

R&S® TS8996 RSE TEST SYSTEM

Specifications



Specifications
Version 10.00

ROHDE & SCHWARZ

Make ideas real



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Definitions

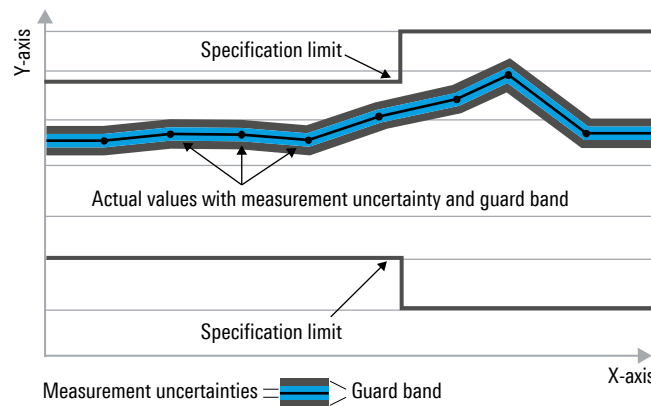
General

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

Signal conditioning units for RSE measurements from 30 MHz to 18 GHz with carrier from 400 MHz to 8 GHz

R&S®OSP-B155G signal conditioning unit, 30 MHz to 18 GHz

The R&S®OSP-B155G signal conditioning unit allows measurements of radiated spurious emissions in the frequency range from 30 MHz to 18 GHz. Its special design in combination with the leveling algorithms of the RSE options of R&S®EMC32 EMC measurement software and R&S®ELEKTRA EMC test software enables the measurement of spurious emissions.



R&S®OSP220 open switch and control platform with R&S®OSP-B155G

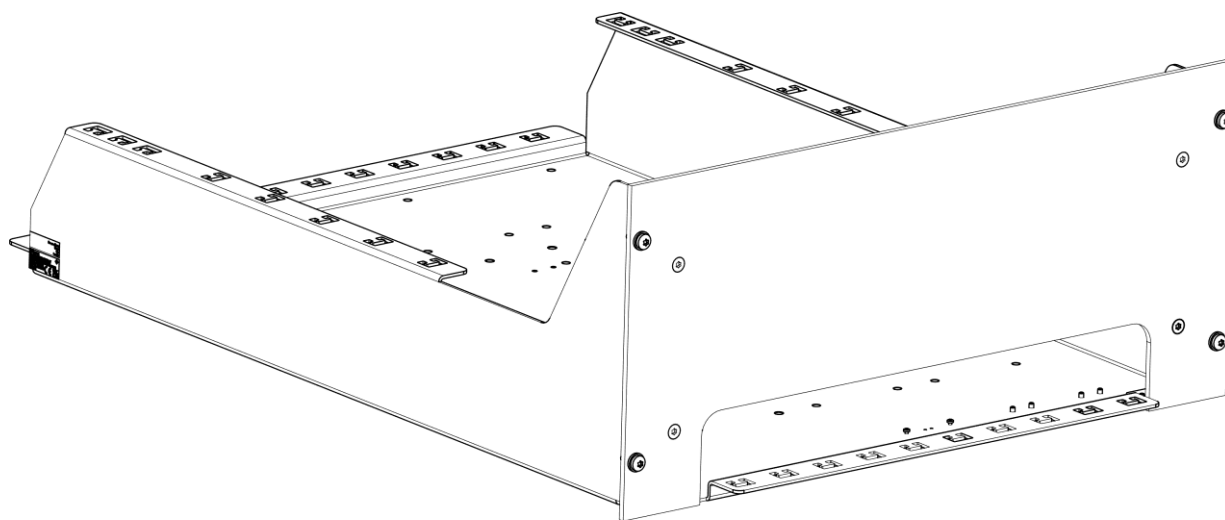
| RF characteristics | | |
|--|---|-----------------------------------|
| Frequency range | | 30 MHz to 18 GHz |
| Maximum EUT power | BiLog antenna, 3 m test distance | +28 dBm |
| Typical sensitivity | R&S®HL562 antenna, 3 m test distance, R&S®ESW or R&S®FSW as analyzer, 12 dB max. cable attenuation between antenna and R&S®OSP-B155G | typ. -50 dBm (1 MHz) (at 6 GHz) |
| Insertion loss, input to output (X1/X2 to X9 connector) | preamplifier off, filters off, attenuation off | |
| | up to 5 GHz | < 3 dB |
| | up to 10 GHz | < 4 dB |
| | up to 18 GHz | < 6 dB |
| | preamplifier off, 1000 MHz lowpass filter on | |
| | from 1500 MHz to 10 GHz | > 40 dB |
| | from 30 MHz to 1000 MHz | < 2.5 dB |
| | preamplifier off, filters off, step attenuation 0 db to 30 dB in 2 dB steps | |
| | up to 5 GHz | < 4 dB + attenuation step value |
| | up to 10 GHz | < 5 dB + attenuation step value |
| | up to 18 GHz | < 8 dB + attenuation step value |
| | preamplifier on, filters off, attenuation off | |
| | up to 5 GHz | < -26 dB |
| | up to 10 GHz | < -23 dB |
| | up to 18 GHz | < -20 dB |
| | preamplifier on, 1000 MHz lowpass filter on | |
| | from 1500 MHz to 10 GHz | > 40 dB |
| | from 30 MHz to 1000 MHz | < -27 dB |
| | preamplifier on, filters off, step attenuation 0 db to 30 dB in 2 dB steps | |
| | up to 5 GHz | < -25 dB + attenuation step value |
| | up to 10 GHz | < -22 dB + attenuation step value |
| | up to 18 GHz | < -19 dB + attenuation step value |
| Insertion loss, input to external filter (X3, X4, X5) ¹¹ | up to 5 GHz | < 2 dB |
| | up to 10 GHz | < 2.5 dB |
| | up to 18 GHz | < 3 dB |
| Insertion loss, external filter (X6, X7, X8) ¹ to output | up to 5 GHz | < 2.5 dB |
| | up to 10 GHz | < 3 dB |
| | up to 18 GHz | < 4.5 dB |
| 1 dB compression point (output) | preamplifier on, from 100 MHz to 18 GHz | typ. 26 dBm, min. 24.5 dBm |
| Maximum amplifier input power (no damage) | preamplifier on | 20 dBm |
| Noise figure | preamplifier on, from 500 MHz to 18 GHz | typ. 3 dB, max. 6 dB |

¹ Interface pairs X3 to X8, X4 to X7, X5 to X6 for external filters

| | | |
|-----------------------|-----------|---|
| RF connectors | | N (f) |
| General data | | |
| DC supply voltage | | 15 V |
| Maximum input current | | 600 mA |
| Slot position | | RS02 to RS03 and FS01 to FS02 |
| Outer dimensions | W x H x D | 217 mm x 70 mm x max. 363 mm (8.54 in x 2.76 in x max. 14.29 in) |
| Weight | | 1.9 kg (4.2 lb) |

R&S®FILTMOUNT1 rack mounting kit for notch filter

For high power services with EIRP > 26 dBm notch filters are required. This is the case e.g. for 2G devices with up to 2 W EIRP. The filters can be switched in the measurement path via R&S®OSP-B155 and, in case of more filters, an additional R&S®OSP-B103. Filters, their mounting material and RF cables are not included.



R&S®FILTMOUNT1 rack mounting kit for notch filter

| | | |
|------------------|-----------|---|
| Outer dimensions | W x H x D | 482.6 mm x 220.7 mm x 679.5 mm (19.0 in x 8.69 in x 26.75 in) 1/1 19", 5U |
| Weight | | 3.4 kg (7.56 lb) |

R&S®TS-PRE2 signal conditioning unit, 1 GHz to 18 GHz

The R&S®TS-PRE2 signal conditioning unit allows measurement of radiated spurious emissions in the frequency range from 1 GHz to 18 GHz in combination with an R&S®HF907 double-ridged waveguide horn antenna. A high sensitivity is achieved by:

- Antenna directly attached to R&S®TS-PRE2 and mounted on a standard EMI mast
- Integrated high gain low noise amplifier (LNA)

To avoid overload, the carrier can be suppressed by switchable highpass filters.



R&S®TS-PRE2 with R&S®HF907 double-ridged waveguide horn antenna

| RF characteristics | | |
|--|--|-------------------------|
| Frequency range | | 1 GHz to 18 GHz |
| Typical sensitivity (RF IN 1/2 to RF OUT) | R&S®HF907 antenna, 3 m test distance, maximum cable attenuation 20 dB between antenna and analyzer (R&S®ESW or R&S®FSW) | typ. -47 dBm (1 MHz) |
| Insertion loss (RF IN 1/2 to RF OUT) | filters off, attenuation off, LNA off | |
| | from 1 GHz to 2.5 GHz | < 2.5 dB |
| | from 2.5 GHz to 8 GHz | < 3.5 dB |
| | from 8 GHz to 18 GHz | < 5 dB |
| | 1000 MHz highpass filter on, attenuation off, LNA off | |
| | from 1 GHz to 2.5 GHz | < 2.5 dB |
| | from 2.5 GHz to 8 GHz | < 3.5 dB |
| | from 8 GHz to 18 GHz | < 7 dB |
| | 2200 MHz highpass filter on, attenuation off, LNA off | |
| | from 1 GHz to 1.8 GHz | > 40 dB |
| | from 2.2 GHz to 8 GHz | < 5 dB |
| | from 8 GHz to 18 GHz | < 7 dB |
| | 4000 MHz highpass filter on, attenuation off, LNA off | |
| | from 1 GHz to 3.6 GHz | > 40 dB |
| | from 4 GHz to 8 GHz | < 5 dB |
| | from 8 GHz to 18 GHz | < 7 dB |
| | 8000 MHz highpass filter on, attenuation off, LNA off | |
| | from 1 GHz to 7.2 GHz | > 40 dB |
| | from 8 GHz to 18 GHz | < 7 dB |
| | 10 dB attenuation on, filters off, LNA off | |
| | from 1 GHz to 8 GHz | 13.5 dB to 9.5 dB |
| | from 8 GHz to 18 GHz | < 15 dB |
| | LNA on, filters off, attenuation off | |
| | from 1 GHz to 8 GHz | > -30 dB |
| | from 8 GHz to 18 GHz | > -29 dB |
| Additional gain (additional amplifier) | from 1 GHz to 8 GHz | > 30 dB |
| | from 8 GHz to 18 GHz | > 28 dB |
| 1 dB compression point (input) | RF IN to RF OUT | min. -20 dBm |
| Maximum input power (no damage) | RF IN to RF OUT | 13 dBm |
| Noise figure | RF IN to RF OUT | typ. 4 dB, max. 6 dB |
| RF connectors | | 1 × NP (f), 2 × SMA (f) |

| General data | | |
|-----------------------|--------------------------------|--|
| Control | | R&S®OSP with R&S®OSP-B103 and R&S®TS-CS96PRE control cable set with included power supply required |
| DC supply voltage | external power supply required | 15 V |
| Maximum input current | external power supply required | 1200 mA |
| Outer dimensions | W x H x D | 257 mm x max. 210 mm x 81.5 mm (10.12 in x max. 8.27 in x 3.33 in) |
| Weight | | 2.8 kg (6.17 lb) |

