

# R&S® ATS1500C

## ANTENNA TEST CHAMBER FOR AUTOMOTIVE RADAR SENSORS

### Specifications



Data Sheet  
Version 03.00

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# Definitions

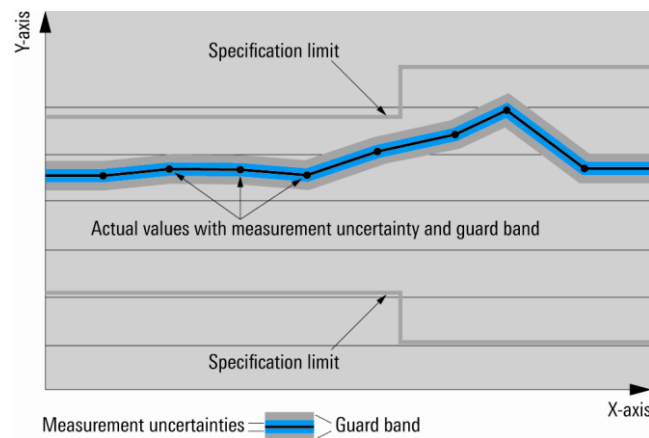
## General

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 bits per second (Gbps), million bits per second (Mbps), thousand bits 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 the R&S®AREG100A automotive radar echo generator as measurement instrument. Its monostatic frontend module is mounted into the chamber as the feed antenna. Further measurement instruments such as power sensors, signal analyzers and signal generators can be attached to the chamber via the R&S®AREG100A.

## 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 at +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 <sup>1</sup>	chamber	6 GHz to 110 GHz
Absorber <sup>2</sup>	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 (W x H x D) <sup>3</sup>		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

<sup>1</sup> Limited by feeding structure, e.g. R&S®AREG100A-B177S.

<sup>2</sup> From 40 GHz to 110 GHz.

<sup>3</sup> Dimensions include all mounts and handle bars attached with the chamber.

**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 × 40 cm
DUT fixture plate	dimensions	7.3 cm × 7.3 cm
	thread size	M3 and M4
	adjustable height	5 cm
	stepped manual rotation (orientation of DUT polarization)	22.5°
Hardware triggering	connection	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 × Ethernet, 1 × D-Sub 9-pole, 1 × USB (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 controller		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 <sup>4</sup>	reflector	6 GHz to 90 GHz
Quiet zone <sup>5</sup>	∅	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 × 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® AREG100A 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

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

<sup>5</sup> 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® AREG100A 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

**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

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

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

## R&S® AREG100A automotive radar echo generator, frontend

In-band frequency range	with R&S® AREG100A-B177S	76.0 GHz to 77.0 GHz
	with R&S® AREG100A-B181S	76.0 GHz to 81.0 GHz
Polarization	feed antenna	linear, vertical polarization, horizontal polarization possible by rotating frontend module
Antenna type and gain	with R&S® AREG-B177S	WR12 rectangular horn antenna 10 dBi (nom.)
	with R&S® AREG-B181S	WR12 rectangular horn antenna 10 dBi (nom.)
RF instantaneous bandwidth	with R&S® AREG100A-B177S	1 GHz
	with R&S® AREG100A-B181S	4 GHz
<b>For complete specifications, see R&amp;S® AREG100A data sheet (PD 3607.7057.22)</b>		

## 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® AREG100A 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® AREG100A 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

## Service that adds value

- ▶ Worldwide
- ▶ Local und 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.

[www.rohde-schwarz.com](http://www.rohde-schwarz.com)

## 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**

Certified Environmental Management

**ISO 14001**

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