

R&S® ATS1500C

ANTENNA TEST CHAMBER FOR AUTOMOTIVE RADAR SENSORS

Specifications



Data Sheet
Version 05.00

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Definitions

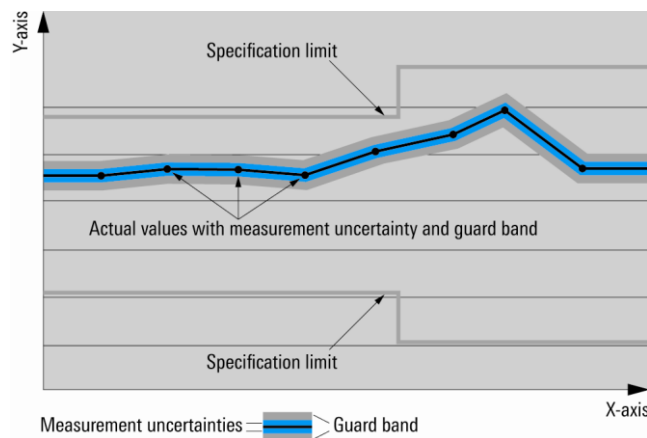
General

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/3GPP2 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 (Msample/s). Gbps, Mcps, Mbps, Msps, kbps, ksps and Msample/s are not SI units.

Specifications

The R&S®ATS1500C is a compact and accurate antenna test chamber for RF testing and validation of 77 GHz/79 GHz automotive radar sensor modules. It is based on the principle of a compact antenna test range (CATR) with a reflector, alignment structure and feed antenna.

The R&S®ATS1500C operates with several instruments such as automotive radar echo generators, power sensors, spectrum and signal analyzers as well as signal generators.

Environmental conditions

Temperature range	operating temperature range	+20 °C to +30 °C
	storage temperature range	-10 °C to +50 °C
Damp heat		75 % relative humidity, noncondensing from +10 °C to +30 °C

Product conformity

Electromagnetic compatibility	in line with EU – EMC Directive 2004/108/EC	applied harmonized standards: EN 61326-1 EN 55011, group I, class B equipment
Electrical safety	in line with EU – Machine Directive 2006/42/EC	applied harmonized and nonharmonized standards: EN ISO 12100 EN 61010-1 EN 61010-2-120
Restriction of the use of hazardous substances in electrical and electronic equipment	in line with EU – RoHS Directive	applied harmonized standard: EN 50581

R&S®ATS1500C antenna test chamber

Frequency range ¹	chamber	6 GHz to 110 GHz
Absorber ²	type	pyramidal and flat
	attenuation of first order reflections	55 dB
Shielding effectiveness	chamber	> 90 dB (typ.)
Weight		approx. 500 kg (1102.31 lb)
Dimensions ³	W x H x D	0.90 m x 1.99 m x 1.61 m (2.95 ft x 6.5 ft x 5.28 ft)
Wheels		4
Door operation		manually operated, electrical closing mechanism

¹ Limited by feeding structure.

² From 40 GHz to 110 GHz.

³ Dimensions include all mounts and handle bars attached with the chamber for depth. If an optional banana plugs feedthrough is mounted, width is extended by 16 mm.

R&S® ARC-TTP1 3D tilt-tilt positioner

Positioner type		2 axis, tilt-tilt
Angular resolution	resolution of feedback	0.03° (nom.)
Standard deviation positioner error	measure of repeatability	0.02° (meas.)
Tilt angle	outer axis	±180°
	inner axis	±45°
Maximum tilt speed	outer axis	120°/s
	inner axis	15°/s
DUT load capability		2.0 kg, centered
Maximum DUT size		40 cm x 40 cm
DUT fixture plate	dimensions	7.3 cm x 7.3 cm
	thread size	M3 and M4
	adjustable height	5 cm
	stepped manual rotation (orientation of DUT polarization)	22.5°
Hardware triggering	interface	optional (requires BNC feedthrough)
Application programming interfaces		yes (C / C++ / C# / VB.NET / Python / MATLAB®, ...)
Control		web interface
Controller communications interface		Ethernet
Interfaces on inner axis	right side: communications with DUT	1 x Ethernet, 1 x D-Sub 9-pole, 1 x USB 2.0 (optional)
	left side: power supply via controller	banana jacks (internal supply)
	left side: power supply via external power supply	banana jacks (optional)
Power supply on inner axis via internal power supply		12 V, 2.5 A
Power supply on inner axis via external power supply		48 V, 5 A