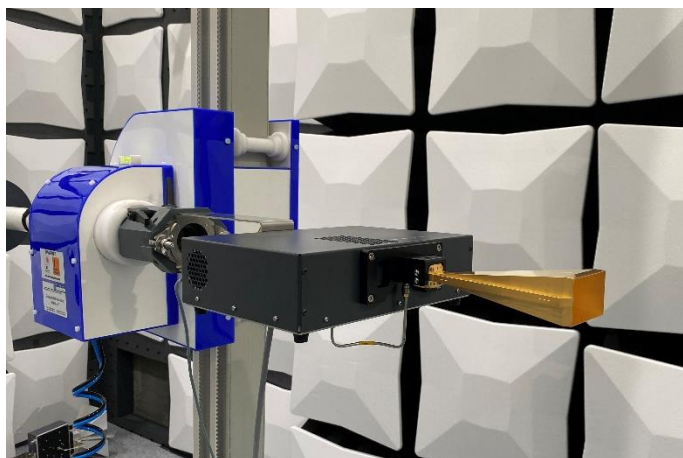
R&S®TS-PRE1850 signal conditioning unit, 18 GHz to 50 GHz

The R&S®TS-PRE1850 signal conditioning unit allows measurement of radiated spurious emissions in the frequency range from 18 GHz to 50 GHz in combination with the included R&S®DRH40G20K and the optional R&S®SGH60G25V horn antenna.

The unit uses 1.85 mm connectors, so an easy upgrade or replacement is possible when higher frequencies are necessary.

A high sensitivity is achieved by:

- Antenna directly attached to R&S®TS-PRE1850 and mounted on a standard EMI mast
- Integrated high gain LNA
- Integrated 35 dB step attenuator



R&S®TS-PRE1850 mounted in EMC chamber

| RF characteristics | | |
|---------------------------------|---|---|
| Frequency range | | 18 GHz to 40 GHz |
| | with R&S®TS-PRE-B1 | 40 GHz to 50 GHz |
| Typical sensitivity | 3 m test distance, maximum cable attenuation: 15 dB between antenna and analyzer (R&S®FSW or R&S®ESW) | typ. -13 dBm (1 MHz) |
| Gain (without antenna) | 18 GHz to 40 GHz | > 20 dB |
| | 40 GHz to 50 GHz | > 18 dB |
| 1 dB compression point (output) | 18 GHz to 40 GHz | > 13 dBm |
| | 40 GHz to 50 GHz | > 8 dBm |
| Maximum input power (no damage) | RF IN to RF OUT AMP | 13 dBm |
| Noise figure | 18 GHz to 40 GHz | typ. < 5 dB |
| | 40 GHz to 50 GHz | typ. < 7 dB |
| Step attenuator | | 0 dB to 35 dB in 5 dB steps |
| RF connectors | | 2 x 1.85 mm (f) |
| General data | | |
| Control | | R&S®OSP with R&S®OSP-B153B (mandatory) |
| Supply voltage | via R&S®OSP-B153B (mandatory) | 15 V |
| Maximum current | | 250 mA |
| Outer dimensions | W x H x D | 257 mm x max. 210 mm x 81.5 mm (10.12 in x max. 8.27 in x 3.33 in) |
| Weight | | 2.8 kg (6.17 lb) |

R&S®TS-LNA1840 preamplifier unit, 18 GHz to 40 GHz

The R&S®TS-LNA1840 preamplifier unit allows measurement of radiated spurious emissions in the frequency range from 18 GHz to 40 GHz in combination with the included R&S®DRH40G20K horn antenna.

The unit uses 1.85 mm connectors, so an easy upgrade or replacement is possible when higher frequencies are necessary.

- Antenna directly attached to R&S®TS-LNA1840 and mounted on a standard EMI mast
- Integrated high gain LNA
- Easily extendable to 50 GHz

| RF characteristics | | |
|---------------------------------|---|---|
| Frequency range | | 18 GHz to 40 GHz |
| | with R&S®TS-PRE-B1 | 40 GHz to 50 GHz |
| Typical sensitivity | 3 m test distance, maximum cable attenuation: 15 dB between antenna and analyzer (R&S®FSW or R&S®ESW) | typ. -13 dBm (1 MHz) |
| Gain (without antenna) | 18 GHz to 40 GHz | > 20 dB |
| | 40 GHz to 50 GHz | > 18 dB |
| 1 dB compression point (output) | 18 GHz to 40 GHz | > 13 dBm |
| | 40 GHz to 50 GHz | > 8 dBm |
| Maximum input power (no damage) | RF IN to RF OUT AMP | 13 dBm |
| Noise figure | 18 GHz to 40 GHz | typ. < 5 dB |
| | 40 GHz to 50 GHz | typ. < 7 dB |
| RF connectors | | 2 × 1.85 mm (f), 1.85 mm to 2.92 mm adapter included |
| General data | | |
| Supply voltage | | 15 V via included power supply |
| Maximum current | | 250 mA |
| Outer dimensions | W × H × D | 257 mm × max. 210 mm × 81.5 mm (10.12 in × max. 8.27 in × 3.33 in) |
| Weight | | 2.8 kg (6.17 lb) |

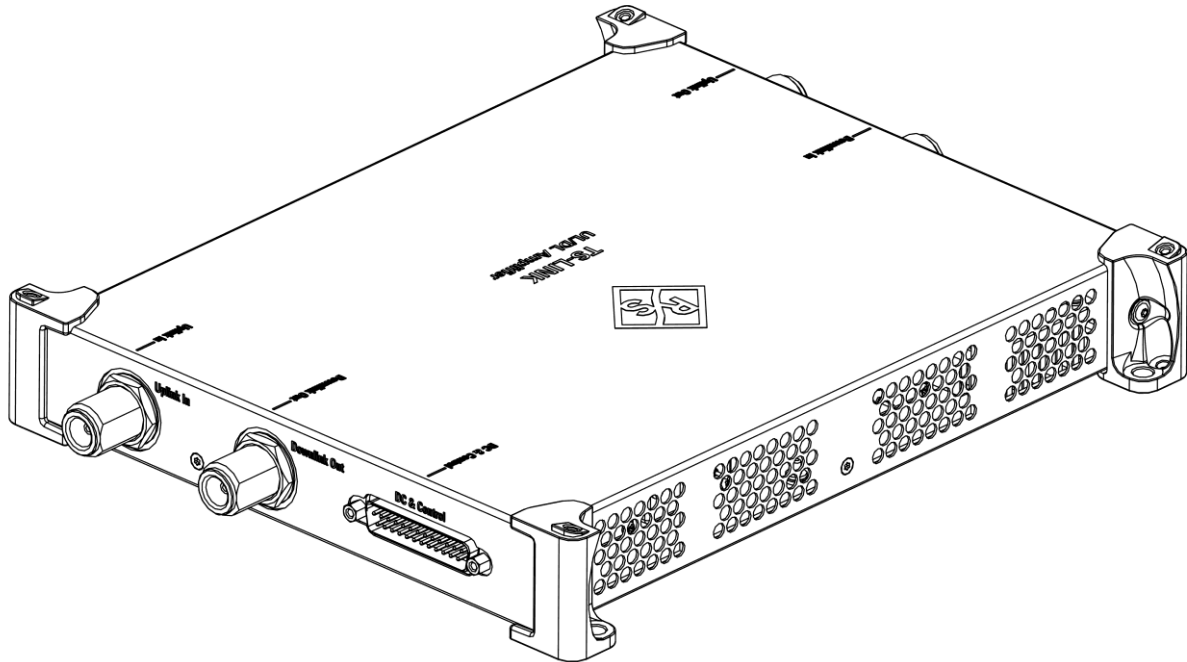
R&S®TS-PRE-B1 antenna, 40 GHz to 50 GHz, for R&S®TS-PRE1850 and R&S®TS-LNA1840

For a frequency extension to 50 GHz the R&S®TS-PRE-B1 antenna can be easily attached to the base units instead of the 18 GHz to 40 GHz antenna delivered with the units.

The technical data are identical to the technical data of the R&S®SGH60G25V horn antenna.

R&S®TS-LINK link amplifier for RSE measurements

R&S®TS-LINK allows stable communications links by amplifying the signal during RSE measurements in combination with the R&S®CMW and R&S®CMX radio communication testers. The downlink path has one amplifier and the uplink path has up to three amplifiers which can be switched.



R&S®TS-LINK link amplifier for RSE measurements

| RF characteristics | | |
|---------------------------------|---|--|
| Frequency range | | 800 MHz to 8 GHz |
| Insertion loss | without LNA (uplink in to uplink out) | < 3 dB |
| | without LNA (downlink in to downlink out) | < 4 dB |
| RF gain | uplink in to uplink out (per amplifier) | 17 dB (typ.) |
| | downlink in to downlink out | 28 dB (typ.) |
| 1 dB compression point (output) | uplink in to uplink out (one amplifier) | 16 dBm |
| | downlink in to downlink out | 26 dBm |
| Maximum input power (no damage) | uplink in (one amplifier) | 8 dBm (23 dBm for 5 minutes) |
| | downlink in | 20 dBm |
| Noise figure | uplink in to uplink out | 2.5 dB (typ.) |
| | downlink in to downlink out | 3 dB (typ.), max. 6 dB |
| RF connectors | | 4 × N (f) |
| General data | | |
| Control | | R&S®OSP with R&S®OSP-B103 and R&S®TS-CS96LIN control cable set with included power supply required |
| DC supply voltage | external power supply required | 15 V |
| Maximum input current | external power supply required | 900 mA |
| Outer dimensions | W × H × D | 219 mm × 40 mm × 286 mm (8.62 in × 1.58 in × 11.26 in) |
| Weight | | 1.52 kg (3.35 lb) |

R&S®TC-RSE60/90/140/220/325 frequency converters

The frequency converters extend the frequency range of an R&S®FSW signal and spectrum analyzer or R&S®ESW EMI test receiver, equipped with R&S®FSW-B21 or R&S®ESW-B21 option. They combine high sensitivity of better than –40 dBm EIRP in 1 m test distance with a high dynamic. The units are automatically recognized and power supplied via an R&S®OSP with R&S®OSP-B153B module.

