

**ROHDE & SCHWARZ**

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# R&S®ATS800R CATR BASED COMPACT 5G NR MMWAVE TEST CHAMBER

Data Sheet | Version 01.00

## Specifications



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# Definitions

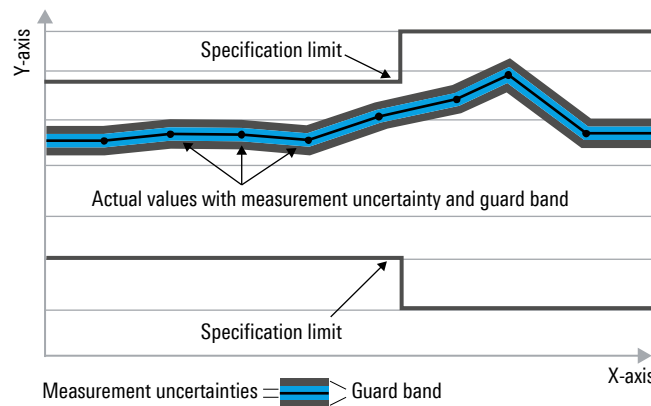
## General

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®ATS800R is a CATR based compact and accurate test chamber for RF testing of antennas, modules or devices in the 5G NR FR2 frequency bands. Values specified are based on system performance level, some individual items might perform better isolated.

### R&S®ATS800R K03 system performance – 20 cm quiet zone (QZ)

| General RF parameters                |                               |                          |
|--------------------------------------|-------------------------------|--------------------------|
| Frequency range                      | in-band                       | 20 GHz to 50 GHz (meas.) |
| Shielding effectiveness <sup>1</sup> | chamber                       | > 60 dB (meas.)          |
| Feed antenna polarization            |                               | dual polarized           |
| RF connectors                        | feed antenna H/V feed through | 2 x PC 2.4 mm (f)        |
|                                      | link/DUT feed through         | 1 x PC 2.4 mm (f)        |

| Quality of quiet zone <sup>2</sup> |                          |                  |
|------------------------------------|--------------------------|------------------|
| Quiet zone size                    |                          | Ø 20 cm (meas.)  |
| Amplitude performance <sup>3</sup> | average amplitude taper  | < 1.5 dB (meas.) |
|                                    | average amplitude ripple | < 0.5 dB (meas.) |
| Total phase variation              | at 28 GHz                | ±7.5° (meas.)    |
|                                    | at 39 GHz                | ±10° (meas.)     |

| Chamber specifications |                            |  |
|------------------------|----------------------------|--|
| DUT load capability    | static, centered           | 5 kg   |
|                        | on positioner, centered    | 2.5 kg   |
| Power supply           | input                      | 100 to 240 V AC, max. 1.4 A                                  |
|                        | output                     | 24 V, max. 5 A   |
| Power plug             |                            | C13  |
| Weight                 | wheels mounted             | approx. 150 kg (330.7 lb)                                    |
|                        | rack mounted               | approx. 300 kg (661.4 lb)                                    |
| Dimensions             | wheels mounted (W x H x D) | 0.69 m x 1.42 m x 1.21 m<br>(27.17 in x 55.91 in x 47.64 in) |
|                        | rack mounted (W x H x D)   | 0.69 m x 1.98 m x 1.21 m<br>(27.17 in x 77.95 in x 47.64 in) |
| Wheels                 | rear lockable              | 4  |
| Door operation         |                            | manually operated, manual closing mechanism                  |
| Ventilation rate       |                            | 140 m <sup>3</sup> /h (nom.)                                 |
| Noise level            |                            | 38 dB(A) (nom.)  |

| Feedthroughs                       |               |   |
|------------------------------------|---------------|---|
| Unoccupied feed throughs available | left          | 3 |
|                                    | right         | 4 |
|                                    | bottom, front | 4 |
|                                    | bottom, rear  | 1 |
|                                    | back, top     | 2 |

### Environmental conditions

|                   |                             |  |
|-------------------|-----------------------------|--|
| Temperature range | operating temperature range | +10 °C to +40 °C   |
|                   | storage temperature range   | -10 °C to +50 °C   |
| Damp heat         |                             | 75 % relative humidity,<br>noncondensing at +10 °C to +40 °C |

<sup>1</sup> From 400 MHz to 60 GHz.

