# R&S®ZV-Z5x Calibration Units

R&S®ZV-Z52
R&S®ZV-Z53
R&S®ZV-Z54
R&S®ZV-Z55
R&S®ZV-Z58
R&S®ZV-Z59


Specifications | Version 12.00

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# Definitions

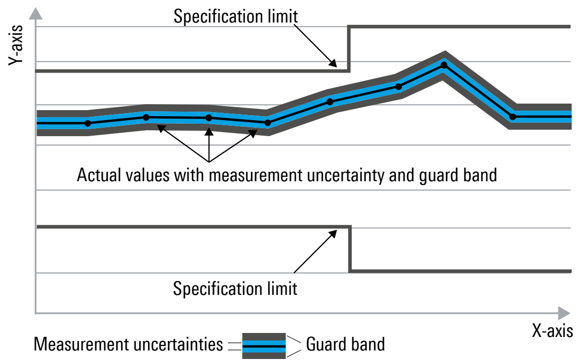
**General**

Product data applies under the following conditions:

- Three hours of storage at ambient temperature followed by 30 minutes of 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 <, ≤, >, ≥, ±, 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.

Specifications apply under the following conditions:
Sufficient warm-up time (approx. 15 minutes) at ambient temperature, specified environmental conditions met, calibration cycle adhered to, and all internal calibrations and characterizations performed. Data designated ”overrange“ and data without tolerance limits is not binding.

# Measurement range

| | | |
|---|---|---|
| Impedance | | 50 Ω or 75 Ω |
| Calibration port connector type | R&S®ZV-Z52 | type N (50 Ω), female or 3.5 mm, female |
| | R&S®ZV-Z53 | type N (50 Ω or 75 Ω), female or 3.5 mm, female |
| | R&S®ZV-Z54 | 2.92 mm, female |
| | R&S®ZV-Z55 | 2.4 mm, female |
| | R&S®ZV-Z58 | type N (50 Ω), female or 3.5 mm, female |
| | R&S®ZV-Z59 | 3.5 mm, female |
| Number of calibration ports | R&S®ZV-Z52 | 4 |
| | R&S®ZV-Z53 | 2 |
| | R&S®ZV-Z54 | 2 |
| | R&S®ZV-Z55 | 2 |
| | R&S®ZV-Z58 | 8 |
| | R&S®ZV-Z59 | 6 |
| Frequency range | R&S®ZV-Z52, model .30 | 10 MHz to 24 GHz |
| | R&S®ZV-Z52, model .70 | 100 kHz to 18 GHz |
| | R&S®ZV-Z53 | 300 kHz to 3 GHz, 18 GHz or 24 GHz |
| | R&S®ZV-Z54 | 10 MHz to 40 GHz |
| | R&S®ZV-Z55 | 10 MHz to 50 GHz |
| | R&S®ZV-Z58 | 300 kHz to 8 GHz |
| | R&S®ZV-Z59 | 10 MHz to 20 GHz |

| | | |
|---|---|---|
| Calibration time | 4 ports | |
| | 201 points, 1 kHz bandwidth | 27 s |
| | 401 points, 1 kHz bandwidth | 34 s |
| | 201 points, 100 Hz bandwidth | 67 s |
| | 8 ports | |
| | 201 points, 1 kHz bandwidth | 84 s |
| | 401 points, 1 kHz bandwidth | 115 s |
| | 201 points, 100 Hz bandwidth | 210 s |
| Nominal input level range | | –45 dBm to +20 dBm |
| Damage level | R&S®ZV-Z52 | +23 dBm |
| | R&S®ZV-Z53 | +23 dBm |
| | R&S®ZV-Z54 | +20 dBm |
| | R&S®ZV-Z55 | +20 dBm |
| | R&S®ZV-Z58 | +23 dBm |
| | R&S®ZV-Z59 | +23 dBm |
| Damage DC voltage | R&S®ZV-Z52 | 12 V |
| | R&S®ZV-Z53 | 12 V |
| | R&S®ZV-Z54 | 0 V |
| | R&S®ZV-Z55 | 0 V |
| | R&S®ZV-Z58 | 12 V |
| | R&S®ZV-Z59 | 12 V |

# Effective system data of the R&S®ZV-Z52 (model .30)

This data is valid between +18 °C and +28 °C, at a measurement bandwidth of 10 Hz, and a nominal power of –10 dBm at the calibration ports.