R&S®TC-RSE60 receive unit

| RF characteristics | | |
|---------------------------------|---|--|
| Frequency range | RF | 41 GHz to 60 GHz |
| | LO | 9.6 GHz to 14.6 GHz |
| | IF | 10 MHz to 3.2 GHz |
| Optimum LO level range | | +15 dBm to +16 dBm |
| Absolute maximum rated LO level | RF input level < maximum permissible CW RF input level | +18 dBm |
| LO multiplication factor | | 4 |
| RF gain | 41 GHz to 60 GHz | 13 dB (nom.) |
| Maximum EIRP at 1 m distance | 41 GHz to 60 GHz | 30 dBm (nom.) |
| Connector type | | 2 × K (f) (PC 2.92 mm) |
| General data | | |
| Power supply and control | | R&S®OSP-B153B |
| Supply voltage and current | via R&S®OSP-B153B | 15 V, < 100 mA; 27 V, < 10 mA; 3.3 V, < 30 mA |
| Dimensions | W × H × D | 307 mm × 85 mm × 64 mm (12.09 in × 3.35 in × 2.52 in) |
| Weight | | 490 g (1.08 lb) |

R&S®TC-RSE90 receive unit, model .02

| RF characteristics | | |
|---------------------------------|---|--|
| Frequency range | RF | 60 GHz to 93 GHz |
| | LO | 9.7 GHz to 14.8 GHz |
| | IF | 10 MHz to 3.2 GHz |
| Optimum LO level range | | +15 dBm to +16 dBm |
| Absolute maximum rated LO level | RF input level < maximum permissible CW RF input level | +18 dBm |
| LO multiplication factor | | 6 |
| RF gain | 60 GHz to 93 GHz | 21 dB (nom.) |
| Maximum EIRP at 1 m distance | 60 GHz to 93 GHz | 17 dBm (nom.) |
| Connector type | | 2 × K (f) (PC 2.92 mm) |
| General data | | |
| Power supply and control | | R&S®OSP-B153B |
| Supply voltage and current | via R&S®OSP-B153B | 15 V, < 150 mA; 27 V, < 10 mA; 3.3 V, < 30 mA |
| Dimensions | W × H × D | 307 mm × 85 mm × 64 mm (12.09 in × 3.35 in × 2.52 in) |
| Weight | | 510 g (1.12 lb) |

R&S®TC-RSE90 receive unit, model .03

| | | |
|---------------------------------|---|--|
| RF characteristics | | |
| Frequency range | RF | 60 GHz to 90 GHz |
| | LO | 9.7 GHz to 14.8 GHz |
| | IF | 10 MHz to 3.2 GHz |
| Optimum LO level range | | +15 dBm to +16 dBm |
| Absolute maximum rated LO level | RF input level < maximum permissible CW RF input level | +18 dBm |
| LO multiplication factor | | 6 |
| RF gain | 60 GHz to 90 GHz | 21 dB (nom.) |
| Maximum EIRP at 1 m distance | 60 GHz to 90 GHz | 17 dBm (nom.) |
| Connector type | | 2 x K (f) (PC 2.92 mm) |
| General data | | |
| Power supply and control | | R&S®OSP-B153B |
| Supply voltage and current | via R&S®OSP-B153B | 15 V, < 150 mA; 27 V, < 10 mA; 3.3 V, < 30 mA |
| Dimensions | W x H x D | 307 mm x 85 mm x 64 mm (12.09 in x 3.35 in x 2.52 in) |
| Weight | | 510 g (1.12 lb) |

R&S®TC-RSE140 receive unit

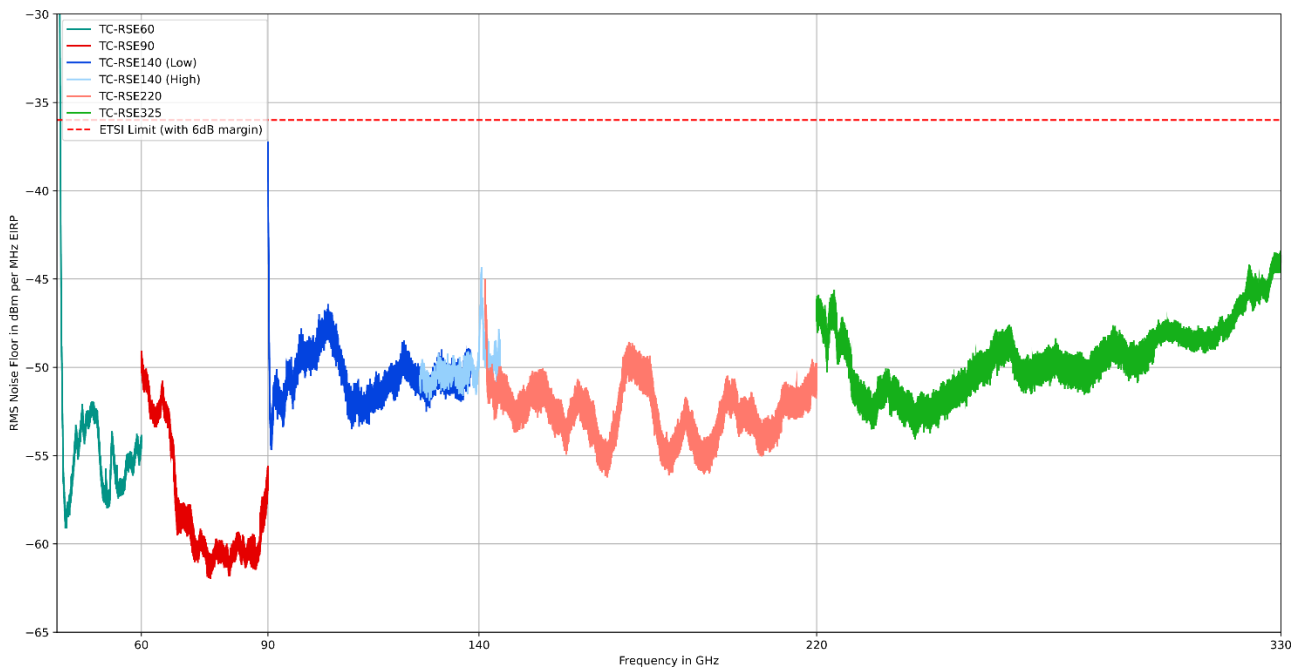
| | | |
|---------------------------------------|---|--|
| RF characteristics | | |
| Frequency range | RF | 90 GHz to 145 GHz |
| | LO | 11.0 GHz to 17.4 GHz |
| | IF | 10 MHz to 20 GHz |
| Optimum LO level range | | +13 dBm to +16 dBm |
| Absolute maximum rated LO level | RF input level < maximum permissible CW RF input level | +19 dBm |
| LO multiplication factor (switchable) | low (90 GHz to 130 GHz) | 8 |
| | high (120 GHz to 145 GHz) | 16 |
| RF gain | 90 GHz to 145 GHz | 8 dB (nom.) |
| Maximum EIRP at 1 m distance | 90 GHz to 145 GHz | 37 dBm (nom.) |
| Connector type | | 2 x K (f) (PC 2.92 mm) |
| General data | | |
| Power supply and control | | R&S®OSP-B153B |
| Supply voltage and current | via R&S®OSP-B153B | 15 V, < 650 mA; 27 V, < 10 mA; 3.3 V, < 30 mA |
| Dimensions | W x H x D | 307 mm x 85 mm x 64 mm (12.09 in x 3.35 in x 2.52 in) |
| Weight | | 1080 g (2.38 lb) |

R&S®TC-RSE220 receive unit

| | | |
|---------------------------------|---|--|
| RF characteristics | | |
| Frequency range | RF | 145 GHz to 220 GHz |
| | LO | 8.625 GHz to 13.75 GHz |
| | IF | 10 MHz to 3.2 GHz |
| Optimum LO level range | | +5 dBm to +6 dBm |
| Absolute maximum rated LO level | RF input level < maximum permissible CW RF input level | +10 dBm |
| LO multiplication factor | | 16 |
| RF gain | 138 GHz to 220 GHz | 10 dB (nom.) |
| Maximum EIRP at 1 m distance | 138 GHz to 220 GHz | 37 dBm (nom.) |
| Connector type | | 2 x SMA (f) |
| General data | | |
| Power supply and control | | R&S®OSP-B153B |
| Supply voltage and current | via R&S®OSP-B153B | 15 V, < 700 mA; 27 V, < 10 mA; 3.3 V, < 30 mA |
| Dimensions | W x H x D | 307 mm x 85 mm x 64 mm (12.09 in x 3.35 in x 2.52 in) |
| Weight | | 630 g (1.39 lb) |

R&S®TC-RSE325 receive unit

| RF characteristics | | |
|---------------------------------|---|--|
| Frequency range | RF | 220 GHz to 325 GHz |
| | LO | 9.16 GHz to 13.75 GHz |
| | IF (typ.) | 10 MHz to 2.9 GHz |
| Optimum LO level range | | +4 dBm to +5 dBm |
| Absolute maximum rated LO level | RF input level < maximum permissible CW RF input level | +10 dBm |
| LO multiplication factor | | 24 |
| RF gain | 220 GHz to 325 GHz | 10 dB (nom.) |
| Maximum EIRP at 1 m distance | 220 GHz to 325 GHz | 37 dBm (nom.) |
| Connector type | | 2 x SMA (f) |
| General data | | |
| Power supply and control | | R&S®OSP-B153B |
| Supply voltage and current | via R&S®OSP-B153B | 15 V, < 700 mA; 27 V, < 10 mA; 3.3 V, < 30 mA |
| Dimensions | W x H x D | 335 mm x 85 mm x 64 mm (13.19 in x 3.35 in x 2.52 in) |
| Weight | | 800 g (1.39 lb) |



