EDS-K1 and software update
External monitor		DVI-D

## General data

<b>Environmental conditions</b>		
Temperature	operating temperature range	+5 °C to +40 °C
	permissible temperature range	0 °C to +50 °C
	storage temperature range	-25 °C to +70 °C
Damp heat		+25 °C/+40 °C, 95 % rel. humidity, cyclic, in line with EN 60068-2-30
Altitude	operating	4600 m (without external power supply)
	transport	10000 m (without external power supply)
<b>Mechanical resistance</b>		
Vibration	sinusoidal	5 Hz to 55 Hz, 0.15 mm amplitude const., 55 Hz to 150 Hz, 0.5 g const., in line with EN 60068-2-6
	random	10 Hz to 300 Hz, acceleration 1.2 g RMS, in line with EN 60068-2-64
Shock		40 g shock spectrum, in line with MIL-STD-810E, method 516.4, procedure I
<b>Power rating</b>		
Rated voltage	base unit	20 V to 28 V DC
	external power supply	100 V to 240 V AC (±10 %)
Rated frequency	external power supply	50 Hz to 60 Hz (±5 %)
Rated current	including R&S®EDS-B2 or R&S®EDS-B4 option	5.0 A DC (max.)
	external power supply (including R&S®EDS-B2 or R&S®EDS-B4 option)	1.2 A to 0.5 A AC
<b>Product conformity</b>		
Electromagnetic compatibility	EU: in line with EMC Directive 2004/108/EC	applied harmonized standards: IEC/EN 61326-1, IEC/EN 61326-2-1, EN 55022 (class B)
Electrical safety	EU: in line with Low Voltage Directive 2006/95/EC	in line with IEC 61010-1, EN 61010-1, UL 61010-1, CAN/CSA-C22.2 No. 61010-04
Test mark		VDE-GS, cCSA <sub>US</sub> , KC
<b>Calibration interval</b>	recommended for highest accuracy	12 months
	for general test and measurement applications	24 months
<b>Dimensions</b>	W × H × D	342 mm × 157 mm × 266 mm (13.46 in × 6.18 in × 10.47 in) (3/4 19", 3 HU)
<b>Weight</b>	fully equipped (incl. R&S®EDS-B1 and R&S®EDS-B4), without external power supply	7.3 kg (16.09 lb)
<b>Display</b>		6.5" TFT color display
Resolution		800 × 600 pixel
Pixel failure rate		< 1.1 × 10 <sup>-5</sup>

## Ordering information

Designation	Type	Order No.
<b>Base unit</b>		
DME/Pulse Analyzer	R&S®EDS300	5202.7006.02
<b>Hardware options</b>		
Additional RX Unit	R&S®EDS-B1	5202.7170.02
Low-Power Interrogator	R&S®EDS-B2	5202.8160.02
High-Power Interrogator	R&S®EDS-B4	5202.8177.02
High-Power Amplifier	R&S®EDS-B5	5202.7193.02
<b>Software options</b>		
TACAN Analysis	R&S®EDS-K1	5202.8102.02
Pulse Shape Analysis	R&S®EDS-K2	5202.8119.02
GPS Synchronization	R&S®EDS-K3	5202.8125.02
Multi-DME Mode	R&S®EDS-K5	5202.8131.02
<b>External accessories</b>		
Rugged transport case	R&S®EDS-Z2	5202.8202.02
Protection Cover	R&S®EVS-Z6	5201.7760.00
19" Adapter	R&S®EDS-Z7	5202.8225.00
Verification Test Dongle	R&S®EDS-Z10	5202.9980.03
Documentation of Calibration Values	R&S®DCV-2	0240.2193.24

<b>Warranty</b>		
Base unit		3 years
All other items <sup>6</sup>		1 year
<b>Options</b>		
Extended Warranty, one year	R&S®WE1	Please contact your local Rohde & Schwarz sales office.
Extended Warranty, two years	R&S®WE2	
Extended Warranty with Calibration Coverage, one year	R&S®CW1	
Extended Warranty with Calibration Coverage, two years	R&S®CW2	
Extended Warranty with Accredited Calibration Coverage, one year	R&S®AW1	
Extended Warranty with Accredited Calibration Coverage, two years	R&S®AW2	

### Extended warranty with a term of one and two years (WE1 and WE2)

Repairs carried out during the contract term are free of charge <sup>7</sup>. Necessary calibration and adjustments carried out during repairs are also covered.

### Extended warranty with calibration coverage (CW1 and CW2)

Enhance your extended warranty by adding calibration coverage at a package price. This package ensures that your Rohde & Schwarz product is regularly calibrated, inspected and maintained during the term of the contract. It includes all repairs <sup>7</sup> and calibration at the recommended intervals as well as any calibration carried out during repairs or option upgrades.

### Extended warranty with accredited calibration (AW1 and AW2)

Enhance your extended warranty by adding accredited calibration coverage at a package price. This package ensures that your Rohde & Schwarz product is regularly calibrated under accreditation, inspected and maintained during the term of the contract. It includes all repairs <sup>7</sup> and accredited calibration at the recommended intervals as well as any accredited calibration carried out during repairs or option upgrades.

For product brochure, see PD 5214.1220.12 and [www.rohde-schwarz.com](http://www.rohde-schwarz.com)

<sup>6</sup> For options that are installed, the remaining base unit warranty applies if longer than 1 year. Exception: all batteries have a 1 year warranty.

<sup>7</sup> Excluding defects caused by incorrect operation or handling and force majeure. Wear-and-tear parts are not included.





## Service that adds value

- | Worldwide
- | Local and personalized
- | Customized and flexible
- | Uncompromising quality
- | Long-term dependability

## Rohde & Schwarz

The Rohde & Schwarz electronics group offers innovative solutions in the following business fields: test and measurement, broadcast and media, secure communications, cybersecurity, monitoring and network testing. Founded more than 80 years ago, the independent company which is headquartered in Munich, Germany, has an extensive sales and service network with locations in more than 70 countries.

Certified Quality Management

**ISO 9001**

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R&S®EDS300 DME/Pulse Analyzer

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