| | | |
|---|---|---|
| Directivity | 10 MHz to 700 MHz | > 36 dB |
| | 700 MHz to 8 GHz | > 40 dB |
| | 8 GHz to 20 GHz | > 36 dB |
| | 20 GHz to 24 GHz | > 32 dB |
| Source match | 10 MHz to 700 MHz | > 30 dB |
| | 700 MHz to 8 GHz | > 36 dB |
| | 8 GHz to 18 GHz | > 30 dB |
| | 18 GHz to 24 GHz | > 26 dB |
| Reflection tracking | 10 MHz to 700 MHz | < 0.2 dB |
| | 700 MHz to 8 GHz | < 0.1 dB |
| | 8 GHz to 24 GHz | < 0.15 dB |
| Load match | 10 MHz to 700 MHz | > 36 dB |
| | 700 MHz to 8 GHz | > 40 dB |
| | 8 GHz to 20 GHz | > 36 dB |
| | 20 GHz to 24 GHz | > 32 dB |
| Transmission tracking | 10 MHz to 700 MHz | < 0.2 dB |
| | 700 MHz to 24 GHz | < 0.15 dB |

# Effective system data of the R&S®ZV-Z52 (model .70)

This data is valid between +18 °C and +28 °C, at a measurement bandwidth of 10 Hz, and a nominal power of –10 dBm at the calibration ports.

| | | |
|---|---|---|
| Directivity | 100 kHz to 10 MHz | > 36 dB |
| | 10 MHz to 8 GHz | > 40 dB |
| | 8 GHz to 18 GHz | > 36 dB |
| Source match | 100 kHz to 10 MHz | > 30 dB |
| | 10 MHz to 8 GHz | > 36 dB |
| | 8 GHz to 18 GHz | > 30 dB |
| Reflection tracking | 100 kHz to 10 MHz | < 0.2 dB |
| | 10 MHz to 8 GHz | < 0.1 dB |
| | 8 GHz to 18 GHz | < 0.15 dB |
| Load match | 100 kHz to 10 MHz | > 36 dB |
| | 10 MHz to 8 GHz | > 40 dB |
| | 8 GHz to 18 GHz | > 36 dB |
| Transmission tracking | 100 kHz to 10 MHz | < 0.2 dB |
| | 10 MHz to 8 GHz | < 0.1 dB |
| | 8 GHz to 18 GHz | < 0.15 dB |

# Effective system data of the R&S®ZV-Z53 (50 Ω)

This data is valid between +18 °C and +28 °C, at a measurement bandwidth of 10 Hz, and a nominal power of –10 dBm at the calibration ports.

| | | |
|---|---|---|
| Directivity | 300 kHz to 10 MHz | > 40 dB |
| | 10 MHz to 4 GHz | > 46 dB |
| | 4 GHz to 8 GHz | > 40 dB |
| | 8 GHz to 18 GHz | > 36 dB |
| | 18 GHz to 20 GHz (3.5 mm only) | > 36 dB |
| | 20 GHz to 24 GHz (3.5 mm only) | > 32 dB |
| Source match | 300 kHz to 10 MHz | > 23 dB |
| | 10 MHz to 4 GHz | > 40 dB |
| | 4 GHz to 8 GHz | > 36 dB |
| | 8 GHz to 18 GHz | > 30 dB |
| | 18 GHz to 24 GHz (3.5 mm only) | > 26 dB |
| Reflection tracking | 300 kHz to 10 MHz | < 0.1 dB |
| | 10 MHz to 4 GHz | < 0.04 dB |
| | 4 GHz to 8 GHz | < 0.1 dB |
| | 8 GHz to 18 GHz | < 0.3 dB |
| | 18 GHz to 24 GHz (3.5 mm only) | < 0.3 dB |
| Load match | 300 kHz to 10 MHz | > 40 dB |
| | 10 MHz to 4 GHz | > 46 dB |
| | 4 GHz to 8 GHz | > 40 dB |
| | 8 GHz to 18 GHz | > 36 dB |
| | 18 GHz to 20 GHz (3.5 mm only) | > 36 dB |
| | 20 GHz to 24 GHz (3.5 mm only) | > 32 dB |

| | | |
|---|---|---|
| Transmission tracking | 300 kHz to 10 MHz | < 0.2 dB |
| | 10 MHz to 4 GHz | < 0.06 dB |
| | 4 GHz to 8 GHz | < 0.1 dB |
| | 8 GHz to 18 GHz | < 0.3 dB |
| | 18 GHz to 24 GHz (3.5 mm only) | < 0.3 dB |