Typical sensitivity EIRP in 1 m test distance with 1 MHz RBW of R&S®TC-RSE receive units with R&S®FSW or R&S®ESW

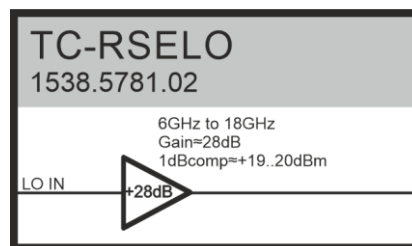
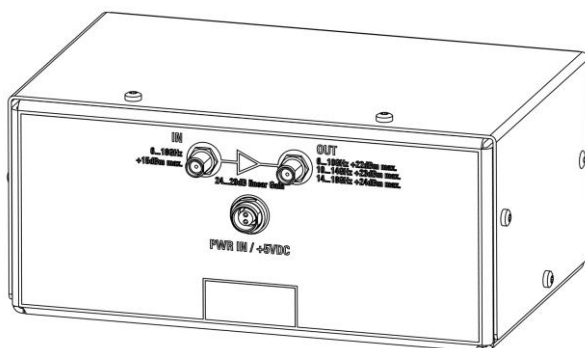
R&S®TC-RSEPOS adapter

With the R&S®TC-RSEPOS adapter up to four R&S®TC-RSE receive units are mounted together into one assembly and the bands are switched automatically. Together with the Maturo EAP positioner and the R&S®ELEKTRA software, automatic measurements over the full frequency range are possible.

| RF characteristics | | |
|-------------------------------|-------------------|---|
| Frequency range IF path | | DC to 18 GHz |
| Frequency range LO path | | 6 GHz to 18 GHz |
| Number of relays | | 2 × SP6T |
| Switching time | | < 15 ms |
| LO amplifier gain | | 28 dB (nom.) |
| General data | | |
| Connector type | | SMA (f) |
| Connectors | | SMA (f) |
| Power supply | | R&S®OSP-B153B |
| DC supply voltage and current | via R&S®OSP-B153B | 15 V, < 300 mA; 27 V, < 10 mA; 3.3 V, < 30 mA |
| Dimensions | W × H × D | 240 mm × 258 mm × 320 mm (9.45 in × 10.16 in × 12.60 in) |
| Weight | | 2.2 kg (4.85 lb) |

R&S®TC-RSELO LO amplifier for a single R&S®TC-RSE converter

With the R&S®TC-RSELO amplifier a single R&S®TC-RSE converter can be used together with a tripod and the R&S®RSEGL tripod adapter.



R&S®TC-RSELO – schematic representation

| RF characteristics | | |
|-------------------------------|-----------|---|
| Frequency range | | 6 GHz to 18 GHz |
| LO amplifier gain | | 28 dB (typ.) |
| LO output power in saturation | | 17 dB to 21 dB (typ.) |
| Input power | | max. +10 dBm |
| General data | | |
| Connector type | | SMA (f) |
| Connectors | | SMA (f) |
| Power supply | | wall power supply |
| DC supply voltage and current | | 5 V, < 1.6 A |
| Dimensions | W × H × D | 240 mm × 258 mm × 320 mm (9.45 in × 10.16 in × 12.60 in) |
| Weight | | 500 g (1.10 lb) |

R&S®TC-MX60/90/140/220/325 frequency multipliers

The frequency multipliers are used for system check and level calibration of a radiated test setup, e.g. radiated spurious emissions (RSE).

R&S®TC-MX60 multiplier unit

| RF characteristics | | |
|---|--|--|
| Frequency range | input | 9 GHz to 14 GHz |
| | output | 40 GHz to 60 GHz |
| RF multiplication factor | | 4 |
| RF gain | | 19 dB (nom.) |
| Optimum RF input power level range | | +5 dBm to +7 dBm |
| Absolute maximum rated RF input power level | RF input level < maximum permissible CW RF input level | +10 dBm |
| General data | | |
| Connectors | | 1 × K (f) (PC 2.92 mm) |
| Power supply | | R&S®OSP-B153B |
| Supply voltage and current | via R&S®OSP-B153B | 15 V, < 450 mA; 27 V, < 10 mA; 3.3V, < 30 mA |
| Dimensions | W × H × D | 307 mm × 85 mm × 64 mm (12.09 in × 3.35 in × 2.52 in) |
| Weight | | 1.23 kg (2.71 lb) |

R&S®TC-MX90 multiplier unit, model .02

| RF characteristics | | |
|---|--|--|
| Frequency range | input | 10 GHz to 15 GHz |
| | output | 60 GHz to 93 GHz |
| RF multiplication factor | | 6 |
| RF gain | | 21 dB (nom.) |
| Optimum RF input power level range | | +5 dBm to +7 dBm |
| Absolute maximum rated RF input power level | RF input level < maximum permissible CW RF input level | +10 dBm |
| General data | | |
| Connectors | | 1 × K (f) (PC 2.92 mm) |
| Power supply | | R&S®OSP-B153B |
| Supply voltage and current | via R&S®OSP-B153B | 15 V, < 550 mA; 27 V, < 10 mA; 3.3 V, < 30 mA |
| Dimensions | W × H × D | 307 mm × 85 mm × 64 mm (12.09 in × 3.35 in × 2.52 in) |
| Weight | | 1.05 kg (2.32 lb) |

R&S®TC-MX90 multiplier unit, model .03

| RF characteristics | | |
|---|--|--|
| Frequency range | input | 10 GHz to 15.5 GHz |
| | output | 60 GHz to 90 GHz |
| RF multiplication factor | | 6 |
| RF gain | | 21 dB (nom.) |
| Optimum RF input power level range | | +5 dBm to +7 dBm |
| Absolute maximum rated RF input power level | RF input level < maximum permissible CW RF input level | +10 dBm |
| General data | | |
| Connectors | | 1 × K (f) (PC 2.92 mm) |
| Power supply | | R&S®OSP-B153B |
| Supply voltage and current | via R&S®OSP-B153B | 15 V, < 550 mA; 27 V, < 10 mA; 3.3 V, < 30 mA |
| Dimensions | W × H × D | 307 mm × 85 mm × 64 mm (12.09 in × 3.35 in × 2.52 in) |
| Weight | | 1.05 kg (2.32 lb) |

R&S®TC-MX140 multiplier unit

| RF characteristics | | |
|---|---|--|
| Frequency range | input | 15 GHz to 22.33 GHz |
| | output | 90 GHz to 138 GHz |
| RF multiplication factor | | 6 |
| RF gain | | 17 dB (nom.) |
| Optimum RF input power level range | | +5 dBm to +7 dBm |
| Absolute maximum rated RF input power level | RF input level < maximum permissible CW RF input level | +10 dBm |
| General data | | |
| Connectors | | 1 × K (f) (PC 2.92 mm) |
| Power supply | | R&S®OSP-B153B |
| Supply voltage and current | via R&S®OSP-B153B | 15 V, < 600 mA; 27 V, < 10 mA; 3.3 V, < 30 mA |
| Dimensions | W × H × D | 307 mm × 85 mm × 64 mm (12.09 in × 3.35 in × 2.52 in) |
| Weight | | 950 g (2.09 lb) |

R&S®TC-MX220 multiplier unit

| RF characteristics | | |
|---|---|--|
| Frequency range | input | 12.5 GHz to 18.33 GHz |
| | output | 138 GHz to 220 GHz |
| RF multiplication factor | | 12 |
| RF gain | | 11 dB (nom.) |
| Optimum RF input power level range | | +5 dBm to +7 dBm |
| Absolute maximum rated RF input power level | RF input level < maximum permissible CW RF input level | +10 dBm |
| General data | | |
| Connectors | | 1 × K (f) (PC 2.92 mm) |
| Power supply | | R&S®OSP-B153B |
| Supply voltage and current | via R&S®OSP-B153B | 15 V, < 500 mA; 27 V, < 10 mA; 3.3 V, < 30 mA |
| Dimensions | W × H × D | 307 mm × 85 mm × 64 mm (12.09 in × 3.35 in × 2.52 in) |
| Weight | | 880 g (1.94 lb) |

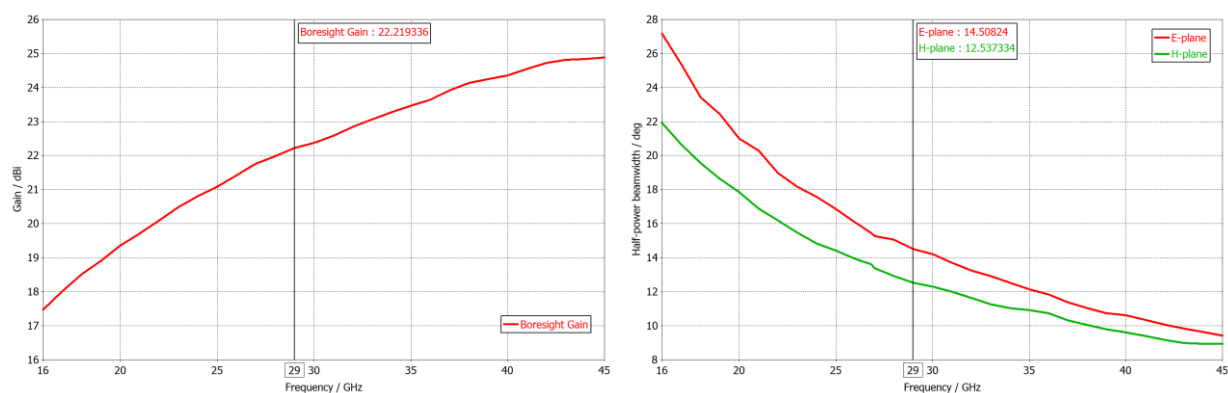
R&S®TC-MX325 multiplier unit

| RF characteristics | | |
|---|---|--|
| Frequency range | input | 12.22 GHz to 18.05 GHz |
| | output | 220 GHz to 325 GHz |
| RF multiplication factor | | 18 |
| RF gain | | 11 dB (nom.) |
| Optimum RF input power level range | | +5 dBm to +7 dBm |
| Absolute maximum rated RF input power level | RF input level < maximum permissible CW RF input level | +10 dBm |
| General data | | |
| Connectors | | 1 × SMA (f) |
| Power supply | | R&S®OSP-B153B |
| Supply voltage and current | via R&S®OSP-B153B | 15 V, < 1100 mA; 27 V, < 10 mA; 3.3 V, < 30 mA |
| Dimensions | W × H × D | 307 mm × 85 mm × 64 mm (12.09 in × 3.35 in × 2.52 in) |
| Weight | | 880 g (1.94 lb) |