R&S® CATR-REFL1 CATR reflector, large size

Frequency range ⁴	reflector	6 GHz to 90 GHz
Quiet zone ⁵	Ø	30 cm
	average amplitude taper	< 1.5 dB (meas.)
	average amplitude ripple	< 0.5 dB (meas.)
Surface roughness	RMS	< 1 µm
Surface material		gold plated
Dimensions		54 cm x 56 cm

R&S® CATR-ALIC1 alignment structure, for CATR systems in selected chambers

Reflector tilts		left-right and front-back
Adjustment bolts		3
Adjustment range		±2°
Adjustment resolution		< 0.1°
Feed goniometer range		30°
Feed goniometer resolution		< 0.1°

R&S® ARC-HARFM holder for R&S® AREGx00A monostatic frontend

Stepped manual rotation	orientation of DUT polarization	45°
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R&S® ATS-F230V power filter

Power rating	rated voltage	100 V to 230 V (AC) (-5 %/+10 %)
	rated frequency	50 Hz to 60 Hz
	rated current	13 A
Connector type		C20
Internal power outlet	power rating	100 V to 230 V (AC) (-5 %/+10 %), 50 Hz to 60 Hz, 2 A

⁴ Higher/lower frequencies are possible with higher mean error inside the quiet zone.

⁵ Measured at 76.5 GHz.

R&S® ARC-VENT1 ventilation 1 for R&S® ATS1500C

Nominal voltage range		12 V to 28 V
Operating temperature range		-20 °C to +75 °C
Ventilation rate		140 m³/h
Ventilation direction		into the chamber
Noise level		38 dB(A)
RF shielding		honeycomb

R&S® ARC-VENT2 ventilation 2 for R&S® ATS1500C

Nominal voltage range		12 V to 28 V
Operating temperature range		-20 °C to +75 °C
Ventilation rate		140 m³/h
Ventilation direction		out of chamber
Noise level		38 dB(A)
RF shielding		honeycomb

R&S® ARC-FARFM feedthrough for R&S® AREGx00A monostatic frontend

Feedthrough types		4 × SMA, 1 × D-Sub 9-pole, 1 × D-Sub 25-pole
Link cables	DSUB	2 × digital links
	SMA	4 × coaxial RF cables
Functionality	DSUB	control interface between R&S® AREG frontend and R&S® AREG base unit
	SMA	RF interfaces between R&S® AREG frontend and R&S® AREG base unit

R&S® TS-F1ETRR1 Ethernet feedthrough

Feedthrough type		1 × Ethernet
Functionality	rear side	to control 3D positioner
	side panel	DUT communications

R&S® TS-F1SD259 D-Sub feedthrough

Feedthrough type		1 × D-Sub 9-pole, 1 × D-Sub 25-pole
Functionality	side panel	DUT communications ⁶

R&S® TS-F1POBB2 banana plugs feedthrough

Feedthrough type		1 × banana plugs
Functionality		DC power supply for DUT
Power supply	maximum voltage	48 V
	maximum current	5 A

R&S® TS-F1BCBB1 BNC feedthrough

Feedthrough type		1 × BNC
Functionality	rear side	trigger

R&S® TS-F1U2BA1 USB 2.0 feedthrough

Feedthrough type		1 × USB 2.0
Functionality	side panel	DUT communications

⁶ Only via D-Sub 9-pole.