# Effective system data of the R&S®ZV-Z53 (75 Ω)

This data is valid between +18 °C and +28 °C, at a measurement bandwidth of 10 Hz, and a nominal power of –10 dBm at the calibration ports.

| | | |
|---|---|---|
| Directivity | 300 kHz to 10 MHz | > 36 dB |
| | 10 MHz to 3 GHz | > 40 dB |
| Source match | 300 kHz to 10 MHz | > 23 dB |
| | 10 MHz to 3 GHz | > 33 dB |
| Reflection tracking | 300 kHz to 10 MHz | < 0.2 dB |
| | 10 MHz to 3 GHz | < 0.1 dB |
| Load match | 300 kHz to 10 MHz | > 33 dB |
| | 10 MHz to 3 GHz | > 36 dB |
| Transmission tracking | 300 kHz to 10 MHz | < 0.2 dB |
| | 10 MHz to 3 GHz | < 0.1 dB |

# Effective system data of the R&S®ZV-Z54

This data is valid between +18 °C and +28 °C, at a measurement bandwidth of 10 Hz, and a nominal power of –10 dBm at the calibration ports.

| | | |
|---|---|---|
| Directivity | 10 MHz to 20 GHz | > 36 dB |
| | 20 GHz to 40 GHz | > 30 dB |
| Source match | 10 MHz to 700 MHz | > 30 dB |
| | 700 MHz to 20 GHz | > 34 dB |
| | 20 GHz to 40 GHz | > 30 dB |
| Reflection tracking | 10 MHz to 700 MHz | < 0.15 dB |
| | 700 MHz to 8 GHz | < 0.1 dB |
| | 8 GHz to 40 GHz | < 0.15 dB |
| Load match | 10 MHz to 20 GHz | > 36 dB |
| | 20 GHz to 40 GHz | > 30 dB |
| Transmission tracking | 10 MHz to 700 MHz | < 0.15 dB |
| | 700 MHz to 8 GHz | < 0.1 dB |
| | 8 GHz to 40 GHz | < 0.15 dB |

# Effective system data of the R&S®ZV-Z55

This data is valid between +18 °C and +28 °C, at a measurement bandwidth of 10 Hz, and a nominal power of –10 dBm at the calibration ports.

| | | |
|---|---|---|
| Directivity | 10 MHz to 20 GHz | > 36 dB |
| | 20 GHz to 40 GHz | > 30 dB |
| | 40 GHz to 50 GHz | > 26 dB |
| Source match | 10 MHz to 700 MHz | > 30 dB |
| | 700 MHz to 20 GHz | > 34 dB |
| | 20 GHz to 40 GHz | > 30 dB |
| | 40 GHz to 50 GHz | > 26 dB |
| Reflection tracking | 10 MHz to 700 MHz | < 0.15 dB |
| | 700 MHz to 8 GHz | < 0.1 dB |
| | 8 GHz to 40 GHz | < 0.15 dB |
| | 40 GHz to 50 GHz | < 0.2 dB |
| Load match | 10 MHz to 20 GHz | > 36 dB |
| | 20 GHz to 40 GHz | > 30 dB |
| | 40 GHz to 50 GHz | > 26 dB |
| Transmission tracking | 10 MHz to 700 MHz | < 0.15 dB |
| | 700 MHz to 8 GHz | < 0.1 dB |
| | 8 GHz to 40 GHz | < 0.15 dB |
| | 40 GHz to 50 GHz | < 0.2 dB |

# Effective system data of the R&S®ZV-Z58

This data is valid between +18 °C and +28 °C, at a measurement bandwidth of 10 Hz, and a nominal power of –10 dBm at the calibration ports.