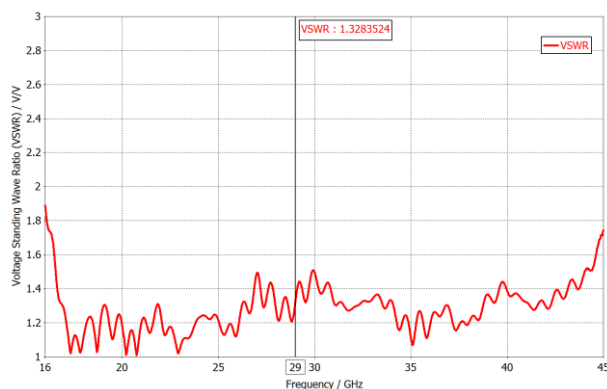
Horn antennas, 18 GHz to 330 GHz

R&S®DRH40G20K double ridged horn antenna, 18 GHz to 40 GHz

| | | |
|-----------------------------|---|---|
| Frequency range | | 18 GHz to 40 GHz |
| VSWR | | < 1.6 (nom.) |
| Polarization | | linear (nom.) |
| Gain | 29 GHz | 22 dBi (nom.) |
| 3 dB beamwidth | 29 GHz | 13° (nom.) |
| Phase center (PHC) location | On-axis offset from the antenna aperture, for the main radiation beam at 29 GHz | 28 mm (nom.) |
| Antenna port | | 1 × K (f) (2.92 mm) |
| Outer dimensions | L × W × H | 191 mm × 71 mm × 38 mm (7.52 in × 2.80 in × 1.50 in) |



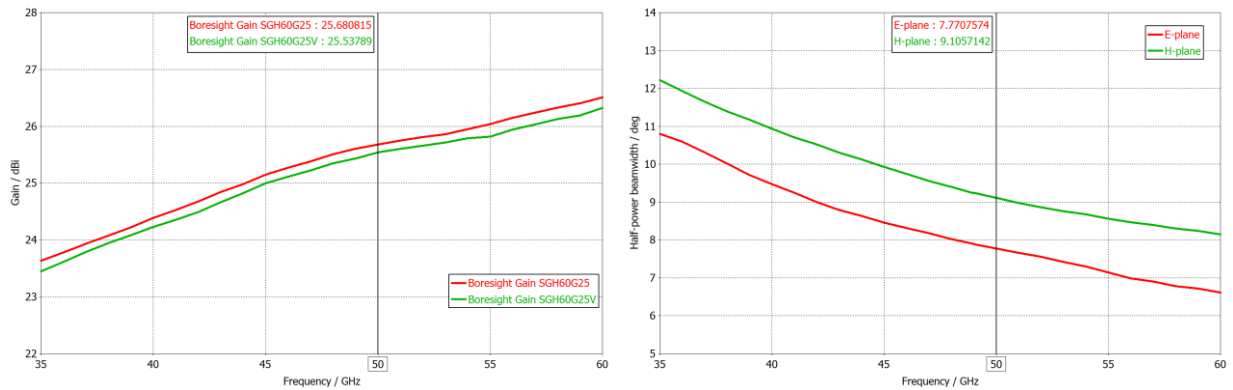
Boresight gain and half-power beamwidth of the R&S®DRH40G20K double ridged horn antenna (nom.)



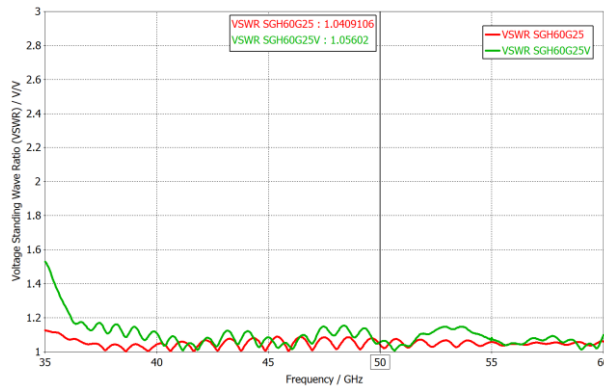
VSWR of the R&S®DRH40G20K double ridged horn antenna (nom.)

R&S®SGH60G25/R&S®SGH60G25V standard gain horn antenna, 40 GHz to 60 GHz

| | | |
|---------------------------------|--|---|
| Frequency range | | 40 GHz to 60 GHz |
| VSWR | | < 1.2 (nom.) |
| Polarization | | linear (nom.) |
| Gain | 50 GHz | 25 dBi (nom.) |
| 3 dB beamwidth | 50 GHz | 8° (nom.) |
| Phase center (PHC) location | on-axis offset from the antenna aperture, for the main radiation beam at 50 GHz | 75 mm (nom.) |
| Antenna port | R&S®SGH60G25 | WR19 waveguide |
| | R&S®SGH60G25V | 1 × V (f) (1.85 mm coaxial) |
| Outer dimensions (R&S®SGH60G25) | L × W × H | 131 mm × 50.8 mm × 41.8 mm (5.16 in × 2.00 in × 1.65 in) |



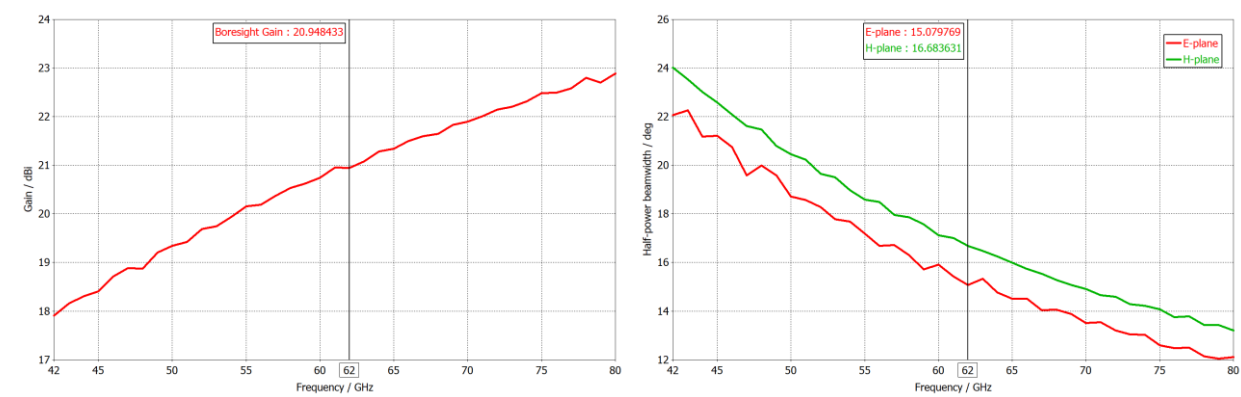
Boresight gain and half-power beamwidth of the R&S®SGH60G25/R&S®SGH60G25V standard gain horn antenna (nom.)



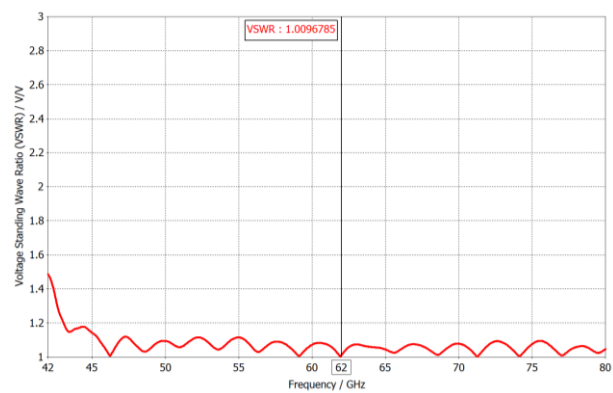
VSWR of the R&S®SGH60G25/R&S®SGH60G25V standard gain horn antenna (nom.)

R&S®SGH75G20 standard gain horn antenna, 50 GHz to 75 GHz

| | | |
|-----------------------------|---|--|
| Frequency range | | 50 GHz to 75 GHz |
| VSWR | | < 1.15 (nom.) |
| Polarization | | linear (nom.) |
| Gain | 62 GHz | 21 dBi (nom.) |
| 3 dB beamwidth | 62 GHz | 15° (nom.) |
| Phase center (PHC) location | on-axis offset from the antenna aperture, for the main radiation beam at 62 GHz | 13 mm (nom.) |
| Antenna port | | WR15 waveguide |
| Outer dimensions | L x W x H | 49 mm x 20.40 mm x 16.40 mm (1.93 in x 0.80 in x 0.65 in) |



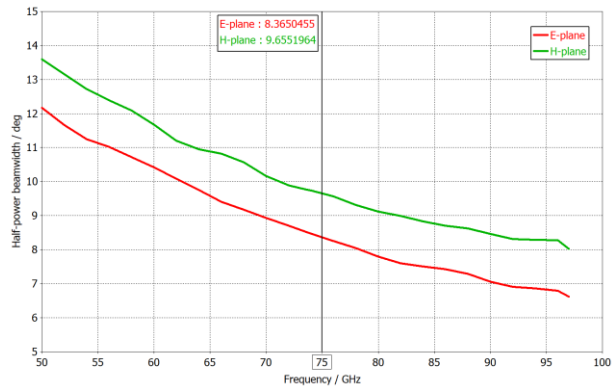
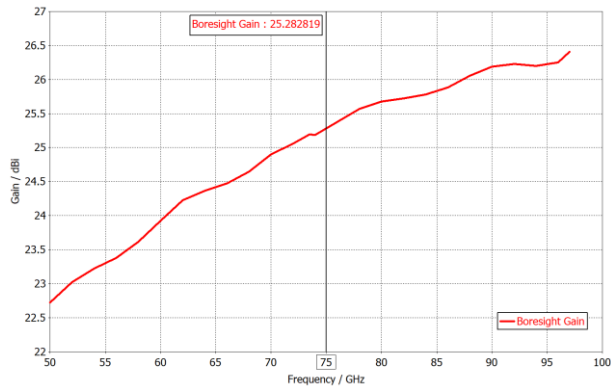
Boresight gain and half-power beamwidth of the R&S®SGH75G20 standard gain horn antenna (nom.)