<sup>2</sup> From 23.5 GHz to 44.3 GHz.

<sup>3</sup> Measured from 23.5 GHz to 44.3 GHz.

**Product conformity**

|                               |   |  |
|-------------------------------|---|--|
| Electromagnetic compatibility | in line with<br>EU – EMC Directive 2014/30/EU | applied harmonized standards:<br>• EN 61326-1,<br>• EN 55011, group I, class B equipment |
| Electrical safety             | in line with<br>EU – LVD 2014/35/EU           | applied harmonized and non-harmonized standard:<br>• EN 61010-1                          |
| International                 | UL61010-1<br>CAN C22.2 No. 61010-1-04         |  |
| EU – ROHS 2011/65/EU          | in line with<br>EU – RoHS Directive           | applied harmonized standard:<br>EN IEC 63000   |

**R&S®CATR-REFL3, CATR reflector, medium size**

|                              |     |                                     |
|------------------------------|-----|-------------------------------------|
| Frequency range <sup>8</sup> |     | 6 GHz to 90 GHz (meas.)             |
| Quiet zone                   |     | Ø 20 cm                             |
| Surface roughness            | RMS | < 1 µm                              |
| Dimensions                   |     | 43 cm x 44 cm (16.93 in x 17.32 in) |

**R&S®CATR-FEED3 feed antenna for CATR system**

|                              |         |                    |
|------------------------------|---------|--------------------|
| Frequency range              | in-band | 20 GHz to 50 GHz   |
| Polarization                 |         | dual polarized     |
| RF connectors on feedthrough |         | 2 x PC 1.85 mm (m) |

**R&S®CATR-RACK1 base rack for R&S®ATS800R mounting**

|                     |                               |  |
|---------------------|-------------------------------|--|
| Instrument capacity |                               | 12 HU                                      |
| Sockets             | C13 sockets<br>maximum supply | 8<br>max. 10 A per socket, max. 16 A total |
| Weight              |                               | approx. 150 kg (330.7 lb)                  |

**R&S®CATR-MNTR3 mounting kit for rear side mounting of RRH and RF42**

|                        |                    |                                       |
|------------------------|--------------------|---------------------------------------|
| Maximum number of RRHs |                    | 2 (threads available)                 |
| Maximum number of RF42 | per mounting plate | 1 (threads available)                 |
| Hole pattern           |                    | 50 mm x 50 mm (1.97 in x 1.97 in)     |
| Mounting surface       | W x H              | 500 mm x 500 mm (19.68 in x 19.68 in) |
| Maximum weight         |                    | 20 kg (44.09 lb)                      |

**R&S®CATR-P3DR 3D positioner for R&S®ATS800R**

|                                     |                                |   |
|-------------------------------------|--------------------------------|---|
| Angular resolution                  | azimuth, elevation             | 0.01°                                   |
| Relative accuracy                   | elevation                      |   |
|                                     | DUTs up to 1.5 kg              | < 0.25° (meas.)                         |
|                                     | DUTs up to 2.5 kg              | < 0.50° (meas.)                         |
|                                     | azimuth                        | ≤ 0.10° (meas.)                         |
| Rotating angle                      | maximum for azimuth, elevation | ±182°                                   |
| Rotating speed                      | maximum for azimuth, elevation | 45°/s                                   |
| DUT load capability                 | maximum weight                 | 2.5 kg, centered                        |
|                                     | maximum device size            | Ø 360 mm                                |
| Controller communications interface |                                | USB                                     |
| Control                             |                                | SCPI via local TCP/IP, GUI              |
| Application programming interfaces  |                                | API for C / C++ / C# / VB.NET / MATLAB® |
| Power supply                        | input                          | 100 V to 230 V, max. 1.85 A             |
|                                     | output                         | 36 V, 4.44 A                            |
| Temperature range                   | operating temperature range    | +10 °C to +50 °C                        |
| Weight                              |                                | 8 kg (17.64 lb)                         |

<sup>8</sup> Higher/lower frequencies are possible with higher mean error inside the quiet zone.

