

R&S® EDS300

DME/PULSE ANALYZER

Specifications



Data Sheet
Version 05.00

ROHDE & SCHWARZ

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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.



Non-traceable specifications with limits (n. trc.)

Represent product performance that is specified and tested as described under “Specifications with limits” above. However, product performance in this case cannot be warranted due to the lack of measuring equipment traceable to national metrology standards. In this case, measurements are referenced to standards used in the Rohde & Schwarz laboratories.

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 designated with the format “parameter: value”.

Non-traceable specifications with limits, typical data as well as nominal and measured values are not warranted by Rohde & Schwarz.

In line with the 3GPP standard, chip rates are specified in million chips per second (Mcps), whereas bit rates and symbol rates are specified in billion bit per second (Gbps), million bit per second (Mbps), thousand bit per second (kbps), million symbols per second (MSPS) or thousand symbols per second (kSPS), and sample rates are specified in million samples per second (Msamples/s). Gbps, Mcps, Mbps, MSPS, kbps, kSPS and Msamples/s are not SI units.

Specifications

Frequency

Frequency range		960 MHz to 1215 MHz
Frequency resolution		0.1 MHz

Reference frequency, internal		
Accuracy		$\pm(\text{time since last adjustment} \times \text{aging rate} + \text{temperature drift} + \text{calibration accuracy})$
Aging per year		$\leq 1 \text{ ppm}$
Temperature drift	+5 °C to +40 °C	$\leq 1 \text{ ppm}$
Achievable internal calibration accuracy		$\leq 1 \text{ ppm}$

Level ¹

Maximum input level		
DC voltage		+25 V DC
RF power		+13 dBm

Absolute level		
Display range		–120 dBm to +20 dBm
Measurement range, average ²	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 ²	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

Total measurement uncertainty		
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

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

DME signal analysis

Standard		
Input level range	pulse recognition efficiency > 70 %	ICAO Annex 10, ICAO Doc 8071 –95 dBm to +10 dBm (nom.)
DME measurement		
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.)

¹ Without R&S®EDS-B1 option.

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

Pulse spacing		
Resolution		0.001 μ s
Deviation		< 0.05 μ 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)

Standard		STANAG 5034, MIL-STD-291C
Input level range		–92 dBm to +10 dBm
Modulation depth		5 % to 50 %
Resolution		0.01 %
Deviation	15/135 Hz $\pm$ 5 % ³	< 0.5 %
AF		
Resolution		0.01 Hz
Deviation	15/135 Hz $\pm$ 5 % ³	< 0.1 Hz
Bearing		
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
Phase angle 15 Hz/135 Hz		
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)

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

³ Maximum frequency drift of modulation signal.

DME distance measurement ⁴

Standard		ICAO Annex 10, ICAO Doc 8071
Input level range		–97 dBm to +10 dBm (nom.)
Distance measurement		
Distance range		0 NM to 400 NM (nom.)
Resolution		0.01 μ 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.)
	–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.)
	–97 dBm to –90 dBm, measurement time $\geq$ 500 ms 95 % confidence level	500 ns (nom.), 75 m (nom.), 0.05 NM (nom.)
Pulse rate	search mode	5/s to 150/s
	track mode	5/s to 30/s
	test mode (with R&S®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
Modes		search, track, memory
Additional measurement values		reply efficiency, velocity

Multi-DME measurement (R&S®EDS-K5 option) ⁵

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

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

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

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

Standard		ICAO Annex 10, ICAO Doc 8071
Maximum output power	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
Pulse rate	up to +15 dBm	3000/s (max.)
	+15 dBm to +43 dBm	1500/s (max.)
Pulse spacing	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
Modes		X, Y

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

Standard		ICAO Annex 10, ICAO Doc 8071
Maximum output power	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
Pulse rate		max. 150/s
Pulse spacing	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
Modes		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 flash drive 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, 40 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, 100BASE-T
RS-232		RS-232, 9-pin D-Sub connector
USB	USB 2.0 double A connector	USB flash drive for data logging, R&S®EDS-K1 and software update
External monitor		DVI-D

General data

Environmental conditions		
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)
Mechanical resistance		
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
Power rating		
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)	1.4 A
Product conformity		
Electromagnetic compatibility	EU: in line with EMC Directive 2014/30/EU	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 2014/35/EU	in line with: IEC 61010-1, EN 61010-1, UL 61010-1, CAN/CSA-C22.2 No. 61010-1
Test mark		VDE, cCSA _{US} , KC
Calibration interval	recommended for highest accuracy	12 months
	for general test and measurement applications	24 months
Dimensions	W × H × D	342 mm × 157 mm × 266 mm (13.46 in × 6.18 in × 10.47 in) (3/4 19", 3 HU)
Weight	fully equipped (including R&S®EDS-B1 and R&S®EDS-B4 options), without external power supply	7.3 kg (16.09 lb)
Display		6.5" TFT color display
Resolution		800 × 600 pixel
Pixel failure rate		< 1.1 × 10 ^{–5}

Ordering information

Designation	Type	Order No.
Base unit		
DME/pulse analyzer	R&S®EDS300	5202.7006.02
Hardware options		
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
Software options		
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
External accessories		
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

Warranty		
Base unit		3 years
All other items ⁶		1 year
Options		
Extended warranty, one year	R&S®WE1	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 ⁷. 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 ⁷ 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 ⁷ and accredited calibration at the recommended intervals as well as any accredited calibration carried out during repairs or option upgrades.

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

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

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- ▶ Customized and flexible
- ▶ Uncompromising quality
- ▶ Long-term dependability

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Sustainable product design

- ▶ Environmental compatibility and eco-footprint
- ▶ Energy efficiency and low emissions
- ▶ Longevity and optimized total cost of ownership

Certified Quality Management

ISO 9001

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