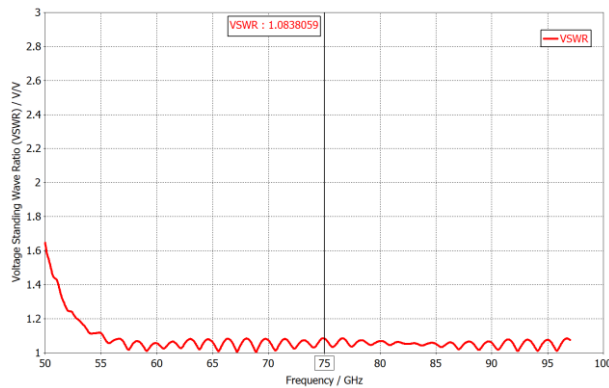
VSWR of the R&S®SGH75G20 standard gain horn antenna (nom.)

R&S®SGH90G25 standard gain horn antenna, 60 GHz to 90 GHz

| | | |
|-----------------------------|--|--|
| Frequency range | | 60 GHz to 90 GHz |
| VSWR | | < 1.1 (nom.) |
| Polarization | | linear (nom.) |
| Gain | 75 GHz | 25 dBi (nom.) |
| 3 dB beamwidth | 75 GHz | 9° (nom.) |
| Phase center (PHC) location | on-axis offset from the antenna aperture, for the main radiation beam at 75 GHz | 38 mm (nom.) |
| Antenna port | | WR12 waveguide |
| Outer dimensions | L × W × H | 80.5 mm × 31.4 mm × 25.4 mm (3.17 in × 1.24 in × 1.00 in) |



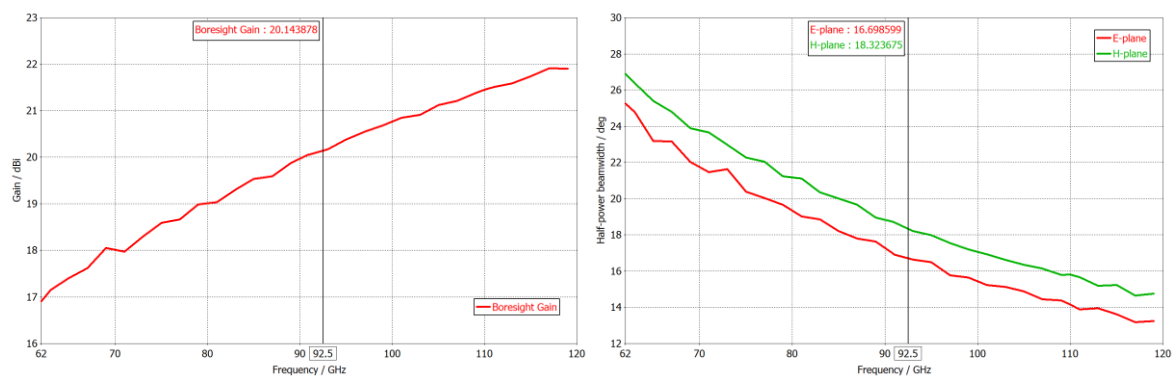
Boresight gain and half-power beamwidth of the R&S®SGH90G25 standard gain horn antenna (nom.)



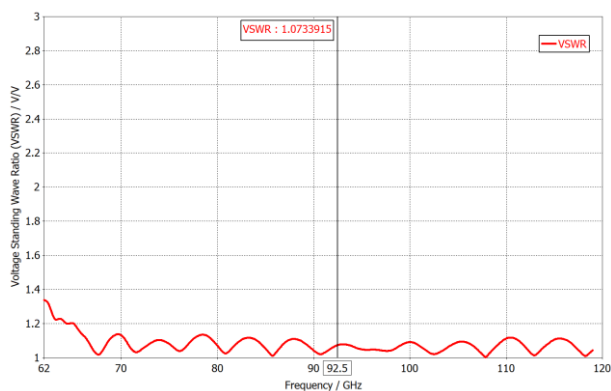
VSWR of the R&S®SGH90G25 standard gain horn antenna (nom.)

R&S®SGH110G20 standard gain horn antenna, 75 GHz to 110 GHz

| | | |
|-----------------------------|---|--------------------------------------|
| Frequency range | | 75 GHz to 110 GHz |
| VSWR | | < 1.15 (nom.) |
| Polarization | | linear (nom.) |
| Gain | 92.5 GHz | 20 dBi (nom.) |
| 3 dB beamwidth | 92.5 GHz | 16° (nom.) |
| Phase center (PHC) location | on-axis offset from the antenna aperture, for the main radiation beam at 92.5 GHz | 4 mm (nom.) |
| Antenna port | | WM-2540 (WR10) waveguide |
| Outer dimensions | L x D | 30 mm x 19 mm (1.18 in x 0.75 in) |



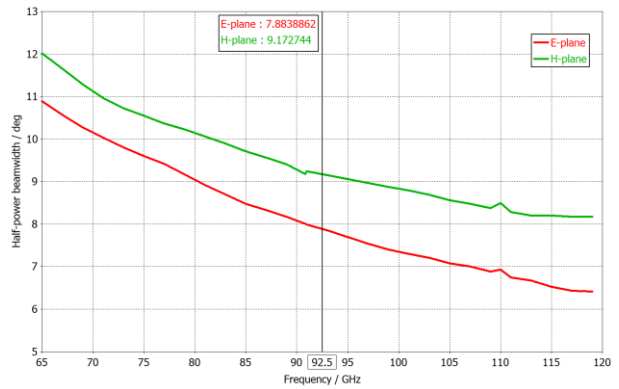
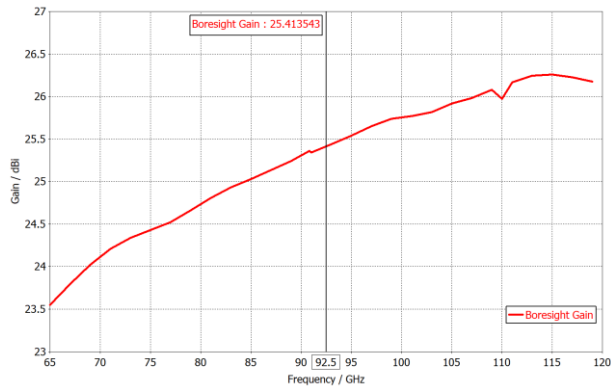
Boresight gain and half-power beamwidth of the R&S®SGH110G20 standard gain horn antenna (nom.)



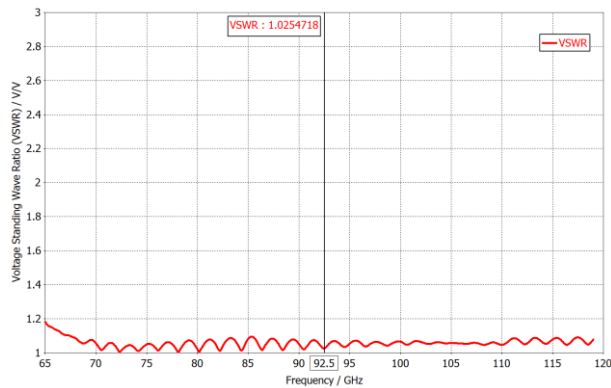
VSWR of the R&S®SGH110G20 standard gain horn antenna (nom.)

R&S®SGH110G25 standard gain horn antenna, 75 GHz to 110 GHz

| | | |
|-----------------------------|--|--|
| Frequency range | | 75 GHz to 110 GHz |
| VSWR | | < 1.1 (nom.) |
| Polarization | | linear (nom.) |
| Gain | 92.5 GHz | 25 dBi (nom.) |
| 3 dB beamwidth | 92.5 GHz | 8° (nom.) |
| Phase center (PHC) location | on-axis offset from the antenna aperture, for the main radiation beam at 92.5 GHz | 45 mm (nom.) |
| Antenna port | | WM-2540 (WR10) waveguide |
| Outer dimensions | L x W x H | 68 mm x 28.6 mm x 22.4 mm (2.68 in x 1.13 in x 0.88 in) |



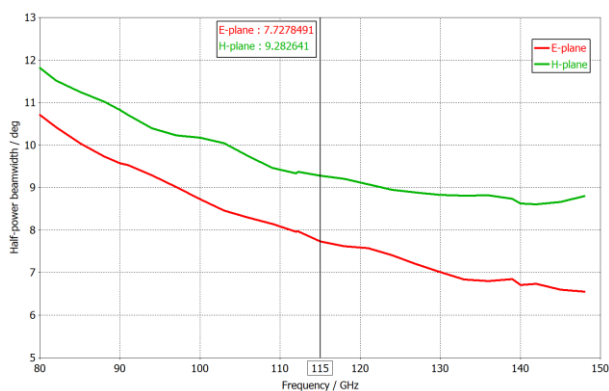
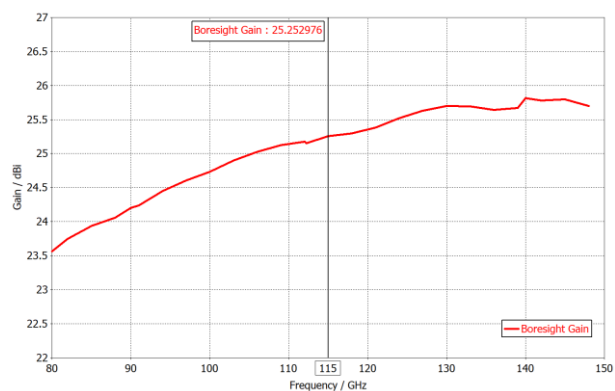
Boresight gain and half-power beamwidth of the R&S®SGH110G25 standard gain horn antenna (nom.)



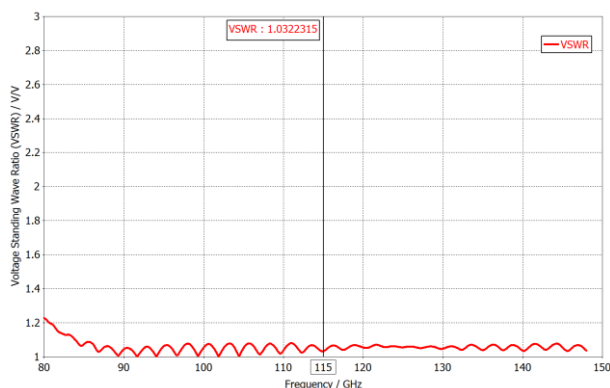
VSWR of the R&S®SGH110G25 standard gain horn antenna (nom.)