| | | |
|---|---|---|
| Directivity | 300 kHz to 4 GHz | > 40 dB |
| | 4 GHz to 8 GHz | > 36 dB |
| Source match | 300 kHz to 10 MHz | > 23 dB |
| | 10 MHz to 4 GHz | > 36 dB |
| | 4 GHz to 8 GHz | > 32 dB |
| Reflection tracking | 300 kHz to 4 GHz | < 0.1 dB |
| | 4 GHz to 8 GHz | < 0.2 dB |
| Load match | 300 kHz to 4 GHz | > 40 dB |
| | 4 GHz to 8 GHz | > 36 dB |
| Transmission tracking | 300 kHz to 10 MHz | < 0.2 dB |
| | 10 MHz to 4 GHz | < 0.15 dB |
| | 4 GHz to 8 GHz | < 0.3 dB |

# Effective system data of the R&S®ZV-Z59

This data is valid between +18 °C and +28 °C, at a measurement bandwidth of 10 Hz, and a nominal power of –10 dBm at the calibration ports.

| | | |
|---|---|---|
| Directivity | 10 MHz to 700 MHz, for the R&S®ZVT8 | > 34 dB |
| | 10 MHz to 700 MHz, for the R&S®ZVT20 | > 34 dB |
| | 700 MHz to 8 GHz | > 38 dB |
| | 8 GHz to 20 GHz | > 32 dB |
| Source match | 10 MHz to 700 MHz, for the R&S®ZVT8 | > 28 dB |
| | 10 MHz to 700 MHz, for the R&S®ZVT20 | > 28 dB |
| | 700 MHz to 8 GHz | > 34 dB |
| | 8 GHz to 20 GHz | > 28 dB |
| Reflection tracking | 10 MHz to 700 MHz, for the R&S®ZVT8 | < 0.3 dB |
| | 10 MHz to 700 MHz, for the R&S®ZVT20 | < 0.3 dB |
| | 700 MHz to 8 GHz | < 0.2 dB |
| | 8 GHz to 20 GHz | < 0.3 dB |
| Load match | 10 MHz to 700 MHz | > 34 dB |
| | 700 MHz to 8 GHz | > 38 dB |
| | 8 GHz to 20 GHz | > 34 dB |
| Transmission tracking | 10 MHz to 700 MHz | < 0.3 dB |
| | 700 MHz to 8 GHz | < 0.2 dB |
| | 8 GHz to 20 GHz | < 0.3 dB |

# USB connector

| | |
|---|---|
| USB | universal serial bus connector (type B) for connecting the calibration unit with a vector network analyzer of the R&S®ZVA/ZVB family, e.g. the R&S®ZVB8 |

# General data

| | | |
|---|---|---|
| **Environmental conditions** | | |
| Temperature loading | operating temperature range | +5 °C to +40 °C |
| | permissible temperature range | 0 °C to +50 °C |
| | storage temperature range | –40 °C to +70 °C |
| | | in line with IEC 60068-2-1 and IEC 60068-2-2 |
| Damp heat | | +40 °C at 85 % rel. humidity |
| **Mechanical resistance** | | |
| Vibration | sinusoidal | 5 Hz to 150 Hz, in line with IEC 60068-2-6 |
| | random | 8 Hz to 500 Hz, in line with IEC 60068-2-64 |
| Shock | | 40 g shock spectrum, in line with IEC 60068-2-27, MIL-STD-810 |
| **Calibration interval** | | 1 year |
| **Product conformity** | | |
| EMC, RF emission | In line with EN 61000-6-4, operation in residential, commercial, and business areas or in small-size companies is not covered. Thus, the instrument may not be operated in residential, commercial, and business areas or in small-size companies unless additional measures are taken to ensure that EN 61000-6-3 is complied with. | in line with CISPR 11/EN 55011 group 1 class A (for a shielded test setup)<br>The instrument complies with the emission requirements stipulated by EN 55011 class A. This means that the instrument is suitable for use in industrial environments. |