R&S® ARC-DUTH1 universal DUT holder for R&S® ATS1500C

Maximum DUT size	∅	30 cm
Material		colorless polycarbonate
Thickness		6 mm
Accessories		clamping brackets

R&S® TS-F1RFFW1 WR12 feedthrough

Waveguide designator Electronic Industries Alliance (EIA)		WR12
Connector type	anti-cocking flange	precision waveguide flange compatible with UG387/U-M
Functionality	rear side	interface to connect general purpose radar target simulator
	additional target distance	< 20 mm

R&S® ARC-F1ARFM feedthrough for R&S® AREG frontend external

Feedthrough type		1 × R&S® AREG frontend external
Functionality	rear side	interface to connect R&S® AREG100A/ R&S® AREG800A frontend outside the chamber, when used in combination with R&S® ARC-FX90 universal feed antenna

R&S® ARC-FX90 universal feed antenna for R&S® ATS1500C

In-band frequency range		60.0 GHz to 90.0 GHz
Polarization	feed antenna	vertical or horizontal polarization possible by changing WR12 interface
Antenna type and gain		OMT with small corrugated horn antenna 10 dBi (nom.) ⁷
	additional radar target distance ⁸	< 1 m
	insertion loss ⁹	1.5 dB (typ.) at 76 GHz to 81 GHz

R&S® ARC-FX90UP upgrade kit to enable second polarization with R&S® ARC-FX90

In-band frequency range		60.0 GHz to 90.0 GHz
Polarization		vertical and horizontal polarization possible ¹⁰
Functionality	additional radar target distance ¹¹	< 1 m
	insertion loss ¹²	1.5 dB (typ.) at 76 GHz to 81 GHz

⁷ Only one polarization is routed to the chamber feedthrough.

⁸ Depending on polarization and type of feedthrough.

⁹ Max. 3.5 dB over frequency range from 60 GHz to 90 GHz.

¹⁰ Two polarizations are routed to the chamber feedthroughs.

¹¹ Depending on polarization and type of feedthrough and in combination with R&S® ARC-FX90.

¹² Max. 3.5 dB over frequency range from 60 GHz to 90 GHz and in combination with R&S® ARC-FX90.

Ordering information

Basic configuration

Designation	Type	Order No.
Antenna test chamber	R&S®ATS1500C	1537.9777K02
Antenna test chamber	R&S®ATS1500C	1537.9777.02
3D tilt-tilt positioner	R&S®ARC-TTP1	1536.0124.02
CATR reflector, large size	R&S®CATR-REFL1	1534.2307.02
Alignment structure, for CATR systems in selected chambers	R&S®CATR-ALIC1	1534.2007.02
Holder for R&S®AREGx00A monostatic frontend	R&S®ARC-HARFM	1536.1095.02
Power filter, 230 V	R&S®ATS-F230V	1532.1161.02
Ventilation 1 for R&S®ATS1500C	R&S®ARC-VENT1	1537.9983.02
Ventilation 2 for R&S®ATS1500C	R&S®ARC-VENT2	1537.9983.03
Feedthrough for R&S®AREGx00A monostatic frontend	R&S®ARC-FARFM	1537.9790.02
Ethernet feedthrough	R&S®TS-F1ETRR1	1525.8729.02
D-Sub feedthrough	R&S®TS-F1SD259	1525.8835.02

Additional options

Designation	Type	Order No.
Banana plugs feedthrough	R&S®TS-F1POBB2	1536.0353.02
BNC feedthrough	R&S®TS-F1BCBB1	1533.4070.02
USB 2.0 feedthrough	R&S®TS-F1U2BA1	1525.8735.02
Universal DUT holder plate for R&S®ATS1500C	R&S®ARC-DUTH1	1536.0282.02
Universal feed antenna for R&S®ATS1500C	R&S®ARC-FX90	1541.8613.02
WR12 feedthrough	R&S®TS-F1RFWW1	1541.8607.02
Feedthrough for R&S®AREG frontend external	R&S®ARC-F1ARFM	1541.8594.02
Upgrade kit to enable second polarization in combination with R&S®ARC-FX90 universal feed antenna	R&S®ARC-FX90UP	1543.1200.02

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ISO 14001

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