R&S®SGH140G25 standard gain horn antenna, 90 GHz to 140 GHz

| | | |
|-----------------------------|--|--|
| Frequency range | | 90 GHz to 140 GHz |
| VSWR | | < 1.1 (nom.) |
| Polarization | | linear (nom.) |
| Gain | 115 GHz | 25 dBi (nom.) |
| 3 dB beamwidth | 115 GHz | 8° (nom.) |
| Phase center (PHC) location | on-axis offset from the antenna aperture, for the main radiation beam at 115 GHz | 42 mm (nom.) |
| Antenna port | | WM-2032 (WR8) waveguide |
| Outer dimensions | L × W × H | 54 mm × 23.8 mm × 18.5 mm (2.13 in × 0.94 in × 0.73 in) |



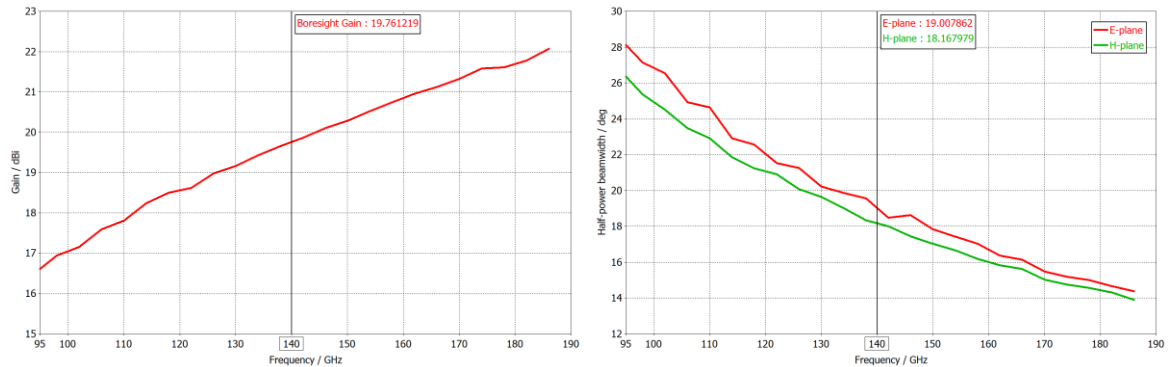
Bore-sight gain and half-power beamwidth of the R&S®SGH140G25 standard gain horn antenna (nom.)



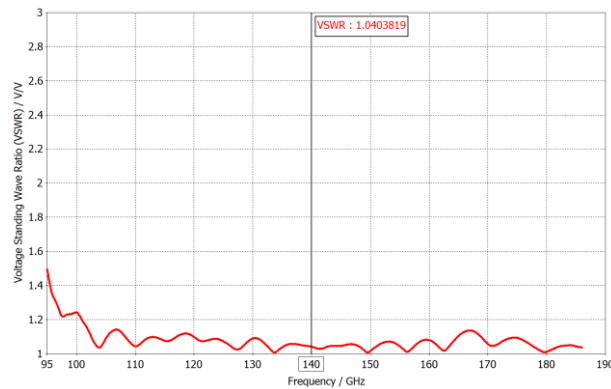
VSWR of the R&S®SGH140G25 standard gain horn antenna (nom.)

R&S®SGH170G20 standard gain horn antenna, 110 GHz to 170 GHz

| | | |
|-----------------------------|--|--------------------------------------|
| Frequency range | | 110 GHz to 170 GHz |
| VSWR | | < 1.15 (nom.) |
| Polarization | | linear (nom.) |
| Gain | 140 GHz | 20 dBi (nom.) |
| 3 dB beamwidth | 140 GHz | 18° (nom.) |
| Phase center (PHC) location | on-axis offset from the antenna aperture, for the main radiation beam at 140 GHz | 2 mm (nom.) |
| Antenna port | | WM-1651 (WR6.5) waveguide |
| Outer dimensions | L x D | 21 mm x 19 mm (0.83 in x 0.75 in) |



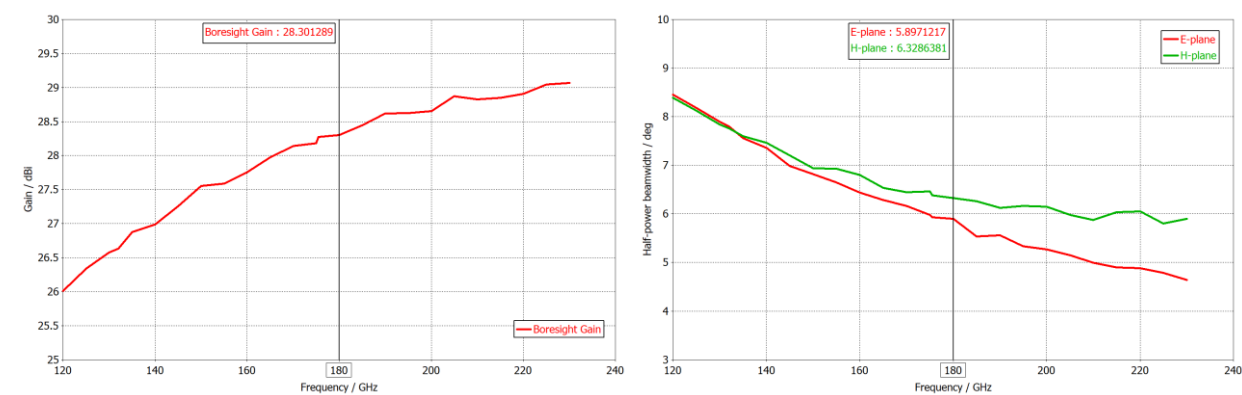
Boresight gain and half-power beamwidth of the R&S®SGH170G20 standard gain horn antenna (nom.)



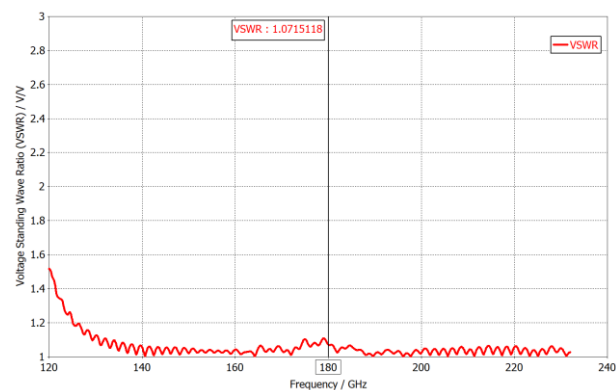
VSWR of the R&S®SGH170G20 standard gain horn antenna (nom.)

R&S®SGH220G28 standard gain horn antenna, 140 GHz to 220 GHz

| | | |
|-----------------------------|--|--|
| Frequency range | | 140 GHz to 220 GHz |
| VSWR | | < 1.12 (nom.) |
| Polarization | | linear (nom.) |
| Gain | 180 GHz | 28 dBi (nom.) |
| 3 dB beamwidth | 180 GHz | 6° (nom.) |
| Phase center (PHC) location | on-axis offset from the antenna aperture, for the main radiation beam at 180 GHz | 47 mm (nom.) |
| Antenna port | | WM-1295 (WR5.1) waveguide |
| Outer dimensions | L x W x H | 75 mm x 22.6 mm x 15.6 mm (2.95 in x 0.89 in x 0.61 in) |



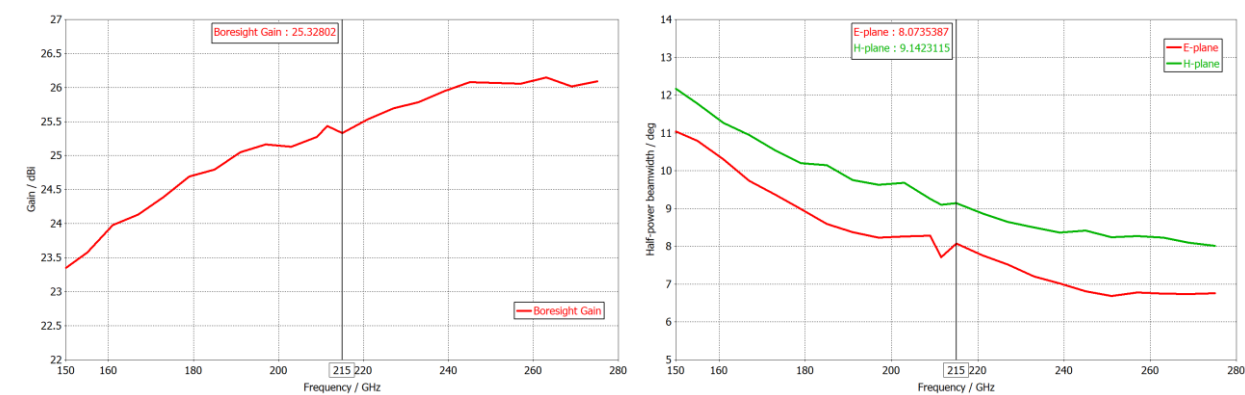
Bore-sight gain and half-power beamwidth of the R&S®SGH220G28 standard gain horn antenna (nom.)



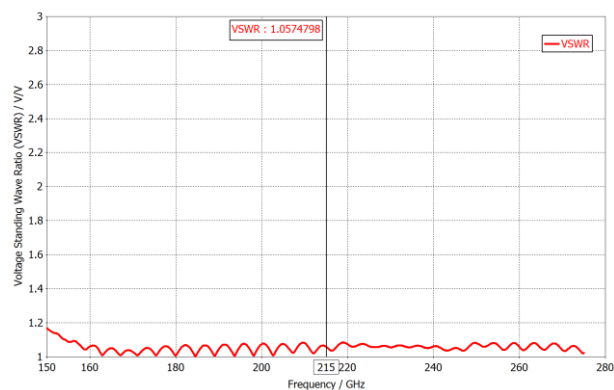
VSWR of the R&S®SGH220G28 standard gain horn antenna (nom.)