**R&S®CATR-P3RJ rotary joints for 3D positioner for R&S®ATS800R**

|                     |                         |                                |
|---------------------|-------------------------|--------------------------------|
| DUT RF rotary joint | number of rotary joints | 2 (1 × elevation, 1 × azimuth) |
|                     | frequency range         | ≤ 50 GHz                       |
|                     | connector types         | PC 2.4 mm female               |

**R&S®CATR-CAM1 camera option, visual and thermal combined**

|                          |                                   |  |
|--------------------------|-----------------------------------|--|
| Image modes              |                                   | visual, thermal, MSX (IR image with enhanced detail presentation)<br>light available |
| Field of view            |                                   | 48° × 37°  |
| Accuracy                 | for values from +10 °C to +100 °C | ±2 °C (nom.)   |
| Communications interface |                                   | Ethernet   |

**R&S®CATR-MIMOA 4x4 MIMO anker**

|                                   |                           |                          |
|-----------------------------------|---------------------------|--------------------------|
| Number of dual polarized antennas |                           | 2                        |
| Antenna mounting                  |                           | Swivel ball or fixed     |
| Adjustability                     | in Y-axis, from QZ center | ±200 mm                  |
| RF connector                      | back, bottom              | 4 × SMA feed through (f) |

**R&S®CATR-HFIXR phantom fixture**

|  |  |                    |
|--|--|--------------------|
| Maximum DUT weight                           |  | 5 kg (11.02 lb)    |
| Alignment options in line with 3GPP standard |  | alignment option 2 |

**Ordering information****Basic configuration**

| Designation   | Type           | Order No.    |
|---|----------------|--------------|
| CATR based compact 5G NR mmWave test chamber          | R&S®ATS800R    | 1534.3403K03 |
| CATR based compact 5G NR mmWave test chamber          | R&S®ATS800R    | 1534.3403.03 |
| Reflector for benchtop CATR, gold-plated, medium size | R&S®CATR-REFL3 | 1534.2807.02 |
| Feed antenna, for CATR systems                        | R&S®CATR-FEED3 | 1534.2207.03 |
| Alignment structure                                   | R&S®CATR-ALIR3 | 1534.3303.03 |