| | | |
|---|---|---|
| EMC, other emissions and immunity | | in line with IEC/EN 61326; emission: class A; immunity: industrial environment (excluding operating frequency) |
| Safety | only for R&S®ZV-Z58, R&S®ZV-Z59 | in line with IEC 61010-1, EN 61010-1, and UL 61010B-1, CSA C22.2 No. 61010.1 |
| EU legislation | for details, see user documentation | EU: in line with Data Act – Regulation (EU) 2023/2854 |
| **Power rating** | | |
| Power supply | R&S®ZV-Z52, R&S®ZV-Z53, R&S®ZV-Z54,R&S®ZV-Z55 | 5 V, 500 mA via universal serial bus (USB) |
| | R&S®ZV-Z58, R&S®ZV-Z59 | 100 V to 240 V (AC) with tolerance ±10 %, 50 Hz to 60 Hz with tolerance ±5 %, safety class I in line with VDE 411 |
| Power consumption | R&S®ZV-Z52, R&S®ZV-Z53, R&S®ZV-Z54, R&S®ZV-Z55 | 2.5 W |
| | R&S®ZV-Z58, R&S®ZV-Z59 | 125 W, typ. 20 W |
| **Dimensions (W × H × D)** | R&S®ZV-Z52, R&S®ZV-Z53, R&S®ZV-Z54, R&S®ZV-Z55 | 121.0 mm × 56.0 mm × 155.0 mm (4.8 in × 2.2 in × 6.1 in) |
| | R&S®ZV-Z58, R&S®ZV-Z59 | 465.1 mm × 108.4 mm × 350.0 mm (18.3 in × 4.3 in × 13.8 in) |
| **Weight** | R&S®ZV-Z52, R&S®ZV-Z53, R&S®ZV-Z54, R&S®ZV-Z55 | 750 g (1.7 lb) |
| | R&S®ZV-Z58, R&S®ZV-Z59 | 5 kg (11 lb) |
| **Shipping weight** | R&S®ZV-Z52, R&S®ZV-Z53, R&S®ZV-Z54, R&S®ZV-Z55 | 3 kg (6.6 lb) |
| | R&S®ZV-Z58, R&S®ZV-Z59 | 13 kg (29 lb) |

# Ordering information

| Designation | Type | Order No. |
|---|---|---|
| Calibration unit, 10 MHz to 24 GHz, 4 ports, 3.5 mm (f) | R&S®ZV-Z52 | 1164.0521.30 |
| Calibration unit, 100 kHz to 18 GHz, 4 ports, type N (f) | R&S®ZV-Z52 | 1164.0521.70 |
| Calibration unit, 300 kHz to 3 GHz, 2 ports, type N (f), 75 Ω | R&S®ZV-Z53 | 1164.0473.75 |
| Calibration unit, 300 kHz to 18 GHz, 2 ports, type N (f) | R&S®ZV-Z53 | 1164.0473.72 |
| Calibration unit, 300 kHz to 24 GHz, 2 ports, 3.5 mm (f) | R&S®ZV-Z53 | 1164.0473.32 |
| Calibration unit, 10 MHz to 40 GHz, 2 ports, 2.92 mm (f) | R&S®ZV-Z54 | 1164.0467.92 |
| Calibration unit, 10 MHz to 50 GHz, 2 ports, 2.4 mm (f) | R&S®ZV-Z55 | 1164.0480.42 |
| Calibration unit, 300 kHz to 8 GHz, 8 ports, type N (f) | R&S®ZV-Z58 | 1164.0638.78 |
| Calibration unit, 300 kHz to 8 GHz, 8 ports, 3.5 mm (f) | R&S®ZV-Z58 | 1164.0638.38 |
| Calibration unit, 10 MHz to 20 GHz, 6 ports, 3.5 mm (f) | R&S®ZV-Z59 | 1164.0450.36 |

## Options

| Designation | Type | Order No. |
|---|---|---|
| Accredited calibration for<br>R&S®ZV-Z52 | ZVZ52-ACA | 1319.5820.02 |
| Accredited calibration for<br>R&S®ZV-Z53 model .32 and .72, R&S®ZV-Z54, R&S®ZV-Z55 | ZVZ53-ACA | 1319.5836.02 |
| Accredited calibration for<br>R&S®ZV-Z58, R&S®ZV-Z59 | ZVZ58-ACA | 1319.5842.02 |

# Warranty and service

| | | |
|---|---|---|
| **Warranty** | | |
| Base unit | | 1 year |
| All other items | | 1 year |
| **Service options** | | |
| | **Service plans** | **On demand** |
| Calibration | up to five years [1] | pay per calibration |
| Warranty and repair | up to five years [1] | standard price repair |
| Contact your Rohde & Schwarz sales office for further details. | | |

[1] For extended periods, contact your Rohde & Schwarz sales office.

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- ► Local and personalized
- ► 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

Certified Environmental Management
ISO 14001



PD 0758.2554.22 | Version 12.00 | October 2025 (la)
R&S®ZV-Z5x Calibration Units
Data without tolerance limits is not binding | Subject to change