R&S®SGH260G25 standard gain horn antenna, 170 GHz to 260 GHz

| | | |
|-----------------------------|--|--------------------------------------|
| Frequency range | | 170 GHz to 260 GHz |
| VSWR | | < 1.1 (nom.) |
| Polarization | | linear (nom.) |
| Gain | 215 GHz | 25 dBi (nom.) |
| 3 dB beamwidth | 215 GHz | 9° (nom.) |
| Phase center (PHC) location | on-axis offset from the antenna aperture, for the main radiation beam at 215 GHz | 19 mm (nom.) |
| Antenna port | | WM-1092 (WR4.3) waveguide |
| Outer dimensions | L x D | 31 mm x 19 mm (1.22 in x 0.75 in) |



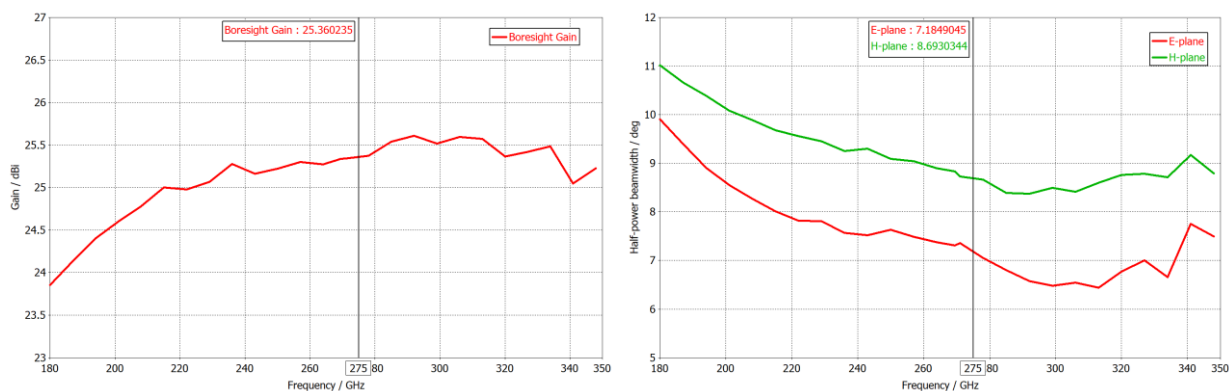
Boresight gain and half-power beamwidth of the R&S®SGH260G25 standard gain horn antenna (nom.)



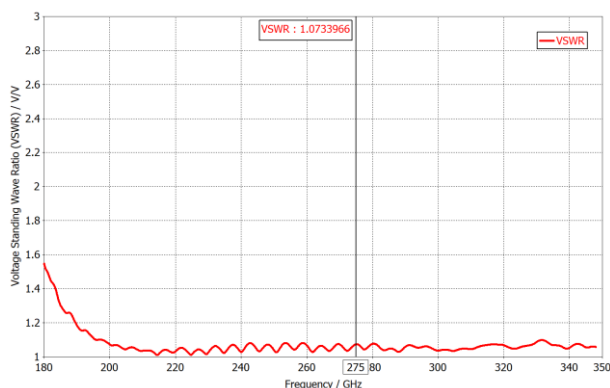
VSWR of the R&S®SGH260G25 standard gain horn antenna (nom.)

R&S®SGH330G25 standard gain horn antenna, 220 GHz to 330 GHz

| | | |
|-----------------------------|---|--|
| Frequency range | | 220 GHz to 330 GHz |
| VSWR | | < 1.1 (nom.) |
| Polarization | | linear (nom.) |
| Gain | 275 GHz | 25 dBi (nom.) |
| 3 dB beamwidth | 275 GHz | 8° (nom.) |
| Phase center (PHC) location | on-axis offset from the antenna aperture, for the main radiation beam at 275 GHz | 27 mm (nom.) |
| Antenna port | | WM-864 (WR3.4) waveguide |
| Outer dimensions | L x D | 26.5 mm x 19 mm (1.04 in x 0.75 in) |



Boresight gain and half-power beamwidth of the R&S®SGH330G25 standard gain horn antenna (nom.)



VSWR of the R&S®SGH330G25 standard gain horn antenna (nom.)

General data

| | | |
|---------------------------------|------------|--|
| Environmental conditions | | |
| Temperature range | operating | +5 °C to +35 °C |
| | storage | –25 °C to +70 °C |
| Damp heat | | +30 °C, 70 % rel. humidity, const., in line with EN 60068-2-78 |
| Mechanical resistance | | |
| Vibration | sinusoidal | 5 Hz to 55 Hz, 0.3 mm double amplitude, 55 Hz to 150 Hz, 0.5 g const., in line with EN 60068-2-6 |
| | random | 8 Hz to 500 Hz, acceleration: 1.2 g RMS, in line with EN 60068-2-64 |
| Shock | | 45 Hz to 2000 Hz: max. 40 g, in line with MIL-STD-810, method 516, procedure I |

Ordering information

| Designation | Type | Order No. |
|---|----------------|--------------|
| Radiated spurious emission (RSE) test system | R&S®TS8996 | 1119.4544.02 |
| Main components | | |
| Signal conditioning unit, 30 MHz to 18 GHz | R&S®OSP-B155G | 1515.5640.06 |
| Rack mounting kit for notch filter | R&S®FILTMOUNT1 | 1535.7754.02 |
| Signal conditioning unit, 1 GHz to 18 GHz | R&S®TS-PRE2 | 1507.3287.32 |
| Signal conditioning unit, 18 GHz to 40 GHz (extendable to 50 GHz with R&S®TS-PRE-B1) | R&S®TS-PRE1850 | 1538.5898.02 |
| Preamplifier with horn antenna, 18 GHz to 40 GHz (extendable to 50 GHz with R&S®TS-PRE-B1) | R&S®TS-LNA1840 | 1536.6100.04 |
| Antenna, 40 GHz to 50 GHz, for R&S®TS-PRE1850 | R&S®TS-PRE-B1 | 1538.5975.02 |
| Link amplifier for RSE measurements | R&S®TS-LINK | 1536.6000.03 |
| Control cable set for R&S®TS-PRE2 | R&S®TS-CS96PRE | 1544.4702.02 |
| Control cable set for R&S®TS-LINK | R&S®TS-CS96LIN | 1544.4690.02 |
| RF cable set for R&S®TS8996 RSE rack, 18 GHz, 1 × 1 m N (m) to SMA (m), 2 × 3 m N (m) to N (m) | R&S®TS-CS96RA | 1544.4725.02 |
| RF cable set for R&S®TS8996 RSE filter, 18 GHz, 2 × 1.5 m N (m) to SMA (m) | R&S®TS-CS96FIL | 1544.4731.02 |
| Receive units | | |
| 41 GHz to 60 GHz | R&S®TC-RSE60 | 1538.5700.02 |
| 60 GHz to 90 GHz | R&S®TC-RSE90 | 1538.5717.03 |
| 60 GHz to 93 GHz | R&S®TC-RSE90 | 1538.5717.02 |
| 90 GHz to 145 GHz | R&S®TC-RSE140 | 1538.5723.02 |
| 145 GHz to 220 GHz | R&S®TC-RSE220 | 1538.5930.02 |
| 220 GHz to 325 GHz | R&S®TC-RSE325 | 1538.5952.02 |
| Multiplier units | | |
| 40 GHz to 60 GHz | R&S®TC-MX60 | 1538.5746.02 |
| 60 GHz to 90 GHz | R&S®TC-MX90 | 1538.5752.03 |
| 60 GHz to 93 GHz | R&S®TC-MX90 | 1538.5752.02 |
| 90 GHz to 138 GHz | R&S®TC-MX140 | 1538.5769.02 |
| 138 GHz to 220 GHz | R&S®TC-MX220 | 1538.5775.02 |
| 220 GHz to 325 GHz | R&S®TC-MX325 | 1538.5946.02 |
| Adapter for up to 4 receive units, for Maturo EAP positioner | R&S®TC-RSEPOS | 1538.5781.02 |
| Tripod adapter for R&S®TC-RSE receive units, with manual polarization control | R&S®TC-RSESGL | 1538.5798.02 |
| Tripod adapter, for R&S®TC-RSE receive units | R&S®TC-RSEADP | 1538.5917.02 |
| Laser kit, for adjustment of R&S®TC-RSE receive units and R&S®TC-MX multiplier units | R&S®TC-RSELAS | 1538.5923.02 |
| Horn antennas | | |
| Double rigid horn antenna, 18 GHz to 40 GHz, 2.92 mm | R&S®DRH40G20K | 1538.5969.03 |
| Standard gain horn antenna, 40 GHz to 60 GHz, WR19 | R&S®SGH60G25 | 1538.5800.03 |
| Standard gain horn antenna, 40 GHz to 60 GHz, 1.85 mm | R&S®SGH60G25V | 1538.5981.03 |
| Standard gain horn antenna, 50 GHz to 75 GHz, WR15 | R&S®SGH75G20 | 1538.6065.02 |
| Standard gain horn antenna, 60 GHz to 90 GHz, WR12 | R&S®SGH90G25 | 1538.5817.03 |
| Standard gain horn antenna, 75 GHz to 110 GHz, WR10 | R&S®SGH110G20 | 1537.3262.02 |
| Standard gain horn antenna, 75 GHz to 110 GHz, WR10 | R&S®SGH110G25 | 1538.5852.03 |
| Standard gain horn antenna, 90 GHz to 140 GHz, WR8 | R&S®SGH140G25 | 1538.5823.03 |
| Standard gain horn antenna, 110 GHz to 170 GHz, WR6.5 | R&S®SGH170G20 | 1537.3327.02 |
| Standard gain horn antenna, 140 GHz to 220 GHz, WR5.1 | R&S®SGH220G28 | 1538.5830.03 |
| Standard gain horn antenna, 170 GHz to 260 GHz, WR4.3 | R&S®SGH260G25 | 1538.5881.03 |
| Standard gain horn antenna, 220 GHz to 330 GHz, WR3.4 | R&S®SGH330G25 | 1538.5875.03 |
| Documentation | | |
| R&S®TC-RSE60 accredited calibration | R&S®ACATCRSE60 | 3599.0299.03 |
| R&S®TC-RSE90 accredited calibration | R&S®ACATCRSE90 | 3599.0301.03 |
| R&S®TC-MX60 accredited calibration | R&S®ACATCMX60 | 3599.0247.03 |
| R&S®TC-MX90 accredited calibration | R&S®ACATCMX90 | 3599.0253.03 |

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