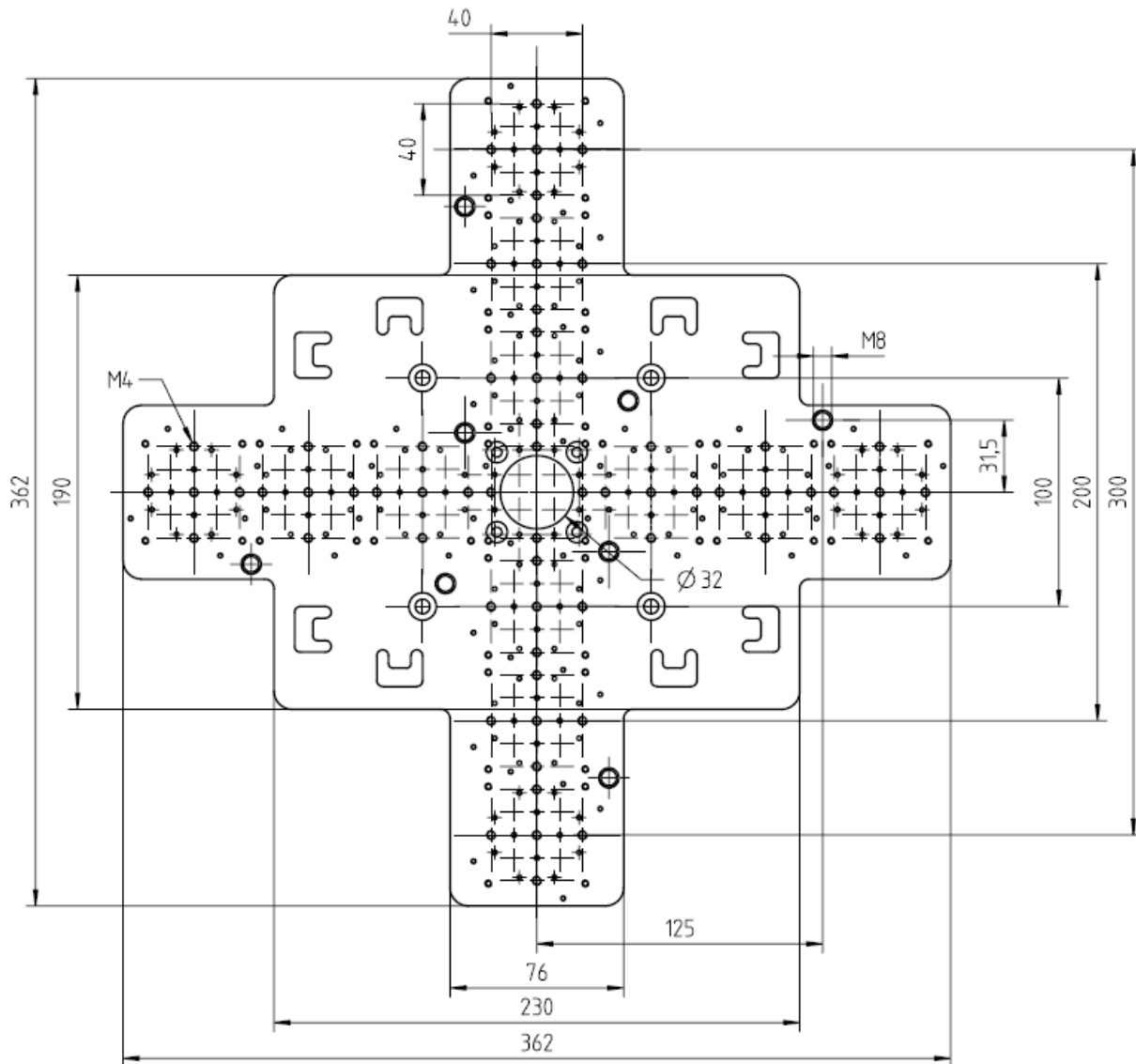
**Additional options**

| Designation  | Type           | Order No.    |
|--|----------------|--------------|
| Base rack for R&S®ATS800R mounting, 12 HU            | R&S®CATR-RACK1 | 1540.6198.02 |
| Mounting kit for rear side mounting of RRHs and RF42 | R&S®CATR-MNTR3 | 1534.1975.03 |
| Positioner 3D, motorized azimuth and elevation       | R&S®CATR-P3DR  | 1534.2820.02 |
| RF rotary joints, for CATR-P3DR 3D positioner        | R&S®CATR-P3RJ  | 1540.6669.02 |
| Camera, visual and thermal view                      | R&S®CATR-CAM1  | 1534.2471.02 |
| 4x4 MIMO anker                                       | R&S®CATR-MIMOA | 1538.8880.02 |
| Cover for throughput testing                         | R&S®CATR-COVER | 1540.6598.02 |
| Upgrade kit chamber for K02 to K03 transition        | R&S®CATR-U800R | 1540.8549.02 |
| Upgrade kit positioner for K02 to K03 transition     | R&S®CATR-UP3DR | 1540.8561.02 |

## Recommended extras

| Designation  | Type           | Order No.    |
|--|----------------|--------------|
| Standard gain horn antenna for calibration, 18 GHz to 26.5 GHz   | R&S®TC-SGH26   | 1530.8630.02 |
| Standard gain horn antenna for calibration, 26.5 GHz to 40 GHz   | R&S®TC-SGH40   | 1530.8617.02 |
| Standard gain horn antenna for calibration, 40 GHz to 60 GHz     | R&S®TC-SGH60   | 1530.8623.02 |
| 50 GHz RF cable, PC 2.4 mm connectors male/female, length: 1.2 m | R&S®ATS-C50MF  | 1535.7977.02 |
| 50 GHz RF cable, PC 2.4 mm connectors male/male, length: 1.2 m   | R&S®ATS-C50MM  | 1535.7983.02 |
| 50 GHz RF cable, PC 2.4 mm connectors male/male, length: 0.3 m   | R&S®ATS-C50MM3 | 3658.4232.02 |

## Drawing



R&S®CATR-DFIR1 mechanical interface

## Rohde & Schwarz

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